INSTRUCTION MANUAL

EVA-MT-03-XX

EVOM™ Auto Automated TEER Measurement System with 24 & 96 Capability (v. 3)

Serial No._____

www.wpiinc.com

CONTENTS

ABOUT THIS MANUAL

The following symbols are used in this guide:

This symbol indicates a CAUTION. Cautions warn against actions that can cause damage to equipment. Please read these carefully.

This symbol indicates a WARNING. Warnings alert you to actions that can cause personal injury or pose a physical threat. Please read these carefully.

NOTES and TIPS contain helpful information.

Fig. 1—The EVOM™ Auto with 96 high throughput screening (HTS) electrode array simplifies transepithelial electrical resistance (TEER) measurement in 96-well HTS plates from MatTek, Corning, and Millipore multiwell plates. The system is also available for 24-well plates.

The EVOM™ Auto automates measurements of TEER in epithelial or endothelial monolayers cultured on 24-well or 96-well high throughput screening (HTS) plates utilizing our innovative EVOM technology, qualitatively measuring cell monolayer health and quantitatively measuring cellular confluence by reaching an increase or a plateau in tissue resistance.

Automated measurement of tissue resistance in cell culture microplates provides the advantages of speed and precision, minimizes the chances of contamination, and ensures the rapid availability of measured resistance data. EVOM™ Auto applies a 12.5 Hz square wave current with switching polarity, which mitigates the chances of charging the sample and nullifies the chances of measurement technique having any adverse effects on the sample. Therefore, it is considered non-invasive measurement. EVOM™ Auto is designed for the non-destructive, high throughput screening of epithelial monolayer confluence and barrier function studies in cell cultures.

INTRODUCTION

The EVOM™ Auto automates TEER measurements. The instrument is controlled through a web browser, and the measurements are stored in the instrument and downloaded to your computer or iPad (control device) through the web browser. At present, the instrument supports MatTek , Corning, and Millipore 96 HTS well plates using the 96-well electrode array, Corning 24 HTS plates using the 24C electrode array, and Millipore 24 HTS plates using the 24M electrode array. EVOM™ Auto is controlled wirelessly via Wi-Fi connectivity using an iPad (included with the system) or any other device with Wi-Fi connectivity.

Features

Features	Advantages	Benefits
Electrodes available for 24- and 96-well HTS plates	Measures wells one column at a time	Efficiency gains with automation
Easily switch between 24 and 96 plate types	Plug-n-play enables fast, easy switching between plate types and heads	Multi-plate compatibility utilzing only one instrument means cost and space savings
Automate your measurements	Streamline your workflow	Minimize human errors
Three rinse locations	Rinse electrodes multiple times during a measuring sequence	Take control of protocol and define custom sequences
Crash protection	Auto alignment detction pauses measurements, preventing equipment damage	Minimize electrode damage, avoiding costly repairs and down time
Auto-detection of electrode head	Auto electrode detection configures its position and software options for your plate	Simple hardware setup without configuration
Intuitive touchscreen user interface	User-friendly programming sequences with basic selection options	Easy-to-navigate system saves time when configuring sequences
Create custom plate profile	Adjust the programmed coordinates	Fine tune the programming as desired
Save up to three plate profiles per plate type	Multiple users can operate instrument with individually saved settings	Ensures custom settings are saved, preserving data integrity
Store all your data or export to Microsoft® Excel	Analyze your data in a manner suitable to your workflow	Flexibility to manage your data

Notes and Warnings:

CAUTION: Never set anything (especially liquids) on top of the autosampler.

CAUTION: When you move or relocate the instrument, remove the front cover/lid, which can fall off. For example, you may move the system in and out of a cell culture hood. Always remove the EVOM™ Auto's front cover anytime the system is lifted and moved from one location in the lab to another and reinstall the cover after the system has been placed at a new location.

CAUTION: To safely change the electrode array, the software must be in offline mode OR the unit must be powered off. If one of these conditions is not met, DO NOT try to change the electrode array. Removing the electrode array when the system is in the fully active mode may put the system in an unresponsive, disrupted communication mode that may necessitate a return to the factory.

TIP: Before you begin experimenting, verify the time zone setting is set correctly on your iPad control tablet. For instructions, visit the *support.apple.com page*.

Parts List

After unpacking, verify that there is no visible damage to the equipment. Verify that all items are included:

(1) Autosampler

(1) Electrode Array Kit for 96 HTS plates (Corning, Millipore, and MatTek), 24 HTS Corning plates, or 24 HTS Millipore plates.* The kit includes all the required matching accessories for the selected electrode array, as follows:
- **EVA-EL-03-01** EVOM™ Auto 96 HTS Electrode Array for TEER includes:
  - (1) Electrode Array
  - (3) Depth adjustment fixtures (C96 for Corning 96, M96 for Millipore 96, and MT96 for MatTek 96)
  - (4) Plate Positioners (2 C96/MT96 for Corning and MatTek 96 HTS plates, and 2 M96 for Millipore 96 HTS plates)
- **EVA-EL-03-02** EVOM™ Auto 24C HTS Electrode Array for TEER includes:
  - (1) Electrode Array
  - (1) Depth adjustment fixtures (C24 for Corning 24)
  - (2) Plate Positioners (2 C24 for Corning and Millipore 24 HTS plates)
- **EVA-EL-03-03** EVOM™ Auto 24M HTS Electrode Array for TEER includes:
  - (1) Electrode Array
  - (1) Depth adjustment fixtures (M24 for Millipore 24)
  - (2) Plate Positioners (2 C24 for Corning and Millipore 24 HTS plates)

(1) iPad Generation 9 Control Tablet

(1) Interface Unit

(1) Interface Unit Cable

(1) Power Supply Unit

(2) Wi-Fi Adaptor

(1) Instruction Manual is available online at *www.wpiinc.com/manuals.*

* The system includes one electrode array and its accessories. Other electrode arrays are sold separately. The electrode array is chosen when ordering. Options include 96-well electrode array, Corning 24-well electrode array, and Millipore 24-well electrode array.

Unpacking

Upon receipt of this instrument, make a thorough inspection of the contents and check for possible damage. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed damage should be reported at once to the carrier and an inspection requested. Please read the section entitled "Claims and Returns" on page 39 of this manual. Please contact WPI Customer Service if any parts are missing at (941) 371-1003 or wpirms@wpiinc.com.

Returns: Do not return any goods to WPI without obtaining prior approval (RMA # required) and instructions from WPI's Returns Department. Goods returned (unauthorized) by collect freight may be refused. If a return shipment is necessary, use the original container, if possible. If the original container is not available, use a suitable substitute that is rigid and of adequate size. Wrap the instrument in paper or plastic surrounded with at least 100mm (four inches) of shock absorbing material. For further details, please read the section entitled "Claims and Returns" on page 39 of this manual.

NOTE: Before shipping your system back to WPI, please contact *wpirms@wpiinc.com* for assistance to ensure proper packaging and avoid damage during shipping.

INSTRUMENT DESCRIPTION

EVOM™ Auto System

Fig. 2—The EVOM™ Auto System, includes the iPad, the autosampler, the interface unit and the power supply (not shown).

The EVOM™ Auto consists of these major components:

- **Autosampler** – The robot contains the electrodes, a 3-compartment rinse stations, and a well plate area. The autosampler may be placed inside an incubator for long term studies, if desired. It may also be used inside a cell culture laminar hood.

- **Interface Unit** – This unit connects through a cable to the autosampler. This unit is a Wi-Fi access point to which the tablet (laptop or iPad) connects to interface with the instrument.

- **Power Supply** – The power supply provides power to the autosampler and the interface unit. The cable plugs into the interface unit power supply port and a standard wall outlet.

- **iPad** – The tablet with Wi-Fi capabilities runs a web browser to communicate with the system.

- **Wi-Fi Adapter** – The Wi-Fi adapter plugs into one of the four USB ports on the right side of the interface unit. It has a range of at least 7 m (25 ft.), and it allows the iPad to communicate with the interface unit.
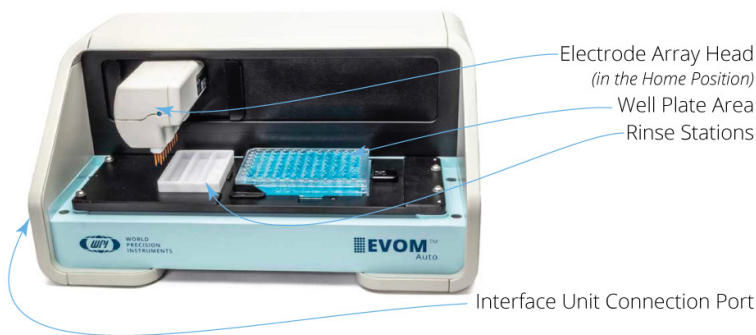
Autosampler

Electrode Array Head
(in the Home Position)
Well Plate Area
Rinse Stations

Interface Unit Connection Port

Fig. 3—The autosampler takes the TEER measurements of the HTS well plate.

Here are the primary components of the autosampler.

Electrode Array Head – The electrode array rests in the home position (shown in Fig. 3), just to the left of the rinse stations. The LED on the electrode array will:
- Flash blue when good measurements are being made.
- Be a steady red on power up. This shows the unit has power but is not yet in communication with the interface unit.
- Blink red when a bad measurement is made. (See "Online/Offline Toggle" on page 9.)
- Be a steady blue when it is in communication with the interface unit.

Well Plate Area – The HTS well plates are positioned in the well plate area.

Rinse Stations – Three rinse stations are located on the left side of the autosampler. These may be used for stabilizing, cleaning or chloridizing.

Rinse Station 3
Rinse Station 2
Rinse Station 1

WORLD
PRECISION
INSTRUMENTS

Interface Unit Connection Port – One end of the autosampler cable connects here and the other end connects to the interface unit. The autosampler power and communications travel through this cable.

Looking at the autosampler measurement plate from the top, you can see the:
- Rinse Station Pocket where the rinse station slides into place.
- Plate Positioner Sockets for installing the Plate Positioner used for positioning the well plate precisely.
- Spring loaded Well Plate Handle used to hold the well plate in place.
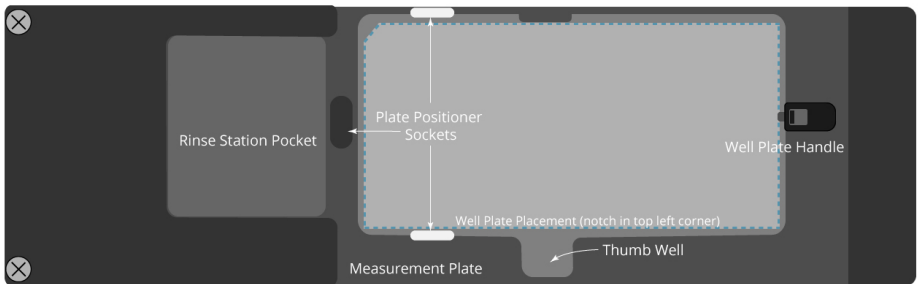- Thumb Well for ease of grasping a well plate.

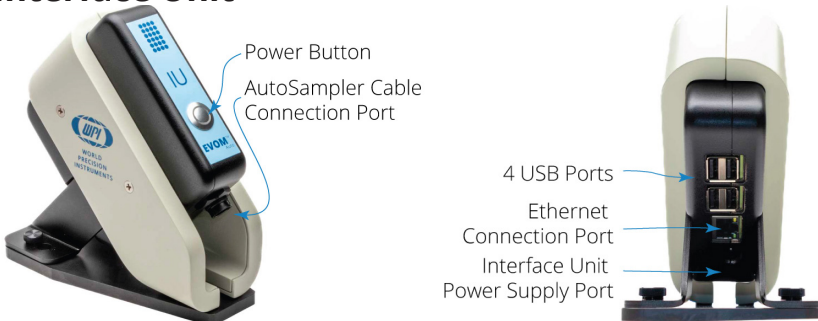*Fig. 4—Top view of the measurement plate on the autosampler*

Interface Unit

Fig. 5—(Left) Side view of the interface unit, showing the front.
Fig. 6—(Right) Back view of the interface unit.

Power Button – Press the power button to turn on the interface unit and the autosampler. When it is powered on, a blue ring illuminates the button.

Autosampler Cable –This cable plugs into the autosampler cable connector on the interface unit and the interface unit connection port on the left side of the autosampler.

Interface Unit Power Supply Port – Plug the power supply cable into this port.

Ethernet Connection Port – This port may be used to connect to your local area network through a standard ethernet cable. Using this option requires interfacing with your local network and observing all your IT policies.

USB Ports (4) – Use one of these ports to connect the Wi-Fi adapter.

Software

The EVOM™ Auto software runs in a web browser and is not tied to any particular operating system or device. A pre-configured iPad is provided with the system.
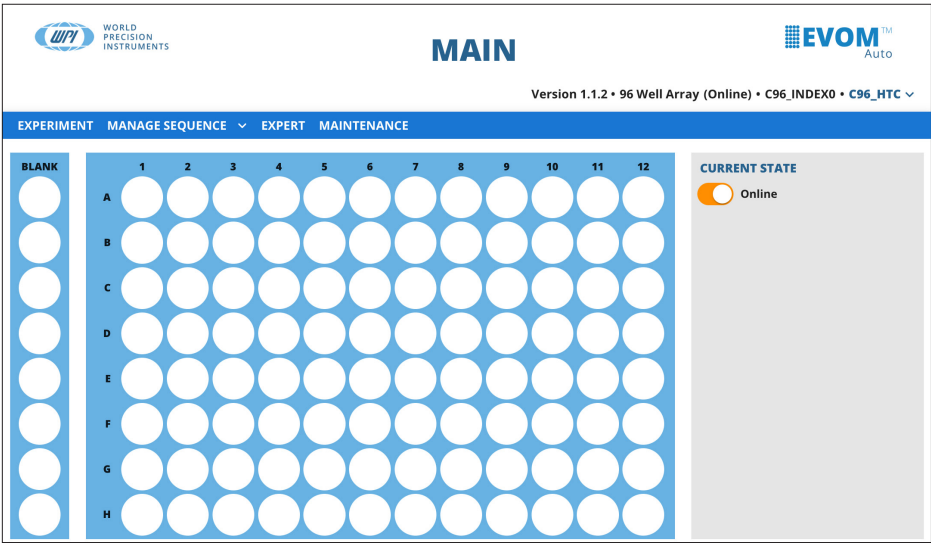

Fig. 7—The Main screen gives you access to all the main menu items and an overview of the selected plate. A 96-well plate is shown.
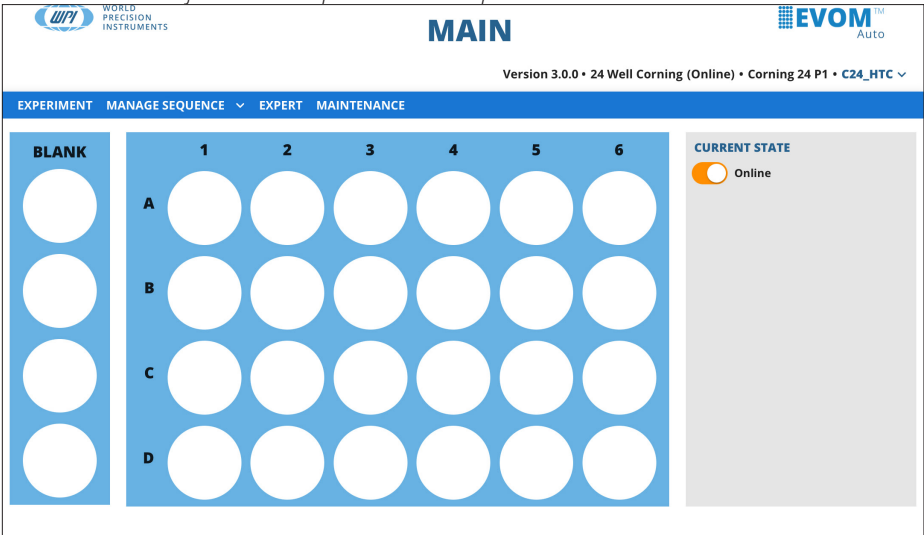

Fig. 8—The 24-well plate option for Millipore 24 is shown in the offline mode. EVOM Auto system recognizes the electrode array and shows matching 24 or 96 plate option.

World Precision Instruments

Online/Offline Toggle

The system can only use the autosampler and collect data when it is in the *Online* state The toggle switch in the grey *Current State* area of the window determines the online status. Use that switch to change the status of the autosampler. The system can only use the autosampler and collect data when it is in the *Online* state.
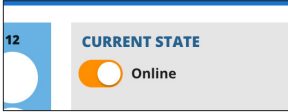

Fig. 9—Toggle this switch to take the autosampler online or offline.

The *Offline* state is used to access data from different head types without taking the risk of using the system with the wrong type of head installed. When in *offline* mode the drop-down menu in the status area allows you to select which head type for the system to simulate and allows access to its data.

If the system is *Offline*, click on the toggle switch to initialize the system and update the header area after initialization.

Resistance Value Display

The resistance values will always be displayed in ohms. There are three possible outcomes when displaying a measurement:

- Resistance values are within the set range.
  Example: 78568 = 78.568 KOhms

- Resistance values are higher than the selected range. This is considered an Overflow measurement and displays as OVF in the file and on screen.

- Resistance values are bad measurements and are displayed as a series of four dashes (––––). This indicates that a proper current could not be injected to accomplish a stable measurement. This is the case when there is no solution, or insufficient levels of fluid in the well being measured.

Emergency Stop

On any window where the electrode array can move, you can access the *Emergency Stop* button. It is the red stop icon located in the bottom right corner of the window.
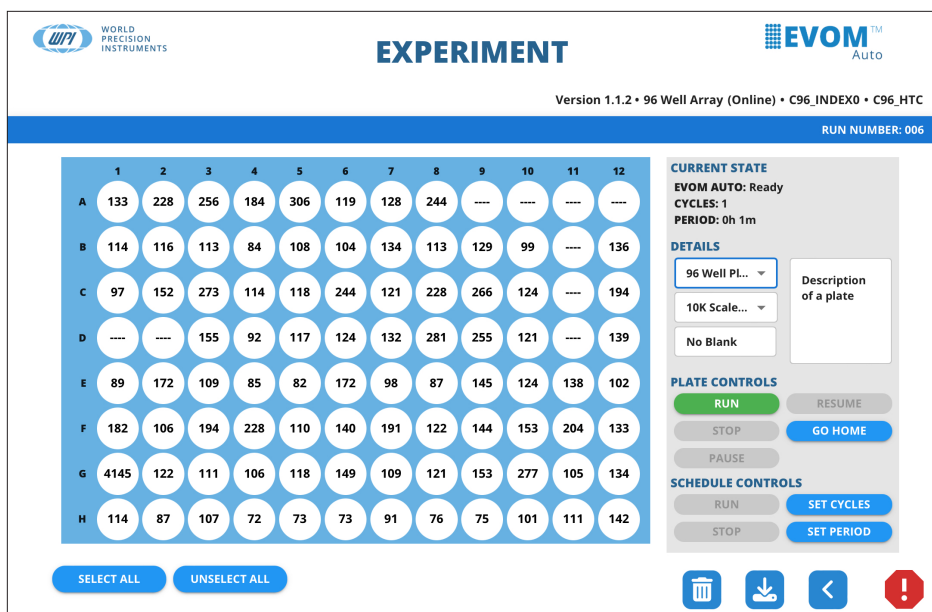
Fig. 10—The emergency stop button is located in the bottom right corner of any window where the electrode array can move.

Press this button ⊖ to disable the autosampler motors and stop movement immediately. The only valid option after this is *Go Home*. The autosampler needs to find the home position again to regain the reference to all movement. When you press the button, a message appears. Click the *Go Home* button to return to the home position.

Fig. 11—After pressing the emergency stop button, the message appears.

SETUP

Refer to the Install Guide for the hardware setup instructions.

1. Once all the components are properly connected, press the *Power* button on the interface unit to turn on the system. The blue ring around the button illuminates.

2. Allow the system to boot up. On the iPad, navigate to the *Setting* area and select *Wi-Fi*. Select your EVOM system when it appears as an available network on the list of Wi-Fi networks. (This may take up to 5 minutes. The electrode array will move to its home position as a self test during this time to establish the connection). The network will be named EVOM_AUTO_X where X is unique to the system. The password is *rems2rems2*.

3. If there is more than one EVOM™ Auto systems being used with the iPad, you will need to go to the Wi-Fi settings on the iPad to select your device in order to establish a connection. Sometimes the bookmarked URL may not work to establish a connection. If a connection is unsuccessful, ensure that the iPad is connected to the correct Wi-Fi network for your EVOM™ Auto. Then, click on the WPI icon (Fig. 26). If you are not using the provided iPad tablet, open a browser and navigate to *https://192.168.54.1:5000*.

   NOTE: If you are using more than one EVOM™ Auto simultaneously, you may need to go to the Wi-Fi settings and select the appropriate device.

Fig. 12—EVOM Auto icon located on the iPad's desktop.

   NOTE: You may use a computer browser to access the software. Once you are connected, open your browser and enter the URL *192.168.54.1:5000*.

   TIP: Add an icon to your iPad home screen to open the application in full screen mode. See "Appendix D: Adding Link to iPad Home Screen" on page 35.

4. The Initializing window displays (Fig. 13) showing the progress. The window briefly displays a ready message when the initialization is complete (Fig. 14). Then, the *Main* window appears (Fig. 27).
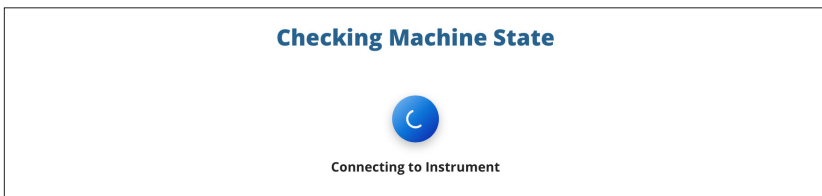

Checking Machine State

Connecting to Instrument
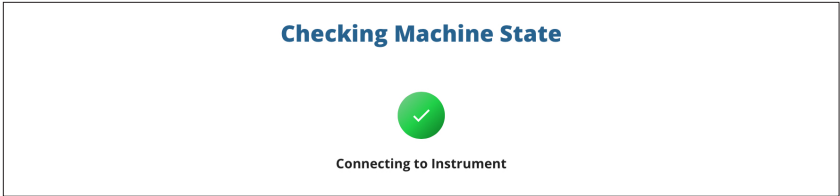
Fig. 13—Initialization screen.
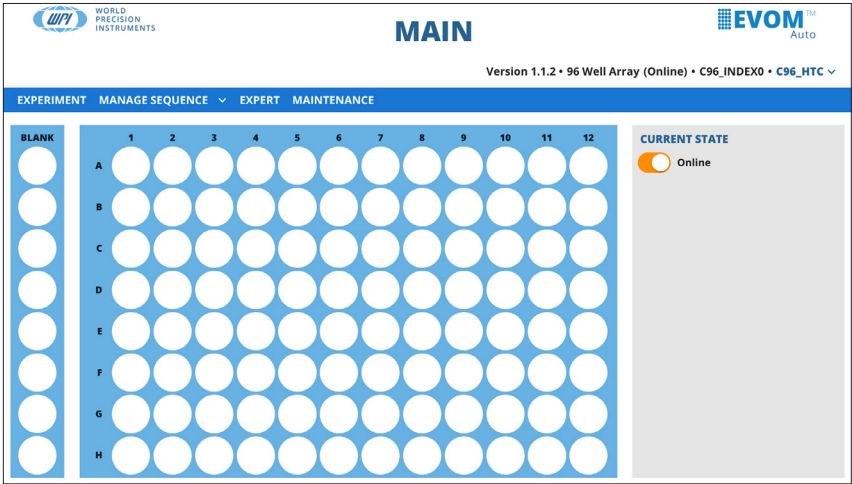
Fig. 14—Ready message displays briefly.

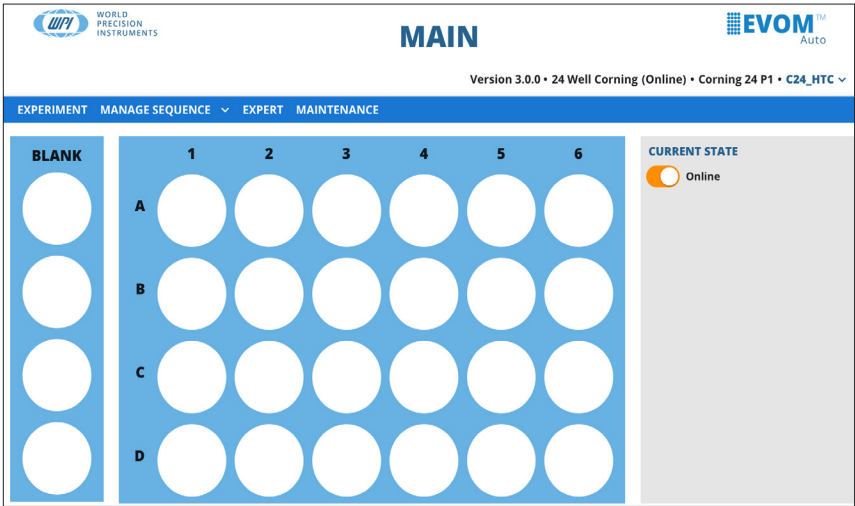*Fig. 15—Home screen showing a 96-well setup.*

Fig. 16—Home screen showing a 24-well setup.

If your connection between the iPad and the instrument is interrupted, you will see the greyed out screen with the *Instrument Disconnected* notice overlaid. This can happen if the unit loses power or the network connection is disrupted. Ensure your unit has power and the Wi-Fi adapter is correctly installed. Then, press the Cl*ick Here to Reconnect* button to re-establish your connection.
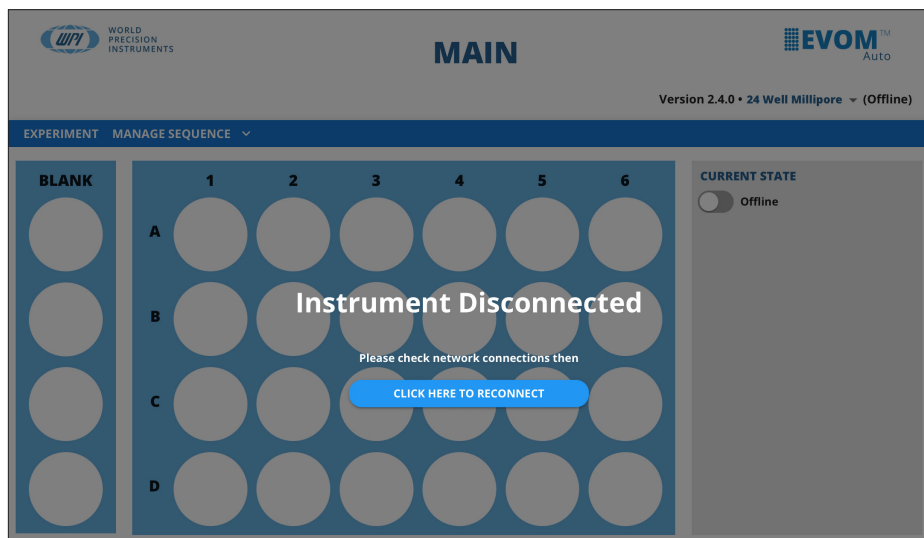

Fig. 17—The instrument connection with the control device was disrupted. Click the reconnect prompt to reestablish your connection.

Changing the Electrode Array Head

1. Place the electrode array head in the home position by pressing the *Go Home* button on the *Experiment* window.

2. Navigate to the main window by using the *Back* button at the bottom of the screen.

3. Toggle the *Online/Offline* switch in the *Current State* section on the right side of the window to offline to set the autosampler in offline mode

4. Remove the electrode array by depressing the button on the left side of the array with your thumb and pull it straight out of the connection port. (Fig. 18)

CAUTION: To safely change the electrode array, the software must be in offline mode OR the unit must be powered off. If one of these conditions is not met, DO NOT try to change the electrode array. Removing the electrode array when the system is in the fully active mode may put the system in an unresponsive, disrupted communication mode that may necessitate a return to the factory.

NOTE: The electrode array needs to be installed before trying to power up the unit, otherwise the software will not recognize the device and will not connect.
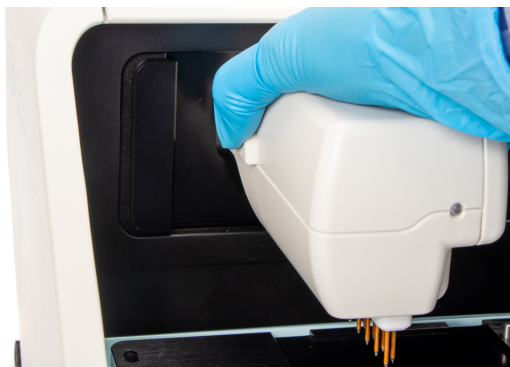

Fig. 18—Depress the button on the left side of the electrode array until you hear a click. Then, pull the array out to remove the electrode array. No light on the electrode array indicates the unit is off, and a red light on the electrode array indicates you are in offline mode. In either case, it is safe to remove the electrode array.

5. To install the new head, line up the connector, and push the new head in firmly until it clicks. Then, give it a little tug to bring it forward as much as possible.
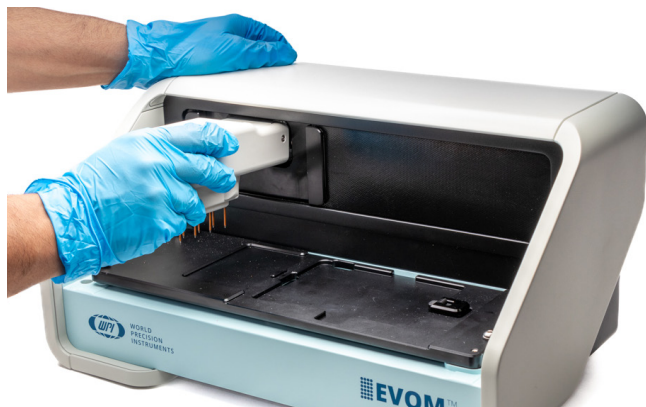

Fig. 19—Hold the top of the autosampler with one hand, line up the electrode array with the connection port and press the electrode array into the connection port until it clicks.

6. After the electrode array is installed, toggle the Online/Offline switch to online mode. This will read the head information and initialize the autosampler accordingly.

Using a Different Plate

1. First, install the matching electrode array. For example, if you want to use a Corning 24 HTS plate, install a 24C electrode array. See "Changing the Electrode Array Head" on page 13.

2. Insert the appropriate plate positioning adapter key. In our example, use the C24/M24 adapter key.

3. Insert the chosen well plate on the measurement plate. In this example, insert the Corning 24 HTS plate.

    The software will automatically recognize the Corning 24 electrode array when it is plugged in and will only show the options for Corning 24 HTS plate option to run experiment.

NOTE: In the offline mode you can see the data for other plate/electrode types, but you can make no measurements.

OPERATING INSTRUCTIONS

After your system is set up and configured, you may use the browser on the iPad to control the autosampler.

It is important to note that the Plate Name ties the elements together in the EVOM™ Auto software. The measurement options and date are attached to the Plate Name. Sequences are attached to a plate to define the measurement options and parameters. For example, parameters include number of rinses, each well measurement time, etc.

TIP: The same sequences may be used on multiple plates.

Full Screen Mode

By default the system runs in full screen mode when you start it using the WPI icon. If you run the software from a browser by entering the URL directly, you will want to put the system into full screen mode, because the software is easier to operate when it runs in full screen mode.

- On the iPad place your finger on the title bar at the top of the screen, and slide it up to minimize the title bar. To view the title bar again, just tap on the frame at the top of the screen.

- On a Windows compatible browser, simply tap on the *Main* headline in the center of the header at the top of the page to enter full screen mode. To exit full screen mode, press the *Main* headline again.

TIP: Pressing the WPI logo or the EVOM logo in the header will take you to the Main window.

TIP: Avoid using the browser forward and back buttons to navigate the web page. Use the icons on the bottom right of the various screens. This ensures that the web page and the instrument are always synchronized.

Re-initializing the Instrument

If it becomes necessary to re-initialize the instrument because it becomes non-responsive, close the active web page and use the bookmark to navigate to the initial web page. This will re-establish communications with the instrument and re-initialize it. The autosampler will finish its run and store the data for the plate it was reading, even if the connection between the web browser and the autosampler was lost. If you relaunch the software web browser, it will not be able to re-establish the connection until the previous plate reading finishes. Allow the last plate or experiment to finish. Then, launch the software to establish the connection again.

If relaunching the software does not reestablish proper connectivity between controlling device and the autosampler, turn OFF the power button of the interface unit, and power it ON again by pressing the power button.

Selecting a Plate Brand and Plate Profile

The plate brand selected displays in the upper right corner of the window. Selecting a brand loads the geographical coordinates for the specific plate you choose. The electrode array is configured to support various 24 or 96 HTS well plates. Three different brands of plates are supported by the 96 electrode array:

- **MT96_HTC** – MatTek 96 Well Plate
- **C96_HTC** – Corning 96 Well Plate
- **M96_HTC** – Millipore 96 Well Plate

Corning 24 HTS plates are supported by 24C electrode array, and Millipore 24 HTS pates are supported by 24M electrode array.

Three plate profiles per plate brand are allowed. For example, the Corning 24 has three plate profile options that may be saved. The plate profile names are editable. Each plate profile is tracked with the last date and time of change. Three different EVOM™ Auto users can set their own plate profiles. Using the plate profile option with date and time stamp, you can track when any changes were made in the plate-electrode coordinate or positioning. Thus, plate profile options allow multiple users to operate the instrument without affecting each other's plate profile settings/data.

TIP: The last used plate profile is stored as the default for your convenience.

NOTE: Only plate profiles for the electrode array that is plugged into instrument are shown when you are in the online mode. To see all the data for other electrode array options, switch to offline mode.

1. To select the desired brand and plate profile, click on the brand name under the EVOM™ Auto logo in the upper right corner of the Main window (Fig. 20). A dropdown menu displays (Fig. 21).

   NOTE: On the *Expert* window, you may also select the brand from the displayed drop-down list.
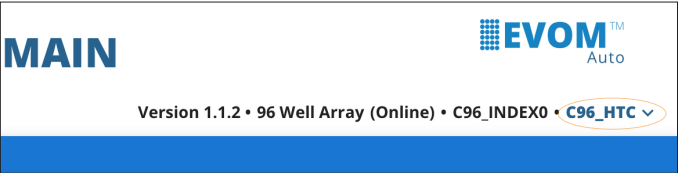

Fig. 20—Click on the brand in the upper right corner under the EVOM™ Auto logo to access the plate brand and plate profile menu.
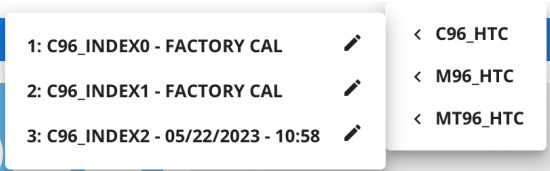

Fig. 21—The plate brand and profile menu displays. In offline mode, you can see all the plate brand options. In online mode, only the available option displays.

2. Select the desired brand (in offline mode), and then click on the profile choice.

3. If you want to rename an existing profile, click on the pencil icon and enter the new name.

Online Status Definition and Use

The online status is displayed next to the electrode array type in the header under the EVOM™ Auto logo. The system automatically displays the head type for the electrode array that is plugged into the system. This field is not editable (Fig. 22). The system can only use the autosampler and collect data when it is in the *Online* state.

Fig. 22—The online/offline state of the system displays next to the electrode array type in the header on the right side of the window.

Creating a Plate File and Setting up Measurements

When the system starts, the *Main* window displays.
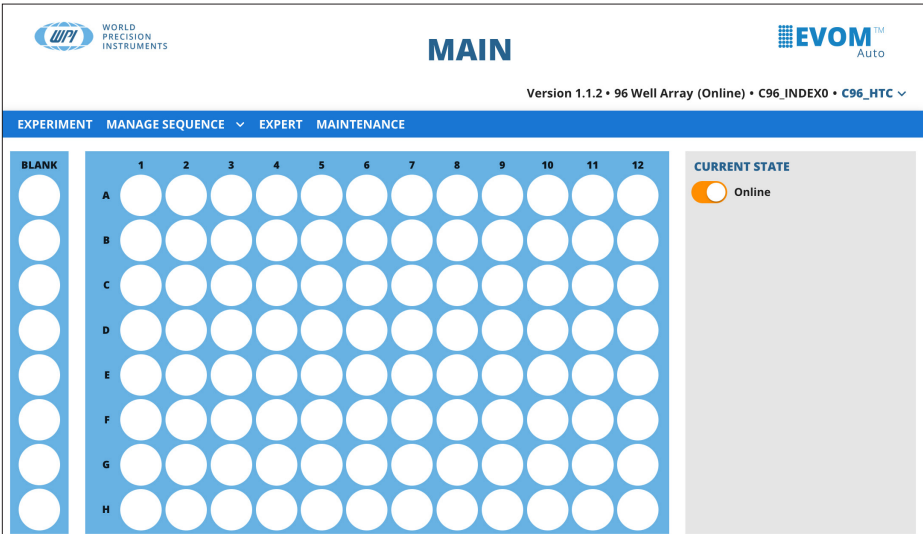
Fig. 23—The Main Window appears.

1. To create a measurement sequence, select the *Manage Sequence* menu. A list of the existing sequences displays (Fig. 24), and you can open and edit any existing sequence or select *New Sequence* to create a new one.
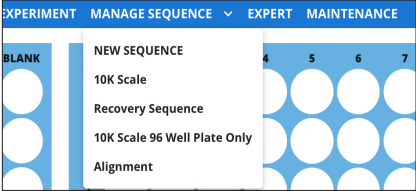
Fig. 24—The Manage Sequence menu lists the existing sequences.

If you select *New Sequence*, a popup allows you to name the sequence (Fig. 25). Enter a name and press *Save* to continue or *Cancel* to return to the main window without saving. The *Sequence* window appears (Fig. 26). The new sequence name is displayed on top of the window.
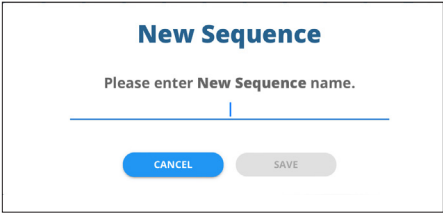
Fig. 25—Use this popup to name your sequence.
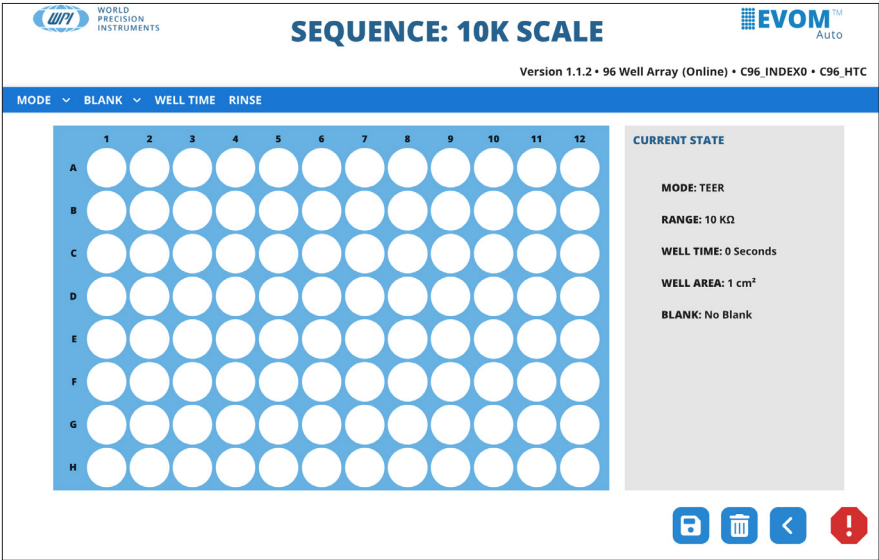
Fig. 26—The Sequence window lets you define a sequence.

2. You may choose to display the measured resistance values or the TEER measurement. TEER is a calculated value based on the surface area of the well and the measured resistance. Select the *Mode* menu. Options include *Resistance and TEER*.
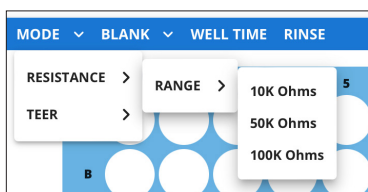

Fig. 27—The mode menu lets you select your options.

3. When you select the *Mode>Resistance>Range*, you can choose the resistance range for making measurements. Options include *10K Ohms*, *50K Ohms* and *100K Ohms*. The *Current State* area on the right side of the window updates accordingly.

   When you select *Mode>TEER*, you may choose the resistance range and the well area. The well area defines the surface area of a well on your plate. You may select the default surface area of the well or manually enter the value.

4. Select your blank option. This option measures the resistance of the first column (Wells A1, B1, C1… H1), and this value is used as a baseline for each row. Each value on the *Blank Value* table measures the resistance of the specific electrode pair used to measure each column on a well containing only buffer or media. (See the column highlighted in blue in Fig. 28.) These values (Value 1 … Value 8) are subtracted from the measurements on the corresponding row (Red Rectangles) to obtain the change from the baseline well (the well with no cell growth) to omit any offset or background values.
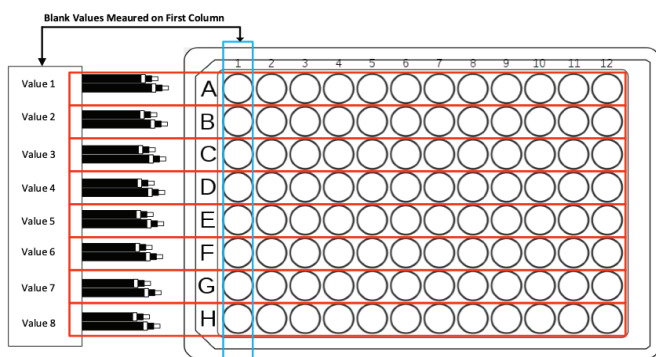

Fig. 28—The values of the blanks are measured to determine the baseline resistance without any cells. This figure shows an array of 96 wells.

   To start the blank setup, select the *Blank* menu and choose *Load Blank*, and then *New Blank* (Fig. 29) to create a blank baseline data file. A popup asks for a name for your new blank file or data set (Fig. 30).

NOTE: You may select previously created blank data sets, which will load previously measured values for the first column.
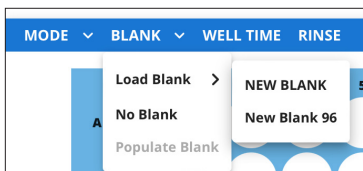

Fig. 29—*The blank menu lets you create a new blank or load a previous set of data for blank wells .*

Fig. 30—*Enter the name of your new blank data set.*

6. Enter a name and press *Save*, or press *Cancel* to abort the action. After the sequence is saved, the container is created with a default value of zero shown. The blank name is updated on the *Current State* area.

7. Load a well plate with media or buffer in the first column of wells and place it in the well plate area on the autosampler.

8. To measure the blanks and load that information into the blank data set, select the *Blank* menu and choose *Populate Blank*. A message appears indicating that the EVOM™ Auto is about to measure the resistance values of the first column and that a well plate with the desired level of buffer or media solution must be placed in the well plate area to be measured (Fig. 31). Press *Continue* to begin or *Cancel* to abort the action. A message displays briefly at the bottom of the screen to indicate the population of the blank will begin.

Fig. 31—*An informational message appears to make sure you have positioned your well plate on the autosampler and filled the first column of wells with media.*

The autosampler moves the electrode array to Column 1 and measures all eight values consecutively. The values are shown in the *Blank* area on the window as they are populated.

9. After the measurement is completed, a message appears (Fig. 32). Press *OK* to complete the sequence. You may re-sample the blanks as many times as desired, now or in the future.
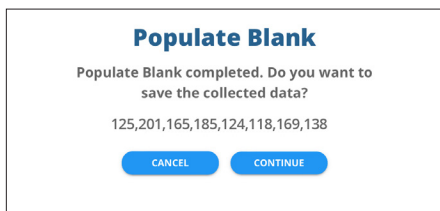

Populate Blank

Populate Blank completed. Do you want to save the collected data?

125,201,165,185,124,118,169,138

CANCEL   CONTINUE

Fig. 32—The message indicates that the blank measurements have completed.

10. Setup the well time by selecting the *Well Time* menu. The well time is the number of seconds the electrodes are held immersed in a well before measurements are taken. The *Well Time* popup appears (Fig. 33). Enter the desired time in seconds and press *Save*. The updated value displays in the *Current State* area of the window.

Well Time

−   0 Seconds   +

CANCEL   SAVE
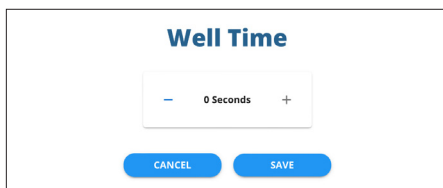
Fig. 33—Set the desired amount of time that the electrodes will be immersed in a well before taking measurements.

11. The three rinse stations may be used for rinsing, disinfecting, stabilizing or any other function desired. Configure the rinse schedule by selecting *Rinse* from the menu. The *Rinse Time* window appears (Fig. 34). You can set the rinse time and the wait time in each rinse station using the toggle controls on each field. Three toggle buttons in the *Rinse Options* section on the right side of the window let you set when the rinse and wait parameters are implemented.

The rinse time is the duration of time that the electrode array stays immersed in the rinse station. The wait time is the duration the electrode array waits above the rinse station to drip any remaining liquids. You may choose any combination of these options:
- Between measurements
- At the beginning of a sequence
- At the end of a sequence

NOTE: If none of the check boxes are selected, measurement will be taken with no rinsing operations.

Fig. 34—The Rinse Time window lets you configure the rinse schedule.

For example, the following rinse schedule will run as shown in Fig. 36.

Fig. 35—This is an example of a rinse schedule.
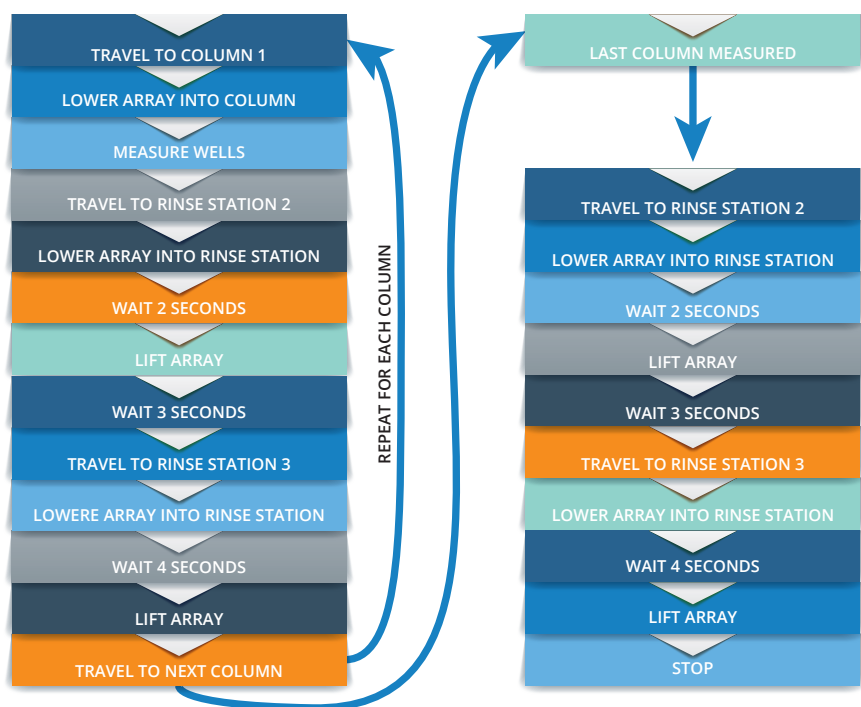
Fig. 36—This is the sequence of events that happens based on the example program above.

12. After the schedule is set in the *Rinse Time* window, press *Save* to save the changes, and then return to the *Sequence* window. Press *Cancel* to abort without saving the changes.

13. Press the *Save* icon 🔒 in the bottom right corner of the *Sequence* window to save the sequence. A brief message displays indicating the sequence was saved.

Now that we have defined the sequence, we can use it in a plate. For example, you can run an experiment with a saved protocol. Press the *Back* button ◀ to return to the *Main* window and select the *Experiment* menu to begin taking measurements.

NOTE: If you press the *Back* button without saving, a confirmation message appears (Fig. 37) asking if you want to proceed without saving. Press *Cancel* to return to the screen and save your changes or *Continue* to proceed to the main window without saving the changes.
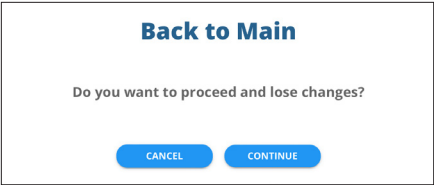
Fig. 37—To save the sequence, press Cancel and return to the previous window.

Running an Experiment

After you have defined a sequence, you can begin running an experiment. The *Experiment* window shows a representation of the plate on the left side of the window. On the right side of the window, you see these areas:

- *Current State* region shows the status of the autosampler and remaining time. It also shows the schedule settings.
- *Details* area lets you set your plate name, choose a sequence, select your blank and make notes.
- *Plate Controls/Schedule Controls* areas have all the buttons for controlling an experiment or scheduling an experiment.
- *System Controls* area has the buttons to manage the data files and the emergency shut off for the autosampler.

Fig. 38—The experiment window has several important areas.

The selected wells appear white in color and unselected wells appear grey in color. In order for the *Run* button and other options to be active, at least one well needs to be selected. Also, a sequence file needs to be selected in order to measure a plate.

Fig. 39—The Experiment window has a 24 well plate window with readings for a 24 Millipore HTS plate, shown in offline mode.

NOTE: In offline mode the *Run* and other options are unavailable. Only previous collected data for a plate may be viewed.
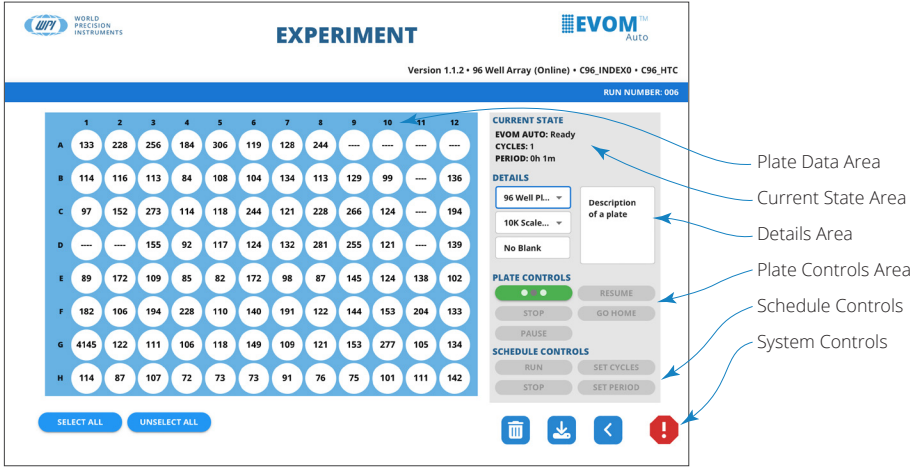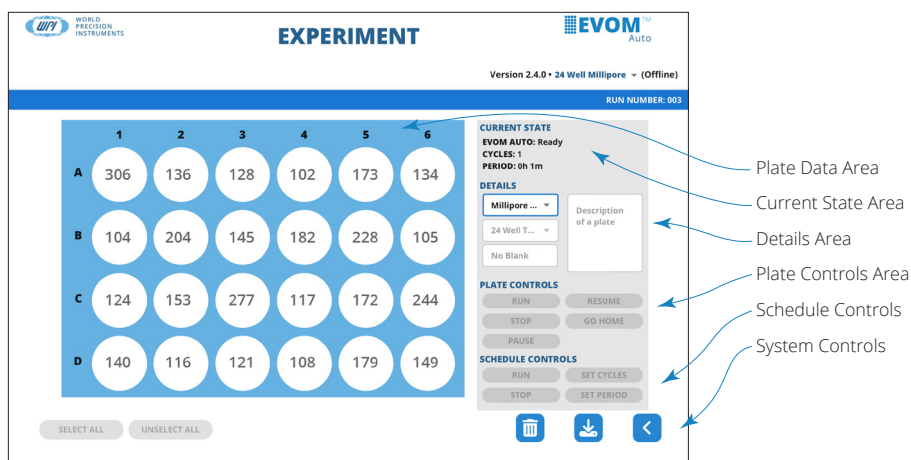
The buttons in the *Plate Controls* Area function as follows:

Run – Starts the data acquisition sequence.

Stop – Finishes the data collection on the present column and lifts the electrode array out of the well plate. The data acquisition is halted. The data can be saved, or the sequence may be restarted.

Pause – Finishes the data collection on the active column and lifts the electrode array out of the well plate. Continue the data acquisition run by pressing the *Resume* button.

Resume – Restarts the data collection at the point it left off when you pressed the *Pause* button.

Go Home – This places the electrode array in the home position away from the well plate and rinse stations. This option is only available after pressing the *Stop* button.

The buttons in the *Schedule Controls* area function as follows:

Run – The *green* button starts the first scan. The time and cycle counters become active, counting down one by one until they reach zero, when the measurement stops. Every time a scan finishes, the data is saved, and the plate run number increments. When the scheduled operations are not being used, the counters are displayed in grey. When active, the buttons are green.

Stop – The *red* button stops the scheduler. The current scan will continue until you press the *Stop* button.

Set Cycles – Brings up a popup to set the number of scans to be performed using the current sequence.

Set Period – Brings up a popup to set the length of time in between well plate scans.

In the *Plate Controls* area, available options are shown in color. If an option is not available, the button will be grey. For example, at the beginning of data acquisition, the *Run* and *Go Home* buttons will be the only valid options.

Fig. 40—(Left) Controls at the beginning of data acquisition.
Fig. 41—(Center) Controls when a sequence is running.
Fig. 42—(Right) Controls when a sequence is paused.

The *System Controls* area has four buttons as follows:

Delete   Download   Back   STOP
Fig. 43—System Control buttons.

Delete – Deletes the current data file. This option is not valid during data acquisition.

Download – Downloads the current data file. This option is not valid during data acquisition.

Back – Returns you to the previous window (*Main* page). If you press this during data acquisition, a popup asks if you wish to discard the collected data. Press *Yes* to discard the data and return to the previous window or *No* to all the data collection to finish normally.

Stop – This emergency stop button is always active. If you press this button, the autosampler will immediately stop, no matter where it is in a sequence. All measurement will be suspended.

NOTE: When a plate file finishes a run, a message window opens, giving you the option to save the data.

To begin running an experiment:

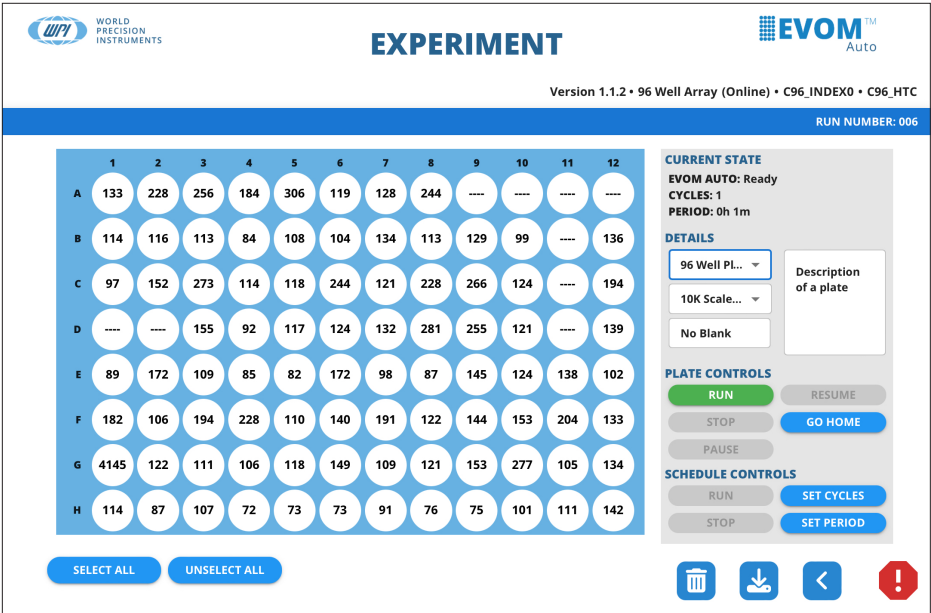1. Select *Experiment* from the main menu. The *Experiment* window appears (Fig. 44).

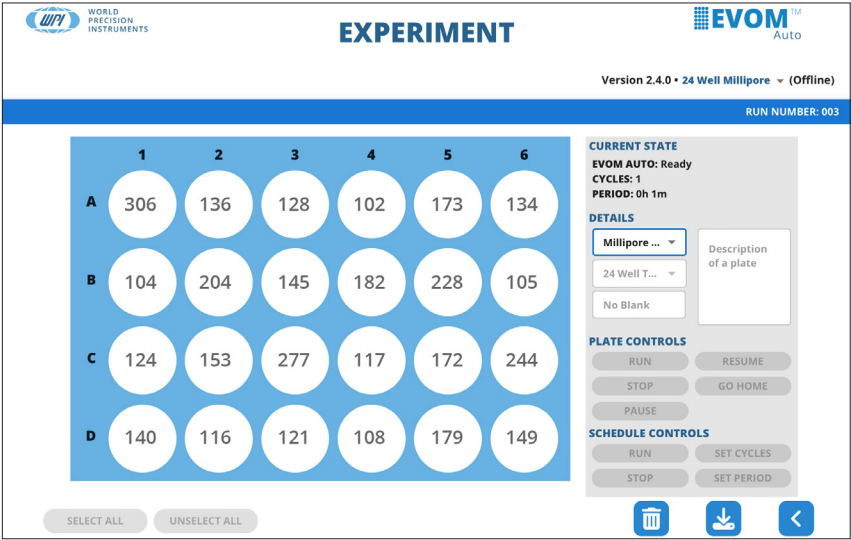*Fig. 44—The Experiment window appears. This example shows a 96-well plate option.*

Fig. 45—This example shows a 24-well plate option, in offline mode.

World Precision Instruments

2. Select the *Plate Name* drop-down in the *Details* area on the right side of the screen. Choose from the list of existing plates or select *New Plate* to define a new plate. A popup appears so you can enter a name for the plate (Fig. 46).

    NOTE: The plate name refers to the CSV output file name where data is saved. If the same plate name is used to read multiple plates, readings for different plates are saved as different run numbers 01, 02 (as different tables) under the same file. Each table would have its date and time stamps and any additional notes you add.

Fig. 46—Plate name popup.

3. Enter the name for the plate and press the *Save* button. A green confirmation message appears briefly in the bottom left corner of the window indicating that the plate was successfully created (Fig. 47). This indicates that this is the first data set for this plate when measurements are taken. The run number displays in the menu bar and indicates the number of times you have run the plate sequence.

Fig. 47—Confirmation message displays briefly in the bottom left corner of the window.

4. Select the *Sequence Name* drop-down, the second drop-down in the *Details* area on the right side of the screen. A list of existing sequences appears. Select the appropriate sequence that you created earlier.

    A blank data table with no data values displays in the window. At this point, select which wells you want to measure. Press the *Select All* button below the data table to select all the wells. The selected wells change color as you select them. You may also select or unselect wells by clicking on them directly. Selected wells are white, and unselected cells are grey.

    Select rows and columns by double clicking on the arrows to the left of rows or on the top of columns in the Experiment window. This is only available when you are running the software revision 3.0.0 or higher. (Fig. 48)
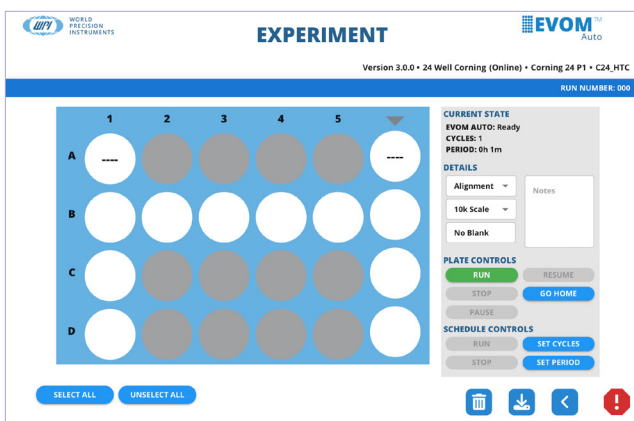
Fig. 48—Double click the arrow on the top of a column or beside a row to select the column or row of the well plate to read in the experiment screen.

> **NOTE**: The status line below the table indicates the EVOM™ autosampler is ready.

5. Press the *Run* button located in the *Plate Controls* area on the right side of the window. The sequence is executed. A brief message in the lower left corner indicates that the experiment has started. If you defined the blank container, the data displayed represents the difference between the baseline and the actual value measured.

> **NOTE**: If the blank values have overflow values, the calculated values on the *Experiment* window are also invalid and will show a --- or *OVF*. Therefore, ensure your blank values are valid.

6. Once the sequence is completed, a confirmation message appears. Press *OK*. To stop the sequence and abort the run, press the *Stop* button in the *Plate Controls* area. To pause the sequence, press the *Pause* button. Press the *Resume* button to continue the sequence where you left off.
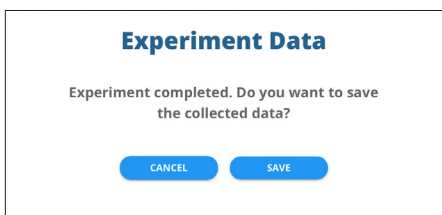

Fig. 49—Select Save to store the data.

7. You may save the data or run the sequence again. To run the sequence again without saving, press *Cancel*. To save the data, press the *Save* button. A popup appears. When you press the *Run* button again after saving the previous data, the run number on the right side of the menu bar increments by 1.

8. At any time, you may add comments for the data run being collected. Click inside the *Notes* text block in the *Details* section on the right side of the screen to attach notes to the plate run. All your comments must be added before you click the *Run* button.

TIP: Select only the wells containing samples. Reading empty wells takes longer to finish reading the sample plate. Click any selected well to disable it, and then read the sample plate.

Downloading the Data File

Once a data acquisition run is completed, the data can be exported. This process exports all the runs performed on a plate into a downloadable, comma-delimited (CSV) file which can be read by Microsoft® Excel. The downloaded file is immediately available.

1. To download a data file, press the *Download* button in the *System Controls* area in the bottom right corner of the window. When the export is finished, it downloads to the tablet or computer in the configured directory. Usually, it exports to the *Downloads* directory.
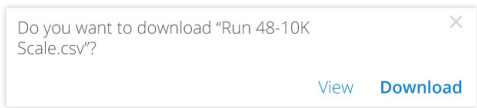
Do you want to download "Run 48-10K Scale.csv"?

View **Download**

Fig. 50—A browser popup appears so you can download the file to the device.

NOTE: In the Safari browser on the iPad, click on the downloads icon in the upper right corner of the screen and select the file to view it. The Google Chrome browser shows the downloaded file in the bottom left corner of the window.

2. Open the file with Microsoft® Excel. The first line of the file indicates when the data was exported.

	A	B	C	D
1	Export Date:	October 4, 2023 9:42AM		
2				

Fig. 51—The CSV file shows the export date of the file in the first line.

For each run there is a header section. The first run at the top of the file is the most recent. A sample file is shown in Fig. 52.

Fig. 52—Sample data file.

Following the header is the data table. See Fig. 53.

Fig. 53—Sample data table in CSV format.

Plates files may be downloaded at any point after a data acquisition run is completed.

Deleting a Data File

Plates files may be deleted using the *Delete* button in the *System Controls* area in the bottom right corner of the window. When a plate is deleted, all data runs are deleted. The sequences are not deleted since other plates may be referencing the same sequences. If you choose to delete a file, a confirmation popup appears asking you to verify that you want to delete the selected plate file (Fig. 54). Select the *Delete* button to delete the file or the *Cancel* button to abort the deletion.

Fig. 54—Confirmation popup to verify the deletion of a plate file.

Transferring Files Between iPad and Computer

There are multiple ways to move files on your iPad to your Mac or Windows PC, and vice versa.

- **Wirelessly** (email, messages, or AirDrop) – Refer to the iPad online User Guide topic *Transfer files wirelessly between your iPad and computer with email, messages, or AirDrop*.

- **iCloud Automatically Sync** – Refer to the iPad online User Guide Topic *Automatically keep your files up to date on your iPad and computer with iCloud.*

- **Cloud Storage** – With a cloud storage provider, you can store your files on a service like Box or Dropbox to make them available on both your iPad and computer.

- **External Storage Device** – You can copy files to an external device, such as a USB drive or SD card, connected to your iPad or computer. After disconnecting the storage device, you can connect it to your other device and copy the files to that device.

- **File Server**– By connecting to a file server from your iPad and your Mac or Windows PC, you can share files between them. Refer to the iPad online User Guide topic *Use a file server to share files between your iPad and computer*.

- **Finder** or **iTunes** – After you connect your iPad to your Mac or Windows PC with a cable, you can sync many types of data and can transfer many types of files.

NOTE: Each approach requires you to set up your computer to receive and send files, and each may have limitations on the items you want to transfer.

NOTE: You can also connect the EVOM™ Auto user interface directly to your computer using the second Wi-Fi key provided. You need to disconnect the iPad from the EVOM™ Auto network and connect the iPad to your computer Wi-Fi network.

Scheduling Operations

The data acquisition functions of the EVOM™ Auto may be repeated at a user-defined time interval when multiple scans of a plate are needed. The scheduled operations are displayed on the right side of the *Experiment* window in the *Current State* area (Fig. 55). The control buttons for scheduling are in the *Schedule Controls* area on the right side of the window (Fig. 56).
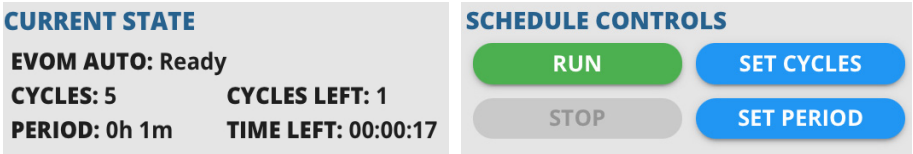

CURRENT STATE

EVOM AUTO: Ready
CYCLES: 5   **CYCLES LEFT:** 1
PERIOD: 0h 1m   **TIME LEFT:** 00:00:17

SCHEDULE CONTROLS

RUN   SET CYCLES

STOP   SET PERIOD

Fig. 55—(Left) Current State area of the window when a schedule is running.
Fig. 56—(Right) Plate Controls area of the window for running a schedule.

Running a Scheduled Measurement Sequence

1. Press the *Set Period* button to set the length of time in between well plate scans. A popup displays (Fig. 57). Tap on the hours and minutes field to open another popup (Fig. 58). Tap the pencil icon to enter the hours and minutes in HH:MM format or use the spinner to select the hours and minutes. Then, press the *SAVE* button to save the changes.

Set Period

Hours and Minutes
00:00

CANCEL   SAVE

HOURS AND
MINUTES

00 : 00 ✏
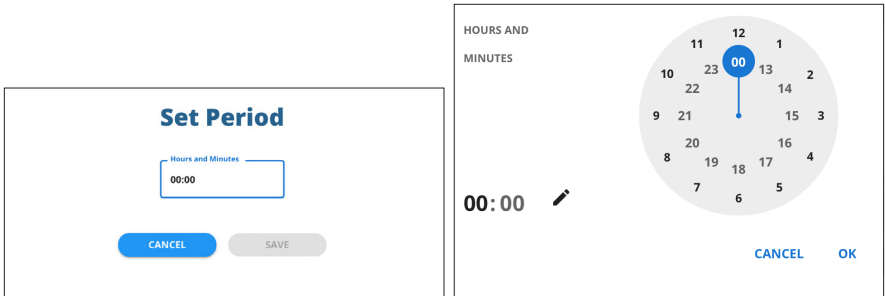
Fig. 57—(Left) Tap the numbers in the hours and minutes field to set the period.
Fig. 58—(Right) Tap the pencil and enter and period or use the spinner to set the number of hours and minutes for which you want the schedule to run.

- If you click on the pencil, a popup appears (Fig. 59). enter a four-digit number (HHMM) to set the hours and minutes.
- If you use the spinner, you may select from 1 to 23 hours. The first 12 hours are on the outside of the spinner, and the inner spinner is used to set 13 – 23 hours. After you make that selection, the spinner displays minutes and you may use the dial to set the number of minutes in the period (Fig. 60).

Fig. 59—(Left) If you select the pencil icon, you may use the keyboard to enter a four-digit number in the form of HHMM to set the period.
Fig. 60—(Right) If you used the spinner to set the hours of the period, then the display changes to allow you to set the minutes of the period.

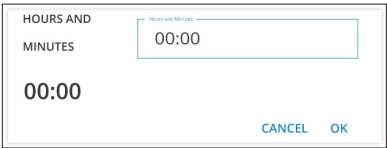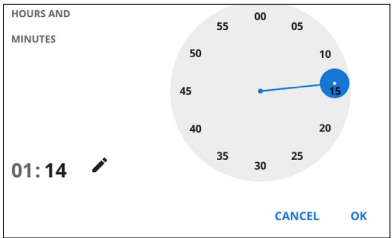2. Press the *Set Cycles* button to set the number of scans to be performed according to the current sequence. A popup displays (Fig. 61). Use the + and – buttons to increment or decrement the number of scans. Then, press the *OK* button to save the changes.

Fig. 61—Use the buttons to set the number of scans to be performed.

3. Press the *Run* button in the *Schedule Controls* area to start the first scan. After that scan, the *Time* and *Cycle* counters become active in the *Current State* area on the right side of the window (Fig. 62). They will continue counting down until they reach zero. Then, measurements stop. When a scan is finished, the data is saved, and the plate number (run number) increments. When the scheduled operations are dormant, the counters display grey. When the schedule is active the counters turn green.

    NOTE: A minimum of two cycles need to be selected in order for the Schedule Controls options to be active.

Fig. 62—The counters display with green text when the schedule is active, and it only appears when it is actually counting down.

Stopping a Running Scheduled Sequence

Press the *Stop* button in the *Schedule Controls* area to stop the schedule. The current scan will continue until it completes the cycle. The *Stop* and *Pause* buttons become active in the *Plate Controls* area. If you need to stop the scan, you must also press the *Plate Controls Stop* button. Measurements will continue until the scan reaches the end of the active column. When it stops a popup appears asking if you want to save the collected data. Saved data includes all the collected data, including the last active row scanned. Click *Save* to store the data or *Cancel* to abort.
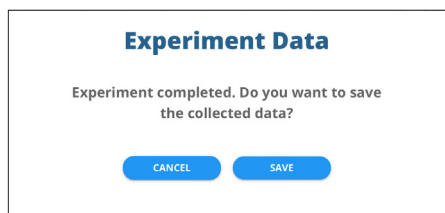

Experiment Data

Experiment completed. Do you want to save the collected data?

CANCEL   SAVE

Fig. 63—After you stop the experiment, you have the option to save data collected.

MAINTENANCE

The electrodes require regular maintenance to keep them performing optimally.

Chloridizing – To replenish the chloride on the surface of the electrodes, the electrode tips need to be submerged in a bleach solution (3–6% sodium hypochlorite) for at least 10 minutes, followed by a rinse with distilled water.

Stabilization – Once chloridized, the electrodes need to be stabilized by being submerged in buffer solution or media.

The *Maintenance* window allows for a timed soaking for each operation.
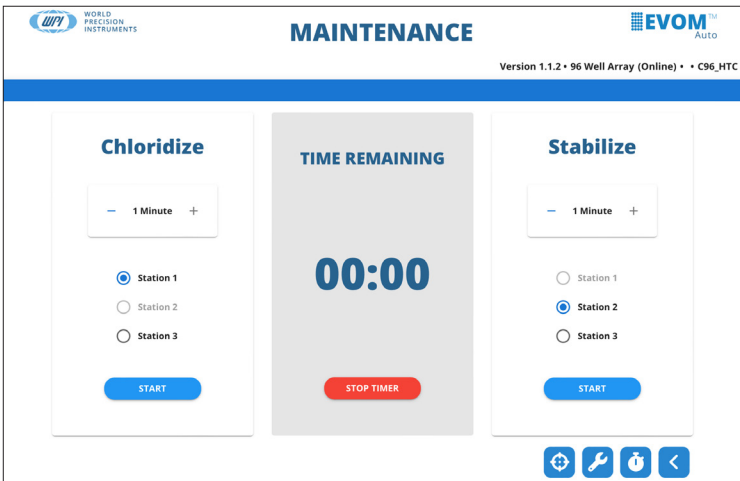
Fig. 64—Maintenance window.

Four control buttons are located at the bottom of this window:

- ⊕ - Go home button positions the electrode array in the home position.

- 🔧 - Calibrate takes a few moments to calibrate the sensor head using the internal reference resistor. Nothing involving the motor movement happens. The icons show the animation until the process is completed.

- ⏱ - Set/Read Time allows you to synchronize the date and time of the EVOM™ Auto system to the iPad. This date is used to time stamp data when acquiring data and when exporting it.

- ‹ - Back returns you to the previous window.

Cleaning

You can use 70% ethanol or isopropanol to disinfect the electrodes. You can include a rinsing option in the sequence. For example, your rinse protocol could include:

- Rinse station 1– 70% Ethanol
- Rinse station 2 – Sterile water, media, or buffer
- Rinse station 3 – Sterile media

1. Select *Manage Sequence* from the main menu and then choose *Rinse* to access the Rinse Time window.

Fig. 65—The Rinse Time window lets you configure the rinse schedule

2. Select your options:
   - Select the *Rinse Between Measurements* option so that the electrode gets quickly disinfected during analysis. Rinse stations 2 and 3 will remove the alcohol before the electrodes go into samples.
   - You can set the rinse time, but you may or may not need to select a wait time. This option allows the electrodes to dry or drip any remaining liquid.
   - For longer disinfection at the end of the day, use the *Maintenance* window and keep the tips in ethanol or isopropanol for 15-20 minutes followed by a rinse with distilled water.

Bleach maintenance is intended for chloridizing the electrode for proper functionality, this will also act as a disinfectant. Ten minutes of chloridizing is recommended every 1-2 weeks. Make sure the bleach is washed off with distilled water. See "Chloriding the Electrode Array" on page 39.

NOTE: Only the electrode tip may be immersed in liquids (for example, ethanol). The remaining parts of the electrode may be disinfected by wiping them with a paper towel or Kimwipe sprayed with alcohol.

Chloriding the Electrode Array

1. Select *Maintenance* on the main menu. The *Maintenance* window appears.
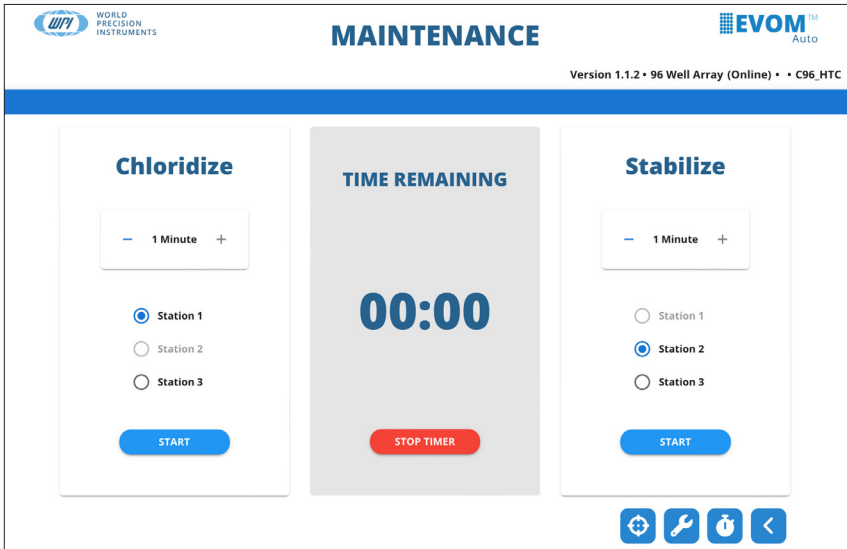
Fig. 66—The Maintenance window.

2. To chloridize, press the + or – buttons to set the timer to the desired time in minutes in the *Chloridize* frame.

3. Select the radio button for the rinse station containing the chloridizing solution.

4. Fill the appropriate rinse station with a bleach solution.

5. Press the *Start Timer* button. The time interval displays on the counter in the center of the window. The title changes to *Chloriding Time Remaining*.

6. The electrode array moves to the selected rinse station, and the counters start counting down to zero.

7. When the count reaches zero, the electrode array retracts.

8. At any point, you may stop the counter by pressing the *Stop Timer* button. This resets the counter to zero and retracts the electrode array.

Stabilizing the Electrode Array

1. Select *Maintenance* on the main menu. The *Maintenance* window appears (Fig. 66).

2. To stabilize, press the + or – buttons to set the timer to the desired time in minutes in the *Stabilize* frame.

3. Select the radio button for the rinse station containing the buffer solution.

4. Fill the appropriate rinse station with distilled water.

5. Press the *Start Timer* button. The time interval displays on the counter in the center of the window. The title changes to *Stabilizing Time Remaining*.

6. The electrode array moves to the selected rinse station, and the counter starts counting down to zero.

7. When the count reaches zero, the electrode array retracts.

8. At any point, you may stop the counter by pressing the *Stop Timer* button. This resets the counter to zero, and retract the electrode array.

9. In the third rinse station, you may perform another rinse in distilled water.

NOTE: The radio button selection requires different rinse stations to be used for chloriding and stabilizing.

ACCESSORIES

Part Number	Description
EVA-EL-03-01	EVOM™ Auto 96 HTS Electrode Array for TEER (For Corning, Millipore, & MatTek 96-well plates)
EVA-EL-03-02	EVOM™ Auto 24C HTS Electrode Array for TEER (For Corning 24-well plates)
EVA-EL-03-03	EVOM™ Auto 24M HTS Electrode Array for TEER (For Millipore 24-well plates)
EVA-MT-03-EX1	EVOM™ Auto 1 Year Premium Warranty
EVA-MT-03-EX2	EVOM™ Auto 2 Year Premium Warranty
EVA-MT-INST	EVOM™ Auto On-Site Premium Installation
CCI96-PET-0.4	PermaCell Cell Culture Insert Plates, 96-Well, PET, 0.4μm, pkg of 1
CCI96-PET-0.4-5	PermaCell Cell Culture Insert Plates, 96-Well, PET, 0.4μm, pkg of 5

TROUBLESHOOTING

Issue	Possible Cause	Solution
Reading displays as dashes	You may not have adequate apical or basolateral liquid volumes.	Increase the liquid volumes.
	Readings may be out of range.	Make sure 100 KΩ maximum range is selected.
Software is not communicating with the autosampler or software connectivity is terminated	Other programs may interfere while the EVOM™ Auto software is running.	To prevent future occurrences, do not launch any other programs or software when EVOM™ Auto software is running.
		You may see the Connection Interruption message with the button to reconnect (Fig. 17). Click the option to reestablish the connection
		Close the browser and relaunch the software.
	Wi-Fi is not properly connected	Restart the interface unit by cycling power to it.

NOTE: If you have a problem/issue with that falls outside the definitions of this troubleshooting section, contact the WPI Technical Support team at (941) 371-1003 or wpirms@wpiinc.com.

SPECIFICATIONS

This unit conforms to the following specifications:
Autosampler Dimensions (W×D×H) ....16×10×8.4"
Autosampler Weight ....15.5 lbs.
Interface Unit Weight... 1 lb.
CE Certified...Yes
Compatibility .... 96-well HTS Plates (Corning, Millipore, MatTek)
.... 24-well HTS Plates (Corning, Millipore)
Resistance Range... 10KΩ, 50KΩ, 100KΩ
Number of Rinse Stations 3
Electrode Array for 96 HTS Plate ....Array of 8 pair of (1.2mm Φ) electrodes
Electrode Array for 24 HTS Plate ....Array of 4 pair of (1.2 mm Φ) electrodes
Minimum Sample Reading Time ....1 Second
Device Connectivity .... Wi-Fi
Wi-Fi Range...25 ft./7 m
Software Type...Web browser
Control Device for Running Software ....Tablet, Laptop, Desktop with Wi-Fi adapter
Output Data ....CSV/Microsoft® Excel

APPENDIX A: UPDATING EVOM™ AUTO SOFTWARE

1. Before updating the software, verify that the system has Wi-Fi connectivity. Insert the Wi-Fi adapter into the interface unit and press the power button on the interface unit control box to power it on. (The blue LED is ON).

   NOTE: Do not plug in the USB drive (WPI#: 97255) with the software upgrade yet.

   Establish the connection between the iPad. If any connectivity issue exist, verify that the Wi-Fi adapter is properly connected to the EVOM™ Auto and relaunch the software.

2. Note the software version in the upper right corner of the software. See Fig. 67.

Fig. 67—Note the software version in the top right corner of the software window.

3. Navigate on the iPad to *Settings* and choose *Wi-Fi*. If you see the WPI BYOD network, click *Forget WPI BYOD Network* to delete it. See Fig. 68, and Fig. 69.
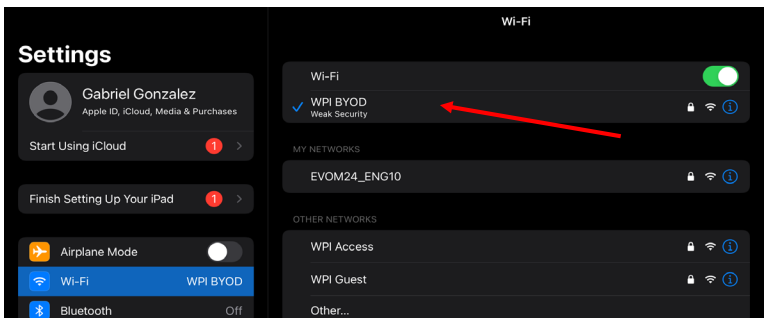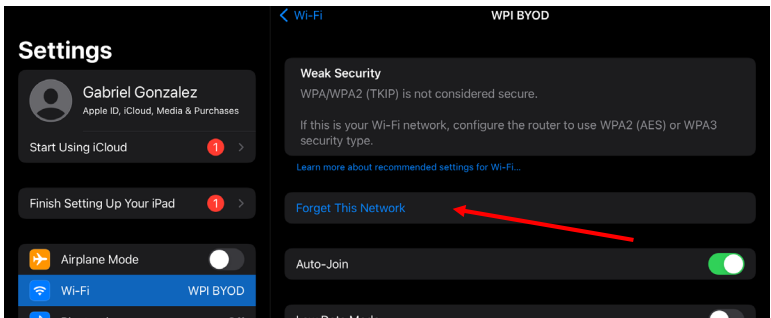

Fig. 68—Locate the WPI BYOD network.

Fig. 69—Click Forget This Network.

NOTE: The network may have already been deleted during the configuration of your iPad at WPI.

4. Now, power off the interface unit by pressing the power button. The blue LED turns off. Plug in the USB drive (WPI #: 97255) onto any available USB port. Keep the Wi-Fi adapter connected to the interface unit.

5. Power on the interface unit by pressing the power button. The blue LED turns on. Allow 5 minutes, and then make sure the Wi-Fi network is connected to EVOM Auto's Wi-Fi.

6. Launch the EVOM™ Auto software. Let the system establish the connection. If a connection does not appear to be established, open the Wi-Fi settings on the iPad to verify that the iPad is connected to the EVOM™ Auto network. See "Setup" on page 11.

7. The electrode array travels to the home position. Note the new version of the software in the upper right corner of the EVOM™ Auto Main Screen.

8. Power off the interface unit by pressing the blue power button. The blue LED turns off.

9. Remove the USB thumb drive with the software upgrade (WPI #: 97255).

CAUTION: This step is important to make sure the unit does not reapply the update.

10. Power on the interface unit by pressing the power button with Wi-Fi adapter connected. The blue LED turns on.

11. Wait 5 minutes. Let the Wi-Fi connect to EVOM™ Auto's network.

12. Launch the software page and note the new version of the software. The system is ready to be used with the latest software version.

APPENDIX B: USING AN ETHERNET CONNECTION

Using a LAN cable, you may connect your interface unit directly to your LAN network.

However, to achieve proper operation through an Ethernet connection, the EVOM™ Auto must be able to obtain an IP address from the selected network in an organization. WPI recommends that you consult with your IT professional to determine the best method to achieve proper connection.

Different network implementations will have different policies regarding connecting devices to their existing network. Once an IP address is obtained for the EVOM™ Auto, you can connect to the interface unit using that IP address. Enter the IP address in your browser's URL field using this format: ###.###.###.###:5000. (Replace the ###.###.###.### with your IP address.)

INDEX

DECLARATION OF CONFORMITY

WORLD PRECISION INSTRUMENTS, LLC.

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Sarasota, FL 34240-9258 USA
Telephone: (941) 371-1003 Fax: (941) 377-5428
E-mail: wpi@wpiinc.com

DECLARATION OF CONFORMITY CE

We: World Precision Instruments
                       175 Sarasota Center Boulevard
                       Sarasota, FL 34240-9258 USA

As the **manufacture/distributor** of the apparatus listed, declare under sole responsibility
that the product(s):
WPI PN: EVOM AUTO

To which this declaration relates is/are in conformity with the following standards or
other normative documents:

Low Voltage:
EN 61010-1:2010+A1:2019
EMC:
EN 61326-2-3:2013, EN 61326-1:2013
EN IEC 61000-3-2:2019+A1:2021
EN61000-3-3:2013+A1:2019+A2:2021

And therefore conform(s) with the protection requirements of Council Directive
2014/30/EU relating to electromagnetic compatibility and Council Directive 2014/35/EU
relating to safety requirements and Council Directive 2011/65/EU relating to hazardous
substances:

	Issued on:	**August 10, 2022**

President of WPI

F-QC-006   Rev C

WARRANTY

WPI (World Precision Instruments) warrants to the original purchaser that this equipment, including its components and parts, shall be free from defects in material and workmanship for a period of one year* from the date of receipt. WPI's obligation under this warranty shall be limited to repair or replacement, at WPI's option, of the equipment or defective components or parts upon receipt thereof f.o.b. WPI, Sarasota, Florida U.S.A. Return of a repaired instrument shall be f.o.b. Sarasota.

The above warranty is contingent upon normal usage and does not cover products which have been modified without WPI's approval or which have been subjected to unusual physical or electrical stress or on which the original identification marks have been removed or altered. The above warranty will not apply if adjustment, repair or parts replacement is required because of accident, neglect, misuse, failure of electric power, air conditioning, humidity control, or causes other than normal and ordinary usage.

To the extent that any of its equipment is furnished by a manufacturer other than WPI, the foregoing warranty shall be applicable only to the extent of the warranty furnished by such other manufacturer. This warranty will not apply to appearance terms, such as knobs, handles, dials or the like.

WPI makes no warranty of any kind, express or implied or statutory, including without limitation any warranties of merchantability and/or fitness for a particular purpose. WPI shall not be liable for any damages, whether direct, indirect, special or consequential arising from a failure of this product to operate in the manner desired by the user. WPI shall not be liable for any damage to data or property that may be caused directly or indirectly by use of this product.

Claims and Returns

Inspect all shipments upon receipt. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed loss or damage should be reported at once to the carrier and an inspection requested. All claims for shortage or damage must be made within ten (10) days after receipt of shipment. Claims for lost shipments must be made within thirty (30) days of receipt of invoice or other notification of shipment. Please save damaged or pilfered cartons until claim is settled. In some instances, photographic documentation may be required. Some items are time-sensitive; WPI assumes no extended warranty or any liability for use beyond the date specified on the container

Do not return any goods to us without obtaining prior approval and instructions from our Returns Department. Goods returned (unauthorized) by collect freight may be refused. Goods accepted for restocking will be exchanged or credited to your WPI account. Goods returned which were ordered by customers in error are subject to a 25% restocking charge. Equipment which was built as a special order cannot be returned.

Repairs

Contact our Customer Service Department for assistance in the repair of apparatus. Do not return goods until instructions have been received. Returned items must be securely packed to prevent further damage in transit. The Customer is responsible for paying shipping expenses, including adequate insurance on all items returned for repairs. Identification of the item(s) by model number, name, as well as complete description of the difficulties experienced should be written on the repair purchase order and on a tag attached to the item.

Electrodes, batteries and other consumable parts are warranted for 90 days only from the date on which the customer receives these items.