

TRAK[®] 3ntr 3D Printers

Printer and MMS - Installation & Printing Manual

Document:	P/N 32240
Version:	060721

Covers Current Models:

- **3ntr A2v4**
- **3ntr A4v4**
- **MMS v2**

TRAK MACHINE TOOLS



SOUTHWESTERN INDUSTRIES, INC.

2615 Homestead Place

Rancho Dominguez, CA 90220-5610 USA

T | 310.608.4422 | F | 310.764.2668

Service Department: 800.367.3165

e-mail: sales@trakmt.com | service@trakmt.com | web: www.trakmt.com

Copyright © 2021, Southwestern Industries, Inc. All rights are reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, mechanical, photocopying, recording or otherwise, without the prior written permission of Southwestern Industries, Inc.

While every effort has been made to include all the information required for the purposes of this guide, Southwestern Industries, Inc. assumes no responsibility for inaccuracies or omission and accepts no liability for damages resulting from the use of the information contained in this guide.

All brand names and products are trademarks or registered trademarks of their respective holders.

Southwestern Industries, Inc.
2615 Homestead Place
Rancho Dominguez, CA 90220
Phone 310-608-4422 Fax 310-764-2668
Service Department
Phone 800-367-3165 Fax 310-886-8029

Table of Contents

Table of Contents	i
Machine Model & Serial Number	1
SSI & KISSlicer Product Keys.....	1
Buytrakparts.com Login Credentials	1
1.0 Safety Specifications	2
1.1 Safety Publications.....	2
1.2 Safety Labels & Notices as Used in this Manual.....	2
1.3 Safety Precautions	3
2.0 3ntr Installation & Training Checklist	4
3.0 Site Preparation & Requirements.....	8
3.1 Machine Specifications	8
3.1.1 Build Volume Configurations	9
3.1.1.1 A2v4.....	9
3.1.1.2 A4v4.....	9
3.2 PC Requirements for Slicers.....	9
3.3 Floor Plan, Layout & Space Requirements	10
3.3.1 A2 Printer	10
3.3.2 A4 Printer	11
3.3.3 Material Management System (MMS)	12
3.4 Electrical Requirements	13
4.0 Installation Process.....	14
4.1 Lifting, Moving, Uncrating and Unpacking.....	14
4.1.1 Lifting/Moving before Uncrating	14
4.1.2 Unpacking	14
4.1.3 Lifting/Moving after Uncrating.....	14
4.2 General Packing List.....	15
4.3 A2/A4 3ntr 3D Printers.....	16
4.3.1 Orientation, Controls & Functions.....	16
4.3.1.1 Front View.....	17
4.3.1.2 Rear View.....	19
4.3.1.3 Internal View.....	22
4.3.2 Installing the Spool Holder to the Back of the Printer	23
4.3.3 Connecting the Cables, Powering ON (PRINTER ONLY)	24
4.3.4 LCD Display Overview	25
4.3.5 Operation Checks.....	27
4.3.5.1 Preheat Bed.....	27
4.3.5.2 Preheat Chamber	27
4.3.5.3 Auto-Home.....	27
4.3.5.4 Cooldown	28
4.3.5.5 Move Axis.....	28
4.3.5.6 Disable Steppers	28
4.4 Raspberry Pi Print Server	29
4.4.1 Orientation, Controls & Functions.....	29
4.4.1.1 Front View.....	29
4.4.1.2 Side View	29
4.4.1.3 Rear / Bottom View	30
4.4.2 Connecting the Cables, Powering ON	30

4.5	External HEPA Filter	33
4.5.1	Orientation, Connecting the Cables & Powering ON	33
4.5.2	Placement	34
4.6	Material Management System (MMS)	35
4.6.1	Orientation, Controls & Functions.....	35
4.6.1.1	Front View & Side View.....	35
4.6.1.2	Rear View.....	37
4.6.1.3	Inside View	39
4.6.2	Installing Desiccant Cannister Holders	40
4.6.3	Installing Strain Relief Flex Collars & Bowden Tubes.....	41
4.6.4	Connecting the HEPA Filter Tube.....	42
4.6.5	Connecting the Cables, Powering ON	42
4.6.6	LCD Display and Menu Overview	44
4.6.7	Touch Calibration	45
4.6.8	Zeroing the cabinet.....	46
4.6.9	Calibrating the MMS	46
4.6.10	Setting the Box Temp.....	48
4.7	OnLogic Print Server	49
4.7.1	Orientation, Controls & Functions.....	49
4.7.1.1	Front View.....	49
4.7.1.2	Rear View.....	50
4.7.2	Connecting the Cables, Powering ON	50
4.8	Repetier Server Overview.....	54
4.8.1	Navigation Bar	54
4.8.2	Dashboard.....	55
4.8.3	Printer Control / Management.....	56
4.8.3.1	Print Tab	57
4.9	MMS Dashboard	58
4.9.1	MMS Summary.....	60
5.0	Printing	62
5.1	Pre-Printing Steps.....	63
5.1.1	Verify all printer maintenance is up to date.....	63
5.1.2	Verify correct file is loaded onto SD Card or Print Server	63
5.2	Material Changes	63
5.2.1	Without MMS.....	63
5.2.1.1	Changing Filament	63
5.2.1.2	Unloading Filament	66
5.2.1.3	Loading Filament.....	68
5.2.2	With MMS.....	70
5.2.2.1	Changing Filament	70
5.2.2.2	Unloading Filament	72
5.2.2.3	Loading Filament.....	74
5.2.3	Nozzle Cleaning Operation	76
5.3	Nozzle Changes	79
5.3.1	Nozzle Change Procedure	79
5.4	Basic Setup Steps	89
5.4.1	Verify Correct Material is Loaded.....	89
5.4.2	Verify Filament Quantity	89
5.4.2.1	Without an MMS	89
5.4.2.2	With an MMS	89
5.4.3	Verify Filament Feed Path is Clear	89
5.4.4	Turn HEPA Filter On	89

5.4.4.1	Without an MMS	89
5.4.4.2	With an MMS	89
5.4.5	Check the Build Plate	89
5.4.6	Purge the Nozzles	89
5.4.6.1	Purge Procedure:	90
5.5	Printing	91
5.5.1	Print from an SD Card	91
5.5.2	Print from the Print Server	91
5.5.2.1	Direct Print	91
5.5.2.2	Upload G-Code	91
5.6	Post Printing	93
5.6.1	Wait for Build Plate to cool	93
5.6.2	Wipe Build Plate with Alcohol	93
5.6.3	Turn HEPA Filter Off	93
5.7	Post Processing	93
TRAK Warranty Policy		94

Machine Model & Serial Number

The plate below is for you to write down your model and serial number. Keep this info handy for when you contact Customer Service.



Serial Number: _____

SSI & KISSlicer Product Keys

SSI Product Key #1: _____

Computer Name / Location: _____

SSI Product Key #2: _____

Computer Name / Location: _____

SSI Product Key #3: _____

Computer Name / Location: _____

KISSlicer Product Key #1: _____

Computer Name / Location: _____

KISSlicer Product Key #2: _____

Computer Name / Location: _____

KISSlicer Product Key #3: _____

Computer Name / Location: _____

Buytrakparts.com Login Credentials

Login: _____

Password: _____

1.0 Safety Specifications

The safe operation of the TRAK 3ntr 3D printer and MMS depends on its proper use and the precautions taken by each operator.

- Read and study the TRAK 3ntr 3D printer and MMS manuals. Be certain that every operator understands the operation and safety requirements of this machine **before** its use.

1.1 Safety Publications










Please note that FFF/FDM 3D printing can produce hazardous Ultra-Fine Particles (UFP's) and Volatile Organic Compounds (VOCs). Our 3ntr printers come with a HEPA Filter and enclosed print chamber to help reduce the amount of UFP and VOC's you come in contact with. Always close the print chamber door and turn on the HEPA Filter while printing.

1.2 Safety Labels & Notices as Used in this Manual

- **DANGER** - Immediate hazards that will result in severe personal injury or death.
- **WARNING** - Hazards or unsafe practices that could result in severe personal injury and/or damage to the equipment.
- **CAUTION** - Hazards or unsafe practices that could result in minor personal injury or equipment/product damage.
- **NOTE** - Call attention to specific issues requiring special attention or understanding.

Safety & Information Labels Used on the TRAK 3ntr A2 / A4

It is forbidden by OSHA regulations and by law to deface, destroy or remove any of these labels from the printers.

 Burn Hazard	 Hot Surface Hazard	 Fire Hazard
 Risk of Crush	 Crush Hazard	 Pinch Hazard
 Electromagnetic Interference Hazard	 Electrocution Hazard	 Toxic Fumes Hazard

1.3 Safety Precautions

- Before printing, make sure the HEPA Filter is connected and functioning properly, as this reduces the amount of VOC's in the air. It is highly recommended that you use the HEPA filter with the printers at all times.
- Do not run this machine without knowing the function of every control key, button, knob, or handle. Ask your supervisor or a qualified instructor for help when needed.
- The 3ntr A2 / A4 generate high temperatures and hot moving parts. Allow the printer to cool before reaching inside. The printer bed, printer surface plate, printed part, extruders/nozzles, and other printer interior components can reach very high temperatures and cause serious burns.
- Do not operate the printer with the printer door open or any of the windows or service access panels removed.
- Never reach inside of the 3ntr A2 / A4 while in operation.
- Do not lean on the machine while it is running.
- Always follow OSHA and workplace electrical safety guidelines when working with these products, as there is a static current and users should be cautious.
- Prevent slippage. Keep the work area dry and clean.
- Protect your eyes. Wear approved safety glasses (with side shields) at all times.
- Don't get caught in moving parts. Before operating this machine remove all jewelry including watches and rings, neckties, and any loose-fitting clothing.
- Keep your hair away from moving parts.
- Remove all tools (wrenches, check keys, etc.) from the machine before you start.
- The printer bed or extruder arm movement can cause a crush or pinch injury
- Make sure to remove the build plate from the chamber before spraying alcohol to clean it. Not doing so can cause fire hazards as IPA is highly inflammable and volatile.
- Turn off printer before unplugging or re-plugging feeder/extruder assembly wires
- Use E-stop button to stop printer before touching any failed parts (in case of print failure).

2.0 3ntr Installation & Training Checklist

This checklist is used by our Field Service Technicians in order to ensure that all installation steps are completed, and to ensure all in-person training topics are covered.

Day 1 – Installation

Check	Steps
	1. Site Preparation & Requirements
<input type="checkbox"/>	a. Verify Floor Plan, Layout & Space Requirements were met
<input type="checkbox"/>	b. Verify Electrical Requirements were met
<input type="checkbox"/>	i. Measure between ground on 220v circuit and on ground 110v circuit = 0v
<input type="checkbox"/>	ii. Measure between two normal phases = 208v to 240v is okay
	iii. Measure between printer chassis on ground 110v circuit = 0v
<input type="checkbox"/>	iv. Double check wiring by repeating
<input type="checkbox"/>	c. Verify PC Requirements were met
	2. Lifting, Moving, Uncrating and Unpacking
<input type="checkbox"/>	a. Lift and move the printer/MMS near the final location
<input type="checkbox"/>	b. Uncrate and unpack printer/MMS
<input type="checkbox"/>	c. Lift and move the printer/MMS after uncrating
<input type="checkbox"/>	3. Review Packing List & Report any missing items immediately <i>Write down Product ID's for SSI / KS in the Additional Comments Section.</i>
	4. Printer Installation
<input type="checkbox"/>	a. Review: Orientation, Controls and Functions
<input type="checkbox"/>	b. Install Spool Holder on the Back of the Printer
<input type="checkbox"/>	c. Connect the cables & Power ON
<input type="checkbox"/>	d. Review: LCD Display Overview
<input type="checkbox"/>	e. Complete a few Operation Checks – to verify the printer is functioning <ul style="list-style-type: none"> <input type="checkbox"/> Preheat Print Bed – just check the plate heater works <input type="checkbox"/> Cooldown – to check the fans & cooling system work <input type="checkbox"/> Move axis – always move Z down before X/Y or you might damage the plate <input type="checkbox"/> Disable Steppers - move print head around (<i>make sure z has been moved down first</i>) <input type="checkbox"/> Auto-home – verify the z sensor arm comes out

Printer Only

Check	Steps
	5. Raspberry Pi
<input type="checkbox"/>	a. Review: Orientation, Controls and Functions
<input type="checkbox"/>	b. Connect the cables & Power ON
	6. External HEPA Filter
<input type="checkbox"/>	a. Review: Orientation, Controls and Functions
<input type="checkbox"/>	b. Connect the cables & Power ON
<input type="checkbox"/>	c. Confirm filter placement

Printer with MMS

Check	Steps
	5. Material Management System (MMS)
<input type="checkbox"/>	a. Review: Orientation, Controls and Functions
<input type="checkbox"/>	a. Install Desiccant Cannister Holder
	b. Install Strain Relief Flex Collars & Bowden Tubes
	c. Connect HEPA Filter tube from Printer to MMS
<input type="checkbox"/>	d. Connect the cables & Power ON
<input type="checkbox"/>	e. Review: LCD Display Overview
<input type="checkbox"/>	f. Zero the cabinet
<input type="checkbox"/>	g. Calibrate the MMS
	6. OnLogic Print Server
<input type="checkbox"/>	a. Review: Orientation, Controls and Functions
<input type="checkbox"/>	b. Connect the cables & Power ON

Day 1 (continued...) – Training

Check	Steps
	1. Extruder Training
<input type="checkbox"/>	a. Disassemble Extruder
<input type="checkbox"/>	b. Change Nozzles
<input type="checkbox"/>	c. Assemble Extruder
<input type="checkbox"/>	d. Ensure zero gap between heat bridge and nozzle
<input type="checkbox"/>	e. Install Extruder Assembly
<input type="checkbox"/>	f. Torque nozzles – i. Hardened Nozzles - Torque while hot (use Unload Filament function)
<input type="checkbox"/>	g. Perform Z nozzle height comparison
<input type="checkbox"/>	h. Install adapter holding bracket
	i. Check extruder gains match the gains value in printer's Hardware Menu
<input type="checkbox"/>	j. Auto-home & Check for Z Nozzle Height from the Build plate using feeler gauge i. 0.4mm gap (standard for 0.4mm nozzle)
<input type="checkbox"/>	2. Load Filament
	3. Calibration Prints
<input type="checkbox"/>	a. Run Z Offset Calibration Print & save offset value
<input type="checkbox"/>	b. Run XY Calibration Print & save offset value
<input type="checkbox"/>	c. Print Cube Test (Plate leveling) – let cube print start, and move onto the next steps
	4. Slicer Training
<input type="checkbox"/>	a. Install Slicer <i>Write down Product ID's for SSI / KS in the Additional Comments Section.</i>
<input type="checkbox"/>	b. Review SSI – Easy Mode & slice part
<input type="checkbox"/>	c. Review KISSlicer – Basic Operations & slice parts <i>(if applicable)</i>
<input type="checkbox"/>	d. Add G-Code to SD Card or Print Server
	5. Follow Basic Printing Checklist

Basic Printing Checklist

Check	Steps
	1. Pre-Printing Steps
<input type="checkbox"/>	a. Verify printer maintenance is up to date
<input type="checkbox"/>	b. Verify the correct file is loaded onto SD card, or Print Server
	2. Material Changes
<input type="checkbox"/>	a. Unload / Load / Change Filament
<input type="checkbox"/>	b. Clean the Nozzles
	3. Nozzle Changes
<input type="checkbox"/>	a. Verify you are using the correct nozzle type
<input type="checkbox"/>	b. Verify you are using the correct nozzle size
	4. Basic Set up Steps
<input type="checkbox"/>	a. Verify the correct material type is loaded
<input type="checkbox"/>	b. Verify filament quantity
<input type="checkbox"/>	c. Verify the filament feed path is clear
<input type="checkbox"/>	d. Turn HEPA Filter on
<input type="checkbox"/>	e. Check the Build Plate
<input type="checkbox"/>	f. Purge the nozzles you plan to use <i>(if no material change is required)</i>
	5. Printing
<input type="checkbox"/>	a. Print Benchmark Part #1 from an SD Card or the Print Server

Day 2 – Training

Check	Steps
<input type="checkbox"/>	1. Review Printed Part from Day 1
	2. Post Printing
<input type="checkbox"/>	a. Let the print cool down & remove
<input type="checkbox"/>	b. Wipe Build Plate with alcohol
<input type="checkbox"/>	c. Turn off HEPA filter
	3. Post Processing
<input type="checkbox"/>	a. Support Removal
<input type="checkbox"/>	b. Additional Post Processing
<input type="checkbox"/>	4. Repetier Overview
	5. Following Printing Checklist for Benchmark Part # 2 <i>(if applicable)</i>

Check	Steps
	1. Pre-Printing Steps
<input type="checkbox"/>	a. Verify printer maintenance is up to date
<input type="checkbox"/>	b. Verify the correct file is loaded onto SD card, or Print Server
	2. Material Changes
<input type="checkbox"/>	a. Unload / Load / Change Filament
<input type="checkbox"/>	b. Clean the Nozzles
	3. Nozzle Changes
<input type="checkbox"/>	a. Verify you are using the correct nozzle type
<input type="checkbox"/>	b. Verify you are using the correct nozzle size
	4. Basic Set up Steps
<input type="checkbox"/>	a. Verify the correct material type is loaded
<input type="checkbox"/>	b. Verify filament quantity
<input type="checkbox"/>	c. Verify the filament feed path is clear
<input type="checkbox"/>	d. Turn HEPA Filter on
<input type="checkbox"/>	e. Check the Build Plate
<input type="checkbox"/>	f. Purge the nozzles you plan to use <i>(if no material change is required)</i>
	5. Printing
<input type="checkbox"/>	a. Print your Benchmark Part #2 from an SD Card or the Print Server

Check	Steps
<input type="checkbox"/>	1. Answer any Customer Questions
<input type="checkbox"/>	2. Get print server set up on the network (if applicable)
<input type="checkbox"/>	3. Set up conference call to follow up on Benchmark Part #2 results (if applicable)

[illegible]

3.0 Site Preparation & Requirements

This section includes the machine specifications, site preparation information and requirements. Please read this section carefully and make sure all requirements are met, in order to ensure that your facility is effectively and safely prepared for printer installation.

3.1 Machine Specifications

Dimensions	A2	A4 110v	A4 220v	MMS
Printer Dimensions (w/ Doors Closed)	32.3 x 36.9 x 44.9" 820 x 937 x 1140 mm	24.8 x 22 x 28" 635 x 560 x 710 mm		30.6 x 38 x 32.5" 777 x 965 x 825 mm
Printer Dimensions (w/ Doors Opened)	61 x 36.9 x 44.9" 1550 x 937 x 1140 mm	40.2 x 22 x 28" 1022 x 560 x 710 mm		88 x 38 x 32.5" 2235 x 965 x 825 mm
Printer Weight	242 lbs. 110 kg.	94 lbs. 43 kg.		250 lbs. 114 kg
Shipping Dimensions	35 x 42 x 52" 890 x 1067 x 1320 mm	24.5 x 26.5 x 38.3" 622 x 673 x 973mm		45.5 x 38.3 x 42.3" 1156 x 973 x 1074 mm
Shipping Weight	498 lbs. 226kg	152 lbs. 69 kg		370 lbs. 168 kg
Heated Print Bed	Anticorodal aluminum 6082			
Removable & Reusable Tray	Yes			
Steel Cabinet / Frame Construction	0.08" (2 mm) Powder Coated			
Clear Panels	Polycarbonate			
Printing Specifications				
Printer Build Volume*	23.6 x 11.8 x 19.6" 600 x 325 x 500mm	11.6 x 6.1 x 7.8" 295 x 195 x 190mm		
No. of Extruders	3			
Min Layer Thickness	0.00157" 40 Microns			
Printer Technology	FFF			
Max X/Y Axis Speed	11.8"/s 300 mm/s			
Max Z Axis Speed	0.08"/s 2 mm/s			
Max Extruders Speed	1.7"/s 43 mm/s			
Positioning Precision – X/Y	0.000433" 11 Microns			
Positioning Precision – Z	0.00157" 40 Microns			
Positioning Precision - Extruders	0.9 Microns			
Filament Diameter	2.85 mm +/- 0.1 mm			
Standard Nozzle Diameter	0.01575" 0.4 mm			
Max Extruder Temperature	806° F 430° C			
Max Heated Bed Temperature	266 °F 130 °C	230 °F 110 °C	266 °F 130 °C	
Max Heated Chamber Temperature	194 °F 90 °C	176 °F 80 °C	194 °F 90 °C	

Environmental		
Ambient Operating Temperature	61-90°F 16-32°C Relative humidity 30% to 70% non-condensing	
Storage Operating Temperature	41-104°F 5-40°C Relative humidity 30% to 70% non-condensing	

**Printer Build Volume may increase with different nozzle configurations. See Build Volume Configurations below.*

3.1.1 Build Volume Configurations

3.1.1.1 A2v4

Nozzle Configuration	Volume - Metric	Volume - Imperial	Bed Center - Metric
3 Nozzle - 3 Nozzle Prints (#1 + #2 + #3)	600mm (X) x 300mm (Y) x 500mm	23.622" (X) x 11.811" (Y) x 19.68"	X 310.5, Y 201
3 Nozzle - 2 Nozzle Prints (#1 + #2 or #2 + #3)	600mm (X) x 325mm (Y) x 500mm	23.622" (X) x 12.79" (Y) x 19.68"	X 310.5, Y 189 Y 209.5
3 Nozzle - 1 Nozzle Prints (#2)	600mm (X) x 350mm (Y) x 500mm	23.622" (X) x 13.77" (Y) x 19.68"	X 310.5, Y 201

3.1.1.2 A4v4

Nozzle Configuration	Volume - Metric	Volume - Imperial	Bed Center - Metric
3 Nozzle - 3 Nozzle Prints (#1 + #2 + #3)	295mm (X) x 156mm (Y) x 200mm	11.61" (X) x 6.14" (Y) x 7.87"	X 148, Y 127
3 Nozzle - 2 Nozzle Prints (#1 + #2 or #2 + #3)	295mm (X) x 180mm (Y) x 200mm	11.61" (X) x 7.08" (Y) x 7.87"	X 148, Y 119.5 Y 140.5
3 Nozzle - 1 Nozzle Prints (#2)	295mm (X) x 204mm (Y) x 200mm	11.61" (X) x 8.03" (Y) x 7.87"	X 148, Y 128.5

3.2 PC Requirements for Slicers

This section contains PC requirements in order to provide you with the best slicing experience possible. Please make sure your PC meets at least the minimum requirements to be able to install the software.

Smart Slicer Interface (SSI) & KISSlicer

Requirements	Minimum	Recommended
Operating System	Windows 7, Windows 8	Windows 10
Display Resolution	1280 x 720	1920 x 1080
RAM	4GB	16GB +
Hard Disk Space	250 MB	1 GB +
Core Processor	2.0Ghz single-core	2.5 Ghz dual-core & up <i>*Slicing is multi-core, the more the better</i>

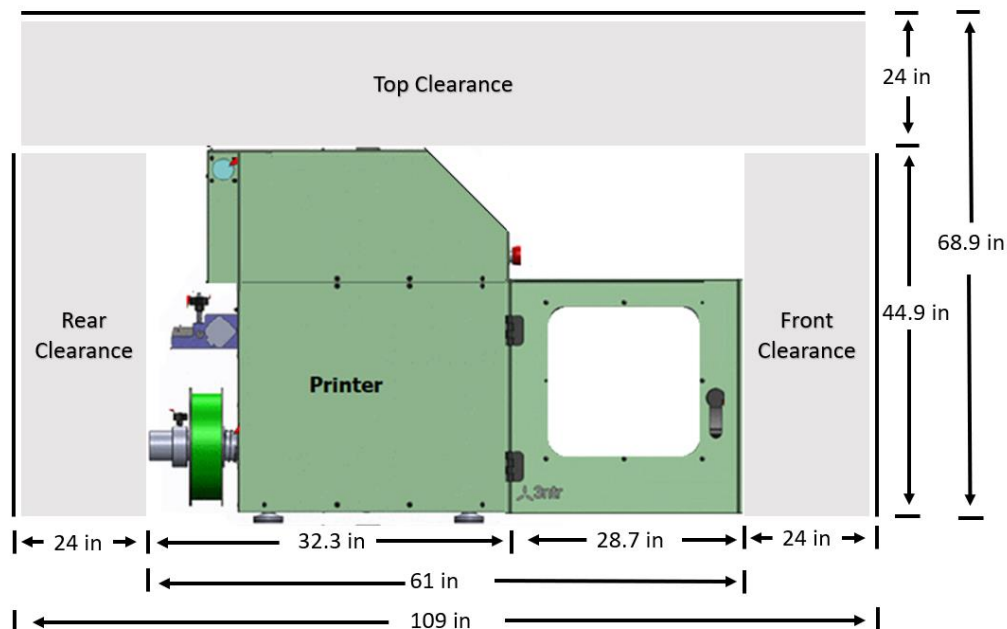
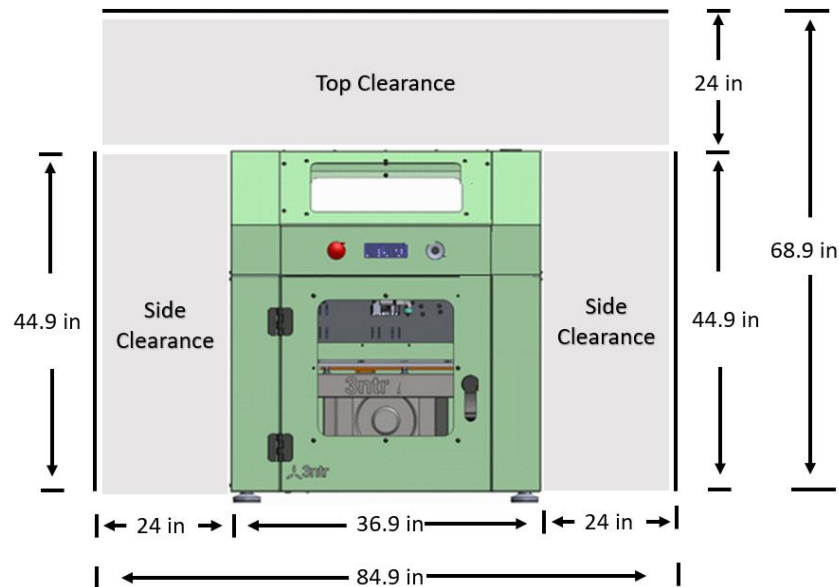
3.3 Floor Plan, Layout & Space Requirements

This section has dimension information for the A2, A4 and Material Management System (MMS).

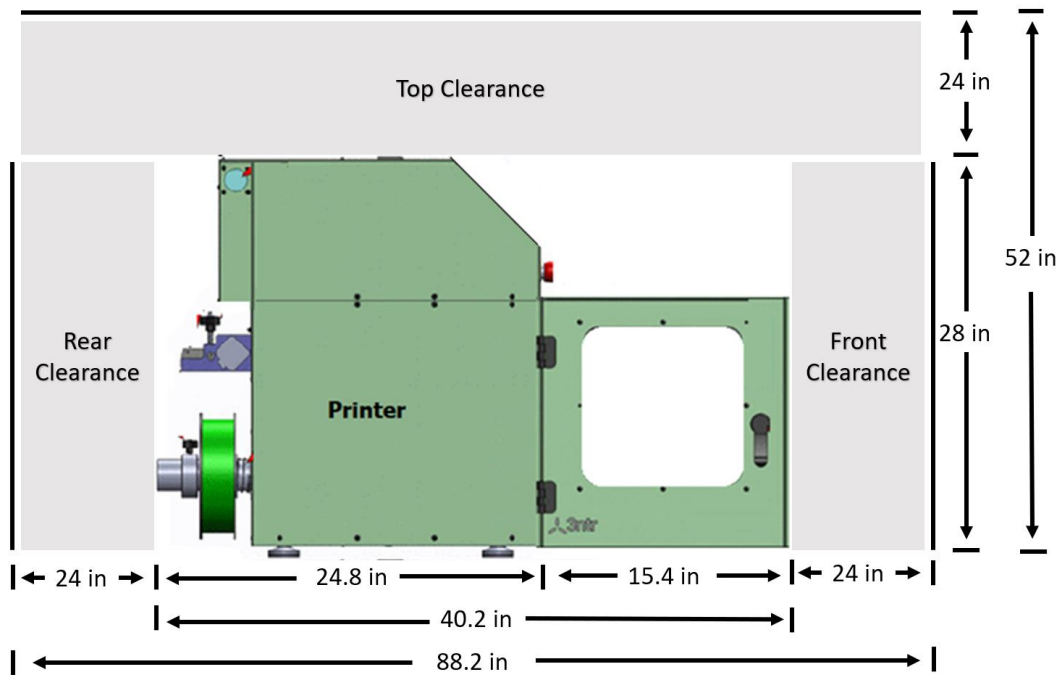
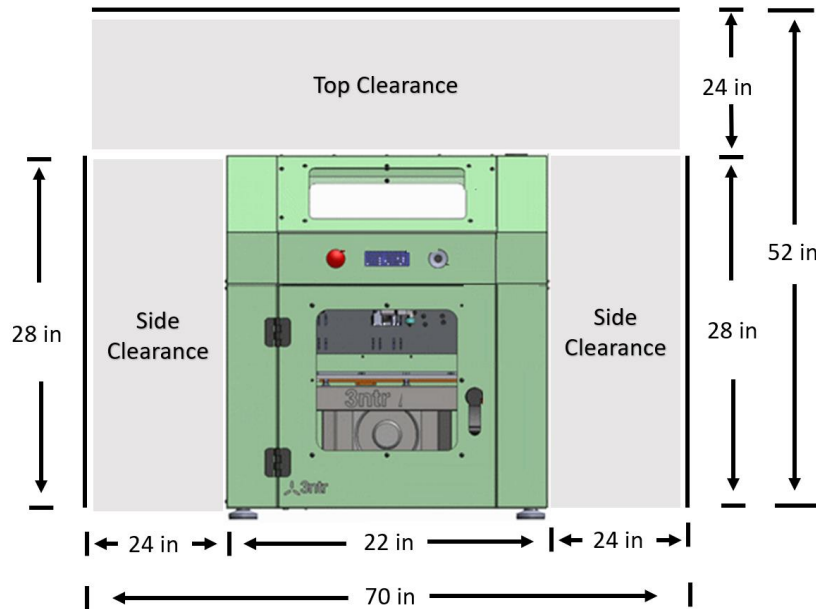
CAUTION!

Always maintain a 24" clearance in order to access the printer for maintenance. If performing maintenance while printer is powered on, please see your local regulations on how much clearance you must provide.

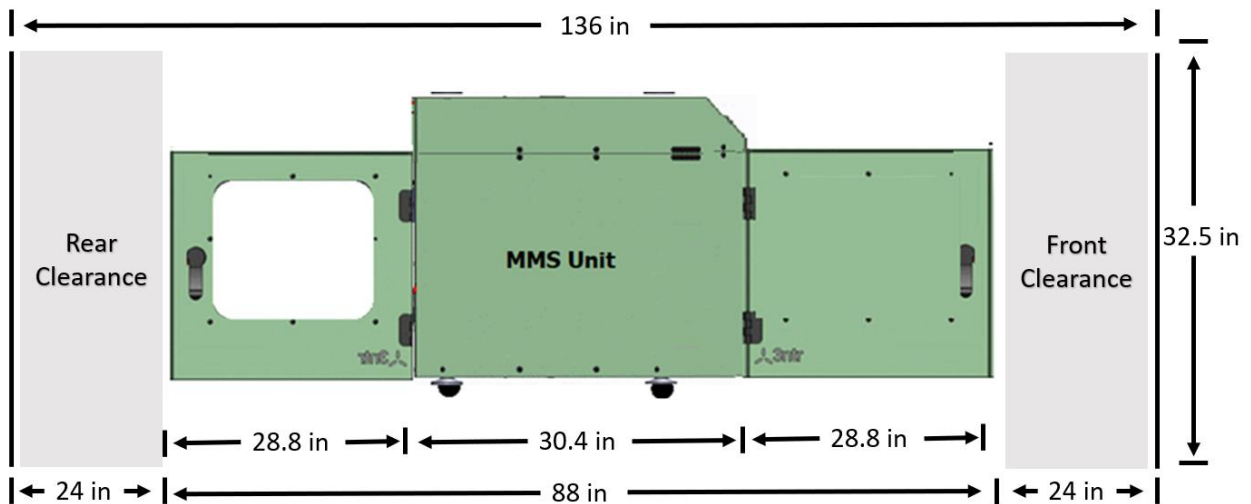
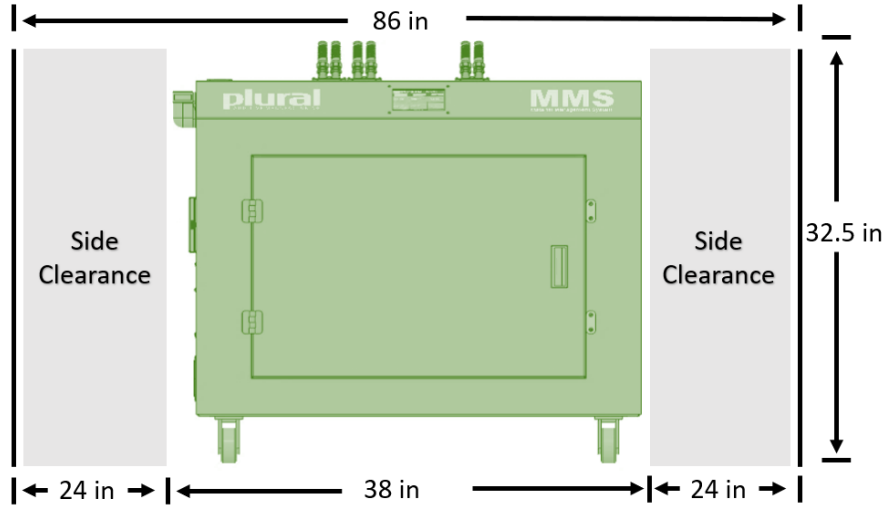
3.3.1 A2 Printer



3.3.2 A4 Printer



3.3.3 Material Management System (MMS)

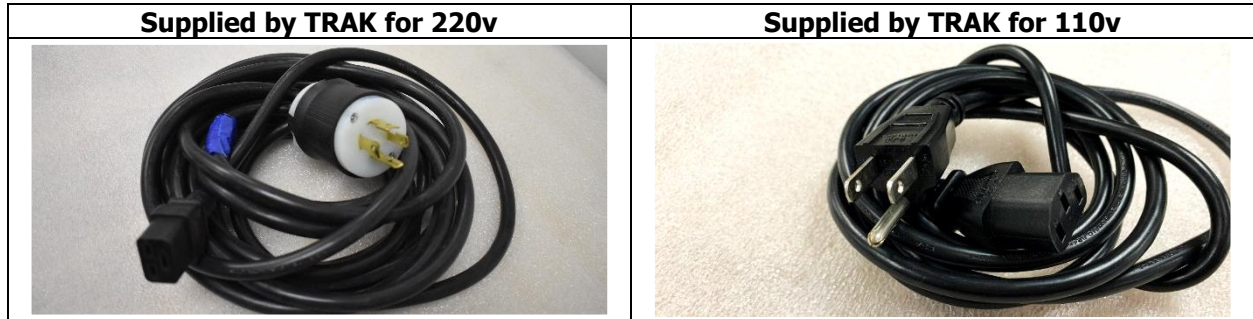


3.4 Electrical Requirements

This section has electrical information for the A2, A4 and Material Management System (MMS). Please review carefully. Always contact a licensed electrician if you are unsure about any electrical wiring.

	A2	A4 110v	A4 220v	MMS
AC Input	220 / 230 VAC – 15A	110 / 120 – 10A	220 / 230 VAC – 10A	220 / 230 VAC – 15A

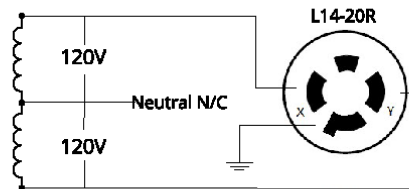
TRAK supplies you with one of two plugs, depending on whether you ordered a printer that runs on 110v or 220v.



For 220v devices, the customer is responsible for providing the L14-20R socket prior to the installation. If you do not have the socket set up, please see the diagram below for information on wiring the L14-20R socket.

3ntr Wiring Diagram

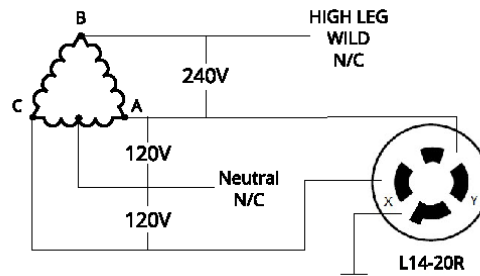
Two Phase



208 to 240 VAC ACROSS X - Y

PRINTER AND OPTIONAL CABINET
NEED 20 AMP SERVICE

Three Phase



4.0 Installation Process

In this section we will walk you through the installation process, from the moment your printer arrives, to the moment that it is powered on and ready to start printing. Do not proceed with this section, or the following sections until the Site Preparation & Requirements section has been completed.

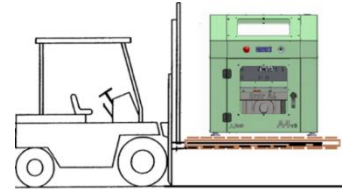
4.1 Lifting, Moving, Uncrating and Unpacking

CAUTION!

Proper equipment of sufficient capacity must be used when lifting and/or moving the printer.

4.1.1 Lifting/Moving before Uncrating

- **A2 or MMS** - The best option for lifting an A2 printer or MMS is a forklift or fork pallet. When using a forklift or fork pallet, orient the printer or MMS with the sides or front, facing the fork truck to prevent damage to the back. The second-best option is using 5-6 people (so that each person does not carry more than 50lbs).
- **A4** - The best option for lifting an A4 printer is a fork pallet. When using a fork pallet, orient the printer with the sides or front, facing the fork pallet handle, to prevent damage to the back of the printer. The second-best option would be using 2-3 people (so that each person does not carry more than 50lbs).



4.1.2 Unpacking

- Never use cutters; you risk piercing the packaging, therefore damaging content. Remove plastic straps, using scissors.
- To open the wooden box, don't use crowbars: use a screwdriver to remove cover and side panels.
- Remove cover, packaging foam/bubbles & packaging side panels.

Steps:

1. Use a forklift or fork pallet to move the printer/MMS unit as close as possible to the final location before uncrating or removing from the pallet.
2. Remove shipping screws holding top portion of printer shipping crate to base. Lift off the top portion of shipping crate from base.
3. Remove contents of printer/MMS and place on table.
4. Remove protective wrapping from outside printer/MMS.
NOTE - Protective film must be removed from printer or it will melt from the heat during the printing process, causing damage to the printer.
5. Open the access door to the printer and identify the protective materials and film at all locations inside. Remove protective materials and plastic film from all printer windows and access doors.

4.1.3 Lifting/Moving after Uncrating

Once the pallet has been removed from the printer/MMS it must be moved by hand. The printers have fixed feet, thus must be lifted and carried to their final position.

- **A2** - Five to six people are recommended to move the A2 printer by hand - lifting it onto a table, printer stand, or MMS.
- **A4** - Two to three people are recommended to move the A2 printer by hand - lifting it onto a table, printer stand, or MMS.
- **MMS** - The MMS has casters, so it can be wheeled over to the designated final location. If lifting is required, five to six people are recommended.

CAUTION!

After uncrating a printer or MMS, DO NOT lift printer directly with forklift or slings. The printer housing could be damaged if excessive force is exerted at any location other than the four printer feet. Always place the printer onto a shipping pallet before using a fork truck or fork pallet.

4.2 General Packing List

In this section we will go over a general packing list. This is **not** your final packing list!

If you are interested in purchasing any additional options, please contact your local sales representative.

Printer Purchase

Every printer purchase comes with the following items:

- ☐ Printer
- ☐ Key for Front Panel Door (*please store in a safe location*)
- ☐ Printer Power Cable
- ☐ License code for SSI
- ☐ USB Drive with Docs and G-Code Files
- ☐ Micro SD
- ☐ Micro SD to SD Converter Card
- ☐ USB SD Card Reader
- ☐ Digital Dial Indicator & Stand
- ☐ Metric Feeler Gauge
- ☐ PTFE Tube Adapter Wrench
- ☐ Gloves

Machine Parts:

- ☐ Spool Spacers & Spool Holders
- ☐ HEPA Elbow w/ Washer

Materials:

- ☐ Cleaning Nylon
- ☐ 1 - 1kg Spool of HIPS (Support Material)
- ☐ 2 - 1kg Spools of ASA (Build Materials)

Print Server Items:

- ☐ Print Server & Power Supply
- ☐ Webcam
- ☐ LCD Monitor & HDMI Cable
- ☐ Keyboard & Mouse Set

Toolbox Items:

- ☐ Hex Bit - 2.5mm
- ☐ Socket - 7mm
- ☐ Wrench - 7mm
- ☐ Coolant Refill Bottle
- ☐ Fuse-AC Power 15 Amps - Kit of 2
- ☐ Allen Wrench Set
- ☐ Pick/Hook Set - Kit of 4
- ☐ Brass Wire Brush
- ☐ Cutter 5" Long
- ☐ Aluminum Pencil Sharpener
- ☐ Dynamometric Screwdriver

Additional Items (*If no MMS was ordered*)

- ☐ External HEPA Filter, Power Supply & Feeder Hose to Printer

MMS Purchase (*optional*)

If you purchased an MMS, below is the list of additional items you should expect to arrive with your shipment.

- ☐ MMS
- ☐ Tablet & Power Supply
- ☐ Tablet Magnet Holder
- ☐ Desiccant Tray
- ☐ Desiccant Cannisters

Machine Parts:

- ☐ Feeder Brackets
- ☐ HEPA Filter Hose (MMS to Printer)
- ☐ Filament Feeder Guides
- ☐ Reel Holders w/ 2 locking pins
- ☐ Round Magnets w/ Tube Plugs

Additional Cables:

- ☐ DP to HDMI
- ☐ Ethernet
- ☐ Printer to MMS Power Supply
- ☐ Male to Male USB Cables

Options

TRAK sells additional options that you might be interested in.

- ☐ Nozzles
- ☐ Materials
- ☐ PrintDry
- ☐ PolyBox
- ☐ Printer Stands

Please contact your local sales rep for more options and price information.

Suggested Items for MMS

TRAK recommends having the following items handy when you order an MMS. TRAK does not sell these items.

- ☐ Oven for Desiccant Drying
- ☐ Postal Scale (up to 10lbs)
- ☐ Step Ladder

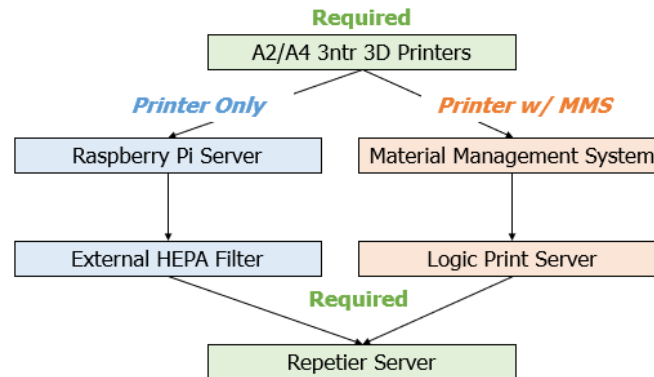
4.3 A2/A4 3ntr 3D Printers

Once you are satisfied with the placement of your printer/MMS, and have made sure everything in your packing list has been received, it's time to go over setting up the printer, print server and MMS, if applicable.

In the upcoming sections, there will be parts that might not apply to you depending on whether you purchased an MMS, or not.

The green sections are required to read regardless of what you ordered. The blue and orange depend on what you ordered.

See diagram below to understand what sections apply to you, and in what order you should read them.





4.3.1 Orientation, Controls & Functions

Whether you purchased an A2 or an A4, everything is almost the same, with the exception of a few key differences like printer size, printer build volume and power supply. For demonstration purposes, we will reference an A2 in the following section.

4.3.1.1 Front View

The front side of the printer is where you run your programs, remove your prints, see your print in action, and do most of your maintenance from.

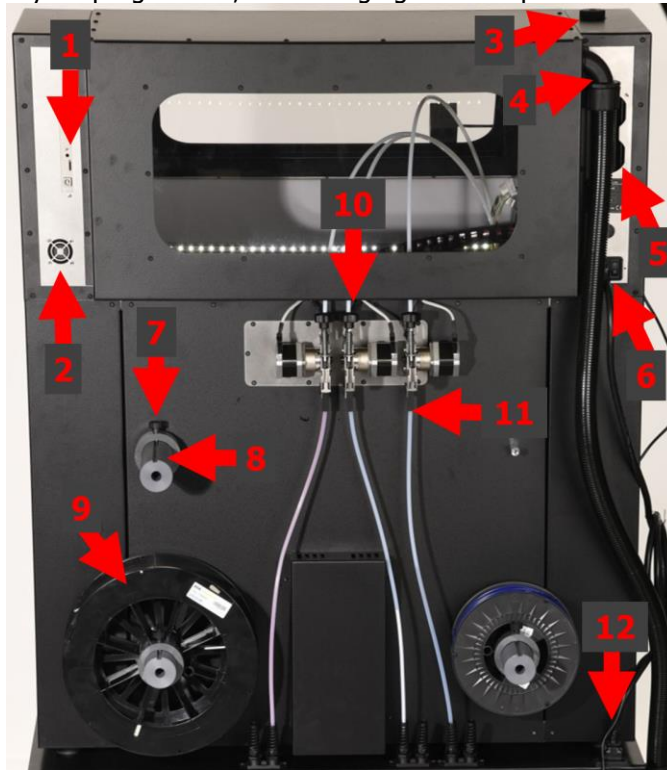


Component & Description	Image
1. Webcam <ul style="list-style-type: none">The webcam is great for remotely monitoring prints progress, documenting the printing process, making time-lapse videos but also to see if something went wrong with the print, and be able to review when the print failed.	
2. E-Stop <ul style="list-style-type: none">Push the E-Stop button if you need to stop the printer immediately in the event of an emergency.You can also use it to turn the printer ON/OFF.	






<p>3. LCD Display</p> <ul style="list-style-type: none"> The LCD screen allows you to control the printer manually and also displays printer information, status and control menus. 	
<p>4. Jog Wheel & Button</p> <ul style="list-style-type: none"> Jog Wheel - Rotate in either direction to navigate menus, change values, control printer. Jog Wheel Button - Push to select the menu option. 	
<p>5. Door Handle</p> <ul style="list-style-type: none"> The door handle can be locked using the pair of keys it comes with. 	
<p>6. Front Door</p> <ul style="list-style-type: none"> The printer's front door gives you access to the Print Chamber, Print Bed, Nozzles, and more. It should always be shut during a print, to reduce the contact with any harmful Volatile Organic Compounds (VOCs). Enclosures for 3D printing are used for safety. There are moving parts and heating elements that you will want to protect yourself from. 	

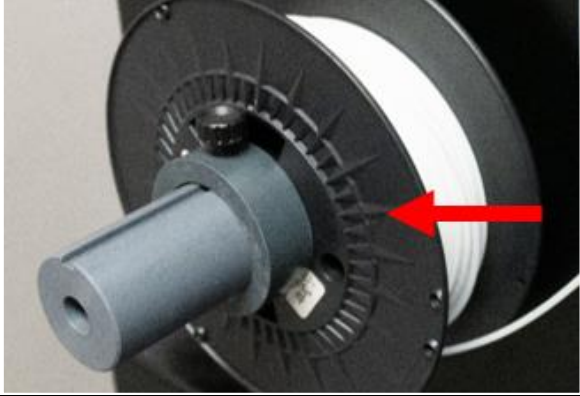
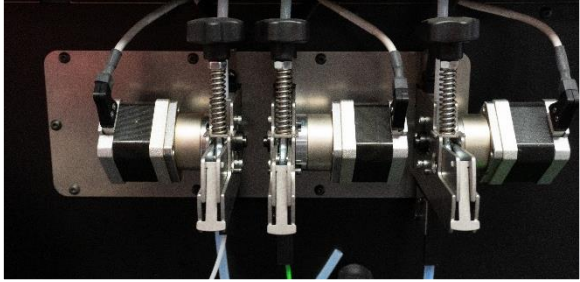
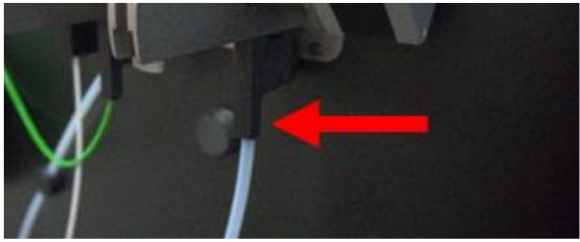

4.3.1.2 Rear View

The back of the printer is where you will spend your time loading/unloading filament from the feeders, putting your SD Card with your programs in, and changing out the spools.



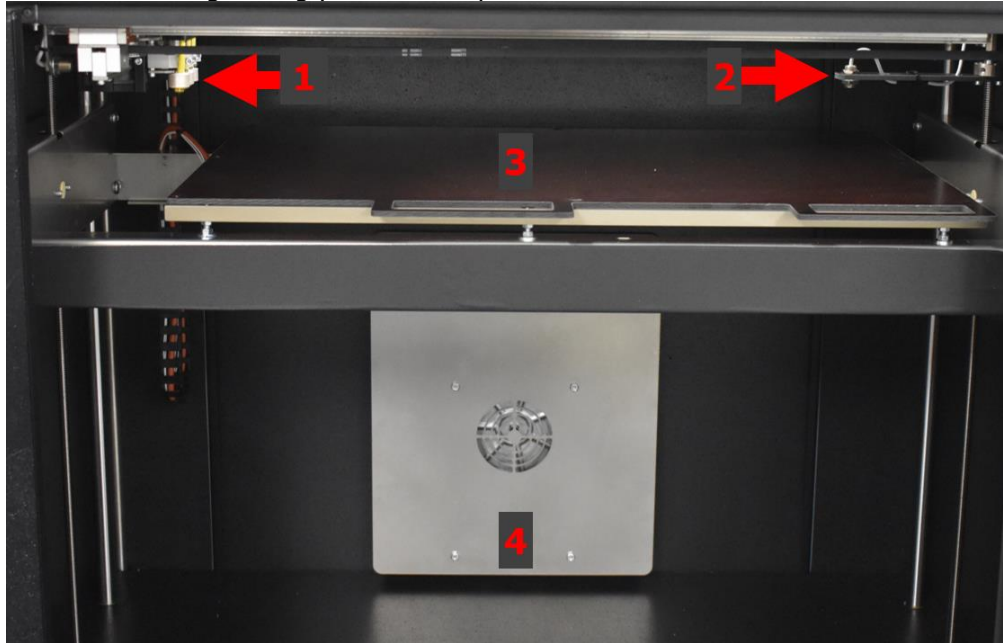
Component & Description	Image
1. SD Card Slot <ul style="list-style-type: none"> This is where you insert your SD card. Your SD Card should come loaded with a Software Tools folder. You can also add any g-code files you would like to print. 	
2. Side Panel Fan <ul style="list-style-type: none"> Helps keep the control board and side panel cool. 	
3. Coolant Reservoir <ul style="list-style-type: none"> Holds the coolant, which can come in red, clear or blue. The coolant helps control the nozzle temperature, optimizing your print quality. 	

<p>4. HEPA Filter Tube</p> <ul style="list-style-type: none"> The HEPA tube filter helps remove harmful Volatile Organic Compounds (VOCs). If you purchased the printer: <ul style="list-style-type: none"> w/o an MMS, you will be supplied an external HEPA Filter to install. w/ an MMS, there is a built-in HEPA filter within the MMS cabinet. 	
<p>5. Heat Exchanger</p> <ul style="list-style-type: none"> The heat exchanger takes away the heat from the coolant reservoir (which gets hot when the coolant pulls the heat from the nozzles). 	
<p>6. Printer Power Inlet and Power Switch</p> <ul style="list-style-type: none"> Left - Printer Power Inlet (w/o MMS) <ul style="list-style-type: none"> The Printer Power Cord plugs in here and connects to the power supply from the wall. (w/ MMS) <ul style="list-style-type: none"> The Printer Power Cords plugs in here but connects to the MMS Power Plug below. Right - Power ON-OFF switch. 	
<p>7. Locking Collar</p> <ul style="list-style-type: none"> The Locking Collar holds the Filament Spools in place, and prevents it from de-coiling or sliding off the Spool Holder. 	
<p>8. Spool Holder</p> <ul style="list-style-type: none"> The Spool Holders (3) are mounted to back of the printer and hold the Filament Spools. If you purchased an MMS, you can use these as additional spool holders! 	



<p>9. Filament Spool</p> <ul style="list-style-type: none"> Filament Spools can come with various materials, and in different sizes and weights. 	
<p>10. Feeder Assembly</p> <ul style="list-style-type: none"> The Feeder Assembly is made up of the Feeder Sensor, Feeder Gear, Stepper Motor, and Feeder Pressure Knob. <ul style="list-style-type: none"> The Feeder Sensor detects if filament has run out and will pause the print. The Feeder Gear and Stepper Motor work together to push the filament forward toward the Extruder. The Feeder Pressure Knob is used to adjust the filament feeder pressure. 	
<p>11. Feeder Unit</p> <ul style="list-style-type: none"> This is where the filament enters the Feeder Assembly. 	
<p>12. MMS Power Inlet</p> <ul style="list-style-type: none"> If you purchase an MMS with your printer, then this is the Power inlet where you would plug in your Printer Power cord. The printer will source its power from the MMS directly. 	

4.3.1.3 Internal View


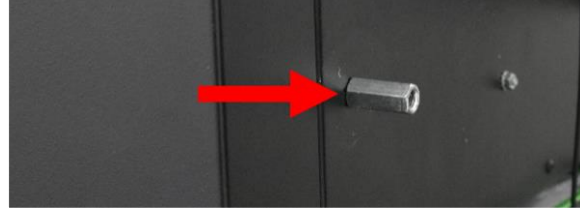

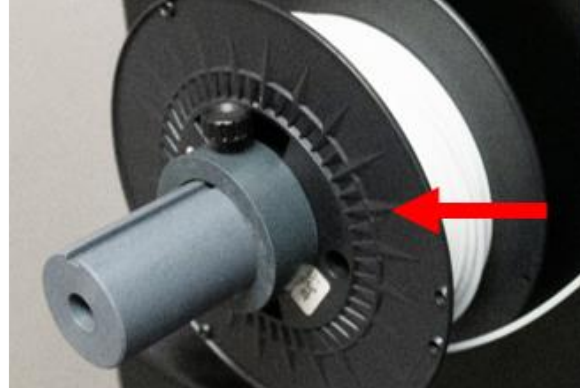
Inside the Print Chamber is where you will spend most of your time when doing maintenance, changing nozzle types and sizes and grabbing your finished prints.



Component & Description	Image
1. Nozzles <ul style="list-style-type: none">The nozzle is a precision piece of metal, where melted filament is extruded out from.Nozzles are interchangeable, and come in various sizes; 0.4 mm is normal, while you might use a smaller nozzle for finer detail or a larger nozzle to print faster.	A close-up photograph of the nozzle assembly. Three nozzles are visible, each with a yellow filament being extruded. A red arrow points to the central nozzle.
2. Z Sensor Assembly <ul style="list-style-type: none">During homing, the Z sensor arm swings over the build plate and sends a signal when the plate is at the right height. This allows for precise height setting. Once homed, the sensor arm retracts to allow for printing.	A close-up photograph of the Z sensor assembly. A white cable is connected to a metal arm that is positioned over the build plate.

<p>3. Build Plate / Print Bed</p> <ul style="list-style-type: none"> The Build Plate is where layers of filament are deposited and your final part is created. 	
<p>4. Chamber Fan</p> <ul style="list-style-type: none"> The Print Chamber Fan helps regulate the temperature within the Print Chamber to optimize print quality. 	





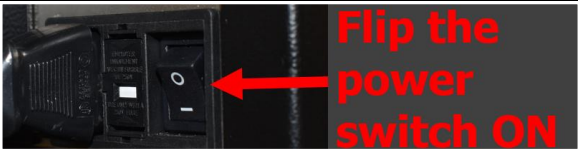

4.3.2 Installing the Spool Holder to the Back of the Printer


From the Back of the Printer:	Images
<p>1. Grab the Spool Holder and long screw that was shipped out to you.</p>	
<p>2. Locate the coupling nut where you want to install the Spool Holder, on the back of the printer. NOTE – There are four coupling nuts on the back of the printer.</p>	
<p>3. Fit the Spool Holder around the coupling nut, and then insert the long screw into the spool holder. 4. Using the provided Allen wrench, tighten the screw into place.</p>	
<p>5. Once tightened, you can now load a spool of filament on your spool holder!</p>	

4.3.3 Connecting the Cables, Powering ON (PRINTER ONLY)

In this section you will learn the steps to power on your printer, if you purchased a printer only. A2 printers are configured for 220V US power. A4 printers are typically configured for 110V US power; however, they may be configured for 220V US power as well.

If you purchased an MMS, skip over to the LCD Overview section. The Material Management System section will show you how to connect your printer & MMS to a power source.

Step	Image
FOR 110v ONLY 1. Grab the 110v power cord that was supplied to you.	
FOR 220v ONLY 2. Grab the power cord provided to you with your printer.	
3. Plug the power cord to the socket at the back of the printer.	
FOR 110v ONLY 4. Plug the power cord to the 110v power socket.	
FOR 220v ONLY 5. Plug the power cord to the 220v L14-20R receptacle.	
6. You are now ready to power on!	
7. Flip the power switch ON.	
8. Turn the E-Stop button clockwise to power on the printer.	

<p>9. Your LCD Display should start to power ON.</p> <p>10. Once it is ready to be used, you will be taken to the Info Screen.</p> <p>11. Once you are at the Info Screen (image on the right), your printer is now successfully powered and installed!</p>	
---	--

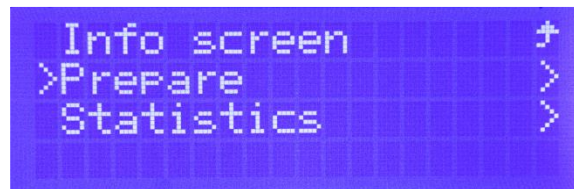
4.3.4 LCD Display Overview

Now that you've connected your printer to a power source and powered it on, it is time to explore the LCD Display, and the menu options.

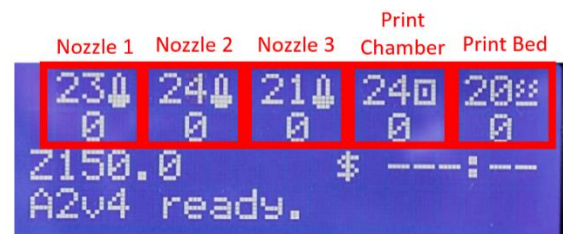
Main Menu

There are two versions of the Main Menu. The standard main menu is displayed when the printer is not printing, and the second version is displayed when the printer is actively printing.

Standard Main Menu



- **Info Screen** - The Info Screen is where you will spend most of your time. It is the default page when you turn your printer on, and the page the printer will automatically go to after some time of not moving the Jog Wheel or pressing the button.
 - Row 1 – Actual/Current temperatures
 - Row 2 – Target Temperatures
 - Row 3 – (left to right)
 - Current Z level
 - SPFU presence (*if installed*)
 - Filament sensor enabled (F)
 - Filament has run out (\$)
 - Elapsed print time of current print
 - Row 4 – Status Line (Shows you the current printer status)
- **Prepare** - Contains the main printer functions, and is only available when the printer is not actively printing.
 - **Main** - Go back to main menu.
 - **Change Filament** - This function is used when you are changing filaments of the same material and color.
 - **Purge Filament** - This function is used before printing, or after every filament is loaded.
 - **Unload Filament** - This function is used to unload the filament.
 - **Nozzle cleaning** - This function is used every time a filament is replaced with a new material or color. Usually used after the Unload function, and before the Purge function.
 - **Preheat Bed** - This function is optional. When you print, the bed is automatically pre-heated, but if you'd like, you could get it pre-heated before you start the print to save some time.
 - **Preheat chamber** - This function is optional. When you print, the chamber is automatically pre-heated, but if you'd like, you could get it pre-heated before you start the print to save some time.
 - **Cooldown** - This function is typically used when performing maintenance, in order to cool down the nozzles back to room temperature.



- **Auto home** - This function returns the printer bed and nozzles to the home position. It also uses a sensor to re-establish the Z position of the top of the printer surface plate.
- **Move axis** - This function allows for all 3 axes to be moved in fixed increments.
- **Disable steppers** - This function powers off all motors and allow you to move the extruder holder in XY directions by hand.
- **Software Tools** - This folder shows you all of the folders contained within the SD Card that is inserted into the printer. The SD Card contains all of the pre-programmed G-Code files needed for calibrations and test prints.
 - This folder shows up ONLY, when the SD Card is inserted into the printer.
 - If there is no SD Card inserted, you will see "ERRORE SD". Once you insert the SD Card, you will see "init.SD" option, that will allow you to initialize the SD Card.
- **Hardware** - This menu allows you to change the following configuration settings such as SPFU, nozzle size, Hi/Std Temp, Calibration values, and more.
- **Statistics** - Displays the print time elapsed and amount of filament extruded.
 - **On:** Time elapsed
 - **F:** Amount of filament extruded

Printing Main Menu





- **Info Screen** - Displays printer / printing information.
 - **Row 4** – Comment Line (shows various messages from the G-Code)
 - **Row 4** – Time (European Time) – ddmmyy
- **Tune Menu** - Allows you to modify and override the print speed, nozzle temperature, print bed temperature, print chamber temperature and the fan speed.
 - **Print Speed:** 0-100% (Default is 100% of set print speed)
 - **Nozzle (1/2/3):** 155°C - 410°C (Above 260°C also requires HI TEMP Extruder Configuration)
 - **Printing bed:** 0°C - 130°C
 - **Heated chamber:** 0°C - 75°C
 - **Fan:** 0 -100%
 - **Change Filament:** Allows you to change filament mid-print.
- **Pause Print** - Pauses the print in progress.
- **Stop Print** - Stops the print in progress.
- **Statistics** - Displays the print time elapsed and amount of filament extruded. (*shown in the previous section*)
 - **On:** Time elapsed
 - **F:** Amount of filament extruded


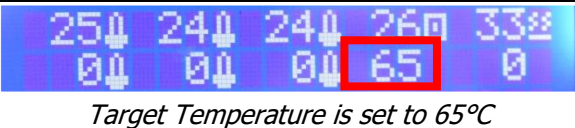
4.3.5 Operation Checks

In this section, we will do a few spot checks (using the Standard Main Menu), just to make sure everything is working properly before we move on.


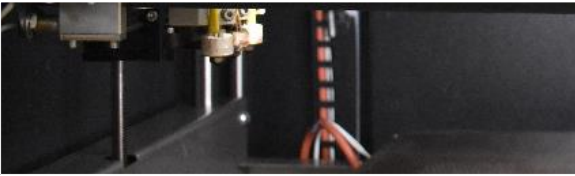
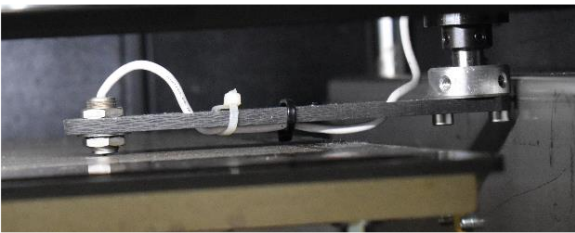
4.3.5.1 Preheat Bed

On the LCD Screen:	
1. From the Info Screen go to: Main Menu > Prepare Menu > Preheat Bed	
2. The printer bed will begin to heat up to 100°C.	



4.3.5.2 Preheat Chamber

On the LCD Screen:	
1. From the Info Screen go to: Main Menu > Prepare Menu > Preheat Chamber	
2. The print chamber will begin to heat up to 65°C.	



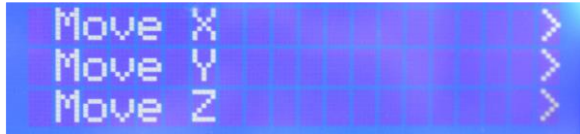
4.3.5.3 Auto-Home

On the LCD Screen:	
1. From the Info Screen go to: Main Menu > Prepare Menu > Auto-home	
2. The nozzles will position itself to the front, leftmost section of the print chamber. Target Position → X-Axis: 0.00 mm Target Position → Y-Axis: 0.00 mm	
3. The build plate will position itself high up, right below the nozzles. Target Position → Z-Axis: 0.00 mm The printer uses the Z-sensor arm in order to detect when the build plate has moved up far enough. When using the Auto home operation, always make sure the z-sensor arm swings out over the build plate.	


4.3.5.4 Cooldown

On the LCD Screen:	
1. From the Info Screen go to: Main Menu > Prepare Menu > Cooldown	
2. The Cooldown function will set the Target Temperatures of nozzles, print bed and print chamber to 0°C. The actual temperature will generally stay around 20-25°C (depending on where you are located), and stop the cooldown function once it has hit room temperature.	 <p><i>Target Temperature is set to 0°C</i></p>

4.3.5.5 Move Axis

On the LCD Screen:	
1. From the Info Screen go to: Main Menu > Prepare Menu > Move Axis	
2. Select the incremental amount that you want to move the axis by.	
3. Select the axis you want to move. CAUTION! ALWAYS move the Z axis down, before moving the X/Y axes. Not moving the Z axis down may result in the nozzles scratching the build plate.	
4. The printer will now start to move in the positive direction that you selected. To reset, use the Auto-Home function.	

4.3.5.6 Disable Steppers

On the LCD Screen:	
1. From the Info Screen go to: Main Menu > Prepare Menu > Disable Steppers	
2. Now you can manually move the print head around the build plate. To enable steppers again, use the Auto-Home function. NOTE – When steppers are disabled, always keep an eye on the nozzle height, or you could potentially scratch the build plate.	

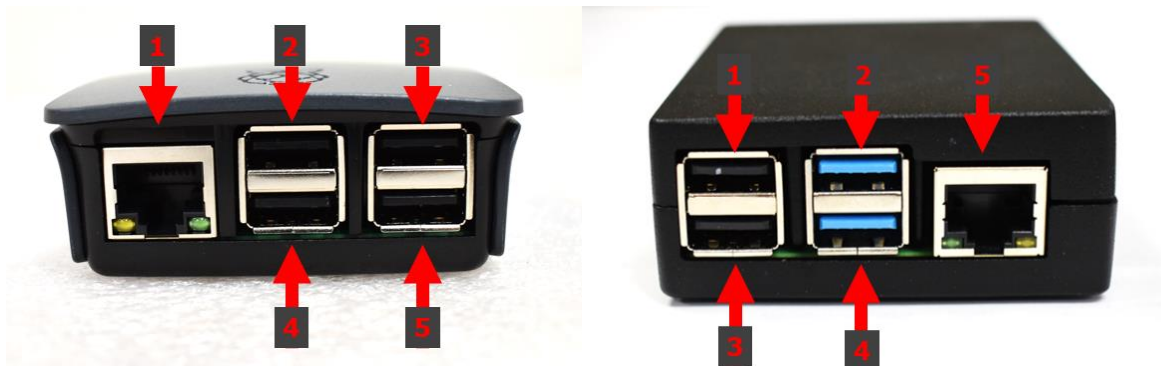
4.4 Raspberry Pi Print Server

When you purchase a 3ntr printer without a Material Management System, you will be provided a Raspberry Pi Print Server. The print server will let you control and send files to your printer remotely. This is an optional feature when working with 3ntr 3D Printers, so if you choose to not remotely control your printer, feel free to skip this section and go onto the External HEPA Filter section.

NOTE – There are two versions of the Raspberry Pi; Raspberry Pi 3 B & Raspberry Pi 4 B.

4.4.1 Orientation, Controls & Functions

4.4.1.1 Front View



Raspberry Pi 3 B Description	Raspberry Pi 4 B Description
1. Ethernet Port	USB Port – For Mouse & Keyboard
2. USB Port – For Mouse & Keyboard	USB 3.0 Port – For Flash Drive
3. USB Port – For Flash Drive	USB Port – For Webcam
4. USB Port – For Webcam	USB 3.0 Port – For Printer
5. USB Port – For Printer	Ethernet Port

4.4.1.2 Side View



Raspberry Pi 3 B Description	Raspberry Pi 4 B Description
1. Power Cord Port	Power Cord Port
2. HDMI Port – Connect one end here, connect the other end to the LCD Monitor provided by TRAK.	Micro-HDMI Port
3. Headphone Jack	Additional Micro-HDMI Port
4. n/a	Headphone Jack

4.4.1.3 Rear / Bottom View






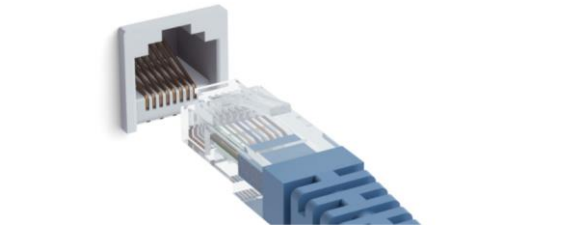




Raspberry Pi 3 B Description	Raspberry Pi 4 B Description
1. MicroSD Card Slot - for loading operating system and data storage	MicroSD Card Slot - for loading operating system and data storage
2. Status Lights	n/a

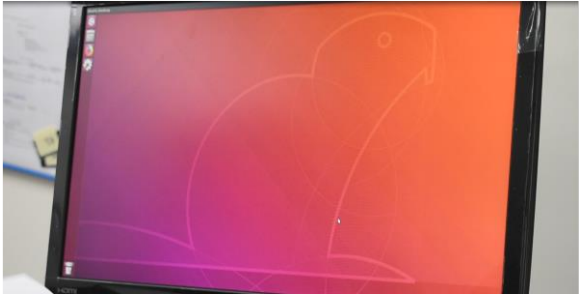
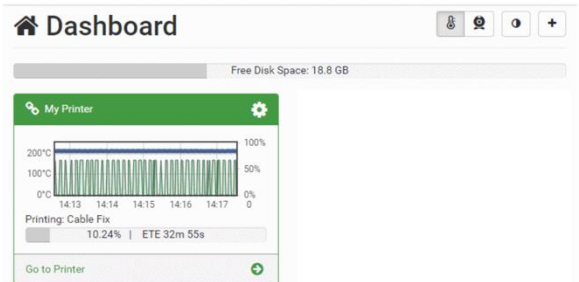
4.4.2 Connecting the Cables, Powering ON

In this section you will learn the steps to power on your Raspberry Pi.

NOTE –Raspberry Pi 4 B is referenced in the instructions, but it is applicable to Raspberry Pi 3 B.

Step	Image
1. Grab the cables provided to you with your print server.	
2. Connect the cables as shown. <ul style="list-style-type: none"> a. USB Receiver for Wireless Mouse & Keyboard b. USB for Web camera c. USB to Printer Port cable a. Ethernet Cable 	

<p>3. Make sure your mouse & keyboard is powered ON.</p>	
<p>4. Your webcam cover is magnetic, so you may place it on any window on the printer you like.</p>	
<p>5. Connect the other end of the "USB to Printer Port" cable, to the back of the printer. <i>(located below the SD Card slot)</i></p>	
<p>6. Connect the other end of your ethernet cable to your modem / router / data jack.</p>	
<p>7. Depending on what version of the Raspberry Pi that you have; you now need to connect the following cables to the side of the Print Server.</p> <ul style="list-style-type: none"> a. Power Cord b. HDMI (Raspberry Pi 3 B) or Micro-HDMI (Raspberry Pi 4 B) 	
<p>8. Connect the other end of the Raspberry Pi Power cord, to your facilities 110v power socket.</p>	
<p>9. Connect the other end of the HDMI cable to the back of the LCD Monitor.</p> <p>10. Connect the power cord for the LCD Monitor to the back of the monitor, and the other end to your facilities 110v power socket.</p>	
<p>11. Turn on your Print Server - <i>The Print Server has a power switch on the power cord for you to power on and off.</i></p> <p>12. Turn on your LCD Monitor.</p>	

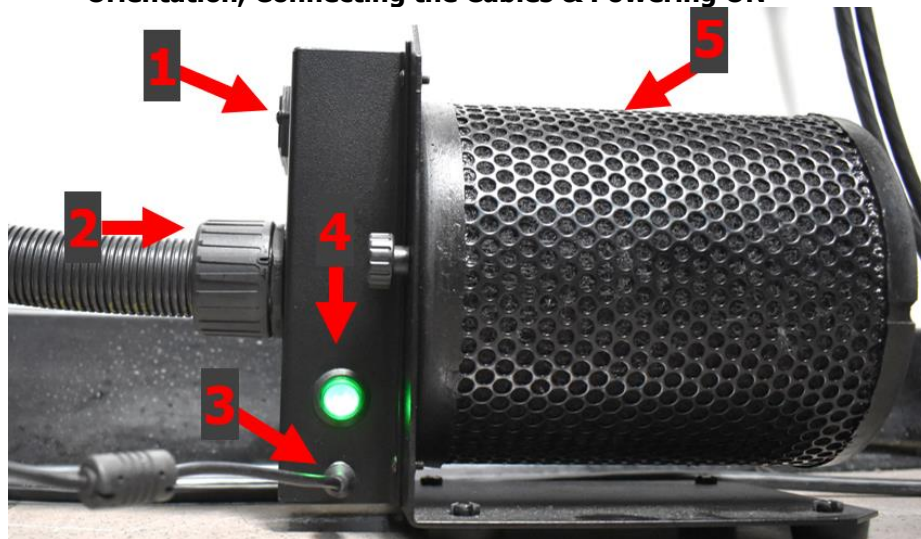
13. Turn on your Printer.	
<p>14. Once the Print Server is all powered on, you should now see the following display on your monitor.</p> <p>15. Click on the Firefox web browser.</p>	
<p>16. The Repetier server dashboard should be your home page on the Firefox web browser.</p> <p>NOTE - The server is shipped out, already configured to your printer so it should look like the screen on the right. If you do not see your printer on the dashboard, or if the page is blank, try refreshing the page and/or pressing the home button.</p>	



4.5 External HEPA Filter


A HEPA filter is required to reduce UFP's and VOC's that you may be exposed to. If you did not purchase an MMS, then TRAK will provide you with an external HEPA filter with your purchase.

Technical Data	
Dimensions	285 x 160 x 195mm
Cartridge Filter	HEPA (0.5 um) – Active Carbon (VOC Barrier)
Power Requirement	Input - 110/230VAC Output - 12VDC 1.5A 18W
Airflow	25 m ³ /h (peak)
Noise	< 48db
Weight	3.5 Kg

4.5.1 Orientation, Connecting the Cables & Powering ON



Description	Image
<p>1. Display – Displays usage Hours The total number of hours the HEPA Filter has been used / powered on.</p>	
<p>2. HEPA Filter Tube Connect one end of the tube to the back of the printer (as shown in the image to the right). Just push the hose into the elbow until it stops.</p> <p>Connect one end of the HEPA Filter tube to the HEPA Filter. (as shown in the image above).</p>	

<p>3. Power Cord Connect one end of the power cord to the HEPA Filter, and the other end to your facilities 110v power socket.</p>	
<p>4. Power Button & Light Indicator Once the HEPA Filter tube and the power supply is connected, press the green button to power your HEPA Filter ON. The display should be powered on, the green button should be lit bright green, and you should hear the light sound of the HEPA filter running.</p>	
<p>5. HEPA Filter – The filter is maintained within the body of the cannister. NOTE – It is recommended that the filter be replaced annually.</p>	

4.5.2 Placement

We recommend placing the HEPA Filter in a secure location near the printer. If you have, or purchased a printer stand/cart, we recommend the bottom shelf of the printer stand/cart.



STOP!

If you did not order an MMS, please skip the following sections:

- Material Management System (MMS)
- OnLogic Print Server

4.6 Material Management System (MMS)


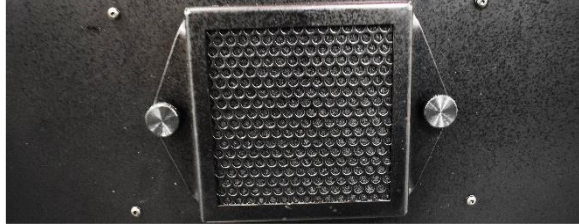

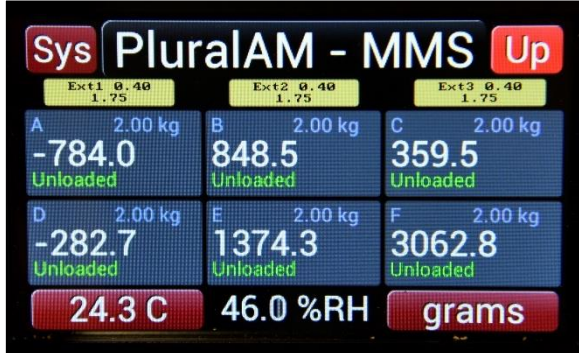
The Plural Material Management System v2 is designed to properly store a range of materials ready for feeding or fed to the printer from a humidity-controlled environment which ensures optimum print quality and part performance. With the server installed and connected to your network, both the browser-based remote dashboard and the touchscreen on the MMS will display live material quantity readouts in meters or grams for each of 6 spools of material.

4.6.1 Orientation, Controls & Functions

In this section, you will learn about the MMS controls and functions.

4.6.1.1 Front View & Side View



Description	Image															
<p>1. HEPA Filter Tube</p> <ul style="list-style-type: none">The HEPA Filter Tube is used to bring the harmful VOCs from the Print Chamber, through the built-in HEPA filter within the MMS Cabinet.																
<p>2. HEPA Filter Power Switch</p> <ul style="list-style-type: none">In order to power the built-in HEPA Filter ON/OFF, you must use the switch on the side of the MMS.																
<p>3. Heater Power Switch</p> <ul style="list-style-type: none">In order to power the built-in heater ON/OFF, you must use the switch on the side of the MMS.																
<p>4. HEPA Filter Vent</p> <ul style="list-style-type: none">The HEPA Filter Vent is where the VOC filtered air will come out of the MMS.																
<p>5. MMS Power Inlet & Power Switch</p> <ul style="list-style-type: none">Power Inlet - The MMS requires only one 220V connection for the cabinet which supplies the correct power and voltage to the printer, the print server, and the web camera.Power Switch - In order to power the MMS ON/OFF, you must use the switch on the side of the MMS.																
<p>6. MMS LCD</p> <ul style="list-style-type: none">The LCD provides you with real-time remaining material status for up to six spools at a time (from 4kg to 500g spools), any three of which are fed to the printer	 <table><tr><th colspan="3">Sys PluralAM - MMS Up</th></tr><tr><th>Ext1 0.40 1.75</th><th>Ext2 0.40 1.75</th><th>Ext3 0.40 1.75</th></tr><tr><td>A 2.00 kg -784.0 Unloaded</td><td>B 2.00 kg 848.5 Unloaded</td><td>C 2.00 kg 359.5 Unloaded</td></tr><tr><td>D 2.00 kg -282.7 Unloaded</td><td>E 2.00 kg 1374.3 Unloaded</td><td>F 2.00 kg 3062.8 Unloaded</td></tr><tr><td colspan="2">24.3 C 46.0 %RH</td><td>grams</td></tr></table>	Sys PluralAM - MMS Up			Ext1 0.40 1.75	Ext2 0.40 1.75	Ext3 0.40 1.75	A 2.00 kg -784.0 Unloaded	B 2.00 kg 848.5 Unloaded	C 2.00 kg 359.5 Unloaded	D 2.00 kg -282.7 Unloaded	E 2.00 kg 1374.3 Unloaded	F 2.00 kg 3062.8 Unloaded	24.3 C 46.0 %RH		grams
Sys PluralAM - MMS Up																
Ext1 0.40 1.75	Ext2 0.40 1.75	Ext3 0.40 1.75														
A 2.00 kg -784.0 Unloaded	B 2.00 kg 848.5 Unloaded	C 2.00 kg 359.5 Unloaded														
D 2.00 kg -282.7 Unloaded	E 2.00 kg 1374.3 Unloaded	F 2.00 kg 3062.8 Unloaded														
24.3 C 46.0 %RH		grams														

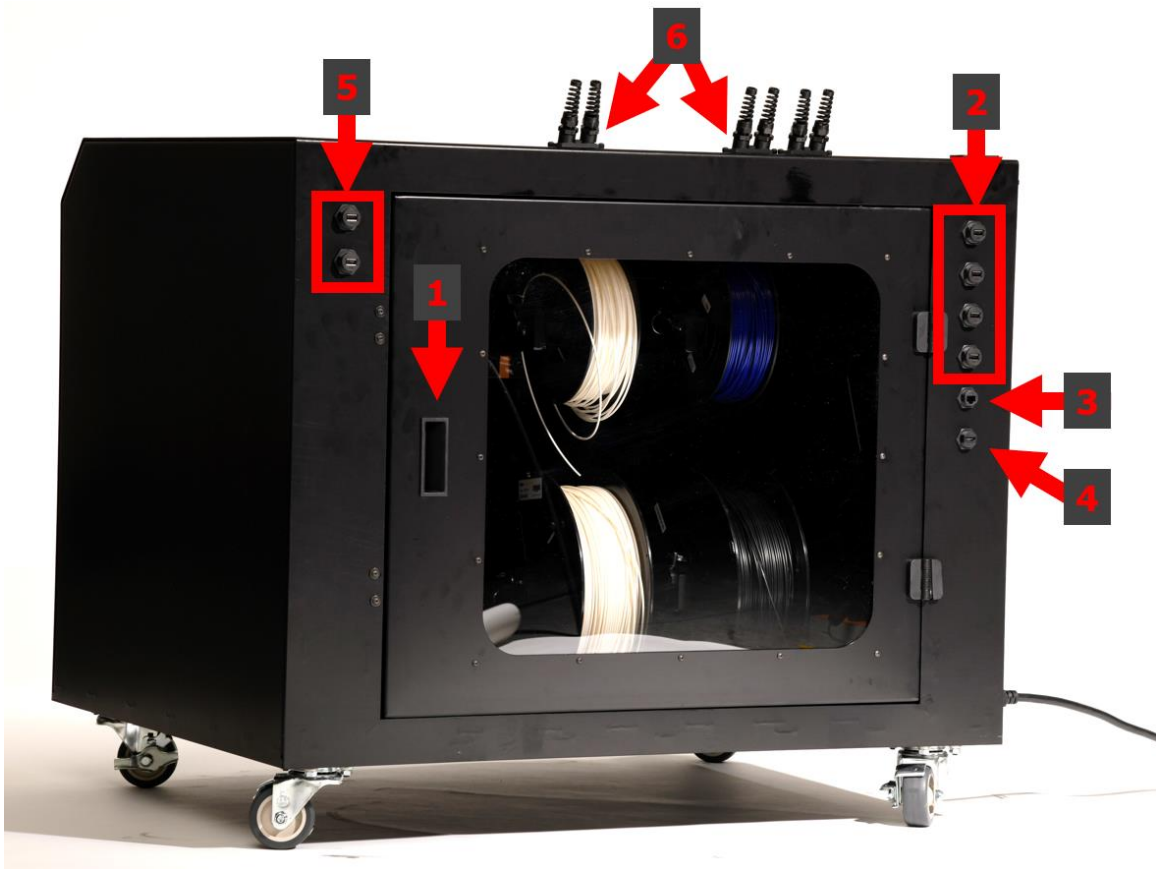
7. Door Handle

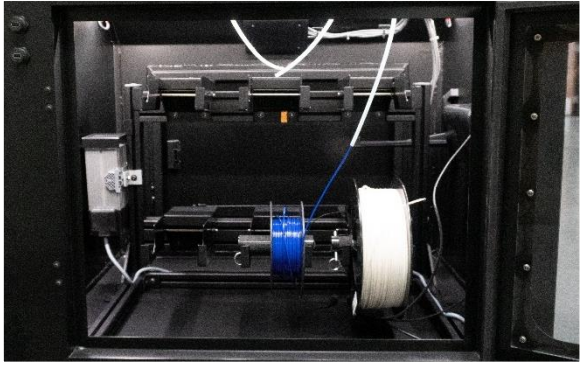
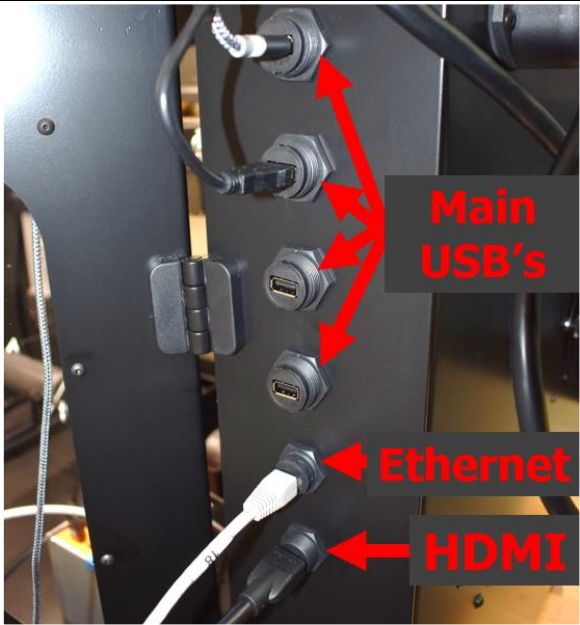


- The door handle provides access to the front side of the MMS cabinet.



4.6.1.2

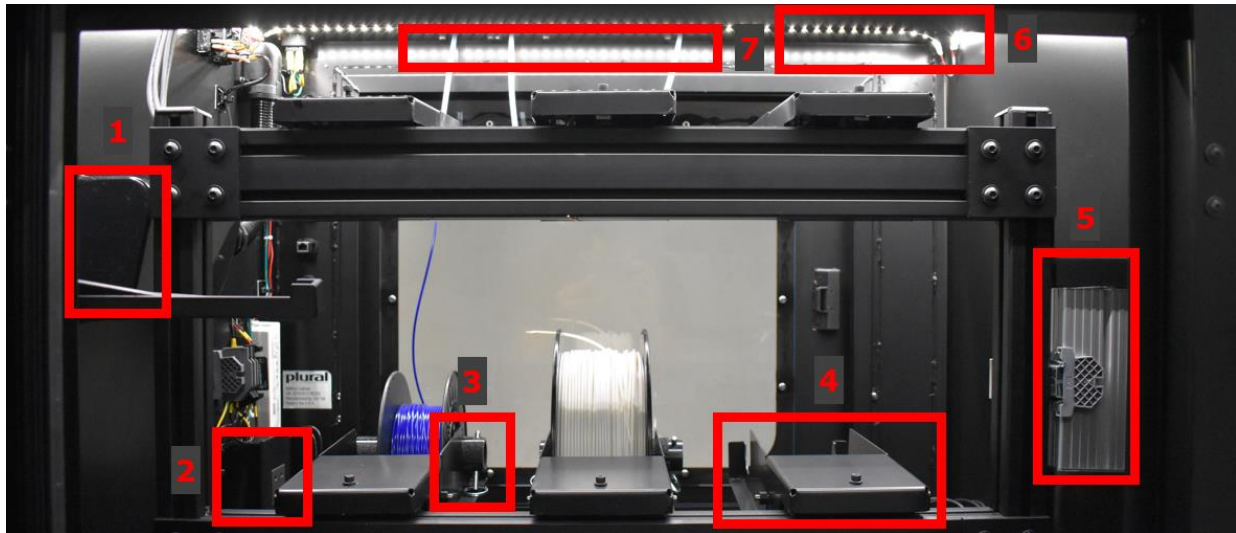
Rear View







Description	Image
<p>1. Rear Door Handle</p> <ul style="list-style-type: none"> The Rear Door Handle provides access to the filament spools, print server and ports. 	
<p>2. Main USB Ports (4)</p> <ul style="list-style-type: none"> There are 4 USB ports on the right side that can be used for the print server, webcam, keyboard and mouse. 	
<p>3. Ethernet Port</p> <ul style="list-style-type: none"> The MMS Provides you with an Ethernet Port for the Print Server to get connected to your network, so you could access your MMS online. 	
<p>4. HDMI Port</p> <ul style="list-style-type: none"> The MMS Provides you with an HDMI Port for you to be able to connect a monitor to the print server. 	
<p>5. Additional USB Ports (2)</p> <ul style="list-style-type: none"> 2 USB ports on the left side. These are additional USB ports for you to use for anything else you may need to connect. 	
<p>6. Strain Relief Flex Collars</p> <ul style="list-style-type: none"> These collars hold the Filament Feeder Guides (white tubes) in place. 	

4.6.1.3

Inside View




Description	Image
1. HEPA Filter <ul style="list-style-type: none"> Integrated HEPA filtration with activated charcoal stage to control VOCs. <p>NOTE – It is recommended to replace the filter quarterly.</p>	
2. Print Server Power Supply <ul style="list-style-type: none"> The MMS provides power for the Print Server within the cabinet. 	
3. Spool Holder & Pin <ul style="list-style-type: none"> Holds the Spool on the Spool Holder Bracket. 	




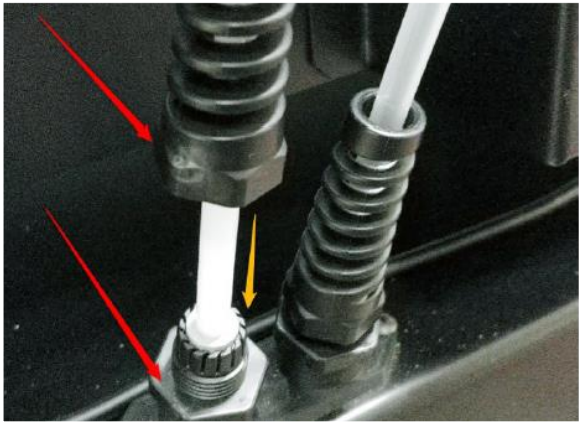

<p>4. Spool Holder Bracket</p> <ul style="list-style-type: none"> • Holds the Spool and Spool Holder. 	
<p>5. Heater</p> <ul style="list-style-type: none"> • The MMS has a built-in heater that helps maintain the temperature (up to 35°C) inside the MMS. It also helps keep materials dry and printing at their best. 	
<p>6. LED Lights</p> <ul style="list-style-type: none"> • Provides lighting within the cabinet. 	
<p>7. Filament Feeder Guides</p> <ul style="list-style-type: none"> • The Filament Feeder Guides are fed through the MMS, and they help protect the filament traveling from the MMS to the printer safe from moisture, dust, oil and physical damage. 	

4.6.2 Installing Desiccant Cannister Holders



Two desiccant cannisters are provided to you for your MMS, in order to manage the humidity within the cabinet.

Step	Image
<p>1. Hang one desiccant cylinder tray inside the front door on the front of the scale structure as shown in image to the right.</p>	
<p>2. The second desiccant cylinder is intended to be rotated with the first so that one can be dried while the second is keeping the humidity within the MMS under control.</p>	

4.6.3 Installing Strain Relief Flex Collars & Bowden Tubes




Step	Image
1. Take one of the six Strain Relief Flex Collars provided to you.	
2. Connect it to the PTFE Tube Clamp sticking out of the back of the printer, by twisting it on.	
3. Repeat steps 1 & 2 until all six Strain Relief Flex Collars have been installed.	
4. Now that all six Strain Flex Relief Collars are installed, it is time to install the Bowden Tubes!	
<p>5. The Bowden Tubes can be pushed right through the Strain Relief Flex Collars.</p> <p>If they do not fit, you can loosen the nut slightly in order to get it the tube through.</p> <p>NOTE – You may leave the nut loose enough to push and pull tube as needed for material loading.</p>	
6. Once the tubes are inserted, leave them about 2-3" inside the MMS.	
7. Your Bowden Tubes are now installed!	





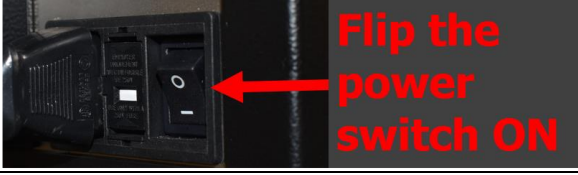

4.6.4 Connecting the HEPA Filter Tube

Step	Image
1. Take one end of the HEPA Filter Tube and push it into the elbow connected to the back of the printer.	
2. Take the other end of the HEPA Filter Tube and push it into the elbow connected to the side of the MMS.	
3. Your HEPA Filter Tube is now connected!	

4.6.5 Connecting the Cables, Powering ON

In this section, you will learn how to connect the cables in order to power on your MMS and printer.

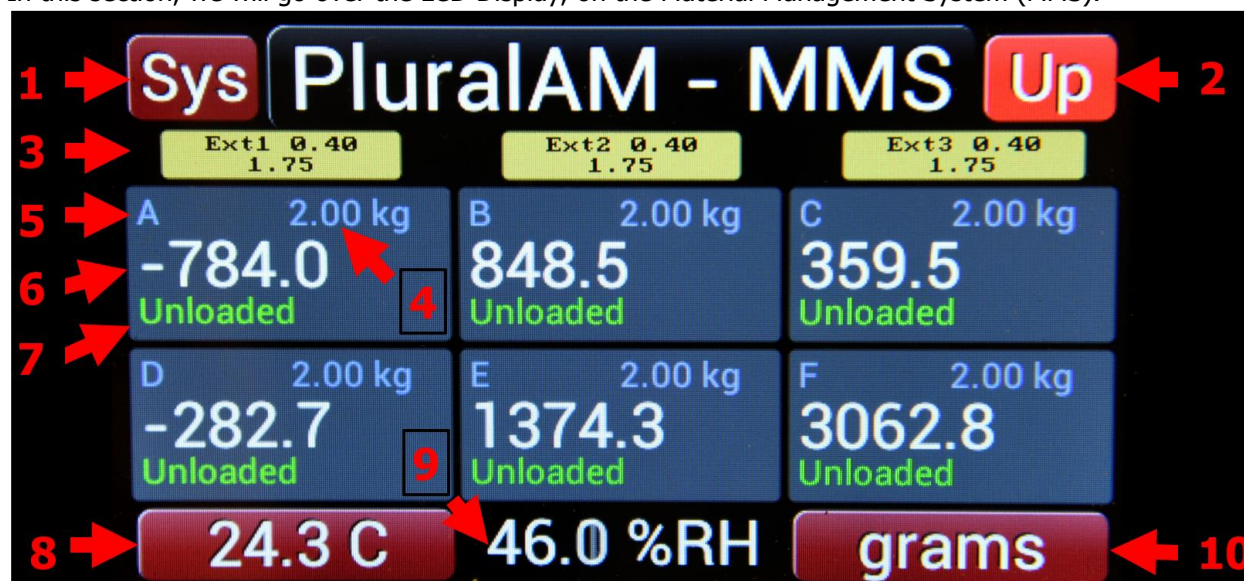
Step	Image
4. Grab the two power cords that were provided to you.	
5. Grab the power cord that goes from the MMS to the 220v receptacle (L14-20R).	
6. Plug one end of the power cord to the lower end of the MMS.	

<p>7. Plug the other end of the power cord to the 220v receptacle (L14-20R).</p>	 <p>Connecting to 220v receptacle</p>
<p>8. Now grab the power cord that goes from the printer to the MMS.</p>	 <p>Printer to MMS</p> <p>Female Male</p>
<p>9. Connect the male end to the top of the MMS.</p>	 <p>Connected to the MMS</p>
<p>10. Connect the female end, to the back of the printer.</p>	 <p>Connected to Printer</p>
<p>11. Now you're ready to start powering on the printer and MMS!</p>	
<p>12. Flip the power switch ON, on the Printer.</p>	 <p>Flip the power switch ON</p>
<p>13. Turn the E-Stop button clockwise to power on the printer.</p>	 <p>Turn the E-Stop button Clockwise</p>


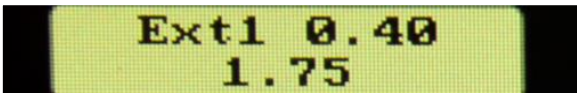



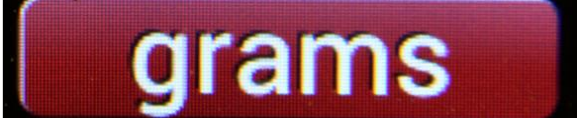
<p>12. Your LCD Display should start to power ON.</p> <p>13. Once it is ready to be used, you will be taken to the Info Screen.</p> <p>14. You're now ready to start using your new printer & MMS!</p>	
<p>15. Flip the power switch ON, on the MMS.</p>	
<p>NOTE - Your MMS LCD Display will not turn on until your print server has been installed and powered on.</p> <p>16. One quick way to know if your MMS is powered on, is by checking to see if the LED lights turn on inside the cabinet.</p>	

4.6.6 LCD Display and Menu Overview

In this section, we will go over the LCD Display, on the Material Management System (MMS).

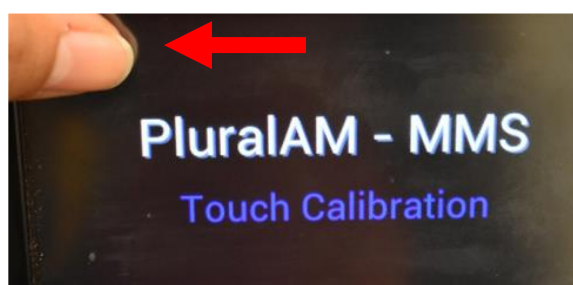
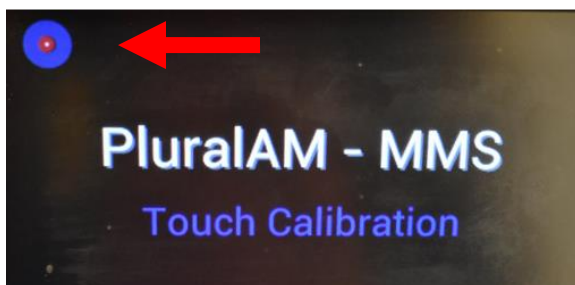


Description	Image
<p>1. System Menu</p> <p>This menu contains the following options:</p> <ul style="list-style-type: none"> • Set Machine ID • Zero all channels - zero the cabinet • Calibrate all channels - calibrate the cabinet • Resume 	

2. Update Menu Press this button to update the firmware on the MMS.	
3. Extruder Nozzle Size & Extruder Filament Size Nozzle Size: 0.4mm Filament Size: 1.75mm	
4. Spool weight This is the overall weight of the Filament, Spool holder, Spool, and Pin. 5. Spool Holder This is the information for Spool Holder A. A is the Top, leftmost Spool Holder Bracket, from the MMS Rear View. 6. Filament Weight This is the weight of the filament only. 7. Loaded Status This displays the status of the Spool Holder bracket, if it has material loaded or not.	
8. MMS Temp (internal) This lets you know the current temperature (Celsius) inside the cabinet.	
9. Relative Humidity This lets you know the current Relative Humidity within the cabinet.	
10. Remaining Filament Display This button selects the remaining filament display unit, which shows you how much filament in left (in either grams or mm).	

4.6.7 Touch Calibration

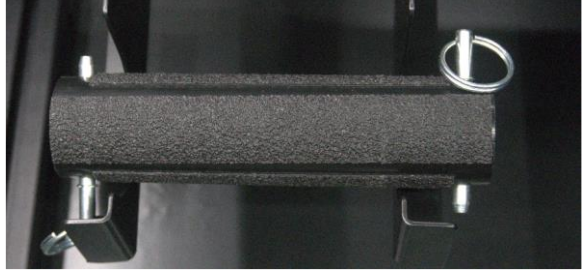

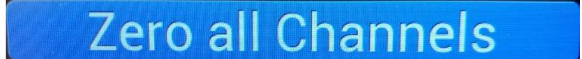


When the MMS is initially powered up, a Touch Calibration must be completed. Simply place your finger over the blue dots on the screen, when prompted to do so.



4.6.8 Zeroing the cabinet

Once the MMS is powered on, the first step is to zero the cabinet.

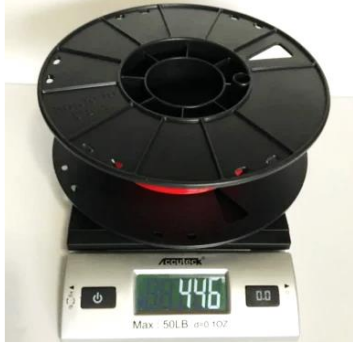


NOTE - Zeroing the cabinet will be required every time the firmware is updated.

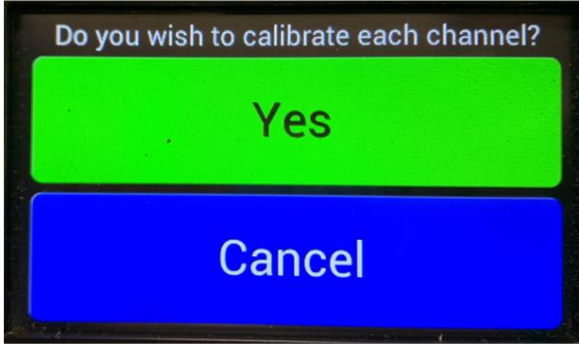
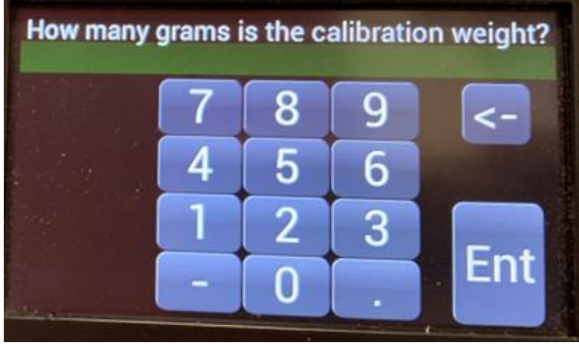


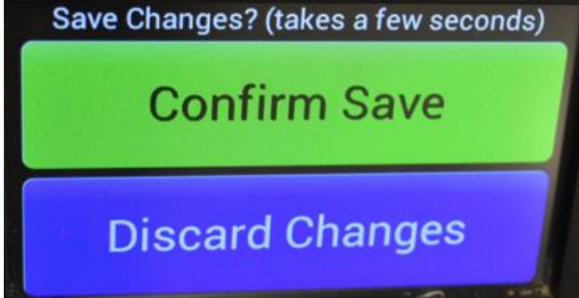
Steps	Image
1. Place the MMS Spool Holders on the Spool Holder Rack.	
2. Press "Sys".	
3. Press "Zero All Channels".	
4. You will be asked if you want to zero all channels. Press "Yes".	
5. Lastly, you will be asked if you want to save changes? Press "Confirm Save".	
6. You have zeroed the cabinet!	

NOTE – Once completed, all the displayed weight values on the touch screen should be very near the "negative empty reel weight" specified by the server (the default empty reel weight for a 2kg reel is 0.960 kg; when the appropriate empty reel is installed, the value should be near zero).

4.6.9 Calibrating the MMS



Calibrating the MMS should always be done after you Zero the Cabinet. Calibrating the cabinet ensures you have the correct amount of material accounted for and prevents printing issues down the line such as running out of filament mid-print.

Steps	Image
1. Get a "calibration reference". <ul style="list-style-type: none"> To do this, use a separate scale, like a shipping scale that goes up to 10lbs. Weigh a spool of material, and record the value in grams. This will be your calibration reference. 	
2. Go to the MMS LCD Screen and press "Sys".	
3. Press "Calibrate All Channels" NOTE – Each spool holder bracket is a "Channel".	

<p>4. You will be asked if you want to calibrate all channels, press "Yes".</p>	
<p>5. You will be prompted to enter a mass in grams to use for calibration, use your calibration reference.</p>	
<p>6. You will be prompted to place the spool of material used for your calibration reference, on the channel (spool holder bracket), one at a time for weighing.</p> <ul style="list-style-type: none"> • <i>Item #1 on the screen is the calibration reference you entered.</i> • <i>Item #2 on the screen displays the channel you would place the spool on.</i> • <i>Item #3 on the screen is the current weight on the channel.</i> 	
<p>7. Let the channel reading settle (takes about 5 – 10 seconds)</p>	
<p>8. Press "Commit" to save the calibration. Repeat for each channel, until all channels are calibrated.</p>	
<p>9. Press "Resume" once all the channels are calibrated.</p>	
<p>10. Press "Confirm Save" to save calibration.</p>	
<p>11. You are now ready to load the MMS!</p>	

4.6.10 Setting the Box Temp

To set the Box Temp, is to set the temperature of the MMS cabinet.

Steps	Image
1. From the main screen, touch the MMS Temp.	 A close-up of a red digital display showing the temperature 24.3 C in white text.
2. Enter the desired cabinet temperature. <i>In this example, we entered 35.0°C.</i> 3. Press Enter.	 A screenshot of the 'Set Box Temp [C] (from 0 to 35)' screen. It features a green header with the text 'Set Box Temp [C] (from 0 to 35)' and the value '35.0' in green. Below the header is a numeric keypad with blue buttons for digits 0-9, a decimal point, a minus sign, and an 'Ent' button. A '<-' button is also present.
4. You have now set your Box Temp!	

4.7 OnLogic Print Server

The OnLogic Print Server is for customers who purchased the Material Management System (MMS).

Technical Data

Dimensions (WxHxD)	196 x 36.75 x 120.8 mm 7.72" x 1.45" x 4.76"
Model	ML350G-10
Hardware Line	Fanless Industrial
Input Voltage	9~24 VDC
Environment	Operating temperature: 0°C ~ 50°C Operating temperature for UL listed configurations: 0°C ~ 40°C Operation humidity: 10% ~ 90% Storage temperature: 0°C ~ 60°C Storage humidity: 5% ~ 95%
Primary Storage	128 GB mSATA SSD
Mounting	Wall, DIN, VESA-75/100. (Additional mounting hardware required)

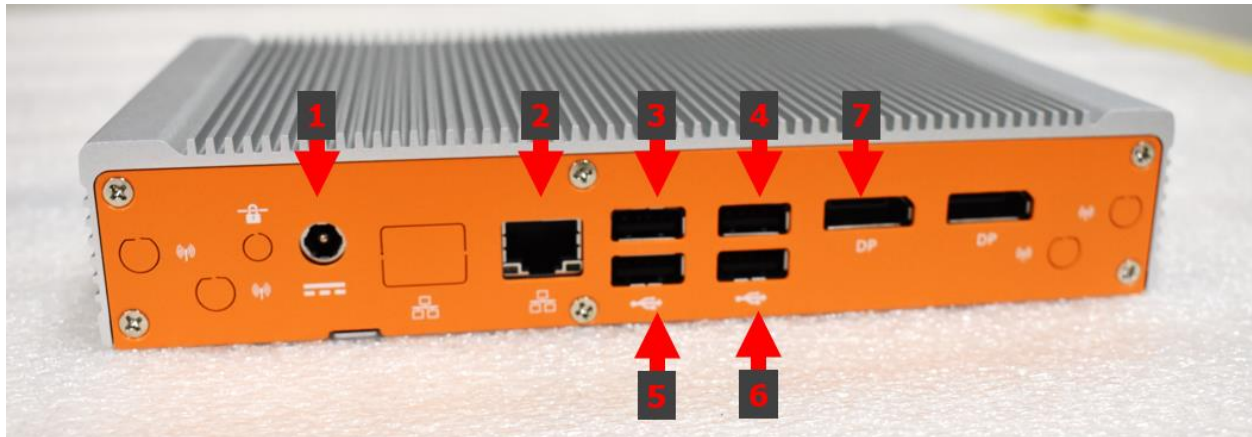
4.7.1 Orientation, Controls & Functions

4.7.1.1 Front View



Description
1. Power Button
2. Additional USB-C
3. Additional USB 3.0
4. Headphone Jack

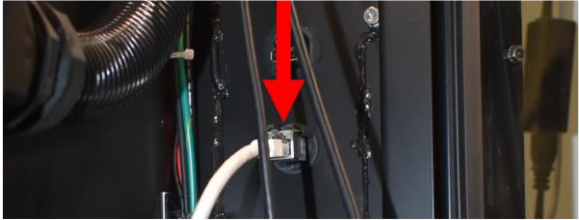




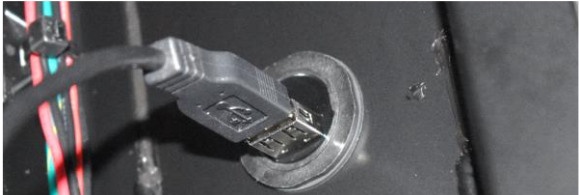

4.7.1.2 Rear View

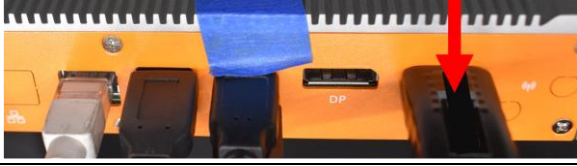
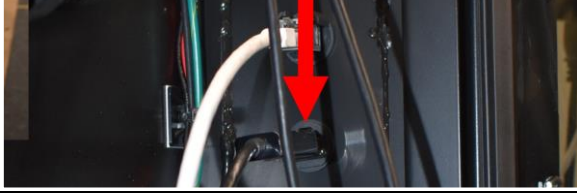

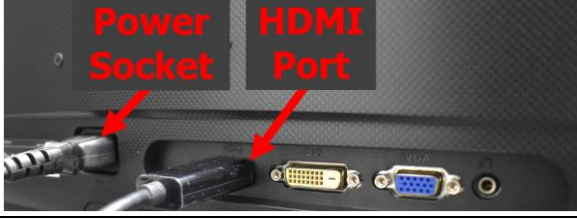










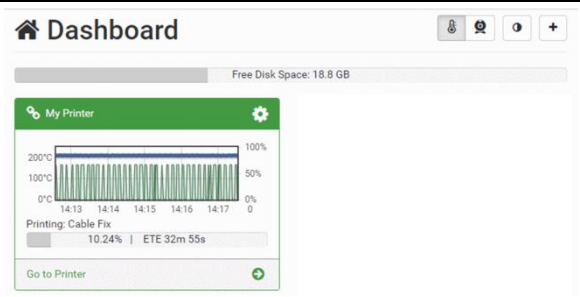
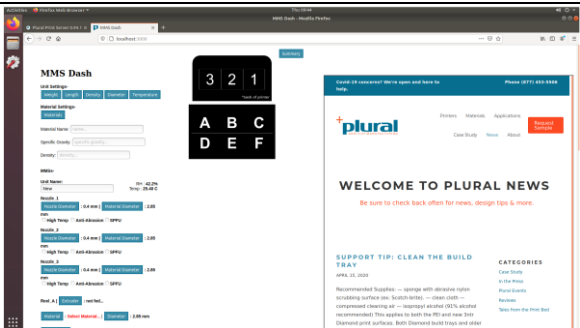
Description	
1. Power Cord Port	
2. Ethernet Cable Port	
3. USB ports – Reserved for the USB that goes from the MMS to the Print Server.	
4. USB Port – For Mouse & Keyboard	
5. USB Port – For Webcam	
6. USB Port – For Flash drive	
7. DisplayPort – Connect to the monitor using the DP to HDMI cable.	

4.7.2 Connecting the Cables, Powering ON

Step	Image
17. Connect the power cord to the back of the Print Server.	A close-up photograph of the power cord being plugged into the power port on the rear panel of the device. A red arrow points to the power port.
18. Then connect the other end to the power socket inside the MMS.	A photograph showing the power cord plugged into a power outlet on a piece of equipment. A red arrow points to the power outlet.
<p>You were provided two ethernet cables. Take one of them and:</p> <p>19. Connect one end of the ethernet cable to the back of the Print Server.</p>	A close-up photograph of an Ethernet cable being plugged into the Ethernet port on the rear panel of the device. A red arrow points to the Ethernet port.

<p>20. Connect the other end to the Ethernet port inside the MMS.</p>	
<p>Take the second ethernet cable; 21. Connect one end to the ethernet port on the outside of the MMS. 22. Then take the other end and connect it to your facilities modem / router / data jack.</p>	
<p>23. Connect the USB Receiver for the Wireless Mouse & Keyboard to the front of the Print Server. 24. Power ON your mouse & keyboard.</p>	
<p>25. Place the webcam on the front window panel.</p>	
<p>26. Connect the USB cable for the webcam to the back of the MMS.</p>	
<p>27. There should be an extra male to male USB cable. Take one end and connect it to the inside of the MMS.</p>	
<p>28. Connect the other end to the back of the Print Server.</p>	

<p>You were provided a HDMI to Display Port (DP) cord.</p> <p>29. Connect the DP end to the back of the Print Server.</p>	
<p>30. Connect the HDMI end to the HDMI Port inside of the MMS.</p>	
<p>You were provided an HDMI-to-HDMI cable.</p> <p>31. Connect one of the HDMI ends to the HDMI port in the back of the MMS.</p>	
<p>32. Connect the other end to the back of the LCD Monitor provided to you.</p> <p>33. Grab the power cord for the LCD Monitor, and connect the power cord to the back of the monitor.</p>	
<p>34. Connect the other end to your facilities power supply socket.</p> <p>35. Power on your LCD Monitor.</p>	
<p>You were provided a USB to Printer Port cable.</p> <p>36. Connect the Printer Port end, to the back of the printer.</p>	
<p>37. Connect the USB end to the back of the MMS.</p>	
<p>You were provided a male-to-male USB cord.</p> <p>38. Connect one of the ends to the USB port inside of the MMS.</p>	

<p>39. Connect the other end to the USB port in the back of the Print Server.</p>	
<p>40. Inside the MMS, there is a male-to-male USB cable already connected (for the MMS). 41. Take that cable and connect it to the back of the Print Server.</p>	
<p>42. You should now be ready to power on your Print Server! 43. Press the power button on the front of your server.</p>	
<p>44. Once everything has powered on, you should see the following screen on your monitor. Please see next section on how to establish a connection with your printer and MMS.</p>	
<p>45. Click on the Firefox web browser. 46. The Repetier server dashboard should be your home page. The server is shipped out already configured to your printer so it should look like the screen on the right.</p> <p>NOTE - If you do not see your printer on the dashboard, or if the page is blank, try refreshing the page and/or pressing the home button.</p>	
<p>47. Go to the next tab over on the web browser to get to the MMS Dashboard. <i>For more information on the Repetier Server Dashboard or MMS Dashboard, see sections 4.8 and 4.9.</i></p>	

4.8 Repetier Server Overview

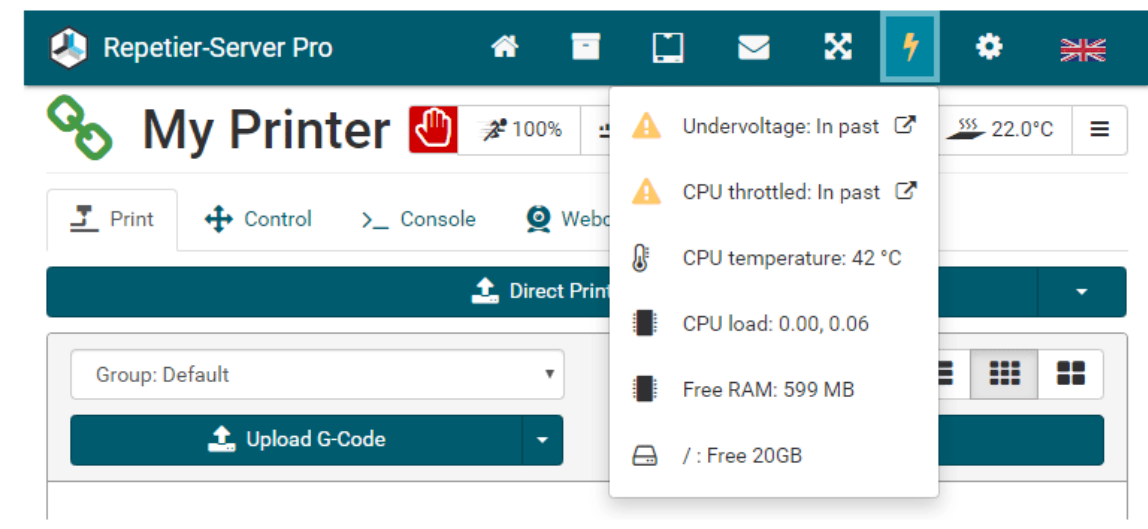
In this section, we will go over the basic functions of the Repetier Server.

4.8.1 Navigation Bar



1. **Dashboard** – Takes you to the Main Page / Dashboard.
2. **Projects** – Lets you see your projects / groups
3. **Status of other printers** – It shows you a summary status of your devices.
4. **Messages / Notifications** –
5. **Fullscreen / Normal Screen** – Let's you switch between Full screen / Normal Screen
6. **Settings** – Takes you to the main configurations, and to see the full manual.
7. **Language** – Let's you select your preferred language.

Extra Icon for Linux – Some servers like the Raspberry Pi and other embedded devices are very popular. These normally run under Linux and have limited resources. The icon is meant to monitor these resources and warn on possible problems early. Under the extra icon the CPU load, the free RAM and the free disk space is displayed. The Raspberry Pi also displays the current or past undervoltage and CPU throttling and the CPU temperature. If there have been problems in the past, the icon is yellow, for current problems it is red. Undervoltage and CPU throttling can cause problems.



4.8.2 Dashboard

The Dashboard is one of two main pages you will visit frequently.

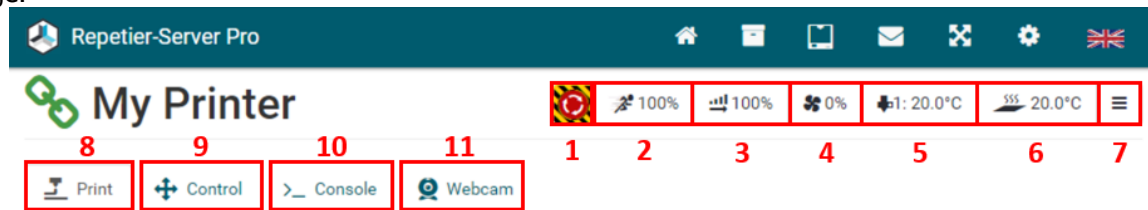
The screenshot shows the Repetier-Server Pro Dashboard. At the top is a dark blue header with the logo and name 'Repetier-Server Pro', and navigation icons for home, files, printer, messages, settings, and language. Below the header is a 'Dashboard' title with a home icon. To the right of the title are four icons: a thermometer (1), a camera (2), a light/dark mode toggle (3), and a plus sign (4). Below these icons is a 'Free Disk Space: 18.8 GB' bar (5). The main content area is divided into two columns. The left column has a 'My Printer' section (6) with a temperature graph (1) showing a sawtooth pattern between 0°C and 200°C over time (14:13 to 14:17). Below the graph is a progress bar for 'Printing: Cable Fix' at 10.24% completion, with an estimated time of 32m 55s (8). At the bottom of this section is a 'Go to Printer' button (9). The right column has a 'My Printer' section (7) with a webcam view (2) showing a 3D printed part. Below the webcam view is the same progress bar for 'Printing: Cable Fix' (8). At the bottom of this section is a 'Go to Printer' button. At the bottom left is a 'Network' section (10) showing details for 'Network Interface wlan0': IP Address 192.168.178.46, MAC 80:1f:02:f9:7c:2a, Web http://192.168.178.46:3344, and a QR code.

1. **Temperature Graph View** – Switch your view from Webcam to Temperature Graph
2. **Webcam View** – Switch your view from Temperature Graph to Webcam View.
3. **Light mode / Dark mode** - Autodetect, Light Mode and Dark Mode.
4. **Add Printer** and **Upload Printer Configuration button** – allows you to add another printer / device. Not recommended.
5. **Memory Bar** - The most important thing, just above the printer(s) mini windows: the free disk space must be always be bigger than 5-6 GB. If you happen to have too many files, you may want to do periodic purging of old/useless data.
6. **Connection Status** – Shows you the current status of the printer. Color statuses:
 - Green=online

- Red=offline
 - Grey=deactivated
 - Orange=connected but no communication
7. **Menu** – Allows you to activate/deactivate printer, update/download/replace printer settings and remove printer.
 8. **Progress Bar** – shows the printing progress
 9. **Go to Printer button** – Sends you to the printer control / management page.
 10. **Network** – you can see your IP address, MAC address, and the URL to access the server with a different PC, smartphone or tablet. Also, you can scan the QR Code with a smartphone or tablet to open the URL.

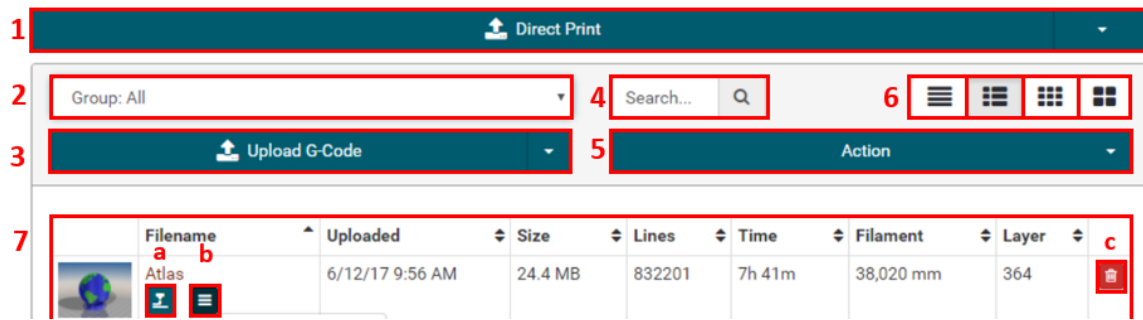
4.8.3 Printer Control / Management

When you are in the Dashboard and click on “Go to Printer”, you will be sent to that printers control page.



1. **E-STOP** – Stops the printer and resets it
2. **Speed Override** – Not Recommended for use
3. **Flow Override** – Not recommended for use
4. **Fan Speed Override** – Not recommended for use
5. **Extruder Temperature Override** – Not recommended for use
6. **Print Bed Temperature Override** – Not recommended for use
7. **Menu** –
 - a. **Deactivate Printer** – Disconnects the printer from the server
 - b. **Connection Information** – Provides the data stream statistics. The most valuable information here is the errors.
 - c. **Printers EEPROM** – not recommended for use
 - d. **Print Logs** – Useful for troubleshooting any printing issues you may experience.
 - e. **History** – Lets you analyze machine use and its activity
 - f. **Printer Settings** – Not recommended for use
 - g. **Wizards** – Not Supported
 - h. **Firmware Upload**
8. **Print Tab** - In this tab you upload G-Code files you want to print, group print jobs together and send jobs to the printer. See the next section for more details.
9. **Control Tab** – Not recommended for use – Lets you change printer configurations
10. **Console Tab** – Not recommended for use – Lets you send commands directly and instantly to the printer
11. **Webcam Tab** – Lets you see the live feed from the webcam.

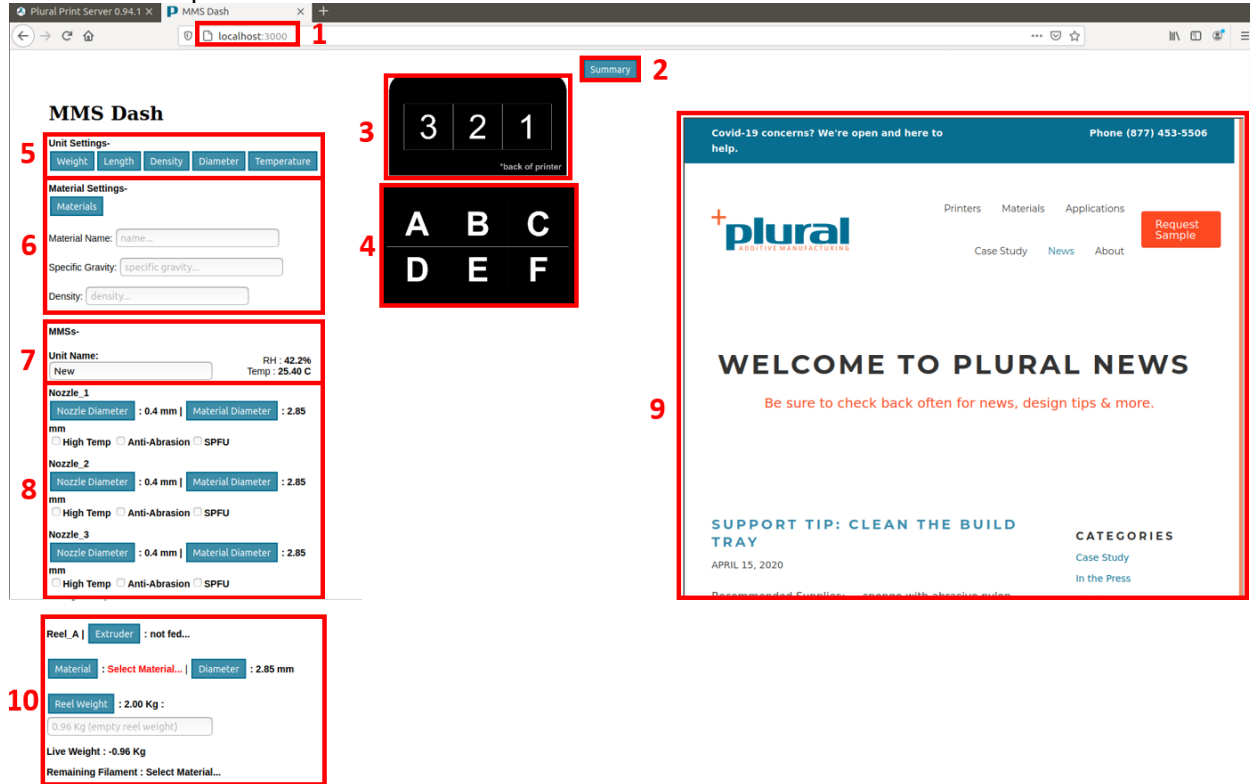
4.8.3.1 Print Tab




1. **Direct Print** – Let's you send your G-Code directly to the printer without saving it to the print server.
2. **Groups Drop Down** – Lets you group your G-Code Files together for a project.
3. **Upload G-Code** – Upload and Save your G-Code onto the Print Server
4. **Search** – Use to search for G-Code files / parts.
5. **Action** – Lets you add, rename or delete groups. You can also use this function to delete all the parts in a group, but the action cannot be undone. Use with caution.
6. **View Mode:** Lets you change the view mode for your save G-Code Files / parts.
7. **Preview / List of the G-Code Files saved onto the server**
 - a. **Print Part** – Immediately starts the printing process
 - b. **Information Menu** – Provides general and/or geometric information about the part.
 - c. **Delete Part** – Once deleted, there is no way to recover the deleted file. Use with caution.


4.9 MMS Dashboard

The MMS Dashboard is a server application that can be accessed over the network with standard web browsers. On the MMS Dash page, you can enter additional materials and edit any existing information, such as material and reel information. After you make changes on the MMS Dash Page, the cabinets touchscreen will prompt you to confirm that the changes have been made on the printer to ensure that the actual set up matched the MMS Servers Data.



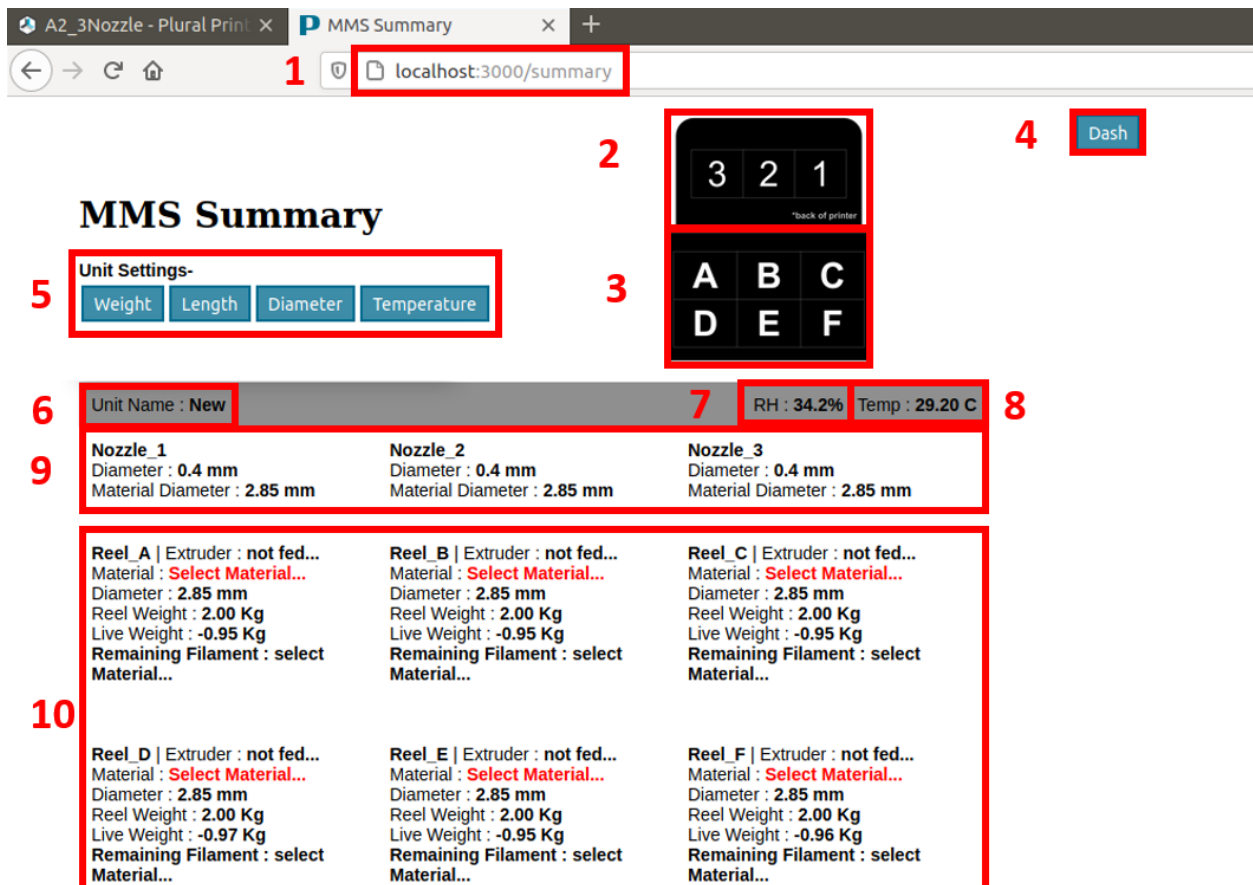
Step	Image
1. Print Server's IP Address To Access the MMS Dashboard, enter the Print Servers IP address followed by :3000, for example: 100.1.100.85: 3000 .	
2. Summary Button Takes you to your MMS Summary page.	
3. Diagram of the nozzle from the back of the printer. <i>Feeder 3, Feeder 2, Feeder 1 in order from left to right.</i>	

<p>4. Diagram of the Spool Holder Brackets (reels) from the view from the back of the printer. <i>Reel A through F, in order from left to right, top to bottom.</i></p>	
<p>5. Unit Settings You can select the unit preference for Weight, Length, Diameter and Temperature</p>	<p>Unit Settings-</p> <div> <div>Weight</div> <div>Length</div> <div>Diameter</div> <div>Temperature</div> </div>
<p>6. Material Settings You can enter and store material information such as the name, specific gravity and density. NOTE – You will need to know the specific gravity or density of each material entered to get reasonably accurate material remaining estimations.</p>	<p>Material Settings-</p> <div>Materials</div> <p>Material Name: <input type="text" value="name..."/></p> <p>Specific Gravity: <input type="text" value="specific gravity..."/></p> <p>Density: <input type="text" value="density..."/></p>
<p>7. MMS Information Unit Name You can change the name of the MMS. Relative Humidity Gives you the current cabinet humidity percentage for the MMS. Box Temperature Gives you the current cabinet temperature for the MMS.</p>	<p>Unit Name:</p> <div>New</div> <p>RH : 42.2% Temp : 25.40 C</p>
<p>8. Nozzles The nozzle information in the MMS Dash is there as a convenient reference to exactly how your printer is configured, and must be input or changed any time the nozzles or configuration is changed by the user. This is most helpful when you have multiple printers connected to the MMS. Nozzle Diameter You may select the nozzle diameter, so you remember the printer configuration. Material Diameter You may select the material diameter, so you remember the printer configuration. Nozzle Type You may select the nozzle type, so you remember the printer configuration.</p>	<div>Nozzle Diameter : 0.4 mm</div> <div>Material Diameter : 2.85</div> <p><input type="checkbox"/> High Temp <input type="checkbox"/> Anti-Abrasion <input type="checkbox"/> SPFU</p>

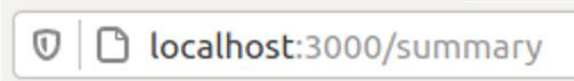



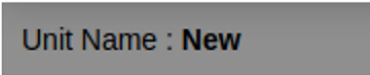
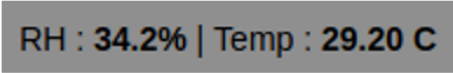
<p>9. Plural News</p> <p>This is where you can retrieve all the latest news from Plural and submit any support tickets.</p>	 <p>WELCOME TO PLURAL NEWS</p> <p>Be sure to check back often for news, design tips & more.</p>
<p>10. Reel Information</p> <p>After entering your material information, you can enter reel weight information, so that you can better track your remaining filament.</p>	<p>Reel_A Extruder : not fed...</p> <p>Material : Select Material... Diameter : 2.85 mm</p> <p>Reel Weight : 2.00 Kg :</p> <p>0.96 Kg (empty reel weight)</p> <p>Live Weight : -0.96 Kg</p> <p>Remaining Filament : Select Material...</p>

4.9.1 MMS Summary

The MMS Summary is where you can find a summary of your nozzles and reel setup.



The screenshot shows the MMS Summary web application. The browser address bar (1) displays 'localhost:3000/summary'. The page title is 'MMS Summary'. A 'Dash' button (4) is in the top right. A 'Unit Settings-' section (5) contains buttons for 'Weight', 'Length', 'Diameter', and 'Temperature'. A numeric keypad (3) and a letter keypad (A-F) are also present. The 'Unit Name' (6) is set to 'New'. Environmental data (7) shows 'RH : 34.2%' and 'Temp : 29.20 C' (8). The interface displays a 2x3 grid of nozzle and reel information. The first row (9) shows 'Nozzle_1', 'Nozzle_2', and 'Nozzle_3', all with a diameter of 0.4 mm and material diameter of 2.85 mm. The second row (10) shows 'Reel_A' through 'Reel_F', each with extruder status, material selection, diameter (2.85 mm), reel weight (2.00 Kg), live weight, and remaining filament information.

Step	Image
1. Print Server's IP Address NOTE - To access the MMS Dashboard, enter the print server's IP address followed by :3000, for example: 100.1.100.85:3000.	
2. Diagram of the nozzle from the back of the printer. 3. Diagram of the Spool Holder Brackets from the view from the back of the printer.	
4. Dash Button Takes you to your MMS Dashboard, to data entry mode to add materials, set spool sizes and store nozzle configuration information.	
5. Unit Settings You can select the unit preference for Weight, Length, Diameter and Temperature	Unit Settings- 
6. Unit Name You can change the name of the printer	
7. Relative Humidity Give you the current cabinet humidity percentage for the MMS	
8. Box Temperature Gives you the current cabinet temperature for the MMS	
9. Nozzle Configuration Gives you a summary of the three nozzle configurations, so you know the Nozzle Diameter and Material Diameter.	Nozzle_1 Diameter : 0.4 mm Material Diameter : 2.85 mm
10. Reel Configuration Gives you the current material information for each spool stored in the MMS, including the extruder it is loaded onto, the material type, diameter, reel weight, live weight and remaining filament. NOTE - Remaining filament on each spool is calculated by using the empty weight of the spool along with the live weight and material information entered for that spool. The server keeps a running average of the empty spool weight, so if you know an empty spool weight has changed enter it into the field for the spool, otherwise no entry will use the default average empty spool weight for that spool size.	Reel_A Extruder : not fed... Material : Select Material... Diameter : 2.85 mm Reel Weight : 2.00 Kg Live Weight : -0.95 Kg Remaining Filament : select Material...

5.0 Printing

Printing parts with your new TRAK 3ntr A2/A4 3D Printer is simple and easy! This section details the 3ntr 3D Printing process. Feel free to print this page out and post it on a wall next to your printer, so you never miss a step!

Basic Printing Checklist

Check	Pre-Printing Steps
<input type="checkbox"/>	1. Verify printer maintenance is up to date
<input type="checkbox"/>	2. Verify the correct file is loaded onto SD card, or Print Server

Check	Material Changes <i>If a material change is needed</i>
<input type="checkbox"/>	1. Unload / Load / Change Filament (<i>with and without MMS</i>)
<input type="checkbox"/>	2. Clean the Nozzles





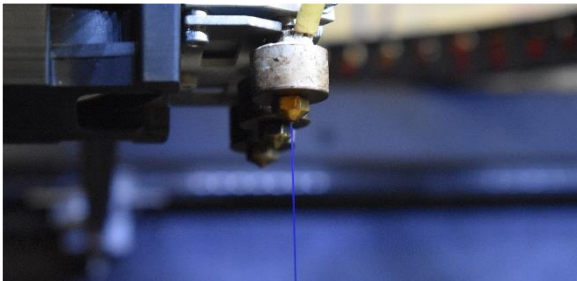

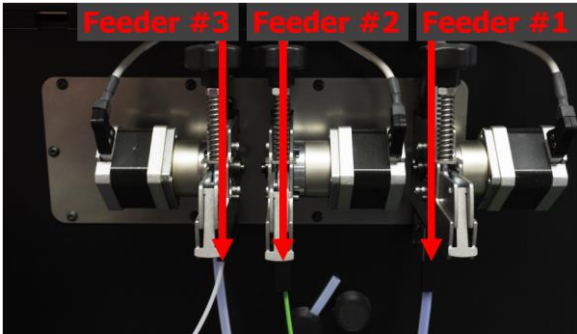

Check	Nozzle Changes
<input type="checkbox"/>	1. Verify you are using the correct nozzle type
<input type="checkbox"/>	2. Verify you are using the correct nozzle size

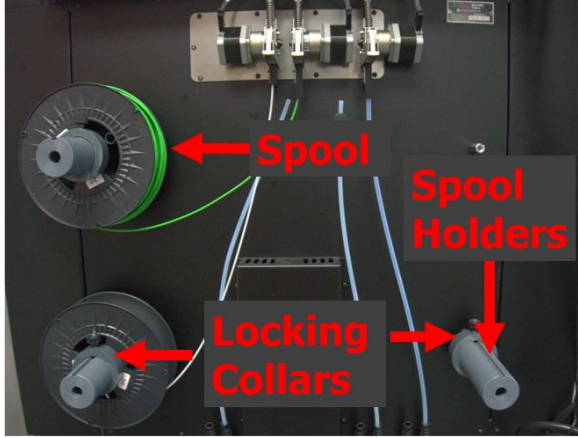


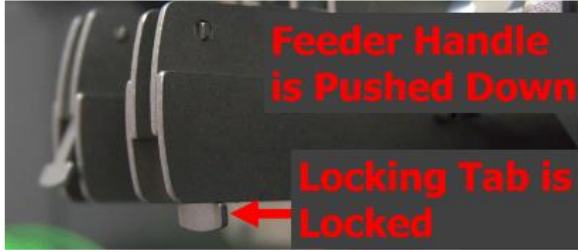
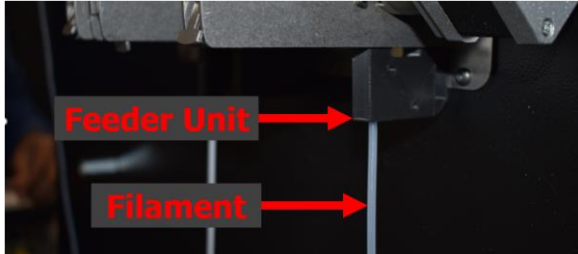
Check	Basic Set up Steps
<input type="checkbox"/>	1. Verify the correct material type is loaded
<input type="checkbox"/>	2. Verify filament quantity
<input type="checkbox"/>	3. Verify the filament feed path is clear
<input type="checkbox"/>	4. Turn HEPA Filter on
<input type="checkbox"/>	5. Check the Build Plate
<input type="checkbox"/>	6. Purge the nozzles you plan to use





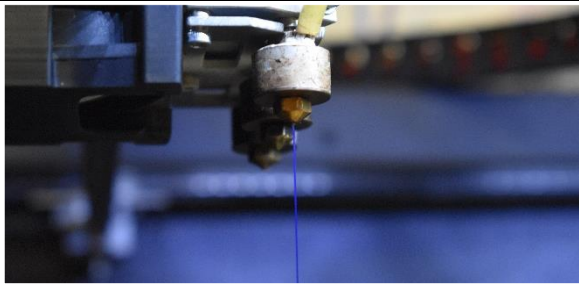
Check	Printing
<input type="checkbox"/>	1. Print your Part from an SD Card or the Print Server

Check	Post Printing
<input type="checkbox"/>	1. Let the print cool down & remove
<input type="checkbox"/>	2. Wipe Build Plate with alcohol
<input type="checkbox"/>	3. Turn off HEPA filter

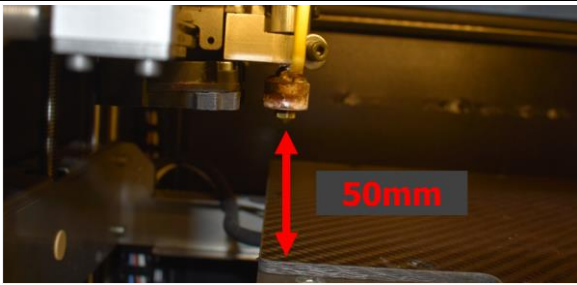


Check	Post Processing
<input type="checkbox"/>	1. Support Removal
<input type="checkbox"/>	2. Additional Post Processing





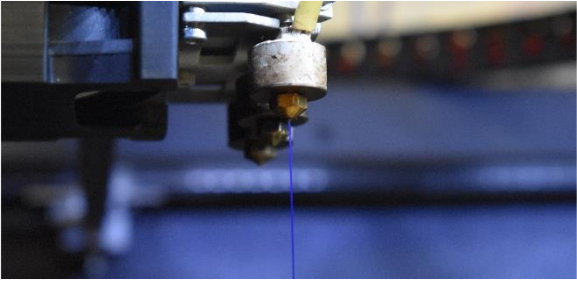

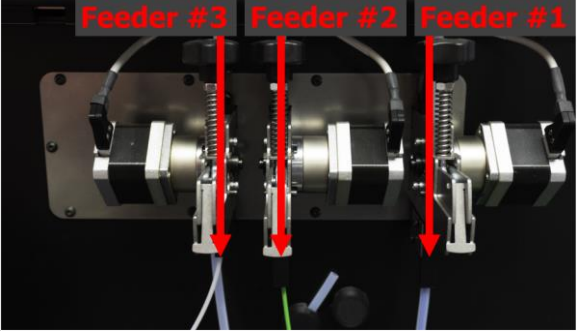

3. Select the nozzle that you want to change filament from.	<p>Change Filament Menu</p> 
4. The Status Line will display " Heating... " as the printer heats the selected nozzle to 245°C.	<p>Status Line</p> 
5. The Status Line will display " Purging #_ " as it purges some filament, and then retracts the filament.	<p>Status Line</p> 
6. The Status Line will display " Change fil.#_ now ", once the purge is complete.	<p>Status Line</p> 
7. Remove the purged filament.	
Back of the Printer:	
8. Push the Feeder Handle down (to disengage the Feeder Mechanism) <i>You may use the Locking Tab to lock the Feeder Mechanism in the pushed down position.</i>	
9. Remove the Filament from the Feeder Unit, rewinding it back on the Spool.	
10. Thread the Filament Tip to the spool to avoid de-coiling, <i>which could lead to knots and print failures.</i>	
11. Unlock and remove the Locking Collar.	

<p>12. Remove the Spool from the Spool Holder.</p>	
<p>13. Fit the new spool on the Spool Holder NOTE - Orientate the spool so that as it unwinds, it is naturally feeding straight to the extruder</p>	
<p>14. Replace the Locking Collar on the Spool Holder. Only a small amount of friction is needed against the spring to keep the filament from de-coiling.</p>	
<p>15. Remove the Filament Tip from the side of the spool where it is secured. NOTE - New spools have the filament secured to the spool with a zip tie. Avoid letting go of the filament tip until it is inside the feeder unit to prevent de-coiling.</p>	
<p>16. Trim off several millimeters off the Filament Tip at an angle to point the tip and remove any damage.</p>	
<p>17. Push the Feeder Handle down (to disengage the Feeder Mechanism) <i>You may use the Locking Tab to lock the Feeder Mechanism in the pushed down position.</i></p>	
<p>18. Feed the Filament into the Feeder Unit until it reaches the Extruder. <i>Upon initial insertion, there may be slight resistance, push past this and keep going until you reach the Extruder.</i></p>	

<p>19. Release the Feeder Handle (to engage the Feeder Mechanism). <i>If you used the Locking Tab, release the tab to release the Feeder Handle.</i></p>	
From the LCD:	
<p>20. Press the black Jog Wheel Button</p>	
<p>21. The Status Line will display "Priming #_", when the machine begins to prime the nozzle.</p>	<p>Status Line</p> 
<p>22. The Status Line will display "Change #_ completed", once the priming is complete.</p>	<p>Status Line</p> 
<p>23. Verify the filament was purged. If not, purge the filament again. 24. Remove the purged filament from the inside of the printer.</p>	
<p>25. You have successfully changed the filament.</p>	

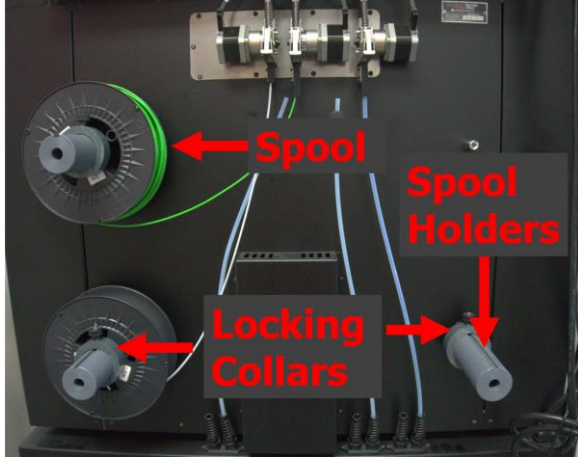



5.2.1.2 Unloading Filament

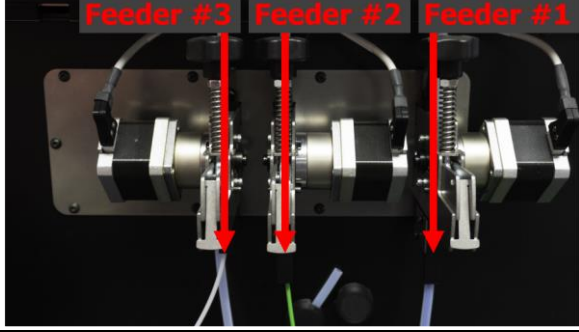

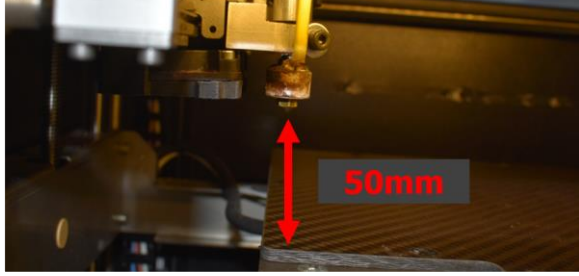






From the LCD:	Images
<p>1. Before unloading filament, always check that there is enough clearance (about 50mm) between the nozzle and the build plate.</p>	
<p>2. Press the black Jog Wheel button to go to the Main Menu. 3. Then go to: Prepare Menu > Unload Filament</p>	<p>Main Menu</p>  <p>Prepare Menu</p> 

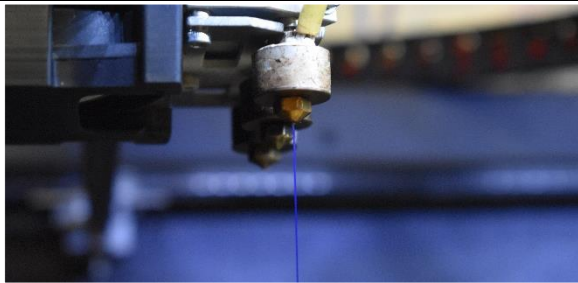
4. Select the nozzle that you want to unload.	<p>Unload Filament Menu</p> 
5. The Status Line will display " Heating... " as the printer heats the selected nozzle to 245°C.	<p>Status Line</p> 
6. The Status Line will display " Unloading #_ " as it purges some filament, and then retracts the filament.	<p>Status Line</p> 
7. The Status Line will display " Unload #_ Completed ", once the purge is complete.	<p>Status Line</p> 
8. Remove the purged filament.	
Back of the Printer:	
9. Push the Feeder Handle down (to disengage the Feeder Mechanism) <i>You may use the Locking Tab to lock the Feeder Mechanism in the pushed down position.</i>	 <p>Feeder Handle is Pushed Down</p> <p>Locking Tab is Locked</p>
10. Remove the Filament from the Feeder Unit, rewinding it back on the Spool.	
11. Thread the Filament Tip to the side of the spool to avoid de-coiling.	 <p>Secured Filament Tip</p> <p>Locking Collar</p>
12. Unlock and remove the Locking Collar.	
13. Remove the Spool from the Spool Holder.	
14. Replace the Locking Collar.	
15. You have unloaded your filament!	

NOTE - Cannot leave an extruder without filament, even if you don't use it. Or else you will encounter the \$ error on the LCD.

5.2.1.3 Loading Filament

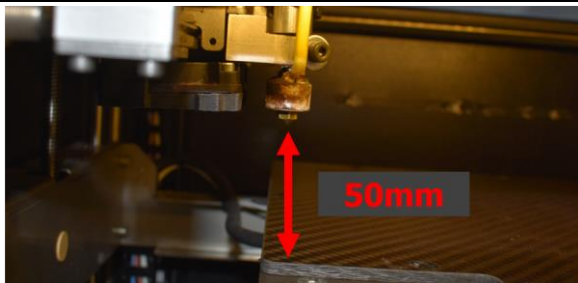


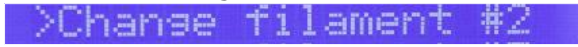


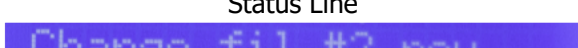

Back of the Printer:	Images
<ol style="list-style-type: none"> 1. Locate the Spool Holder you want to load the spool onto. 	
<ol style="list-style-type: none"> 2. Remove the Locking Collar, then fit the new spool on the Spool Holder. NOTE - Orientate the spool so that as it unwinds, it is naturally feeding straight to the extruder 	
<ol style="list-style-type: none"> 3. Replace the Locking Collar on the Spool Holder. Only a small amount of friction is needed against the spring to keep the filament from de-coiling. 	
<ol style="list-style-type: none"> 4. Remove the Filament Tip from the side of the spool where it is secured. NOTE - New spools have the filament secured to the spool with a zip tie. Avoid letting go of the filament tip until it is inside the feeder unit to prevent de-coiling. 	
<ol style="list-style-type: none"> 5. Trim off several millimeters off the Filament Tip at an angle to point the tip and remove any damage. 	
<ol style="list-style-type: none"> 6. Push the Feeder Handle down (to disengage the Feeder Mechanism) <i>You may use the Locking Tab to lock the Feeder Mechanism in the pushed down position.</i> 	

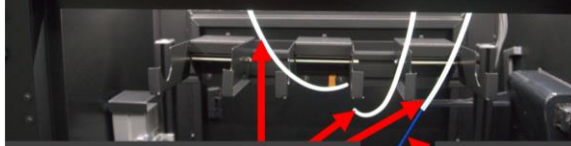
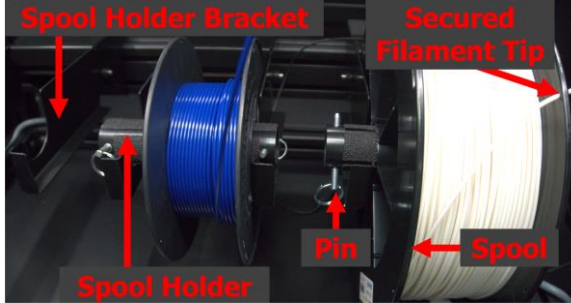

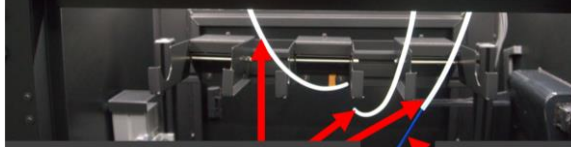

<p>7. Feed the Filament into the Feeder Unit until it reaches the Extruder. <i>Upon initial insertion, there may be slight resistance, push past this and keep going until you reach the Extruder.</i></p>	
<p>8. Release the Feeder Handle (to engage the Feeder Mechanism). <i>If you used the Locking Tab, release the tab to release the Feeder Handle.</i></p>	
<p>On the LCD Screen:</p>	
<p>9. Before loading filament, always check that there is enough clearance (about 50mm) between the nozzle and the build plate.</p>	
<p>10. Press the black Jog Wheel button to go to the Main Menu. 11. Then go to: Prepare Menu > Purge Filament</p>	<p>Main Menu</p>  <p>Prepare Menu</p> 
<p>12. Select the nozzle that you want to purge (the nozzle you loaded filament into)</p>	<p>Purge Filament Menu</p> 
<p>13. The Status Line will display "Heating..." as the printer heats the selected nozzle to 245°C.</p>	<p>Status Line</p> 
<p>14. The Status Line will display "Purging #_" as it purges some filament.</p>	<p>Status Line</p> 
<p>15. The Status Line will display "Purge #_ Completed", once the purge is complete.</p>	<p>Status Line</p> 




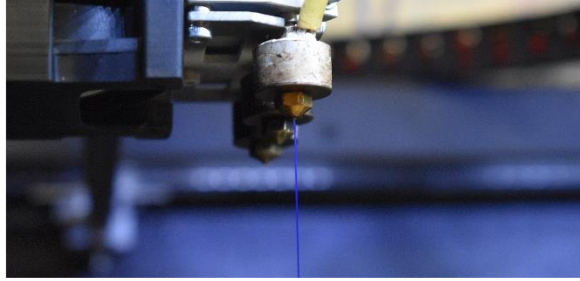
<p>16. Verify the filament was purged. If not, purge the filament again.</p> <p>17. Remove the purged filament from the inside of the printer.</p>	
18. Your nozzle is now ready to use!	

5.2.2 With MMS

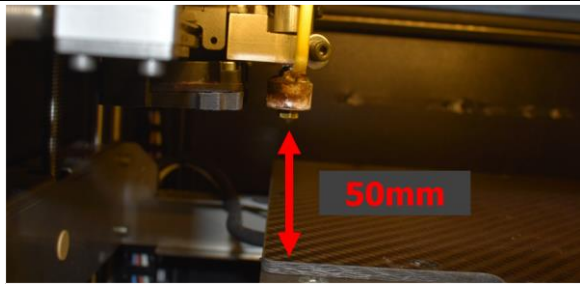


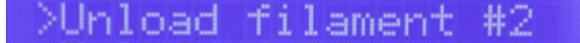


5.2.2.1 Changing Filament

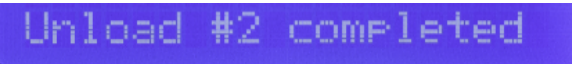
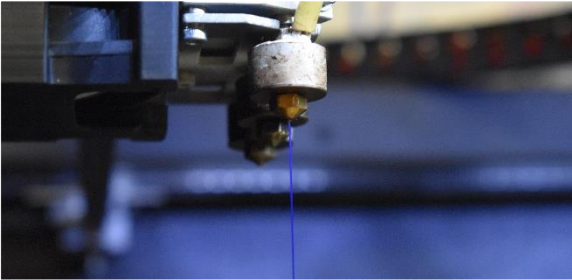

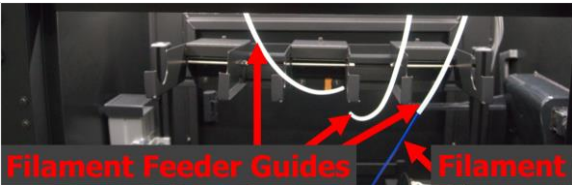
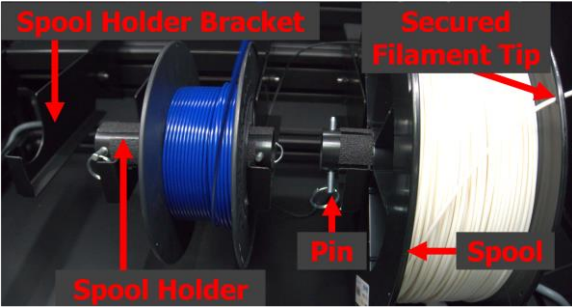
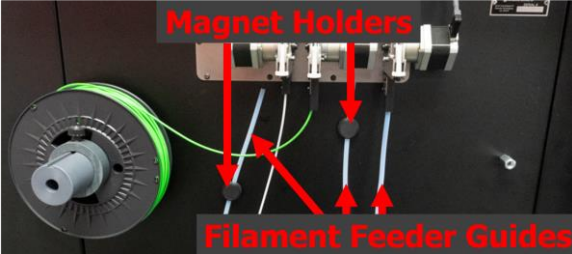
From the LCD:	Images
<p>6. Before changing filament, always check that there is enough clearance (about 50mm) between the nozzle and the build plate before starting.</p>	
<p>7. Press the black Jog Wheel button to go to the Main Menu. Then go to: Prepare Menu > Change Filament</p>	<p>Main Menu</p>  <p>Prepare Menu</p> 
<p>8. Select the nozzle that you want to change filament from.</p>	<p>Change Filament Menu</p> 
<p>9. The Status Line will display "Heating..." as the printer heats the selected nozzle to 245°C.</p>	<p>Status Line</p> 
<p>10. The Status Line will display "Purging #_" as it purges some filament, and then retracts the filament.</p>	<p>Status Line</p> 
<p>11. The Status Line will display "Change fil.#_ now", once the purge is complete.</p>	<p>Status Line</p> 
Back of the Printer:	
<p>12. Push the Feeder Handle down (to disengage the Feeder Mechanism) <i>You may use the Locking Tab to lock the Feeder Mechanism in the pushed down position.</i></p>	
Back of the MMS:	

<p>13. Pull the Filament from inside the MMS. Pull it out of the Filament Feeder Guides, rewinding it back onto the Spool.</p>	 <p>Filament Feeder Guides Filament</p>
<p>14. Thread the Filament Tip to the side of the spool to avoid de-coiling.</p>	
<p>15. Remove the Spool Holder from the Spool Holder Bracket, and remove the Pin.</p>	
<p>16. Remove the old Filament Spool from the Spool Holder.</p>	
<p>17. Load the new Filament Spool onto the Spool Holder. NOTE - Orientate the spool so that as it unwinds, it is naturally feeding straight to the extruder</p>	 <p>Spool Holder Bracket Secured Filament Tip Spool Holder Pin Spool</p>
<p>18. Replace the Pin, and place the Spool Holder back on the Bracket.</p>	
<p>19. Remove the Filament Tip from the side of the new spool where it is secured. NOTE - New spools have the filament secured to the spool with a zip tie. Avoid letting go of the filament tip until it is inside the feeder unit to prevent de-coiling.</p>	
<p>20. Trim off several millimeters off the Filament Tip at an angle to point the tip and remove any damage.</p>	
<p>21. Feed the Filament from the inside of the MMS through the Filament Feeder Guide and through the Feeder Unit, until it reaches the Extruder.</p>	 <p>Filament Feeder Guides Filament</p>
<p>Back of the Printer:</p>	
<p>22. Release the Feeder Handle (to engage the Feeder Mechanism). <i>If you used the Locking Tab, release the tab to release the Feeder Handle.</i></p>	 <p>Feeder Handle is Released Locking Tab is Released</p>

From the LCD:	
23. Press the black Jog Wheel Button	
24. The Status Line will display " Priming #_ " as it primes the nozzle.	<p>Status Line</p> 
25. The Status Line will display " Change #_ completed ", once the priming is complete.	<p>Status Line</p> 
26. Verify the filament was purged. If not, purge the filament again. 27. Remove the purged filament from the inside of the printer.	
28. You have successfully changed the filament.	

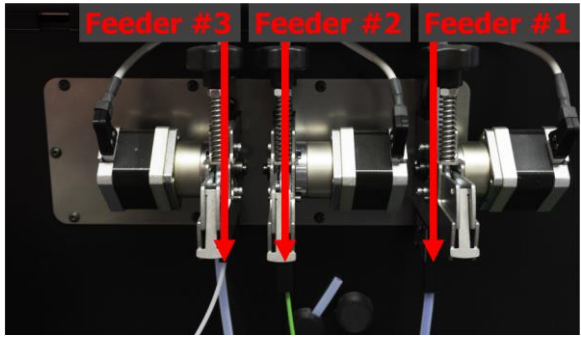
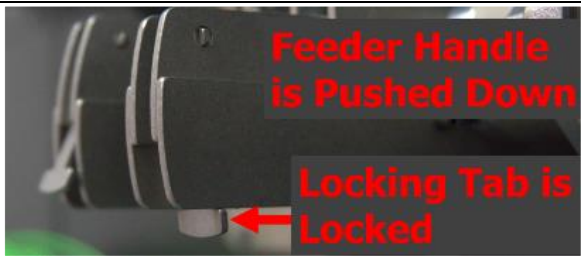
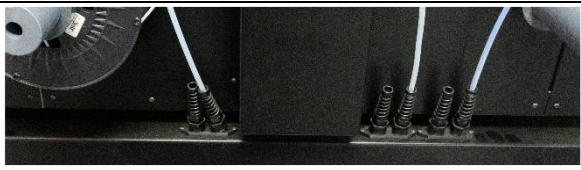
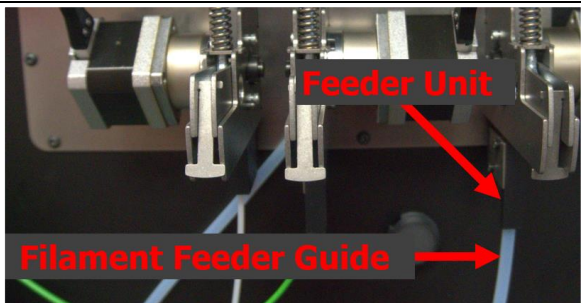
5.2.2.2 Unloading Filament

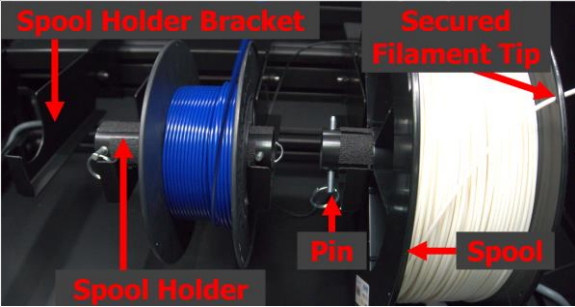

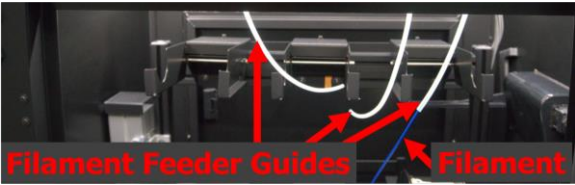

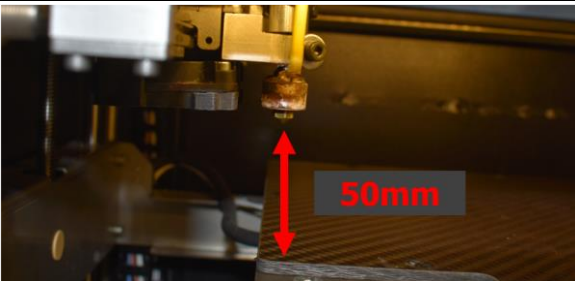
From the LCD:	Images
1. Before unloading filament, always check that there is enough clearance (about 50mm) between the nozzle and the build plate before starting.	
2. Press the black Jog Wheel button to go to the Main Menu. Then go to: Prepare Menu > Unload Filament	<p>Main Menu</p>  <p>Prepare Menu</p> 
3. Select the nozzle that you want to unload.	<p>Unload Filament Menu</p> 
4. The Status Line will display " Heating... " as the printer heats the selected nozzle to 245°C.	<p>Status Line</p> 
5. The Status Line will display " Unloading #_ " as it purges some filament, and then retracts the filament.	<p>Status Line</p> 







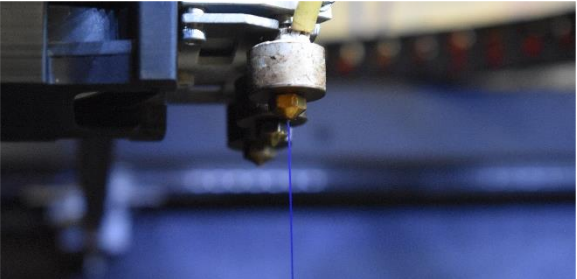
6. The Status Line will display " Unload #_ Completed ", once the purge is complete.	<div>Status Line</div> 
7. Remove the purged filament.	
Back of the Printer:	
8. Push the Feeder Handle down (to disengage the Feeder Mechanism) <i>You may use the Locking Tab to lock the Feeder Mechanism in the pushed down position.</i>	
Back of the MMS:	
9. Pull the Filament from the Filament Feeder Guides rewinding it back on the Spool.	
10. Thread the Filament Tip to the side of the spool to avoid de-coiling.	
11. Remove the Spool Holder from the Spool Holder Bracket, and remove the Pin.	
12. Remove the Spool from the Spool Holder.	
13. Replace the Pin, and place the empty Spool Holder on the Bracket.	
14. Remove the Filament Feeder Guides from the Feeder Unit and hold them to the back of the printer with the Magnet Holders. NOTE - The Filament Feeder Guides do not need to be removed from the MMS every time you unload filament.	
15. You have unloaded your filament!	

NOTE - Cannot leave an extruder without filament, even if you don't use it. Or else you will encounter the \$ error on the LCD.

5.2.2.3 Loading Filament

Back of the Printer:	
<p>1. Locate the Feeder Unit you want to load material into. <i>Ex: Feeder #3 goes to Extruder #3</i></p>	
<p>2. Push the Feeder Handle down (to disengage the Feeder Mechanism) <i>You may use the Locking Tab to lock the Feeder Mechanism in the pushed down position.</i></p>	
<p><i>If applicable</i></p> <p>3. Feed the Filament Feeder Guide from the inside of the MMS Feeders / Strain Relief Flex Collars. Leave it about 2" inside the MMS.</p>	
<p>4. Connect the Filament Feeder Guides to the Feeder Unit.</p>	

Back of the MMS:	
5. Remove the Spool Holder from the Spool Holder Bracket.	
6. Remove the Pin from the Spool Holder and fit the new Spool on it.	
7. Replace the Pin on the Spool Holder, and place the loaded Spool Holder on the Bracket. NOTE - Orientate the spool so that as it unwinds, it is naturally feeding straight to the extruder	
8. Remove the Filament Tip from the side of the spool where it is secured. NOTE - New spools have the filament secured to the spool with a zip tie. Avoid letting go of the filament tip until it is inside the feeder unit to prevent de-coiling.	
9. Trim off several millimeters off the Filament Tip at an angle to point the tip and remove any damage.	
10. Feed the Filament from the inside of the MMS through the Filament Feeder Guide and through the Feeder Unit, until it reaches the Extruder.	
Back of the Printer:	
11. Release the Feeder Handle (to engage the Feeder Mechanism). <i>If you used the Locking Tab, release the tab to release the Feeder Handle.</i>	
On the LCD Screen:	
12. Before loading filament, always check that there is enough clearance (about 50mm) between the nozzle and the build plate.	

13. Press the black Jog Wheel button to go to the Main Menu.	Main Menu 
14. Then go to: Prepare Menu > Purge Filament	Prepare Menu 
15. Select the nozzle that you loaded >Purge filament #__ <i>For example, if we loaded Extruder #2, we are purging Nozzle #2</i>	Purge Filament Menu 
16. The Status Line will display " Heating... " as the printer heats the selected nozzle to 245°C.	Status Line 
17. The Status Line will display " Purging #_ " as it purges some filament.	Status Line 
18. The Status Line will display " Purge #_ Completed ", once the purge is complete.	Status Line 
19. Verify the filament was purged. If not, purge the filament again. 20. Remove the purged filament from the inside of the printer.	
21. Your nozzle is now ready to use!	


5.2.3 Nozzle Cleaning Operation

Cleaning the nozzles is highly recommended after each material change, but most importantly if you're changing to a different material, or a different colored material. When you unload any material, the inside of the nozzle is not always completely clean, and there may be some filament left inside the nozzle. Running the Nozzle Cleaning operation a few times will help remove the left-over material.

NOZZLE CLEANING

Use the Hollow Cleaning Nylon filament.



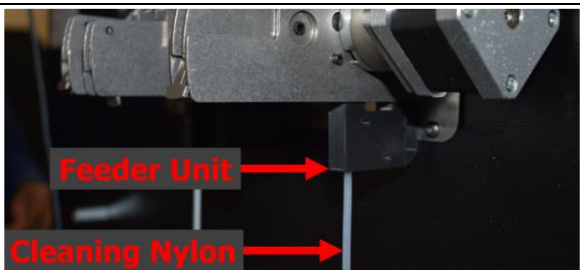

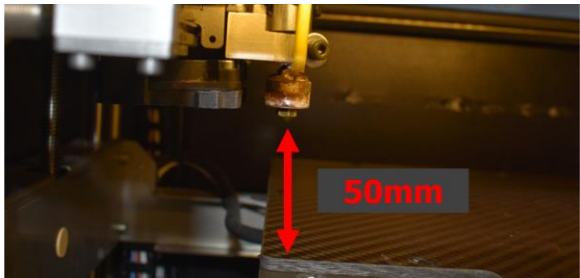
Run "Nozzle Cleaning" Program from the SD card


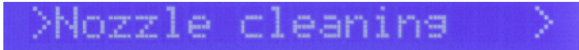

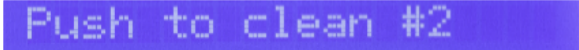


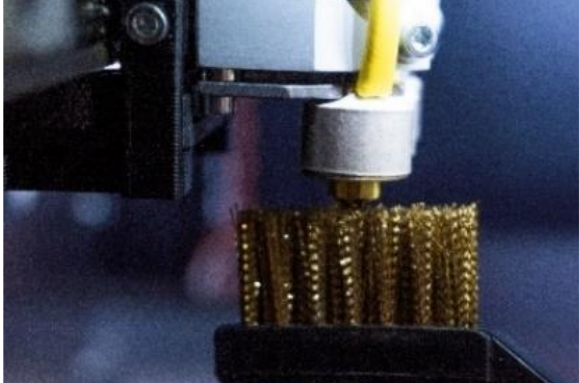

Cycle #	1	2	3	4	5	6	7	8	9	10
Nozzle #1										

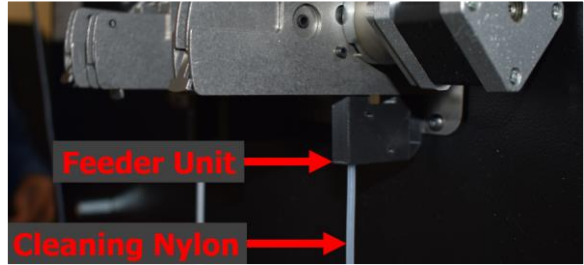


Sample of multiple cleaning cycle operations being completed

NOTE – No Filament should be loaded onto the printer at this time. If there is, complete the Unloading Filament procedure first.

NOTE – If you have an MMS – Avoid feeding the Cleaning nylon through the Filament Feeder Guides for easier loading and unloading of the cleaning nylon.

At the back of the Printer	
<ol style="list-style-type: none"> 1. Push the Feeder Handle down (to disengage the Feeder Mechanism) <i>You may use the Locking Tab to lock the Feeder Mechanism in the pushed down position.</i> 	
<ol style="list-style-type: none"> 2. Trim off several millimeters off the Filament Tip at an angle to point the tip and remove any damage. 	
<ol style="list-style-type: none"> 3. Feed the Cleaning Nylon through the Feeder Unit until it reaches the Extruder. 	
<ol style="list-style-type: none"> 4. Release the Feeder Handle (to engage the Feeder Mechanism). <i>If you used the Locking Tab, release the tab to release the Feeder Handle.</i> 	
From the LCD:	
<ol style="list-style-type: none"> 5. Before changing filament, always check that there is enough clearance (about 50mm) between the nozzle and the build plate before starting. 	

<p>6. Press the black Jog Wheel button to go to the Main Menu.</p> <p>7. Then go to: Prepare Menu > Nozzle cleaning</p>	<p>Main Menu</p>  <p>Prepare Menu</p> 
<p>8. Select the nozzle you want to clean, and has Cleaning Nylon loaded into it.</p>	<p>Clean Nozzle Menu</p> 
<p>9. The printer will beep and the Status Line will read "Push to Clean #_".</p> <p>10. Press the black Jog Wheel Button to start the nozzle cleaning.</p>	<p>Status Line</p> 
<p>11. The Status Line will display "Heating..." as the printer heats the selected nozzle to 245°C.</p>	<p>Status Line</p> 
<p>12. The Status Line will display "Heating Done." once it is heated, and start to purge the cleaning nylon.</p> <p>13. Once the purge is complete, the nozzle will begin to cool down until it reaches 140°C, then it will retract the filament from the nozzle tip.</p>	<p>Status Line</p> 
<p>At the front of the printer</p>	
<p>14. Remove the purged filament from the nozzle tip.</p> <p>15. Scrub nozzles with a brass brush.</p>	
<p>At the back of the printer</p>	
<p>16. Push the Feeder Handle down (to disengage the Feeder Mechanism) <i>You may use the Locking Tab to lock the Feeder Mechanism in the pushed down position.</i></p>	

17. Feed the Cleaning Nylon into the Feeder Unit.	
18. Inspect the Nylon tip to see if it is clean and cone shaped.	 <i>Clean, Cone shaped Nylon tip</i>
19. If it looks like the picture on the right, your nozzle is now ready to be loaded with new filament!	
20. If it is not, repeat the Nozzle Cleaning Operation until it looks clean and cone shaped.	 <i>Dirty, misshaped Nylon Tip</i>

5.3 Nozzle Changes

Once you verify that maintenance is up to date, have the correct file loaded, and learned to load/unload/change filament and clean the nozzles, it's time to verify the nozzle setup! The nozzle is the component of a 3D printer that actually extrudes the filament to build the part. There are many different types and sizes available, and installing the correct one for the print is critical.

Nozzle Types




The nozzle type can have a large impact on the quality of your print, as well as how quickly you have to replace the nozzles. Before you print, you should verify that you are using the correct nozzle type, based on the material required for the print.

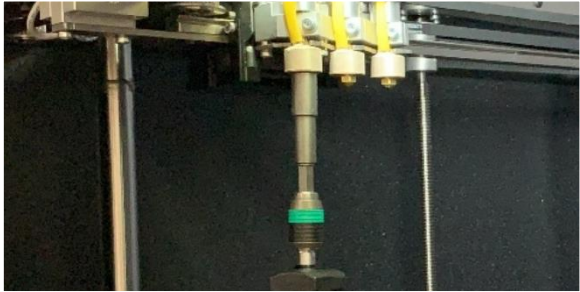

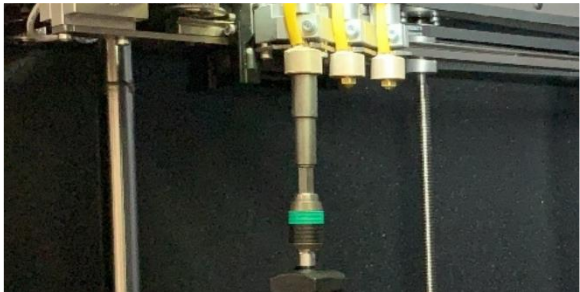
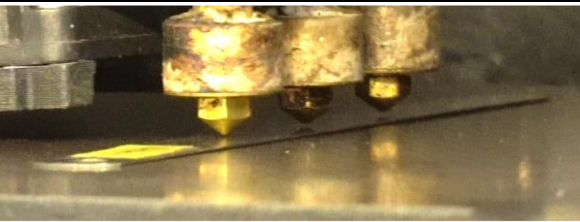
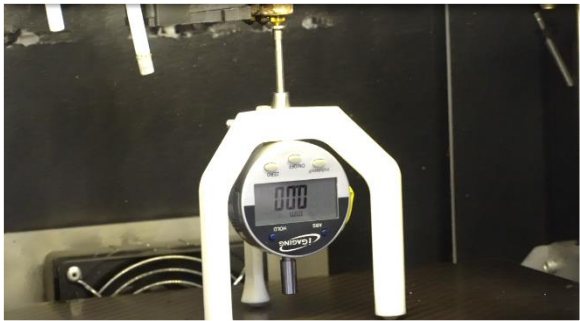

Nozzle Sizes







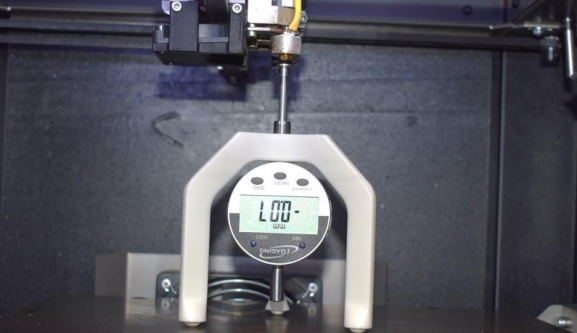

Nozzle sizes can have a huge impact on print quality, surface finish and print time. Before you print, make sure the printers' nozzles are configured based on the settings you selected on the slicer.

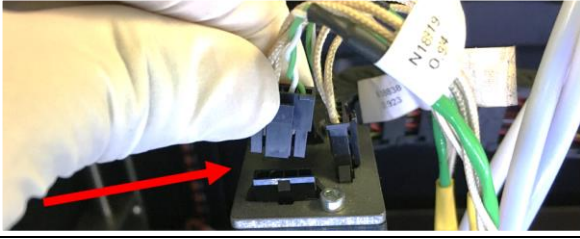
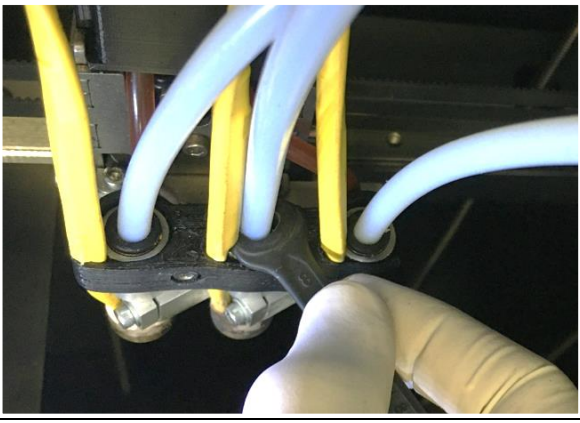
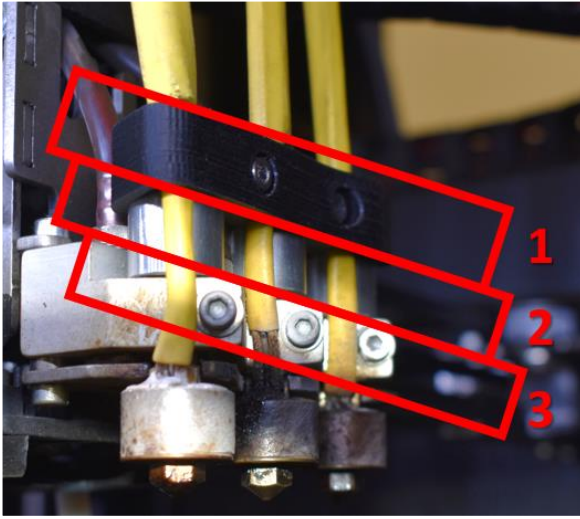

CAUTION	
When printing, you must install the correct nozzle diameter size and nozzle type based upon the print requirements. Failure to install the correct nozzle size and type may result in bad prints, clogged nozzles, rapid nozzle wear, and/or machine downtime.	

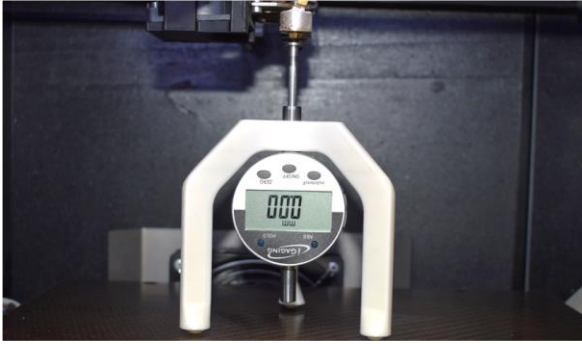
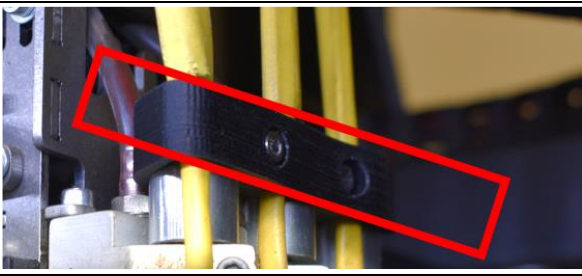
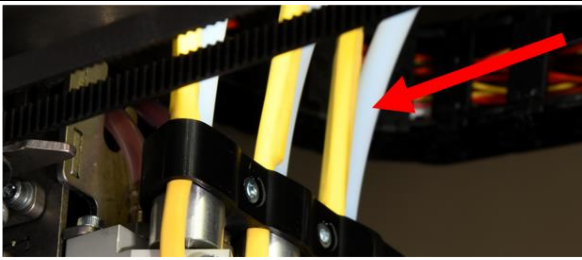
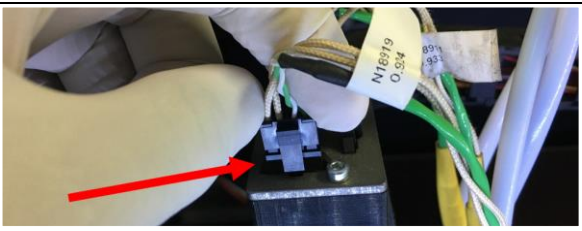

5.3.1 Nozzle Change Procedure

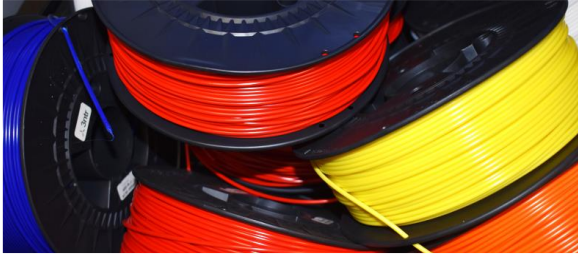





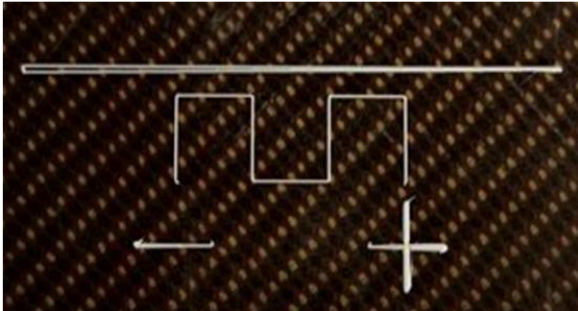
Step	Image
1. Unload filament from the nozzles being changed.	
2. Perform the Clean Nozzle Procedure , this will ensure most of the material within the nozzle is removed, in order to make the nozzle change much easier.	
3. Using the Move Axis function, move the Z – Axis about 200mm down.	

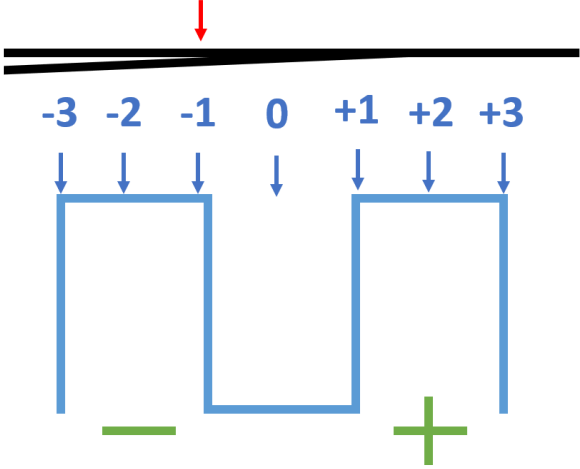
<p>4. Fit the 7mm socket on the dynamometric screwdriver.</p> <p>5. Put the socket around the nozzle tip, and loosen the nozzle until it is removed.</p>	
<p>6. Grab the new nozzle, and put it into the socket.</p> <div data-bbox="207 625 794 709" style="border: 1px solid black; padding: 5px; text-align: center;"> <p>WARNING! Socket may be hot!</p> </div>	
<p>7. Torque the nozzle to 1.3 Nm.</p> <p>NOTE – when using hardened nozzles, torque the nozzles while they're hot. Use the "Unload Filament" function to heat up the nozzles.</p>	
<p>8. Using a feeler gauge, ensure that there is a gap between the nozzles and the build plate, of approximately</p> <ul style="list-style-type: none"> • 0.4mm for 0.4mm nozzles, and • 0.5mm for 0.6mm nozzles 	
<p>9. Use the Move Axis function to move the Z-axis up to 142mm.</p> <p>10. Place the Dial Indicator on its stand, and place it underneath nozzle # 1.</p> <p>11. Reset the dial indicator, so that the measurement is at 0.00mm when placed under nozzle #1.</p>	
<p>12. Make sure the MicroSD card with the pre-installed programs is inserted to the back of the printer.</p>	







<p>13. From the LCD screen, go to: Prepare > Software Tools > A2/A4 <i>(depending on what machine you have)</i> > Service > Z_Comparison.gcode</p>	<p>Main Menu</p>  <p>Prepare Menu</p>  <p>Software Tools</p>  <p>A4 Folder</p>  <p>Service Folder</p> 
<p>14. The program will automatically start to move the print head in the programmed sequence in order to give a dial indicator reading for each nozzle.</p> <ul style="list-style-type: none"> • The recommended tolerance between Nozzle 1 & 3 is +/- 0.02mm. • The recommended tolerance between Nozzle 1 & 2 or Nozzle 2 & 3 is +/- 0.01mm. <p>If the nozzle heights are not within the tolerances listed above, they will need to be re-calibrated. If the nozzles heights are within tolerance, move on to Calibration Prints <i>(skip Adjust your Z Nozzle Height)</i></p>	
<p>Adjust your Z Nozzle Height <i>(if applicable):</i></p>	
<p>1. Leave the Dial Indicator placed underneath the nozzle that you need to adjust.</p>	
<p>2. Remove the top cover from the printer for better access to the extruder assembly and print head.</p>	

<p>3. Disconnect the Pin Head Connector.</p>	
<p>4. Remove the Bowden Tubes from the Tube Adapter. To do so, use the #8 wrench provided to you, to push down on the “push to connect fittings” in order to release the Bowden tube.</p> <p>NOTE – Never pull on or twist a Bowden tube that is still connected to the Tube Adapter. Doing so could result in breaking the “push to connect fittings” on the Tube Adapter, requiring a new Tube Adapter to be purchased.</p>	
<p>5. Remove the screws on the Adapter Bracket, highlighted as item #1 on the image to the right.</p>	
<p>6. Remove the Adapter Bracket, highlighted as item #1 on the image to the right. <i>(This will provide you with access to the Tube Adapters, labeled as item #2 on the image to the right).</i></p>	
<p>7. Loosen only the screws for only the nozzles that need adjustment, labeled as item #3 on the image to the right.</p>	
<p>8. Once the screws are loose, you may tighten or loosen the Tube Adapter by turning it, using the tube adapter wrench provided to you. Tighten the adapter bracket to move the nozzle up, and loosen the Adapter Bracket to move the nozzle down.</p> <p>NOTE – You may need to push down on the Tube Adapter.</p>	

<p>9. Use the Dial Indicator to ensure the nozzle height is within tolerance.</p> <p>10. Once it is within tolerance, tighten the screw for that nozzle, and then tighten the Tube Adapter to lock it into place.</p>	
<p>11. Place the Adapter Bracket back on, and tighten the screws.</p>	
<p>12. Connect the Bowden Tubes back onto the Tube Adapter.</p>	
<p>13. Reconnect the Pin Head Connector.</p>	
<p>14. Replace the top cover, and secure it into place using the screws.</p>	
<p><i>Feel free to run the Z_Comparison.gcode file again, if you would like to ensure the heights are within tolerance.</i></p> <p>15. Remove the Dial Indicator.</p>	

<p>Calibration Prints</p> <p>NOTE - We recommend running the following two calibration prints after every nozzle change, in order to check that the printer is calibrated and ready to print:</p> <ul style="list-style-type: none"> • Z-Offset Calibration Print • XY Calibration Print 	
<p>1. In order to run the two calibration prints, you will need to load ABS or ASA into all 3 nozzles. Load the material now, before moving onto the next step.</p> <p>NOTE - We recommend loading 3 highly contrasting colors in order to be able to see the calibration prints clearer. For example, in Extruder 1, load black, white or grey. And in extruder 2 and 3, load different, contrasting colors.</p>	
<p>To complete the Z Offset Calibration Print:</p> <p>2. From the LCD, go to: Prepare > Software Tools > A2 or A4 (depending on what machine you have) > Service > Z_Offset_Ext1.gcode</p>	<p>Main Menu</p>  <p>Prepare Menu</p>  <p>Software Tools</p>  <p>A4 Folder</p>  <p>Service Folder</p> 
<p>The Z offset calibration print takes approximately 20 minutes to print, and should look similar to the image on the right.</p>	

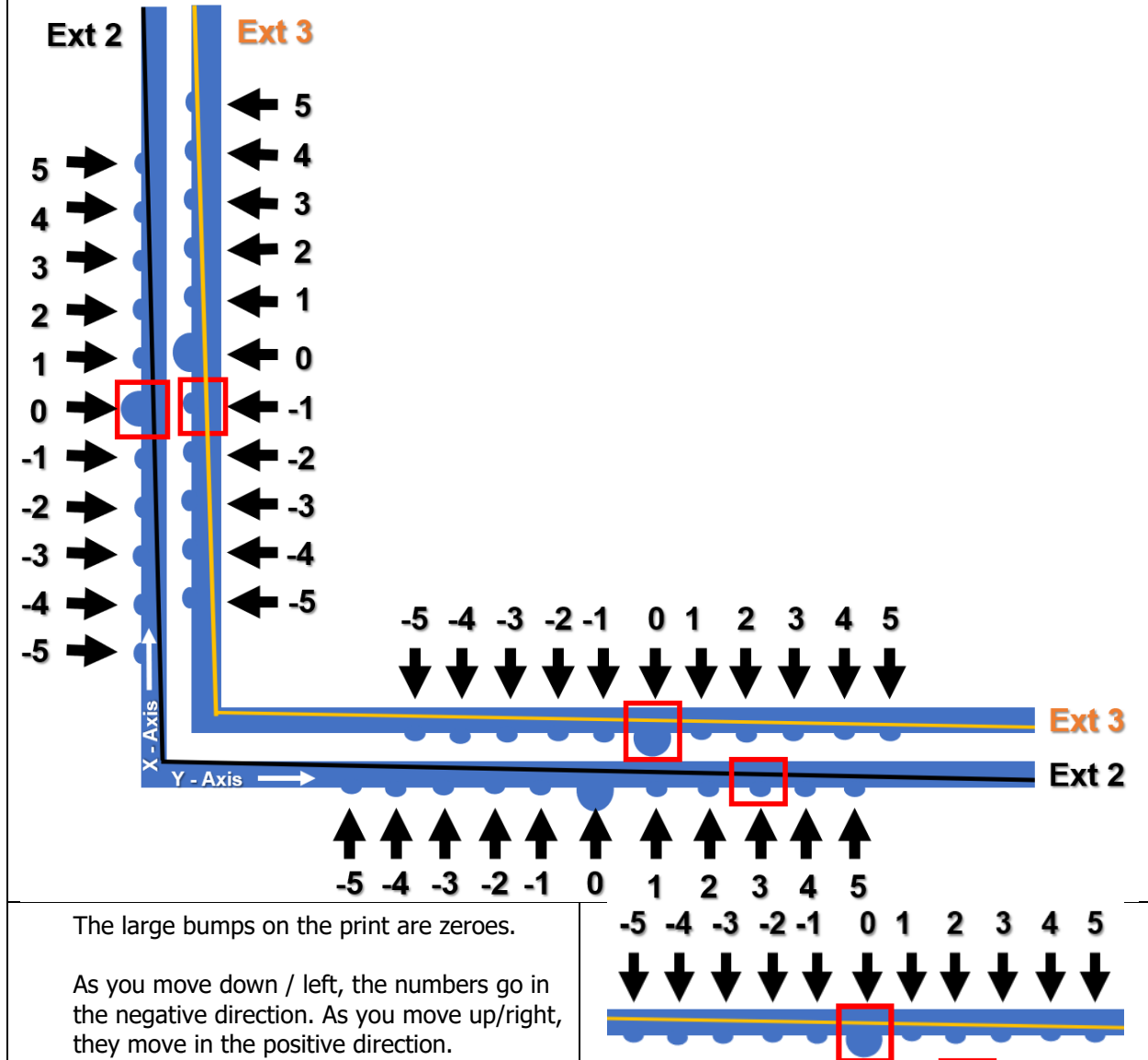
<p>3. Once the Print is completed, read the Z Offset.</p> <p>To read the offset, see the image to the right.</p> <p>To find the offset, you must find where the two lines meet.</p> <p>The red arrow shows where the two lines meet in this example, which is right around "-1".</p> <p>Therefore, the Z offset value is "-1".</p>	
<p>To record the Z Offset value:</p> <p>4. From the LCD, go to: Prepare Menu > Hardware > Calibration > Offset Z:</p>	<p>Main Menu</p> <p>Prepare ↑</p> <p>Prepare Menu</p> <p>>Hardware ></p> <p>Hardware Menu</p> <p>>Calibration ></p> <p>Calibration Menu</p> <p>>Offset Z : - 1</p>
<p>5. Enter the Z Offset reading. <i>In this example, it is "-1", so you would turn the black jog wheel counter clockwise until you see "-1".</i> <i>Press the black jog wheel button to record the offset value.</i></p>	<p>Offset Z : - 1</p>
<p>6. Once the value is entered, go back to the Hardware Menu.</p>	<p>Calibration Folder</p> <p>↑Hardware ↑</p>
<p>7. Scroll down to the bottom and select "Save".</p>	<p>Hardware Menu</p> <p>>Save ></p>
<p>8. Select "save" again.</p>	<p>>Save ></p>
<p>9. Your Z Offset is now set!</p>	

<p>Now it is time to move onto the next calibration print; XY Calibration Print.</p> <p>10. From the LCD, go to: Prepare > Software Tools > A2 or A4 <i>(depending on what machine you have)</i> > Service > XY_Ext_2+3.gcode</p>	<p>Main Menu</p>  <p>Prepare Menu</p>  <p>Software tools Folder</p>  <p>A4 Folder</p>  <p>Service Folder</p> 
<p>The XY calibration print takes approximately 42 minutes to print and should look similar to the image on the right.</p>	

11. Once the print is completed, read the XY offset values.

To read the offset values, see image below.

NOTE – The axes on the calibration print are flipped. The vertical line is the X-Axis Offset and the horizontal line is the Y-Axis Offset.



<div>12.To find the offset value, look at the line that traverses the row/column. When the line is centered perfectly in the middle, that is where the offset value can be found.</div> <div>13.In this example above, the XY Offset values would be as follows:</div> <table><tr><td>Offset Values</td><td>Ext 2</td><td>Ext 3</td></tr><tr><td>X-Axis</td><td>0</td><td>-1</td></tr><tr><td>Y-Axis</td><td>3</td><td>0</td></tr></table>	Offset Values	Ext 2	Ext 3	X-Axis	0	-1	Y-Axis	3	0	
Offset Values	Ext 2	Ext 3								
X-Axis	0	-1								
Y-Axis	3	0								
<div>To record the XY Offset Values:</div> <div>14.From the LCD, go to Prepare Menu > Hardware > Calibration > Offset #2</div>	<div>Main Menu</div> <div>Prepare ↑</div> <div>Prepare Menu</div> <div>>Hardware ></div> <div>Hardware Menu</div> <div>>Calibration ></div> <div>Calibration Menu</div> <div>>Offset #2 ></div>									
<div>15.Use the black jog wheel to select which offset you want to enter a value for.</div>										
<div>16.Enter the offset values for X and Y.</div>										
<div>Offset X: In this example it would be 0</div>	<div>#2 OFFSET X : 0</div>									
<div>Offset Y: In this example it would be 3</div>	<div>OFFSET Y : 3</div>									
<div>17.Go back to Calibration, then go to Offset #3</div>	<div>>Offset #3 ></div>									
<div>18.Enter the offset values for X and Y.</div>										
<div>Offset X: In this example it would be -1</div>	<div>#3 OFFSET X : -1</div>									
<div>Offset Y: In this example it would be 0</div>	<div>OFFSET Y : 0</div>									
<div>19.Go back to the Hardware Menu</div> <div>20.Scroll down to the bottom and select "save".</div>	<div>Calibration Menu</div> <div>↑Hardware ↑</div> <div>Hardware Menu</div> <div>>Save ></div>									
<div>21.Select "save" again.</div>	<div>>Save ></div>									
<div>22.You have now completed the XY Calibration Check!</div> <div>You can now unload the ABS/ASA if you are printing with another material, and load the material you wish to print with.</div>										

5.4 Basic Setup Steps

5.4.1 Verify Correct Material is Loaded

Based on the print requirements, loading the correct material is a critical step in the printing process. In the event that the wrong material is loaded into the printer, it can lead to printing with the wrong temperatures which can cause print failures, nozzle clogs, or extensive maintenance and even serious damage to printer.

5.4.2 Verify Filament Quantity

When you are preparing to print, always verify that you have enough filament for the print. If you don't, you can replace the spool, or you can prepare for a mid-print filament change. The slicer will tell you the estimated amount of filament needed for the print.

5.4.2.1 Without an MMS

Typically, in order to check how much filament you have left, you would have to eyeball it and make a judgment call based on the quantity needed for the print.

5.4.2.2 With an MMS

The LCD on the MMS and the Print Server's Dashboard, will show you how much material is currently loaded on the MMS. The MMS precisely measures the spool so you can have confidence that your print will not be paused by running out of filament. You can trust your printer to run longer prints and with a higher degree of guaranteed success.

5.4.3 Verify Filament Feed Path is Clear

Always verify that the spool is oriented in a way that feeds easily into the feeder and ensure minimal friction. Also verify that there are no obstructions in the feed path.

If excess friction is placed on the filament while feeding into the feeder unit, or it gets jammed on something, it can cause immediate print issues and feeder damage.

5.4.4 Turn HEPA Filter On

The HEPA Filter is critical to one's health when printing. Printing polymers can lead to Volatile Organic Compounds (VOC's) that one might inhale.

5.4.4.1 Without an MMS

In order to assure the safety of our customers, TRAK provides a standalone HEPA filter even if you do not purchase an MMS. It is not integrated into the printer; therefore, it requires its own installation process (but it is quite simple!)

5.4.4.2 With an MMS

When you purchase a 3D Printer from TRAK, with a Material Management System (MMS), a HEPA Filter is already built in to the MMS and ready to go! All you need to do is flip the switch ON.

5.4.5 Check the Build Plate

Make sure the Build Plate is clean, clear and properly seated.







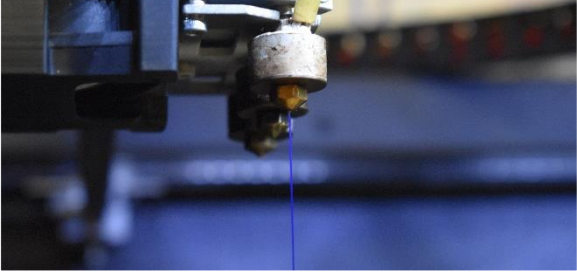
5.4.6 Purge the Nozzles

Purging the nozzles before a print can help identify some potential issues such as partially clogged nozzles, feeder gear issues, and/or flow path issues. A good filament purge is straight, smooth and consistent. A bad filament purge will coil up at the nozzle tip, bubble up and/or not flow consistently, or at all. As a standard printing step, it is highly recommended that you purge some filament before every print.

CAUTION

Before purging nozzles, verify the default purging temperature (245°C) is acceptable for the material in use, otherwise use a custom purging routine/temperature. The default setting is acceptable for the ABS/ASA materials that ship with the printer.

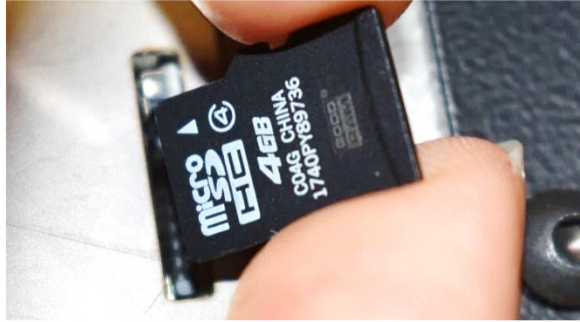
5.4.6.1 Purge Procedure:

On the LCD Screen:	
1. Press the black Jog Wheel button to go to the Main Menu .	Main Menu 
2. Then go to Prepare Menu > Purge Filament	Prepare Menu 
3. Select the nozzle you want to purge >Purge filament #__	Purge Filament Menu 
4. The Status Line will display "Heating..." as the printer heats the selected nozzle to 245°C.	Status Line 
5. The Status Line will display "Purging #_" as it purges some filament.	Status Line 
6. The Status Line will display "Purge #_ Completed", once the purge is complete.	Status Line 
7. Remove the purged filament.	 <i>Good purge: Straight, smooth and consistent</i>
8. Your nozzle is now ready to use!	

5.5 Printing

Now that you have verified that everything was setup properly, let's start printing! You have two options when it comes to printing, you can print using an SD Card or the Print Server.

5.5.1 Print from an SD Card


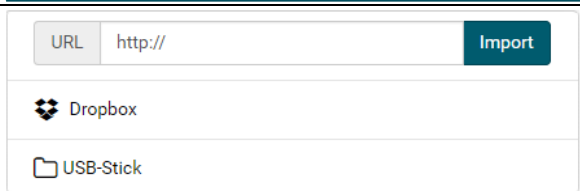
Steps	
<p>1. Insert an SD Card.</p> <p>NOTE - If the SD card falls into the printer, you will have to remove the side sheet metal cover to retrieve it.</p> <p>Initializing your SD Card: If you do not know if your card is already initialized, go to the prepare menu. If you see "ERRORE SD" at the bottom of the menu, then you need to initialize your SD Card.</p> <p>To initialize, go to Prepare > init. SD</p> <p>If you do not see "ERRORE SD", then your card is already initialized.</p>	
2. Once initialized, go to: Prepare > Software Tools	
3. Browse until you find the desired g-code file to print.	

5.5.2 Print from the Print Server

When printing from the Print server, you have two options; Direct Print, or Upload G-Code.

5.5.2.1 Direct Print

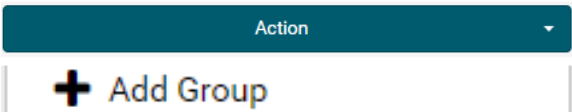
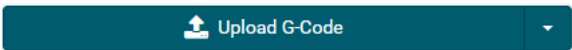
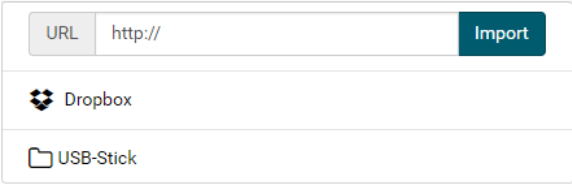

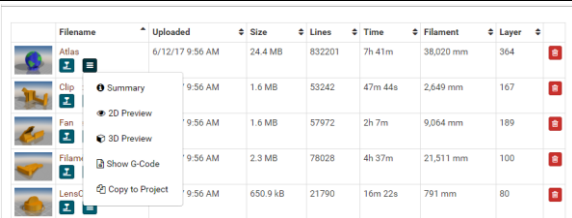

To upload and start printing directly, use the Direct Print button.

Steps	
1. Press Direct Print	
2. Upload the file that you want to print and press "import".	
3. You are not printing your part!	

5.5.2.2 Upload G-Code

To save your print to the print server first, and then print, use "Upload G-Code".

Steps	
<p>1. Make sure there is a group created prior to uploading your G-Code.</p> <p>NOTE - All G-Codes are stored in groups, so that related objects can be managed clearly in a separate group. If no group is</p>	

assigned, the group DEFAULT is used automatically.	
To create a group: 2. Click on "Action" 3. Click on "+ Add Group" 4.	
5. Select "Upload G-Code"	
6. Select the files that you want to import, to the group that you created. NOTE - All imported files get stored in the selected group. If the current group is ALL, it will be stored in the DEFAULT group.	
7. Import your files.	
8. They will now be saved to your print server. You can choose to print, delete or see more options like a summary, 2D/3D preview, see the G-Code or copy to a project.	
9. To print, hit the "Print" button labeled a in the image.	
10. You are now printing your part!	

5.6 Post Printing

Once your print is finished, there are a few recommended Post-Printing steps that we recommend.

5.6.1 Wait for Build Plate to cool

We recommend letting the print cool down inside the print chamber before attempting to take it off the build plate. Most prints, should slide right off. If they don't, a small nudge with your finger should be enough.

5.6.2 Wipe Build Plate with Alcohol

We recommend wiping the build plate down with 90 percent or more denatured alcohol after every print if there is any residue. Simply apply a light mist or dampen cloth and wipe down the print surface thoroughly. If print surface ends up wet, allow it to air dry.

5.6.3 Turn HEPA Filter Off

A HEPA Filter is only needed when any filament is purging or printing. Other than that, you may turn it off.



5.7 Post Processing

Post-processing will vary based on what you want to achieve from your prints. At the very least, you will need to plan some time to remove the support material from your parts. One type of support material every part will have, is a raft. The raft will prevent the build material from sticking on the build plate, and ruining the print.

CAUTION

If you do not print on a raft, you will void the one-year warranty on your Build Plate.

Support Removal

The post-processing that will occur on all of your printed parts. Different types of support:

- Breakaway Support
- Soluble/Dissolvable Support

Breakaway support material can be manually removed, using your finger, or tools such as picks.

However, when you're working with these support materials, consider compatibility. Specific support materials adhere more effectively to some build materials than others.

Most soluble/dissolvable supports will require submerging the entire part in a solution, so keep that in mind when choosing soluble support. Using soluble supports is hands-free and doesn't require further sanding and polishing to remove the marks left by supports. This process can be time-consuming (taking several hours), but can be sped up by agitating the water (for some support materials).

Additional Post Processing

You may choose other types of post-processing, which include sanding, gluing, painting and inserts. Specific procedures and steps depend on your individual part needs and requirements; therefore, we have not included any procedures.

TRAK Warranty Policy

Warranty

TRAK products are warranted to the original purchaser to be free from defects in workmanship and materials for the following periods:

Product	Warranty Period
New TRAK/ProtoTRAK	1 Year
New 3ntr	1 Year

The warranty period starts on the date of the invoice to the original purchaser from Southwestern Industries, Inc. (SWI) or their authorized distributor.

If a product, subsystem or component proves to be defective in workmanship and fails within the warranty period, it will be repaired or exchanged at our option for a properly functioning unit in similar or better condition. Such repairs or exchanges will be made FOB Factory/Los Angeles or the location of our nearest factory representative or authorized distributor.

Warranty Disclaimers

- This warranty is expressly in lieu of any other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular purpose, and of any other obligations or liability on the part of TMT/SWI (or any producing entity, if different).
- Warranty repairs/exchanges do not cover incidental costs such as installation, labor, freight, etc.
- TMT/SWI is not responsible for consequential damages from use or misuse of any of its products.
- TRAK products are precision mechanical/electromechanical/electronic systems and must be given the reasonable care that these types of products require. Evidence that the product does not receive adequate Preventative Maintenance may invalidate the warranty. Excessive chips built up around ballscrews and way surfaces is an example of this evidence.
- Accidental damage, beyond the control of TMT/SWI, is not covered by the warranty. Thus, the warranty does not apply if a product has been abused, dropped, hit or disassembled.
- Improper installation by or at the direction of the customer in such a way that the product consequently fails, is considered to be beyond the control of the manufacturer and outside the scope of the warranty.
- Warranty does not cover wear items that are consumed under normal use of the product. These items include, but are not limited to: windows, bellows, wipers, filters, drawbars and belts.

F10302-1 | Rev: 12/16/2020