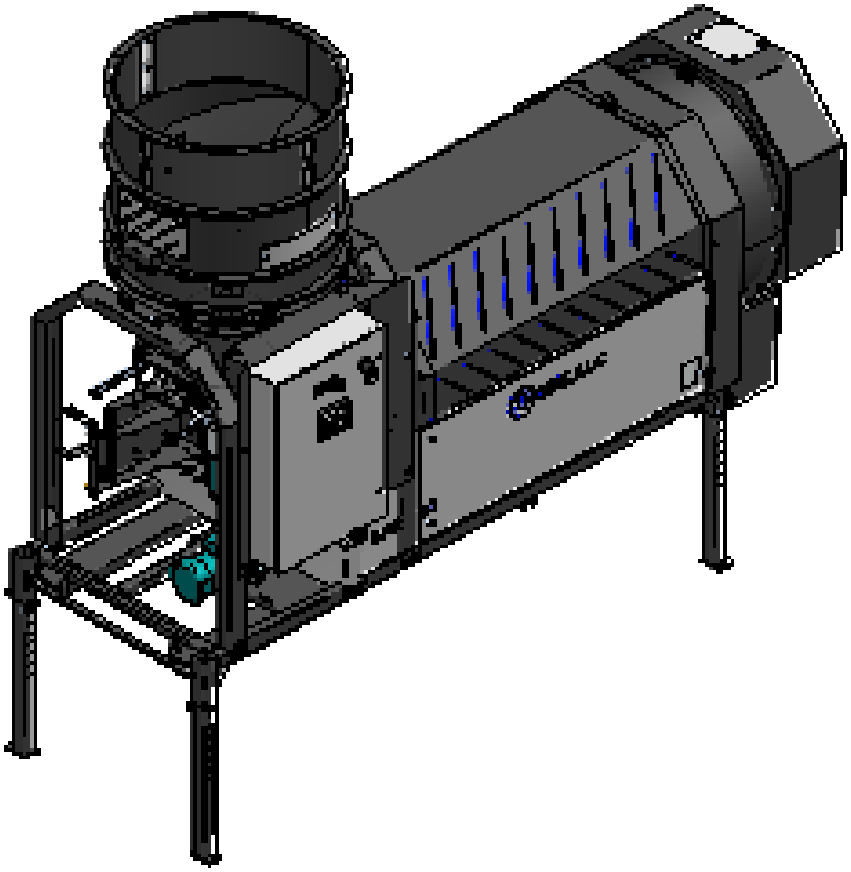
U-Treat Lite Automation

ELECTRICAL OPERATION



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Revision Effective 3 November 2019

INTRODUCTION

Thank you for choosing USC, LLC for your equipment needs. We appreciate your business and will work diligently to ensure that you are satisfied with your choice.

OVERVIEW

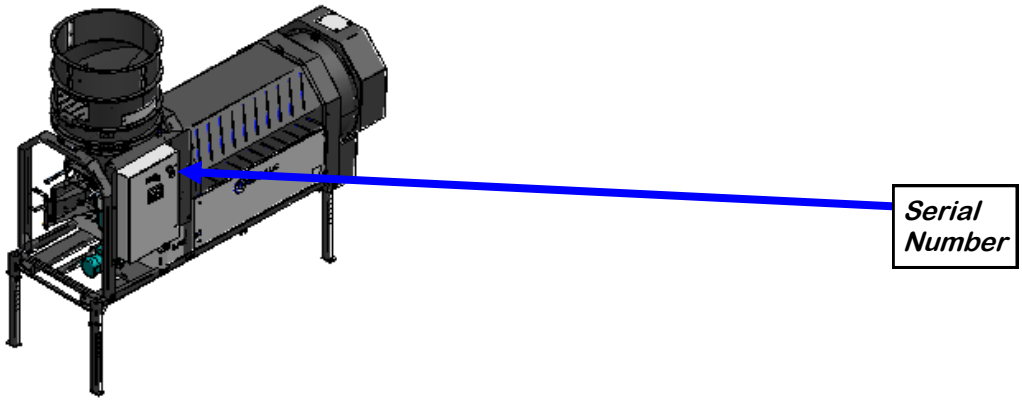
The purpose of this manual is to provide you with the basic information needed to operate and maintain the U-Treat Automation. It does not hold USC, LLC liable for any accidents or injuries that may occur.

The technical information provided in this document is based on extensive testing under controlled conditions at the USC research and development facility. This information is given without guarantee as the conditions of operation and storage of the equipment are beyond our control. Variables such as temperature, humidity, viscosity of chemical products and changes in seed size or variety may all effect the accuracy of application and seed coverage. Periodically check the equipment calibration while treating and make adjustments as required. This will insure the optimum seed coverage.

RECEIVING YOUR EQUIPMENT

As soon as the equipment is received, it should be carefully inspected to make certain that it has sustained no damage during shipment and that all items listed on the packing list are accounted for. If there is any damage or shortages, the purchaser must immediately notify USC, LLC. Ownership passes to purchaser when the unit leaves the USC, LLC. premises. The purchaser is responsible for unloading and mounting all components of the equipment.

Document the serial number of the machine for future reference. The serial number is located on the upper right hand corner of the main control panel.



SERIAL NUMBER:_____

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SECTION A SAFETY INSTRUCTIONS

Every year accidents in the work place maim, kill and injure people. Although it may be impossible to prevent all accidents, with the right combination of training, operating practices, safety devices, and operator vigilance, the number of accidents can be significantly reduced. The purpose of this section is to educate equipment users about hazards, unsafe practices, and recommended hazard avoidance techniques.

If any of the required regularly scheduled maintenance is located above the reach of the operator, they should follow the companies normal safe practices of reaching that particular height, utilizing the companies specified equipment and following normal safety precautions.

When working with treatment chemicals, operators should always wear protective gloves, safety glasses, and follow the companies safety precautions in the case of any spillage or operator contamination.

SAFETY WORDS AND SYMBOLS

It is very important that operators and maintenance personnel understand the words and symbols that are used to communicate safety information. Safety words, their meaning and format, have been standardized for U.S. manufacturers and published by the American National Standards Institute (ANSI). The European Community (E.C.) has adopted a different format based on the International Standards Organization (I.S.O.) and applicable machinery directives. Both formats are presented below.

⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury and/or property damage.
SAFETY INSTRUCTIONS	Provides additional information that the operator needs to be aware of to avoid a potentially hazardous situation.
NOTICE	Notice is used to notify people of important installation, operation or maintenance information which is not hazard related.

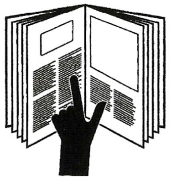
Mandatory Lockout Power Symbol. Disconnect, lockout and tagout electrical and other energy sources before inspecting, cleaning or performing maintenance on this panel.

International Safety Alert Symbol. The exclamation point (!) surrounded by a yellow triangle indicates that an injury hazard exists. However, it does not indicate the seriousness of potential injury. The exclamation point (!) is also used with the DANGER, WARNING and CAUTION symbols so the potential injury is indicated.

Electrocution Hazard Symbol. This symbol indicates that an electrocution hazard exists. Serious injury or death could result from contacting high voltage.

International Electrocution Hazard. This symbol indicates that an electrocution hazard exists. Serious injury or death could result from contacting high voltage.

Mandatory Read Manual Action Symbol. (I.S.O. format) This symbol instructs personnel to read the Operators Manual before servicing or operating the equipment.



Mandatory Read Manual Action Symbol. This symbol instructs personnel to read the Operators Manual before servicing or operating the equipment.

LOCKOUT / TAGOUT PROCEDURES

Lockout/Tagout is the placement of a lock/tag on an energy isolating device in accordance with an established procedure. When taking equipment out of service to perform maintenance or repair work, always follow the lockout / tagout procedures as outlined in ANSI Z344.1 and/or OSHA Standard 1910.147. This standard "requires employers to establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices and to otherwise disable machines or equipment to prevent unexpected energizing, start-up, or release of stored energy in order to prevent injury to employees."

EMERGENCY STOP

There is an Emergency Stop push button on all LPV and LPX Seed Treaters which is located on the Treater Control Panel. The LPX Automated Treater has an additional Emergency Stop pushbutton on the Main Control Panel. Actuators of emergency stop shall be colored RED. The background immediately around the device actuator shall be colored YELLOW. The actuator pushbutton operated device shall be of the palm or mushroom head type.

CONTROLLED STOP

This is the stopping of machine motion by reducing the electrical command signal to 0 (zero) once the stop signal has been recognized.

HAZARD REVIEW

Electrocution Hazard

Electrocution accidents are most likely to occur during maintenance of the electrical system or when working on or near exposed high voltage wiring. This hazard does not exist when the electrical power has been disconnected, properly locked, and tagged out.

Automatic Start Hazard

This equipment may be controlled by an automated system and may start without warning. Failure to properly disconnect, lockout, and tagout all energy sources of remotely controlled equipment creates a very hazardous situation and could cause injury or even death. PLEASE STAY CLEAR AND BE ALERT.

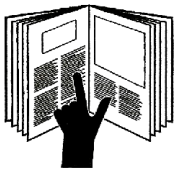
YOU are responsible for the **SAFE** operation and maintenance of your USC, LLC equipment . **YOU** must ensure that you and anyone else who is going to operate, maintain or work around the equipment be familiar with the operating and maintenance procedures and related **SAFETY** information contained in this manual. This manual will take you step-by-step through your working day and alert you to good safety practices that should be adhered to while operating the equipment

Remember, **YOU** are the key to safety. Good safety practices not only protect you, but also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this equipment is familiar with the recommended operating and maintenance procedures and follows all the safety precautions. Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

- Equipment owners must give operating instructions to operators or employees before allowing them to operate the machine, and at least annually thereafter per OSHA (Occupational Safety and Health Administration) regulation 1928.57.
- The most important safety device on this equipment is a **SAFE** operator. It is the operator's responsibility to read and understand **ALL** Safety and Operating instructions in the manual and to follow them. All accidents can be avoided.
- A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.
- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment.
- Think SAFETY! Work SAFELY!

GENERAL SAFETY

1. Read and understand the operator's manual and all safety labels before operating, maintaining, adjusting or unplugging the equipment .



2. Only trained persons shall operate the equipment . An untrained operator is not qualified to operate the machine.
3. Have a first-aid kit available for use should the need arise, and know how to use it.

4. Provide a fire extinguisher for use in case of an accident. Store in a highly visible place.
5. Do not allow children, spectators or bystanders within hazard area of machine.
6. Wear appropriate protective gear. This includes but is not limited to:

   - A hard hat
   - Protective shoes with slip resistant soles
   - Protective goggles
   - Heavy gloves
   - Hearing protection
   - Respirator or filter mask

7. Place all controls in neutral or off, stop motor, and wait for all moving parts to stop. Then disable power source before servicing, adjusting, repairing, or unplugging.

8. Review safety related items annually with all personnel who will be operating or maintaining the equipment.

OPERATING SAFETY:

1. Read and understand the operator's manual and all safety labels before using.
2. Disconnect and disable electrical supply completely and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
3. Clear the area of bystanders, especially children, before starting.
4. Be familiar with the machine hazard area. If anyone enters hazard area, shut down machine immediately. Clear the area before restarting.
5. Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
6. Stay away from overhead obstructions and power lines during operation and transporting. Electrocution can occur without direct contact.
7. Do not operate machine when any guards are removed.
8. Inspect welds and repair if needed.

PLACEMENT SAFETY

1. Move only with the appropriate equipment
2. Stay away from overhead power lines when moving equipment. Electrocution can occur without direct contact.
3. Be familiar with machine hazard area. If anyone enters hazard areas, shut down machine immediately. Clear the area before restarting.
4. Operate the equipment on level ground free of debris. Anchor the equipment to prevent tipping or upending.

⚠ WARNING

Before placement of the equipment, be sure that ground is reasonably level. The equipment may topple or work improperly if the ground is too uneven, damaging the equipment and / or causing personal injury.

MAINTENANCE SAFETY

1. Review the operator's manual and all safety items before working with, maintaining or operating the equipment .
2. Place all controls in neutral or off, stop motors, disable power source, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
3. Follow good shop practices:

   Keep service area clean and dry.
   Be sure electrical outlets and tools are properly grounded.
   Use adequate light for the job at hand.
4. Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
5. Clear the area of bystanders, especially children, when carrying out any maintenance and repairs or making any adjustments.
6. Before resuming work, install and secure all guards when maintenance work is completed.
7. Keep safety labels clean. Replace any sign that is damaged or not clearly visible.

SAFETY LABELS

1. Keep safety labels clean and legible at all times.
2. Replace safety labels that are missing or have become illegible.
3. Replaced parts that displayed a safety label should also display the current label.
4. Replacement safety labels are available. Contact your authorized dealer.

How to Install Safety Labels:

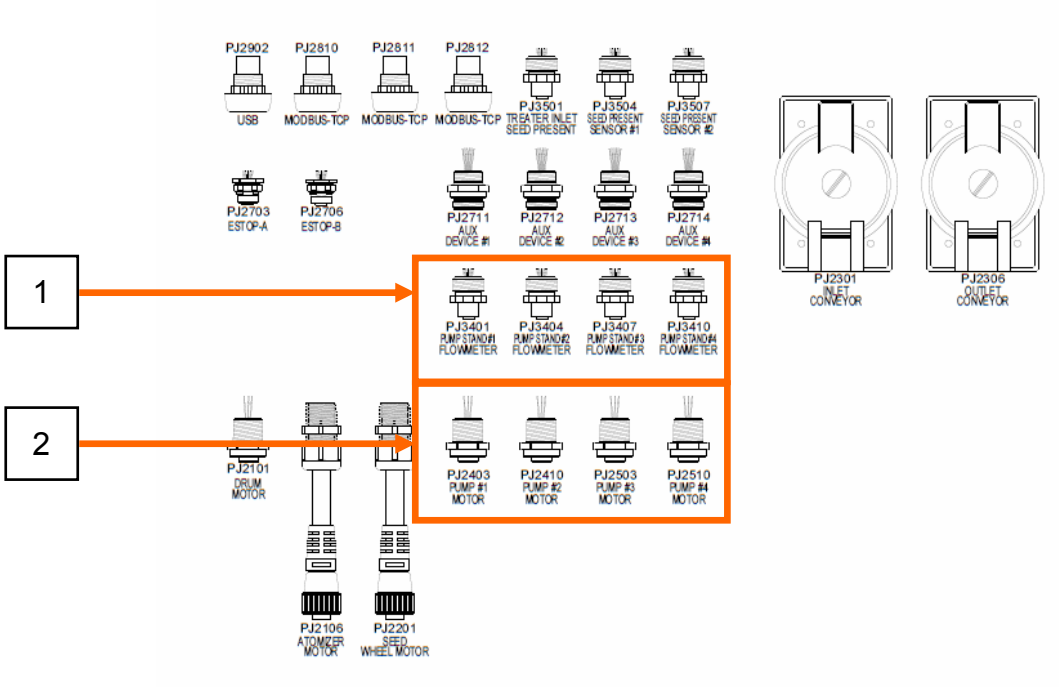
- Be sure that the installation area is clean and dry.
- Be sure temperature is above 50°F (10°C).
- Decide on the exact position before you remove the backing paper.
- Remove the smallest portion of the split backing paper.
- Align the sign over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the sign in place.
- Small air pockets can be pierced with a pin and smoothed out using the piece of sign backing paper.

Located on the USC equipment you will find safety labels. Always be sure to read and follow all directions on the labels.

Guards provided with USC equipment are to remain in place during operation.

INSTALLATION SECTION B

1. Attach cable from the FLOW METER connection on the bottom of the pump stand control panel to one of the 4 PUMP STAND FLOW METER connections on the bottom of the treater control panel.
2. Connect the cable from the PUMP MOTOR connector on the bottom of the pump stand control panel to the PUMP MOTOR connector on the bottom of the treater control panel .
3. Be sure to connect both cables from each pump stand to the same set of connectors on the treater control panel.



ELECTRICAL OPERATION SECTION C

DANGER **HIGH VOLTAGE ~** Always disconnect the power source before working on or near the control panel or lead wires.

DANGER **HIGH VOLTAGE ~** Use insulated tools when making adjustments while the controls are under power.

CAUTION AUTHORIZED PERSONNEL only shall work on the control panel. Never allow anyone who has not read and familiarized themselves with the owner's manual to open or work on the control panels.

NOTICE **USC strongly recommends that you implement a routine data export strategy. This will give your company a regularly updated back-up file containing all of the important information in your seed treating system. Customer, seed, bin and chemical profiles, as well as chemical recipes may easily be restored in the event of a catastrophic system failure, such as a lightening strike or PLC failure. Reports may not be imported back into the system, but you will still have an electronic copy for your records. USC recommends daily back-ups.**

NOTICE **USC recommends the use of a surge protection device with a minimum rating of 400 Joules for all automated main control panels.**

General Panel Descriptions:

- The LPX Panel is an enclosure that contains the electrical components required to control the seed treater. This includes the VFDs for the Seed Wheel and or an actuator for Loss in Weight Gate. Power for the treater is supplied here. Power to this panel is usually hard wired.

USC STARTUP SCREEN

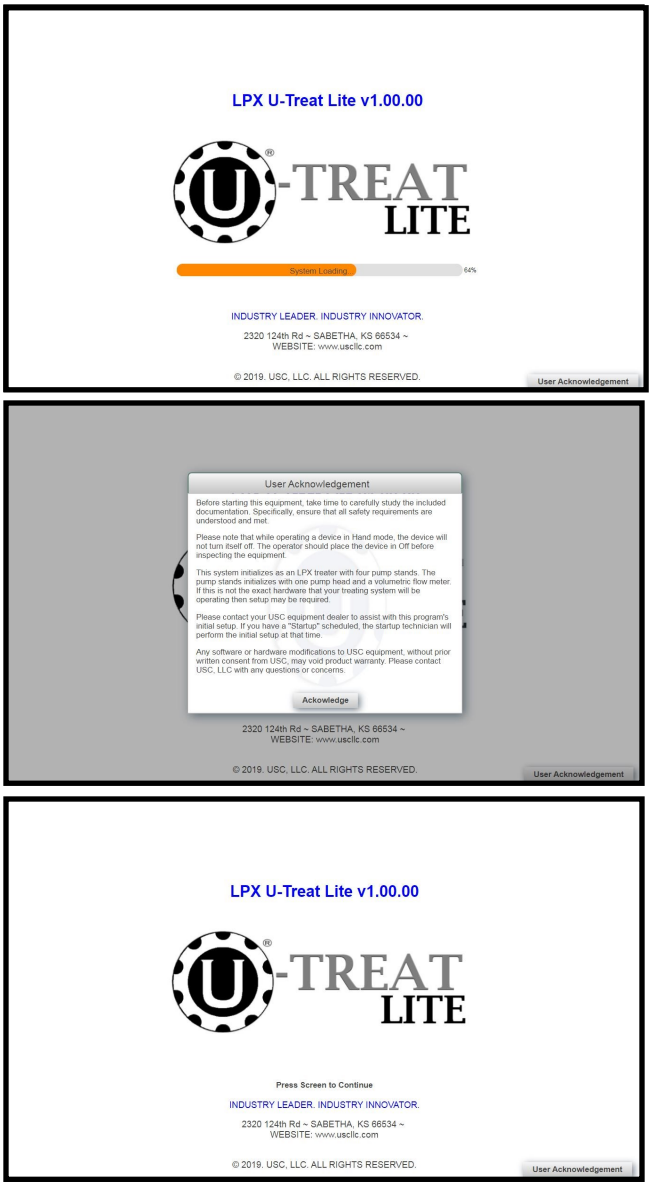
This is the first screen the operator will see after the system receives power at the initial startup.

While the system is booting up, the touch screen will display a progress bar at the bottom of the Start Up Screen (see page 13, top).

Once the progress bar reaches the end it will disappear and be replaced with the User Acknowledgement statement, push the Acknowledge button at the bottom of the popup window to close the screen (see page 13 middle).

After the User Acknowledgement statement has been read, press anywhere on the screen and it will advance to the Main screen (see page 1, bottom).

USC STARTUP SCREEN



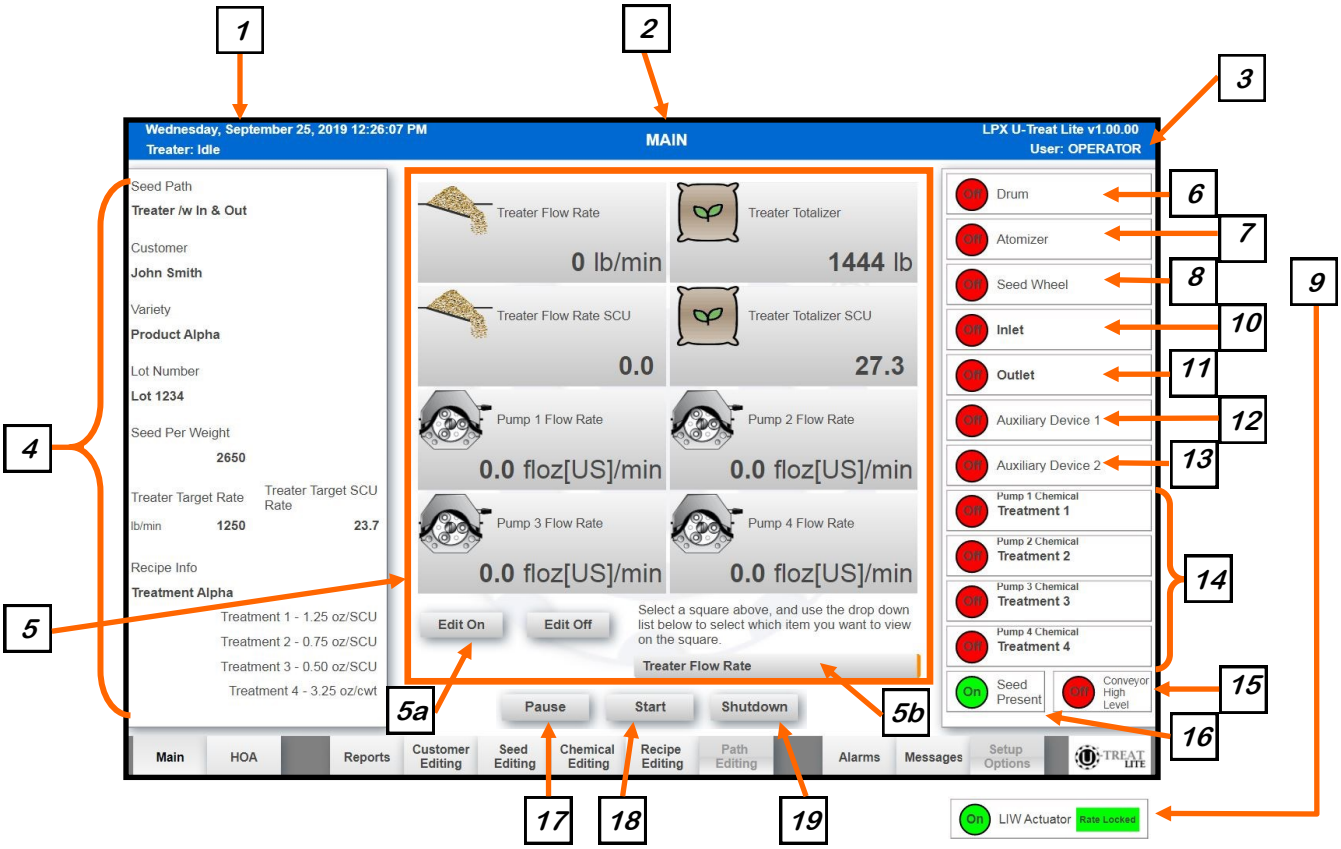
FUNCTIONS COMMON TO ALL SCREENS

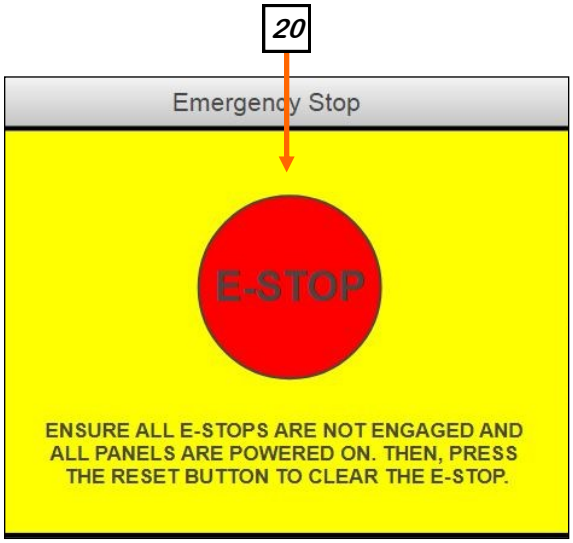
At the top of every screen is the dark blue title bar. In the center of the screen is the title. In the upper left corner is the date and time. Below that is the treater message bar. It will display messages notifying the operator of which stage the treating process is in. In the top right corner is the program version, and current user identification.

At the bottom of every screen are the buttons that the operator uses to navigate from one screen to another. Pressing the button in the lower right hand corner with USC U-Treat Lite logo on it returns the operator to the startup screen.

MAIN SCREEN

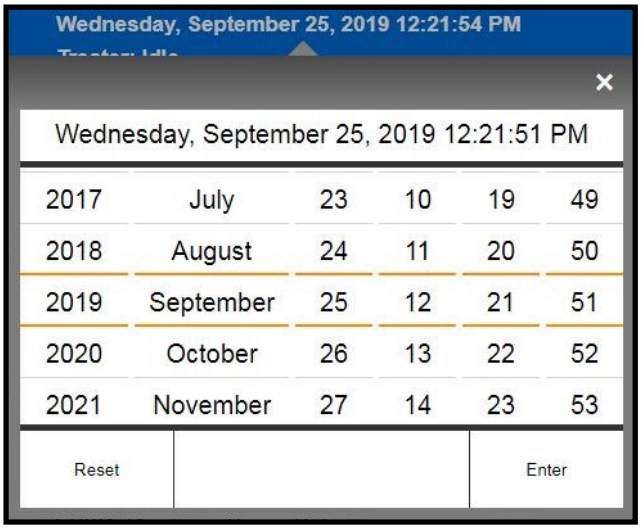
This screen informs the operator of the status of all system motors and electrical devices and allows for control / adjustment of system operations.





MAIN SCREEN DESCRIPTIONS

1. DATE & TIME: The date and time are displayed in the upper left corner of the screen. If you press the text, a dialog will appear and allow you set the Date and Time. To select the correct Date and Time, scroll on the respective field to the desired value.



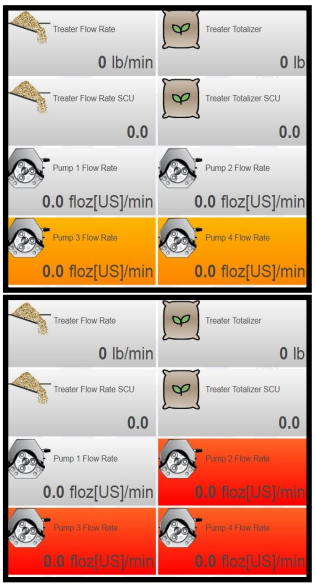
2. TITLE BAR: Displays the current page name.

3. SECURITY SCREEN: In the upper right corner is the current user name. If you press the text, a dialog will appear. The operator uses this input to obtain access to all options on this screen. When the Username/Password box is pressed a keypad will appear on the screen. Select the up arrow on the left side to enter upper case text. **Pressing the up arrow twice will activate the CAPS lock.** The Username will be **OPERATOR**. The password is **USC** and should only be made accessible to personnel qualified to operate the system. Press Login to complete the login process. The username and password are both case sensitive.

4. CURRENT RUN PARAMETERS: These displays show the general information that was entered on the Start Setup popup screen prior to starting the run. This includes the selected Seed Path, Customer, Seed Variety, and Chemical Recipe. This will also include the Target Treating Rate and the SCU Treating Rate based on the currently selected Seed Variety.

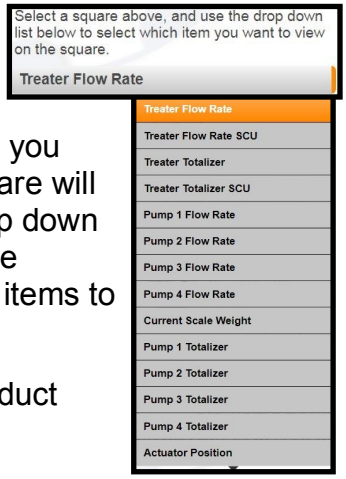
MAIN SCREEN DESCRIPTIONS

5. WATCH VIEW: This section is a configurable window that will allow you to select what you would like to view and modify how you would like to view it.



5a. MODIFYING WATCH VIEW LAYOUT: To change the layout and size of the boxes in the Watch View, press the Edit On button shown on right. Once Edit On is pressed you can select several of the Watch View squares within the 4x4 grid to either Combine or Split them up. You may only Combine Watch View squares that form a rectangle. If the squares are Orange (shown on upper right) then a valid Combine combination is active. If the squares are Red (shown on lower right) then an invalid Combine combination is active. If a larger square that had been previously combined is selected, Split can be pressed to break them up into the smallest square. Once you are satisfied with how your Watch View is laid out, select Edit Off to prevent unintended layout changes.

5b. MODIFYING WATCH VIEW DISPLAY ITEMS: To change the items displayed in the Watch View, make sure that Layout Editing is off by selecting Edit Off. Select the square that you wish to change within the Watch View. Please note that the square will not highlight or change colors when it is selected. Using the drop down list (shown to the right), select a new item to take the place of the selected square. Below is a list of items that can be selected as items to view in the Watch View.



Treater Flow Rate: This display indicates the amount of product being treated per minute in real time.

Treater Flow Rate SCU: This display indicates the amount of product being treated per minute in real time in Seed Count Units. This value is based on currently selected Seed Variety.

Treater Totalizer: This display indicates the amount of seed the program estimates has been treated on the current or last run. It will display the final number after the run is complete.

Treater Totalizer SCU: This display indicates the amount of seed in Seed Count Units the program estimates has been treated on the current or last run. It will display the final number after the run is complete. This value is based on currently selected Seed Variety.

5b. MODIFYING WATCH VIEW DISPLAY ITEMS (Continued):

Pump 1-4 Flow Rate: This display indicates the amount of chemical being treated per minute in real time.

Current Scale Weight: This display indicates the amount of weight currently on the scale. This item is for LIW systems only.

Pump 1-4 Totalizer: This display indicates the amount of chemical the program estimates has been used on the current or last run. It will display the final number after the run is complete.

Actuator Position: This display indicates the actuators real position out of 20,000 total positions. This item is for LIW systems only.

6. DRUM MOTOR INDICATOR: Informs the operator if the motor for the drum is ON or OFF.

7. ATOMIZER MOTOR INDICATOR: Informs the operator if the motor for the atomizer is ON or OFF.

8. SEED WHEEL MOTOR INDICATOR: Informs the operator if the motor for the seed wheel is ON or OFF. This will only be displayed on Seed Wheel systems.

9. LIW ACTUATOR INDICATOR: Informs the operator if the LIW actuator is ON or OFF. Rate Locked will be displayed if it has been configured during a run and the rate has been locked in. This will only be displayed on LIW systems.

10. AUXILIARY CONVEYOR 1 MOTOR INDICATOR: Informs the operator if the motor for the first auxiliary conveyor is ON or OFF.

11. AUXILIARY CONVEYOR 2 MOTOR INDICATOR: Informs the operator if the motor for the second auxiliary conveyor is ON or OFF.

12. AUXILIARY DEVICE 1 INDICATOR: Informs the operator if the first set of auxiliary devices are ON or OFF.

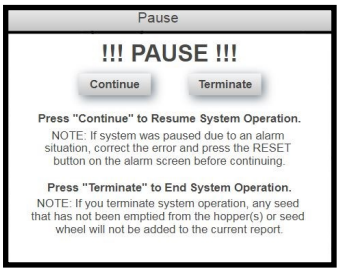
13. AUXILIARY DEVICE 2 INDICATOR: Informs the operator if the second set of auxiliary devices are ON or OFF.

14. Pump 1-4 MOTOR INDICATOR: Informs the operator if the motor for the pumps are ON or OFF.

15. CONVEYOR HIGH LEVEL INDICATOR: Informs the operator if the conveyor high level indicator is detecting seed.

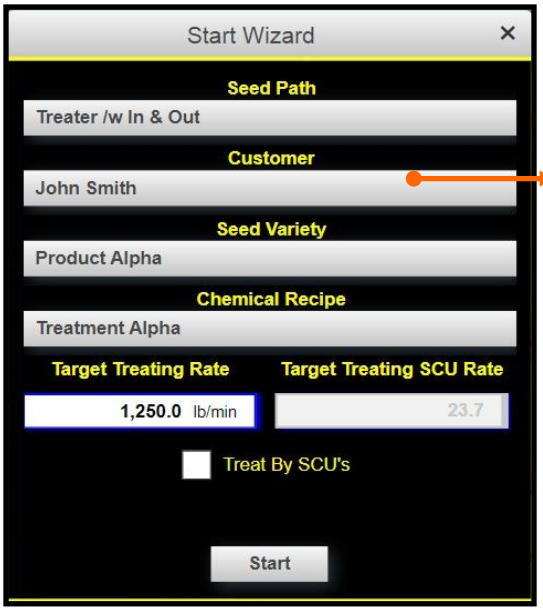
MAIN SCREEN DESCRIPTIONS

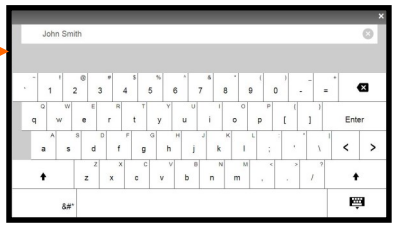
16. SEED PRESENT INDICATOR: Informs the operator if the seed metering device is detecting seed.



17. PAUSE: Once the Start button has been pushed and the system begins to operate, the Pause button appears. Pressing it will stop the run in progress. If the system was automatically paused by the system due to an alarm situation, correct the error then press the reset button on the control panel. The operator may now press the Continue button to resume the run. If they press the Terminate button, any seed that has not been emptied from the hopper or seed wheel will not be added to the current report.

18. START WIZARD: This is used to start the machine after all motors have been placed into the Auto position. Press the button and a pop-up window appears. You may select the seed path, customer, seed variety, and chemical recipe by selecting one of the box's in the popup or search the listing for an existing entry by typing the name in the search field or using the navigation arrows. The target treating rate can be entered by weight per minute or SCU per minute depending on whether the Treat By SCU's check box is checked. When all the information has been added press Start to begin the run. Once the system begins to operate it becomes the Shutdown button.





By pressing the up arrow once, the next character typed will be uppercased. By pressing the up arrow twice, all the following characters will be uppercased until the arrow is pressed again.

19. SHUTDOWN: Pressing this button will shutdown the seed metering device and finish coating the product in the drum.

20. EMERGENCY STOP: This display is activated when the system's E-Stop button is activated.

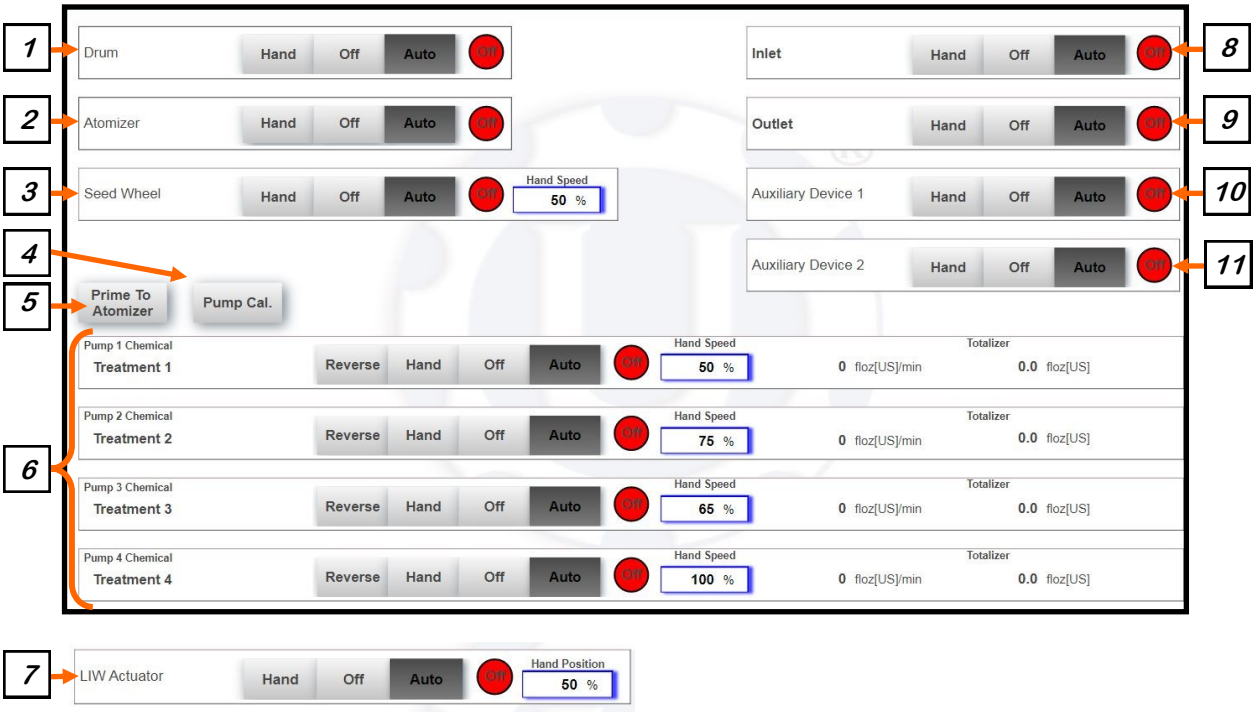
TREATER H-O-A (HAND-OFF-AUTO) SCREENS

⚠ WARNING

These H-O-A buttons force the selected component to be energized (HAND), de-energized (OFF), or automatically energized by the normal logic sequence (AUTO). The HAND function will cause the component to operate independent of whatever else the system is trying to do automatically. These functions should not normally be used if the automated sequencing is active. **Be sure to understand the impact of energizing or de-energizing a component with the settings before using them. These commands are not a substitute for Lockout/ Tagout procedures when working on or near this machine. Use proper lockout/tagout procedures to disable the equipment before servicing it.**

Hand-Off-Auto controls are provided for most of the automated devices in the system, and are accessed on this screen. All treater, conveyor and pump stand motors are controlled here.

TREATER H-O-A (HAND-OFF-AUTO) SCREEN

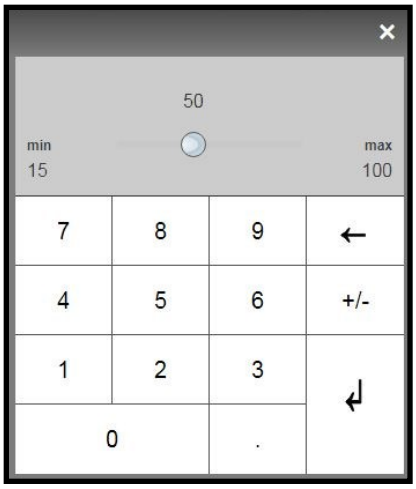


TREATER H-O-A (HAND-OFF-AUTO) SCREEN

1. DRUM CONTROL MODULE: This module controls the function of the drum. The Hand button will place the drum in the manual mode of operation. The Off button will turn the associated device in the Off mode of operation. The Auto button will place the device in the automatic mode of operation. The motor will not operate in this function unless all other needed devices are in the Auto mode and the Start button is pressed on the main screen.

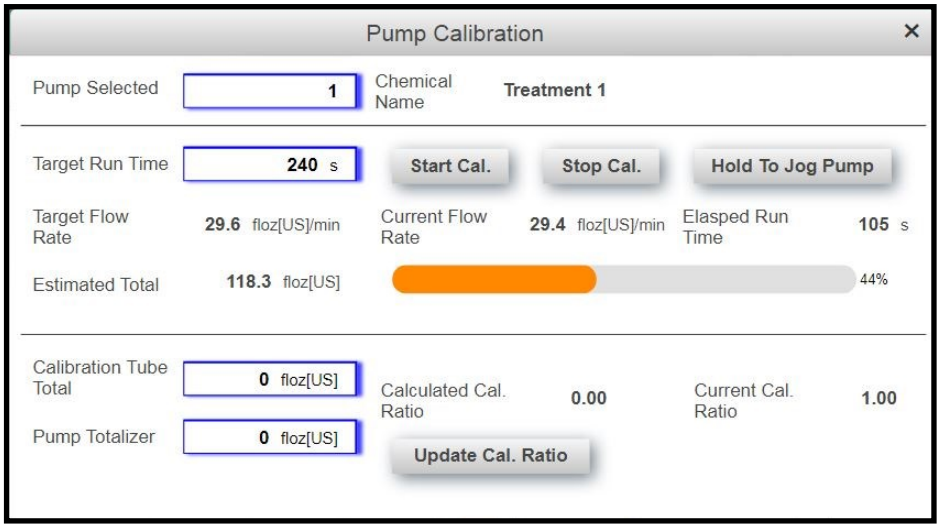
2. ATOMIZER CONTROL MODULE: This module controls the function of the atomizer. The Hand button will place the atomizer in the manual mode of operation. The Off button will turn the associated device in the Off mode of operation. The Auto button will place the device in the automatic mode of operation. The motor will not operate in this function unless all other needed devices are in the Auto mode and either the Prime to Atomizer or the Start button is pressed on the main screen.

3. SEED WHEEL CONTROL MODULE: This module controls the function of the seed meting wheel. The Hand button will start the seed metering wheel motor to the selected speed percentage. The Off button will turn the seed meter wheel motor off. The Auto button will place the seed meter wheel in the automatic mode of operation. The seed meter wheel motor will not operate in this function unless all other needed devices are in the Auto mode and the Start button is pressed on the main screen. By pressing the Hand Speed button, a numeric touch pad (right) will appear to allow the operator to manually adjust the percentage of the motor speed. When running in the Auto mode the program will override this manual setting. This module will only be displayed on Seed Wheel systems.



TREATER H-O-A (HAND-OFF-AUTO) SCREEN

4. PUMP CALIBRATION: Pressing this button brings up the pump calibration screen shown below. This screen is used to calibrate the pumps. Enter the number of the pump you wish to calibrate. Ensure that you have a chemical recipe selected that includes a chemical to calibrate with. Enter a target run time for the calibration process. The longer the run time the more accurate the calibration. USC recommends a minimum of 60 seconds. Holding the Jog Pump Motor button will turn the pumps on and off to fill the process lines attached to the top of the calibration tube. Release the button again to stop the flow. Continue until liquid in the calibration tube is at the zero mark. You can also place a measuring receptacle under the tube coming from the valve. Press the Start Cal. button to begin the calibration. When the target run time has elapsed, the pump will shutoff automatically. If for any reason you need to stop the process, press the Stop Cal. button. If the calibration is stopped before the target time has elapsed, the operator must start the process over again. If you press start and continue from your stopping point, the calibration will not be accurate. Enter the receptacle reading in the Calibration Tube Total. Press the Update Ratio button to correct the ratio. Closing this popup will stop the calibration process if it has not been completed.



5. PRIME TO ATOMIZER: Used before a controlled startup to preload chemical in the tubing leading to the atomizer. To operate this button, place the atomizer and any pump or auxiliary device that will be used in the Auto mode. Next press and hold the Prime to Atomizer button. The atomizer, pumps, and auxiliary devices will turn on and the liquid will be directed to the atomizer. The atomizer, pumps, and auxiliary devices will run as long as the button is being pressed. When the button is released the atomizer, pumps, and auxiliary devices will shut-off.

TREATER H-O-A (HAND-OFF-AUTO) SCREEN

6. PUMP CONTROL MODULES: These modules control the function of the Pump Stands. The Hand button will place the desired pump in the manual mode of operation. The Off button will turn the associated device in the Off mode of operation. When OFF the REV. button appears. This allows the operator to reverse the pump direction and pump the product back into the tank. The Auto button will place the device in the automatic mode of operation. The pump will not operate in this function until the Start button is pressed on the main screen. By pressing the Hand Speed button, a numeric touch pad will appear to allow the operator to manually adjust the speed of the pumps. When running in the Auto mode the program will override this setting. To the right of the Hand Speed is the Flow Rate Indicator, which shows liquid flow rate in real time. To the right of the Flow Rate Indicator is the Liquid Totalizer. This shows the estimated total chemical ran. Pressing the Liquid Totalizer will reset the total back to zero.

7. LIW ACTUATOR CONTROL MODULE: This module controls the function of the LIW Actuator Gate. The Hand button will open the LIW Actuator Gate to the selected open percentage. The Off button will turn the LIW Actuator Gate off. The Auto button will place the LIW Actuator Gate in the automatic mode of operation. The LIW Actuator Gate will not operate in this function unless all other needed devices are in the Auto mode and the Start button is pressed on the main screen. By pressing the Hand Position button, a numeric touch pad will appear to allow the operator to manually adjust the percentage of the gate. When running in the Auto mode the program will override this manual setting. This module will only be displayed on LIW systems.

8. AUXILAIRY CONVEYOR 1 CONTROL MODULE: This module controls the function of the first auxiliary conveyor. The Hand button will request it to turn on in the manual mode of operation. The Off button will request it to place the associated device in the Off mode of operation. The Auto button will place the program in the automatic mode of operation. The request to turn the conveyor motor On will not be sent unless all other needed devices are in the Auto mode and the Start button is pressed on the main screen.

9. AUXILAIRY CONVEYOR 2 CONTROL MODULE: This module controls the function of the second auxiliary conveyor. The Hand button will request it to turn on in the manual mode of operation. The Off button will request it to place the associated device in the Off mode of operation. The Auto button will place the program in the automatic mode of operation. The request to turn the conveyor motor On will not be sent unless all other needed devices are in the Auto mode and the Start button is pressed on the main screen.

TREATER H-O-A (HAND-OFF-AUTO) SCREEN

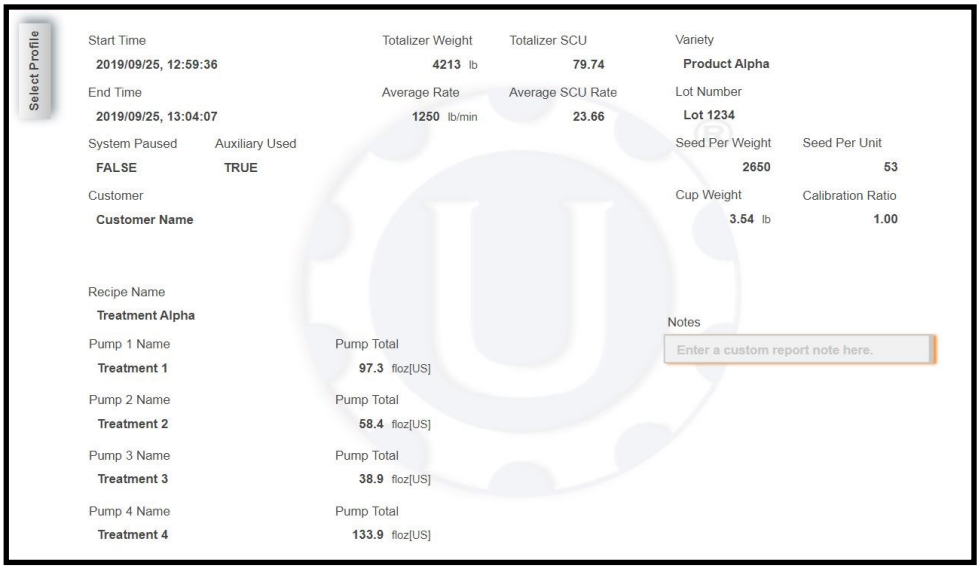
10. AUXILIARY DEVICE 1 CONTROL: These modules allow the operator to control any unit which is plugged into auxiliary port 1 or 2 located on the bottom of the treater control panel. The Hand button will allow the user to operate the unit in the manual mode of operation. The Off button will disconnect control to the auxiliary port. The Auto button will place the unit in the automatic mode of operation. Any unit plugged into the auxiliary port will not operate in this function until the Start button is pressed on the main screen. It will also turn off using the same logic as the pump stands.

11. AUXILIARY DEVICE 2 CONTROL: These modules allow the operator to control any unit which is plugged into auxiliary port 3 or 4 located on the bottom of the treater control panel. The Hand button will allow the user to operate the unit in the manual mode of operation. The Off button will disconnect control to the auxiliary port. The Auto button will place the unit in the automatic mode of operation. Any unit plugged into the auxiliary port will not operate in this function until the Start button is pressed on the main screen. It will also turn off using the same logic as the pump stands.

REPORTS

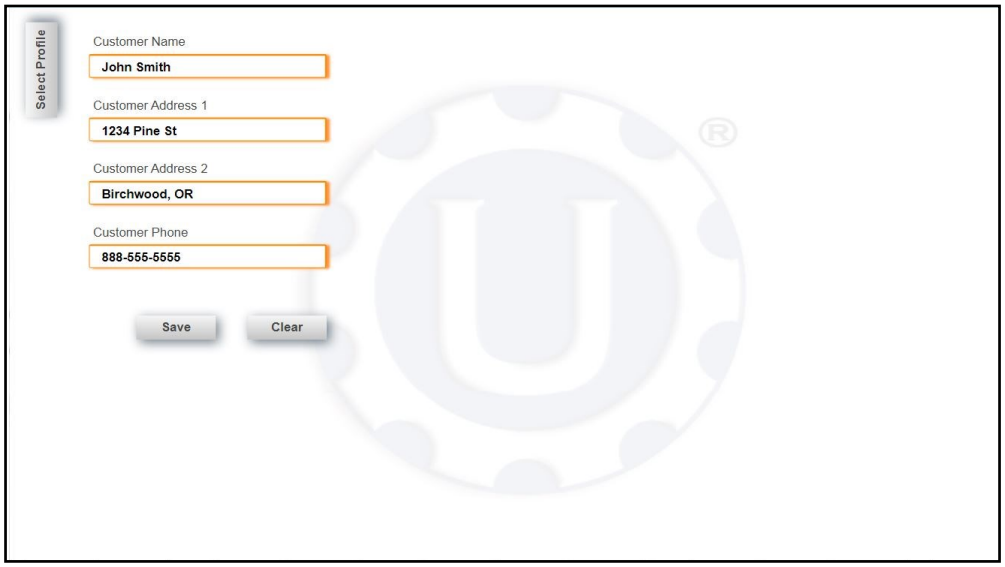
After the run is complete and all of the seed has been run into the drum, press the shutdown button. Once a run is finished the data is saved automatically in the reports file. The operator may access these records from the Reports screen. Press the Reports button and you will be viewing the last recorded run. The top of the screen displays all of the information recorded from the run. At the bottom, the values for the pumps are shown. To the right of the pumps is a field to view notes. These notes can be modified by an administrator by selecting the field and entering the notes.

Selecting the Select Profile button in the upper left corner activates a dropdown list displaying all of the reports. Use the arrows to scroll through them or press the grey box to enter the name of a specific report. That report will be brought to the top of the list. Select that report to view it's details. The system is capable of storing up to 5000 entries.



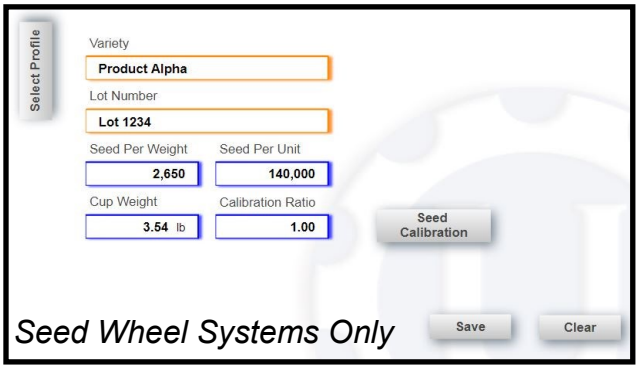
PROFILE EDITING SCREENS

CUSTOMER EDITING: Pressing this button will advance to the Customer Editing screen. If you are looking for a specific customer, select the Select Profile button in the upper left corner to open the customer profile list. You may enter the name in the Search box at the top of the customer list or use the arrows to scroll through the list. To create a new customer profile, select a used or unused profile from the list, select the name box and key in a new name and all of the information of the customer, then press the Save button.

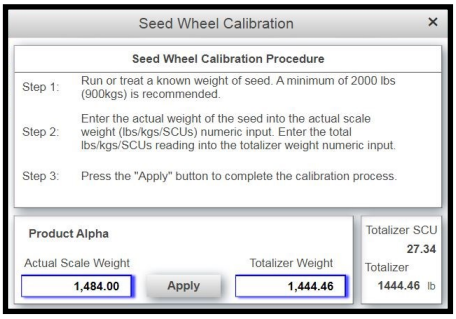


PROFILE EDITING SCREENS

SEED EDITING: Pressing this button will advance to the Seed Editing screen. If you are looking for a specific seed, select the Select Profile button in the upper left corner to open the seed profile list. You may enter the name in the Search box at the top of the seed list or use the arrows to scroll through the list. To create a new seed profile, select a used or unused profile from the list, select the name box and key in a new name and all of the characteristics of the seed, then press the Save button.

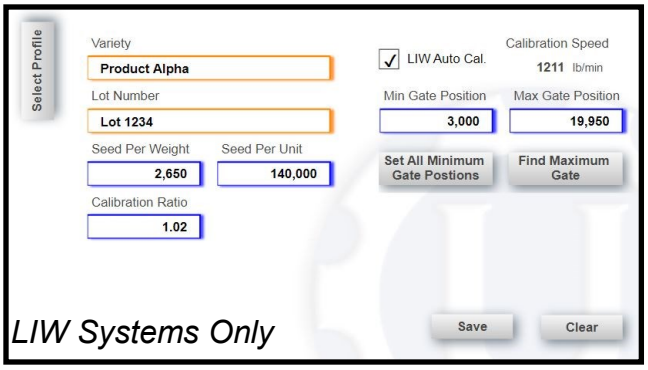


Seed Wheel Systems Only



Pressing Seed Calibration causes a pop up screen to appear that allows for the calibration of the seed variety for the Seed Wheel.

From the Seed Wheel Calibration pop up, enter the actual scale weight from the run. Then press the Apply button. This will enter the two weights in the system and return the operator to the Seed Editing screen. You must press the Save button again to confirm the updated calibration ratio.



LIW Systems Only

Checking the LIW Auto Cal. box will automatically calibrate the LIW Actuator during a run.

Calibration Speed will indicate the flow rate that the LIW Actuator last calibrated at, while LIW Auto Cal. is checked.

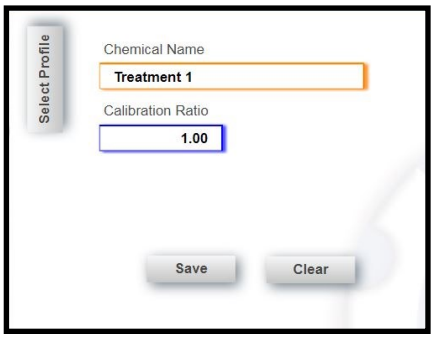
Min Gate Position indicates the minimum actuator position that allows the selected seed variety to have a steady flow of seed. This can be applied to all other seed varieties by pressing the Set All Minimum Gate Positions button.

Max Gate indicates the maximum actuator position achievable by the system. The max

NOTICE **Cup Weight Information can be found on page 30**

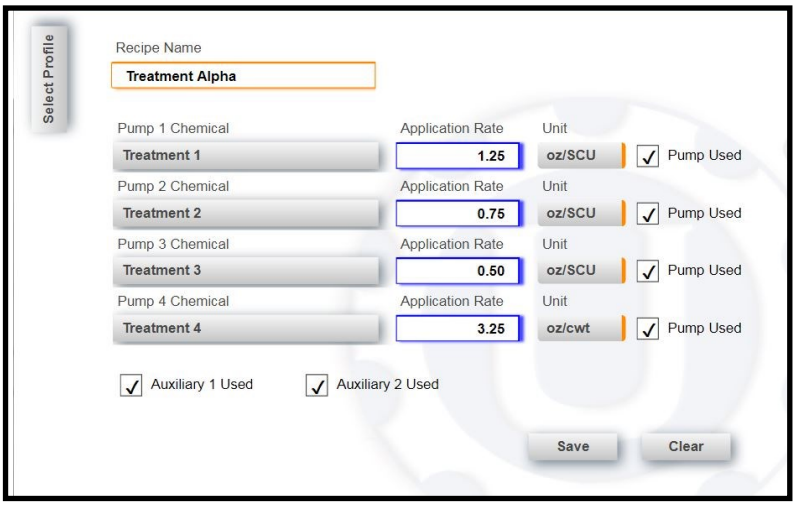
PROFILE EDITING SCREENS

CHEMICAL EDITING: Pressing this button will advance to the Chemical Editing screen where the operator may define the parameters for each individual chemical. If you are looking for a specific profile you may select the Select Profile button in the upper left corner to access the chemical profile list. You may enter the name in the Search box at the top of the chemical list or use the arrows to scroll through the list. To create a new chemical profile, select a used or unused box from the list, select the name box and key in a new name and all of the characteristics of the chemical, then press the Save button. After you press save, there will be a delay while the system searches for any recipe profiles that may need updated.



RECIPE EDITING: Pressing this button will advance to the Recipe Editing screen where the operator defines the parameters for each Recipe. If you are looking for a specific profile you may select the Select Profile button in the upper left corner to access the recipe profile list. You may enter the in the Search box at the top of the recipe list or use the arrows to scroll through the list. To create a new recipe profile, select a used or unused box from the list, select the name box and key in a new name and all of the characteristics of the recipe, then press the Save button

Choose which pumps will be active and the chemical for each pump. Pressing the chemical box for each pump, a drop down list will appear with all the chemicals that have been entered in the system. Choose a chemical from the list to select the chemical. After assigning a chemical the operator must define the treating rate. Pressing the first box to the right of the chemical brings up a numeric keyboard to enter the number application rate. The button to the right of that will open a drop down list to select between hundredweight and Seed Count Units. The last check box will tell the system that when this recipe is selected what pumps will be used.



ALARMS SCREEN

The Alarms screen shows a listing of system alarms both current and reset. If an alarm is active, a red triangle (shown to right) will appear on the Alarms navigation button located on the bottom bar. You can also observe the Treater Status, in the upper left hand corner, to see if the treater is in an alarmed state.

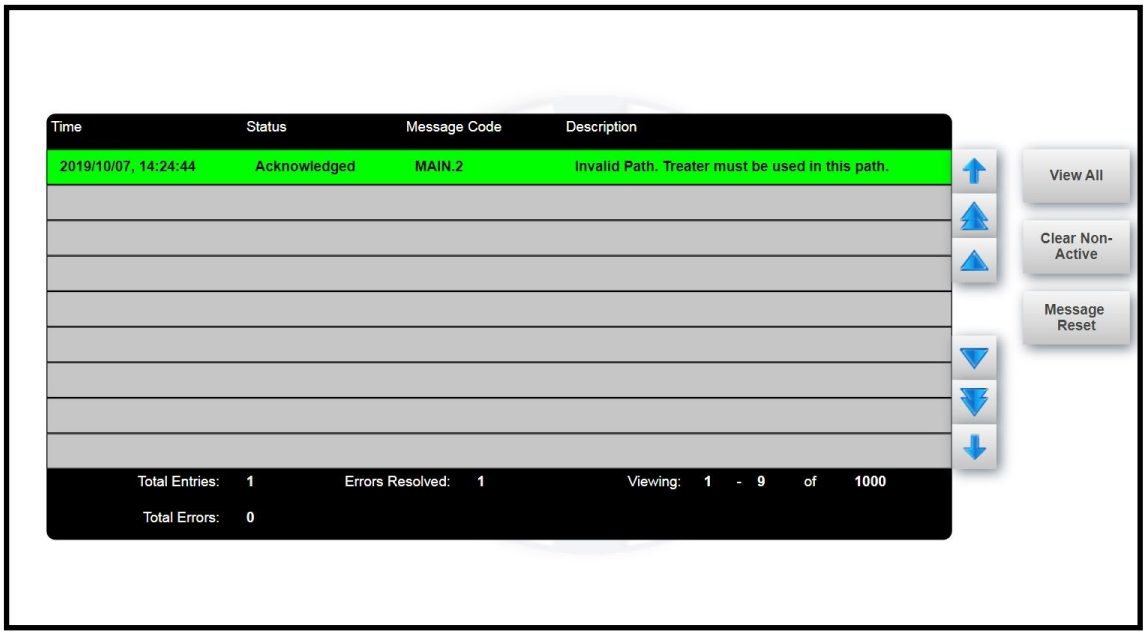
1. VIEW ALL: This button toggles between View All to display all alarms and faults stored at any given time. When an alarm or fault occurs, it will be shown in the list with a red background until the Reset button is pressed, then it will turn green.

2. CLEAR NON-ACTIVE: The alarm status will change to Acknowledged once an alarm condition has been resolved and the Reset button has cleared the alarm. Pressing this button will clear all alarms with the status of acknowledged.

3. RESET: After you think you have resolved the issue that caused the alarm, pressing this button will clear the alarm as confirmation. If you did not correct the problem it will alarm again.

MESSAGES SCREEN

The Messages screen shows a listing of system messages both current and reset. If a message is active, a yellow triangle (shown to right) will appear on the Messages navigation button located on the bottom bar.



1. VIEW ALL: Press this button to view all messages stored at any given time . When an message occurs, it will be shown in the list with a yellow background until the Reset button is pressed, then it will turn green.

2. CLEAR NON-ACTIVE: The message status will change to Acknowledged once an message condition has been resolved and the Reset button has cleared the message. Pressing this button will clear all messages with the status of acknowledged.

3. RESET: After you think you have resolved the issue that caused the message, pressing this button will clear the message as confirmation. If you did not correct the problem the message will appear again.

DETERMINING SEED CUP WEIGHT

The following is a list of steps to use when calibrating the seed wheel. A seed calibration cup, funnel, stand, and scale are used to calibrate the seed wheel.

1. Set the empty seed calibration cup on the scale and zero out the weight of the cup.
2. Place the funnel and stand in the seed to be treated or a separate container (see page 31, figure 1). This will help to avoid any unnecessary clean-up while filling and leveling the top of the seed calibration cup.
3. Place your hand under the bottom of the funnel and fill the funnel up with seed.
4. Place the calibration cup under the funnel stand and remove your hand from the bottom of the funnel, and allow the cup to be filled (see page 31, figure 1).

Seed Calibration Cup

5. After the cup has been filled, strike off the top of the calibration cup with a straight edge (see page 31, figure 2).

NOTICE **Do <u>not</u> shake the cup.**

6. Weigh the sample of seed (see page 31, figure 3).

NOTICE **A typical weight of the sample of seed will be anywhere between 2.8 to 4.0 lbs. Anything over or under this range could be caused by not zeroing out the weight of the cup, or the scale may be set on the wrong units.**

DETERMINING SEED CUP WEIGHT

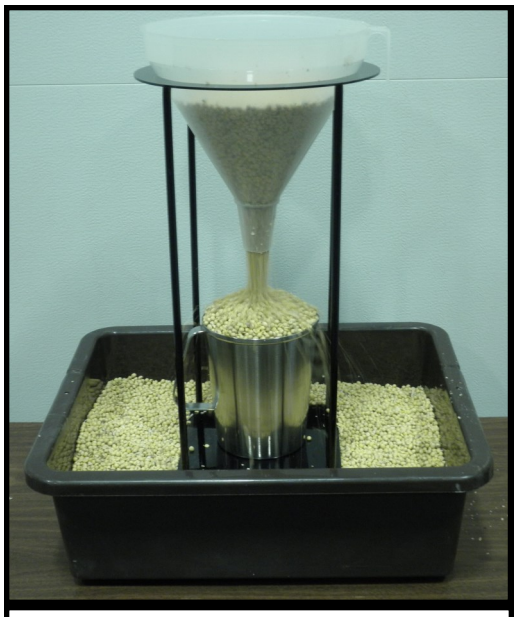


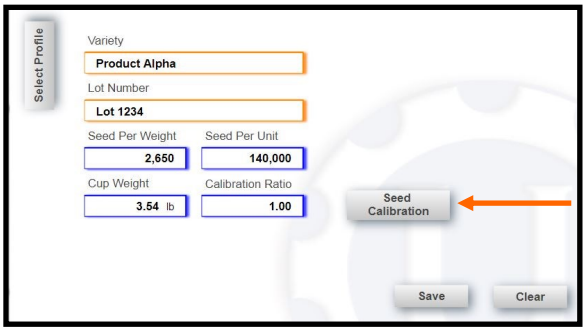
Figure 1

Figure 2

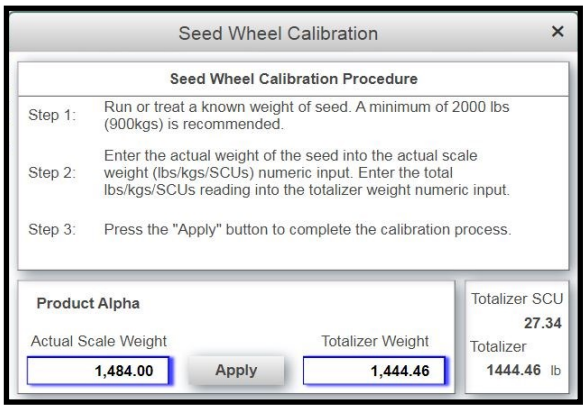
Figure 3

SEED FLOW CALIBRATION SEED WHEEL

1. Press the Seed Editing button on the popup screen. Press the Select Profile button to bring up the seed list and select the seed profile you wish to calibrate. The seed profile may now be edited and calibrated. Press the Seed Wheel Calibration Calculator button to open the Seed Wheel Calibration popup screen.

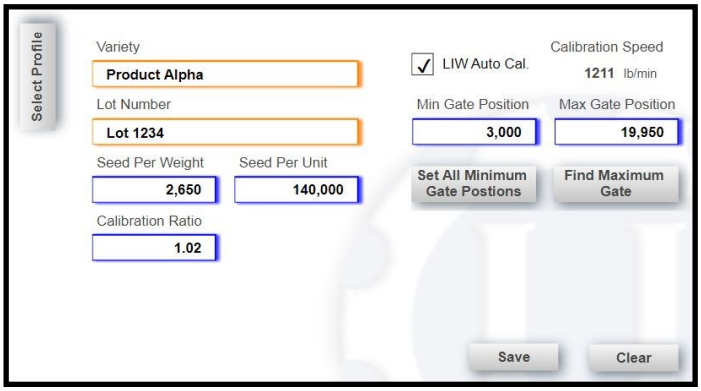


2. From the Seed Wheel Calibration Calculator popup screen, enter the actual scale weight and the totalizer weight from the run. Then press the Apply button. This will enter the two weights in the system and return the operator to the Seed Editing screen. You must press the Save button again as the system will update the calibration ratio based on this calculation.



SEED FLOW CALIBRATION LOSS IN WEIGHT

1. Press the Profile Editing Screens button and then push the Seed Editing button on the popup screen. Press the Select Profile button to bring up the seed list and select the seed profile you wish to calibrate. The seed profile may be edited and the seed actuator gate may be calibrated for that seed. The operator must press Save button before leaving the profile or the changes will be lost and go back to what that profile was previously set to.



2. Setting Minimum Gate Position is adjustable for every profile or may be set the same for every profile. If you have varying seed sizes is it suggested to set them for each profile. This setting indicates the lowest setting that seed will flow at. To set it for a certain seed you will need to have seed available in the buffer zone above the actuator gate. With the gate completely closed, go to the H-O-A screen and set the LIW Actuator Hand Position setting to 5 % and place the actuator in Hand mode. Then open the gate in small increments adjusting the Hand Position until a small but steady stream of seed is flowing out of the actuator. Note the Gate Position reading located on the Main screen and place the actuator back in Auto mode of operation.

3. Pressing the Setting The Min. Gate Position button is used to set the value for this seed profile only. Press the button and use the keypad to enter the gate value. Pressing the Set All Minimum Gate Position is used to set the value for all seed profiles. Press the button and a popup (shown below) will appear to confirm that you want to take the currently entered Minimum Gate Position and apply it to all seed profiles. Press the OK button to confirm.

FLOW METER CALIBRATION

Due to the composition of some types of chemicals, additional flow meter calibration may be required. It is recommended that, like other calibration devices, the flow meter is checked regularly and calibrated when needed. When calibrating the flow meter, each chemical must be checked and adjusted for.

1. To begin the calibration process, fill the appropriate tank with the slurry that is going to be used for this calibration.

2. Place the bottom valve in the RECIRCULATE position. Turn the corresponding pump to the Hand position and adjust the flow rate until it reads about 20 percent on the pump control module. Let the system run in recirculation mode for approximately 5 minutes. This will remove any air from the system. Now place the pump in Auto mode.

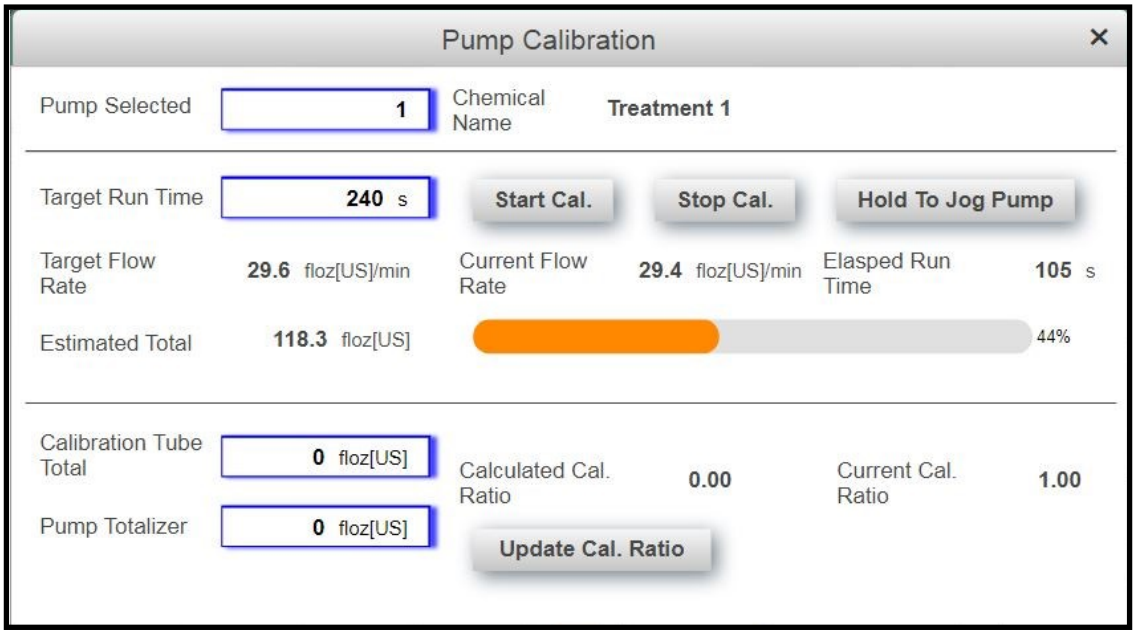
3. Place the bottom valve in the PROCESS / CALIBRATE position and the top valve in the CALIBRATION position.

FLOW METER CALIBRATION

4. From the Treater HOA screen, press the Pump Cal. button. Enter the number of the pump you wish to calibrate and a target run time for the calibration. The longer the run time the more accurate the calibration. USC recommends a minimum of 60 seconds. Hold the Jog Pump Motor and then release it. This will turn the pump on and off quickly. This is done to fill the plumbing between the two valves. When liquid reaches the zero mark on the calibration tube, release the jog button.

   Press the Start Cal. button to begin the calibration. When the target run time has elapsed, the pump will shutoff automatically. If for any reason you need to stop the process, press the Stop button. If the calibration is stopped before the target time has elapsed, the operator must start the process over again. Enter the calibration receptacle ounces into the Calibration Tube Total box. Enter the flow meter reading into the Calculated Totalizer box. Press the Update Cal. Ratio button and it will automatically update the chemical profile. Closing this screen will stop the calibration process if it has not been completed.

   Repeat this process for each pump The ratio could be slightly different due to hose wear, temperature, or chemical settling for a length of time.



5. Repeat the process as necessary and for each different chemical slurry used.

TREATING SEED

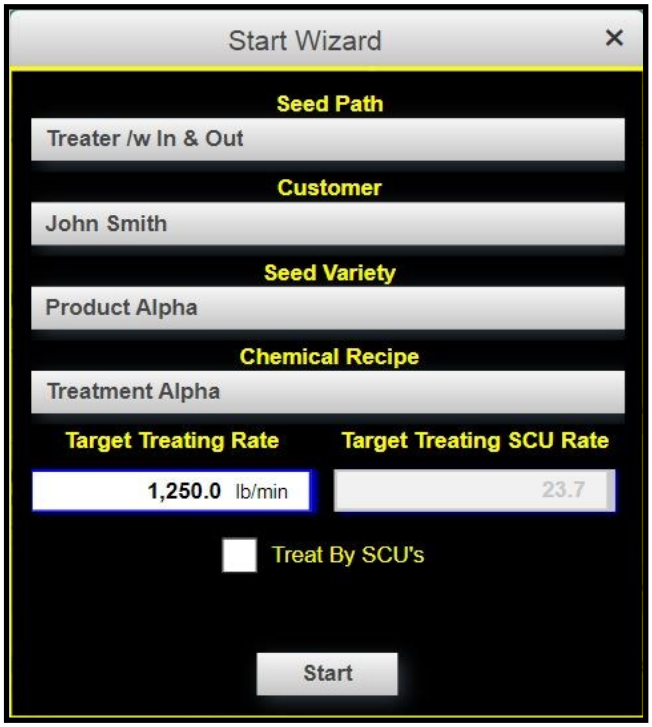
1. From the Treater HOA screen, press the Auto button on the seed metering device, Atomizer, Drum, and any needed conveyors to place the devices in Auto. The pumps and auxiliary devices will set themselves to Auto base on the active selected recipe.

2. Next, prime the chemical line to the atomizer. Ensure that the valve on each of the chemical attachment ports on the treater are in the correct position. Press and hold the Prime To Atomizer button. The atomizer will turn on, the auxiliary devices will turn on, and liquid will begin pumping up to the atomizer. When liquid reaches the atomizer release the Prime to Atomizer button. Leave the valve in the process position.

3. Return to the main screen and press the Start Setup button. Press the gray buttons to change the Seed Path, Customer, Seed Type, or Recipe fields. Press Start to begin the run. The atomizer, drum, and any inlet conveyors will turn on. Feed the system with seed. When the proximity switch detects seed, a timer will count down the number of seconds the start delay was set for. When that time elapses, the slide gate will open or the seed wheel will turn on depending on your system.

TREATING SEED

3. (Continued):
   The pump will turn on the same way. Waiting for the pump start delay time defined in the pumps. The pump may be set to turn on a second or two before seed is flowing to ensure thorough coating of the first seed out of the box. The operator may open the seed gate first so after pressing the start button, the treating processing will begin immediately after the system is up and running. The message bar in the upper left corner will always show what part of the process the system is currently in.



4. As the seed is being treated, the main screen will display the seed flow rate and the liquid flow rate. If the system needs to be stopped for a moment, the Pause button may be pressed to temporarily stop the process. When ready to begin again, press the Continue button on the Continue / Terminate popup screen.

5. When all seed passes through the system the low level proximity switch will turn off and the pumps will turn off. When more seed is fed into the treater, the treating process will continue.

6. After all seed has been treated the pumps will shut off. However, the atomizer, auger will still be running. When there is no more seed discharging from the drum, press the Shutdown button (see page 20) at the bottom of the screen. The outlet conveyors will continue to run for the number of seconds defined by the treater shutdown time.

TROUBLESHOOTING

Below is a table describing the most frequent problems and solutions with the USC Automated Controller . For further assistance, contact your authorized dealer.

SEED WHEEL

Problem	Possible Cause	Solution
Seed calibration is fluctuating. Or Flow rate less than minimum setpoint.	1. Seed treater supply hopper is not staying full. 2. Restriction in the supply hopper or seed wheel. 3. Build-up in the atomizing chamber.	1. Make sure the supply hopper and seed wheel are staying full. May have to lower seed flow rate in order to have a consistent flow of seed. 2. Check supply hopper and seed wheel for any debris, and remove. 3. Remove atomizing housing and clean out any build-up of material.
Seed Wheel motor will not shut off after all seed has emptied from the Hopper.	1. Proximity switch is dirty. 2. Proximity switch is set too sensitive. 3. The system is running in HAND mode.	1. Clean proximity switch. 2. Adjust the pump proximity switch sensitivity (see page 42). 3. Change to AUTO mode.
Seed Wheel Motor will not run in AUTO.	1. Proximity switch is not staying covered. 2. Proximity switch is not set sensitive enough. 3. HMI screen not set to AUTO.	1. Make sure proximity switch is staying covered with seed. 2. Adjust pump proximity switch sensitivity by turning the adjustment screw clockwise. 3. Set HMI screen to AUTO.
Seed Wheel Motor Fault	1. No signal from Seed Wheel motor drive (VFD) indicating that the Seed Wheel is running. 2. Seed Wheel motor has been shutdown while in Auto mode of operation.	1. Verify that the VFD is powered up, or check if it is faulted out. Check the Information screen. 2. Verify that the Seed Wheel was not turned Off while the system was in Auto mode of operation.

LOSS IN WEIGHT

Problem	Possible Cause	Solution
Seed Gate Actuator will not move.	1. Adjustable Chamber mechanism jammed with debris. 2. One or both of the two connectors linking the actuator to the control panel are not connected.	1. Clear all debris and make sure mechanism moves freely. 2. Make sure both connectors are properly engaged.
Seed Gate Actuator will not return to the closed position after all seed has emptied from the box.	1. Proximity switch is dirty. 2. Proximity switch is set too sensitive. 3. The system is running in HAND mode.	1. Clean proximity switch. 2. Adjust the pump proximity switch sensitivity (see page 42). 3. Change to AUTO mode.
Seed Gate Actuator will not move in AUTO.	1. Proximity switch is not staying covered. 2. Proximity switch is not set sensitive enough. 3. HMI screen not set to AUTO.	1. Make sure proximity switch is staying covered with seed. 2. Adjust pump proximity switch sensitivity by turning the adjustment screw clockwise. 3. Set HMI screen to AUTO.
Seed Gate Actuator will not close completely.	1. Debris may be keeping it from closing completely.	1. Open the seed gate, remove debris and power cycle the entire system. When the system is turned back on, the gate will automatically close and find it's Home position.

GENERAL

Problem	Possible Cause	Solution
Flow Meter is fluctuating	1. Pump is sucking air. 2. Restriction in the line. 3. Flow meter is not full of liquid	1. Check and tighten all hose connections. 1. Check filter to see if gasket is missing or cracked. 2. Clean out filter and lines to check for any debris. 3. The meter will fluctuate if there is nothing pumping and there is some liquid left in the meter. Drain out liquid.
Flow meter won't turn on	1. Improper power going to flow meter. 2. Loose connection.	1. Check incoming power to flow meter. 2. Check connections inside the control panel and inside the flow meter.
Flow Meter is reading too low or too high.	1. Restriction in Flow Meter or in line. 2. Air in treatment. This can cause the flow meter to read lower than calibrating it using a measuring cup. 3. Seed flow has changed.	1. Flush the flow meter with water or use compressed air and blow air backwards through the meter. 2. Check and tighten all hose connections. 2. Check filter to see if gasket is missing or cracked. 3. Recheck seed flow rate.
Flow meter will not zero	1. Improper wiring 2. Wrong parameter programmed into flow meter	1. Check wiring schematic. 2. Check flow meter parameters. Call local dealer.

Problem	Possible Cause	Solution
Pump will not turn off in AUTO when seed runs out.	1. Proximity switch is dirty. 2. Proximity switch is set too sensitive.	1. Clean proximity switch 2. Adjust the pump proximity switch sensitivity by turning adjustment screw counter-clockwise (page 42).
Pump will not turn on in AUTO	1. Proximity switch is not staying covered. 2. Proximity switch is not sensitive enough.	1. Make sure proximity switch is staying covered with seed. 2. Adjust pump proximity switch sensitivity by turning the adjustment screw clockwise (page 42).
Pump is fluctuating.	1. Restriction in tubing 2. Filter is plugged or missing gasket. 3. Hoses are worn out.	1. Flush tubing and check filter for any restrictions. 2. Clean filter and check for gasket. 3. Replace hoses.
Conveyor overload keeps tripping	1. Seed flow is too high. 2. Too much liquid being applied.	1. Slow down seed flow. 2. Lower the liquid rate.
Treater Outlet Conveyor Motor Fault	1. Outlet Conveyor motor auxiliary contact was not sensed after being energized to run.	1. Verify that the motor started has power and is turned on.
Treater Inlet Conveyor Motor Fault	1. Inlet Conveyor motor auxiliary contact was not sensed after being energized to run.	1. Verify that the motor starter has power and is turned on.
Atomizer Motor Fault	1. No signal from Atomizer motor starter indicating that the Atomizer is running. 2. Atomizer motor has been shutdown while in Auto mode of operation.	1. Verify that the motor starter is powered up, or check if it is faulted out. 2. Verify that the Atomizer was not turned OFF while the system was in Auto mode of
Drum Motor Fault	1. No signal from Drum motor starter indicating that the Drum is running. 2. Drum motor has been shutdown while in Auto mode of operation.	1. Verify that the Motor starter is powered up, or check if it is faulted out. 2. Verify that the Drum was not turned OFF while the system was in Auto mode of opera-

PROXIMITY SWITCH ADJUSTMENT GUIDE

If a proximity switch is not working properly, this can be caused by wear, dust, or even moisture. The first step is to clean the lens of the proximity switch. If this does not solve the problem, the next step would be to adjust the sensitivity of the proximity switch.

The LED lights indicates the power status. If they are active the device is powered.

The center LED is when the switch closes.

Using the small screwdriver, you can adjust the proximity switch by turning the sensitivity dial of the proximity switch.

- Turn Clockwise to make the proximity switch more sensitive.
- Turn Counterclockwise to make the proximity switch less sensitive.

NOTES

USC Limited Warranty

USC, LLC, (Manufacturer) warrants its seed treating equipment as follows:

1. **Limited Warranty:** Manufacturer warrants that the Products sold hereunder will be free from defects in material and workmanship for a period of 18 months from date of shipment. If the Products do not conform to this Limited Warranty during the warranty period, Buyer shall notify Manufacturer in writing of the claimed defects and demonstrate to Manufacturer satisfaction that said defects are covered by this Limited Warranty. If the defects are properly reported to Manufacturer within the warranty period, and the defects are of such type and nature as to be covered by this warranty, Manufacturer shall, at its expense, furnish replacement Products or, at Manufacturer's option, replacement parts for the defective products. Shipping and installation of the replacement Products or replacement parts shall be at the Buyer's expense.

2. **Other Limits:** THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Manufacturer does not warrant against damages or defects arising from improper installation (where installation is by persons other than Manufacturer), against defects in products or components not manufactured by Manufacturer, or against damages resulting from such non-Manufacturer made products or components. Manufacturer passes on to the Buyer the warranty it received (if any) from the maker of such non-Manufacturer made products or components. This warranty also does not apply to Products upon which repairs and / or modifications have been effected or attempted by persons other than pursuant to written authorization by Manufacturer. This includes any welding on equipment which could damage electrical components. Manufacturer does not warrant against casualties or damages resulting from misuse and / or abuse of Products, improper storage or handling, acts of nature, effects of weather, including effects of weather due to outside storage, accidents, or damages incurred during transportation by common carrier.

3. **Exclusive Obligation:** THIS WARRANTY IS EXCLUSIVE. The sole and exclusive obligation of Manufacturer shall be to repair or replace the defective Products in the manner and for the period provided above. Manufacturer shall not have any other obligation with respect to the Products or any part thereof, whether based on contract, tort, strict liability or otherwise. Under no circumstances, whether based on this Limited Warranty or otherwise, shall Manufacturer be liable for lost profits, lost revenue, lost sales (whether direct or indirect damages), incidental, special, punitive, indirect or consequential damages.

4. **Other Statements:** Manufacturer's employees or representatives' oral or other written statements do not constitute warranties, shall not be relied upon by Buyer, and are not a part of the contract for sale or this limited warranty.

5. **Return Policy:** Approval is required prior to returning goods to Manufacturer. A restocking fee will apply.

6. **Entire Obligation:** This Limited Warranty states the entire obligation of Manufacturer with respect to the Products. If any part of this Limited Warranty is determined to be void or illegal, the remainder shall remain in full force and effect.

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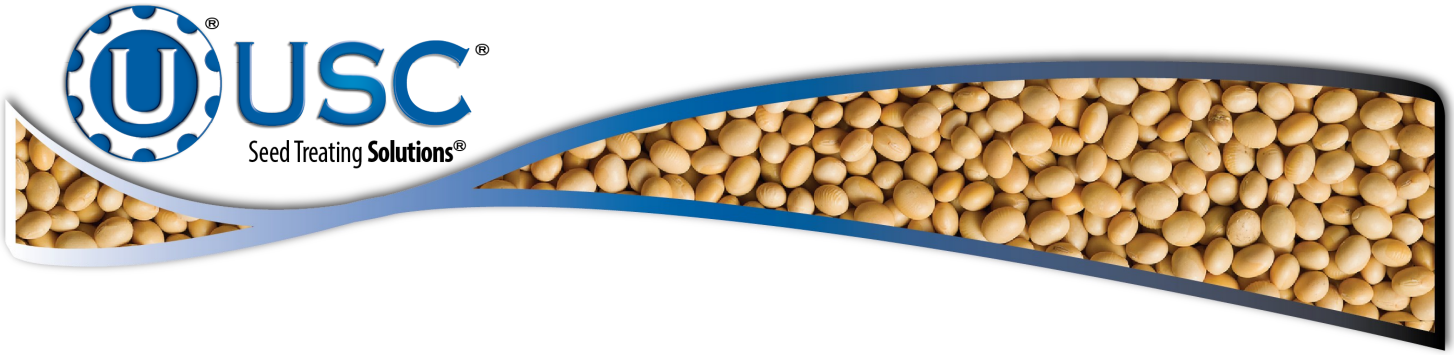

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