



BST 1200es / SST 1200es

User Guide



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Conforms to ANSI/UL std. 60950-1-2003

Certified to CAN/CSA C22.2 no. 60950-1-03

The Dimension system conforms with the following standards, in accordance with the EU Machinery, Low Voltage and Electromagnetic Compatibility Directives: EU 98/37/EEC, EU 73/23/EEC amended by 93/68/EEC, EU 89/336/EEC

Introduction

Dimension is designed with ultimate simplicity in mind. The system enables you to build parts quickly, even if you've never used a 3D printer before. Its display panel prompts you to press a few keys to get you modeling quickly.

The system models with ABS plastic, so modeled parts are strong and durable. ABS also ensures you'll be able to drill, tap, sand, and paint your creations. With the speed and convenience of Breakaway Support Technology (BST) or Soluble Support Technology (SST), your completed parts are quickly available for review and test.

Dimension is an innovative combination of proprietary hardware, software, and material technology.

Congratulations...

you've made a smart choice!

How To Use This Manual

This User's Guide is laid out in easy to follow sections which cover Set-up, Operation, Maintenance, and Troubleshooting of your Dimension printer. Be sure to read each section carefully so that you will get the best performance from your system.

Highlighted Information

The manual is written in a step-by-step format so as to guide you through a variety of operational tasks. Information of particular importance is presented in one of three formats

WARNING



A WARNING indicates a procedure that may cause Injury to an operator if the procedure is not followed. A WARNING will precede the paragraph of instruction to which it relates.

CAUTION



A CAUTION indicates a procedure that may cause Damage To Equipment if the procedure is not followed. A CAUTION will precede the paragraph of instruction to which it relates.

NOTE

A NOTE is used to highlight a specific point or to provide an operational tip. While useful, a NOTE does not indicate a procedure that can cause injury or damage if it is not followed. A NOTE will follow the paragraph of instruction to which it relates.

The Dimension printer guides you through operational tasks from a User Interface (UI) on the front panel of the printer. Throughout the User Guide, text representing messages that appear on the UI are presented in a specific format. **Interface Messages** appear as a bold, serif, fixed-pitch (mono-space) font.

Sections Of The Manual

Overview...

Provides a quick reference for the layout of the printer and its operating components. Overview also provides a quick reference for sources of additional information and printer supplies.

Setup...

Guides you through the initial printer installation and setup. Topics include unpacking, connecting power, installing software, and connecting to a computer network. Generally, topics in setup are only accomplished during installation or relocation of the printer.

Operation...

Further develops your understanding of the printer by presenting the User Interface, Loading and Unloading of Material, Building Parts, Removing Completed Parts, and Removing Support Material. The tasks presented are common procedures accomplished during the normal operation of the printer.

Maintenance...

Lists several tasks that you will need to perform to keep your printer performing at its best. Some tasks are 'As Needed' while others are determined by a set number of printer hours (CatalystEX includes an odometer of printer hours). 'House Cleaning', Axis Maintenance, Tip Cleaning Assembly Replacement, Chamber Light Bar Replacement, Tip Area Clean-up, and Tip Replacement are procedures that you can perform with the help of the User Guide.

Troubleshooting..

Allows you to perform some problem diagnosis and correction procedures in the event that your printer has a problem. A Troubleshooting Checklist, Fault Determination Codes, and a procedure to recover from a Loss of Extrusion are provided.

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Overview

Dimension builds models, including internal features, directly from CAD STL files. The system builds three-dimensional parts by extruding a bead of ABS plastic through a computer-controlled extrusion head, producing high quality parts that are ready to use immediately after completion. With two layer resolution settings, you can choose to build a part quickly for design verification, or you can choose a finer setting for higher quality surface detail.

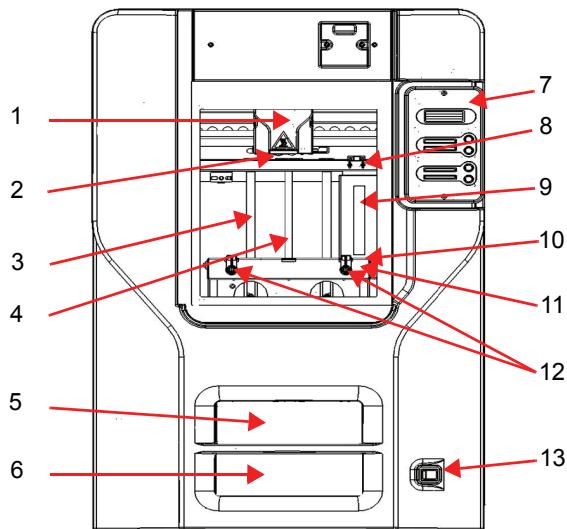


Figure 1: Dimension Front View

Item Nomenclature

- 1 Extrusion Head
- 2 Extrusion Tips
- 3 Guide Rods
- 4 Lead Screw
- 5 Model Material Cartridge
- 6 Support Material Cartridge
- 7 Display Panel

Item Nomenclature

- 8 Tip Cleaning Assembly
- 9 Purge Container
- 10 Modeling Base
- 11 Z Platform
- 12 Platform Retainers (2)
- 13 Power Switch

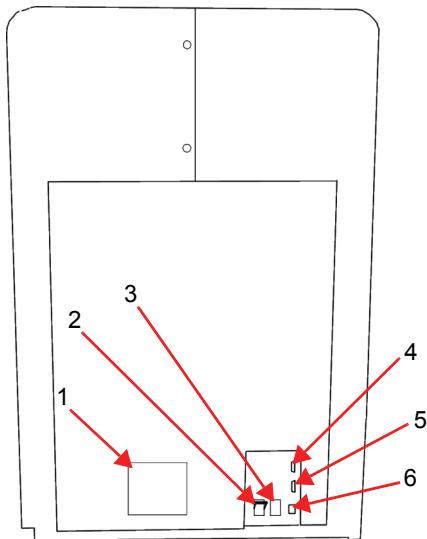


Figure 2: Dimension Rear View

Item Nomenclature

- 1 Fan Cover
- 2 Main Circuit Breaker
- 3 Power Cord Adapter

Item Nomenclature

- 4 UPS Connection
- 5 Diagnostic Hookup
- 6 Network Cable Connection

The Dimension system consists of two primary components — the Dimension 3D printer and CatalystEX. CatalystEX is the preprocessing software that runs on a Windows 2000 or Windows XP Pro platform.

Dimension's build envelope measures 254 x 254 x 305 mm (10 x 10 x 12 in). Each material cartridge contains 922 cc (56.3 cu. in.) of usable material.

Finding More Information

Several references are available for use with Dimension.

Setting up Dimension



Dimension User Guide

Step-by-step instructions for installing, setting up and operating the Dimension system.

Using Dimension



CatalystEX Online Help

Simple operating instructions for CatalystEX are available through the application. Help is displayed in the Dynamic Help window ...or... you can access them from the Menu Bar - **Help>Contents**.



World Wide Web

Additional information is available at:
<http://www.dimensionprinting.com>

Supplies

This section lists all replaceable supplies used by the Dimension 1200es modeling system. The parts mentioned in this list can be obtained by contacting the sales representative through whom you purchased your system.

Part Number	Description
Modeling Material	
340-21200	Natural ABSplus Filament Cartridge
340-21201	White ABSplus Filament Cartridge
340-21202	Black ABSplus Filament Cartridge
340-21203	Dark Gray ABSplus Filament Cartridge
340-21204	Red ABSplus Filament Cartridge
340-21205	Blue ABSplus Filament Cartridge
340-21206	Nectarine (orange) ABSplus Filament Cartridge
340-21207	Fluorescent Yellow ABSplus Filament Cartridge
340-21208	Olive Green ABSplus Filament Cartridge
Breakaway Support Material (BST Only)	
340-30000	Breakaway Support Cartridge
Soluble Support Material/Concentrate (SST Only)	
340-30200	Soluble Support Cartridge
300-00600	Soluble Soluble Concentrate (12 bottles)
Modeling Base	
340-00300	Modeling Base (qty. 24)
Tip Replacement Kits	
540-10100	BST 1200/1200es Tip Replacement Kit
540-10500	SST 1200/1200es Tip Replacement Kit
Miscellaneous	
540-00200	Tip Wipe Assembly
300-00100	Z-Stage (Krytox) Grease
300-01100	ABS Glue (case of 12) Available only in North America
To order supplies for your Dimension system, contact your local Dimension reseller.	

Setup

Workspace

Observe the following when placing Dimension in its operating location:

- Dimension has an approximate weight of 148 kg (326 lbs) and requires a table capable of safely supporting 181kg (400 lbs).
- System Dimensions:
838 x 737 x 1143 mm (33 x 29 x 45 in)
Four-inch minimum space behind unit for air circulation
- Dedicated outlet requirements (Nominal):
100-120 VAC, 60 Hz, 20 A
—or—
220-240 VAC, 50/60 Hz, 10 A
- Temperature: 18–30°C (65–86°F)
- Relative Humidity: 30-70%, Non-condensing
- Ethernet 10/100 Base T network
- Optional UPS for power interruptions (brown-out conditions):
Rated Power – 2200 VA
Output Power – 1600 watts

Unpacking

This section describes the recommended procedures for unpacking and preparing Dimension for its first use.

Unpack the printer:

WARNING



The Dimension printer weighs approximately 148 kg (326 lbs). Use proper moving and lifting techniques when positioning the unit. For your convenience, there are forklift pads built into the bottom of the unit. They are accessible from the side of the unit.

1. Before unpacking the printer, move it near to its operating location.
2. Remove the plastic banding from around the cardboard.
3. Remove the top cover. Set aside the fork access covers (2) and bag of screws (2).
4. Remove screws (4) that attach cardboard to pallet and remove the cardboard side panels.
5. Remove the top foam.
6. Remove outer plastic wrap - use care if using a knife so as to not scratch the printer.
7. Remove the foam door channels (2) and tape.

WARNING



The Lead Screw and Guide Rods are lubricated with a thin coat of Krytox grease. Krytox grease can cause skin irritation. Be careful not to get the grease on your hands or clothing.

CAUTION



Remove the foam tubes that isolate the extrusion head from the frame (see [Figure 3](#)). The printer will be damaged if powered on with the foam tubes in place.

CAUTION



Be careful not to damage the rod sensors when removing the foam tubes (see [Figure 3](#)).

8. Remove the foam tubes that isolate the extrusion head from the frame (see [Figure 3](#)).

Extrusion Head
Circles indicate Rod Sensor locations. There is also one sensor on each side of the Extrusion Head.
Foam Tubes (4)

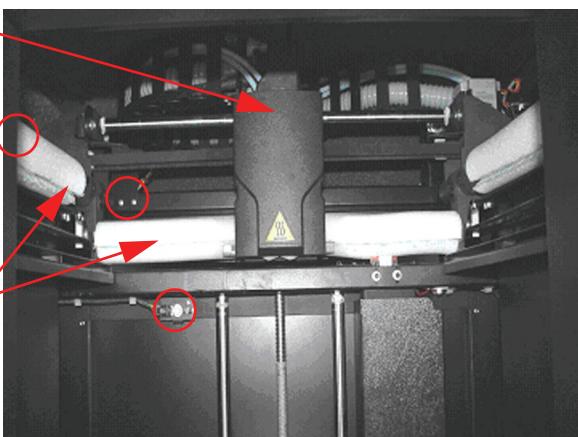


Figure 3: Foam tubes isolating the extrusion head from the Z-axis frame

9. After unpacking, inspect the printer and report any shipping damage to the carrier.

Installing Forklift Access Covers

The forklift access covers can be placed over the forklift channels after the printer is placed in its final location (see [Figure 4](#)). The covers are press-fit in the front and held in place with one screw in the rear.



Figure 4: Installing the forklift access covers

Power Connections

This section discusses the procedure for preparing all power connections for the printer.

CAUTION



Before connecting power to the printer, make sure that the Dimension circuit breaker is in the off (down) position. It is located in the rear of the printer next to the power cord attachment point.

Dimension is provided with two power cords: one for 110 V and one for 220 V.

Prepare all power connections:

1. Connect the male end of the supplied power cord directly into a grounded electrical outlet, as shown in [Figure 5 on page 19](#). (If using a Uninterrupted Power Supply (UPS), connect the cord directly into the UPS).

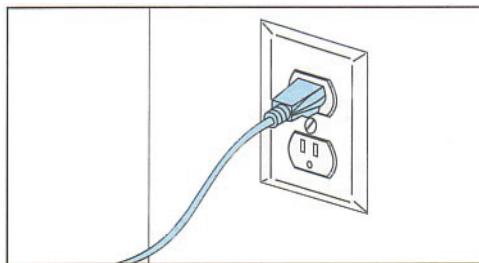


Figure 5: Connecting to a grounded electrical outlet



CAUTION

Do not use an extension cord or power strip with the Dimension system. Connect the cord directly into the receptacle or UPS.

2. Connect the female end of the power cord directly into the rear of the cabinet.
3. Switch the Dimension circuit breaker to the on (up) position. Power is now supplied to the Dimension system. The system is ready to be 'Powered ON'.

Powering On Dimension

WARNING



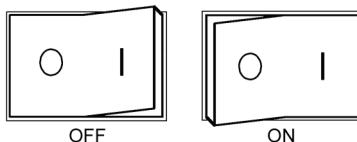
Dimension's build chamber and extrusion-head tip get very hot! The chamber and head tip reach temperatures of approximately 75° C (167° F) and 300° C (572° F) respectively. Personal injury can occur if proper techniques and safety materials are not used. Use the leather safety gloves provided in the Startup Kit when working inside the printer.

CAUTION



Remove the foam tubes that isolate the extrusion head from the frame (see [Figure 3 on page 17](#)). The printer will be damaged if powered on with the foam tubes in place.

Dimension's power switch is located on the front of the cabinet, near the bottom right corner (see [Figure 6](#)). After the switch is pushed, Dimension boots up in three to seven minutes.



*Figure 6: Location of Power Switch
(View From Front of Printer)*

NOTE

If the printer was off and is at room temperature, it requires approximately 40 minutes to warm up before you can perform any functions. Temperatures are factory-preset and not adjustable. The panel displays the head and envelope temperatures while Dimension is warming up and cooling down.

NOTE

For safety, the head and Z Platform do not move while the chamber door is open. During warm-up and operation the door is locked. The door can be opened only when Dimension is not building a part, getting ready to build a part, or in Pause mode.

Insert Modeling Base

Make sure retainers are turned 'down' - so as not to interfere with the modeling base installation. Set the modeling base on the Z Platform aligning the tabs on the modeling base with the slots on the metal tray. Slide the modeling base toward the back of the unit until its front edge (with the handle) is flush with the front edge of the tray (see [Figure 7](#)). Secure the base with the two retainers by turning them up.

NOTE

When inserting and removing the modeling base, use the handle to avoid touching the top surface. Grease and oil that contact the top build surface could cause poor part adhesion. You can clean the build surface with isopropyl alcohol if necessary.

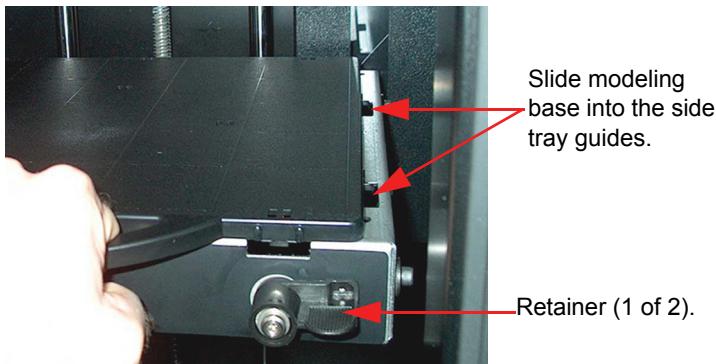


Figure 7: Inserting a modeling base

Installing Software

There are two software programs that work with Dimension.

- CatalystEX is the preprocessing software that controls Dimension. If you have not already done so, you will need to install the CatalystEX software on your PC. You will find the CatalystEX software on the CD-ROM included in your Startup Kit ([See “Install CatalystEX:” on page 22.](#)).
- There is also ‘controller’ software loaded directly onto your Dimension system from the factory. Because we do occasionally make changes to this software, you will need to verify that you have the latest version installed ([See “Verifying controller software version:” on page 22.](#)). A controller software CD is included in your Startup Kit.

Install CatalystEX:

1. Insert the CatalystEX installation disc into your CD-ROM drive. The installation menu automatically appears.
2. Click the **Install** button.
3. Follow the prompts to finish installing the software.

NOTE

CatalystEX’s installation setup allows you to change or confirm the target installation directory. To install CatalystEX in a directory other than the default, type the path and directory name in the dialog box when prompted.

4. If you want to customize your installation, select the **Custom** option. Custom options include the following:
 - CatalystEX Files
 - Training Files

Verifying controller software version:

1. Check the version displayed on the system keypad.
 - From **Idle**, press **Maintenance**. The version number will be listed in the top display window under **Maintenance**.

2. Compare the version number to the controller software CD provided in the Startup Kit.
3. If the version on the controller software CD is newer than the system version, follow the Controller Software Upgrade Notice instructions provided in the Startup Kit.

Networking Your Printer

You will need to establish communication between your PC and printer before you can send files to print. How you establish this communication is dependent upon how your computer network is configured. In many cases, it is a simple matter of letting the CatalystEX software 'find' your printer. In some situations you may need to set the network address for your printer and, possibly, record the IP address in the CatalystEX program.

Establishing communication on a Dynamic network:

If you are on a Dynamic network (or not sure of your network type) follow these steps to allow the CatalystEX software to 'find' your printer and establish communication.

1. Plug in the network patch cable from your network to the rear of Dimension. (A 14 foot network cable (blue) is included with the Start Up Kit.)
2. Make sure the printer is 'on' and determine the Unique Device Name (UDN) for your printer.
 - A. From **Idle (or Ready to Build)**, press **Maintenance**. The panel displays **Maintenance** and the software version.
 - B. Press **System**.
 - C. Press **Set Network**. The top window displays: **Network - Dynamic IP Address; UDN**
 - D. The UDN for your printer is listed here. This is preset at the factory and cannot be changed.
3. From your PC, start the CatalystEX application.
 - A. From the General Tab, click the 'Manage 3D Printers' button.

- B. Click the ‘Add from Network...’ button in the lower right corner of the pop-up.
- C. A new pop-up, ‘Add 3D Printer’, should list your printer in the main window (identified by its UDN). Click on the printer in this window and enter a Name and Location (your choice) in the lower portion of the pop-up.
- D. Click ‘Add Printer’ - and you are ready to go. Close the 3D Printer pop-up.

NOTE

If your printer is not displayed in the ‘Add 3D Printer’ pop-up, you are not using a Dynamic network. You will need to set up a Static Network address.

If necessary, set the Static Network addresses:

1. Obtain your network addresses from your Network Administrator.
2. From **Idle (or Ready to Build)**, press **Maintenance**. The panel displays **Maintenance** and the software version.
3. Press **System**.
4. Press **Set Network**. The top window displays: **Network - Static IP Address; UDN**
5. Press **Static IP** to display current settings. For example:

IP Address: 192.000.000.001

NM Address: 255.255.000.000

GW Address: 198.000.000.001

These are the factory default addresses; they must be changed for your network.

6. Look for the cursor beneath the first digit of the IP address. The cursor does *not* blink. To update the IP address:

Press **Increment** to increase the value one digit at a time.

Press **Next Digit** to move the cursor one place to the right.

Press **Last Digit** to move the cursor one place to the left.

7. Use the three functions above to set your IP address.
8. After setting the final digit of the IP address, move the cursor one more place to the right. The cursor moves to the NM (or Netmask) address. Follow the same steps for setting the NM and GW addresses.
9. When you have finished setting the addresses, press **Done**. The panel displays **Change IP, Netmask, Gateway?**
10. Press **Yes**. The panel then displays **Resetting Network** and after a moment returns to **Idle** or starts warming up.
11. If you have not done so already, plug in the network patch cable from your network to the rear of Dimension.
12. From your PC, start the CatalystEX application.

NOTE

Detailed instructions for using CatalystEX can be found in the **CatalystEX Help file**.

- A. From the General Tab, click the 'Manage 3D Printers' button.
 - B. Click the 'Add from Network...' button in the lower right corner of the pop-up.
 - C. A new pop-up, 'Add 3D Printer', should list your printer in the main window (identified by its UDN). Click on the printer in this window and enter a Name and Location (your choice) in the lower portion of the pop-up.
 - D. Click 'Add Printer' - and you are ready to go. Close the 3D Printer pop-up.
13. If your printer is NOT displayed in the 'Add 3D Printer' pop-up (Step 12.C.), you will need to add the printer IP address manually.
 - A. From the General Tab, click the 'Manage 3D Printers' button.
 - B. Click the 'Add Manually...' button in the lower right corner of the pop-up.

- C. In the pop-up, ‘Add 3D Printer’, enter a Name and Location (your choice) for your printer in the appropriate fields.
 - D. Enter the IP Address for your printer in the appropriate field. It will be the same address as the one entered in Step 5.
 - E. Select the appropriate printer type from the drop down list.
 - F. Click ‘Add Printer’ and close the 3D Printer pop-up.
14. If you are unable to connect the printer to your PC, contact your Network Administrator.

Connecting Directly To Your PC

You can connect the Dimension printer directly to your PC without the use of a network. This is most easily accomplished with the printer in Dynamic network mode (as received from the factory).

1. Connect a crossover cable from your printer directly into a network port on your PC (A 14 foot crossover cable (orange) is included with the Start Up Kit.)
2. The UDN for your printer is listed here. This is preset at the factory preset and cannot be changed.
 - A. From **idle** (or Ready to Build) press **Maintenance**. The panel displays **Maintenance** and the software version.
 - B. Press **System**.
 - C. Press Set Network. The top window displays: **Network - Dynamic IP Address; UDN**
 - D. The UDN for your printer is listed here. This is factory preset cannot be changed.
3. From your PC, start the CatalystEX application.

NOTE

Detailed instructions for using CatalystEX can be found in the CatalystEX Help file.

- A. From the General Tab, click the ‘Manage 3D Printers’ button.

- B. Click the 'Add from Network...' button in the lower right corner of the pop-up.
- C. A new pop-up, 'Add 3D Printer', should list your printer in the main window (identified by its UDN). Click on the printer in this window and enter a Name and Location (your choice) in the lower portion of the pop-up.

NOTE

It may take up to 1 minute for your printer to appear in the pop-up window.

- D. Click 'Add Printer' - and you are ready to go. Close the 3D Printer pop-up.
4. If your printer does not appear in the pop-up window:
 - A. Cancel the 'Add 3D Printer' pop-up and click the 'Add Manually' button on the '3D Printers' pop-up.
 - B. In the pop-up, 'Add 3D Printer', enter a Name and Location (your choice) for your printer in the appropriate fields.
 - C. Enter the Dynamic IP Address for your printer (from Step **2C**) in the appropriate field.
 - D. Select the appropriate printer type from the drop down list.
 - E. Click 'Add Printer' and close the 3D Printer pop-up.
 - F. If you get an 'Error: Unable to connect to printer.' message it may be that your PC is not configured for Dynamic networking. To configure your PC for Dynamic networking:
 - (1). From the 'Control Panel' of your PC, choose 'Network and Internet Connections'.
 - (2). Choose 'Network Connections', then double click 'Local Area Connection'.
 - (3). Scroll the 'Local Area Connection Properties' window to find the 'Internet Protocol' (TCP/IP) selection. Double click or highlight and click the 'Properties' button.
 - (4). From the 'General' Tab of the 'Internet Protocol TCP/IP' Properties pop-up click the 'Obtain an IP address automatically' radio button.
 - (5). Click OK, then OK again.

- (6). After allowing your PC a minute or so to adjust to the new setting, your PC should connect to your printer.
- (7). If you are still unable to connect to your printer, recheck your connections and settings. Contact your local reseller for additional customer service.

Operation

Display Panel and Keypad

The main User Interface to Dimension is the Display Panel and Keypad (see [Figure 8](#)).

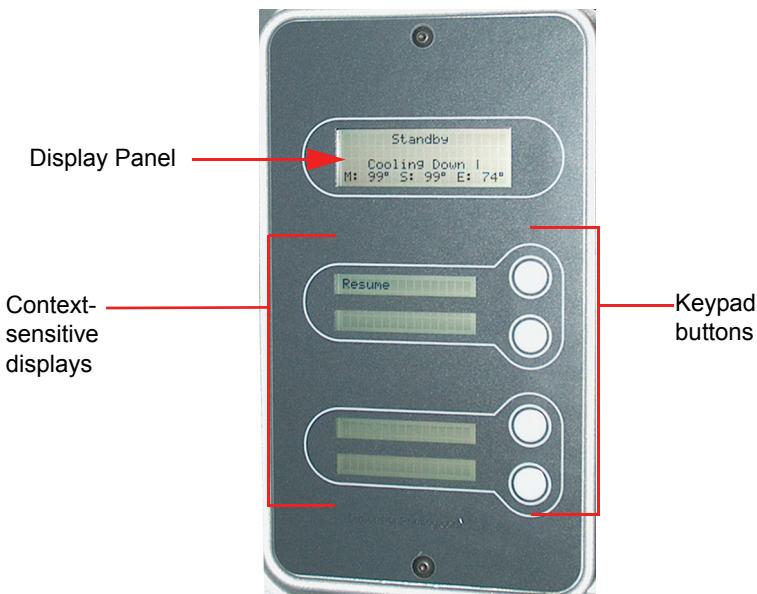


Figure 8: Dimension display panel and keypad

The Dimension display panel and keypad are very easy to use, consisting of a larger multiple-line LCD display on top, and four single-line context-sensitive displays, each with one button (or key). The top line in the large display always reveals the printer status. The lower three lines of the large display show details related to the current operation.

At times there will be an item blinking in the lower (context-sensitive) displays. The blinking item is usually the most logical selection.

Inserting a Modeling Base

Prior to inserting a modeling base into the tray, remove any material buildup on and behind the Z Platform and around the lead screw. Failure to do so could cause the modeling base to be unlevel or, if the amount of buildup is large enough, the Z Platform could jam at its upper limit.

Install the modeling base (See “[Insert Modeling Base](#)” on page 21. - “[Setup](#)”).

Reusing a modeling base:

The base is intended for single-use only on each modeling area.

CAUTION



Building on a used modeling area may cause loss of extrusion or cause a part to curl or break loose from the modeling base.

CAUTION



Failure to completely remove all other layers from a previous build can cause a head collision and result in system damage.

A modeling base may become worn or distorted after a build. The printer performs a modeling base levelness check at the start of every part build; upon detection of a faulty modeling base, the printer pauses and allows you to install a new one.

Powering On Dimension

Refer to “[Powering On Dimension](#)” on page 20 for instructions.

Powering Off Dimension

To power-off Dimension, move the power switch to the OFF position (see [Figure 6 on page 20](#)). You can do this at any time without harming the printer. No other steps are necessary. If this is done while the printer is building a part, the current build will be lost. System cooling fans will continue to operate for several minutes. This ensures a safe, systematic power down.

NOTE

For extended non-use periods, unload the material cartridges and then power off the system.

Cycling Power

Situations may occur that require the removal of all power to the Dimension system followed by a restart. This section discusses the procedure for this ‘cycling’ of the electrical system.

Cycle power:

1. Move the power switch to the OFF position (see [Figure 6 on page 20](#)). Wait for the printer to completely power down.
2. Move the circuit breaker located on the rear of the cabinet to the OFF (down) position.
3. Wait ten seconds and then move the circuit breaker to the ON (up) position.
4. Move the power switch to the ON position.
5. Wait for the system to prepare itself for normal operation.

NOTE

When the system is ‘cycled’ in this manner, it may take up to 15 minutes for it to reach its normal operating state.

Loading Material

Material cartridges are factory packaged in a box and an anti-static, moisture-proof bag to preserve shelf life. Material will stay humidity free inside the cartridge for at least 30 days after opening. Shelf life is more than one year if the cartridge package remains sealed.

Load material cartridges:

1. Remove packaging.
2. Remove the red sealing plug from the cartridge: (see [Figure 9](#))

NOTE

Plug must be removed before cartridge can be installed.

- A. Turn the plug a quarter turn counter clockwise.
- B. Lift up the plug to remove it from the cartridge - discard (or recycle) the plug.



Figure 9: Remove red plug before loading

3. Find the end of the material filament taped with a "flag".

**CAUTION**

Be careful when touching the pinch roller on the side of the cartridge. If you roll it backwards, you could draw the material into the cartridge (see [Figure 10](#) for the correct direction to move the cartridge roller).

If this occurs, there is no way to retrieve the filament without opening the cartridge and exposing the material to humidity, which reduces shelf life to a few days.

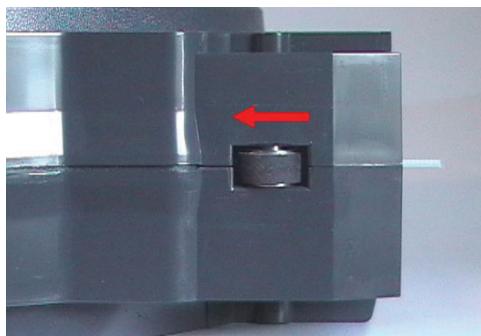


Figure 10: Direction to move cartridge roller

4. Pull filament out of cartridge to expose about 12 inches of material. You should easily be able to pull out the material.

NOTE

The above step makes sure that the filament will feed freely from the spool.

5. With the cutter from your Startup Kit, snip the filament flush with the end of the cartridge (see [Figure 11](#) on page 34).



Figure 11: Snipping the material filament

6. If the printer is in **Idle**, press the **Load Material** button, which will be blinking.
7. Display will prompt with **Load Model - Replace Both Cartridges** (flashing).
8. Insert material cartridges into their appropriate slot from the front of the printer (Model material cartridge goes in the Top slot; Support material goes in the Bottom slot).

NOTE

You might get the message, **Cartridge Not Replaced Or Invalid**. This occurs if you do not insert the new cartridges within 30 seconds. In this case the cartridge will not lock into its slot. You must press the **Retry** button before continuing the process.

9. The panel will display **Material Load - Ready To Load**. Press **Load** to load model material. (Or, if the model material has been previously loaded, the panel will display **Load Support - Replacing Support**. Skip to Step 10.) Display with show percentage of material left in cartridge.
 - Watch the model extrusion tip (see [Figure 12 on page 35](#)) to see if material extrudes (purges) after loading. The panel will then display **Did Model Material Purge?**
 - Press **Yes** (to continue) or **No** (to return to Load Material) as appropriate — or press **Purge Again** if you're unsure which to choose.

10. Next you are prompted with **Support Load - Ready to Load** (if not previously loaded). Press **Load** to load support material.

- Watch the support extrusion tip (see [Figure 12](#)) to see if material extrudes (purges) after loading. The panel will then display **Did Support Material Purge?**
- Press **Yes** (to return the printer to the **Ready to Build** state) or **No** (to return to **Load Material**) as appropriate — or press **Purge Again** if you're unsure which to choose.

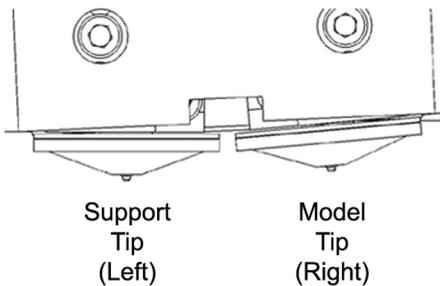


Figure 12: Close-up of extrusion tips

NOTE

If the display shows **Load Failed**, press **Retry**. If load fails again, remove the cartridge, snip the material (see [Figure 11 on page 34](#)), remove filament in the printer, and reinsert the cartridge.

Unloading Material

The model and support material cartridges may be replaced separately or at the same time. In idle-, load-, or build-related modes, the panel displays the percentage of material remaining in the cartridges. If the printer will be operating unattended for a long period, and the material level is getting low, you may want to replace the cartridges before starting a new part. Of course, you will also need to replace the cartridges when they are empty.

Unload material cartridges:

1. From **Idle** (or **Ready To Build**), Press **Load Material**.
 - A. The panel displays **Load Material** and prompts with, **Replace model?**
 - Press **Yes**. to unload the Model Material.
The panel displays **Replacing model**,
 - Press **No** if you do not wish to unload the model material.
 - B. The panel then prompts with, **Replace support?**
 - Press **Yes**. to unload the Support Material.
The panel displays **Replacing support**,
 - Press **No** if you do not wish to unload the support material.
 - C. After you have made the above choices, the panel displays **Unloading** for approximately 2 minutes (the selected materials will be unloaded from the extrusion head).
 - D. When unloading is complete, the panel will prompt you to remove a cartridge based upon your choices - i.e., **Replace Both Cartridges**, **Replace Model (Top) Cartridge**, or **Replace Support (Bottom) Cartridge**.

2. Remove the material cartridge(s) by first pushing it forward gently, and then pulling it out of the slot.

CAUTION



Do NOT try to rewind the filament that remains in the system. This will cause material to cross-wind in the cartridge causing cartridge failure.

- When you remove a cartridge there will be approximately 213 cm (7 feet) of filament that will need to be pulled from the system. (This is normal. Material is only retracted from the extrusion head during ‘unloading’.)
3. To store a partially used cartridge, place a small flag of tape on the filament near the cartridge. Cut off and discard the remaining material. The tape flag ensures the filament does not retract into the cartridge.

Building a Test Part

Factory test parts have been preloaded into your Dimension. To familiarize yourself with the system, it is recommended that you build one of the test parts before attempting to build one of your own files.

Once the printer has warmed up, material has been loaded, and a modeling base is in place, you can send a test part to the printer.

Build a test part:

1. Press **Maintenance**.
2. Press **System**.
3. Press **Test Parts**, and select one of the available sample parts.
 - Dimension automatically starts building the part.
4. When the part is finished, follow the steps under “[Removing a Completed Part](#)” on page 43.

Building a Part From Your File

1. If a part has not been sent to the printer for build (the build queue is empty):

NOTE

For detailed information about the CatalystEX Build Queue, refer to “[Sending Your CAD File to the System](#)” on page 39 and the CatalystEX Help files.

- a. The panel displays **Idle** and **Queue Empty**.
- b. **Wait for Part** is blinking. Choose whether you want to start the build process from a ‘remote’ location or from the display panel at the printer.
 - (1) At Printer ‘Start Model’ - You send a part to the printer from your CatalystEX work station. You start the build of the part from the printer.
 - (a) Do not press the **Wait for Part** button.
 - (b) From your CatalystEX work station, send a part to the printer.
 - (c) The printer panel displays the name of the first model in the printer queue and **Start Model** is blinking.
 - (d) From the printer, press the **Start Model** button to begin building the displayed part.
 - (2). Remote ‘Start Model’: - You send a part to the printer from your CatalystEX work station. The part automatically begins to build.
 - (a) From the printer, press the **Wait for Part** button.
 - (b) Make sure an empty modeling base is installed, then answer Yes to the prompt **Is Model Base Installed?**
 - (c) **Wait for Part** is displayed in the upper window. Press **Cancel** if you wish to exit the remote start mode.
 - (d) From your CatalystEX work station, send a part to the printer. The printer will automatically start to build the model.

2. If a part has been sent to the printer for build (there is at least one part in the build queue), but is not building:
 - a. The panel displays **Ready to Build**.
 - b. The name of the first model in the build queue is displayed.
 - c. The amount of material remaining in the model material cartridge and the support material cartridge (e.g. Mod 90%, Sup 85%) is displayed.

NOTE

If a material amount is flashing, it indicates that the remaining material will NOT be sufficient to complete the current build.

- d. **Start Model** is blinking. Press the **Start Model** button to begin building the displayed part.

Sending Your CAD File to the System

This section describes the procedures used for sending your own CAD files to Dimension.

Send a “job” to Dimension:

1. Create an STL file with your CAD software.
2. Click on the CatalystEX icon  on the desktop of your PC. The CatalystEX main window opens ([Figure 13 on page 40](#)).

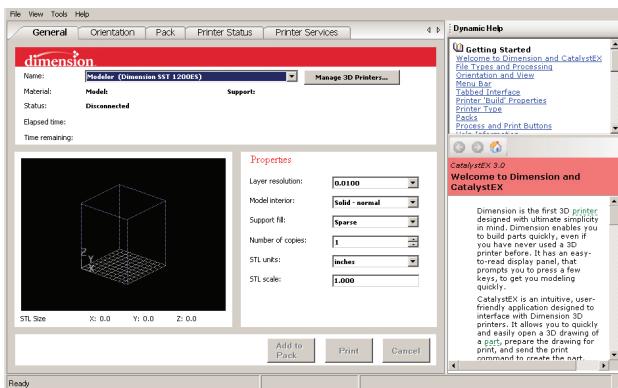


Figure 13: CatalystEX main window

3. From the **File** menu, click **Open**.
4. Select and Open an STL file produced with your CAD software.
5. Choose one of several options for printing your part. From the General Tab:

NOTE

For detailed information about the many file processing options available in CatalystEX, refer to the CatalystEX Help files.

- Click 'Print' to have CatalystEX process your part and immediately send it to your Dimension for printing.
...OR...
- Click 'Pack' to have CatalystEX process the part for printing, but not send the part to your Dimension... send the part to the printer later as part of a pack (from the Pack Tab).

Regardless of how you choose to prepare your file for printing, the end result will be the same. CatalystEX will process the STL file into a CMB file. It is the CMB file that CatalystEX will send to the Dimension printer to create your part.

NOTE

For more information about STL files, CMB files, part orientation, modeling envelope placement, print 'job' efficiency, and other print controls refer to the CatalystEX Help file.

The Display Panel During Build:

The top two lines of the display panel show printer-status messages (see [Figure 14](#)). The bottom line of the panel shows the material amounts remaining in the cartridges.

NOTE: If a material amount is flashing, it indicates that the remaining material will NOT be sufficient to complete the current build.

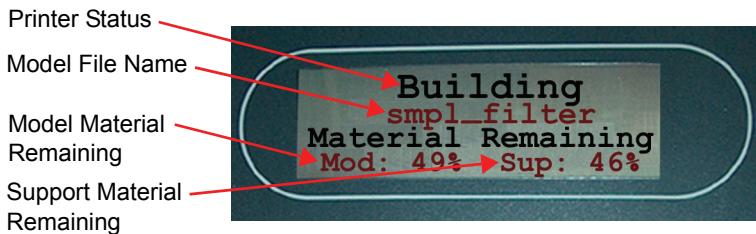


Figure 14: Display panel during build

Chamber Lights

When a part starts to build, the chamber lights are automatically ON. You can toggle lights ON or OFF through the Display Panel.

You can also turn the light on continuously. Go to the **Idle** or **Ready to Build** mode. Press **Maintenance** and then press **Next** until **Setup Maintenance** is displayed. Press **Lights Always**. The light will remain ON until the system is powered OFF.

Pausing Build

While building a part, you may want to pause the operation - e.g, to allow for replacement of a material cartridge. To pause the build operation at any time, press **Pause**.

NOTE

When the build process is paused, Dimension completes the current tool path before pausing. This may take several minutes.

Resuming Build from Pause Mode

If you have pressed **Pause**, and are ready to resume building the part, press **Resume**. Dimension resumes modeling.

Resuming Operations from Standby Mode

After several minutes of inactivity, Dimension enters Standby mode. During Standby, the head temperature will decrease to save energy.

The display panel shows, **Standby** and **Cooling Down**. The printer temperatures are also displayed; **M** = Model, **S** = Support, **E** = Envelope.

Press the **Resume** button - The printer returns to the Idle mode as described in “[Building a Part From Your File](#)” on page 38

Cancelling a Job

You can cancel a job at any time while the part is building.

Cancel a job:

1. Press **Pause**.
2. Once Dimension stops building, press **Cancel Build**. The panel displays Are you Sure?
3. Press **Yes**. The panel displays Build Stopped followed by the part name.
4. The panel prompts you to remove the part and replace the modeling base (“[Inserting a Modeling Base](#)” on page 30). Once the chamber door has been opened and closed, the panel asks: Part Removed?
5. Press **Yes** only after removing the part - refer to “[Removing a Completed Part](#)”

**CAUTION**

If you press Yes before removing the part, the system can be damaged and a service call will be required.

Removing a Completed Part

When the part has completed, the panel displays Completed Build, and the file's name. It also shows Remove Part and Replace Modeling Base.

Remove a completed part from the Dimension system:

1. Open the modeling chamber door.
2. Release the modeling base retainers and pull the modeling base towards you, out of the tray guides.
3. Insert a new modeling base.
4. Close the modeling chamber door.
5. After you have opened and closed the door, the panel displays Part Removed? only after removing the part, press Yes.

**CAUTION**

The system can be damaged if your answer Yes and the part has not been removed!

- After you press Yes, the panel displays the status as Ready to Build for the next part in the queue.

Remove a completed part from the modeling base:

1. After removing the base from the printer, firmly flex the modeling base back and forth with your hands to loosen the part. From best results, flex the modeling base front-right to back-left.

2. Pull the part off the base or use a putty knife to pry the part completely off.

NOTE

Supports are much easier to remove when the modeling base is still warm,

Removing Support Material

Breakaway Supports

WARNING



Wear safety goggles and LEATHER gloves (provided in Startup Kit) when removing breakaway supports.

Dimension BST uses breakaway supports. Removing breakaway support is a simple matter of gently removing material by scraping, or twisting. Basic tools such as a pick or needle-nose pliers can facilitate material removal from cavities.

Soluble Supports

WARNING



Wear safety goggles and LEATHER gloves (provided in Startup Kit) when removing soluble supports.

When removing soluble supports by hand, wear LEATHER gloves.

When removing soluble supports with the soluble concentrated, wear RUBBER gloves.

Dimension SST uses soluble supports - a water-based solution designed to allow you to simply wash away the support material. Your part is left smooth and clean with the fine details intact. The soluble support material can be removed by hand with relative ease, but is designed to be dissolved off of your parts for hands-free part finishing.

Refer to the SST Process Guide for details regarding the removal of soluble support material.

Maintenance

Follow the simple procedures within this chapter to ensure continued proper operation of Dimension.

Startup Kit Tools

The Dimension Startup Kit contains replacement parts and a set of tools used to help you maintain the system. The following is a list of the tools contained in the Startup Kit.

- Needle Nose Pliers
- T-Handled Wrench - 1/8 inch
- T-Handled Wrench - 7/64 inch
- Leather Insulated Gloves (Pair)
- Putty Knife
- Cutters
- Brush (bronze)
- Magnifier

WARNING



**Krytox grease can cause skin irritation.
Avoid contact with skin and clothing
when it is being handled.**

- 2 oz. Tube Krytox Grease

After Each Build

Empty Purge Container

The black, plastic purge container is attached to the right side of the modeling envelope rear wall (see [Figure 1 on page 11](#)).

NOTE

A full purge container may impact part quality.

1. Remove the purge container by grasping it and pushing it upward to release it from its three mounts.
2. Pull the container towards you and out of the chamber.

CAUTION



When reinstalling the container, make sure that it locks on all three mounts and hangs flush with the chamber wall to avoid damage.

3. Empty the container and reinstall on 3 mounts.

500 Hour Maintenance

Clean Fan Filter

To clean the fan filter:

1. Locate the lower fan on the rear panel of Dimension and remove the plastic frame (snaps on and off) that secures the fan filter.
2. Clean the filter with soap and water, and blot it dry.
3. Reassemble.

Replacing the Brush/Flicker Assembly

(Refer to [Figure 16 on page 47](#)).

NOTE

The brush/flicker should be replaced after 500 hours. Prior to Performing Tip Cleaning Assembly Maintenance

1. Completely power down Dimension. See on “[Powering Off Dimension](#)” on page 31.
2. Move the Toggle Head to the left of the machine in order to gain access to the Brush/Flicker Assembly ([Figure 15](#)).



Figure 15: Move the Toggle Head to the left

3. Remove the Brush/Flicker Assembly by lifting the assembly up and out of the machine. Discard the old Brush/Flicker Assembly ([Figure 16](#)).

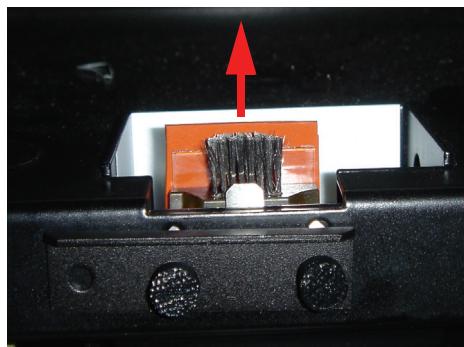


Figure 16: Replacing the Brush/Flicker Assembly

4. Place the new Brush/Flicker Assembly over the two mounting posts making sure the assembly is fully seated.

2000 Hour Maintenance

Axis Maintenance

1. Clean and lubricate the Z-axis lead screw (*drive screw*), X-axis guide rods (2), Y-axis guide rods (2), and Z-axis guide rods (2). See [Figure 17](#) for locations.
 - Clean with isopropyl alcohol.

WARNING



**Krytox grease can cause skin irritation.
When it is being handled, use impervious
gloves and avoid contact with skin and
clothing.**

- Lubricate using the Krytox grease provided in the Startup Kit. Use the grease sparingly.

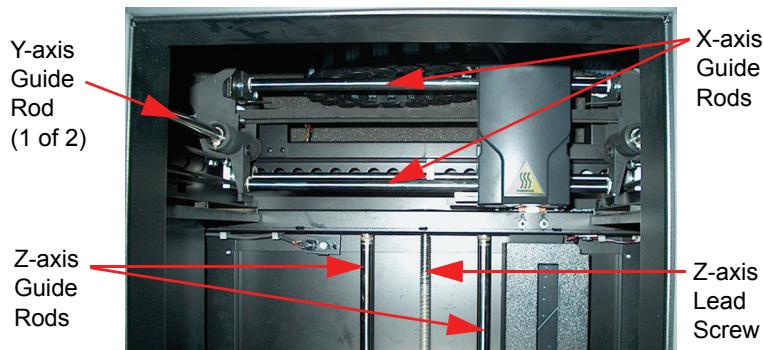


Figure 17: Lead Screw and Guide Rod Identification

Liquefier Tip Replacement

Replace Tips at approximately 2000 hours - depending upon operating conditions. Tips can also be damaged by improper care while performing maintenance in the area around the tips.

Inspect the heat shield Teflon shield for wear or damage each time the liquefier tips are replaced.

NOTE

CatalystEX displays the tip time (hrs) - from the Printer Services Tab - Printer Info button (Tip time will reset to zero after replacement).

Removing Tips

1. Enter **Tip Maintenance - Replace Tips**.
 - From Idle, Select **Maintenance > Machine > Tip > then Replace**.
 - The printer will display **Load Model - Unloading**, followed by **Tip Maintenance - Adjusting Temperature**.
 - After the temperature has stabilized, the printer will display **Tip Maintenance - Replace Tips**. You can now open the printer door and replace the tips - or you can **Cancel** the tip replacement procedure.
2. Remove Plastic Head Cover
 - Remove plastic head cover by squeezing raised pads on sides of cover.

Squeeze Tabs
(one on each side)
to Remove Cover.



Figure 18: Removing the Head Cover

3. Remove Tips
(Figure 19 on page 50)

- A. Use 7/64 T-Handle Allen wrench to loosen the tip screws three to four full turns counterclockwise - or until the top of the screws are flush with the metal cover.
- B. Use needle nose pliers to grasp the stainless steel shield of the tip.
- C. Pull the tip shield toward you, then pull down to remove the tip. Discard the used tip.
- D. Repeat for second tip if necessary.

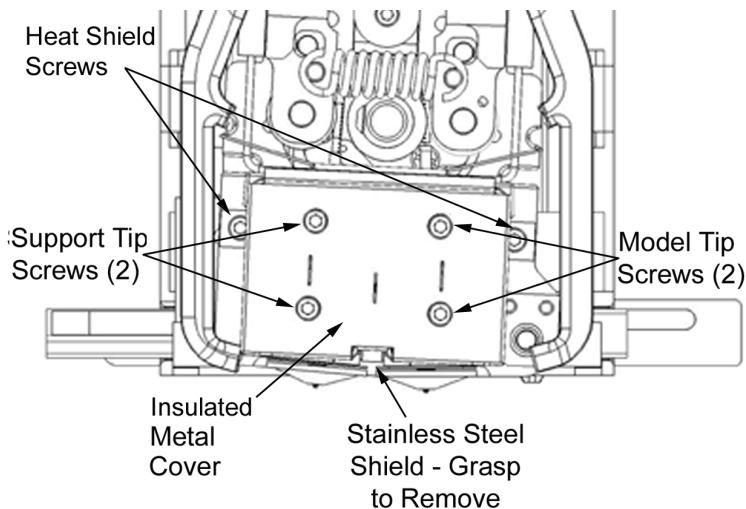


Figure 19: Tip Removal

Inspecting the Teflon Shield

The Teflon shield is designed to prevent build material from reaching the heater blocks. Inspect the Teflon shield to make sure that it is able to perform efficiently.

1. Remove the Heat Shield - loosen the 2 Heat Shield retaining screws (7/64 allen) ([Figure 19](#) on page 50).

NOTE

There is a teflon washer on each screw - between the back of the metal cover tabs and the Toggle Assembly. If the retaining screw is not completely removed from the Heat Shield and the washer is not damaged, the washer will act as a retainer, holding the screw to the metal cover.

2. Check the Teflon shield for:
 - Damage - Replace if the area around a cover hole is not intact or if the shield is torn.
 - Material trapped between shield and cover - Replace the shield if there is evidence of trapped material.
 - Security of attachment to metal cover - Replace the shield if it does not appear to be attached firmly to the cover. The shield is held in place by an adhesive strip.

Replacing the Teflon Shield

1. Remove the old Teflon shield from the heat shield - remove excess adhesive and support/modeling material.
2. Remove any excess support/model material around the Heater assemblies and Toggle Plate Assembly.
3. Remove the protective strip from the adhesive band on the new teflon shield.
4. Position the new Teflon shield on the inside of the cover. Center the intersecting cut lines of the teflon shield in the center of the heat shield holes.
5. Press the new shield in place. Check for good adhesion of teflon shield to heat shield

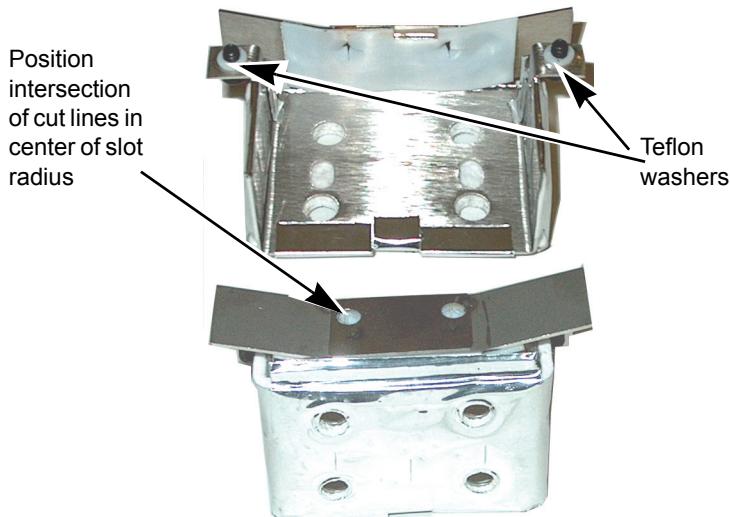


Figure 20: Replacing the Teflon Shield

Installing Tips

1. Install the heat shield - make sure the teflon washers are in place. Tighten the retaining screws.
2. For a Dimension 1200es BST, the SUPPORT tip and MODEL tip are interchangeable. Both tips are the same as the MODEL tip shown in [Figure 21 on page 53](#). (The tips come in a Red capped container).
3. For a Dimension 1200es SST, you must identify the correct replacement tip. The SST uses two tip types. You must make sure a SUPPORT tip is used on the LEFT side of the head assembly. A MODEL tip must be used on the RIGHT side of the head assembly (See [Figure 21 on page 53](#)). The Model tip comes in a Red capped container. The Support tip comes in a Black capped container.

CAUTION



For a Dimension SST: Model and SOLUBLE support tips are different. The correct tip must be installed in the correct side.

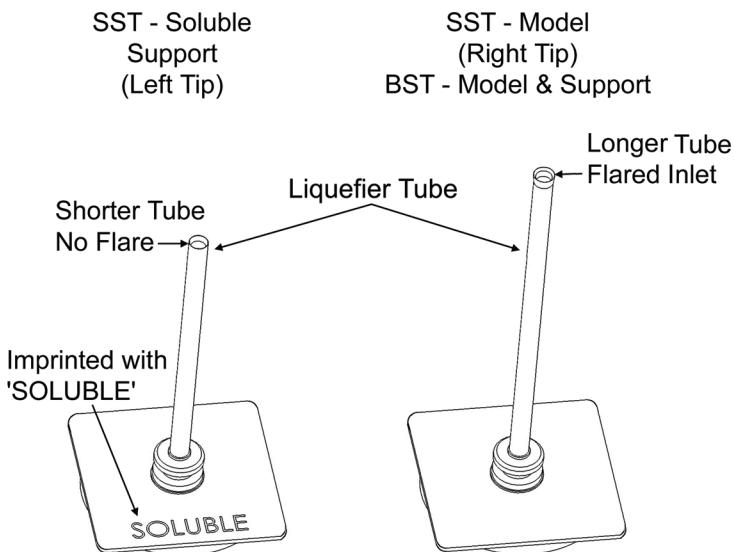


Figure 21: Identifying Tips

4. With gloved hand, insert the new tip into the heater block.
5. Use needle nose pliers to grasp the stainless steel shield of the tip.
6. Pull the tip shield toward you, then lift up to install the tip.
7. Push the tip toward the back of the printer once it is all the way up against the heater block.
8. Verify the tip is fully inserted into the heater block and that the stainless steel shield is aligned (See [Figure 22 on page 54](#)).
9. Use 7/64 T-Handle Allen wrench to firmly tighten the heater block clamp screws.

NOTE

Make sure Tip remains all the way up against the heater block as you tighten the screws.

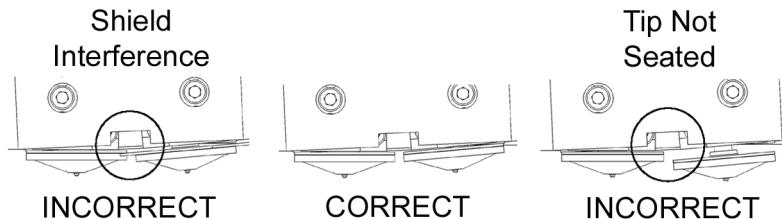


Figure 22: Installation Examples

10. Repeat steps 3 through 8 for second tip if necessary.
11. Replace Plastic Head Cover and close the printer door.
12. The printer will display **Tip Maintenance - Tips Replaced?** - select **Yes** to begin material load.
 - A. The printer will display **Load Model - Replace Both Cartridges** (flashing).
 - If you want to replace a material cartridge, do so now (See "[Loading Material](#)", paragraphs [2](#) and [3](#) on page [37](#) and "[Loading Material](#)" on page [32](#)).
 - If you do NOT want to change a material cartridge, you must unlatch and latch the cartridges to continue (Press the cartridge forward to unlatch, then press it forward again to latch).

NOTE

Because the material ‘unloaded’ during the tip replacement, the printer is in a material replacement mode. You must unlatch/latch the cartridges to continue.

If there is a delay in the unlatch/latch process, the printer will display **Both Cartridges Not Replaced Or Invalid. Select Retry**, then unlatch/latch the cartridges.

- B. The printer will now begin to load material. See “[Loading Material](#)” on page 32, paragraphs 9 and [10](#) on page 35 for procedure
- C. After Material Loading is complete the printer will display **Tip Calibration - Install Modeling Base And Build Calibration Part.**

CAUTION



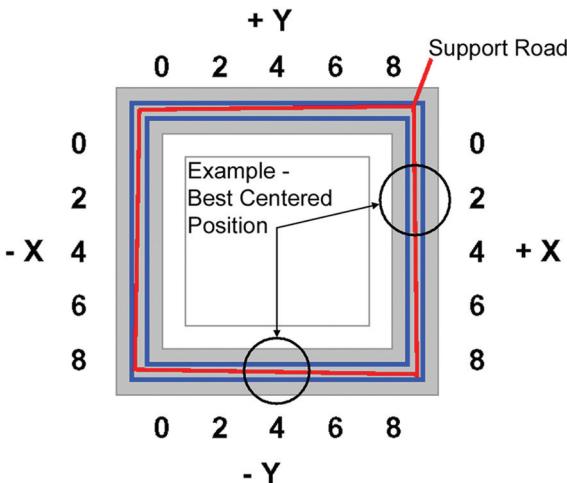
Make sure a NEW, UNUSED modeling base is installed before starting calibration. Calibration results will be incorrect if a NEW, UNUSED modeling base is not used.

Tip Calibration

Tip Replacement requires that a Tip Calibration must be performed.

1. Select **Start Part** (flashing) - the printer will run two calibration parts.
 - The printer will automatically build a Z Calibration part, measure the part and calibrate the Z Axis for tip depth and tip level (approximately 5 minutes).
 - The printer will then automatically build an XY Calibration part (approximately 10 minutes). You must inspect the XY Calibration part and calibrate the X and Y axes for tip offset:
2. When the XY Calibration part is complete the printer will display **Remove Part and Select XY Adjustment - X:0 , Y:0**

3. Remove the XY tip calibration part from the Dimension printer.
4. Inspect the part and calibrate the X and Y axes (See [Figure 23 on page 56](#)).
 - A. Use the magnifier from the Startup Kit to view the support road (shown in red).
 - B. Identify the location on the **+X or -X** side of the part where the support road is best centered within the model boundaries (shown in blue).
 - C. Read the number closest to this location. This is the required X Tip Offset adjustment, in mils. If the number is on the **-X** side, a negative offset is required.
 - D. Select **Increment** or **Decrement** to input the X offset adjustment - the value will change in the upper display window (by default, the printer will be ready to accept the X value).
 - E. When you are satisfied with your X offset value, **Select Y** and repeat the procedure to identify and input the required Y Tip Offset adjustment.
5. Select **Done** after you have input the X and Y offsets. The printer will return to **Maintenance**.



*Figure 23: Example XY Tip Offset Part.
This example requires an adjustment of X = + 2 mils, Y = - 4 mils*

As Needed Maintenance

The following maintenance items have no routine schedule but should be tended to as needed.

Remove Debris Buildup

Remove all material buildup on the Z Platform and around the lead screw ([See “Lead Screw and Guide Rod Identification” on page 48.](#)). Failure to do so could cause the base to not be level or the Z Platform to jam at its upper limit.

Vacuum Build Chamber

Vacuum the build chamber to remove all foreign particles and purged material.

Clean Door Glass

The door glass can be cleaned with any commercial glass cleaner.

Chamber Light Bar



**ESD
Sensitive!**

Use proper ESD grounding techniques
when handling electronic components.

CAUTION



Use only a factory authorized
replacement light bar.

Replace a chamber light bar when it burns out.

NOTE

There are two light bars in the modeling chamber. They are located on the front wall of the chamber - one to the right, the other to the left of the chamber door.

Replace chamber light bar:

1. Power down the printer.
2. Locate the wiring harness leading away from the bottom of the light bar.
3. Disconnect the light bar from the wiring harness by squeezing the wiring harness clip while pulling down.
4. Remove the light bar by removing the 3 attachment screws (top, middle, bottom) - use the 7/64 T-handle wrench supplied in the Startup Kit.
5. Install a replacement light bar with the 3 attachment screws - do not overtighten the screws.
6. Re-attach the wiring harness lead.

Tip Area Clean-up

Material can build up on the metal strip behind the extrusion tips ([Figure 24](#)). Build up can be caused by an overflowing Purge Bucket or an improperly adjusted Tip Cleaning Assembly.

1. Enter **Head Maintenance** (tips must be hot to clean area).
 - A. From **Idle**, press **Maintenance**.
 - B. Press **Machine**.
 - C. Press **Head**. The head will come to rest in the center of the chamber and the Z Platform will change position. Choose **Head Maintenance**.

WARNING



The head area is very hot!! Use leather gloves when working in this area of printer!

2. Clean the area of all material using the needle nose pliers supplied with your Start Up Kit.
3. Exit **Maintenance**.



Figure 24: Material Buildup Behind Tips

Tip Shroud Replacement

Tip shrouds can become torn or damaged over time. This can have a negative impact on the surface finish and detail of models.

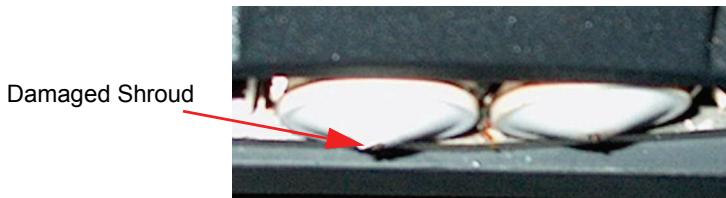


Figure 25: Tip Shroud Damage

1. Enter **Head Maintenance**.
 - A. From **Idle**, press **Maintenance**.
 - B. Press **Next**. The head will come to rest in the center of the chamber and the Z Platform will change position. Choose **Head Maintenance**.

WARNING



The head area is very hot!! Use leather gloves when working in this area of printer!

2. Position the blade of the putty knife supplied with Start-Up Kit between the Tip Shroud and Tip Shield ([Figure 26](#))
3. Use the blade to separate the Tip Shroud from the Tip Shield.

Insert the putty knife blade between the shroud and shield to remove the shroud.

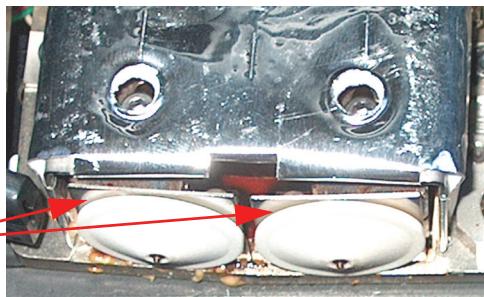


Figure 26: Tip Shroud Removal

4. Clean the tip using the wire brush supplied with the Start Up Kit to remove any debris.
5. Install a new Tip Shroud by pushing it, by hand, over the exposed tip. Make sure it is fully seated against the Tip Shield.
6. Exit **Maintenance**.

Troubleshooting

Troubleshooting Checklist

Problem or error message	Solution
No power	Verify power cord is securely plugged in.
	Verify that the circuit breaker (at rear of system) and the power switch (on front panel of system) are both in the ON position.
	Verify AC power is present at wall outlet.
System fails to reach operating temperatures	Verify the system is not connected to an extension cord or power strip.
Material not extruding	Filament may be jammed in extrusion head (see " Loss of Extrusion " on page 63.).
Purge material accumulating on part.	Material may have accumulated behind tips. (See "Tip Area Clean-up" on page 58.)
	Make sure that the flicker and brush are set to the proper height. (" Replacing the Brush/Flicker Assembly " on page 47.)
	Check condition of Flicker and Brush. Replace if worn. (" Replacing the Brush/Flicker Assembly " on page 47.)
No text displayed on Display Panel	Cycle power (see " Cycling Power " on page 31.).
Cannot communicate with system through network	Make sure network cables are connected - at the printer, at the PC, and where cables connect to network boxes.

62 Troubleshooting

Problem or error message	Solution
Cannot communicate with system through network (Continued)	Re-configure settings per (see “Networking Your Printer” on page 23. .)
	If using a Static network address, verify that the IP address entered in CatalystEX has the same value as the address entered for the printer.
	Your system configuration may have changed. Contact your Network Administrator.
Error Code displayed on Display Panel	Call your local reseller for customer service. For more information, refer to “Fault Determination Codes” on page 63..
Display Panel displays Build Error	Partial or bad part file sent to system. Check STL file validity in CAD software; reprocess STL in Catalyst and redownload to system.
Display Panel displays Can't Find Home – Check Modeling Base	Verify a modeling base is inserted.
	Modeling base may be used or defective – replace.
Display Panel displays Communication lost at HR:MN UCT	The system stopped reporting its status at the Universal Coordinated Time (UCT) shown. Wait for the system to complete building the part. The system will automatically restart and display Build Complete. It is then safe to remove the model.
Display Panel displays Could Not Read Cartridge	Remove cartridge and cycle power (see “Cycling Power” on page 31.); reload cartridge.
	Try a different cartridge.
Display Panel displays Load Failed	Retry with same cartridge.
	Try a different cartridge.
	Filament may be jammed in extrusion head (see “Loss of Extrusion” on page 63.).

Fault Determination Codes

If a fault occurs, which would prevent Dimension from executing an operator request, the system will begin to shut down and cool. The panel will display one or two error codes. An error-code list (with the filename "error.txt") can be found on the CD-ROM for the controller software. (Because this list may change with each new software version, be sure to check the error.txt attachment when you download new software upgrades.)

After the printer has finished cooling, the only option displayed is **Continue**. Press **Continue** and the printer reboots and tries to return to normal operation. If pressing **Continue** does not recover the printer, the printer should be power cycled (see "["Cycling Power" on page 31.](#)"); wait 60 seconds before switching power on again. In most cases you will be able to continue operation. However, if the printer continues to shut down and display the same error, call your service representative.

Loss of Extrusion

Diagnosing Loss of Extrusion

Occasionally, the printer's head may experience loss of extrusion. This will be evident by observing one of the following:

- Seeing the head moving with no material coming out of either liquefier tip
- The height of the model and support materials are not equal
- Sagging structures due to lack of support materials

WARNING



The head area is very hot!! Use gloves when working in this area of printer!

Diagnose loss of extrusion:

1. Press **Cancel** and remove any parts from the printer.

2. Insert a new modeling base.
3. From **Idle**, enter **Maintenance**
 - A. Using the keypad, press **Machine**.
 - B. Press **Head**. The head will come to rest in the center of the chamber and the Z Platform will change position.
4. The display will read:
Model Drive Motor
Stopped
5. Determine if there is a model material extrusion problem by pressing **Forward** (command will be available after Head reaches operating temperature). Watch the model tip (right tip) for several seconds, looking for extrusion (material purge).

NOTE

If it was previously at a cool temperature, the tip may not immediately extrude material. After the tip reaches operating temperature you may need to wait up to 30 seconds before extrusion will begin.

6. Press **Stop** to stop the extrusion.
7. If material steadily flowed from the model tip, the model tip is not experiencing loss of extrusion.
8. Test the support material tip by choosing: **Select Drive** - the display will read:
Support Drive Motor
Stopped
9. Determine if there is a support material extrusion problem by pressing **Forward**. Watch the support tip (left tip) for several seconds, looking for extrusion (material purge).
10. Press **Stop** to stop the extrusion.
11. If material steadily flowed from the support tip, the support tip is not experiencing loss of extrusion.
12. Return the printer to the Maintenance state - Push **Done**, then answer **Yes** when the printer displays **Is Material Loaded?**

13. If material did not extrude from both tips follow the procedure in the following section, "[Recovering From Loss of Extrusion](#)".

Recovering From Loss of Extrusion

NOTE

It is recommended that you read and understand this entire procedure before performing any of the work.

1. Enter **Head Maintenance** mode.
 - From **Idle**, press **Maintenance** > then **Next** > then **Head Maintenance**.

WARNING



The head area is very hot!! Use leather gloves when working in this area of printer!

2. Remove plastic head cover.
 - Remove plastic head cover by squeezing raised pads on sides of cover.
3. Place the tip toggle bar in neutral position (bar will extend equally from both sides of head - [Figure 27](#)). This can be done manually - push on the extended bar end.

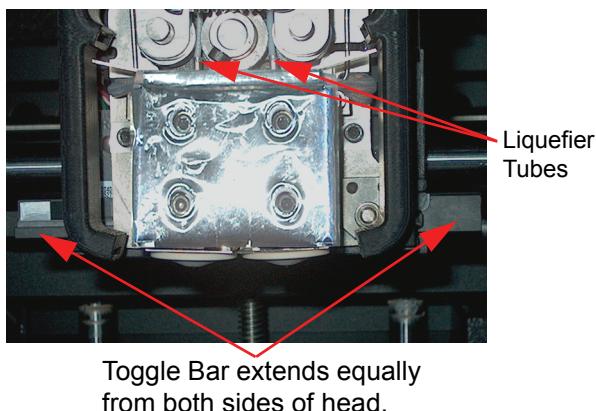


Figure 27: Tip Toggle Bar in Neutral Position

CAUTION



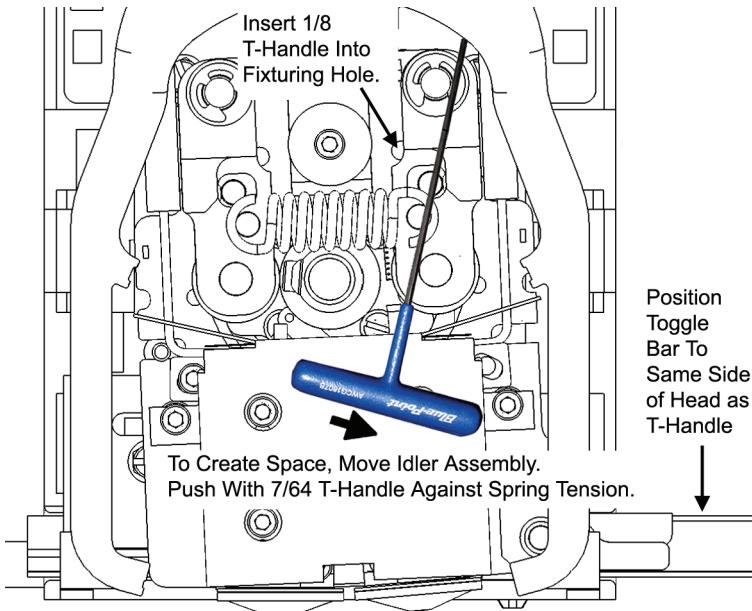
The end of the extrusion tip where the material enters is called the Liquefier Tube. Liquefier Tubes are fragile. Use care when working in this area so as to avoid damage to the tubes.

4. Remove excess material found around the head area.

NOTE

Filament feed to the tip can sometimes jam causing a build-up of material under the head cover.

- A. Clean out as much of the material as possible using needle nose pliers, a probe, or equivalent tool.
- B. To facilitate access to areas that may need to be cleaned, move the material idler wheels out of the way (there is one idler wheel for support material and one for model material - Figure 28 illustrates the model side):



*Figure 28: Create Access Space for Cleaning - Model Tip Side
Repeat for Support Tip Side*

NOTE

Move only one idler wheel assembly at a time. Finish cleaning around the moved wheel and restore it to its normal position before moving the other idler wheel. Having both wheels out of position simultaneously could stretch the spring.

- (1). Using a 7/64 T-handled hex driver (from Start-Up Kit) to leverage against the lower idler wheel shaft, push the idler assembly away from the filament drive gear by pushing against the spring tension.

NOTE

When moving the idler wheel assembly, you can obtain maximum clearance for cleaning if you also move the Tip Toggle Bar so that it is extended to the same side of the head assembly as the one on which you are working. It is not necessary to keep Toggle Bar in a neutral position.

- (2). Insert 1/8 T-handled hex driver (from Start-Up Kit) into the fixturing hole.
- (3). Ease pressure on the 7/64 T-handle driver to carefully return the leveraged idler wheel back toward its original position - until the idler assembly is resting against the 1/8 T-handled hex driver.
- (4). Remove the 7/64 T-handled driver used to leverage the idler assembly.
- (5). Clean the area that is now accessible. Remove the 1/8 T-handle hex driver when complete.

CAUTION

Liquefier Tubes are fragile. When removing excess material from the top of the liquefier be careful not to damage the tube.

5. Remove excess material from the top of the liquefier.
 - Use needle nose pliers to carefully grip and remove excess material from the top of the liquefier.

6. Snip the filament line from the cartridge close to the drive wheel.
7. Make sure that all loose filament is removed from the affected liquefier inlet area.
8. Check for loose material in the other liquefier inlet area. Clean the area as necessary.

Inspect the Teflon Shield

If the printer experiences a loss of extrusion (LOE), material can build up around the Toggle Plate Assembly. The Teflon shield is designed to prevent this material from reaching the heater blocks, reducing the amount of maintenance required to return the printer to service. To make sure that the Teflon Shield is able to perform efficiently, it is recommended that it be inspected when returning a printer to service following a LOE event.

1. Remove the liquefier tips - refer to “[Removing Tips](#)” on [page 49](#).
2. Inspect the Teflon shield - refer to “[Inspecting the Teflon Shield](#)” on [page 50](#).
3. Install the liquefier tips - refer to “[Liquefier Tip Replacement](#)” on [page 49](#).
4. Perform a Tip Calibration (every time a tip is installed, a Tip Calibration must be performed).
 - A. If you are installing new tips, perform the Tip Calibration per “[Tip Calibration](#)” on [page 55](#). After the calibration, the tip odometer will be re-set to zero.
 - B. If you are re-using tips, perform the Tip Calibration as follows (the tip odometer will not be re-set to zero):
 - (1). Perform a Z Calibration; from **Maintenance > Machine**, choose **Tip > Calibrate Z**.

The printer will automatically build a Z Calibration part, measure the part and calibrate the Z Axis for tip depth and tip level (approximately 5 minutes).

- (2). Perform an XY Calibration; from **Maintenance > Machine**, choose **Tip > Calibrate XY**.

The printer will then automatically build an XY Calibration part (approximately 10 minutes). You must inspect the XY Calibration part and calibrate the X and Y axes for tip offset. See paragraphs 1 through 4 on page 56.

Prepare Printer for Return to Service

1. Install plastic head cover.
2. Exit **Maintenance** - press **Next >** then **Done**.
3. Unload the material. Make sure that the cartridges are entirely removed so that all of the filament loaded into the printer can be withdrawn. (See “[Unloading Material](#)” on page 36..

NOTE

It is recommended that an unload be performed for each material.

4. Load material (See “[Loading Material](#)” on page 32.

Clogged Liquefier Tip

Occasionally, a Liquefier Tip may clog with material. This is often accompanied by a Loss of Extrusion (LOE). (Refer to “[Loss of Extrusion](#)” on page 63.). A clogged Tip will prohibit material load.

Clearing A Clogged Liquefier Tip

NOTE

It is recommended that you read and understand this entire procedure before performing any of the work.

This procedure assumes that filament is loaded to near the liquefier tip. If filament has not been loaded, see “[Loading Material](#)” on page 32.

1. Enter **Maintenance** mode.

From **Idle**, press **Maintenance > Machine > then Head**.

2. Move the material idler wheel out of the way on the side that is clogged. Use a 7/64 and 1/8 T-Handle as illustrated in [Figure 28](#) (model side shown).
3. Move the toggle bar so as to ‘deactivate’ the clogged tip.

NOTE

Push the toggle bar to the right to deactivate the support side; push the toggle bar to the left to deactivate the model side.

4. Snip the filament just after the it passes between the filament drive and the idler wheel ('pinch point').

NOTE

If necessary manually pull more filament forward in order to reach the ‘pinch point’.

5. Move the toggle bar to activate the clogged side. This will make the drive wheel control options active for the clogged side.

NOTE

Push the toggle bar to the left to activate the support side; push the toggle bar to the right to activate the model side.

6. Press **Forward** on the interface panel. The drive wheel will turn, but filament will not feed because the idler wheel is held out of position.
7. Use the 7/64 T-Handle to hold pressure against the toggle spring and keep the idler wheel away from the filament. Remove the 1/8 T-Handle.
8. Press **Blower Off** on the interface panel. With the head blower off the temperature the liquefier tube will increase.

9. After approximately 5 seconds, reduce pressure against the toggle spring and allow the idler wheel to contact the filament. Filament should extrude from the clogged tip.

NOTE

The blower will automatically turn on in 10 seconds.

10. Press **Stop** on the interface panel.
11. Move the toggle bar to activate the drive wheel control options for the non-clogged side.
12. Press **Forward** on the interface panel. Make sure that filament extrudes from the non-clogged liquefier.

NOTE

It is necessary to confirm proper operation of the non-clogged side. Temporarily having the blower off can occasionally cause the non-clogged side to clog.

13. Press **Stop** on the interface panel.
14. Install plastic head cover.
15. Exit **Maintenance** - press **Next >** then **Done**.



7665 Commerce Way
Eden Prairie, MN 55344-2080 USA
Telephone: (952) 937-3000
Fax: (952) 937-0070
Web Site: www.dimensionprinting.com