

EON-ID™

controller w/ integrated touchscreen

user guide

for vers. 3.0.11 software

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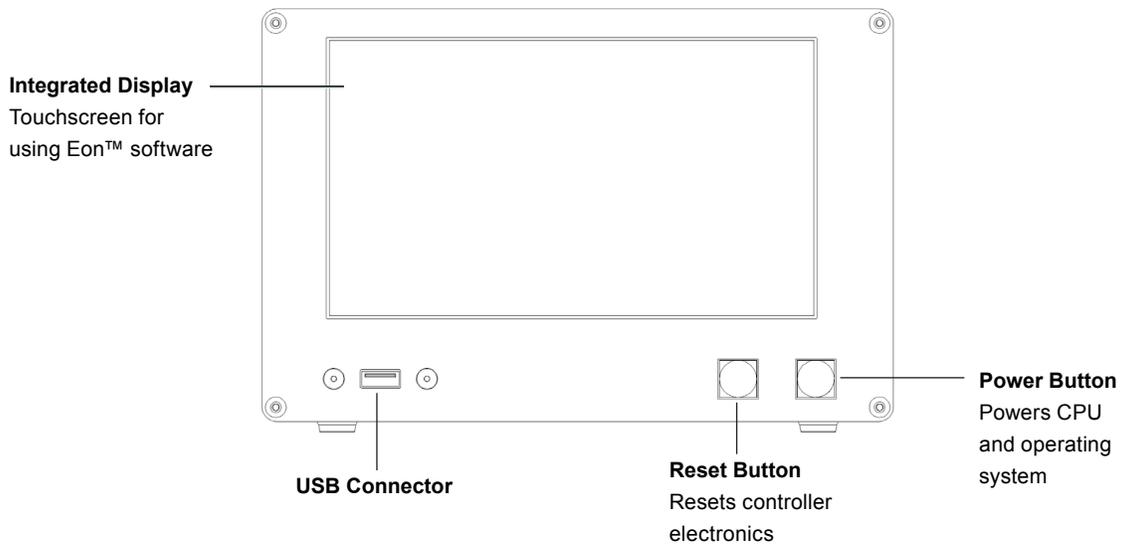
Eon-ID™ at a Glance

1

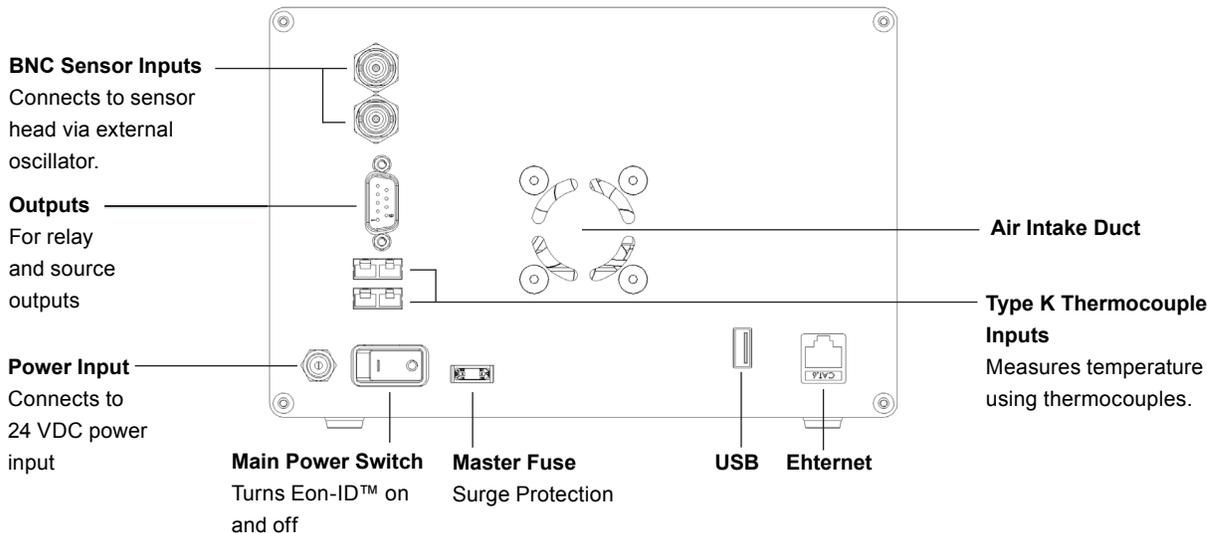
This guide describes Eon-ID™ controller with temperature control (3rd generation) and Eon™ software version 3.0.11.

Eon-ID™ Connectors

Eon-ID™ Front



Eon-ID™ Back





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

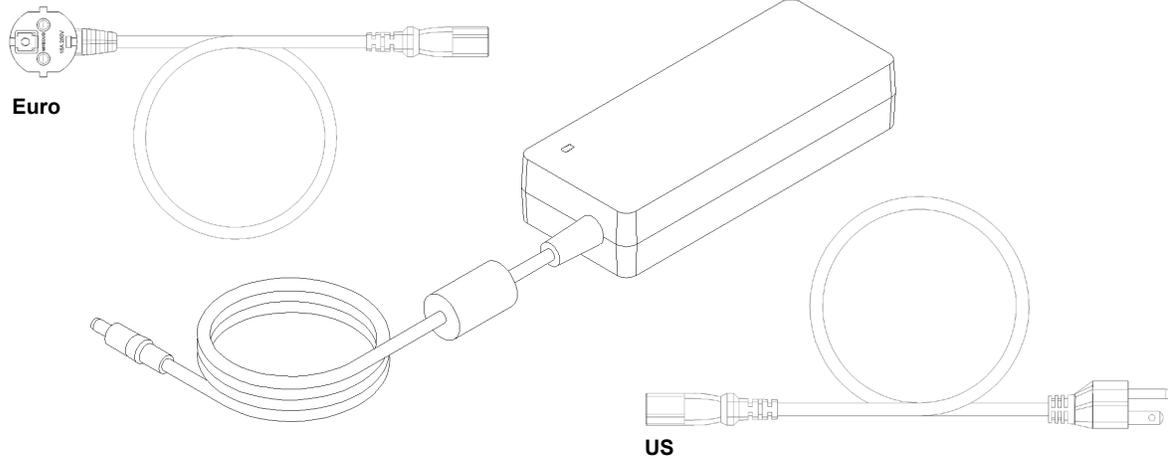


WARNING Only the provided power supply should be used with Eon-ID™. Not doing so will damage product and void warranty. Make sure power supply has a 24 VDC.

Accessories

The Eon-ID™ ships with the following accessories:

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



External oscillator. Amplifies crystal drive signal.



Getting Started

2

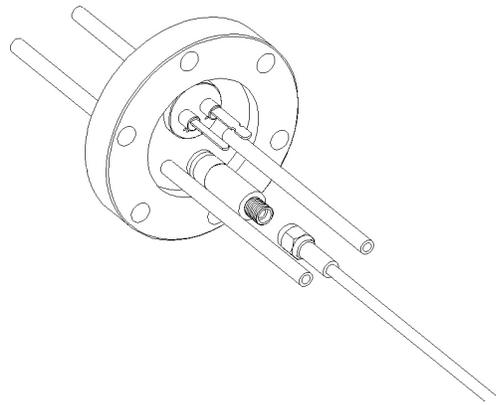
Eon-ID™ System Assembly

The following guide will describe in detail how to integrate the Eon-ID™ controller into a basic QCM configuration. The QCM depicted below is the Colnatec Phoenix™ sensor head featuring temperature control technology. If using an alternative QCM, skip the steps highlighted in red. (See Appendix A for connection map of a fully assembled Eon-ID™ system).

Connecting to QCM

Connect SMA Coaxial Cable to QCM

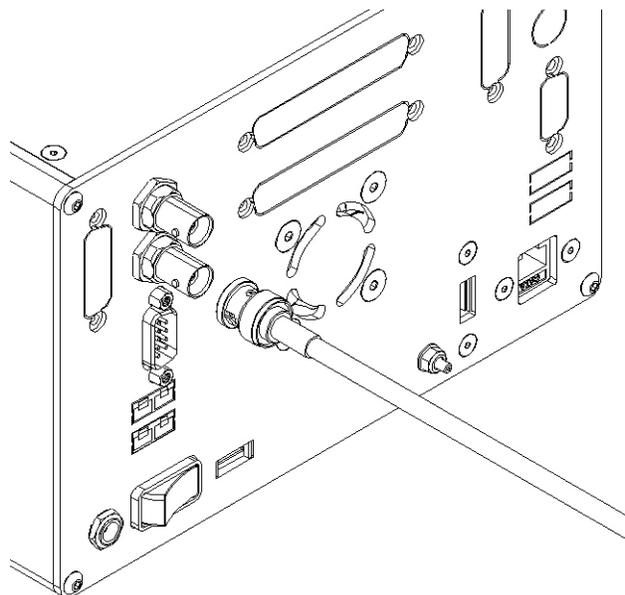
Spin cable in place using cable shaft until resistance is felt. (Twisting cable shaft past point of resistance may damage cable). Roll fingertip over connector to tighten.



Connecting to Eon™

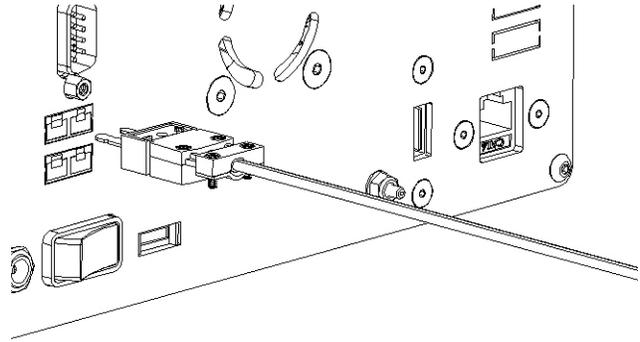
1. BNC Coaxial Cable to Eon-ID™

Slide coaxial connector onto BNC.



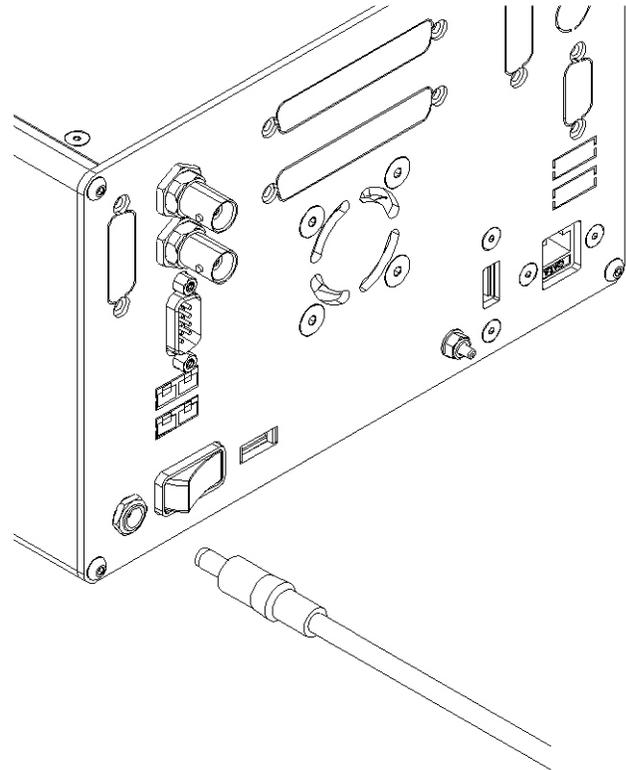
2. TC to Eon-ID™

Plug thermocouple connector into the Eon-ID™.



3. Connect Power to Eon-ID™

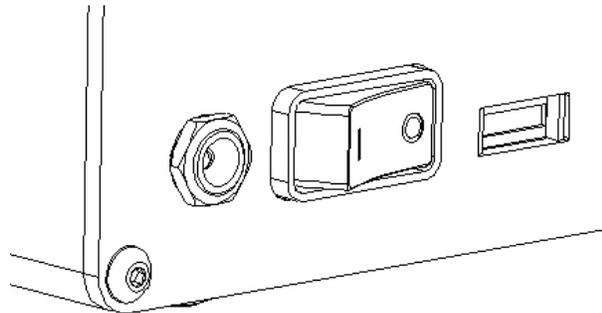
Plug Eon-ID™ power adapter into AC outlet. Then plug DC connector into the Eon-ID™.



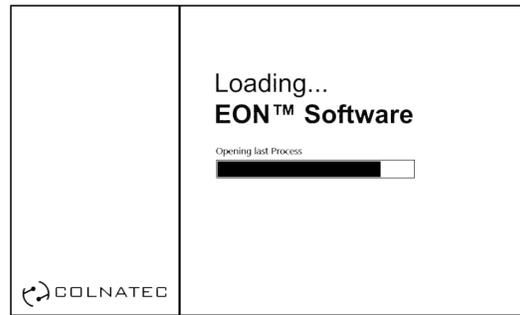
Powering on Eon-ID™ and Launching Software

1. Master Power Switch

Flip the master power switch on the back of Eon-ID™ to power on unit.

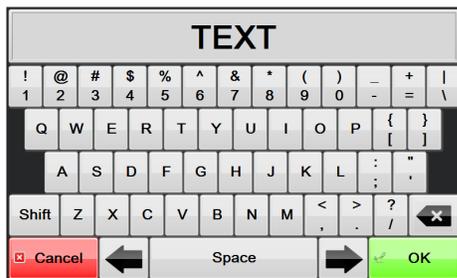


Once powered up,
Eon-ID™ automatically
launches Eon™ software.



Using Virtual Keyboards

Eon-ID™ is pre-loaded with Eon-ID™ software designed specifically for touchscreen interactivity. In instances where a physical keyboard would normally be required, virtual alpha and numeric keyboards can be accessed. To use the virtual keyboards, touch and hold text input field until the text entry window appears.



Type in text as usual.

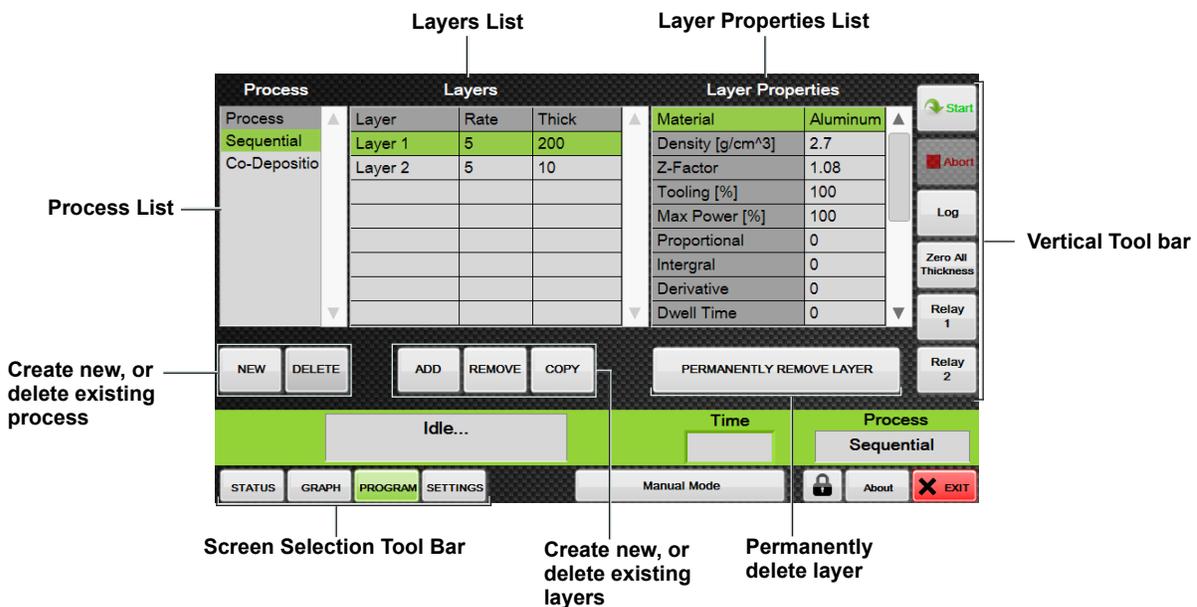
To use special characters in the alpha keyboard, select the Shift button (turns green while active). To return to the regular keyboard, unselect the Shift button.

Program Control

3

Program Control Screen

Select the Program button in the Control Menu to access the Program screen. With this screen, user 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. To enter name, touch the text field until the hidden keyboard appears. Press OK. The process now appears on the Process List.



To enter text, touch and hold the text field until virtual keyboard appears.

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.



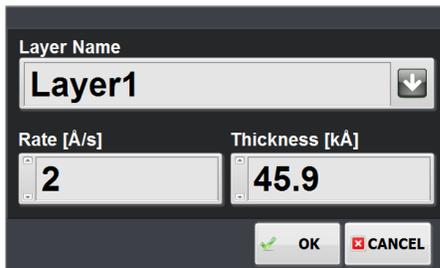
Layers List

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.

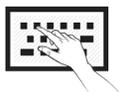
Edit layer name, rate, and thickness. Double-click a layer. Modify the name, rate, and/or thickness. Click OK.



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

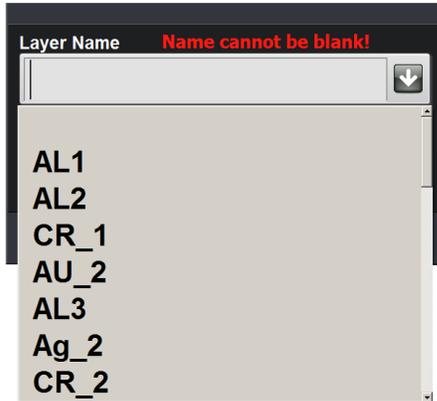
Change order of layers. On the Layers List click and hold a layer, drag the layer up or down the list, and release the layer where desired.

Remove Layer. Select the layer to be removed and click the Remove button below the layer selection list.



To enter text, touch and hold the text field until virtual keyboard appears.

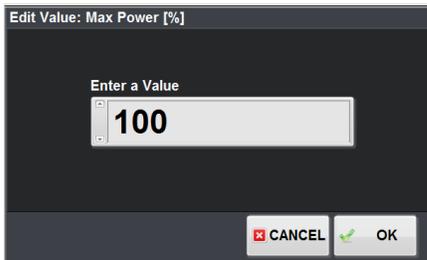
Create new layer. Select New button located below the Layers List. You can also use an existing layer by typing in the layer name or pressing the dropdown arrow to reveal a list of currently available layers.



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.



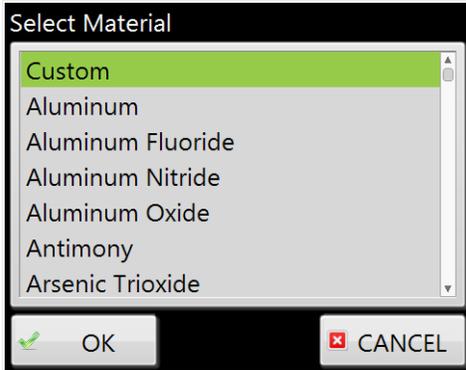
Enter a value and click OK or Cancel.

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.



To enter text, touch and hold the text field until virtual keyboard appears.

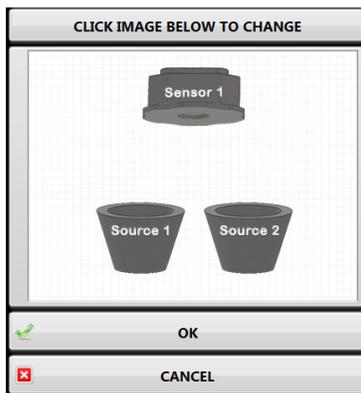
Select a material. Scroll down and click on the Material row to open the Materials List. Select the applicable material and double-click a material or click OK. The correct density and Z-Factor is automatically set.



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.

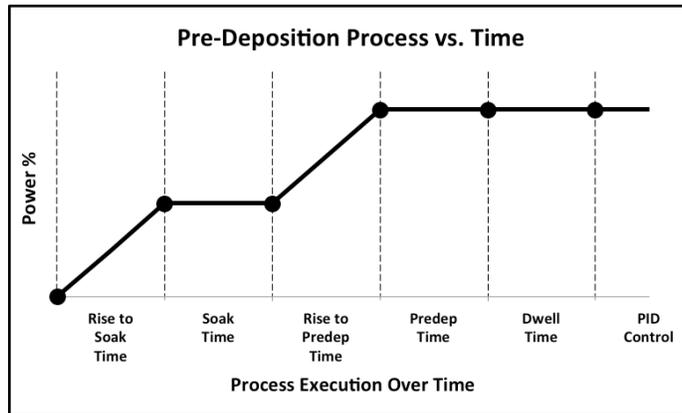
Click the image to configure which sensors and sources will be used during deposition. Select one of four configurations:

- **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-ID™ 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-ID™ 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-ID™ 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-ID™ 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-ID™ uses to control the selected layer/material. The Eon-ID™ 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

4

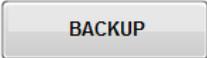
Settings Screen

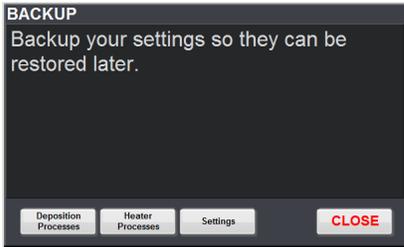
Click the Settings button in the Screen Selection tool bar to access the Settings screen. Use tabs to select settings operations. The Settings screen enables user to perform numerous tasks such as backing up and restoring settings, opening the log folder, adjusting period, and managing relays and sensor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



Backup & Restore

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

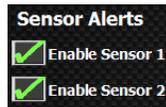


opens the Restore screen.



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.



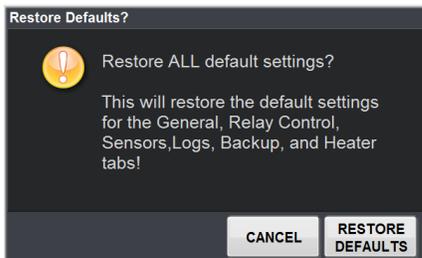
Although it is recommended that the sensor alerts generally remain enabled, the user can disable the notifications in the instance that the crystal is being used in a testing environment.

Log

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

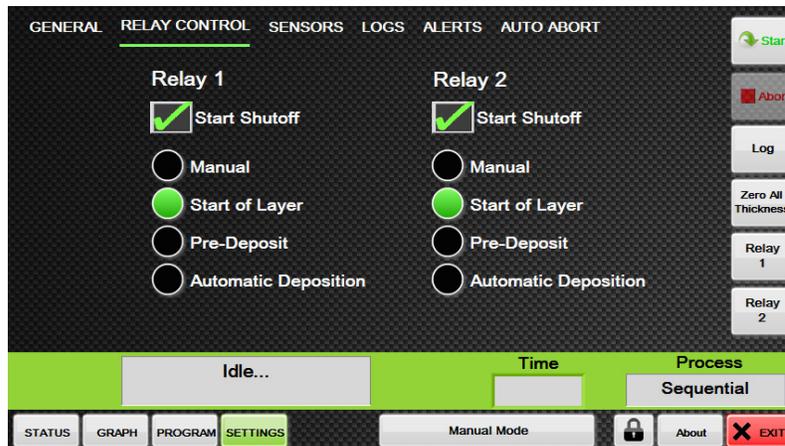
The **Period** control tuner  is used to adjust data collection frequency in increments of 0.1 seconds. The period range is 100 milliseconds to 1 second.

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.



Applies during
deposition only
(automatic control)



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.

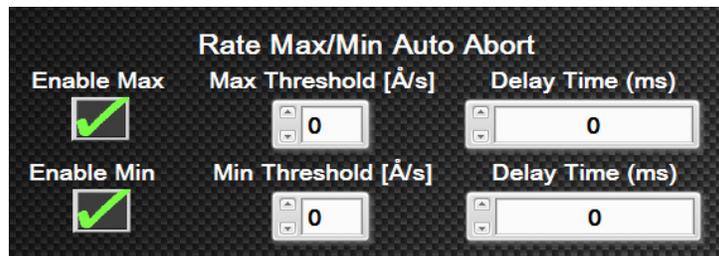
Auto Abort on Max Power

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.

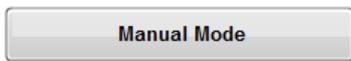


Manual Mode

5

Manual Control

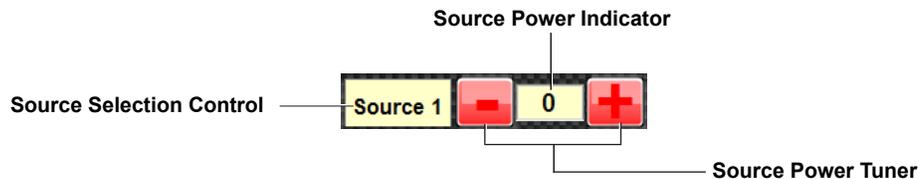
Manual Mode is an alternative operating environment in which the user can exercise manual control over the sources (Source 1 and 2). To access manual mode, simply click on the Manual Mode button from any screen.



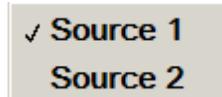
Adjusting Source

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.



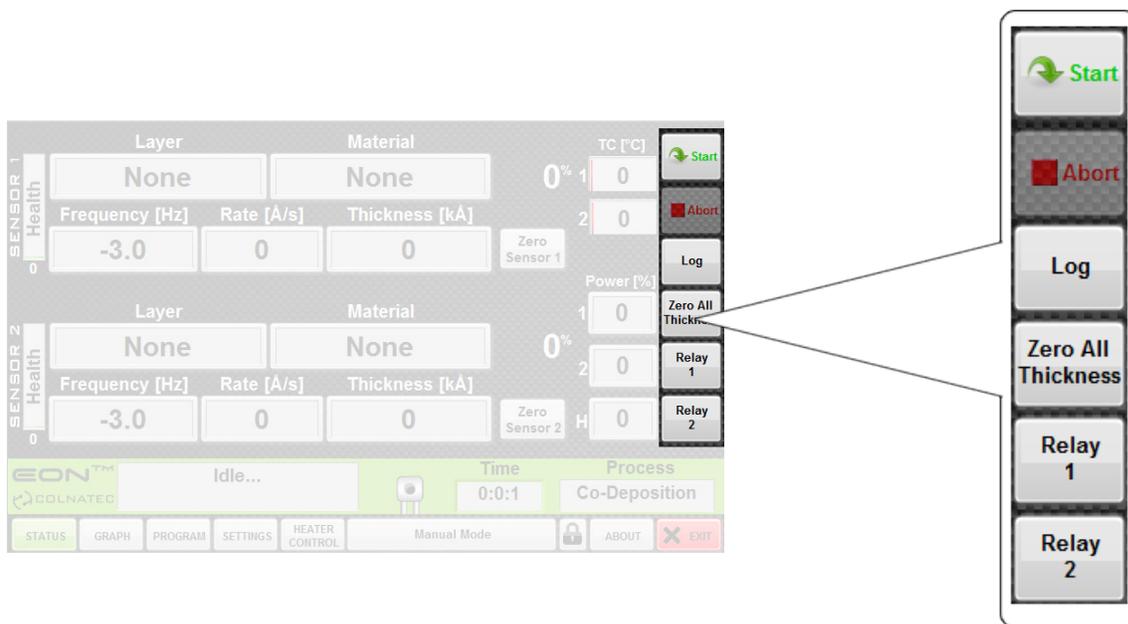
IMPORTANT When the user manually adjusts the value of the source power output, the source will no longer be controlled by the PID, regardless of the current process. If a source is adjusted during a deposition, the Eon-ID™ will no longer control the source controlling the PID or the predeposition processes,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

Vertical Tool Bar

6

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-ID™ 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-ID™ Status

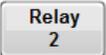
Eon-ID™ status can be logged to a monitor log from any screen. Pressing the Log button  saves a monitor log to the monitor log save folder (Public/EON_LOGS/MONITORING”).

When a process is initiated, Eon-ID™ 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-ID™ monitor log recording is in process, Eon-ID™ 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-ID™ Software

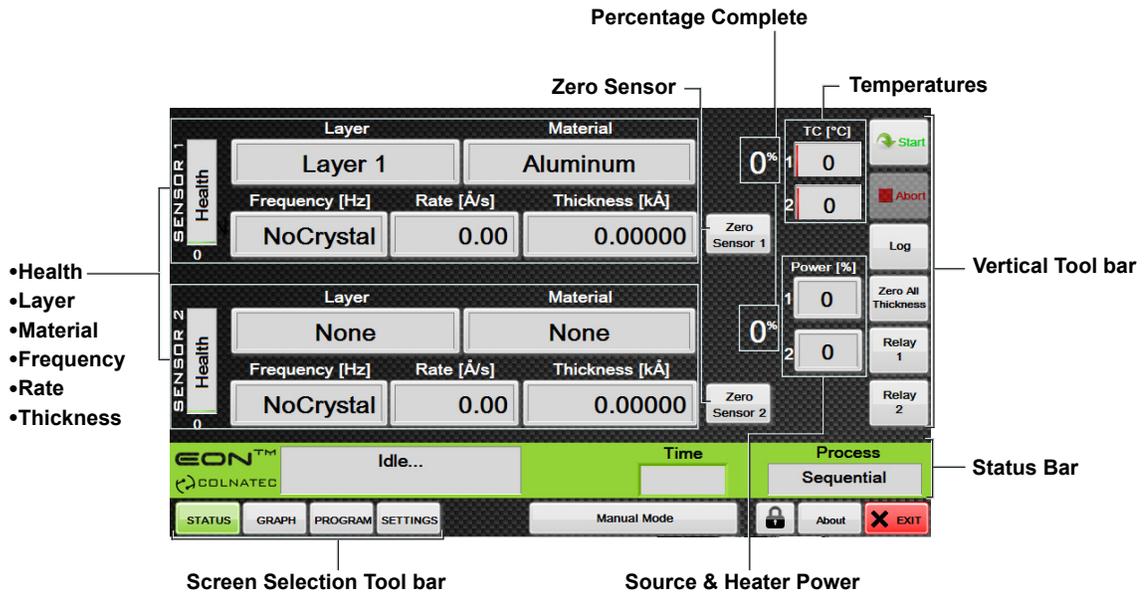
Eon-ID™ software can be exited from any screen. Simply press the Exit button  , and when prompted, press Exit again.

Status

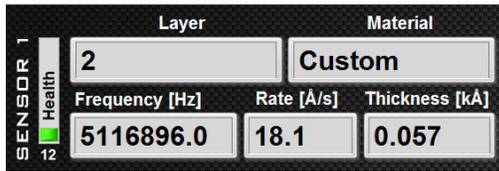
7

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.

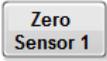
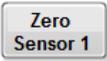
Material. When the sensor is being used during a deposition to apply material, the indicator will flash red, informing the user that the sensor is being used to control the selected source for the material being applied. During this process, the material being applied is also displayed.

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

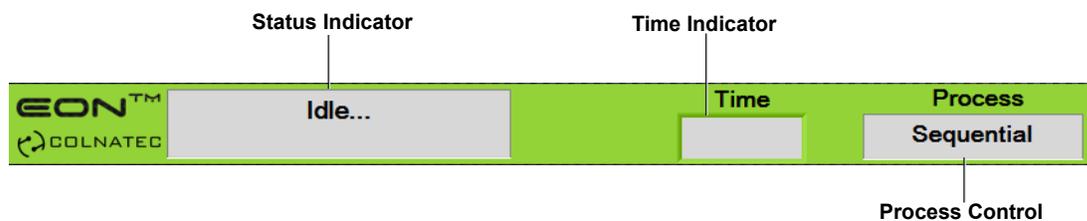
Click the Zero Sensor button that corresponds to the sensor to be zeroed.

Green Status Bar

8

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-ID™ is currently performing. Information updates in real-time as Eon-ID™ 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.

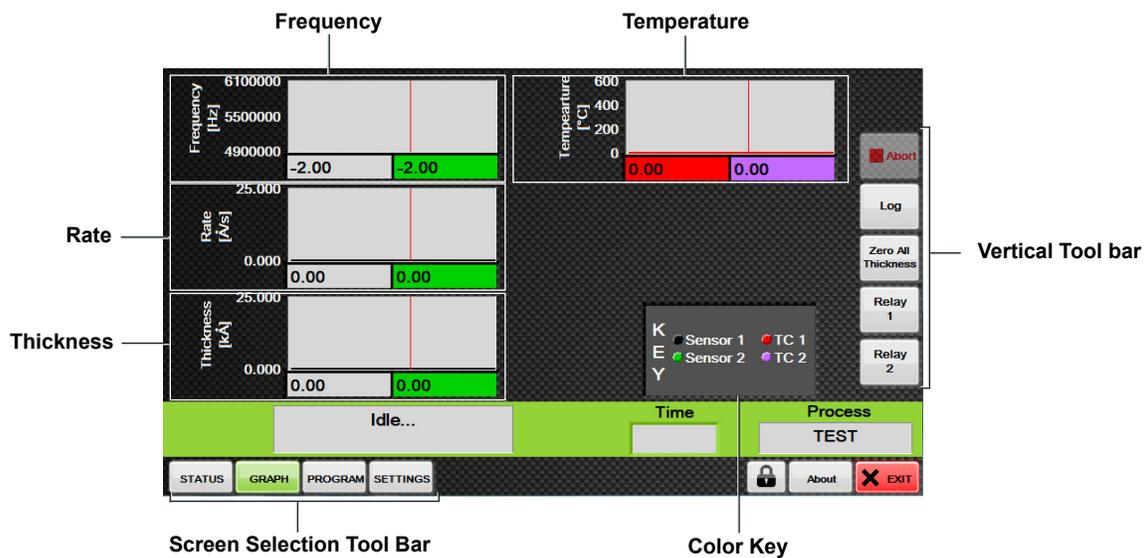
Layer	Material
None	None

Graphs

9

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.

Please select a maximum and minimum range for this graph

Minimum	Maximum
0	25

CANCEL OK

Graphs

The graphs provide a visual representation of data gathered by Eon™. 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



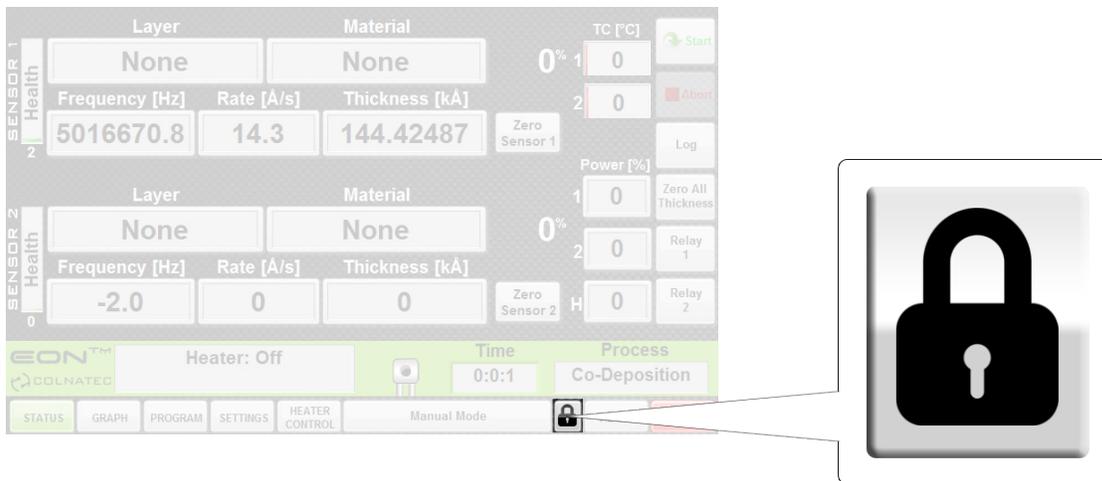
The Color Key displays the color values representing the various devices being depicted on each graph.

Screen Lock

10

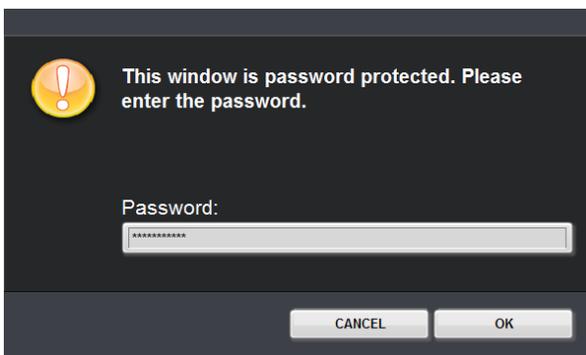
Password-Protect Eon-ID™ Screens

The Eon-ID™ 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.



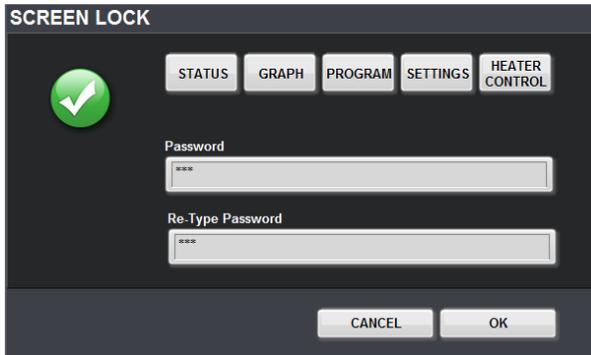
Screen Lock Button

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.



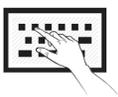
Click OK to engage Screen Lock protection. When clicked on, the *protected* screen(s) will now generate a password prompt.

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.

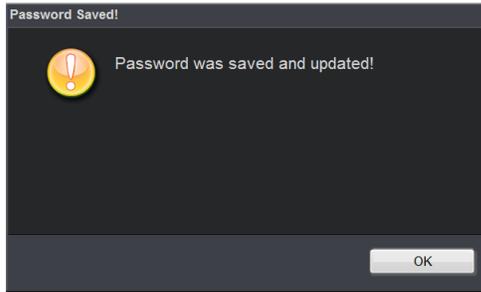


Click OK to save new Screen Lock screen settings or Cancel to return to original settings.



To enter text, touch and hold the text field until virtual keyboard appears.

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.



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.

Troubleshooting

11

Symptom	Cause	Solution
Frequency reads -2.0 [Hz]	Sensor not detected	Check sensor connection
“Could not connect to Eon-ID™ 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

12

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]
-------------	---------------------

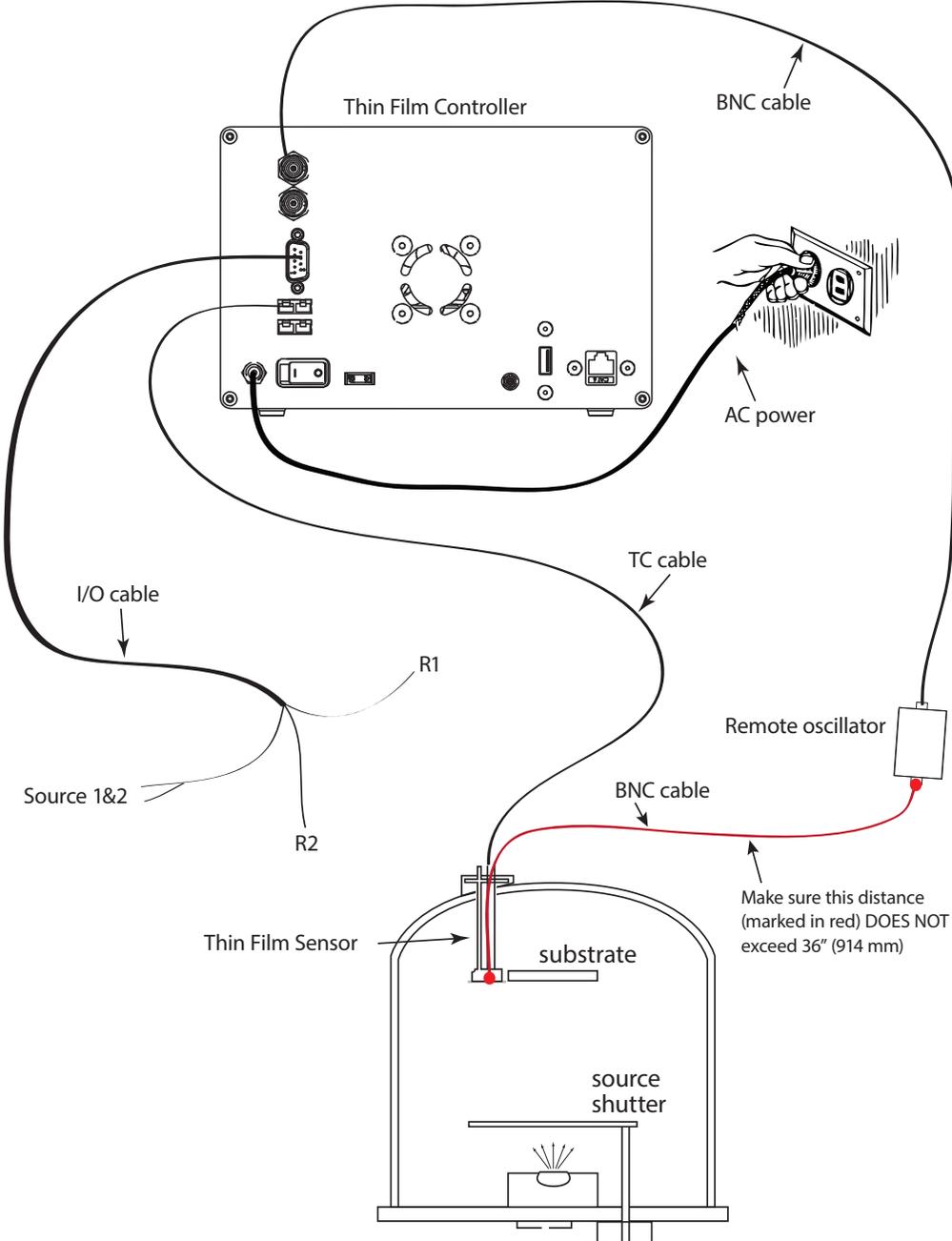
Inputs and Outputs

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	

Eon-ID™ System

Eon-ID™ System Configuration

Rendering illustrates basic connections of Eon-ID™ 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 [$\text{k}\text{\AA}$]. 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 properties 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-ID™ 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-ID™ 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-ID™ 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-ID™ 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-ID™ uses to control the selected layer/material. The Eon-ID™ 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-ID™

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

Note: Eon-ID™ 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-ID™ monitor log recording is in process, Eon-ID™ 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-ID™ 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-ID™ 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-ID™ zeros thickness when Log button is pressed.
 - Start Pressed: Eon-ID™ zeros thickness when Start” button is pressed to start a new deposition.
 - Before Layer: Eon-ID™ zeros thickness each time a new layer/material engages during the process.
 - Before PID: Eon-ID™ 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-ID™ FOR ANY SIGNS OF PHYSICAL DAMAGE. ALSO, ENSURE THAT THE TAMPER-EVIDENT LABELS ARE INTACT

Before shipping, your Eon-ID™ 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-ID™

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

Software Updates

The Eon-ID™ 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-ID™ 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-ID™, please follow the step-by-step instructions presented in the Eon-ID™ Quick Start guide included with your product.

Warranty

Eon-ID™ 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.

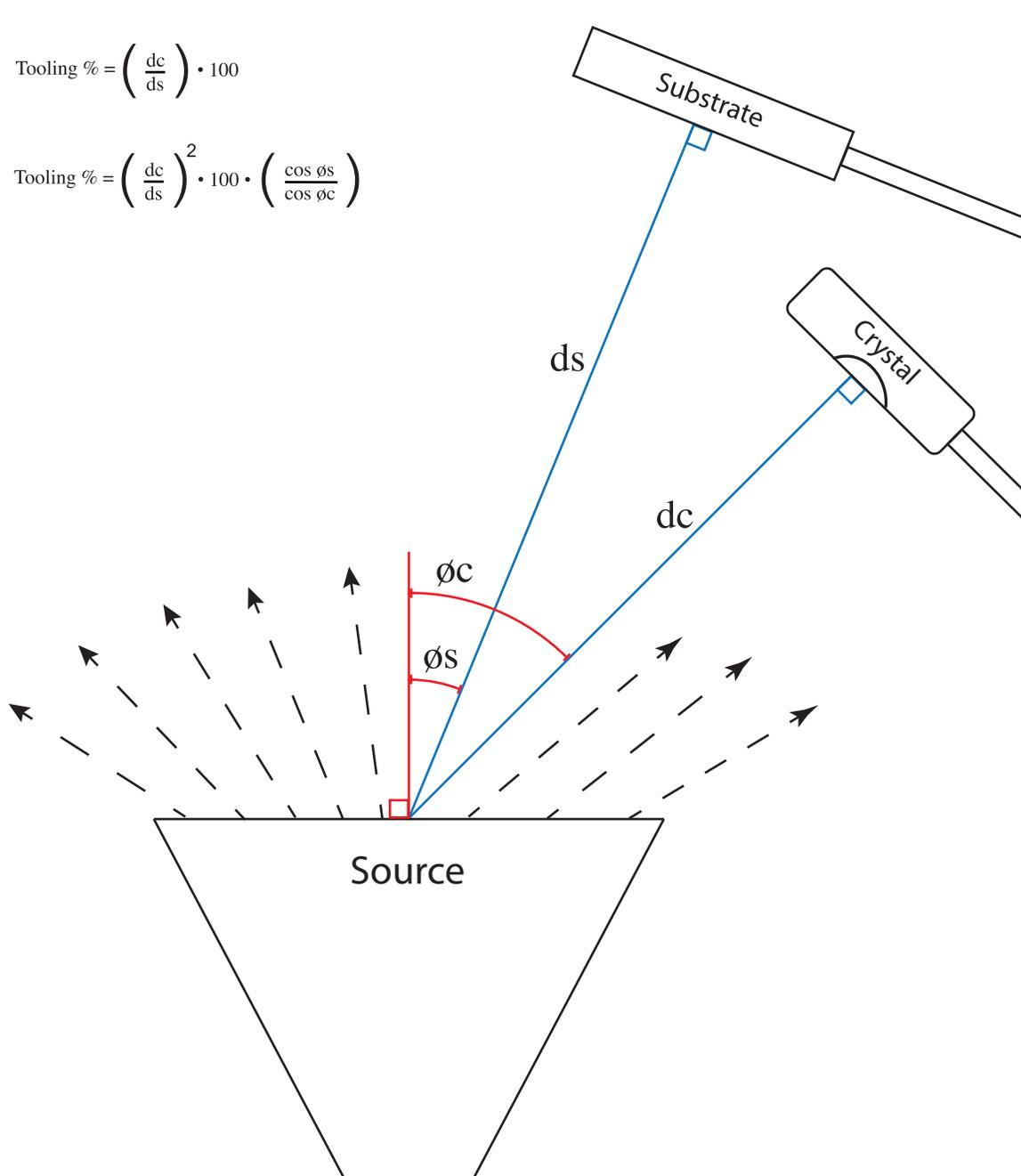
Contact Colnatec Support

771 N. Golden Key, Suite A
Gilbert, AZ 85233
(480) 634-1449
support@colnatec.com
www.colnatec.com

Tooling Factor

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

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



Mass-to-Frequency Correlation Formula

Sauerbrey equation (modified)

$$T_F = \frac{N_{at} d_q}{\pi d_f F_c Z} \tan^{-1} \left(Z \tan \left(\frac{\pi (F_q - F_c)}{F_q} \right) \right)$$

Nat=Frequency Constant=166100 [Hz*cm]

dq=Density of Quartz=2.649 [gm/cm3]

df=Density of film [gm/cm3]

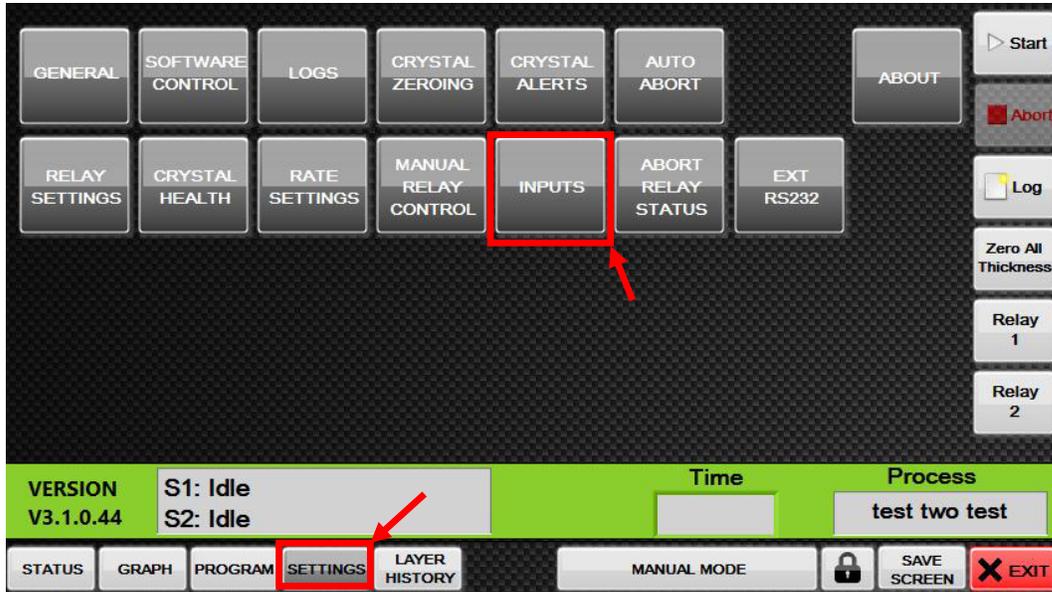
Fc=Coated Frequency [Hz]

Fq=Uncoated Frequency [Hz]

Z=Z ratio

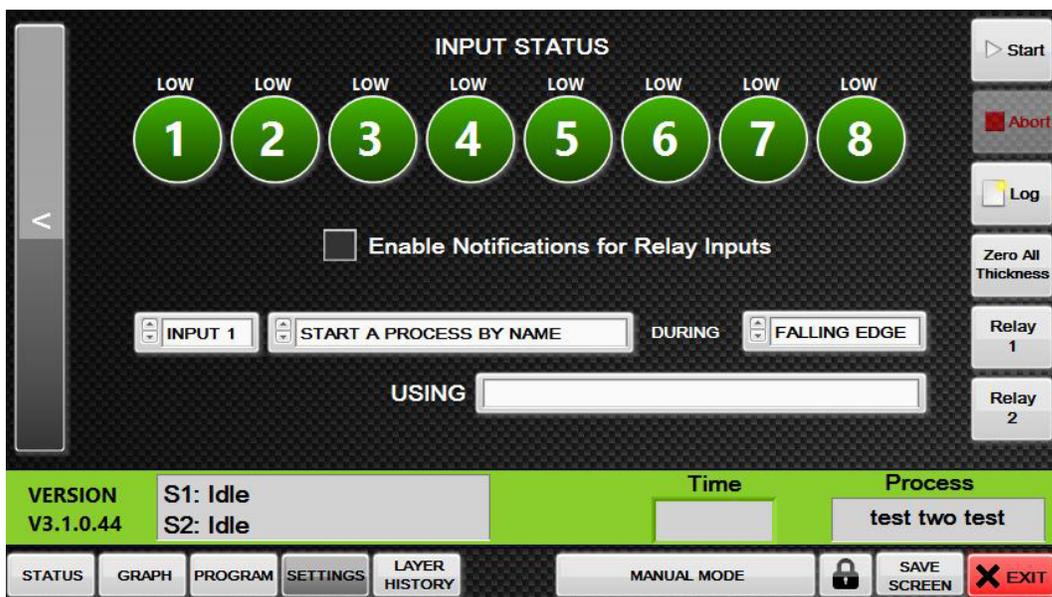
Input Control

GETTING TO INPUT CONTROL SCREEN

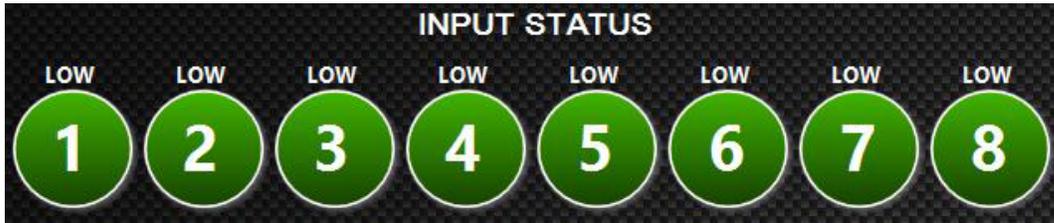


1. First press the Settings button
2. Press the "Relay Settings" button in the settings screen

INPUT CONTROL



Input Control (cont.)



The input status bar shows the current status of the inputs. If the word “Low” is displayed, there is no continuity between the relay pins. If the indicator is bright and “High” appears over the indicator, there is continuity between the pins of that input.



The “Enable Notifications for Relay Inputs” option notifies the user when a specific operation could not be performed that was enabled by an input; e.g., if the “Activate Start Button” command is used but a process is already started. A notification will appear indicating that the input tried to start the process but that the process could not be started, as it is already activated.

This option enables / disables these notifications.



Use the controls on the “Input Settings” page to program an input.



This selector allows the user to select which input they would like to program. Selecting the input field will cause the other fields to update accordingly.



Selects what action should be performed when the input changes state.

Start a process by name – Starts a process by the specified name. This command requires that the name of the process be entered into the string box that will appear.

Activate abort button – Activates the about button as if the user had pressed the about button manually.

Input Control (cont.)

Zero thickness – Zeroes the thickness of the specified sensor. An option will appear to select the desired sensor.

Decrease manual power mode – Reduces the power output to the specified source by the amount specified. A numeric box will appear allowing user to specify the percent power to apply when the event occurs.

Increase manual power mode – Increases the power output to the specified source by the amount specified. A numeric box will appear allowing user to specify the percent power to apply when the event occurs.

Activate start button – Activates the start button as if the user had pressed the button manually.

Flash an alert – Displays an alert on the unit. This option will show a string box that allows the user to type in a message that will be displayed on the screen when the specified event occurs.

Step into next layer – Placeholder for future implementation.

Do nothing – Does not perform any action. This is used when no state change is requested.

NOTE: Some of these actions require additional information such as a sensor, number, or string. When one of these options are selected, the following controls will appear:



Specifies what edge (state transition) the operation should be performed on.

Falling Edge- A falling edge is when the input goes from a HIGH state to a LOW state. (The input is latched, then unlatched)

Rising Edge – When the input goes from a LOW state to a HIGH state (the input is unlatched, then latched)

Low State - The action will be continually performed while the state of the input is LOW (unlatched)

High State – The action will be continually performed while the state of the input is HIGH (latched)

Any Edge – The action will be performed when the state of the input goes from LOW to HIGH (unlatched to latched) or from HIGH to LOW (latched to unlatched).

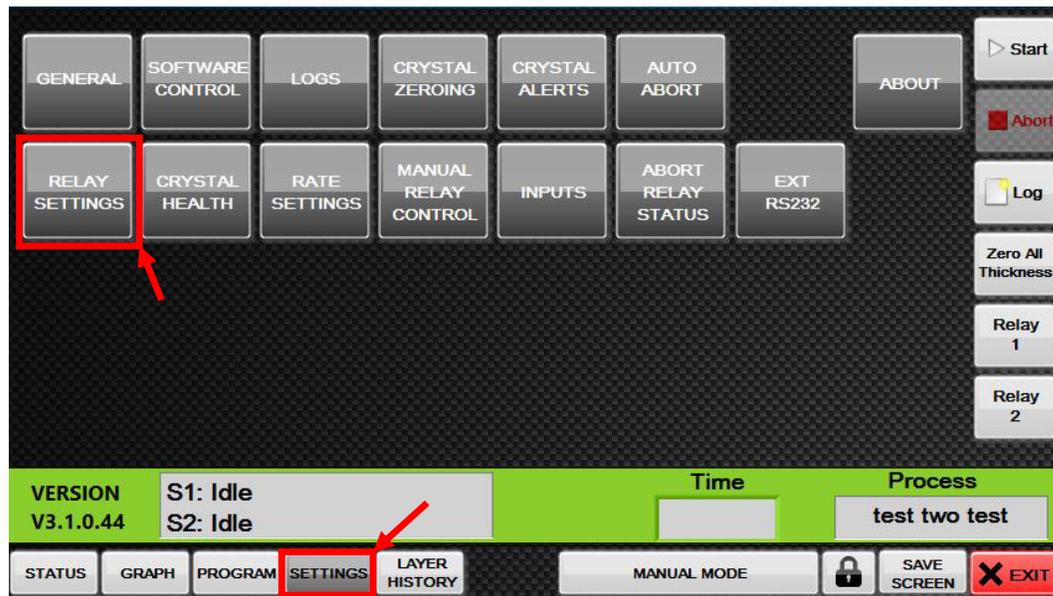
Relay Control

Eon-ID Relay Control

NOTE: This is a beta version of the software . It is strongly recommended that you test this unit before using in live deposition or for production.

Please direct all questions or feedback to support@colnatec.com

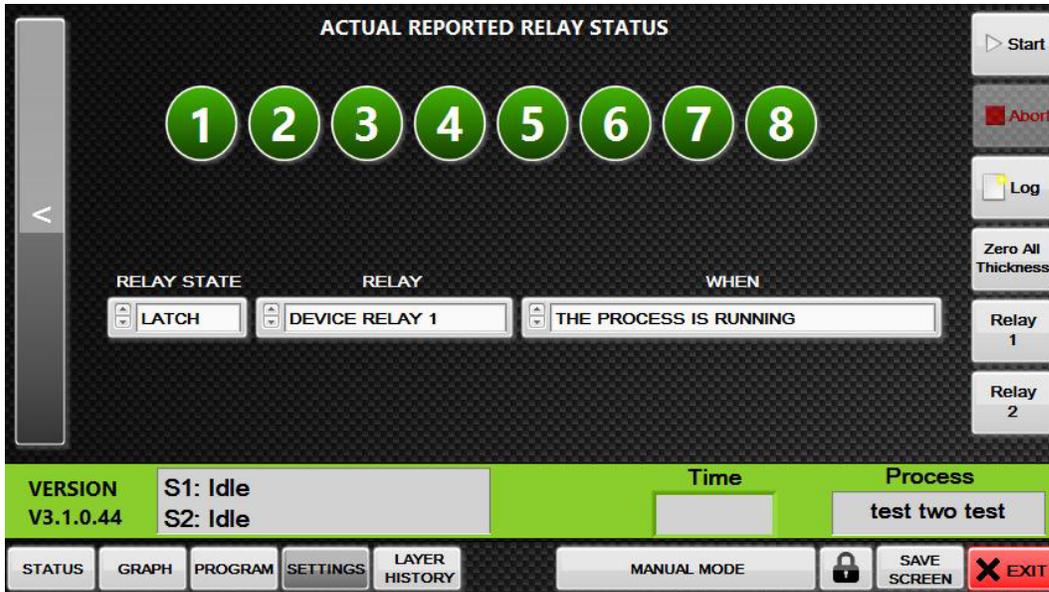
Getting to the Relay Screen



1. Press the SETTINGS button
2. Press the RELAY SETTINGS button in the settings screen

Relay Control (cont.)

Relay Screen



Actual Reported Relay Status Indicator



The status indicator on the top of the screen displays the currently reported status of the relay by the relay board. This status is updated real time.

When the indicator is lit up and has the word "LATCHED" appears above the corresponding relay number, that relay is latched (see above).

When the relay is not latched, the status indicator will not be lit up and the word "LATCHED" will not appear.

Relay Control (cont.)

Relay Controls



The Relay Controls allows the user to set the state of the relay during specific events.

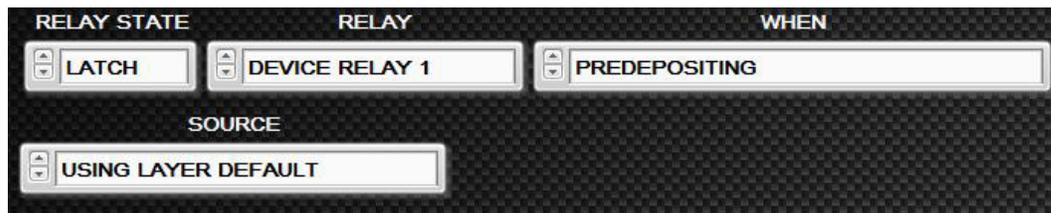
RELAY STATE – Specifies the state that the relay should be in when the event occurs.

RELAY – This allows the user to select which relay should be activated when the event occurs

- o Relays labeled as DEVICE RELAY are located on the Eon board itself.
- o Relays labeled RELAY BOARD are specifically controlled by the relay board.

WHEN – This selection determines the event that controls the relay state.

NOTE: Some events may require additional information, such as specifying the source or sensor. If this information is required, the input field will appear below the relay controls. See below for an example.



Here are the different events that are programmed into the relay control as of version 3.1.0.44:

NEVER – Never latch or unlatch the relay

THE PROCESS IS RUNNING – Activate the state specified during the duration of the process run. If the process is no longer running, the relay will return to the opposite state.

A LAYER IS RUNNING – While a layer is running the relay will go to the specified state. Once a layer has completed, the relay will return to its previous state

A CRYSTAL NEEDS TO BE CHANGED– This is based on the value set by the “Crystal HP Replace %” setting. When either crystal falls below the % of health specified for the crystal change, the relay will be set to the state specified until the crystal’s health reaches a point above that state; i.e., because the crystal has been replaced with a new one.

RISING TO SOAK – The relay will be set to the state specified during the “rise to soak” step of the predeposition process. When leaving the “rise to soak” step, the relay will return to the opposite state. The source that the relay should monitor during the pre-deposition process will need to be specified.

SOAKING – The relay will be set to the state specified during the “soak” step of the pre-deposition process. When leaving the “soak” step, the relay will return to the opposite state. The source that the relay should monitor during the predeposition process will need to be specified.

RISING TO PREDEPOSIT - The relay will be set to the state specified during the “rise-to-predeposit” step of the predeposition process. When leaving the “rise to predeposit” step, the

Relay Control (cont.)



relay will then return to the opposite state. The source that the relay should monitor during the predeposition process will need to be specified.

PREDEPOSITING - The relay will be set to the state specified during the “predeposit” step process of the “predeposit” step. When leaving the predepositing process, the relay will then return to the opposite state. The source that the relay should monitor during the predeposition process will need to be specified.

DEPOSITING - The relay will be set to the state specified during the “deposit / PID” step of the process. When leaving the “deposit / PID” step of the process, the relay will then return to the opposite state. The source that the relay should monitor during the predeposition process of the process will need to be specified.

RATE IS RAMPING – The relay will be set to the desired state, when the current rate read is greater than or equal to the set rate for the specified sensor. If the rate is below or returns to below the rate set point, the relay will return to the opposite state.

LAYER IS RUNNING – The relay will be set to the desired state while a process is running. If the process is not running, the relay will return the opposite state of that is selected.

PROCESS COMPLETED SUCCESSFULLY– The relay is only set to the desired state when the process status is set to complete. This means that a process ran successfully and was not aborted either automatically or manually. (Note: The process status will be set to Complete when the unit is first powered on before any processes have been run).

ABORT IS PRESSED – The relay is activated to the desired state when the abort button is pressed. This relay does not activate to the desired state if the process is automatically aborted, or if completed. It will only be set when the process was aborted manually via the abort button. The relay will remain in the desired state until the process status changes; e.g., a new process is started.

PROCESS AUTO ABORTED– The relay is set to the desired state when the process is aborted automatically. This can be due to max rate reached or max power reached; it will return to its previous state once the auto abort flag is removed by starting a new process.

LAST LAYER RUNNING – The relay will be set to the desired state when the last layer of the current process is running; it will then return to its previous state once the last layer has been completed.

CRYSTAL FAILS DURING PROCESS– The crystal will be set to the desired state when the frequency falls below zero Hz. This indicates a crystal failure has occurred. If the frequency returns, then the relay will return to its previous state.

MAX POWER REACHED - The relay will be set to the desired state if max power defined by the layer’s settings has been reached. The relay will then remain in that state until a new process has begun or a process has been resumed.

ANY ABORT OCCURS – If a process is aborted (manually or automatically) the relay will be set to the desired state. The relay will remain in that state until a new process has started.

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