SmartClear II Pro

User's Manual

lifecanvas technologies

Contents

Components & Accessories

The SmartClear II Pro consists of the SmartClear clearing module and the SmartBox control module:

The SmartClear II Pro comes with an accessory box including the following items:

Additional Sample Holders are for sale, and can be found at:
http://lifecanvastech.com/smartclear-ii-pro/

Installation

Please take note of the following before installation:

- Connect the instrument to an electrical outlet according to local or country standard.
- Do not use the instrument for purposes other than those shown by the manufacturer.
- Do not switch on the instrument without having waited at least 20 seconds after switching it off.
- Follow instructions contained in the manual when changing consumables.
- At least two people are required to move the instrument.
- Do not use this instrument outdoors.
- If deemed necessary, ask the manufacturer or your sales agent for help when setting up the system. This will help prevent unexpected problems caused by mishandling.
- The instrument must be placed in a stable and level location.
- Do not leave this instrument in humid or wet conditions. It could cause an electrical short.
- Use the recommended volume of Buffer A and B.
- Only use buffers or membranes provided by LifeCanvas Technologies.

Note: In the event of any unexpected problems, please report immediately to your service representative or LifeCanvas Technologies:
support@lifecanvastech.com / info@lifecanvastech.com

1. Carefully remove **SmartClear 2 Pro** and the **SmartBox** from the packaging and place at the installation location. We recommend at least 8 inches of space around the devices for proper airflow, and a level surface. Locate the parts listed below.
2. Connect the cable originating from the 'Alternating' port on **SmartBox** to **SmartClear 2 Pro**. Do the same for the 'Direct' cable. Attach the main power cable to the rear side of **SmartBox** and plug it into an outlet with the correct voltage requirements.

SmartBox

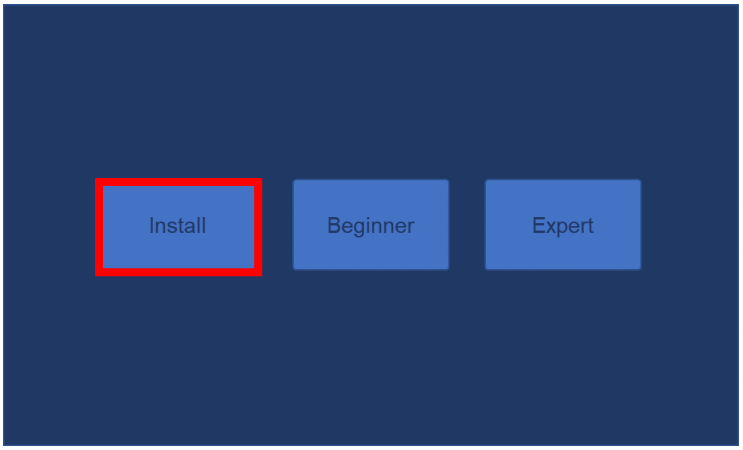
SmartClear 2 Pro

Align tabs and plug in cable.

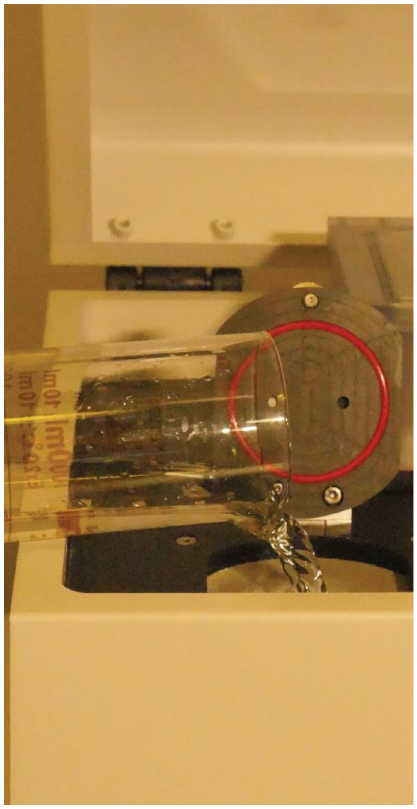
Screw bearing lock nut clockwise completely

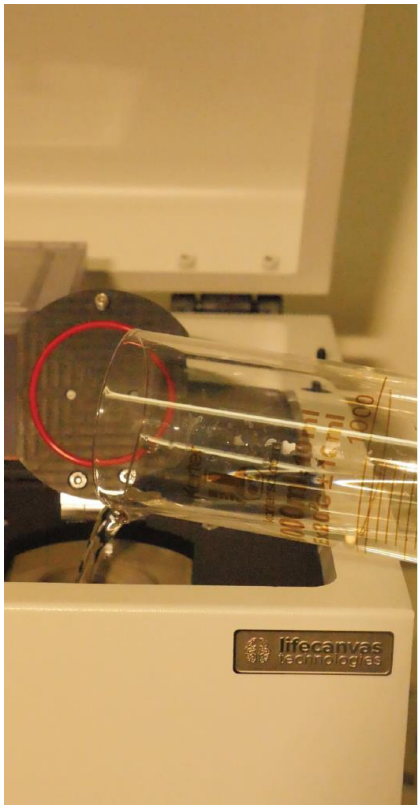
Plug power cord into outlet.

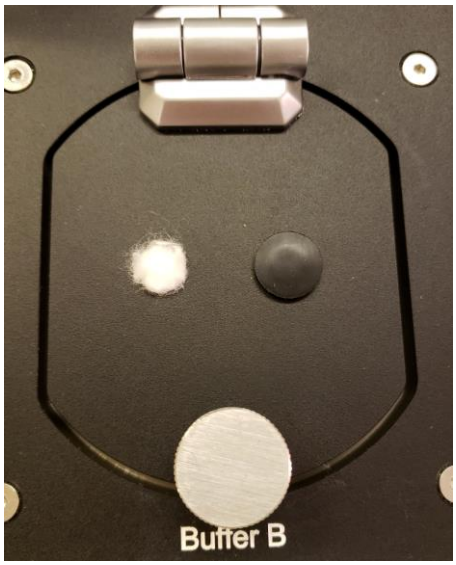
3. Turn on the **power switch**. Choose **'Install'** for buffer and membrane installation and follow the direction on the screen.



4. Remove any paper towel packing from the reservoirs and pour **500 mL** of DI water in both A and B reservoirs.



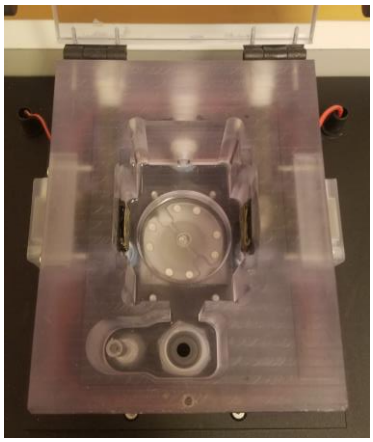




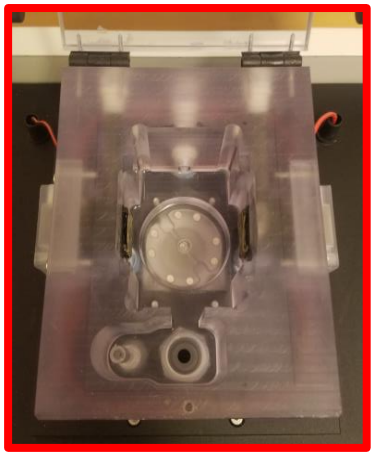
Note: the cotton in the reservoir lids prevents bubble formation and allows gas exchange. If it pops out or leaks bubbles, you can replace it with more cotton.

5. The next step is for installation of the membrane window in the clearing chamber. Installation must be done in a swift manner to ensure that the membrane stays hydrated and does not get damaged from dryness.

Membrane Window



Clearing Chamber

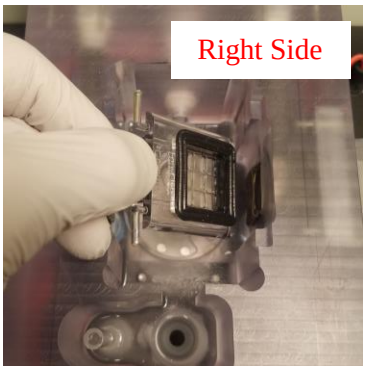


***Don't touch electrodes**

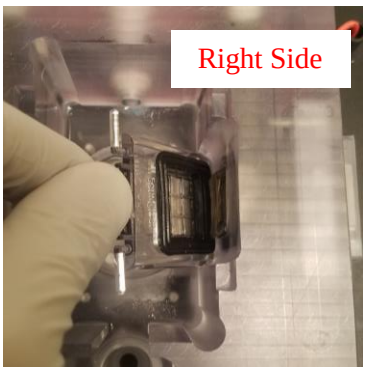
Place the membrane windows into the right and left slots of the chamber without touching the electrode (PT wire). The window wing fits each side holder.

Remember:

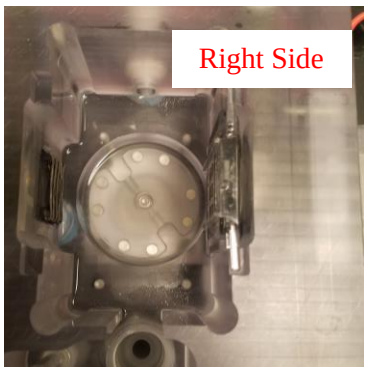
1) Place the rubber gasket towards the electrode (outside).
2) Make sure that the rubber gasket does not touch the electrode.



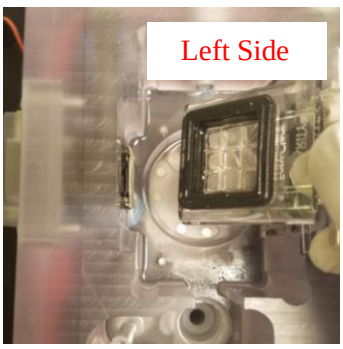
1) Place the rubber gasket toward the electrode

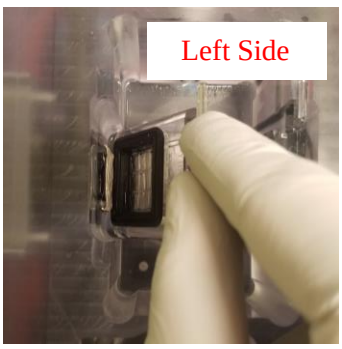


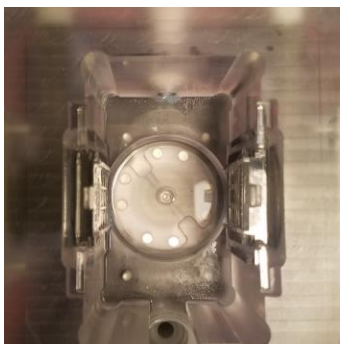
2) Place the window below the electrode and tilt it up without touching electrode



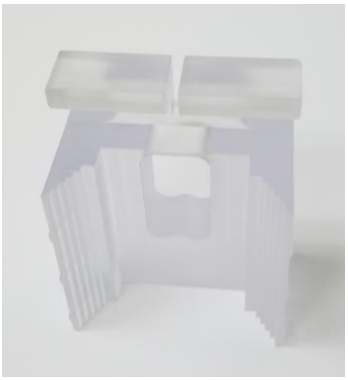
3) The window wings are placed on the window holder at each side.



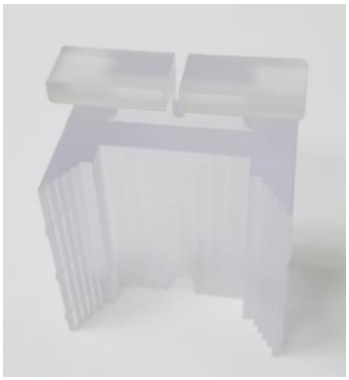




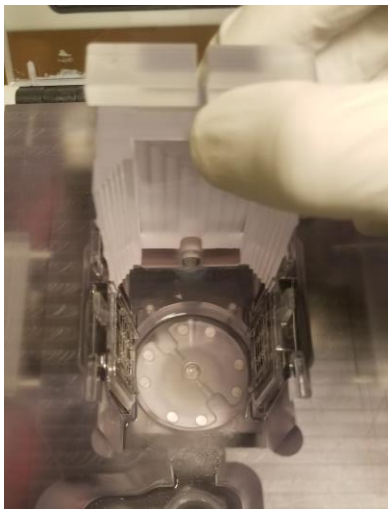
6. Place **Spacer B** into the rear slot. Place **Spacer A** into the front slot. When the spacers are placed properly, membrane windows stand straight. Installation must be done in a swift manner to keep the membrane hydrated and does not get damaged from dryness.



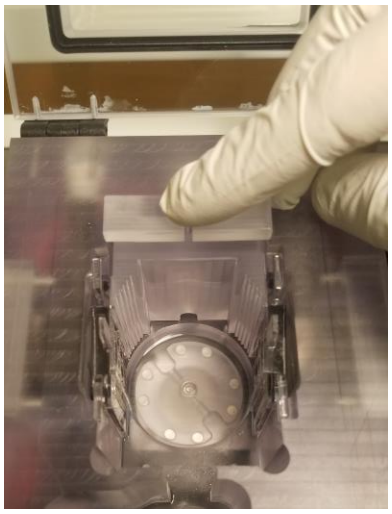
Spacer A



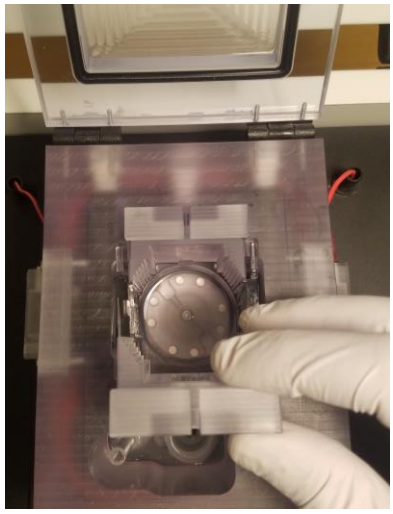
Spacer B



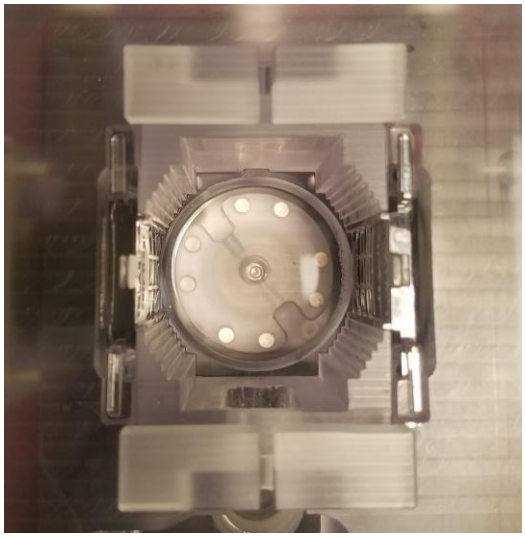
1) Place **Spacer B** with the small hole into the rear side.



2) Gently push until the spacer touches the bottom.



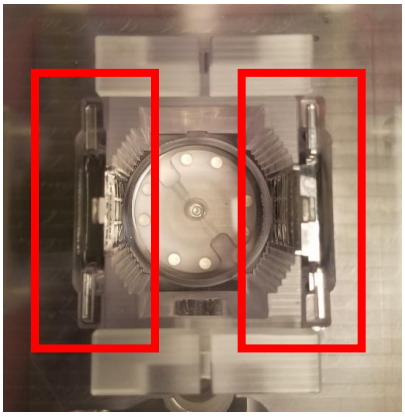
3) Repeat steps 1 and 2, inserting **Spacer A** with the big hole into the front side



4) Check if the spacers are well fixed and secure.

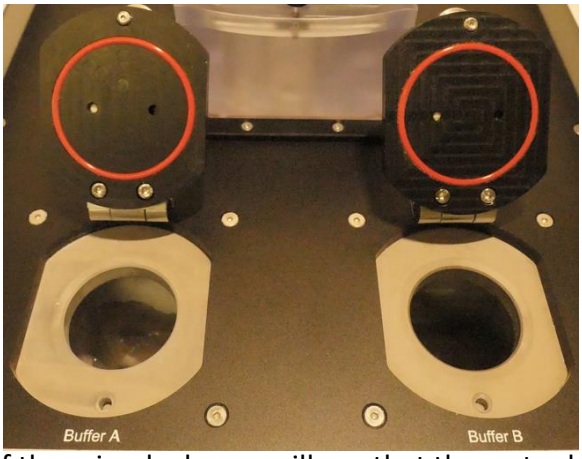
7. Look inside the chamber and confirm that the membranes do not leak.

Check around membranes for leaks.



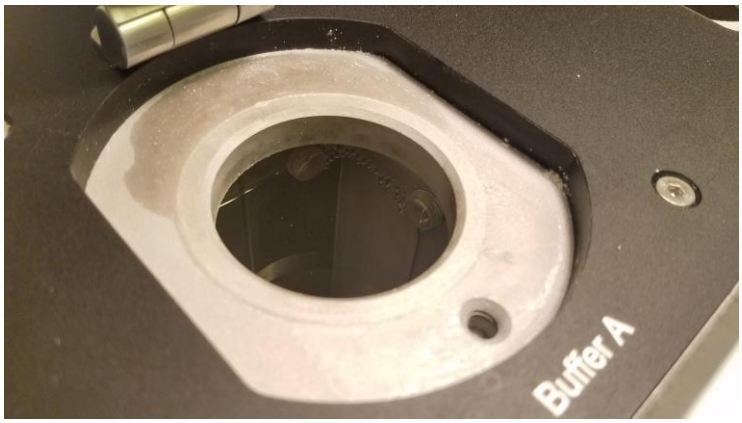
This is a significant leak.

8. Look inside the A and B reservoirs, and remember the water level. Wait more than an hour to check the membranes. Check the level of DI water in Reservoir A and B by checking its height relative to the drain tubes in the back.



If there is a leak, you will see that the water level in Reservoir A will be very high, and the water level in Reservoir B will be very low. If this happens, replace the membranes and install again or contact the LifeCanvas support team.

Reservoir A water level after leak.



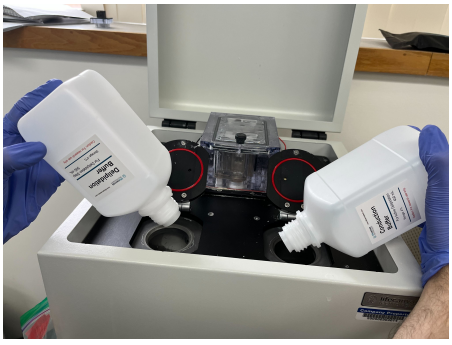
Reservoir B water level after leak.

9. You will find a drain hose at the bottom of the device. The drain hose on the left is for **Reservoir A**, and the drain hose on the right is for **Reservoir B**. Drain DI water completely by opening the valve one at a time and close the valve when you are done.

Drain Reservoir A

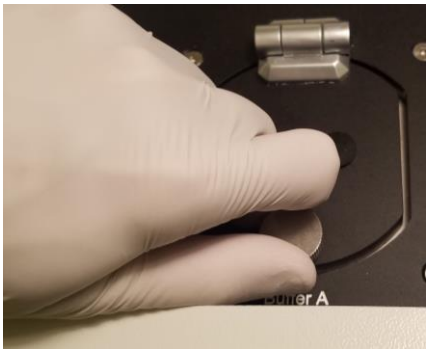
Drain Reservoir B

10. Fill **Reservoir A** with **Delipidation Buffer** and fill **Reservoir B** with **Conduction Buffer**, respectively.



Pour new **Delipidation Buffer.**

Pour new **Conduction Buffer.**



Close lids by tightening screws.

11. Place the samples in the shaped **Mesh Bags**. You can use the notches on the top of the bags to identify your samples. For optimal clearing, orient your samples with the longest axis vertically. Then, use the **Sample Holder Spacers** to make slots in the **Sample Holder** for your samples. Insert the mesh bag and sample all the way down into the slots. Then, insert the **Sample Holder** into the **Clearing Chamber**.

Insert sample in mesh bag with long axis vertical.

Insert sample holder spacers in sample holder.

Insert mesh bags into sample holder.

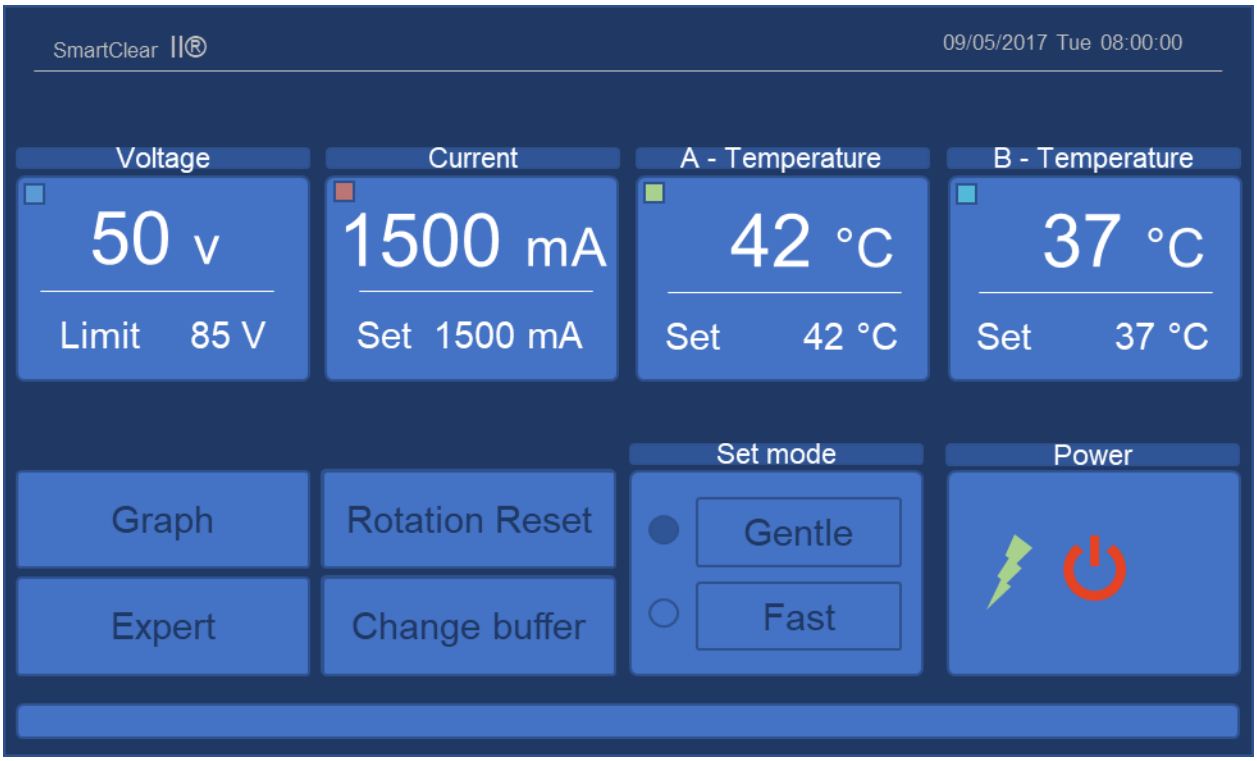
Insert sample holder into the clearing chamber

Operation

After installing buffers and membranes, the device is ready to start clearing samples. The device can be operated in 2 modes: Beginner Mode and Expert Mode, with Beginner Mode optimized for speed and ease-of-use and Expert Mode optimized for maximal user control.

Beginner Mode

The Beginner Mode is optimized for beginners, and has preset clearing settings. In this mode, the pumps for both Reservoir A and B will always remain on. This ensures that the membranes will stay hydrated. The Beginner Mode User Interface appears as follows:

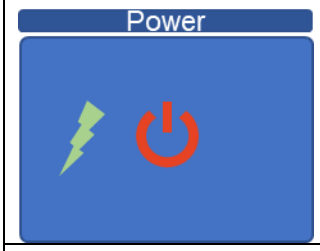
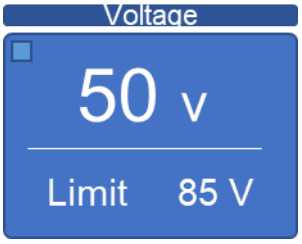
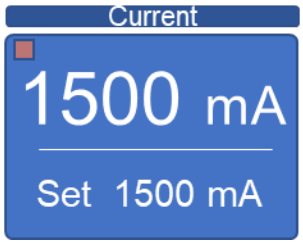
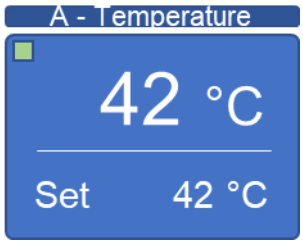


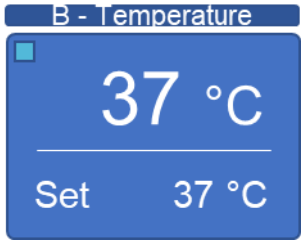
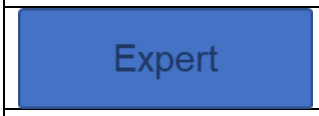
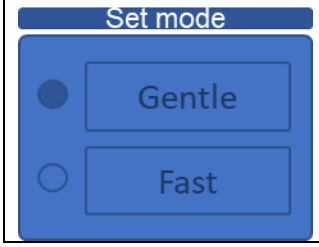
To operate the device in Beginner Mode:

1) Choose the Gentle or Fast Set Mode.*
2) Change any Voltage, Current or Temperature Settings as desired. *
3) Press the Power button in the bottom right.
4) When not actively clearing a sample, it is best to turn the clearing power off to preserve the buffer and membrane.
5) The clearing power will automatically turn off when the lid of the SmartClear clearing module is opened, and will resume once the lid is closed.

* See the following table for more information.

Complete description of Beginner Mode UI:

	This is the clearing power button. Pressing this button turns on the clearing power, and the button will light up red to indicate the power is on. **Note: the only time that counts towards the 10 day lifetime of the buffer and membrane is when the clearing power is turned on.**
	This is the Voltage indicator and control button. The top number indicates the applied voltage across the electrodes. **Note: it is normal for the system to read a voltage even if the clearing power is off.** The bottom number is the Limit Voltage. The device normally operates in Current control mode, so the device will apply the voltage needed to reach the Set Current. If the voltage required to reach the Set Current is higher than the limit, the device will only apply the limit voltage to the electrodes. To change the Limit voltage, please enter **Expert Mode** and press the button. **Note: Depending on a number of factors, 60 V – 75 V is required to pass the default 1500 mA between electrodes.**
	This is the Current indicator and control button. The top number indicates the current passed between the electrodes. **Note: it is normal for the system to read a small current (~10 mA) even if the clearing power is off.** The device normally operates in Current control mode. The bottom Set Current number is the current the device will attempt to pass between electrodes. To change the Set Current, please enter **Expert Mode** and press the button. **Note: We do not recommend increasing the Set Current above 1500 mA.** **Note: It is normal for this value to fluctuate around the Set value (± 20 mA).**
	This is the Buffer A Temperature indicator and control button. The top number indicates the current temperature of Buffer A. The bottom number shows the Set Temperature for Buffer A. By default, this is 42° C in Gentle Mode, and 50° C in Fast Mode. To change the Buffer A Temperature, enter **Expert Mode,** press this button and enter the desired Temperature. **We do not recommend setting the temperature above 50° C.** **Note: if the measured temperature is consistently above the Set temperature, the user can lower the set temperature of Buffer B, which will improve heat flow and allow Buffer A to reach lower set**

	values.
	This is the Buffer B Temperature indicator and control button. The top number indicates the current temperature of Buffer B. The bottom number shows the Set Temperature for Buffer B. The default temperature is calibrated to each device and can range from 30° C – 40° C in both Set Modes. To change the Buffer B Temperature, enter **Expert Mode,** press this button and enter the desired Temperature. **We do not recommend setting the temperature above 50° C.**
	This is the Graph button. It takes the user to another Menu to access the History Log and Graph of the device operation and Settings. For more information, see the Graphing & History section of the manual.
	This is the Expert Mode button. It takes the user to Expert Mode. For more information, see the Expert Mode section of the manual.
	This is the Rotation Reset button. It restarts the timer for the Rotation of the sample. We recommend you press this button when first putting a new sample into the chamber.
	This is the Change Buffer button. This button takes the user back through the Installation steps to change the buffer and membranes in the same procedure described in the Installation section of this manual.
	This is the Set Mode button. This changes between the default Gentle and Fast settings for Beginner Mode: Gentle: T_A = 42°C, T_B = 30 – 40°C, V_{Limit} = 85 V, I_{Set} = 1500 mA. Fast: T_A = 50°C, T_B = 40°C, V_{Limit} = 85 V, I_{Set} = 1500 mA.

Expert Mode

Expert Mode offers the greatest amount of user control during operation. To enter Expert Mode from Beginner Mode, press the 'Expert' button. It allows the user to specify polarity switching, sample rotation settings, timer operation, and individual control of pumps and clearing power. However, it removes some of the protections present in Beginner Mode:

Note: Remember to turn on pumps when membranes are installed. Also, never run the pumps when no liquid is in the system.

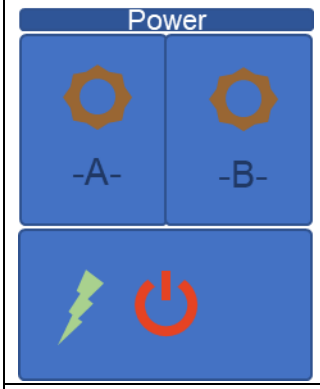
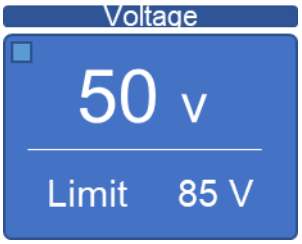
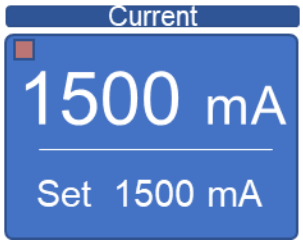
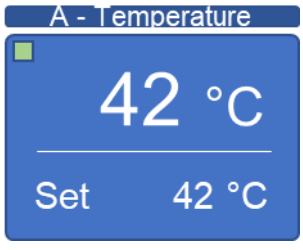
The User Interface of Expert Mode is like that of Beginner Mode with some exceptions:

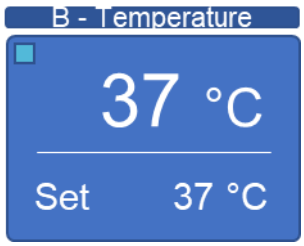
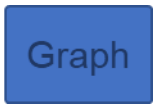
To run the system in Expert Mode:

1) Install Buffers and membranes.
2) Turn on Pump B.*
3) Turn on Pump A.*
4) Choose desired Polarity, Rotation, Timer, Voltage, Current and Temperature Settings. *
5) Turn on Clearing Power.
6) When not actively clearing a sample, it is best to turn the clearing power off to preserve the buffer and membrane.
7) The clearing power will automatically turn off when the lid of the SmartClear clearing module is opened, and will resume once the lid is closed.

* See the following table for more information.

Complete description of Expert Mode UI:

	This is the Power button for the Pumps and Clearing Power. To power Pump A and B, press the buttons with -A- and -B- respectively. When the pumps are on, the gear will light up as shown and rotate. To turn on clearing power, press the lower power button. This will light up as shown to indicate the clearing power is on. **Note: The pumps and clearing power have to be turned on and off in a particular sequence: B Pump, A Pump, Clearing Power to turn everything on, and vice versa to turn everything off. A message will be displayed if the wrong order is chosen.**
	This is the Voltage indicator and control button. The top number indicates the applied voltage across the electrodes. **Note: it is normal for the system to read a voltage even if the clearing power is off.** The bottom number is the Limit Voltage. The device normally operates in Current control mode, so the device will apply the voltage needed to reach the Set Current. If the voltage required to reach the Set Current is higher than the limit, the device will only apply the limit voltage to the electrodes. To change the Limit voltage, press this button, and enter the desired value in the number pad. **Note: Depending on a number of factors, 45 V – 70 V is required to pass the default 1500 mA between electrodes.**
	This is the Current indicator and control button. The top number indicates the current passed between the electrodes. **Note: it is normal for the system to read a small current (~10 mA) even if the clearing power is off.** The device normally operates in Current control mode. The bottom Set Current number is the current the device will attempt to pass between electrodes. To change the Set Current, press this button and enter the desired Current. The default Set Current is 1500 mA, and the user can change this current from 0 to 2000 mA. **Note: We do not recommend increasing the Set Current above 1500 mA.** **Note: It is normal for this value to fluctuate around the Set value (± 20 mA).**
	This is the Buffer A Temperature indicator and control button. The top number indicates the current temperature of Buffer A. The bottom number shows the Set Temperature for Buffer A. By default, this is 42° C. **We do not recommend setting the temperature above 50° C.** **Note: if the measured temperature is consistently above the Set temperature, the user can lower the set temperature of Buffer B,**

	which will improve heat transfer and allow Buffer A to reach lower set values.
	This is the Buffer B Temperature indicator and control button. The top number indicates the current temperature of Buffer B. The bottom number shows the Set Temperature for Buffer B. The default temperature is calibrated to each device and can range from 30° C – 40° C. To change the Buffer B Temperature, press this button and enter the desired Temperature. **We do not recommend setting the temperature above 50° C.** **Note: If Buffer A is consistently above its Set Temperature, the user can lower the Temperature of Buffer B, which will improve heat transfer and allow Buffer A to reach lower set values.**
	This is the Graph button. It takes the user to another Menu to access the History Log and Graph of the device operation and Settings. For more information, see the Graphing & History section of the manual.
	This is the Beginner Mode button. It takes the user to Beginner Mode. For more information, see the Beginner Mode section of the manual.
	This is the Rotation Settings button. The top number shows the rotation speed in Rotations per minute. Lower numbers show the time since Rotation was started (middle) and the time when the Rotation speed reaches the next stage (bottom). Pressing this button will take the user to the Rotation Settings Screen. For more information, see the Rotation Settings section of this manual. The button on the right toggles the Sample Rotation on and off. When on, the gear will light up as shown and rotate. The Rotation Reset button will reset the timer to 0 and begin the cycle again. We recommend resetting the Rotation when first starting to clear a new sample.
	This is the Polarity indicator and button. The number on top is a timer, which counts up from the last time the polarity was switched. The Set value on the bottom indicates the interval between polarity switches. Pressing this button opens the Polarity Settings screen. For more information, see the Polarity Switch Settings section of this manual. Pressing the button on the right with the Arrow will immediately switch polarity and reset the timer.

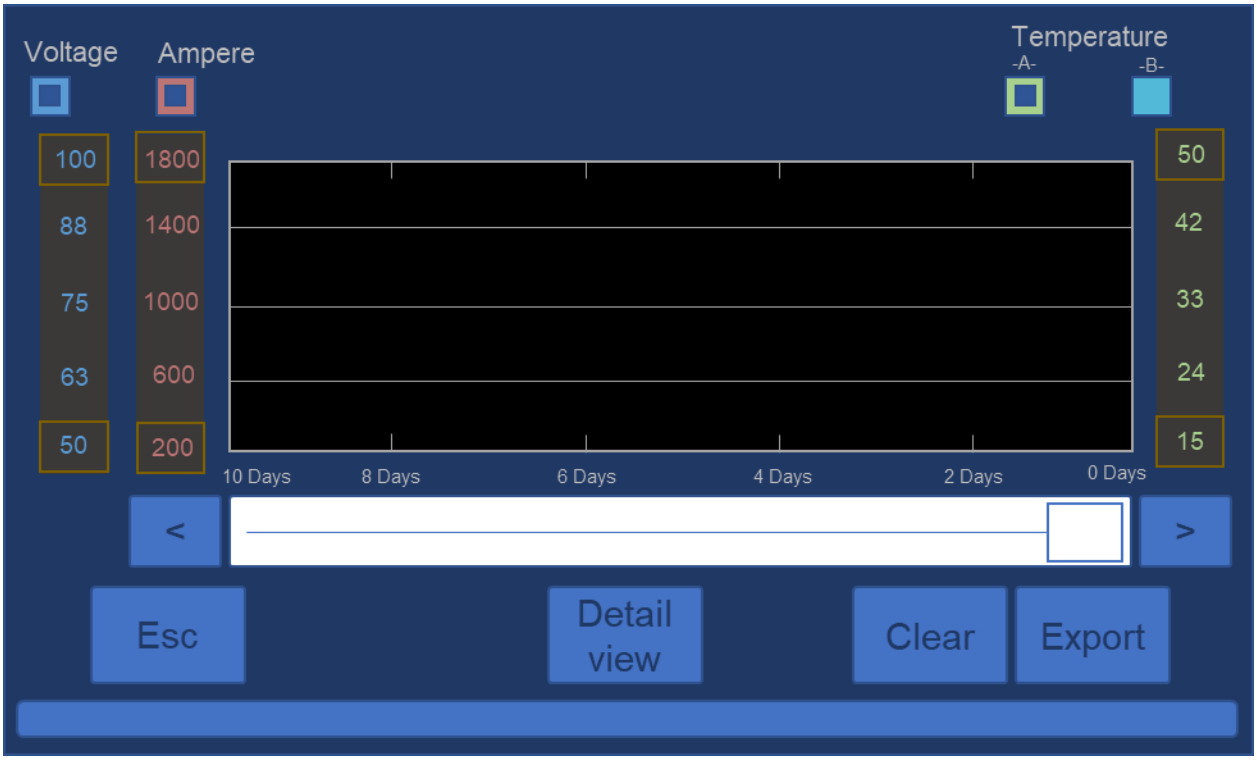
	This is the Timer button and indicator. The top number is the current timer value, and the Set value is the time when clearing will be turned off. Press this button and enter the desired time to change the Set value. Press the button on the right to start the timer.
	This is the Settings button. It takes the user to a Menu Screen with the Graph, History and Settings. For more information, see the Graphing & History and Advanced Settings section of this manual.

Graphing & History

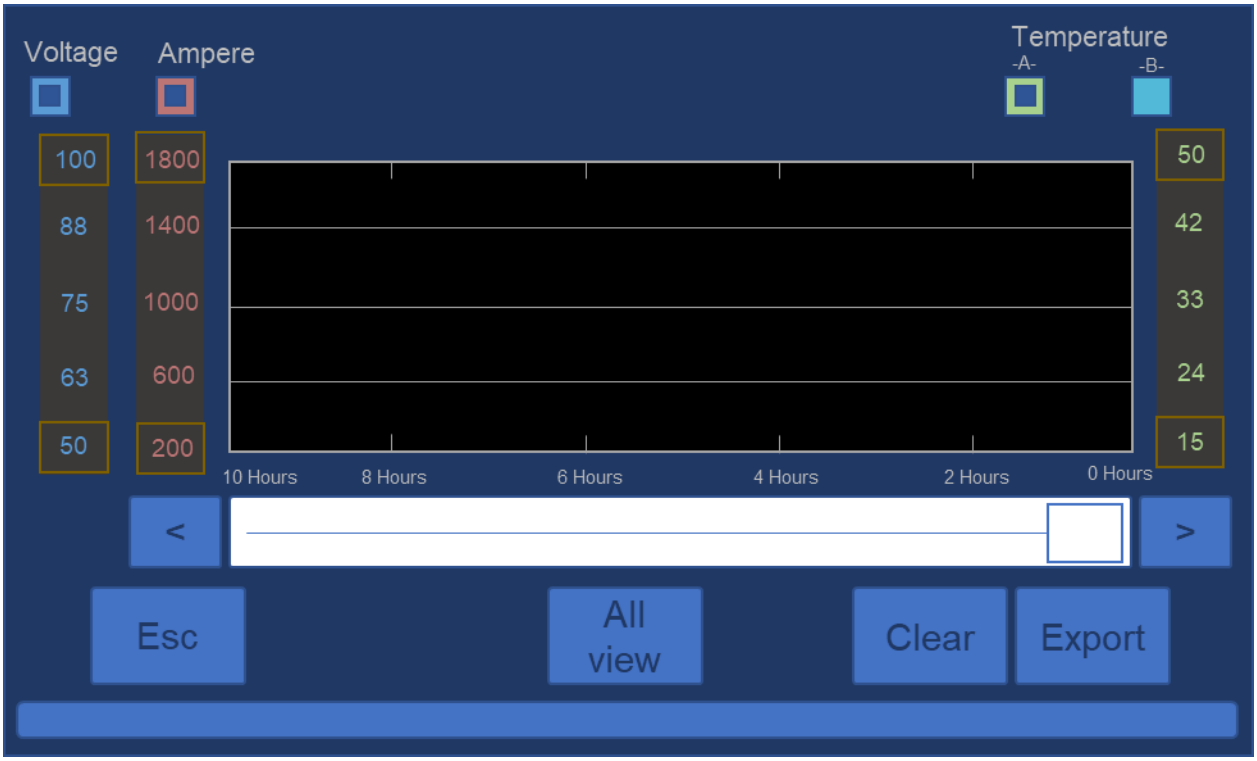
The SmartClear II Pro saves the status information displayed on the front panel once per minute, and stores this data for up to 10 days. The device also records a log of any changes made to the settings or pump/clearing power.

Viewing the Graph

To access the Graph, press the Graph button from either Beginner Mode or Expert Mode:



The data is color coded, showing the clearing Voltage and Current, as well as the Temperature of Buffer A and B. To toggle which data is being plotted, press the square buttons under the appropriate label: . Each dataset uses its own, color-coded, y-axis scale. To adjust the upper limit, press the top number on the y-axis of the appropriate color, and enter the desired value. To adjust the lower limit, press the bottom number of the y-axis of the appropriate color, and enter the desired value. The scroll-bar and arrows can be used to scroll through time, where 0 hours is the present and 2 days is 48 hours ago. To zoom in on the x-axis, press 'Detail View': Detail view



To zoom back out in the x-axis, press ‘All View’: 

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To Clear the stored graph data, press ‘Clear’: 

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To return to Expert or Beginner Mode, press ‘Esc’: 

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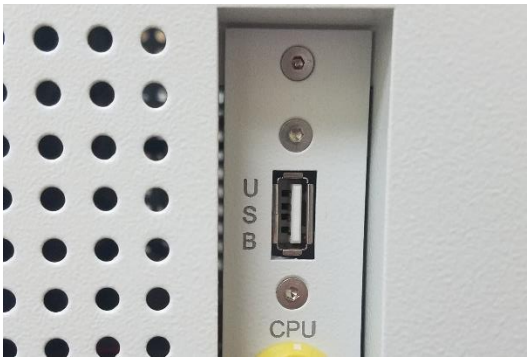
Exporting the Graph

The Graph data can be exported via USB device to a .txt file. This text file will include each stored data point per minute for the past 10 days of stored data. **Note: the device will only export the datasets that are toggled on.**

1) Enter the Graph from either Beginner Mode or Expert Mode by pressing the Graph button.
2) Insert USB flash memory stick into the USB port on the side of the SmartBox:



3) Use the toggle buttons to choose which datasets to export:

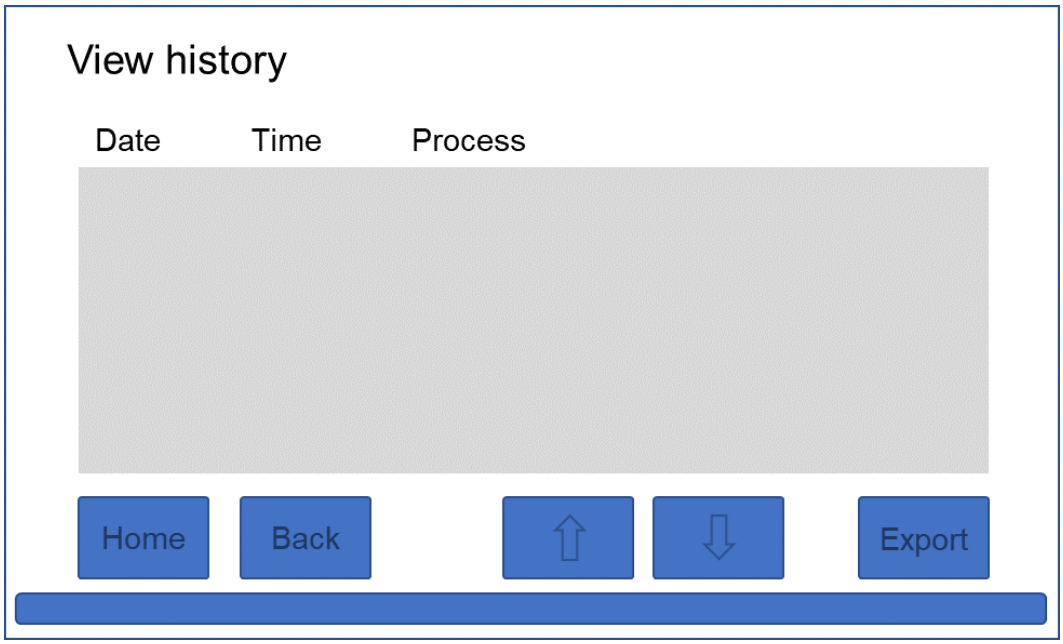
Only datasets with the blue square indicator will be exported.

4) Press 'Export' Export.
5) When the Export is complete, a message will be displayed in the bottom left of the screen: Completed the export.
6) You may now remove the USB device.

Viewing the History

The SmartClear II Pro stores all changes in device settings and pump/clearing power in the history log.

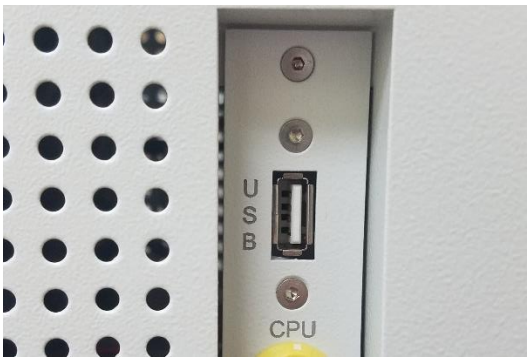
1. From the Expert Menu, press ‘Set’: Set.
2. Press ‘View History’: View history. This is the history log screen:



3. Use the arrows to scroll through the history.
4. To return to the previous menu, press ‘Back’: Back.
5. To return to the Expert Mode panel, press ‘Home’: Home.

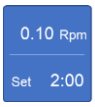
Exporting the History

1. Enter Expert Mode.
2. Press ‘Set’: Set.
3. Press ‘View History’: View history .
4. Insert USB flash memory stick into the USB port on the side of the SmartBox:



5. Press ‘Export’ Export.
6. When the Export is complete, a message will be displayed in the bottom left of the screen: Completed the export.
7. To return to the previous menu, press ‘Back’: Back.
8. To return to the Expert Mode panel, press ‘Home’: Home.

Rotation Settings

The Rotation Settings screen controls the sample rotation in the clearing chamber. This screen can be accessed through Expert Mode by pressing the Rotation button: 

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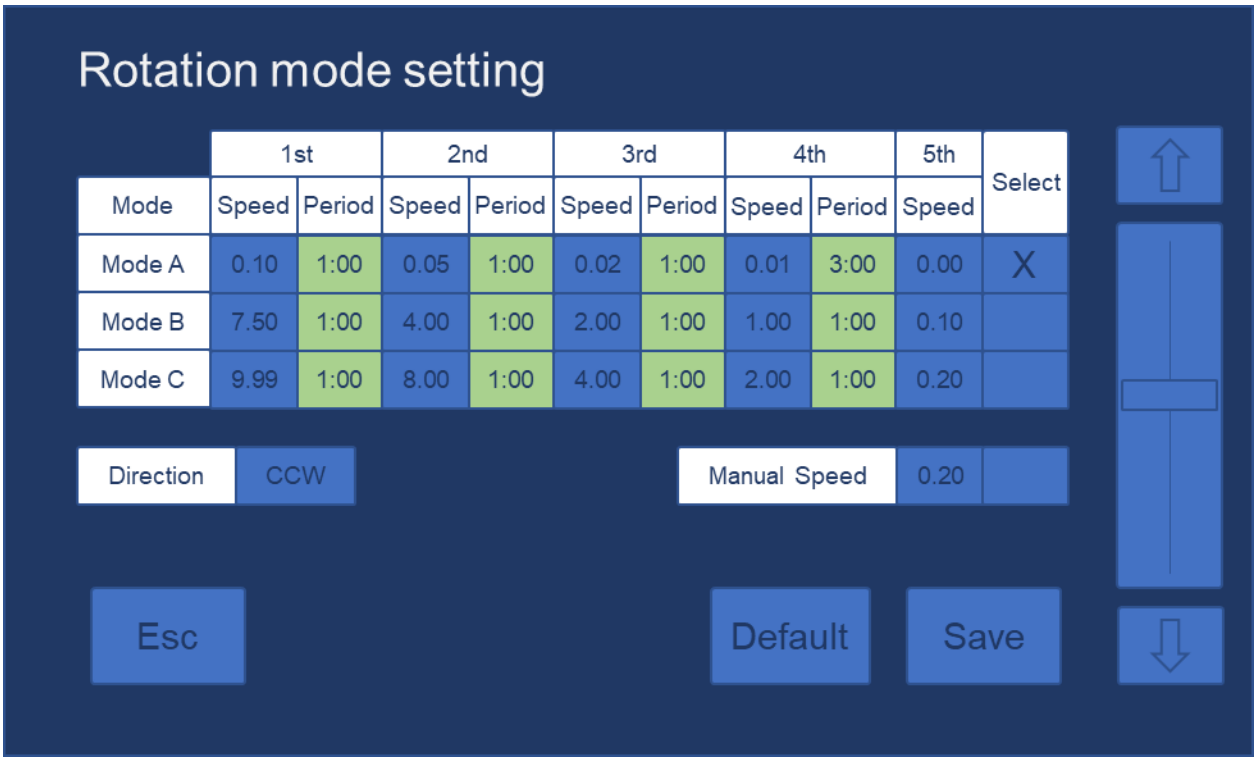

The device can remember 3 unique rotation modes (A,B,C). To change between modes, press the box under the select column in the appropriate row. Each mode is split into 5 time segments as shown in the table. The 5th time segment has no time limit and will continue indefinitely. As displayed on the Expert Mode screen, the device will keep track of the time and progress through Periods accordingly. To reset the timer, please press the 'Rotation Reset' button in either Beginner or Expert Mode: 

. The user can modify the period of each time segment by pressing the box in the appropriate location and changing the time with the arrows and slider on the right side of the screen. The speed can be modified in a similar manner. The user can change between clockwise and counter clockwise rotation by pressing the label next to Direction: 

. To rotate the sample at a constant speed only, Select the box next to Manual Speed and choose the desired speed: 

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To return to Default settings, press 'Default': 

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To return to the previous menu, press 'Esc': 

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Note: Always press 'Save' after changing any settings: 

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Polarity Switch Settings

The Polarity Settings screen controls the direction of current in the clearing chamber. This screen can be accessed through Expert Mode by pressing the polarity button: 

. By default, the device will always pass current in one direction. However, the device can switch polarity at a user defined time interval. By switching polarity, black particle accumulation will be even on both membranes, but can briefly delay clearing and may affect device longevity.

The arrows indicate the Current direction: 

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To switch the Current direction, press 'Direction': 

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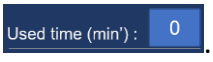
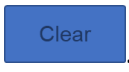
The device keeps track of the time since the Polarity was last switched. This is shown in the Used time indicator: 

. Press 'Clear' to reset the timer: 

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To change the time interval between polarity switching, press the number next to 'Change time': 

and enter the desired time in the number pad to the right.

Note: if the change time is 0, the device will never switch polarities and will always pass current in one direction.

Note: Always press 'Save' after changing any settings: 

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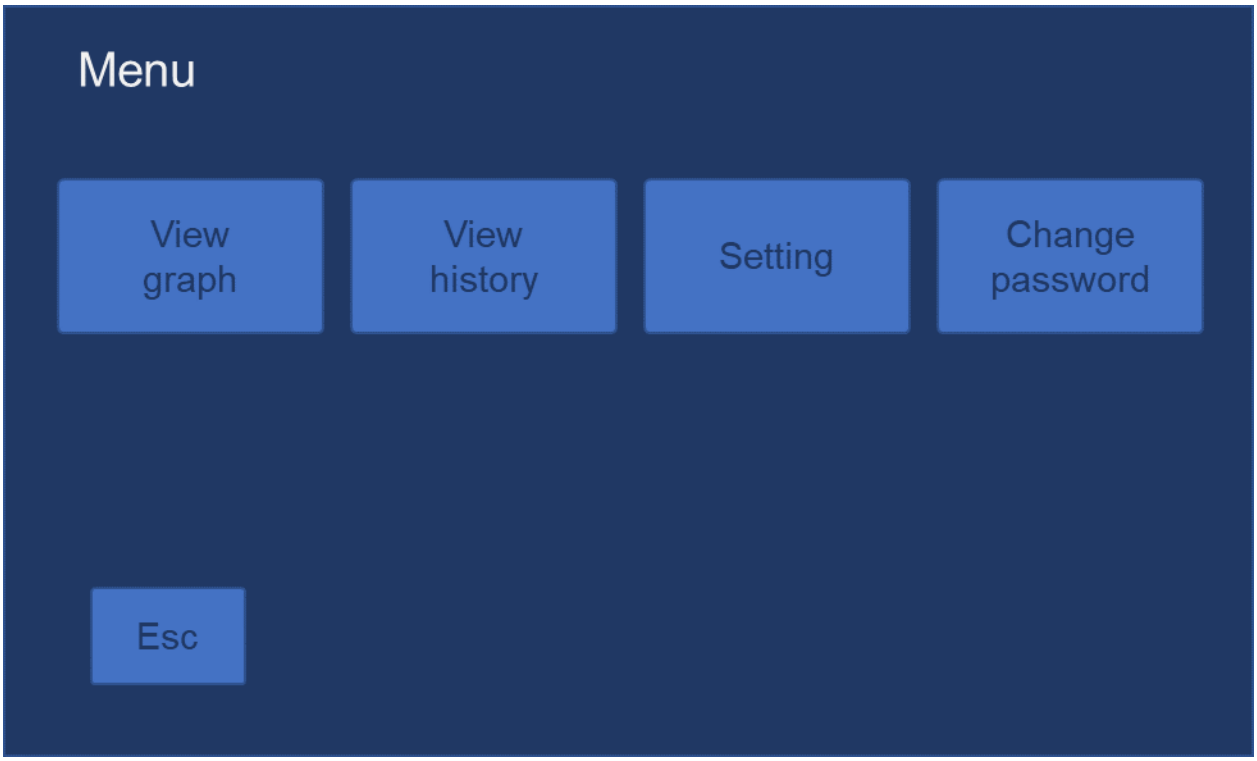
Advanced Settings

To access the Advanced Settings screen, first press ‘Set’: Set in Expert Mode. This will open the Menu Screen shown below:

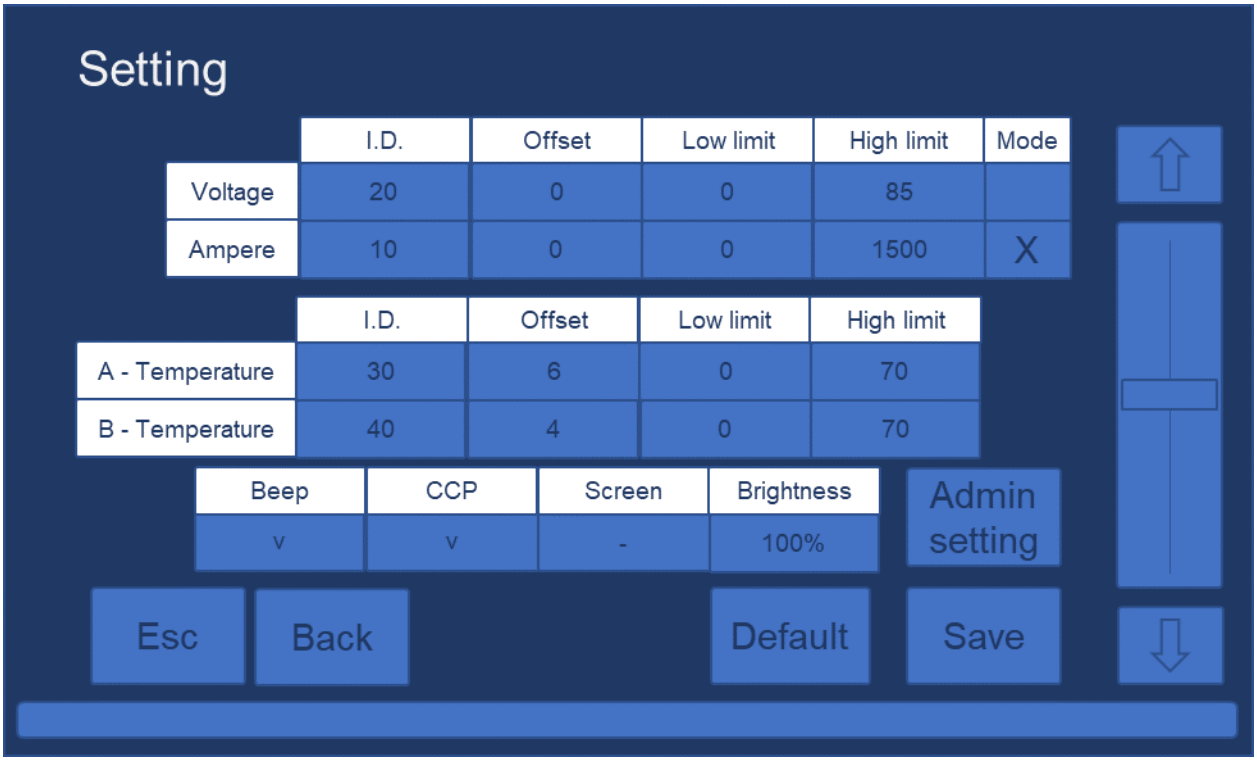


The ‘View Graph’ button takes the user to the Graph. The ‘View History’ button takes the user to the History Log screen. For more information, see the Graphing & History section of this manual. To return to Expert Mode, press ‘Esc’: Esc.

To enter the Advanced Settings screen, press ‘Setting’: Setting and enter the password: **1234** and press ‘Enter’.

The password can be changed by pressing ‘Change Password’ in this menu.

This is the Advanced Settings screen. The top table contains information about the voltage and current settings. The column titled ‘Mode’ indicates whether the device will operate as a Current source or Voltage source. By default, the device runs as a Current source with a high limit of 1500 mA and a high limit of 85 V. The High Limit values are the maximum values the user will be able to enter from the Expert or Beginner Mode screens. To change these values, press the appropriate box and use the arrows or scroll bar to reach the desired value.



The table in the middle of the screen is used to determine the Maximum and Minimum temperature the user can enter for each Buffer from the Expert or Beginner Mode. To change these values, press the appropriate box and use the arrows or scroll bar to reach the desired value. The 'Offset' column is used for Temperature calibration. For more information, see the Temperature Calibration section of this manual.

The table on the bottom of the screen controls the Beep sounds of the SmartBox, and screen brightness. Press their respective boxes to toggle these settings or change the number with the arrows and scroll bar.

To return to the previous menu, press 'Back': Back.

To return to the Expert Mode panel, press 'Home': Home.

To return to Default settings, press 'Default': Default.

Note: Always press 'Save' after changing any settings: Save.

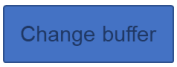
The 'Admin Settings' are set by the manufacturer and are password protected.

Maintenance

Buffer Change

The Buffers and Membranes must be changed after 10 days of clearing time.

The Buffer and Membrane change process is the same as the Installation process as described in the Installation section of this manual.

In Beginner Mode, press 'Change Buffers': 

and the instructions will be displayed on the screen.

The same process can be replicated in Expert Mode by manually controlling the Pumps as described in the Installation section of this manual.

Note: we recommend flushing the system approximately once a month, or for every 3 buffer changes. For more information, see the System Flushing section.

Electrode Maintenance

During normal operation, the electrodes will slowly wear over time. This does not affect performance of the device until they degrade completely. If this happens, the electrodes will need to be replaced.

If you are experiencing any of the following, please contact support at info@lifecanvastech.com for more information:

- Visible wear and disconnection of electrode wire
- Decreased current at normal operating voltage

System Flushing

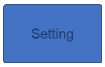
To keep the system clear of debris, we recommend flushing the system approximately once a month, or for every 3 buffer changes. It is best to clean the system with the membranes installed. This prevents cross-contamination of the system whereby electrophoresis byproducts produced in Buffer B can enter the clearing chamber and Buffer A. Therefore, we recommend cleaning the system at the end of the buffer's lifecycle before installing new membranes and buffer.

1. Enter Expert Mode on the SmartBox.
2. Turn off Electrophoresis Power and both Pumps with the buttons in the lower right corner.
3. Locate the hoses at the bottom of the clearing module and drain both reservoirs.
4. Pour distilled water into each reservoir and let the water drain out to remove some bubbles. .
5. Close the drain tubes and pour 500 mL distilled water in each reservoir and turn on the pumps. Let the system run for a few minutes before turning the pumps off and draining the water again.
6. Repeat steps 4 and 5 until the bubbles are gone and the water runs clear in the electrophoresis chamber. Open the clearing chamber and pour DI water directly into the chamber. Make sure the chamber does not overflow to prevent spills.
7. If you are now going to install new membranes, remove the membrane spacers from the clearing chamber and remove the old membranes. Pour some distilled water directly into the chamber and let it drain out into Reservoir A. Make sure to drain both reservoirs before installing new membranes and testing with water.

Temperature Calibration

We recommend re-calibrating the temperature sensors every 3 months to ensure best clearing speed and fluorescence preservation.

1. With Buffers and Membranes installed, run the system and wait to allow the temperature of Buffer A and B to reach equilibrium.
2. Mark the Temperature of Buffer A and Buffer B as shown on the SmartBox.
3. Turn off the clearing power.
4. Open the clearing chamber and Reservoir B.
5. Using a thermometer, measure the temperature of Buffer A directly inside the clearing chamber. This is not possible for Buffer B, so simply measure the temperature of the Buffer in Reservoir B.
6. If the measured temperature and displayed temperature are the same, the SmartClear is properly calibrated. If not, follow these steps to correct the temperature difference:
    a. Go to Expert Mode.
    b. Press 'Set': 

.
    c. Press 'Setting': 

and enter **1234** as the password and press 'Enter'.
    d. Subtract the displayed temperature reading from the measured temperature for Buffer A.
    e. Add the value you calculated in (d) to the 'Offset' in the center table under the Temperature A row. To do this, press the box highlighted below and use the arrows and scroll-bar to add this number to the existing offset. *

	I.D.	Offset	Low limit	High limit
A - Temperature	30	6	0	70
B - Temperature	40	4	0	70

    f. Repeat (d,e) for Buffer B to change its 'Offset'.
    g. Press 'Save': 

.

* As an example, the SmartBox is reading TA = 42° C, and the thermometer measures 44° C in the chamber. We must increase the offset by 2° in this case. So, if the offset was previously 6°, it must be increased to 8° for proper calibration.

Specifications

SmartClear II Pro Module			
Physical Characteristics	Product Type		SmartClear Pro: Tissue Clearing System
	Product Dimensions		144” (W) x 14.8” (D) x 16.1” (H) 366mm (W) x 375mm (D) x 410mm (H)
	Weight		55 lbs (25 kg)
	Operating Power/Frequency		AC 100~120V / 50~60Hz AC 200~240V / 50~60Hz
	Electrical Input		100~120V (5A) or 200~240V (3A)
Clearing Part	Chamber	Dimensions	1.8” (W) x 1.8” (D) x 1.7” (H) 46mm (W) x 46mm (D) x 42mm (H)
		Sample Rotation Speed	0 rpm ~10 rpm
		Sample Protection Method	Specialized nanoporous membrane
		Control Values	Current value Current upper limit Voltage value Voltage upper limit Electricity cycle Sample cup rotation speed/period Scheduling for sample cup rotation speed Polarity direction change (timer function) Electricity On/Off/Timer Buffer pump On/Off Temperature control
	Buffer Reservoir	Reservoir A	Buffer A for clearing tissue
		Reservoir B	Buffer B for cooling the electrode
		Reservoir Capacity	500mL each
	Cooling		Water circulation with hydraulic pump and cooling fan

Smart Box: SmartClear II Pro Control Module		
Physical Characteristics	Product Dimensions	8.3” (W) x 14.8” (D) x 10.4” (H)
	Weight	12 lbs (5 kg)
	Electrical Input	100~120V (15A) or 200~240V (8A)
Interface	LCD Monitor/Touch	RGB256 Color, 800 x 480 Pixel Resistive Touch
	Software	Beginner mode/Expert mode Fluorescent/Non-fluorescent preset

Warranty

We warrant the product you have purchased for one calendar year after the date of delivery. In case of any malfunctions caused by the manufacturer during this period of time, LifeCanvas Technologies will be responsible for repair or replacement of failed parts. However, this warranty is only guarenteed when LifeCanvas consumables (buffers, membrane windows, sample holders and any other consumables) are used for the SmartClear System and excludes the following conditions.

- When used outside of recommended settings (temperature higher than 70° C, voltage higher than 85V, current higher than 1750mA)
- Any damages due to fire, earthquake, thunderstorm, and other catastrophic events and pollution or abnormal electrical supply.
- Any damages due to unofficial repair, adjustment, calibration and modification.
- Any damages due to unduly usage or mishandling.
- Any damages caused by moving, dropping or transporting of the instrument.
- Repair of expendables and consumables.

For service, please contact the agent that you have purchased the instrument from or LifeCanvas Technologies. LifeCanvas Technologies offers direct support.

Warranty is valid only if the installation is done by people trained, in accordance with instructions provided in this manual.