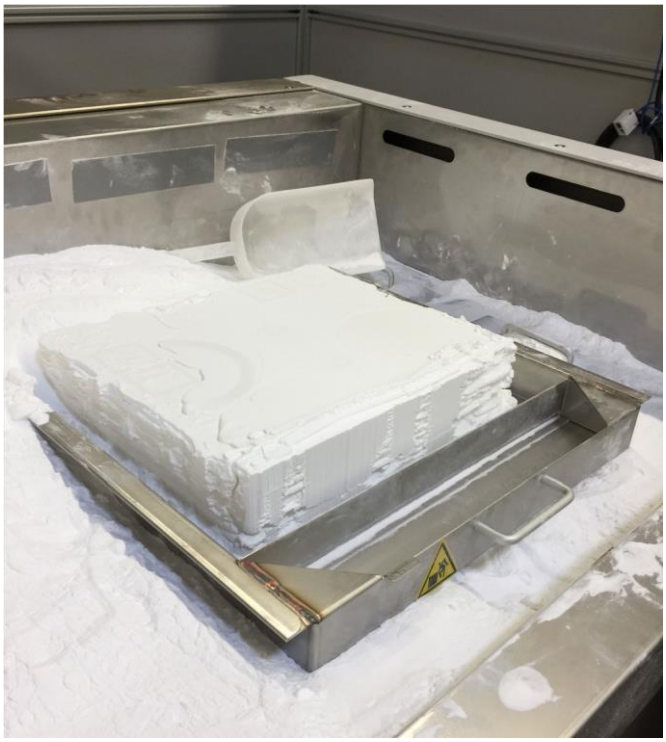


NOTE: You can find material-specific information about breaking out and cleaning parts in your Material Guide.

Before breakout, you must:

- Cool down the print cake then remove the part transfer cylinder from the print chamber—or vice-versa.
- Roll the part transfer cart to the ProX® MQC Single Use System and unload the print cylinder onto the breakout area.
- Remove the print cylinder.
- Remove the surrounding powder from the outline of the parts with a spatula and brush. Ensure the sifter is running, then brush unsintered print cake powder into the sifter.
- When you can easily grasp a part, carefully lift it. Gently brush off the parts and place them on the breakout area of the ProX® MQC Single Use System.

Part Finishing After Breakout

NOTE: Consult your Material Guide for full details on part finishing.

After breakout, remove and dispose of any remaining print cake material from holes and crevices .

Your SLS system ships with a basic set of rough and fine part cleaning tools. You may find it useful to supplement these with other fine tools, picks, and brushes, such as those used for dental and jewelry work.

3D Systems recommends you also purchase a glass bead blaster (pneumatic blast cabinet). A bead blaster makes fine cleaning much easier and faster . See your **Facility Guide** for specifications.

Operational Mode Screen

> Operational mode
+ Load fresh powder
+ Start/stop cool cycle
> Setup/Service/Diag
+ Activate Svc mode
- Deactivate Svc mode

From the **Main Control Screen**, use the dial to highlight the menu item, **Operational mode** and press the dial to select .

This menu allows the user to choose the mode of material handling for the ProX MQC Single Use System .

- **Full Cycle** will allow the ProX MQC Single Use System and printer to control all material handling in fully-automatic mode.
- **Local Cycle** is the same as Full Cycle, except that all printer powder requests are ignored by the ProX MQC Single Use System.
- Choose **Stop Cycle** to turn material handling off.

Operational mode
+ Run Full cycle
+ Run Local Cycle
+ Stop Cycle

Main Control

System Setup/Service Screen

From the **Main Control** Screen, use the dial to highlight the menu item **Setup/service**, and press the dial to select . The **Service** option is for Certified Personnel only and not available to the user .

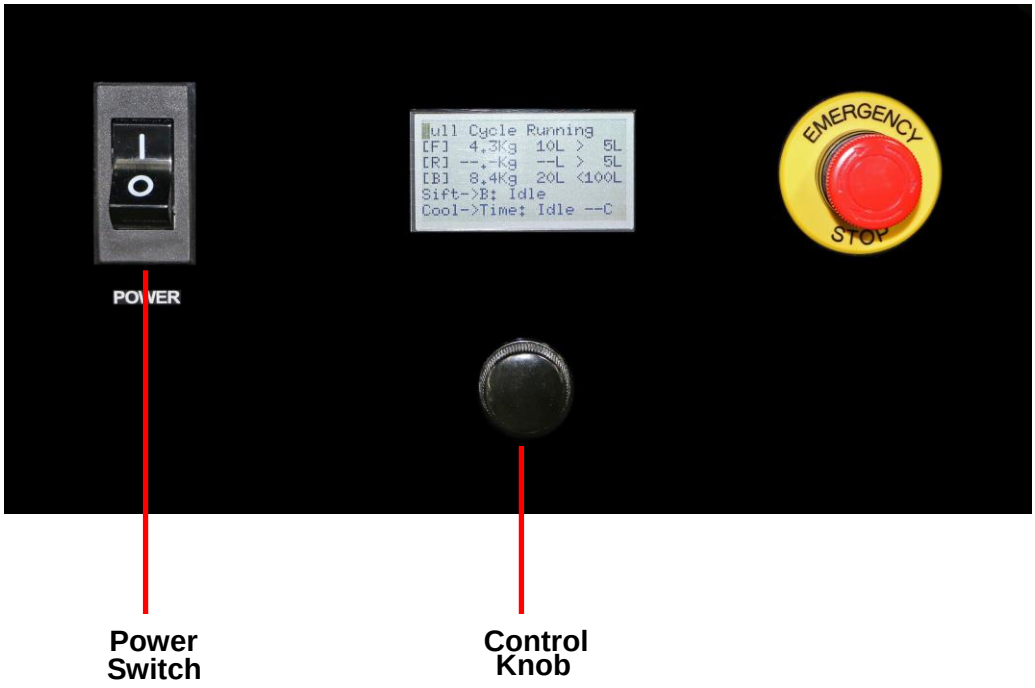
System setup/service

From this screen, you can:

> Diagnostics
> Setup •
> Service

Navigate to the **Diagnostics** screen.

- Navigate to the **Setup** screen . + Version info
- Navigate to the **Service** screen. This is available to certified personnel only.
- View the **Version information** for the software installed on the ProX MQC Single Use System .



PROX MQC SINGLE USE SYSTEM USER INTERFACE SETTINGS

Display Legend

The following information is applicable to all LED Display menu items:

LEGEND

> Submenu - rotate knob to highlight and select submenu, press knob to enter.

+ Command - press button to start action or edit value.

- (or no symbol) - Output or unavailable command, does not respond to the knob.

> BACK - Rotate knob to highlight and select, press knob to return to previous menu.

Rotate the knob to switch between items.

Press and hold the knob down to return to **Main Status** screen.

ProX MQC Single Use System Main Status Screen

The **Main Control** screen allows the user to:

- Displays the current operational mode and other status information .
- Shows amount of powder in MQC Single Use System bins (Kg and Liters) and the amount of powder required to begin a powder blend .
- F - Fresh powder bin
- B - Blended powder bin
- Sifter status
- Cooling lid status

In opposite screen:

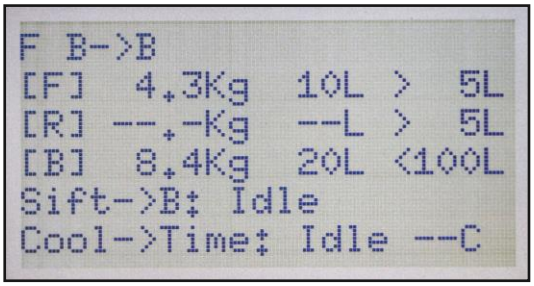
- There are 10 liters in fresh bin
- There are 20 liters in blended powder bin
- The ProX MQC Single Use System will not start another blend cycle unless:
- The fresh bin level is greater than 5 liters
- The blended bin level is less than 100 liters
- There is more than 5 liters of reclaimed powder available . (reclaimed through the sifter from completed print jobs)
- The sifter is idle and but if in use the output would be directed to Blended bin
- The cooling lid is idle but if in use N2 flow duration would be controlled by time

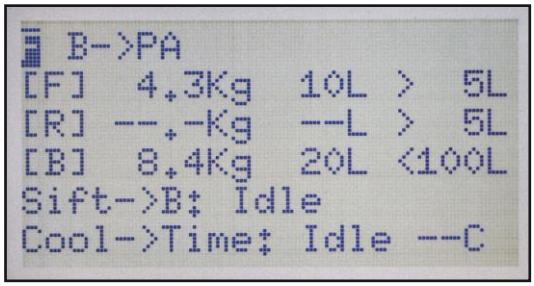
The amount of Fresh and reclaimed powder required to start a blend is based on the current replenish percentage . If 50%, then equal amounts of powder are required . The screen above shows that for a replenish rate of 50% a minimum of 5 liters of Fresh and reclaimed powder is required .

First line display may change based on MQC current status:

- F B -> B indicates Full Cycle mode and Blended Bin recirculation

- Other possible status messages:
  - B -> PA Blended bin transporting to Printer A

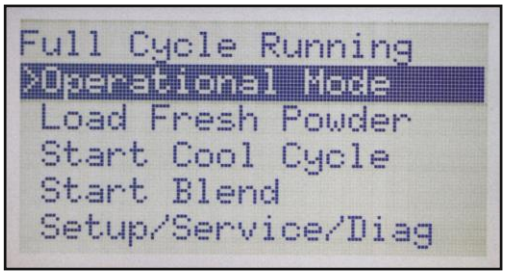


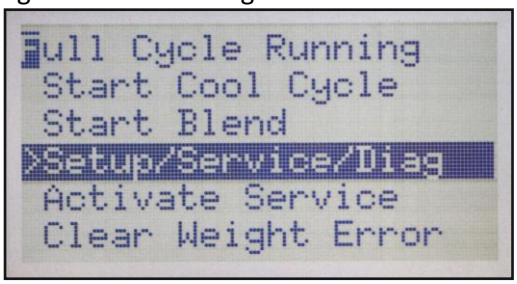


NOTE: To toggle from Status screen to Main Control screen, quickly press and release control knob .

ProX MQC Single Use System Main Control Screen

- The **Main Control Screen** allows the user to:
- Navigate to the **Operational Mode** screen .
- **Load Fresh Powder** into the system (To do this the user must first scan the material RFID tag on the lid of the material container across the RFID reader on the front panel of the MQC Single Use system . This will unlock the fresh bin access doors . The RFID tag material type must match the material type currently in MQC Single Use System .
- **Start Cool Cycle** - Start the N2 flow to the Nitrogen lid (duration controlled either by temperature or time)
- **Change Sifter Mode** – allows user to select destination of the output from the sifter (reclaimed bin or external barrel or drum)
- **Setup/Service/Diag** – Navigate to submenu . (only the Setup screen is available to general users . Service and Diag screens are only for use by 3D Systems Certified Technicians)
- **Activate Service** – Service RFID tag required
- **Clear Weight Error** - usage by operator for a clear bin weight tag to clear a bin weight error

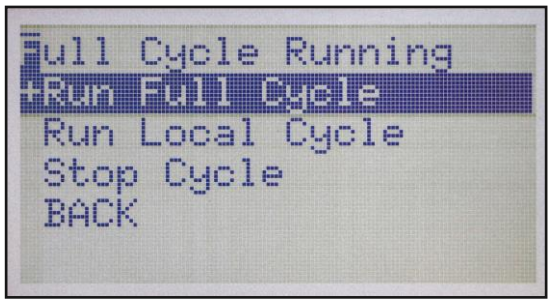




Operational Mode Screen

On the Main Control Screen, rotate the button to highlight Operational Mode .

Quickly press and release knob to display the following screen:



Full Cycle allows the ProX MQC Single Use System to operate in a fully automatic mode .

- The ProX MQC Single Use System will send powder to requesting printer if blended powder is available .
- The ProX MQC Single Use System will blend powder if adequate powder is available in the fresh bin .
- The ProX MQC Single Use System will periodically recirculate the powder in the blended bins .

Local Cycle will allow the ProX MQC Single Use System to operate the same way as Full Cycle mode except that all printer requests for powder are ignored by the ProX MQC Single Use System .

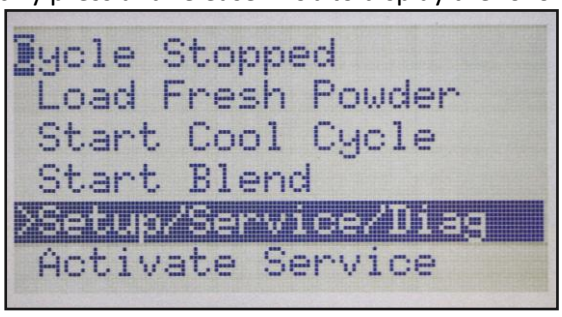
Stop Cycle prevents the ProX MQC Single Use System from blending powder, recirculating powder in Fresh and Reclaimed bins or responding to printer requests for powder .

User should select **Stop Cycle** to:

- Load Fresh Powder • Enter Setup submenu to:
- Change replenish percentage for blending
- Change sifter timeout

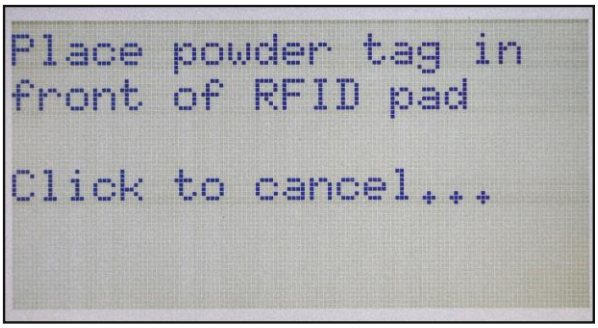
To Load Fresh Powder

1 . After **Stop Cycle** is selected, quickly press and release knob to display the following screen .



2 . Rotate knob to select **Load Fresh Powder** .

Quickly press and release knob to display the following screen:



4 . Remove lid from powder container . Place the lid against the RFID pad and hold there until you hear the doors to the fresh powder bin unlock .

5 . Turn on ProX MQC Single Use System air handler . Open Fresh Bin doors and empty the powder container into Fresh bin, then close doors . You should hear doors relock .

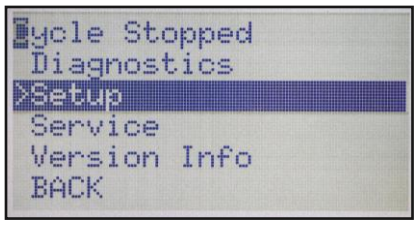
NOTE: If loading multiple powder containers, you must close and lock the Fresh Bin doors between each container .

6. When finished with loading powder into the Fresh Bin, return ProX MQC Single Use System to Full Cycle mode to blend powder or continue in Stop mode if you wish to change Replenish percentage or make any other changes to the setup parameters .

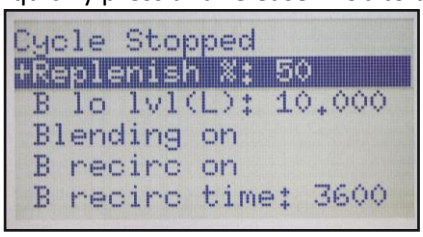
To change Replenish percentage:

1 . Quickly press and release knob to display the following screen:

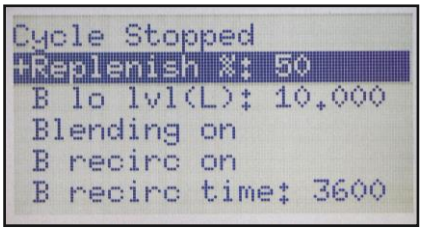
2 . Rotate control knob to select **Service/Service/Diag** and quickly press and release knob .



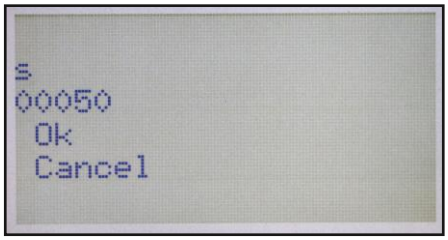
3 . Rotate control knob to select **Setup** and quickly press and release knob to display the following screen:

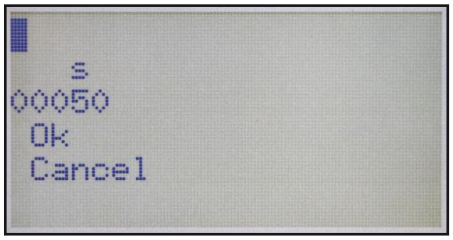


4 . Select **Replenish% .**

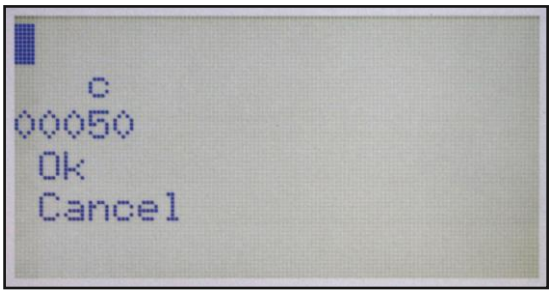


5 . Twist knob to position selection cursor .

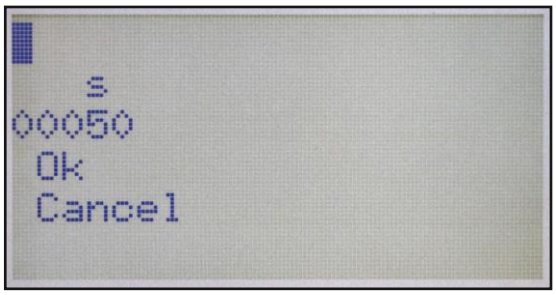




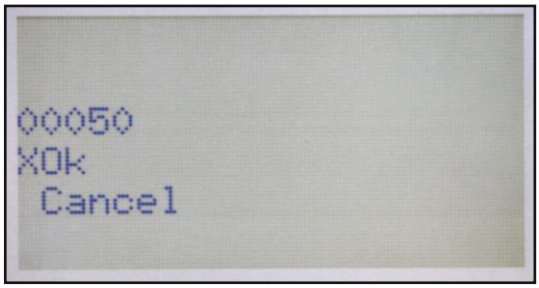
6 . Push knob to change cursor from **Select** to **Change** mode and rotate to change value .



7 . Push knob again to go back to **Select** mode .



8 . Continue to rotate until the selection is adjacent to the OK and push knob again (this will save your changes) .



Diagnostics Screen

From the **System setup/service** screen, use the dial to highlight the menu item **Diagnostics**, and press the dial to select .

From this screen, you can navigate to the following diagnostic screens:

Diagnostics
> Material tracking
> Fresh-bin diag
> Blend-bin diag
> Sifter diag
> Generic I/O diag

- **Material tracking** . This allows you to view details regarding the material that is in the system .
- **Fresh-bin diagnostics** . This allows you to view status details of the components that comprise the handling of fresh material in the system .
- **Blend-bin diagnostics** . This allows you to view status details of the components that comprise the handling of blended material in the system .
- **Sifter diagnostics** . From here you can view the status of components related to the sifting system .
- **Generic I/O diagnostics** . Details related to the stack lights, E-Stop, relays, nitrogen, and temperature can be viewed here .

Setup Screen

From the **System setup/service** screen, use the dial to highlight the menu item **Setup**, and press the dial to select . This screen is only operational when the system is in **Stop** mode .

NOTE: all times are in seconds except the nitrogen cooldown time, which is in minutes .

This menu provides the following commands:

- Choose the percentage of **fresh powder** in the **blended bin** .
- Choose the **lower level limit** of the **blended bin** in liters .
- Turn the **blending function** on or off .
- Turn the **blended bin recirculation** function on or off .
- Set the **time** for the **blended bin recirculation** (in seconds) .
- Set the **minimum weight** threshold for fresh bin (in Kg) .
- Set the **length of time for the sifter** to automatically turn off .
- Toggle the **nitrogen** setting between **temperature** and **time** .
- Set the **time that the nitrogen will be used** to cool off the print cake .
- Set the **temperature** of the print cake at which the nitrogen will stop being dispensed .
- Reset the data for the material .
- Shutdown the system .

Setup
+ Replenish %
+ B lo lvl (L)
+ Blending on/off
+ B recirc on/off
+ B recirc time
+ Minimum Fresh Weight

+ Sift timeout
+ Cool by temp/time
+ Cool time (min)
+ Cool temp
+ Reset material data
+ System Shutdown

Material Tracking Screen

From the **Diagnostics** screen, use the dial to highlight the menu item **Material tracking**, and press the dial to select .

This screen displays the following status information:

- **Material Number**: The number associated with the material .
- **Name**: The name of the material .
- **Material Density**: The density of the material .
- **Minimum Fresh Blend Percentage**: The minimum percentage of fresh material that is available for blending .
- **Maximum Fresh Blend Percentage**: The maximum percentage of fresh material that is available for blending .
- **Max Recirculation Period**: The maximum time (in seconds) that recirculation will take place
- **Fresh Consumed:** The amount of fresh material consumed (in Kg) .
- **Used Consumed:** The amount of used material consumed (in Kg) .

Material Tracking
Matl #
Name
Matl density
Min Replensish %
Max Replenish %
MaxRecircPeriod
Fresh Consumed
Used Consumed

Fresh-Bin Diag Screen

From the **Diagnostics** screen, use the dial to highlight the menu item **Fresh-bin diag**, and press the dial to select .

This screen displays the following status information:

- **Door closed/open**: This indicates whether the left door for inputting fresh material is open or closed .
- **Door unlocked/locked**: Indicates whether or not the door for inputting fresh material are locked or unlocked .
- **Gate valve open/closed**: Indicates if the gate valve for the fresh material bin is opened or closed .
- **Transport level full/not full**: Indicates whether or not the transporter for the fresh material is full or not .
- **Fluidizing air on/off**: Indicates whether or not the air responsible for fluidizing the material in the transporter is on or off .
- **Transporter air on/off**: Indicates whether or not the air responsible for transporting the material out of the transporter is on or off .
- **Weight**: Gives the weight (Kg) of the material in the fresh bin .
- **Pressure**: Gives the air pressure (KPa) from the transporter .

Fresh-bin diag

Door closed/open
Door unlocked/locked
Gate valve open/closed
Tport level full/not full
Fluid air on/off
Tport air on/off
Weight Kg
Pressure KPa

Blend-Bin Diag Screen

From the **Diagnostics** screen, use the dial to highlight the menu item **Blend-bin diag**, and press the dial to select .

This screen displays the following status information:

- **Gate valve open/closed**: Indicates if the gate valve for the blended material bin is opened or closed .
- **Transport level full/not full**: Indicates whether or not the transporter for the blended material is full or not .
- **Fluidizing air on/off**: Indicates whether or not the air responsible for fluidizing the material in the transporter is on or off .
- **Transporter air on/off**: Indicates whether or not the air responsible for transporting the material out of the transporter is on or off .
- **Weight**: Gives the weight of the material in the blended bin .
- **Pressure**: Gives the air pressure from the transporter .
- **Current Blend:** Gives the current percentage of blended material in the bin

Blend-bin diag

Gate valve open/closed
Tport level full/not full
Fluid air on/off
Tport air on/off
Pinch B->B closed/open
Pinch B->PA closed/open
Weight Kg
Pressure KPa
Current Blend %

Sifter Diag Screen

From the **Diagnostics** screen, use the dial to highlight the menu item **Sifter diag**, and press the dial to select .

This screen displays the following status information:

- **Gate valve open/closed**: Indicates if the gate valve for the sifter is opened or closed .
- **Transport level full/not full**: Indicates whether or not the transporter for the sifter is full or not .
- **Fluidizing air on/off**: Indicates whether or not the air responsible for fluidizing the material in the sifter transporter is on or off .
- **Transporter air on/off**: Indicates whether or not the air responsible for transporting the material out of the sifter transporter is on or off .
- **Pinch valve sifter to blended bin closed/open**: Indicates whether or not the sifter's blended bin is open or closed .
- **Cycle start active/inactive**: Indicates whether or not the sifter's cycle start is active or inactive .
- **Cycle stop active/inactive**: Indicates whether or not the sifter's cycle stop is active or inactive .
- **Shaker on/off**: Indicates whether or not the sifter's shaker is on or off .
- **Pressure**: Gives the air pressure from the transporter .

Sifter diag

Gate valve open/closed
Tport level full/not full
Fluid air on/off
Tport air on/off
Pinch S->B bin closed/open
Cycle start active/inactive
Cycle stop active/inactive
Shaker on/off
Pressure KPa

Generic I/O Diag Screen

From the **Diagnostics** screen, use the dial to highlight the menu item **Generic I/O diag**, and press the dial to select .

This screen displays the following status information:

- **E-Stop active/inactive**: Indicates whether or not the E-Stop for the machine has been activated .
- **24V Relay on/off**: Indicates the on/off status of the 24 volt relay .
- **Red light on/off**: Indicates the status of the red stack light .
- **Amber light on/off**: Indicates the status of the amber stack light .
- **Green light on/off**: Indicates the status of the green stack light .
- **Logo backlight on/off**: Indicates the status of the logo backlight .
- **Nitrogen supply valve open/closed**: If the valve for the nitrogen supply is open, nitrogen can be fed to the system .
- **Nitrogen blanket (cooling lid) valve open/closed**: If the valve for the nitrogen supply to the cooling lid is open, the cooling lid can be used .
- **Part Cake 1 (thermocouple) temperature**: Gives the temperature of the first thermocouple used to measure the temperature in the part cake .
- **Part Cake 2 (thermocouple) temperature**: Gives the temperature of the second thermocouple used to measure the temperature in the part cake .
- **Digital Output temperature**: Gives the temperature of the digital output on the controller board of the MQC System .

Generic I/O diag

Estop active/inactive
24V Relay on/off
Red light on/off
Amber light on/off
Green light on/off
Logo backlight on/off
N2 supply v. open/closed
N2 blanket v. open/closed PC1 temp.
PC2 temp.
DO temp.
PS temp.

- **Power Supply temperature**: Gives the temperature of the power supply on the controller board of the MQC System .

MQC – USER MAINTENANCE

- Inspect compressed air condensation/oil trap, empty if needed
- Wipe surfaces, sift, discard unusable powder, as needed
- Disposal container
- Inspect weekly, empty as needed
- Sifter screen
- Vacuum after every use
- Sock filter
- Inspect weekly, clean monthly, replace at 6 months

LEGAL NOTICES

COPYRIGHT AND CORPORATE IDENTITY

IMPROVEMENTS

3D Systems may (but shall not be obligated to) make improvements to this document from time to time . However, the Licensed User acknowledges that at any time after the expiration of the date of issuance, 3D Systems may institute a periodic charge or fee payable by the Licensed User in return for ongoing receipt of improvements . It is the responsibility of the Licensed User to provide 3D Systems with current information as to its name and address . The Licensed User also undertakes to notify 3D Systems promptly in the event that it considers any of the data contained in this document to be incomplete or erroneous in any respect, in connection with Licensed User’s particular or general use .

FCC NOTICE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules . These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment . This equipment generates, uses, and can radiate radio frequency energy . If it is not installed and used in accordance with these instructions, it may cause harmful interference to radio communications . Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense .

Changes or modifications to this equipment not approved by 3D Systems can void the authority of the user to operate this equipment .9

RADIO FREQUENCY TRANSMISSION

This product generates 13.56 MHz using an Inductive Loop System as a Radio Frequency Identification device (RFID). This RFID device complies with the requirements specified in FCC Part 15, Industry Canada RSS-210, European Council Directive 2014/53/EU, and all applicable local laws and regulations .

Operation of this device is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation .

The device referenced in this guide contains transmitter, FCC ID: 2ADGF-MERCURY ID: 12666A-MERCURY

Access to the transmitter for service technicians is available through common enclosure access methods including use of common tools and removal of covers .

NOTE: Changes or modifications to this equipment not specifically approved by 3D Systems may void the user's authority to operate this equipment .

BASIC REGULATIONS

3D Systems has tested this printer to electromagnetic emission and immunity standards . These standards are designed to mitigate interference caused or received by this printer in a typical office environment.

United States

This device complies with part 15 of the FCC Rules . Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation .

Changes or modifications to this equipment not approved by 3D Systems can void the authority of the user to operate this equipment .

Canada

This device complies with Industry Canada license-exempt RSS standard(s) . Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device .

Ce dispositif est conforme aÌ la norme CNR-210 d'Industrie Canada applicable aux appareils radio exempts de licence . Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage preìjudiciable, et (2) ce dispositif doit accepter tout brouillage rec?u, y compris un brouillage susceptible de provoquer un fonctionnement indeìsirable . This Class A digital apparatus complies with Canadian ICES-003 .

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada .

European Union

CAUTION: This is a Class A product . In a domestic environment, this product can cause radio interference in which case the user could be required to take adequate measures .

In order to allow the equipment to operate in close proximity to Industrial, Scientific and Medical (ISM) equipment, the external radiation from the ISM equipment may have to be limited or special mitigation measures taken .

Changes or modifications to this equipment not approved by 3D Systems can void the authority of the user to operate this equipment .

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www .3dsystems .com

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