WORLD
PRECISION
INSTRUMENTS

INSTALL GUIDE

EVA-MT-03

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

Serial No._____

www.wpiinc.com

091324

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
Disposable rinse station inserts available	Sterile disposable rinse station inserts fit in the base station	Convenient and fast for effective electrode disinfection options while reading a number of sample plates
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:

WARNING: A BIOHAZARD LABEL IS ADDED ON THE AUTOSAMPLER UNIT SINCE IT MAY BE EXPOSED TO BIOLOGICAL SAMPLES WHILE BEING USED. IF YOU PROCESS POTENTIALLY HAZARDOUS SUBSTANCES ON THIS DEVICE, ENSURE PROPER HANDLING AND CLEANING PROCEDURES ARE FOLLOWED.

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

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.)
- 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. Place a sterile disposable rinse station insert in the base rinse station for a convenient way to disinfect and maintain your electrode. Simply discard the insert with the solutions when you change plates or need to change the solutions.

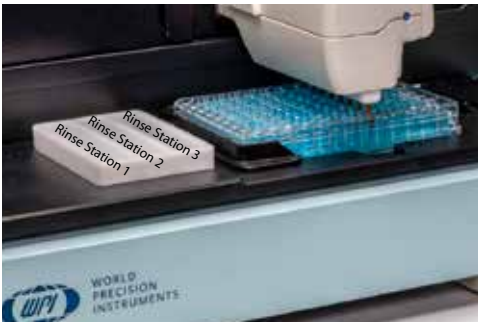


Fig. 4—(Left) Three rinse stations are available.
Fig. 5—(Right) Disposable inserts are used in the base rinse station for convenience to change solutions of the rinse stations.

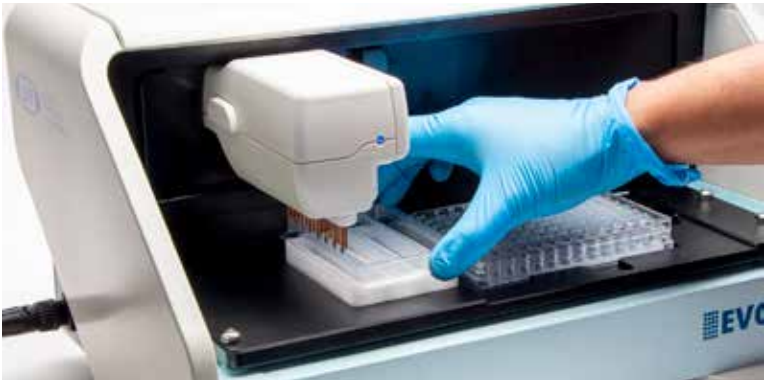


Fig. 6—Place a sterile disposable rinse station insert in the base rinse station. Discard it and use a fresh rinse station insert before installing a different plate or running a different set of experiments

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. Sterile disposable rinse station inserts may be placed inside this base rinse station.
- 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.

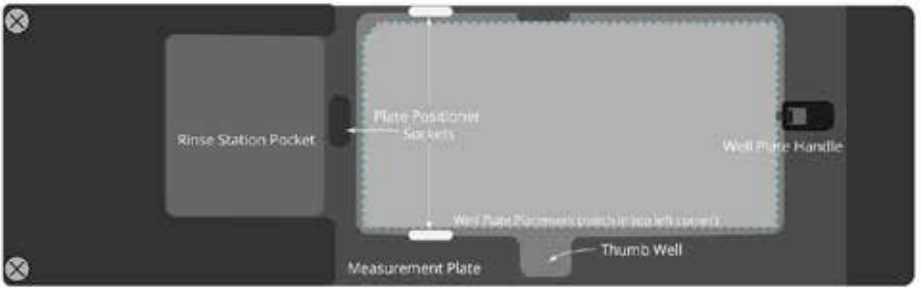


Fig. 7—Top view of the measurement plate on the autosampler

Interface Unit

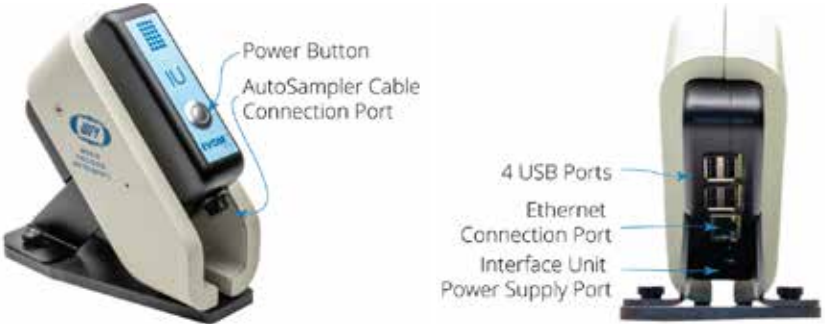


Fig. 8—(Left) Side view of the interface unit, showing the front.
Fig. 9—(Right) Back view of the interface unit.

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.

SYSTEM SETUP

The autosampler is packed with the lid taped in place. Remove all the components from the packing materials and remove the protective tape.

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.

Setting up the System

1. Remove the safety tape from the lid and remove the lid from the autosampler.
2. Connect the interface unit to the autosampler using the interface cable. Connect one end to the interface unit connection port on the autosampler (Fig. 10) and connect the other end to the autosampler cable connection port on the interface unit (Fig. 11). Line up the pins on the connector with the port and press the connector firmly into place. Rotate the knurled ring to secure the cable.

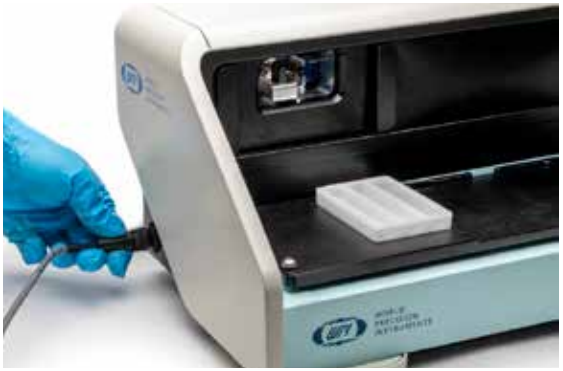


Fig. 10—Line up the pins and connect the interface cable to the autosampler.

Fig. 11—Line up the pins and connect the interface cable to the interface unit.

3. Connect the power supply wall adapter to the wall outlet and insert the barrel connector into the interface unit power supply port on the back side of the interface unit.

Fig. 12—Connect the power cable to the interface unit.

4. Install the provided Wi-Fi adapter into any one of the four USB ports on the back of the interface unit.

Fig. 13—The Wi-Fi adapter is installed in one of the four USB ports on the back of the interface unit.

NOTE: You must install the electrode array before powering on the system.

5. The autosampler ships with a red electrode array lock in place (Fig. 14). To remove it:
   - Pinch the lock at the top (Fig. 15) and lift the slide on the side (Fig. 16).
   - Push the locking mechanism towards the right till the clasp releases from the slot in the base plate. (Fig. 17)
   - Firmly grasp the electrode port cap and pull it out of the port socket. (Fig. 18)

Fig. 14—The autosampler ships with a red lock to prevent the electrode array connection port from moving during transit.

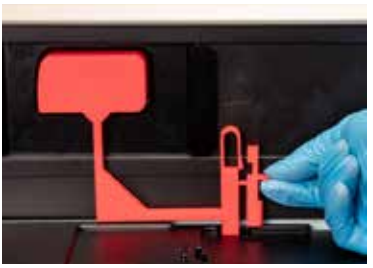


Fig. 15—(Left) Pinch the latch at the top of the lock.
Fig. 16—(Right) Release the slide from the slot in the base and push it up so it moves freely.

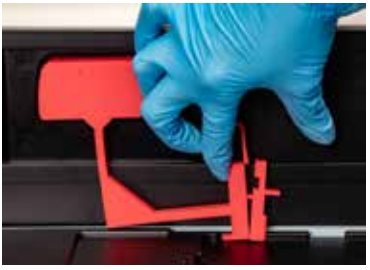


Fig. 17—(Left) Push the locking mechanism till the clasp releases from the slot in the base.
Fig. 18—(Right) Pull the electrode port cap out of the port socket.

6. Make sure that there are no well plates installed on the autosampler and make sure that the rinse station block is not installed on the autosampler plate.

Fig. 19—This autosampler has no well plate and no rinse station installed. When the lock is removed, you have access to the electrode array connection port.

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

Installing the Electrode Array Head

1. Locate the electrode array box and carefully remove the electrode array. It is shipped with a red protective sleeve to prevent damage to the electrode tips.

Fig. 20— The electrode array is packaged with a protective sleeve secured with a heavy Velcro strap.

2. Remove the red electrode protection shield by releasing the Velcro strap.

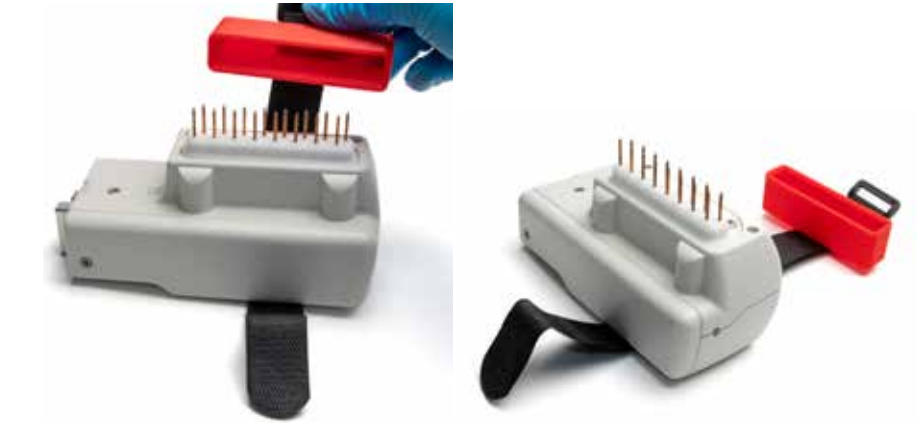


Fig. 21—Remove the protective sleeve.

3. Make sure that the autosampler is in the home position on the left side of the unit.
4. Locate the electrode array connection port on the back wall of the autosampler.

Fig. 22—The electrode array connection port is on the back wall of the autosampler.

5. Place the electrode array in front of the connection port and line it up. Hold the top left corner of the autosampler with your left hand. With the electrode array in your right hand and with the electrode tips pointing down, line it up with the connection port. Press firmly until it stops and you hear a click (Fig. 23). Then give it a little tug (without pushing the button on the side) to ensure it says in position. This helps with alignment of the electrode with the plate.

   NOTE: To remove the electrode array, depress the button on the left side of the array with your thumb and pull it straight out of the connection port. (Fig. 24)

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. 23—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.

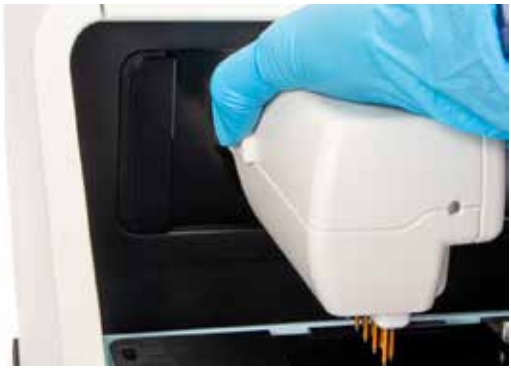


Fig. 24—Depress the button on the left side of the electrode array until you hear a click. Then, pull the array out to remove the electrode array. No light on the electrode array indicates the unit is off, and a red light on the electrode array indicates you are in offline mode. In either case, it is safe to remove the electrode array.

Starting the System

NOTE: Before you begin using the iPad, your IT department should register the device so that it is properly licensed to the organization. An iCloud account should be established to upload files. When you receive it, the iPad is configured to begin using the autosampler, but WPI recommends that you register it to your organization for optimal use of the device.

NOTE: On the iPad, the screen timeout is set to the maximum. If you are planning to use a different device to operate the EVOM™ Auto, set the screen timeout to the maximum. If the device screen turns off or goes into the sleep mode, it will disrupt the web browser connectivity with the autosampler. In this case, the web-browser window needs to be closed and launched each time to reestablish the connection

1. Power on the system by pressing the power button on the interface unit. Make sure the LED in the electrode array head is lit red (Fig. 22). The blue ring around the button on the interface unit illuminates (Fig. 26).

Fig. 25—The electrode array LED is illuminated red.

Fig. 26—The blue ring illuminates around the power button when the unit is powered on.

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. 27). 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. 27—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 36.

4. The Initializing window displays (Fig. 28) showing the progress. The window briefly displays a ready message when the initialization is complete (Fig. 29). Then, the *Main* window appears (Fig. 30).

Fig. 28—Initialization screen.

Fig. 29—Ready message displays briefly.

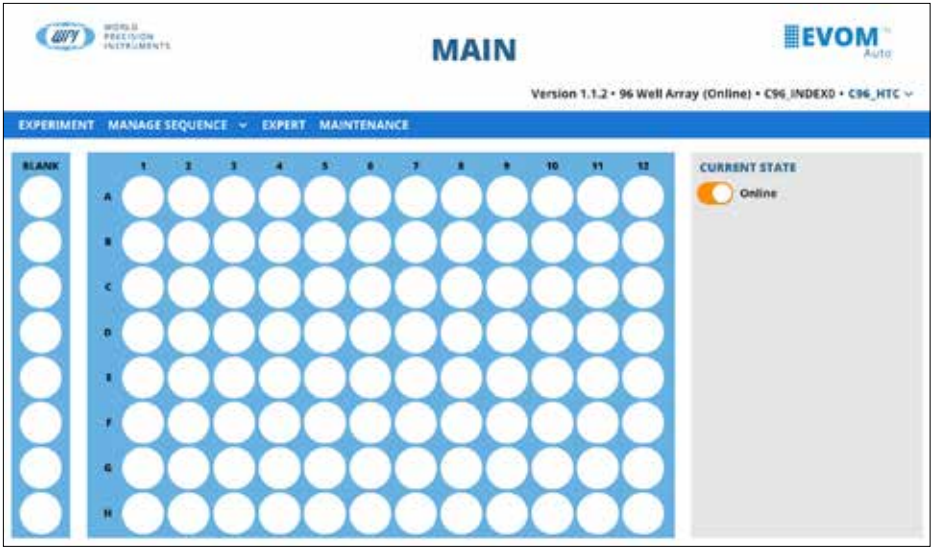


Fig. 30—Main window.

This is your main window. Keep the online slider enabled to perform experiments.

- The *Experiment* menu to select a sequence and start an experiment.
- The *Manage Sequence* menu to create or modify a sequence.
- The *Expert* menu lets you adjust the plate electrode coordinates (positioning).
- The *Maintenance* menu lets you perform electrode maintenance or cleaning, like chlorodizing or disinfection.

Lost Connection

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 *Click Here to Reconnect* button to re-establish your connection.

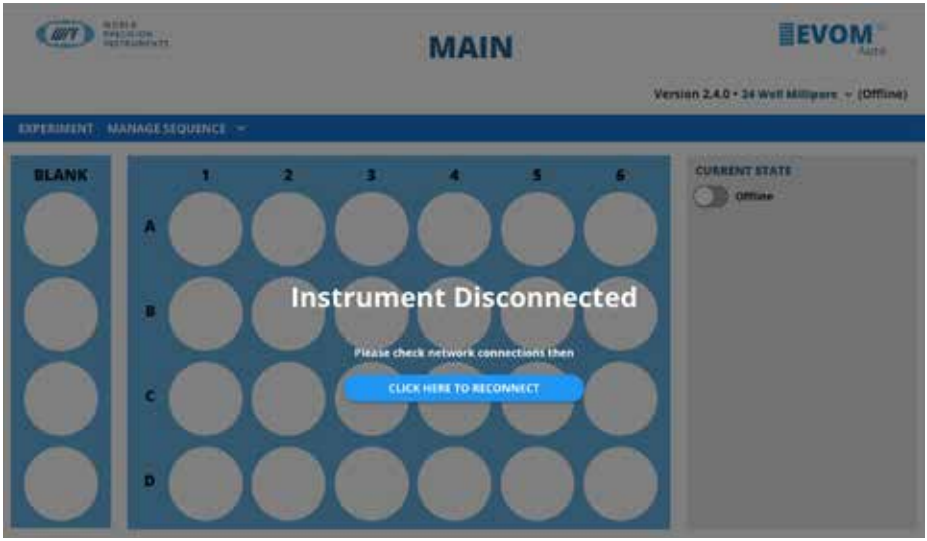


Fig. 31—The instrument connection with the control device was disrupted. Click the reconnect prompt to reestablish your connection.

Installing the Rinse Stations

1. Ensure that the electrode array is in the home position. Navigate to the *Experiment* window on the tablet and press the *Go Home* button.
2. Slide the rinse station into the pocket on the left side of the measurement plate (Fig. 32). Install a sterile disposable rinse station insert (Fig. 33). Add electrode cleaning, disinfection, or stabilization solutions to the rinse stations. For convenience or to maintain sterile conditions, use a fresh disposable rinse station insert after each sample plate reading or when switching to a different sample plate.

Fig. 32—(Left) Slide the rinse station into the pocket.
Fig. 33—(Right) Insert a sterile disposable rinse station insert in the base rinse station.

Fig. 34—The rinse station is positioned in the Rinse Station Pocket.

Installing the Well Plates

1. Ensure that the electrode array is in the home position.
2. Three plate positioners are included with the system. Choose the one that corresponds with your plate. Locate the three plate positioner slots in the base plate and line up the plate positioner with the slots.
   - C96/MT96 for Corning and MatTek 96 HTS plates
   - M96 for Millipore 96 HTS plates
   - C24 for Corning and Millipore 24 HTS plates

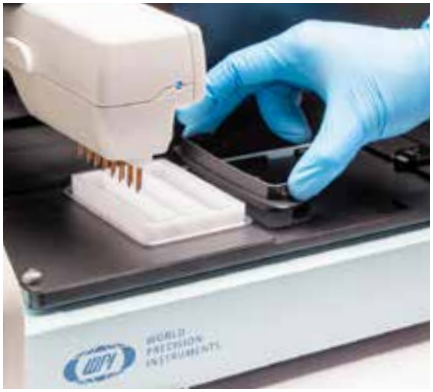


Fig. 35—Identify the slot to plug in the plate positioner
Fig. 36—Lightly press the plate positioner and plug the plate positioner in place.

3. Install the well plate by gently positioning the A1 well in the top corner of the plate positioner. Using the thumb of your right hand, retract the spring mechansm of the plate holder and gently lay the plate on the measurement plate and release the spring mechanism.

Fig. 37—(Left) Let the left side of the well plate (A1) rest on the base.
Fig. 38—(Right) Retract the spring mechanism of the plate holder and gently lay the right side of the plate in position.

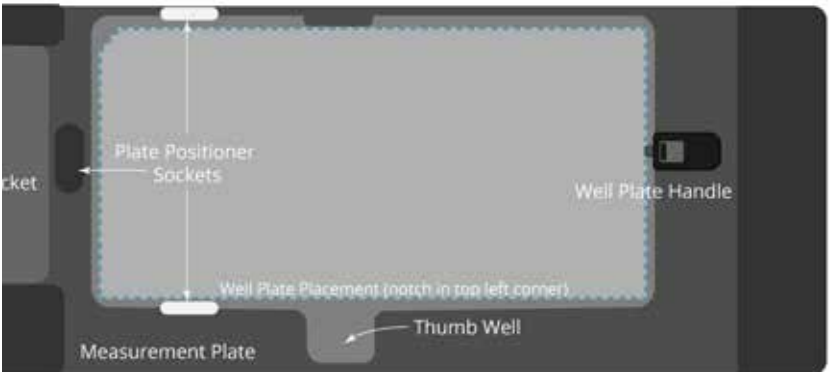


Fig. 39—Use the plate positioner to align the well plate.

Make sure the plate is secured in between plate positioner and well plate handle and sitting flat onto the base surface.

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. 40). A dropdown menu displays (Fig. 41).

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

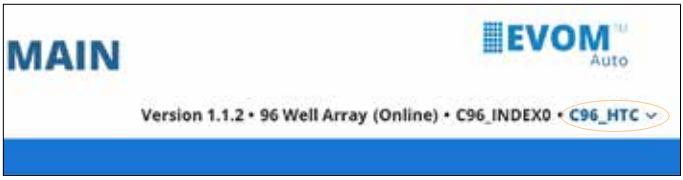


Fig. 40—Click on the brand in the upper right corner under the EVOM™ Auto logo to access the plate brand and plate profile menu.

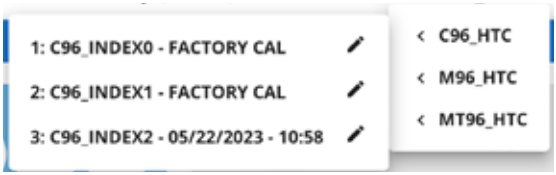


Fig. 41—The plate brand and profile menu displays. In offline mode, you can see all the plate brand options. In online mode, only the available option displays.

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.

Verifying Alignment

To ensure that the electrode array alignment was preserved during the shipping process, verify the alignment.

1. Place the appropriate depth adjustment fixture (MatTek, Corning or Millipore) in the well plate location as described in “Installing the Well Plates” on page 20.

Fig. 42—(Left) A variety of depth adjustment fixtures.
Fig. 43—Install the depth adjustment fixture where a well plate would go.

2. On the Main window select the appropriate plate from the drop-down on the right side of the header area under the logo. (C96_HTC for Corning 96, M96_HTC for Millipore 96 or MT96_HTC for MatTek 96) and select a plate profile.

   NOTE: You will only be able see plate options for the electrode array plugged in, not other plate types. For example, with a 24C electrode array plugged in, only the Corning 24 option would be visible to operate in the software.

3. Select the *Expert* menu to open the Expert window. Press the *Measure Position* button. The electrode array travels horizontally and then lowers the electrodes to the measurement depth. Once the electrode is positioned just above the height of the membrane, use the height adjustment fixture to verify the depth or adjust it using the up or down button in the software. The tips of the electrodes should stop just above the height of the depth adjustment fixture. The top surface of the depth adjustment fixture represents the location of the bottom of the membrane on the well plate. The electrodes should always be above this height (about 1mm). If the depth measurement is correct, click the *Save* button to store the settings. If not, see "APPENDIX A: Using Expert Mode to Position Well Plate" on page 26.

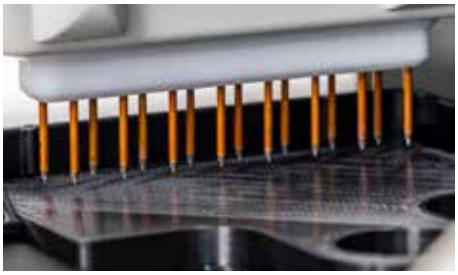


Fig. 44—The tips of the electrodes should stop just above the alignment tool without touching.

4. Select the *Experiment* menu to open the Experiment window, and press the *Go Home* button to send the electrode array to its home position.

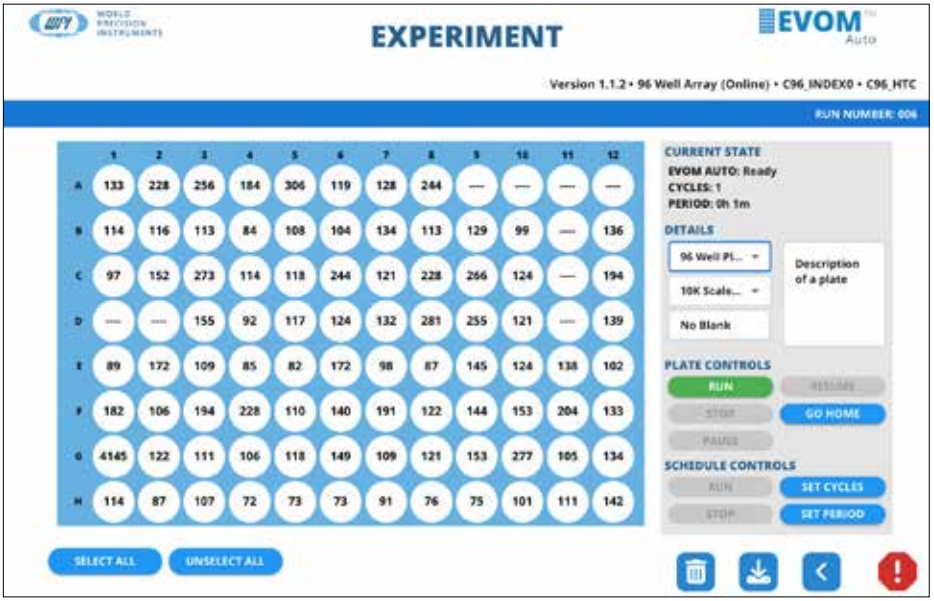


Fig. 45—The controls for the experiment are in the panel on the right side of the window.

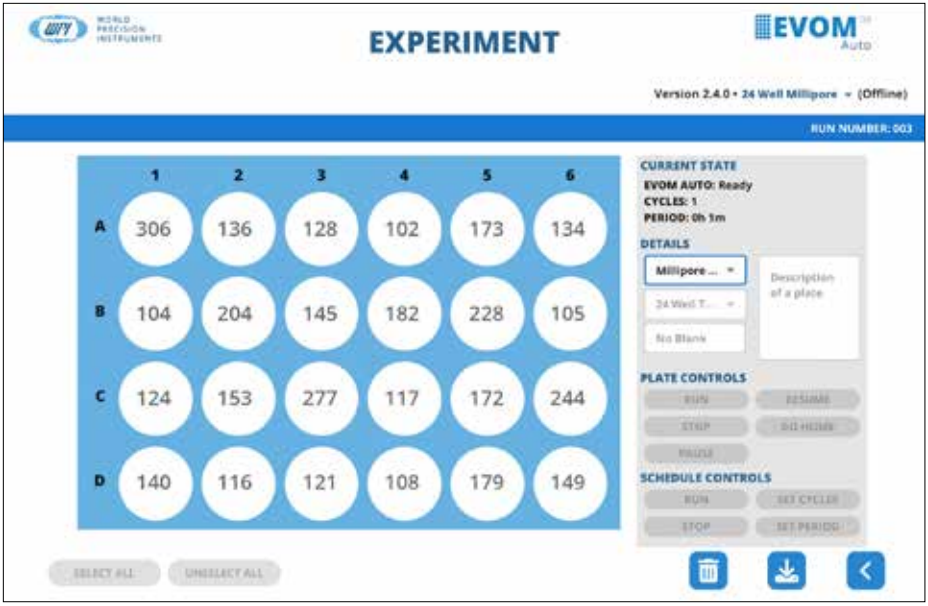


Fig. 46—A 24-well plate option in the offline mode is shown here.

5. Remove the depth adjustment fixture and install the matching plate positioner and the matching well plate. For example, the C24/M24 plate positioner and the Corning 24 well plate are used when a 24C electrode is plugged in.

Fig. 47—Plug the plate positioner into the slot. The plate positioner helps to keep the well plate properly aligned on the base.

6. From the *Plate Name* drop-down field in the *Details* area on the right side of the window, select *Alignment Check*.
7. From the *Sequence Name* drop-down field, select *Alignment Sequence*. This sequence directs the electrode array to travel to the first column and lower the electrode array to the measurement height. It then stays in that position for 10 seconds before moving to the last column and repeating the operation. Press the *Run* button in the *Plate Controls* area on the right side of the window to start the test sequence. If the electrode array is properly positioned, it will enter the first column and the last column easily and you are ready to begin making measurements.

   NOTE: You can cancel when you are asked to save the data collected. The electrode array will automatically travel to the home position.

   Make sure the correct plate is properly positioned in the well plate area, and the correct plate coordinate file is used. For example, make sure the MT96_HTC is used with a MatTek plate. If the electrode array does not look like it is in position or does not travel over the plate correctly, see "APPENDIX A: Using Expert Mode to Position Well Plate" on page 26.

APPENDIX A: USING EXPERT MODE TO POSITION WELL PLATE

In Expert mode, you can adjust the positions of the first column in the X direction and the depth of measurement (Z direction). If the position of the electrodes needs to be adjusted, select the *Expert Mode* menu. When entering the Expert mode, a warning displays indicating that potential damage to the instrument is possible (Fig. 48). Use caution. Once you have read the instructions on how to use this mode, press *Yes* to continue.

Fig. 48—Select Yes to continue.

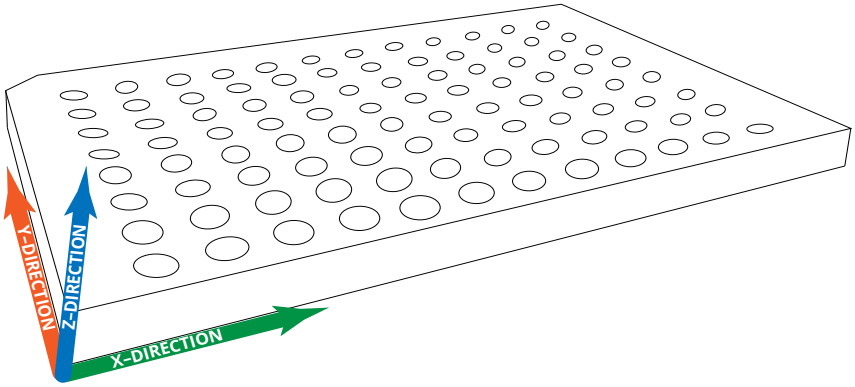


Fig. 49—You may make adjustments to the X and the Z directions.

There are two sections in the expert screen:

- Well Plate adjustments
- Rinse Station Adjustments

See Fig. 50.

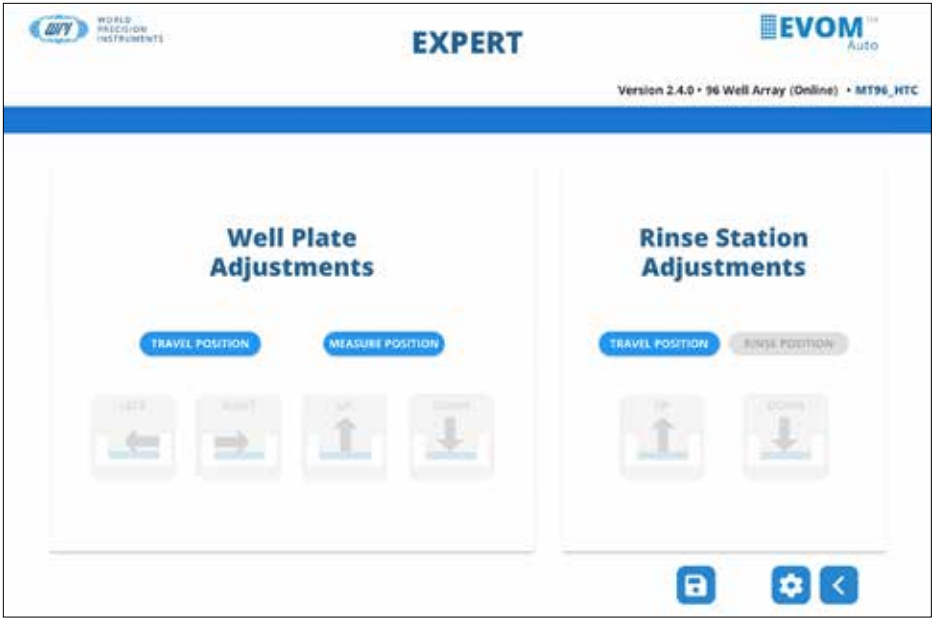


Fig. 50—The Expert window has two sections: well plate adjustments and rinse station adjustments.

Saving a Profile Setting

To save a profile, click on the Save button at the bottom of the window. A dialog box opens asking you to verify whether you want to save the profiles settings for that plate profile. Click *Continue* to save your settings or *Cancel* to abort the action.

Fig. 51—Save the new plate profile settings once you have adjusted.

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. Pressing this button immediately stops the electrode action.

If an electrode array encounters a crash with the plate, no matter what type of error

occurred (wrong plate or wrong plate positioner or plate-electrode coordinates being off), an emergency stop is automatically invoked. As soon as the the electrode array touches a solid surface (crash), an the emergency stop mechanism is initiated to prevent any damage to the electrode array. Whether you initiate the stop or it is an automatic system action, you will see this popup message. Click the *Home* button to send the electrode array to the home position.

Fig. 52—After an emergency stop is detected, your only option is to send electrode array to the home position. Make sure the well plate is sitting flat onto the base and the correct plate is being used.

Well Plate Adjustments

The well plate adjustments set the position parameters related to the measurements performed on the well plate.

Travel Position Button – This button places the electrode array on column 1 above the well plate at the travel position. The travel position is the height at which the electrode array travels across the well plate when moving from one column to another.

Measure Position Button – This button lowers the electrode array into column 1 down to the measuring depth.

Left and Right Buttons – These buttons move the electrode array to the left or to the right in the X direction. However, before moving, they lift the electrode array to the travel position and then move it. If you wish to see the electrode array inside the well, you can press the *Measure Position* button.

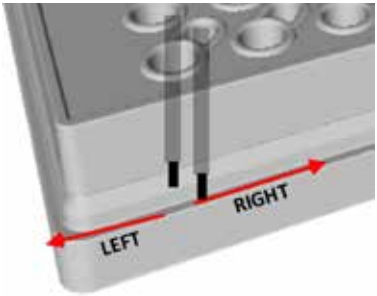


Fig. 53—The Left and Right buttons allow you to move the electrode array on the X-axis.

Up and Down Buttons – These buttons move up or down in the Z direction. Use this adjustment to set the measuring height to make sure it does not puncture the membrane on the well plate. When using the depth adjustment fixture make sure that none of the electrodes touch the plate surface and some clearing distance is added.

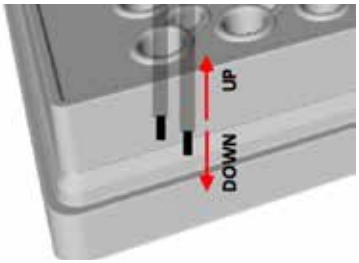


Fig. 54—The Up and Down buttons allow you to move the electrode array on the Z-axis.

Adjusting the Electrode Array Position

1. Select *Expert* from the main menu. A warning displays. Click the *Continue* button.
2. Press the *Go Home* button to place the electrode array away from the well plate area.
3. Install the appropriate depth adjustment fixture tool in the position of the well plate. This is a critical step.
4. Press the *Travel Position* button in the *Rinse Station Adjustments* area of the window (Fig. 55). This will move the electrode array to the position above rinse station 2. The electrodes' horizontal position is adjusted at the factory to place them in the center of the rinse station.

Fig. 55—In the Rinse Station Adjustment area, press the Travel Position button to move the Array over rinse station 2.

5. Press the *Rinse Position* button in the *Rinse Station Adjustments* area. This moves the electrode array to the rinsing position inside rinse station 2. Observe the depth and use the *Down* and *Up* buttons to lower or raise the electrode array, as needed. The *Up* and *Down* buttons become active.

6. Press the *Travel Position* button in the *Well Plate Adjustments* area. This places the electrode array above the depth adjustment fixture where the first column of wells should be.

Fig. 56—In the Well Plate Adjustment Area, press the Travel Position button.

7. Press the *Measure Position* button to bring the electrode array to the measurement depth.

Fig. 57—The electrode tips should be positioned above the plate, but should not touch it.

8. Use the *Up* and *Down* buttons to change the measuring height as needed. Make sure that no electrodes are touching the depth adjustment fixture tool and that there is clearance for the electrodes. (See "Selecting a Plate Brand and Plate Profile" on page 21.)
9. Once the initial alignment check is done with the depth adjustment fixture, the final check can be done with the appropriate well plate. Press the *Go Home* button to return the electrode array to its home position. Then, install the appropriate well plate.
10. Press the *Travel Position* button in the *Well Plate Adjustment* area. This will place the electrode array above the column 1.

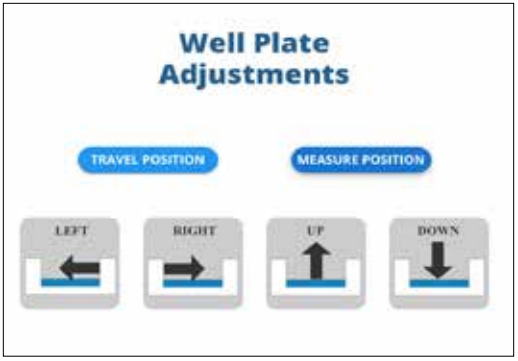


Fig. 58—In the Well Plate Adjustment Area, press the Travel Position button. After pressing the TRAVEL POSITION button only the left and right arrows are operational. The up and down arrows are greyed out

11. Visually verify that the electrodes are directly above the well plate openings. If necessary, use the *Left* and *Right* adjustment buttons to place the electrode array in the target area (X-axis adjustment).

Fig. 59—Make sure the electrodes align with the holes in the well plate.

12. Once aligned, press the *Measure Position* button. The electrodes will descend to the measurement level inside the wells. Make sure the electrodes don't hit the sides of the plate. If necessary, use the *Left* and *Right* buttons to place the electrodes in the optimal position.

Fig. 60—The electrodes are properly placed in the well plate.

13. Press the *Go Home* button.

14. When you are satisfied with the position, click the *Save* button. This saves the settings, and they become the new operational set of parameters. Or, press the *Back* button to cancel the action. The changes will not be saved.

15. Press the Back button to return to the Main window.

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. 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 networks. 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.)

APPENDIX C: RESTORE FACTORY DEFAULTS

If you need to restore the factory default parameters, press the *Restore icon* at the bottom of the *Expert* window. A popup window opens asking you to verify whether you want to restore factory settings for that plate profile (e.g. C24 user 1). Click *Continue* to restore the factory settings or *Cancel* to abort the action.

Fig. 61—Click continue to restore the factory settings.

APPENDIX D: IPAD SETUP AUTO-LOCK

Ensure these iPad settings are properly configured for the best experience with EVOM™ Auto software. Check your EVOM™ Auto iPad to ensure that steps 1–4 (below) have been applied.

1. On the iPad, navigate to *Settings.* Then, select *Display & Brightness*, and go to *Auto-Lock* at the bottom. Select *Never*. See Fig. 62 and Fig. 63.

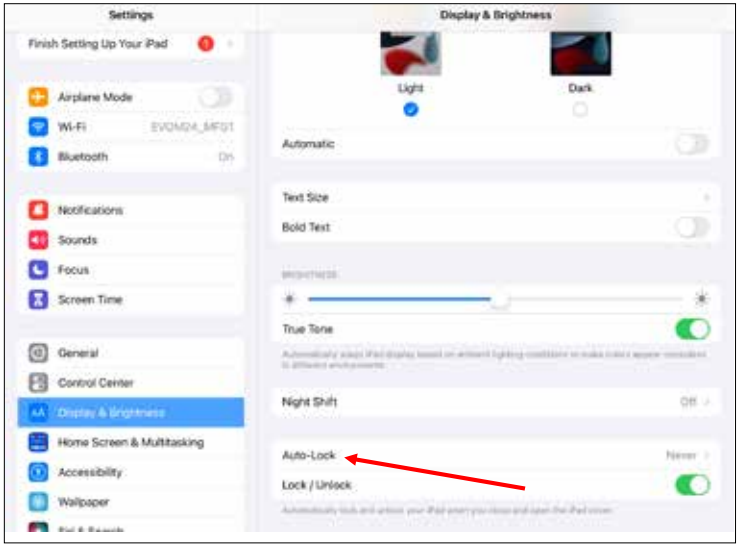


Fig. 62— Select Auto-Lock from the Display & Brightness setting.

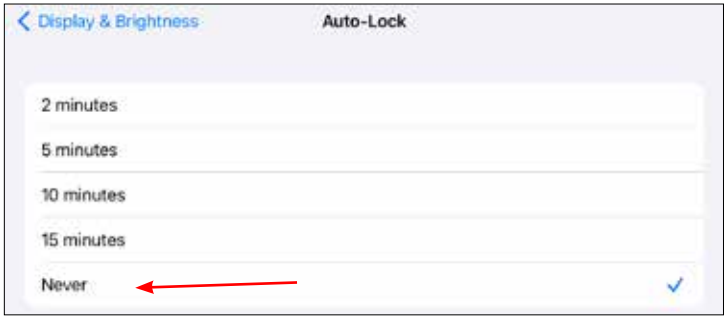


Fig. 63—Select Never.

4. From the home screen, while holding the iPad in landscape position, press the upper right corner of the screen and drag to the center without lifting the finger. This will bring up the following shortcut screen.

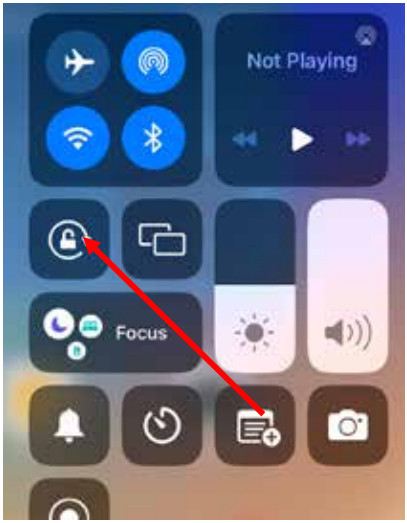


Fig. 64—Press the landscape auto lock. The icon will turn red.

APPENDIX D: ADDING LINK TO IPAD HOME SCREEN

By adding an EVOM™ Auto icon to the home screen of your iPad, you can open the program in full screen mode. If you do not have a link on your iPad to connect to the EVOM™ Auto software, follow steps 1–4 (below) to create the link.

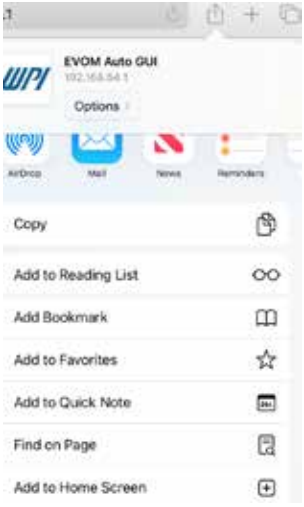
PRO TIP: Make sure you connect to the EVOM™ Auto Wi-Fi Access Point before trying to add this link.

1. To add a URL icon to the home screen, open Safari (or a web browser) and navigate to the URL (https://192.168.54.1:5000) on the tablet to load the EVOM™ Auto software.

2. Click the share icon found in the upper right corner of the tablet screen. A drop down menu list appears.

Fig. 65—Icon set in the upper right corner of the tablet window. The share icon is the first one.

3. Select *Add to Home Screen*. The *Add to Home* window appears.



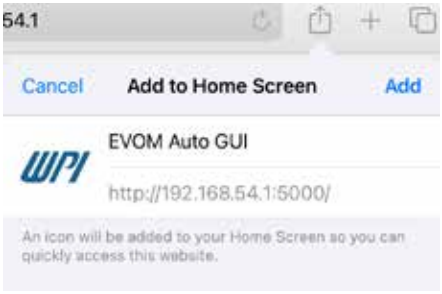


Fig. 66—(Left) Select Add to Home Screen.
Fig. 67—(Right) Enter EVOM Auto.

4. Enter “EVOM Auto” (or your preferred name for the icon) in the Add to Home window and click *Add* in the upper right corner. The new icon appears on your home screen. Tap the icon to open the web page in full screen mode.

DECLARATION OF CONFORMITY

WORLD PRECISION INSTRUMENTS, LLC.
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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.*

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