

EON-LTTM

pc-based controller

user guide

for vers. 3.0.11 software

Contents

7	Chapter 1: Eon-LT™ at a Glance
7	Eon-LT™ Connectors
9	Accessories
11	Chapter 2: Getting Started
11	Eon-LT™ System Assembly
15	Chapter 3: Program Control
15	Program Control Screen
15	Process List
16	Layer List
17	Layer Properties List
18	Layer Properties Defined
21	Chapter 4: Settings
21	Settings Screen
21	Backup & Restore
22	Sensor Alerts
23	Log
23	Restore Defaults
23	Period Control
24	Relay Control
25	Sensor Zeroing
25	Auto Abort on Max Power
25	Rate Max/Min Auto Abort
26	Chapter 5: Manual Mode
26	Manual Control
26	Adjusting Source & Heater Power
26	Exiting Manual Mode

Contents

28	Chapter 6: Vertical Tool Bar
28	Using the Vertical Tool Bar
28	Starting a Deposition
29	Aborting a Process
29	Resume or Restart an Aborted Process
29	Logging Eon-LT™ Status
29	Zeroing the Sensors
29	Activating Relay 1 and Relay 2
30	Exiting Eon-LT™ Software
31	Chapter 7: Status
31	Status Screen
32	Health, Layer, Material, Frequency, Rate, and Thickness
32	Zero Sensor
32	Percentage Complete
32	Source Power
33	Temperatures
33	Manually Zeroing Individual Sensors
34	Chapter 8: Green Status Bar
34	Status Indicators and Remote Process Control
35	Chapter 9: Graphs
35	Graph Screen
35	Adjusting Y Values
36	Graphs
36	Color Key
37	Chapter 10: Screen Lock
37	Password-Protect Eon-LT™ Screens
37	Screen Lock Button
38	Locking a Screen
38	Setting a New Password
39	Resetting the Password

Contents

40	Chapter 11: Troubleshooting
41	Chapter 12: Specifications
41	Device Parameters
41	Coating
42	Measurement
42	Process Display
42	Communications
43	Inputs and Outputs

Appendices

44	Appendix A: Eon-LT™ System
44	Eon-LT™ System Configuration
45	Appendix B: Quick Info
45	Screen Selection Tool Bar
45	Adding a Process
45	Renaming a Process
45	Deleting a Process
46	Edit the Name, Rate, and Thickness of a Process
46	Adding a Layer to a Process
46	Copy a Layer
46	Re-ordering the Layers
46	Changing Properties of a Layer
47	Layer Properties List
48	Removing a Layer
48	Deleting a Layer
48	Changing the Material for a Layer
49	Selecting Sensor
50	Vertical Tool Bar
50	Settings
53	Appendix C
54	About Eon-LT™
54	LabVIEW Interface
54	Software Updates
54	Inspection & Initial Setup
54	Warranty
56	Appendix D
56	Tooling Factor

Miscellaneous

57 [Index](#)

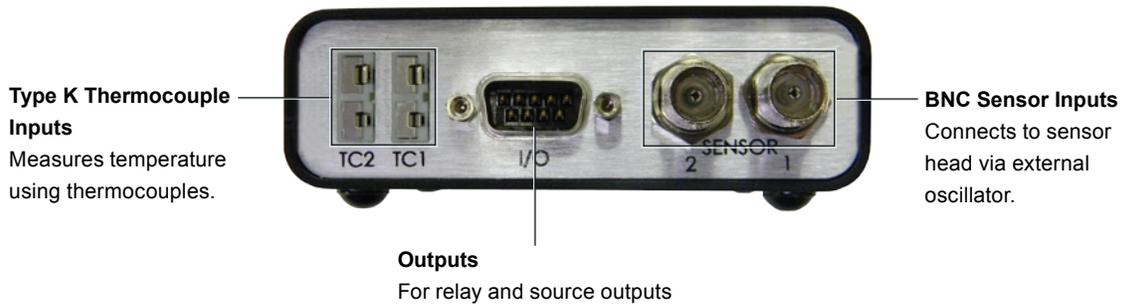
Eon-LT™ at a Glance

1

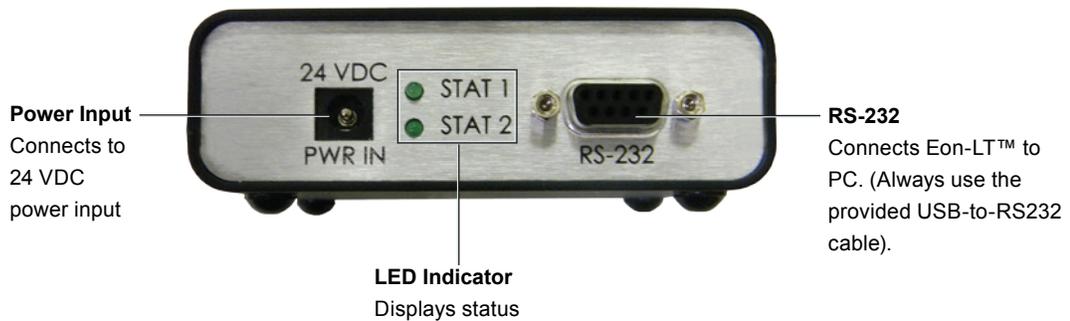
This guide describes Eon-LT™ controller with temperature control (3rd generation) and Eon-LT™ software version 3.0.11.

Eon-LT™ Connectors

Eon-LT™ Front



Eon-LT™ Back





WARNING Make sure the correct hardware is used with Eon-LT™ inputs and outputs. See proper setup procedures in this manual and in the Phoenix-Eon-LT™ quick reference guide.



WARNING Only the provided power supply should be used with Eon-LT™. Not doing so will damage product and void warranty. Make sure power supply has a 24 VDC.

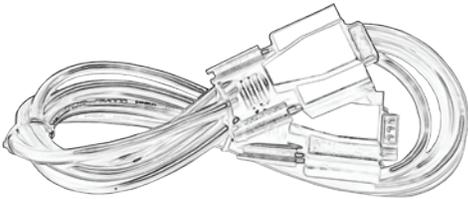
Accessories

Eon-LT™ controller ships with the following accessories:

Power supply and cable. Input 100-200 VAC, 50/60Hz, 2 A. Output 24V, 3.75 A, 90W Max.



RS-232 extension cable. Male-to-female serial cable.



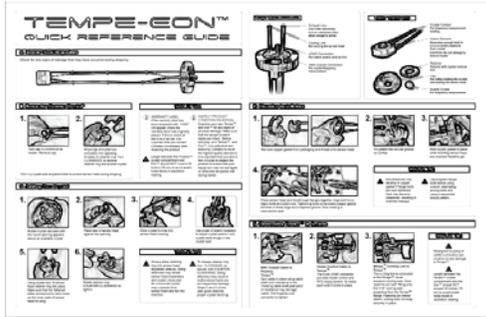
USB to RS-232 adapter. Connects RS-232 cable and PC.



External oscillator (Optional). Replaces the Eon-LT™ internal oscillator.



Phoenix-Eon-LT™ quick reference guide. Instructs user in quickly assembling and integrating Eon-LT™ into existing system.



Software CD. Contains Eon-LT™ software suite.



Getting Started

2

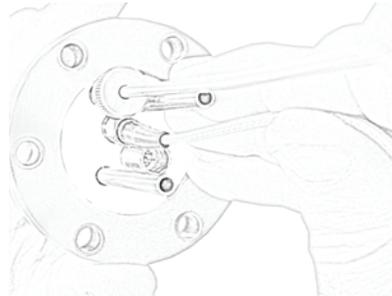
Eon-LT™ System Assembly

The following guide will describe in detail how to integrate the Eon-LT™ monitor into a basic QCM configuration. The QCM depicted below is the Colnatec Phoenix™ sensor head featuring temperature monitoring technology. (See Appendix A for connection map of a fully assembled Phoenix-Eon-LT™ system).

1. Connecting to QCM

Connect SMA Coaxial Cable to QCM

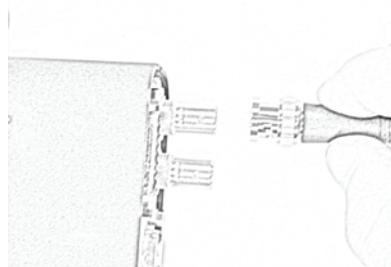
Spin cable in place using cable shaft until resistance is felt. (Twisting cable shaft past point of resistance may damage cable). Roll fingertip over connector to tighten.



2. Connecting to Eon-LT™

Connect QCM to Eon-LT™

Connect BNC extension cable to SMA, which then connects to the BNC adapter cable using the provided BNC union. Then, connect the other end of the BNC extension cable to the Eon-LT™ coaxial input (either sensor 1 or 2).



Connecting Eon-LT™ to PC

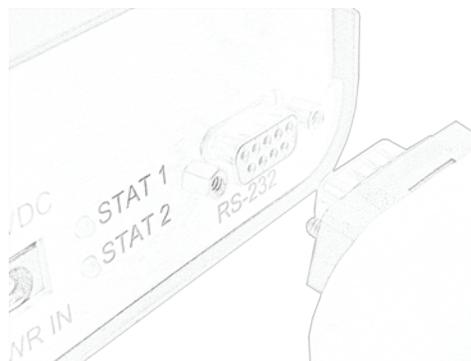
1. Install Eon-LT™ Software onto PC

Insert the accompanying Eon-LT™ software CD into disc drive. Follow prompts to install software onto PC.



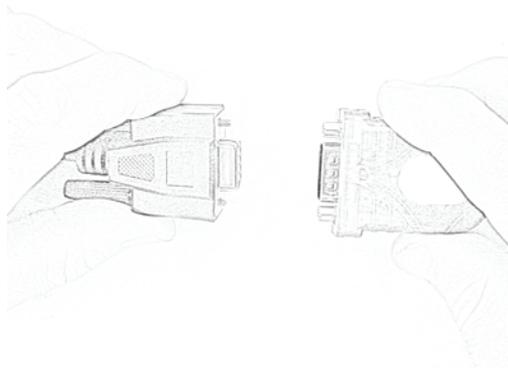
2. RS-232 to Eon-LT™

Plug RS-232 connector into female serial port on rear panel. Tighten integrated screws.



3. RS-232 cable to USB Adapter

Plug the other end of the RS-232 cable into the USB-to-RS-232 adapter. Tighten integrated screws.



4. Plug USB-to-RS-232 Adapter into PC

Plug USB-end of the USB-to-RS-232 adapter into PC.



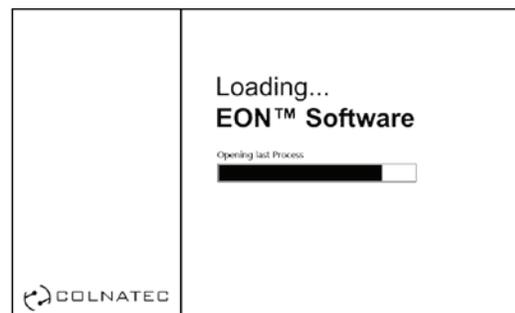
5. Connect Power to Eon-LT™

Plug Eon-LT™ power adapter into AC outlet. Then plug DC connector into the Eon-LT™.



6. Start Eon-LT™ Software

Start Eon-LT™ software and navigate to the Program Control screen to begin creating your processes (see Chapter 3).





If drivers are already installed, simply update the drivers when installing software.

Use only the provided USB cable.

Ensure that the software has been fully installed before connecting **Eon-LT™ to your PC**.

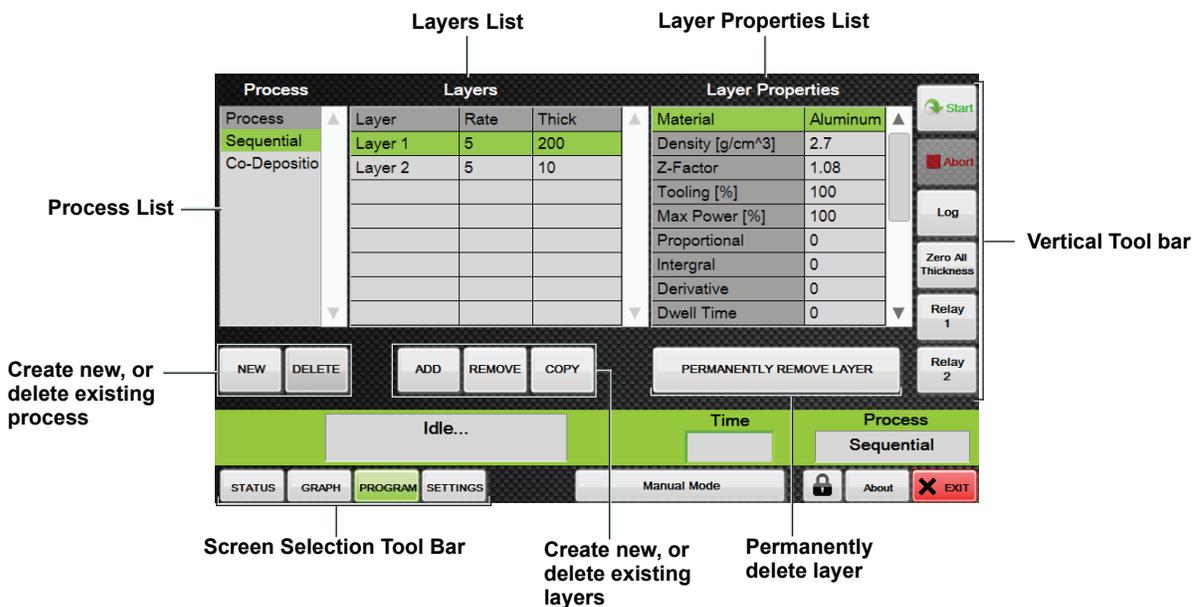
Reboot PC following Eon-LT™ software installation.

Program Control

3

Program Control Screen

Click the Program button in the Control Menu to access the Program screen. With this screen you will be able to create a new process, edit or delete an existing process, as well as add or remove layers and layer properties.



Process List

Create a new process, or edit or delete an existing process. The list contains all of the available processes.

Create a new process. Selecting the New button located below the Process List allows you to create and name a new process. Choose either Sequential or Co-Deposition, enter name, and press OK. The process now appears on the Process List.

Delete a process. Pressing delete will permanently delete a process. Once deleted, a process is only recoverable if it was backed up prior.

Renaming a process. Double-click a process in the Process Layers List.



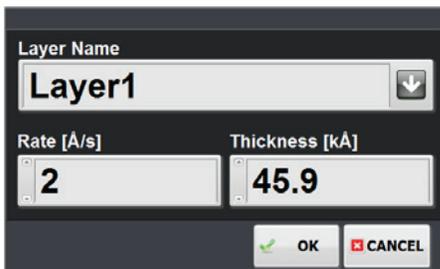
Layers List

Open the Layers List. Click a process name. Layers List displays the current layers associated with a process. Set the rate, thickness, name, and order of the layers.

Add a layer. Click a process name

Select a layer. Single-click.

Edit layer name, rate, and thickness. Double-click a layer. Modify the name, rate, and/or thickness. Click OK.

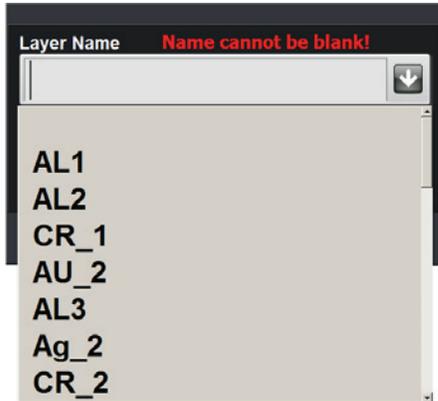


Copy Layer. Select an existing layer and press Copy to produce a copy in the list.

Change order of layers. On the Layers List click and hold a layer, drag the layer up or down the list, and release the layer where desired.

Remove Layer. On the Layers List click and hold a layer, drag the layer up or down the list, and release the layer where desired.

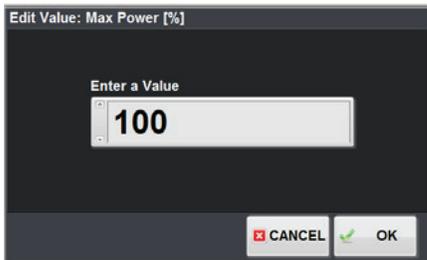
Create new layer. Select New button located below the Layers List. You can also use an existing layer by typing in the layer name or pressing the dropdown arrow to reveal a list of currently available layers.



Layer Properties List

Enter or change values for layers. The Layer Property Value window allows you to enter or change the value of a layer property. (Note: Material, Source, and Sensor operate differently than the other items listed on the Layer Properties List).

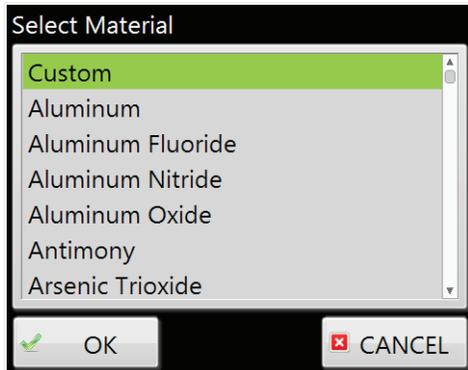
Open Layer Property Value window. Double-click a layer property at any time, even during a process run.



Enter a value and click OK or Cancel.

Permanently remove layer. Use the Permanently Remove Layer button to delete a selected layer. A deleted layer is removed from ALL processes (including those not selected). Once deleted, a layer is only recoverable if it was backed up prior.

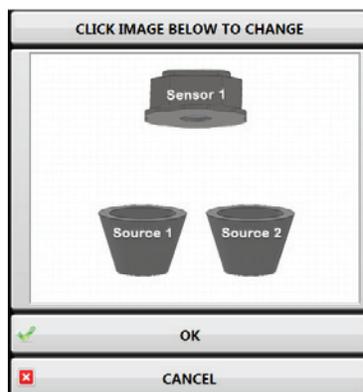
Select a material. Scroll down and click on the Material row to open the Materials List. Select the applicable material and double-click a material or click OK. The correct density and Z-Factor is automatically set.



Materials list.

If the material being applied in your process is unlisted, select Custom and click OK. You can then manually enter your custom Density and Z-Factor settings in the Layer Properties List. Note also that whenever you manually change Density and Z-Factor settings to an unlisted material, the software will automatically classify the material as “Custom”.

Selecting Sources and Sensors. In the Layer Properties List, click on either Source or Sensor to open the Source/Sensor configuration window.



Source and sensor selector.

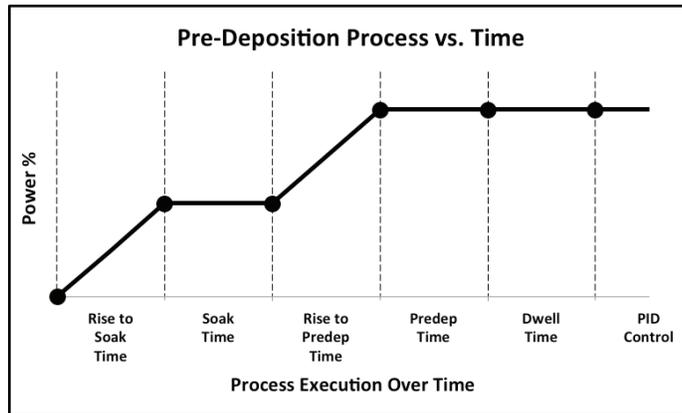
Click the image to configure which sensors and sources will be used during deposition. Select one of four configurations:

- **Source 1 → Sensor 1**
- **Source 2 → Sensor 1**
- **Source 1 → Sensor 2**
- **Source 2 → Sensor 2**

Layer Properties Defined

The following is a list of settings that defines the parameters of the deposition. All settings must be set correctly for the software to function properly.

- **Materials**
The material being applied during the deposition process. This entry turns to “Custom” if the Density or Z-Factor is modified by the user, in order to prevent mismatch.
- **Density**
The density of the selected material being applied.
- **Z-Factor**
Acoustic impedance factor which is used to compensate for dense materials and is predefined based on the selected material.
- **Tooling [%]**
The geometric relationship between the substrate and the positioning of the sensor.
- **Max Power [%]**
Represents the maximum power level Eon-LT™ will deliver to the source [from 0%-100%].
- **Proportional**
The proportional coefficient that controls the material deposition rate during the PID phase.
- **Integral**
The integral time constant that controls the material deposition rate during PID phase.
- **Derivative**
The derivative time constant that controls the material deposition rate during the PID phase.
- **Dwell Time**
The time specified that follows the completion the predeposition process before activation of the PID. This delay prevents the PID from engaging the source power prematurely, giving the material a chance to reach the sensor. (No material is applied to the sensor directly after the predeposition process finishes, for the brief time it takes for the material to initially transition from the source to the crystal in the event that a shutter is present).
- **Rise to Soak Time**
The time specifying how long it takes Eon-LT™ to raise source power from 0% to desired soak power



Predeposition process vs. time

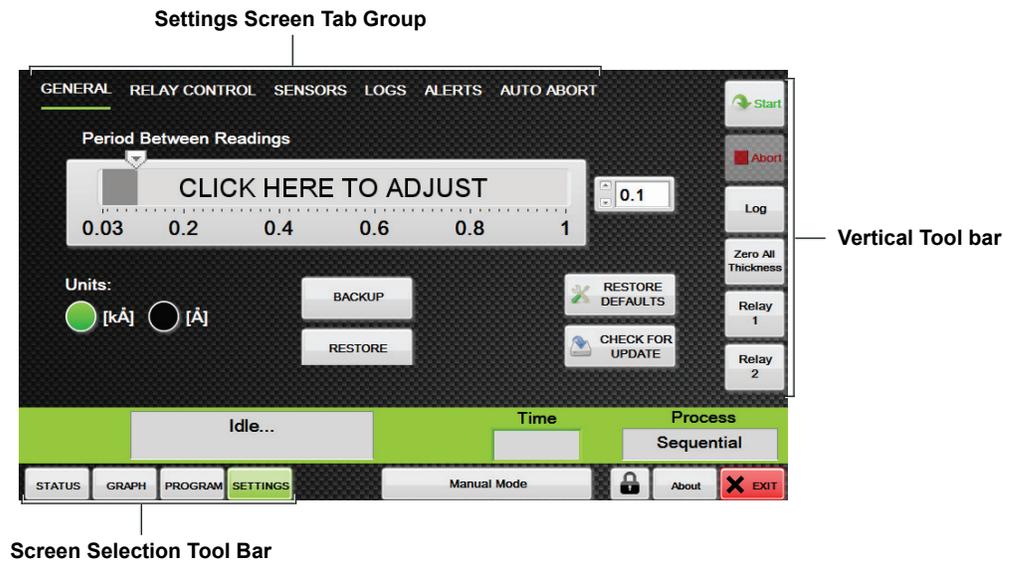
- **Soak Time**
Once the soak power is reached, this is the time specifying how long Eon-LT™ sits at soak power before continuing to “Rise to Predeposit”.
- **Soak Power**
The power percentage that the source will achieve during soak process.
- **Rise to Predeposit**
The time specifying how long it takes Eon to change the current source power to the power percentage set for Predeposit.
- **Predeposit Time**
The time specifying how long Eon-LT™ will maintain the set “Predeposit Power” before moving into dwell.
- **Predeposit Power**
The power percentage that the source will achieve during the Predeposit process.
- **Source**
The source Eon-LT™ uses to control the selected layer/material. The Eon-LT™ has two sources, Source 1 and Source 2.
- **Sensor**
Determines which sensor should be used to control the source selected for the current layer/material.

Settings

5

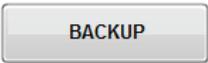
Settings Screen

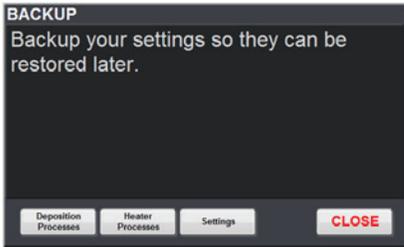
Click the Settings button in the Screen Selection tool bar to access the Settings screen. Use tabs to select settings operations. The Settings screen enables user to perform numerous tasks such as backing up and restoring settings, opening the log folder, adjusting period, and managing relays and sensor zeroing settings.



Backup & Restore

The Backup and Restore commands enable the user to save deposition processes, heating cycles, and general settings in Eon-LT™ software.

Selecting Backup  brings up the Backup screen.

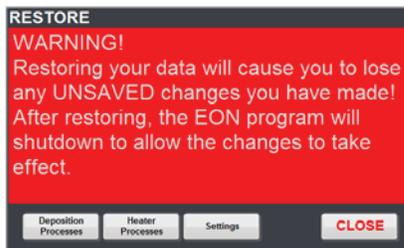


On the Backup screen, click on the item you wish to save.

Restoring backed up settings. Selecting the Restore button

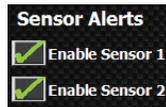


opens the Restore screen.



The user can now restore deposition processes, heating cycles, and general settings by clicking on the appropriate button. Note: The restoration process will overwrite any of the current settings you restore.

Sensor Alerts



The **Sensor Alerts** setting provides the option of enabling or disabling the crystal failure alerts, which occur when the crystal frequency drifts out of the 5 MHz - 6 MHz range.



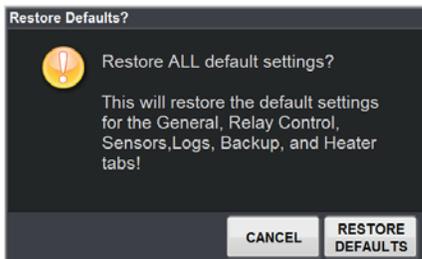
Although it is recommended that the sensor alerts generally remain enabled, the user can disable the notifications in the instance that the crystal is being used in a testing environment.

Log

With the **Append Log Name**  feature the user can add a specialized name to the end of the logs recorded by Eon-LT™ software.

Note: If a log recording is already underway, the logging must be restarted for the new name to take effect.

Note: Naming restrictions built into Microsoft Windows will prevent log recording if the following characters are used: [* / > “ : |]. Eon-LT™ software raises a prompt to warn the user that the name is invalid. Log files with incorrect characters in the name will not save.



Opening saved log files. Selecting the **Open Log Folder**  opens the folder to which the logs are currently being saved. By default this location is “Public Documents\EON_LOGS”.

Restore Defaults

The **Restore Defaults** button  reinstates all of the settings to default values. This command is often used if the current settings are producing undesired results.

Period Control

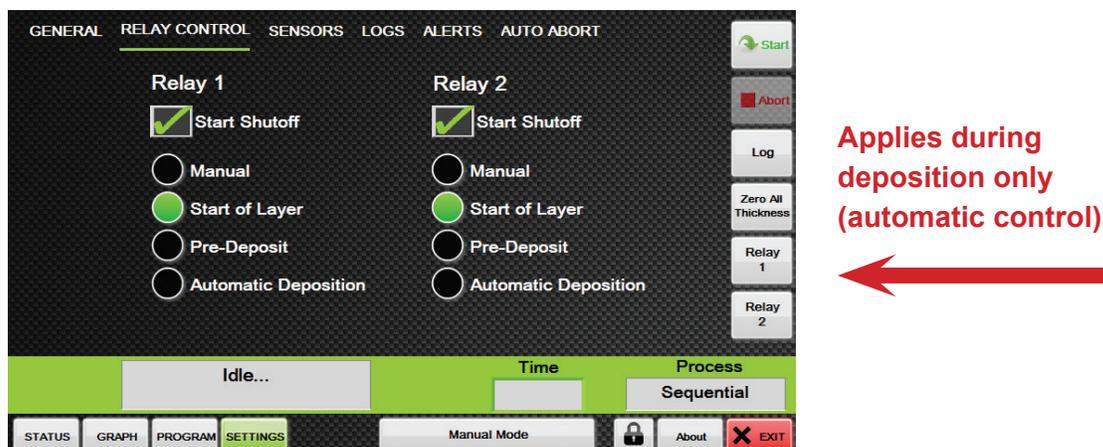
The **Period** control tuner  is used to adjust data collection frequency in increments of 0.1 seconds. The period range is 100 milliseconds to 1 second.

For precision adjustment, moving the slider  produces an indicator showing the current value.

Changing the measurement magnitude  only affects the Status screen. Log files will still be recording in kilo-angstroms.

Relay Control

The **Relay Control** panel features two relays with independent settings.



Start Shutoff. When enabled with a check mark  the Start Shutoff command opens (turns off) the relay each time a process is started. When the relay is used for a shutter, Start Shutoff ensures that the shutter is always shut before the deposition process begins.

If Start Shutoff is disabled the relay remains in its present state when a deposition process begins.

Manual. When Manual is selected, the relay remains in its present state. The user can close (turn on) or open (turn off) the relay at will.

Start. Relay is closed (turned on) as soon as the process starts.

Predeposit. Relay is closed (turned on) at the beginning of the predeposit phase during the predeposition process.

Auto Deposition. Relay is closed (turned on) just before the PID starts, activating as soon as Dwell Time (preset) is initiated. Once Dwell Time concludes, Auto Deposition begins. This process is designed to prevent the Automatic Deposition from engaging prematurely, providing a window of time between the shutter opening and the material reaching the substrate. This selection is specifically designed for shutters.

Sensor Zeroing

With the **Sensor Zeroing** panel, the user can select when to zero Sensor 1 or Sensor 2. Settings for each sensor are identical.



WARNING Failing to zero a sensor before each layer or PID can produce flawed data. Selecting Before Layer or Before PID will ensure timely zeroing.

Before Log. Pressing Log button zeros the sensor.

Start Pressed. Pressing Start button zeros the sensor.

Before Layer. Starting a new layer zeros the sensor.

Before PID. Starting PID zeros the sensor.

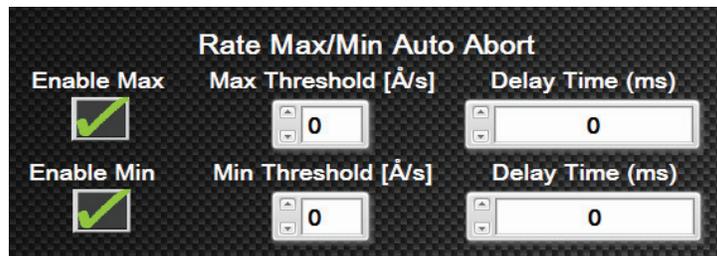
Auto Abort on Max Power

The Auto Abort on Max Power feature provides the user with the option of aborting a process if the Max Power percentage specified in the Program settings is reached and sustained for a period that exceeds the time set in the Abort Delay Time control.



Rate Max/Min Auto Abort

During a process, unexpected occurrences (crystal spatter, failed crystal) can cause sudden spikes or dips in deposition rates. In such instances, undesirable results may occur. To prevent this from occurring, Eon has the ability to abort the process when rate fluctuations develop. If the current rate of the deposition goes above the maximum threshold or below the minimum threshold for longer than the specified delay times, the process will automatically abort; so that if your preset rate is 25 Å/s, your Max Threshold rate is 6 Å/s, and your Min Threshold rate is 4 Å/s, then the process will abort at above 31 Å/s or at below 21 Å/s.

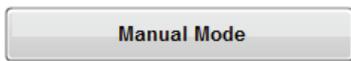


Manual Mode

6

Manual Control

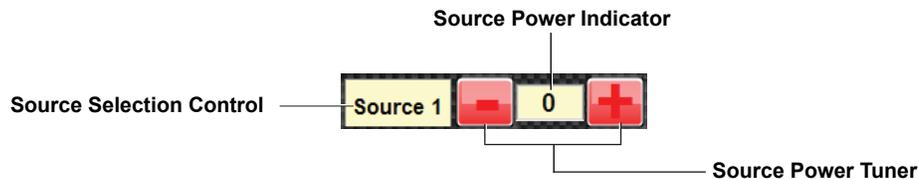
Manual Mode is an alternative operating environment in which the user can exercise manual control over the sources (Source 1 and 2). To access manual mode, simply click on the Manual Mode button from any screen.



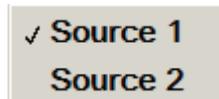
Adjusting Source

Using the following steps, the source and heater power can be manually adjusted by the user through the Manual Mode operating environment:

1. Press Manual Mode from any screen
2. Click on the Source Selection Control to select the source that needs to be manually controlled.



3. Clicking on the Source Selection control produces a dropdown list from which the user can select from available sources.



4. Use the Source Power adjustment buttons to increase or decrease the power of the selected source in increments of 0.1%, OR click directly onto the Source Power indicator and enter a specific power percentage. Then, press Enter.

Note: In order for the program to update the source power, the user must enter a new value and then click in an area other than the Source Power indicator or press enter.

Exiting Manual Mode

Click the Abort button  to exit Manual Mode and return to the standard operating environment.

Note: Pressing the Abort button returns both sources to 0 power.



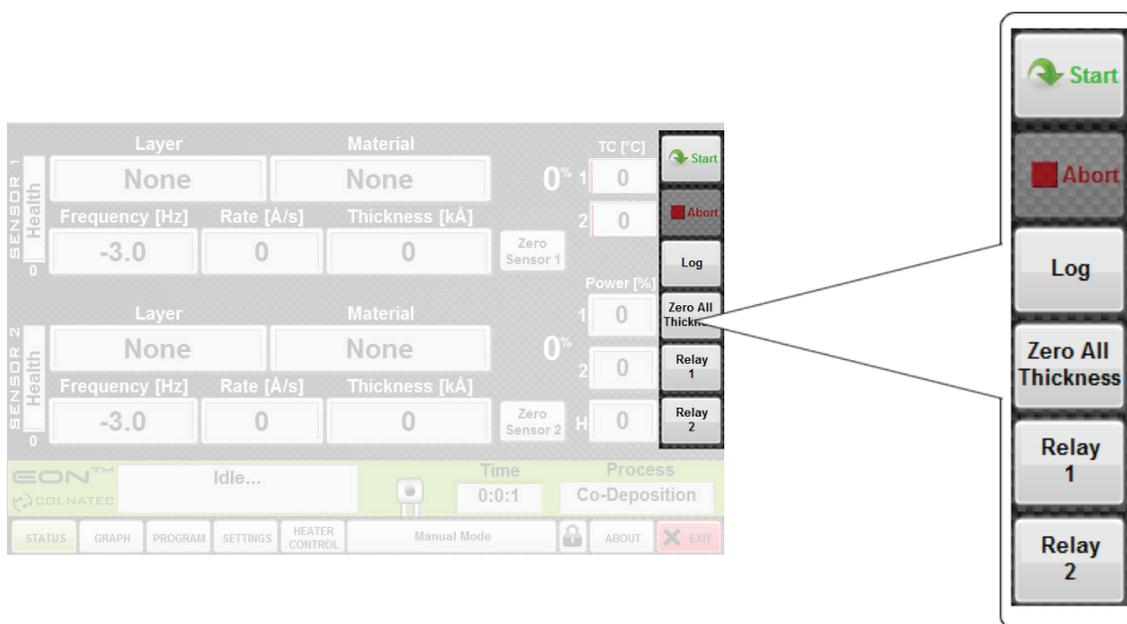
IMPORTANT When the user manually adjusts the value of the source power output, the source will no longer be controlled by the PID, regardless of the current process. If a source is adjusted during a deposition, the Eon-LT™ will no longer control the source controlling the PID or the predeposition processes, as the user has taken full control over the source.

Vertical Tool Bar

7

Using the Vertical Tool Bar

Like the Screen Selection tool bar, the vertical tool bar is always available. Use the vertical tool bar to start a deposition, abort a process, record a log, zero the sensors, activate the relays, enter Manual Mode, or exit Eon-LT™ software.



Starting a Deposition

A deposition process can be started from any screen. The process selected in the Process List on the Program Control screen or through the Remote Process Control panel is the process that will run.

Press the Start button  to begin the process. When the process is complete, a Process Complete notification will appear.

Tip: To create a new process, navigate to the Program screen and select New under the Process List.

Aborting a Process

A process can be aborted from any screen. Pressing the Abort button  ends an active process. Abort is also used to exit Manual Mode.

Resume or Restart an Aborted Process

A process can be resumed or restarted from any screen. Press the Start button . A window with the option to Resume or Restart will appear. Make a selection.

Logging Eon-LT™ Status

Eon-LT™ status can be logged to a monitor log from any screen. Pressing the Log button  saves a monitor log to the monitor log save folder (Public/EON_LOGS/MONITORING”).

When a process is initiated, Eon-LT™ software will automatically begin recording the real-time status of the process to the process log folder (Public/EON_LOGS/PROCESSES). If a process is started while an Eon-LT™ monitor log recording is in process, Eon-LT™ will automatically stop recording to the monitor log and begin recording to the process log.

Zeroing the Sensors

The sensors can be zeroed from any screen. Pressing the Zero All Thickness button  zeros Sensor 1 and Sensor 2 at once.

Activating Relay 1 and Relay 2

The Relay 1 and Relay 2 buttons  ,  permit manual control of the relays.

Exiting Eon-LT™ Software

Eon-LT™ software can be exited from any screen. Simply press the Exit button, and when prompted, press Exit again.

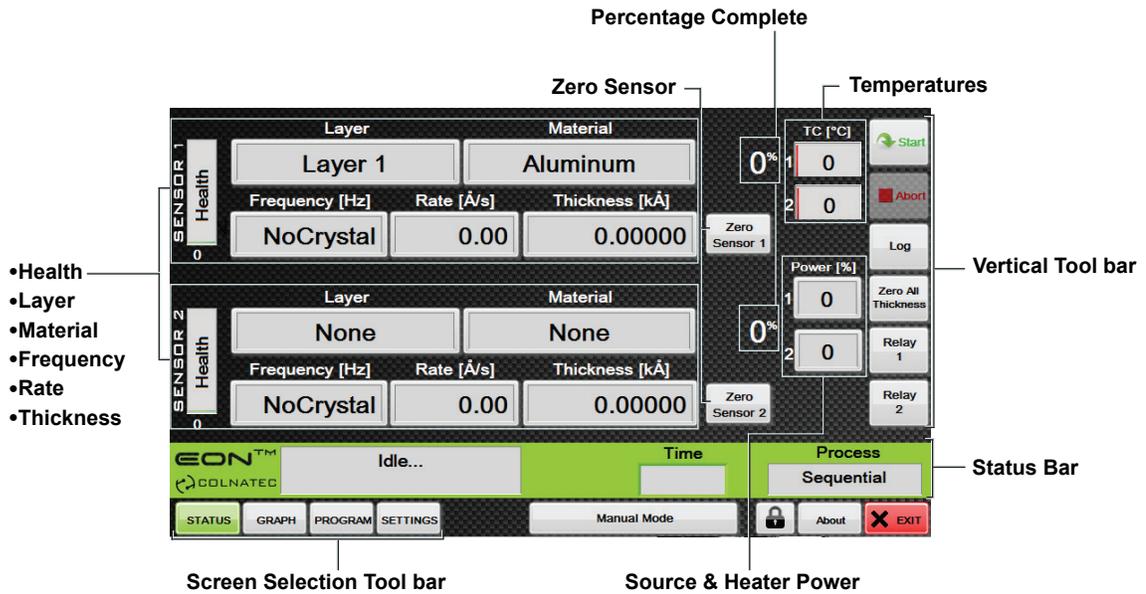


Status

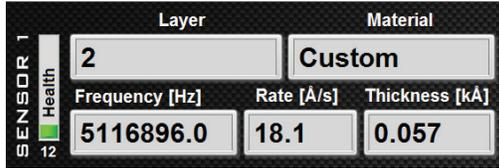
8

Status Screen

Navigate to the Status screen by selecting the Status button in the Screen Selection tool bar. The Status screen displays real-time information on the progress of the process. Data for each sensor is represented - health, layer, frequency, material, rate, thickness, and percentage complete. Important information such as source power and temperature is also displayed.



Health, Layer, Material, Frequency, Rate, and Thickness



Layer. The name of the layer being applied.

Material. When the sensor is being used during a deposition to apply material, the indicator will flash red, informing the user that the sensor is being used to control the selected source for the material being applied. During this process, the material being applied is also displayed.

Frequency. Sensor frequency.

Rate. Rate of deposition.

Thickness. Thickness of deposition applied to sensor.

Zero Sensor

The Zero Sensor buttons   zero corresponding sensor thickness to zero.

Percentage Complete

The Percentage Complete indicators  corresponding sensor thickness to zero.

Source Power

The Source Power indicators display the current power being applied to Source 1 (S1 Power [%]), Source 2 (S2 Power [%]).



Temperatures

TC2. Axillary thermocouple connection.

Body Temp [°C]
0
TC 2 Temp [°C]
0

Manually Zeroing Individual Sensors

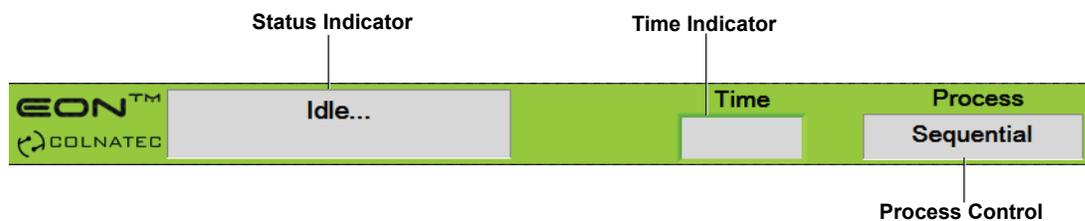
Click the Zero Sensor button that corresponds to the sensor to be zeroed.

Green Status Bar

9

Status Indicators and Remote Process Control

A fixed menu available from any screen, the Green Status bar serves a variety of display and control functions.



Status Indicator. Displays process Eon-LT™ is currently performing. Information updates in real-time as Eon-LT™ performs each task.

Time Indicator. Displays the run-time of the current active process. The Time Indicator also retains the run-time of the last completed or aborted process.

Remote Process Control. When a process is selected, the Status screen will display the first material to run on each sensor. If no materials are selected to be measured by one of the sensors, the sensor will display **None** in the Layer and Material indicator.

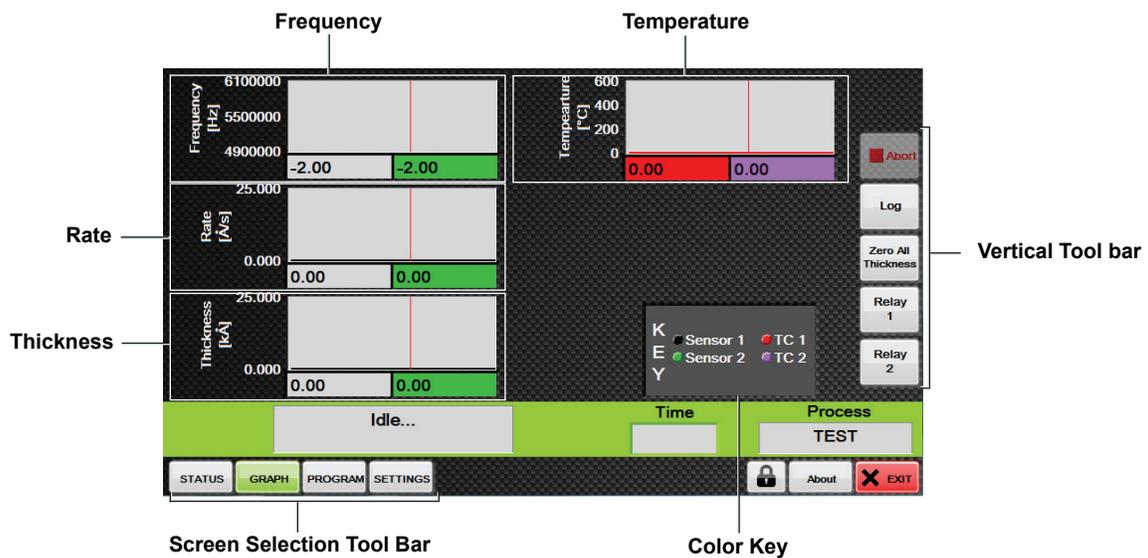
Layer	Material
None	None

Graphs

10

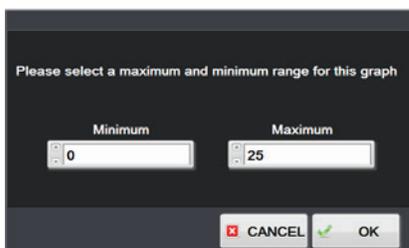
Graph Screen

To view the Graphs screen, click on Graphs in the Screen Selection tool bar. The Graphs screen features line graphs for frequency, temperature, rate, power, and thickness. Unlike real-time data, data in graph-form can provide the user with a comprehensive, historical perspective on a developing deposition process.



Adjusting Min/Max Range of Graphs

Click anywhere on a graph to produce the range adjustment window.



Graphs

The graphs provide a visual representation of data gathered by Eon-LT™. The following data is presented by the graphs:

- **Frequency**
Displays frequency over time in [Hz]
- **Rate**
Displays the rate of the material application over time in [Å/s].
- **Thickness**
Displays the thickness of material application over time in [kÅ].
- **Temperature**
Displays the temperature over time in [°C].
- **Power**
Displays the power of the sources and heater over time in percentages in [%].

Color Key



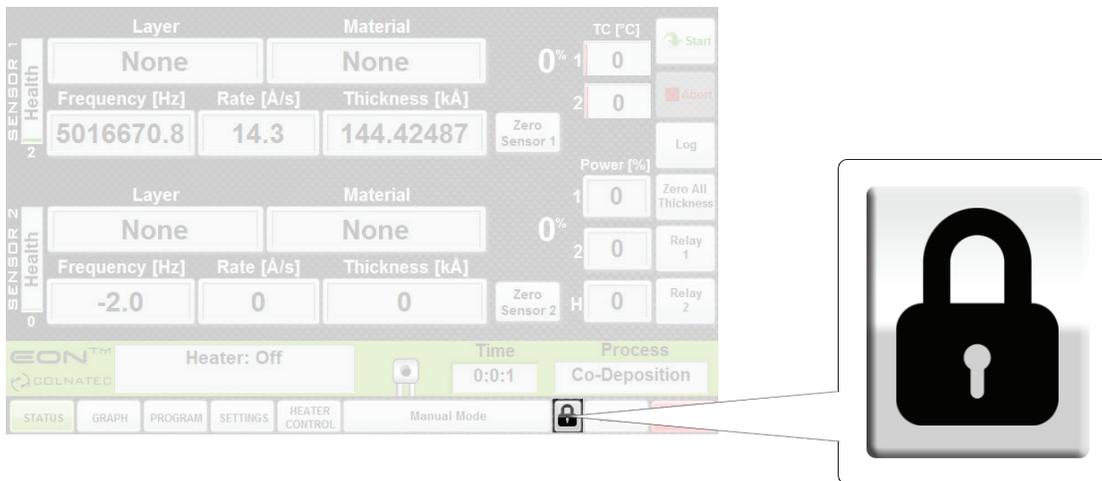
The Color Key displays the color values representing the various devices being depicted on each graph.

Screen Lock

11

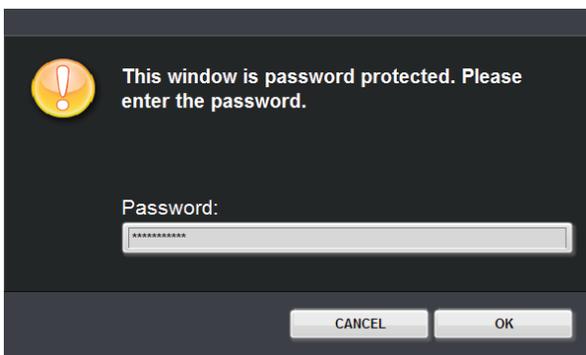
Password-Protect Eon-LT™ Screens

The Eon-LT™ Screen Lock enables the user to lock any screen that appears on the Screen Selection tool bar. Locking a screen helps ensure that the controls and settings on each screen remain secure and under password protection.



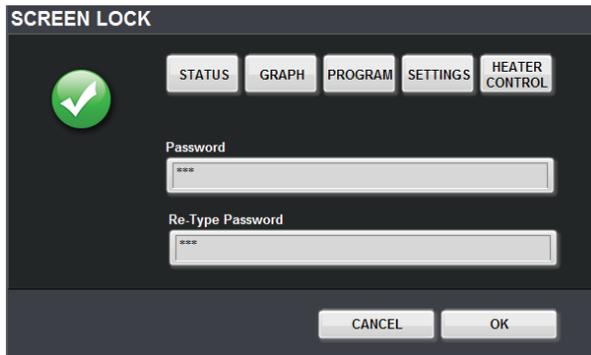
Screen Lock Button

To access the Screen Lock controls, click on the Screen Lock button . If a password is already in place, the password prompt appears.



Entering the correct password will exit to the Screen Lock screen.

If a password is NOT already in place, the Screen Lock screen appears. Use these controls to lock and unlock screens and change the Screen Lock password.



Locking a Screen

On the Screen Lock screen, select the screen(s) to be locked. Selecting a screen highlights it.



Click OK to engage Screen Lock protection. When clicked on, the *protected* screen(s) will now generate a password prompt.

Setting a New Password

The user may keep an existing password or enter a new password using the password controls. In order for a new password to be accepted, the Password and Re-Type Password fields must contain the same password.

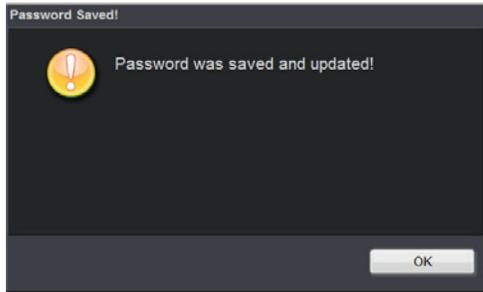


Click OK to save new Screen Lock screen settings or Cancel to return to original settings.



IMPORTANT Leaving password fields empty DOES NOT disable the Screen Lock. Attempting to access a locked screen will continue to produce a password prompt. Leave field blank and click OK to proceed to the Screen Lock menu. To disable the Screen Lock, unclick any locked screens.

Clicking OK saves screen lock and password settings.



Resetting Password

To reset the Screen Lock controls password, click on the Screen Lock button  and enter the following code into password prompt: **45647kyswx94272fyshq**

When the Screen Lock screen appears, enter a new password into the password fields.

Symptom	Cause	Solution
Frequency reads -2.0 [Hz]	Sensor not detected	Check sensor connection
“Could not connect to Eon-LT™ after 3 seconds” message appears	Wrong COM port selected	Restart and select the correct COM port
Layer completes immediately	Thickness is set to 0 in the layer	Enter a value other than 0 for the layer
At program start, a “Wrong Firmware” notification appears, even though the firmware is current	Noise in the RS232 line	Make sure the RS232 line is connected and secure. Separate the RS232 line and any high current power lines.
Crystal warnings fail to appear	Sensor Alerts disabled	Go to Settings screen and enable Sensor Alert for sensor(s) in use

Specifications

13

Device Parameters

Density	0.10 to 99.999 [g/cm ³]
Z-Factor	0.10 to 15.00

Coating

Density	0.100 to 99.999 [g/cm ³]
Z-Factor	0.00 to 15.000
Rate Set-point	0.00 to 9999.99 [Å/s]
Thickness Set Point	0.00 to 9999.99 [KÅ]
Proportional Gain	0.00 to 9999.00 [s]
Integral Time	0.00 to 99.9 [s]
Derivative Time	0.0 to 99.9 [s]
Rise to Soak	0.10 to 9999.9 [s]
Soak Time	0.00 to 9999.99 [s]
Soak Power	0.00 to 100.00 [%]
Rise to Predeposit	0.00 to 999.99 [s]
Predeposit Time	0.00 to 9999.99 [s]
Predeposit Power	0.00 to 100.0 [%]
Dwell Time	0.0 to 9999.9 [s]

Measurement

Frequency Resolution	+/-0.002 [Hz]
Display Rate	10x to 1x per second
Crystal Frequency Range	6 [MHz]
Filter	0-1
Alpha	0-1

Process Display

Film	Selected Material
Layer	Layer Being Deposited
Rate	0.00 to 99.9 [$\text{\AA}/\text{s}$]
Thickness	0.00 to 999.9[K \AA]
Frequency	-3.00 to 6,500,000 [Hz]
Run Time	Hh/mm/ss
Temperature	0 to 999.9 [$^{\circ}\text{C}$]
Health	0.00 to 100 [%]

Communications

Factory Set	RS-232 [PC version]
-------------	---------------------

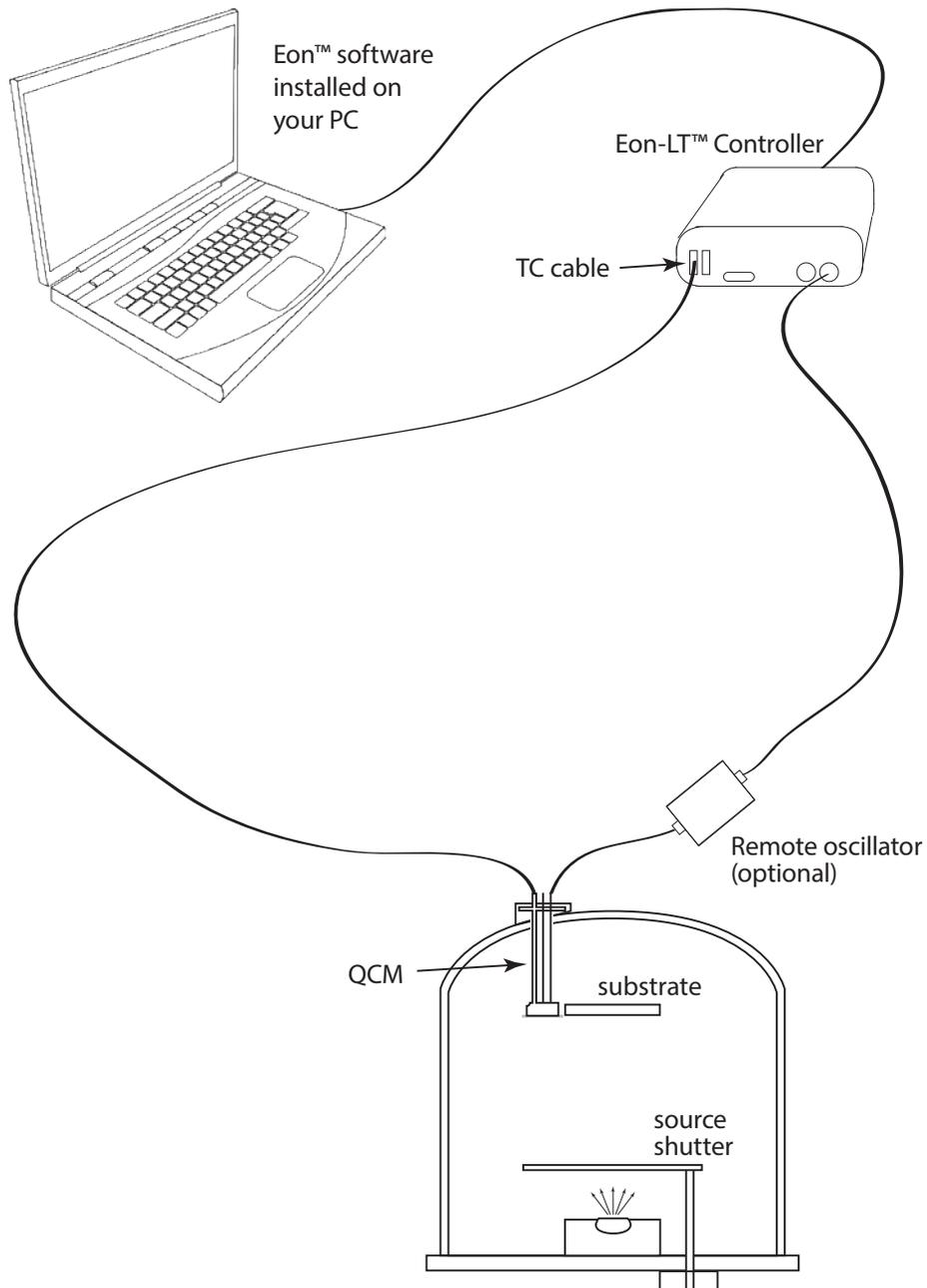
Inputs and Outputs

Voltage input	24 [VDC]
RS232 Input	One Half Duplex
Sensor Input	Two BNC Connector
TC Output	2 Type K Connectors
0-5 [VDC] Control Output	One DB9 Connector
Dual Relay Output	

Phoenix-Eon-LT™ System

Phoenix-Eon-LT™ System Configuration

Rendering illustrates basic connections of Phoenix-Eon-LT™ system.



Quick Info

B

Appendix

Screen Selection Tool Bar

The Screen Selection Tool Bar is the collection of buttons used to access the various screens in which the user will be working. The buttons consist of Status, Graph, Program, Settings.



Adding a process

1. Press the Program button to enter the programming screen.
2. Press the New button located beneath the Process List.
3. Enter the desired name for the process.
4. Select the process type - Sequential or Codeposition.
5. Click OK.
6. This process is now selectable through the Process List or the Remote Process Control panel on the Green Status bar.

Note: In order for the program to update the source power, the user must enter a new value and then click away from the Source Power indicator.

Renaming a process

1. Press the Program button on the Screen Selection tool bar.
2. Double click the process you wish to rename.
3. In the new window, enter the new name for the process.
 - Field must not be left blank
 - Name must not already exist
4. Click OK.

Deleting a Process

1. Press the Program button in the horizontal tool bar.
2. On the Process List select the Process to be deleted.
3. Press the delete key directly beneath the Process List.

Edit the name/rate/thickness of a process

1. Click the Program button to enter the Program screen.
2. Click the process that has the layer to edit.
3. Double-click the layer to be edited.
4. Modify the name, rate, and/or thickness.
5. Click OK to save changes.

Adding a layer to a process

1. Press the Program button to access the Program screen.
2. Select the process from the process list. This will open the Process Layers list.
3. Press the New button under the Process Layers list.
4. Enter a new name to create a new layer, or select a layer that has already been created by clicking the arrow on right of the Name and selecting it from the list of layers.
5. Enter the desired Rate in [$\text{\AA}/\text{s}$] and the Thickness in [k\AA]. Click OK.

Note: The name cannot be left blank. Typing the name of a layer that is already created will use that layer's settings.

Copy Layer

1. Click the Program button to enter the Program screen.
2. Select an existing layer and press Copy to produce a copy in the list.

Re-Ordering the layers

1. Click and drag the layer to the desired location in the list.
2. Layers are executed in numerical order, from top to bottom.

Changing properties of a layer

1. Press the Program button on the bottom of the screen.
2. Select the process in the Process List containing the layer that requires editing.
3. From the Process Layers list select the layer to be edited.
4. Double-click on the Property to be edited.
5. In the new window that opens, enter the new value for the property.
6. Press OK.

Note: If an incorrect value is entered for the property selected, a notification window will appear displaying the acceptable values for that property.

Layer property list

- **Materials:** The material being applied during the deposition process. This entry turns to “Custom” if the Density or Z-Factor is modified by the user.
- **Density [g/cm³]:** The density of the selected material being applied.
- **Z-Factor:** Acoustic impedance factor which is used to compensate for dense materials and is predefined based on the selected material.
- **Tooling [%]:** The geometric relationship between the substrate and the positioning of the sensor.
- **Max Power [%]:** Represents the maximum power level Eon-LT™ will deliver to the heater [from 0%-100%].
- **Proportional:** The Proportional coefficient that controls the material deposition rate during the PID phase.
- **Integral:** The integral time constant that controls the material deposition rate during PID phase.
- **Derivative:** The derivative time constant that controls the material deposition rate during the PID phase.
- **Dwell Time:** The time specified that follows the completion of the predeposition process and the activation of the PID. This delay prevents the PID from engaging the source power prematurely, allowing the material to reach the sensor. (No material is applied to the sensor directly after the predisposition process finishes, for the brief time it takes for the material to initially transition from the source to the crystal in the event that a shutter is present).
- **Rise to Soak Time:** The time specifying how long it takes Eon-LT™ to raise source power from 0% to desired soak power
- **Soak Time:** Once the soak power is reached, this is the time specifying how long Eon-LT™ sits at soak power before continuing to “Rise to Predeposit”.
- **Soak Power:** The power percentage that the source will achieve during soak process.
- **Rise to Predeposit:** The time specifying how long it takes Eon to change the current source power to the power percentage set for Predeposit.
- **Predeposit Time:** The time specifying how long Eon-LT™ will maintain the set “Predeposit Power” before moving into dwell.
- **Predeposit Power:** The power percentage that the source will achieve during the Predeposit process.
- **Source:** The source Eon-LT™ uses to control the selected layer/material. The Eon-LT™ has two sources, Source 1 and Source 2.
- **Sensor:** Determines which sensor should be used to control the source selected for the current layer/material.

Removing a Layer

1. Press the Program button in the Screen Selection tool bar.
2. From the process list, select the Process with the layer that needs to be removed.
3. In the Process Layers, list select the layer that needs to be removed.
4. Press Remove directly beneath the Process Layers list.

Note: Removing the layer only removes the layer from the Process Layers list. The layer can be re-added to the list by pressing “New” and selecting the layer from the dropdown menu. See “Adding a process” on the first page of this appendix.

Deleting a Layer

1. Press the Program button on Screen Selection tool bar to enter the Program screen.
2. Select a process that contains the layer to be deleted.
3. After selecting the Layer from the Process Layers list, press Permanently Delete Layer to delete the layer.

Warning: This action will permanently delete the layer from ALL processes. The layer will also be deleted from the list of layers. There is no way to recover a layer once it is deleted.

Changing the material for a layer

1. In the Program screen, select the layer with the material to be changed.
2. Double-click on the Material row.
3. In the new window select a new material.
4. Click OK.

Note: When editing Density or Z-Factor, the material value defaults to Custom to prevent contradictions from occurring between the material and the material values.

Selecting sensor and source of layer

Co-Deposition

1. In the Program screen, select the layer to which a sensor/source will be added.
2. Click on the Sensor/Source selection animation to change the sensor/source combination.

Sequential Deposition

1. In the Program screen, select the layer to which a sensor/source will be added.
2. In the Layer Properties list, scroll down to the Sensor or Source row and double-click.
3. In the new window, click the animation until the desired sensor/source setup is displayed
4. Click OK.

Vertical tool bar

Starting a deposition

1. A deposition can be started from any screen.
2. Ensure that the desired process to run is selected in the Remote Process Control panel on the Green Status bar.
3. To start the process, press the Start button on the vertical tool bar.
4. Wait for the Process Complete notification to appear.

Abort button to end a process or exit Manual Mode

1. From any screen, press the Abort button to end a process or exit Manual Mode.

Resuming an Aborted Process

If a process has been aborted before it has been completed, and a new process has not been selected, the original process can be resumed.

1. To resume a process, press the Start button from any screen.
2. When prompted to Resume or Restart, press Resume.

Logging the status of the Eon-LT™

1. Press the Log button on the vertical tool bar.

Note: Eon-LT™ status can be logged to a monitor log from any screen. Pressing the Log button saves a monitor log to the monitor log save folder (MyDocuments/eon_logs/monitoring”).

When a process is initiated, Eon software will automatically begin recording the real-time status of the process to the process log folder (MyDocuments/eon_logs/processes). If a process is started while an Eon-LT™ monitor log recording is in process, Eon-LT™ will automatically stop recording to the monitor log and begin recording to the process log.

Zeroing Both Sensors Manually

1. Press the Zero All Thickness button on the Screen Selection tool bar.

Activating Relays Manually

1. The relays can be activated from any screen.
2. On the Screen Selection tool bar, toggle the Relay # button to activate the relays.

Settings

Note: All settings are automatically updated and saved as soon as they are changed.

Adjusting Eon-LT™ period readings

1. Press the Settings button on the Screen Selection tool bar.
2. Select General tab.
3. Click and drag the marker on the Period control to adjust the period time in increments of 100ms.

Changing Thickness Units [KÅ, Å]

1. Press the Settings button on Screen Selection tool bar.
2. Select General tab.
3. Select the desired thickness measurement units.

Disable/Enable Sensor Failure Alerts

1. Press the Settings button on the Screen Selection tool bar.
2. Select Alerts tab.
3. Check or uncheck the checkmark box of the corresponding sensor to enable or disable failure alerts.
 - Checked: Shows sensor failure alerts
 - Unchecked: Hides sensor failure alerts

Append a Log Name to Log files

1. Press the Settings button on the Screen Selection tool bar.
2. Select Logs tab.
3. Enter text to append a log filename

Note: Using the characters */>":| will cause the filename to be invalid and can prevent logs from being recorded.

Restore Default Settings

1. Press the Settings button on the Screen Selection tool bar.
2. Press the Restore Defaults button on the settings screen.
3. A prompt will appear warning the user that selecting OK will return all settings to a default state.

Force Relays to shutoff when a process is started

1. Press the Settings button on the Screen Selection tool bar.
2. In the Relay Control section, check Start Shutoff for the desired relay you wish to shutoff on process start.

Set when relays activate during deposition process

1. Press the Settings button on the Screen Selection tool bar.
2. In the Relay Control section, select the round radio button associated with the step during the deposition process when the relay should activate.
 - Manual: The relays will not activate during the deposition process automatically, but can still be controlled by the Relay # button.
 - Start: At the start of each layer/material in the process the relay will activate and will deactivate at the end of each material.
 - Predeposit: The relay will activate during the predeposit phase of the deposition process for each layer/material. The relay will then shutoff at the end of the deposition process.
 - Auto Deposition: The relay will activate during the dwell phase, just before the PID activation. This allows the dwell time to occur between shutters release and PID activation.

Setting when Eon-LT™ automatically zeros sensor thickness

1. Press the Settings button on the Screen Selection tool bar.
2. In the Sensor Zeroing menu, checkmark each setting associated with the sensor that is to have its thickness automatically zeroed.
 - Before Log: Eon-LT™ zeros thickness when Log button is pressed.
 - Start Pressed: Eon-LT™ zeros thickness when Start" button is pressed to start a new deposition.
 - Before Layer: Eon-LT™ zeros thickness each time a new layer/material engages during the process.
 - Before PID: Eon-LT™ zeros thickness each time a new layer/material activates the PID.

Safety, Handling, & Support



WARNING All electrical components are to be considered extremely dangerous if tampered with in any way. Colnatec is not liable for any injury resulting from product misuse, modification, or disassembly.



WARRANTY LABEL If the warranty label has been tampered with, “VOID” will appear where the warranty label was originally placed. If this is visible at the time of arrival, it is important that you contact Colnatec immediately after receiving the product.



EXAMINE YOUR NEW EON-LT™ FOR ANY SIGNS OF PHYSICAL DAMAGE. ALSO, ENSURE THAT THE TAMPER-EVIDENT LABELS ARE INTACT

Before shipping, your Eon-LT™ was calibrated and tested by Colnatec to meet the highest quality standards. It is important that you take a few minutes to inspect the product to ensure that your equipment was not damaged or otherwise tampered with during transit.

About Eon-LT™

With the ability to sense deposition and temperature with high precision, the Eon-LT™ thin film controller is one of the newest advancements in Thin Film deposition controllers. The Eon-LT™ provides features that help improve measurement accuracy for better process control.

LabVIEW® Interface

The Eon-LT™ offers a simple LabVIEW® interface that provides an operating environment that is intuitive, efficient, and impressive. The Eon-LT™ is easy to set up right out of the box.

Software Updates

The Eon-LT™ interface software can be upgraded on site to provide software improvements. There will be notifications when these updates become available.

Inspection and Initial Setup

Examine Eon-LT™ for any signs of physical damage. Also, make sure that the tamper-evident labels are intact. In order to ensure safe, correct operation of your Eon-LT™, please follow the step-by-step instructions presented in the Eon-LT™ Quick Start guide included with your product.

Warranty

Eon-LT™ is warranted to the original purchaser to be free of any manufacturing-related defects for one year from the date of purchase. Colnatec reserves the right to repair or replace the unit after inspection.

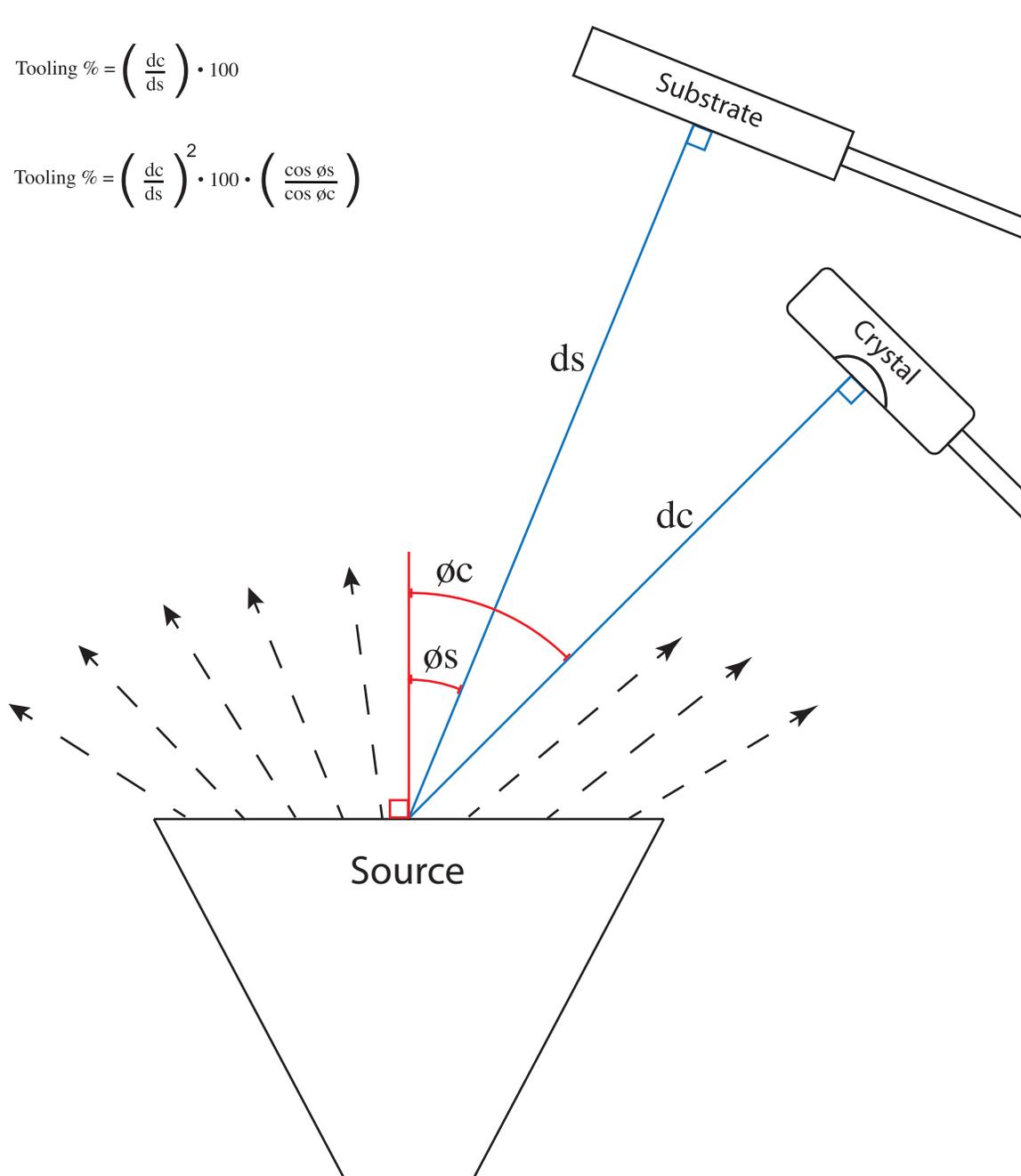
Contact Colnatec Support

511 W. Guadalupe Road, Suite 23
Gilbert, AZ 85233
(480) 634-1449
support@colnatec.com
www.colnatec.com

Tooling Factor

$$\text{Tooling \%} = \left(\frac{dc}{ds} \right) \cdot 100$$

$$\text{Tooling \%} = \left(\frac{dc}{ds} \right)^2 \cdot 100 \cdot \left(\frac{\cos \phi_s}{\cos \phi_c} \right)$$



Index

A

Abort 27, 28, 29, 50
Aborting a Process 29
About Eon-LT™ 54, 57
Accessories 9
Activating Relay 1 and Relay 29
Adjusting Y Values 35
Assembly 11

B

Backup 21, 22
Backup & Restore 21

C

Coating 41
Color Key 35, 36
Communications 42
Copyright 61

D

Deleting a Layer 48
Deleting a Process 45
Drivers 14

E

Eon-LT™ 11, 12, 13, 14
Eon-LT™ at a Glance 7, 8, 9, 10, 57
Eon-LT Connectors 7
Exiting 27, 30
Exiting Eon-LT™ Software 30
Exiting Manual Mode 27

F

Frequency 22, 23, 31, 32, 35, 36

G

Getting Started 11, 12, 13, 14
Graph 35, 45
Graphs 35, 36
Graph Screen 35
Green Status Bar 34

Index

H

Health 32, 42
Health, Layer, Material, Frequency, Rate, and Thickness 32

I

Inputs and Outputs 43
Inspection & Initial Setup 54

L

Layer 15, 16, 17, 20, 25, 31, 32, 40, 46, 47, 48, 49, 52
 New 17, 25, 46, 52
 Deleting 48
Layer Properties Defined 19
Layer Properties List 15, 17, 18, 49
Layers list 46, 48
Locking a Screen 38
Log 23, 25, 29, 50, 51, 52
Log Files 23, 51
Logging Eon-LT™ Status 29, 58

M

Manual Control 26
Manually Zeroing Individual Sensors 33
Manual Mode 26, 27, 28, 29, 50
Material 18, 19, 20, 24, 31, 32, 34, 36, 47, 48, 52
Measurement 42

P

Password 37, 38, 39
Password-Protect Eon-LT™ Screens 37
Percentage Complete 31, 32
Period Control 23
Phoenix-Eon-LT™ 8, 10, 11, 44, 60
Predeposition 24, 27
Process Display 42
Process List 15, 28, 45, 46
Program 15, 16, 17, 18, 19, 20, 28, 45, 46, 48, 49
Program Control 15, 16, 17, 18, 19, 20, 28
Program Control Screen 15

Index

Q

Quick Info 45

R

Rate 16, 19, 31, 35, 36, 46, 47

Relay Control 24, 51, 52

Removing a Layer 48

Restore 21, 22, 23, 51

Restore Defaults 23, 51

Resume or Restart an Aborted Process 29

RS232 40

S

Safety 53, 54, 55

Screen Lock 37, 38, 39

Screen Lock Button 37

Screen Selection Tool Bar 15, 21, 35, 45

Sensor 25

Sensor Alerts 22

Sensor Zeroing 21, 25, 52

Setting a New Password 38

Settings 21, 22, 23, 24, 25, 45, 51, 52

Settings Screen 21

Shutter 19, 24, 47

Software Updates 54

Source 19, 20, 26, 27, 31, 32, 45, 47, 49

Source Power 26, 31, 32, 45

Starting a Deposition 28

Status 23, 29, 31, 32, 33, 34, 45, 50

Status Indicators and Remote Process Control 34

Status Screen 31

Support 53, 54, 55

Index

T

TC 43

Temperatures 31, 33

Thermocouple 33

Thickness 16, 31, 32, 35, 36, 46, 51, 52

Time 17, 19, 20, 24, 29, 31, 34, 35, 36, 47, 50, 51, 52, 53

U

Units 51

Updates 54

USB 7, 9, 12, 13, 14

Using the Vertical Tool Bar 28

V

Vertical Tool Bar 28, 29, 30

W

Warranty 53, 54

Z

Zeroing the Sensors 29

Zero Sensor 31, 32, 33

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