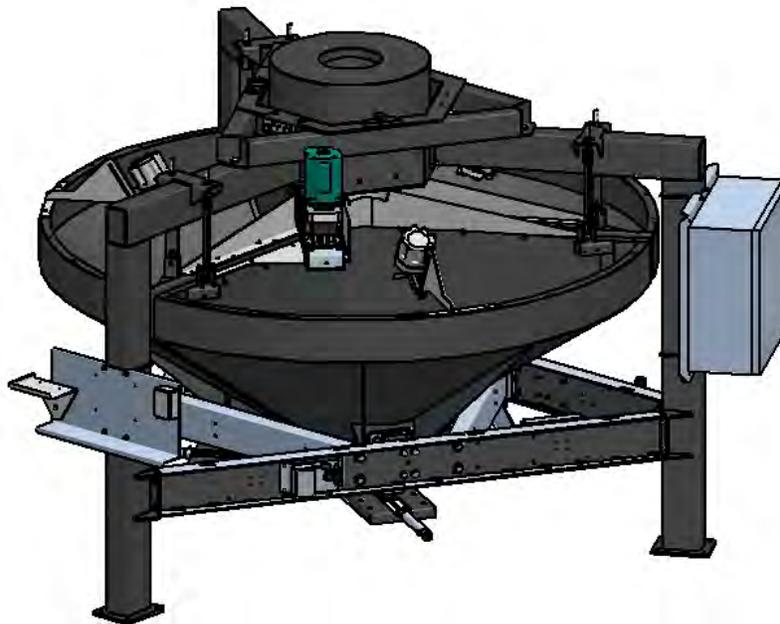




TRI-FLO™

Continuous Batch Weighing System

with Bin Site Automation



Operators Manual

Build Revision A



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 USC Tri - Flo™ System. It does not hold USC, LLC liable for any accidents or injuries that may occur.

OPERATOR RESPONSIBILITIES

As the purchaser/owner/operator of this equipment and control system, you have an obligation to install, operate, and maintain the equipment in a manner that minimizes the exposure of people in your care to any potential hazards inherent in using this equipment. It is critical that the owner of this equipment:

- Has a clear and documented understanding of the process this machine is being used in and of any resulting hazards or special requirements arising from this specific application.
- Allow only properly trained and instructed personnel to install, operate, or service this equipment.
- Maintain a comprehensive safety program involving all who work with this machine and other associated process equipment.
- Establish clear areas of staff responsibility (e.g. operation, setup, sanitation, maintenance, and repairs).
- Provide all personnel with necessary safety equipment.
- Periodically inspect the equipment to insure that the doors, covers, guards, and safety devices are in place and functioning, that all safety instructions and warning labels are intact and legible, and that the equipment is in good working order.
- In addition to the operating instructions, observe and enforce the applicable legal and other binding regulations, national and local codes.

As the person with the most to gain or lose from working safely, it is important that you work responsibly and stay alert. By following a few simple rules, you can prevent an accident that could injure or kill you or a co-worker.

TRI-FLO™ CONTINUOUS BATCH WEIGHING SYSTEM

- Disconnect, lockout, and tagout electrical and all other energy sources before inspecting, cleaning, servicing, repairing, or any other activity that would expose you to the hazards of electrical shock.
- Do not operate, clean, or service this equipment until you have read and understood the contents of this manual. If you do not understand the information in this manual, bring it to the attention of your supervisor, or call your local USC dealer for assistance.
- Any operator who is known or suspected to be under the influence of alcohol or drugs should not be allowed to operate the equipment.
- Understand and follow the safety practices required by your employer and this manual.
- **PAY ATTENTION** to what you and other personnel are doing and how these activities may affect your safety.
- **Failure to follow these instructions may result in serious personal injury or death.**

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 your USC dealer. Ownership passes to purchaser when the unit leaves the USC, LLC premises. The purchaser is responsible for unloading all components of the equipment.

Document the serial number of the machine for future reference. Below are pictures showing where the serial numbers are located.



*Tri-Flo™
Serial Number*

TRI - FLO™ PANEL SERIAL NUMBER: _____

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SAFETY INSTRUCTIONS

SECTION A

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.

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. Graphic symbols are not standardized, but most manufacturers will use some variation of the ones seen in this manual.



Indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury and/or property damage.



Provides additional information that the operator needs to be aware of to avoid a potentially hazardous situation.



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.



Notice is used to notify people of important installation, operation, or maintenance information which is not hazard related.

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 are three Emergency Stop push buttons. There is one on the Main Control Panel, one on the Tri - Flo™ Control Panel and one on the Bin Site 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. The operator initiates this stop by pressing the “PAUSE” button at the bottom of the main screen.

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 seed treating system is usually 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 Tri - Flo™ System. **YOU** must ensure that you and anyone else who is going to operate, maintain, or work around the Tri - Flo™ System 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 Tri - Flo™ System.

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.

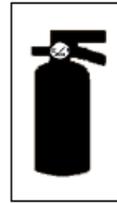
- Tri - Flo™ System owners must give operating instructions to operators or employees before allowing them to operate the machine, and at least annually thereafter per OSHA (Occupational Safety and Health Administration) regulation 1928.57.
- The most important safety device on this equipment is a **SAFE** 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 signs before operating, maintaining, adjusting or unplugging the Tri - Flo™ System.
2. Only trained persons shall operate the Tri - Flo™ system. 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 bin site system.



OPERATING SAFETY:

1. Read and understand the Operator's Manual and all safety signs 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 any components of the Tri - Flo™ System. 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 Tri - Flo™ System on level ground free of debris. Anchor the equipment to prevent tipping or upending.



Before placement of any 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 bin site system.
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 signs clean. Replace any sign that is damaged or not clearly visible.



SAFETY SIGNS

1. Keep safety signs clean and legible at all times.
2. Replace safety signs that are missing or have become illegible.
3. Replaced parts that displayed a safety sign should also display the current sign.
4. Safety signs are available from your Authorized Dealer.

How to Install Safety Signs:

- 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.

SECTION
B

INSTALLATION & SETUP



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



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



Permanent installation may require additional electrical cords, liquid hose, and air lines, since each installation is unique.

SET-UP

The following steps outline the initial set-up of your USC Tri - Flo™ System:

1. Confirm all equipment has been received and then contact USC, LLC or your dealer to setup a time for an installation crew to install your Tri - Flo™ System.
2. A USC trained install crew will arrive on site and perform the necessary steps for installation of the equipment.



Based on your particular Tri - Flo™ System, some additional equipment may be required to install the Tri - Flo™ System (i.e. fork lift(s), crane, etc)



USC requires that all touch screen control panels be set up inside a building or in a covered structure to protect the machine from weathering.

3. Have a certified electrician provide power to the Tri - Flo™ System and wire in all necessary “customer supplied” wiring, including Ethernet cables as listed in your provided Tri - Flo™ schematics. Provide convenient shutdown switches and comply with local electrical codes. The USC Tri - Flo™ System must be connected to the same electrical requirements as specified in the main control panel on the power requirement tag and the electrical schematic shipped with the piece of equipment. USC recommends that flexible conduit be used wherever possible.. Attach 110V power to the Tri - Flo™ System and touch screen control panels.

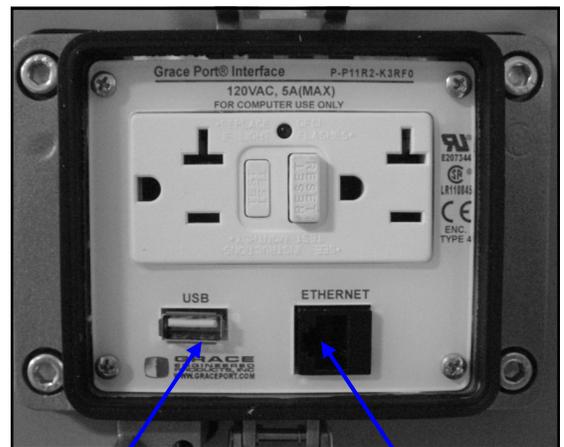


4. Connect a dedicated analog phone line to the modem located in the top left portion of the control panel. This will allow USC remote access to the Tri-Flo™ System.

*Analog Phone
Line Hooked Up
Here*



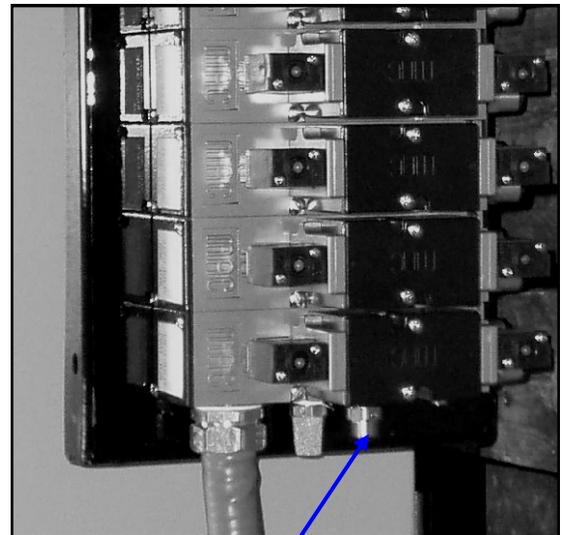
5. A service port located on the side of the main control panel will allow the operator to connect a printer and an Ethernet connection to the unit. The printer connection will allow the user to print reports directly from the reports screen.



*Printer
Connection*

*Ethernet
Connection*

6. Supply approximately 100-110 psi of air pressure at two locations. It is required that this air supply have an in-line customer supplied air dryer to protect the air system from contamination. From the dryer, one line goes to the bottom of the solenoid group on the side of the Bin Site Control Panel. (right) The other line goes from the dryer to the pressure regulator on the Tri - Flo™ System to operate the bin slide gates under the Tri - Flo™ weigh hoppers.
7. Contact USC, LLC or your dealer to setup a startup and training session(s) before using your Tri - Flo™ system.
8. Have the scales calibrated by a state certified professional scale technician after the USC, LLC trained technician has performed a startup session on your site.

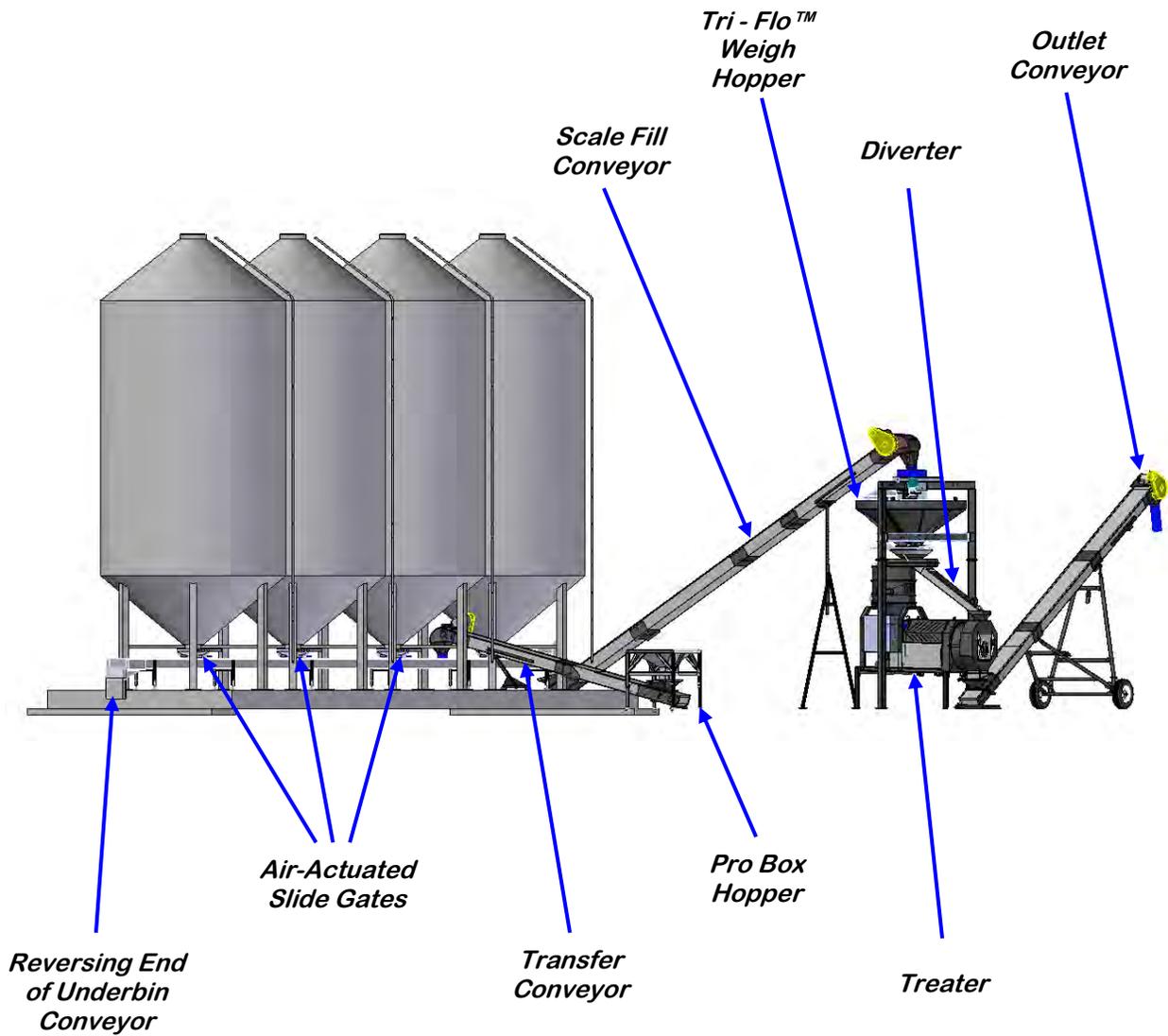


*Connect Air
Line Here*

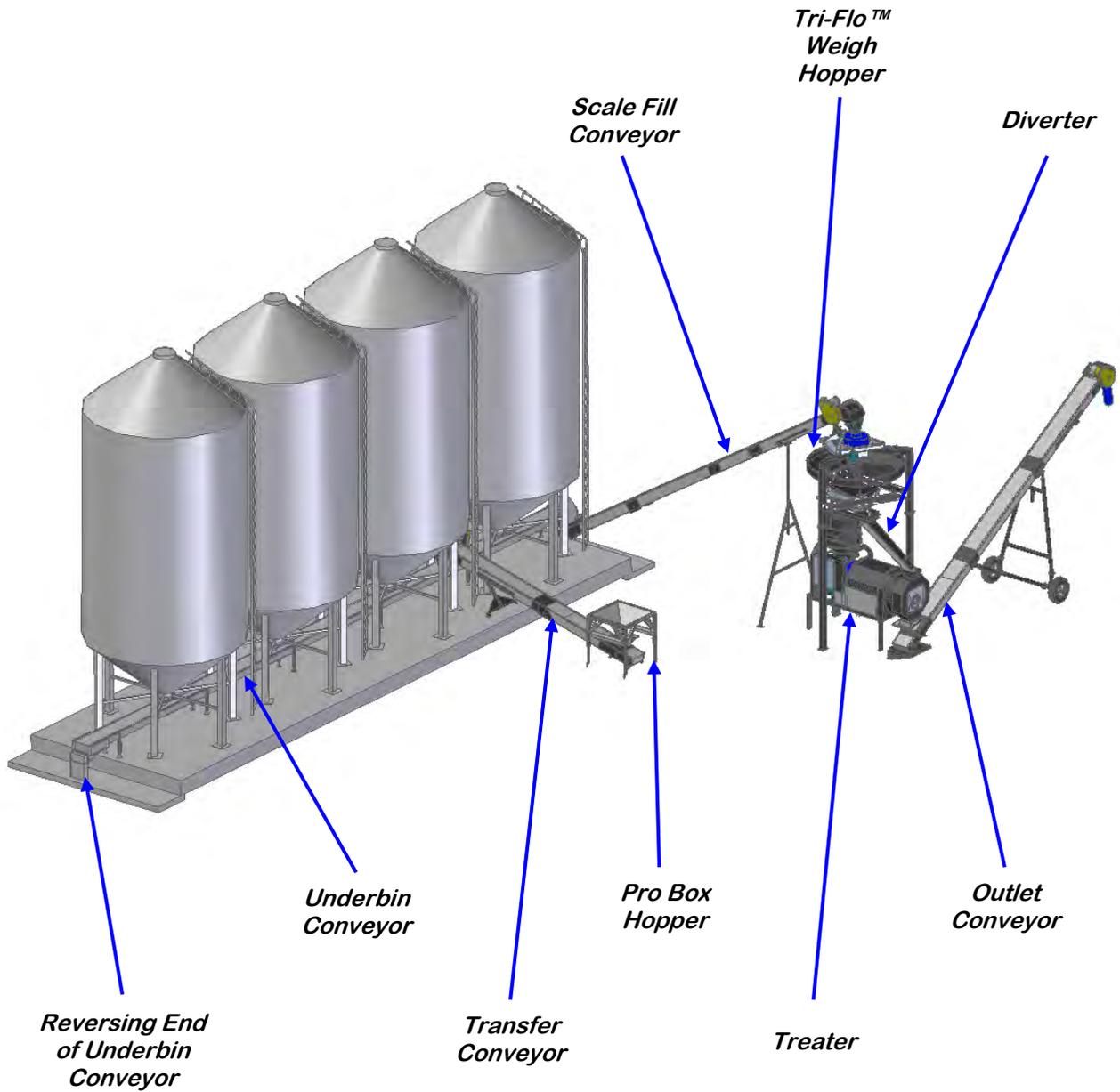
SECTION
C

MECHANICAL OPERATION

SYSTEM OVERVIEW



SYSTEM OVERVIEW



BIN SLIDE GATES

An air-actuated slide gate attaches to the bottom of each bin. The slide gate sits below the manual crank gate on the bin. The flow rate of seed passing through the gate is adjusted by moving the collar on the rod that exits out of the back of the bin slide gate. Moving the collar further away from the bin slide gate will allow the gate to open more and increase seed flow. It is recommended that the manual gate be opened all the way. The system calibrates seed flow through a timing mechanism that tells the air gate to close after a given amount of seed has passed through the gate. During each run of seed, the system will constantly perform an automatic calibration that is flow rate specific. If the manual gate or the collar is adjusted, recalibration of the seed flow will need to be done (see page 38).

UNDERBIN CONVEYOR

The underbin conveyor sits directly below each of the air-actuated slide gates that are in turn positioned directly under the manual slide gates of the bulk bins. The conveyor transports seed forward to the scale fill conveyor. The underbin conveyor may also include an option so that it can run in reverse for clean out purposes. Seed is moved inside the underbin conveyor via a crescent belt. An adjustment for the tracking of this belt is located at both the head and tail section of the conveyor. The head section also includes a viewing window and the tail section has a removable cover to help with proper adjustment. An encoder is located in the tail section of the underbin conveyor. The encoder is used to verify that the conveyor is running without any slippage at the belt.

SCALE FILL CONVEYOR

The scale fill conveyor is a fixed conveyor that is used to transport seed from the discharge end of the underbin conveyor to the top of the weigh hopper. This conveyor's intake hopper will sit directly under the discharge portion of the underbin conveyor and the discharge end of the scale fill conveyor will be directly above the center of the Tri-Flo™. The scale fill conveyor is commonly used as the device that brings seed from outside of the treater building to the inside.

TRI - FLO™ WEIGH HOPPER, SLIDE GATES & SCALE HEAD

Once seed exits the discharge end of the scale fill conveyor, it will fall down into an inlet diverter that is located in the center of the Tri - Flo™. Seed will then come to rest above the slide gate in one of the three weigh hoppers as it waits to be weighed. The weigh hoppers sit atop load cells. The system uses a Avery Weigh Tronics 1310 scale head to display the current weight of the seed in the weigh hoppers. The scale head communicates with the system via an Ethernet cable. Once the first hopper has been filled, seed will be diverted to the second hopper. While the second hopper is filling the first hopper will then weigh the seed and begin dumping out of its discharge gate. This process runs in a continuous flow until the system determines the total weight has left the bin. At this point the bin slide gate is closed and the program runs in the finish batch mode. Once the run is finished the system begins to shutdown the conveyors in the order specified by the time entered on the Utilities screen to assure that all seed has been cleaned out of the conveyors. The system looks to the scale head for the total weight of seed and prints a scale ticket based on that weight.

NOTICE

The Avery Weigh Tronics 1310 scale head will require calibration by a state certified calibration specialist in order for it to be legal for trade.

Located below each weigh hopper is an air-actuated slide gate. The slide gates each have a sensor that is positioned to read whether or not the slide gate is currently in the open or close position. This is done to ensure an accurate scale reading will always be achieved.

PRO BOX HOPPER (optional)

The pro box hopper is an inverted pyramid shaped hopper that is used as a means of running seed straight from a pro box into the Tri - Flo™ System. This hopper includes an adjustable slide gate for metering the flow of seed and adjustable legs for changing the height of the hopper.

TRANSFER CONVEYOR (optional)

The transfer conveyor is the conveyor that connects the pro box hopper to the rest of the system. This conveyor is located so that its intake hopper is directly under the pro box hopper and its discharge end is feeding into the underbin or scale fill conveyor. This conveyor can be run in the “auto” mode or be run manually via the Tri - Flo™ H-O-A screen.

DIVERTER (optional)

The diverter is an air actuated gate that is located above the seed wheel and below the Tri - Flo™. The diverter gate will sit in one of two positions: Treat or Bypass. When the gate is in the treat position, seed will flow into the treater to have chemical applied to it. When the gate is in the bypass position, seed will not enter the treater but instead will be carried away through a separate chute to a conveyor or holding device. The diverter can be manually actuated by pressing and holding the Treat or Bypass button in the lower right corner of the Tri-Flo™ H-O-A screen.

UNDERBIN CONVEYOR ENCODER

The underbin conveyor encoder is an electronic device that is connected to a non-drive shaft on the underbin conveyor. This is usually the rear conveyor shaft. The encoder sends an electrical signal to the Tri - Flo™ System whenever the shaft is spinning. That signal allows the Tri - Flo™ System to know that the belt on the underbin conveyor is traveling at the correct speed and that no slippage is occurring. This process allows the Tri - Flo™ System to perform correct auto-calibrations during each run of seed.

SECTION
D

ELECTRICAL OPERATION



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



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



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 panel.

This section provides a general overview and description of the operator controls for the Tri - Flo™ System.

General Panel Descriptions

This system consists of three panels:

- The Tri - Flo™ Control Panel (TFCP) is a plug connected (via the PJ1000 cables) enclosure that is located on the Tri - Flo™. This enclosure contains the electronic components for the Tri - Flo™.
- The Bin Site Control Panel (BSCP) is a 36 x 30 x 10 inch enclosure that contains the bulk of the electrical control components. The air solenoid bank that controls the Tri - Flo™ weigh hopper slide gate valves and the bin slide gate valves is located on the side of this panel and hardwired to the BSCP.
- The Main Control Panel (MCP) is the moveable enclosure that contains the PLC and touch screen HMI. This is where the operator will control all the functions of the Tri - Flo™ System. The MCP is connected to the BSCP and TFCP via plug connected cables. The MCP may also be connected to the Treater panel via the same plug connected grey cables (PJ1000).

Main Control Panel

The following pages explain the function of the touch screen controls.

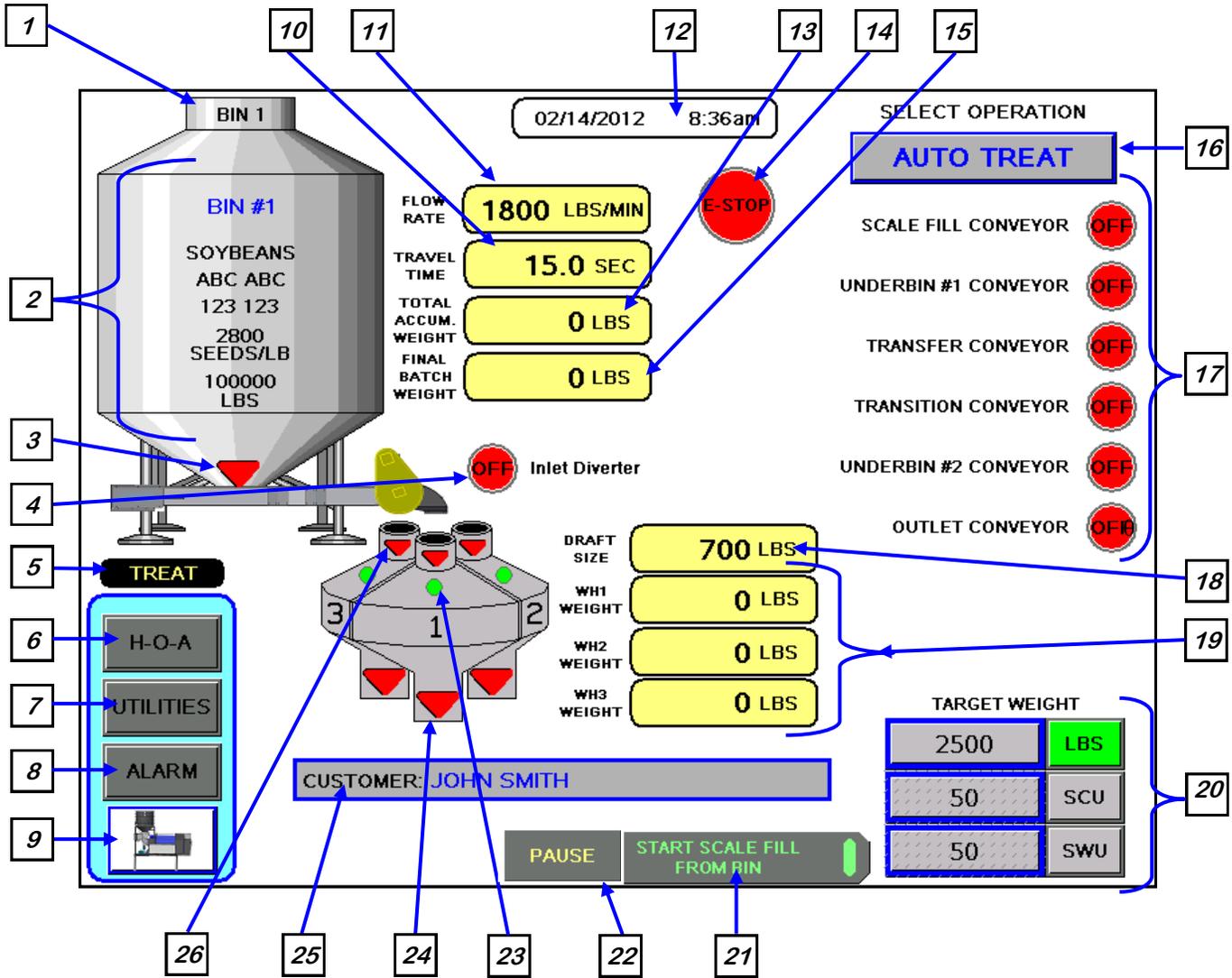
USC STARTUP SCREEN

This screen is the first screen the operator will see after the system receives power. Touch this screen to allow the operator to advance to the Main screen.



MAIN SCREEN

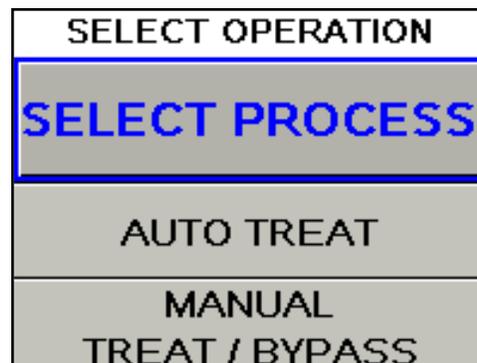
This screen informs the operator of the status of all system motors and electrical devices and allows for control / adjustment of system operations.



Main Screen Button Descriptions

- 1. Current Bin Selected:** Indicates the currently selected bin.
- 2. Current Bin Info:** Displays the bin information that has been entered into the currently selected bin. Includes seed type, seed variety, seeds/lb and inventory.
- 3. Bin Slide Gate Indicator:** Informs the operator as to whether the currently selected bin slide gate is in the “open” or closed” position.
- 4. Tri - Flo™ Inlet Diverter Motor Status Indicator:** Informs the operator if the inlet diverter motor is “ON” or “OFF”.
- 5. Diverter Indicator (optional):** Informs the operator if the diverter is currently in the “treat” or “bypass” position. This indicator will only be present if the Tri-Flo™ System has a diverter.
- 6. “H-O-A” (Hand-Off-Auto) Button:** This button advances the operator to the “H-O-A” screen.
- 7. “UTILITIES” Button:** This button advances the operator to the “Utilities” screen.
- 8. “ALARM” Button:** This button advances the operator to the Alarms screen.
- 9. Treater Button (optional):** This button advances the operator to the treater Main screen. This button is only available if the Tri-Flo™ system is being operated in conjunction with a PLC controlled seed treater.
- 10. “Travel Time” Display:** Informs the operator of the amount of time seed takes to flow from the currently selected bin to the Tri-Flo™.
- 11. “Flow Rate” Display:** Informs the operator of the flow rate of seed from the currently selected bin.
- 12. Current Date and Time Display**
- 13. “Total Accum. Weight” Display:** Informs the operator of the current running total of seed that has entered the Tri-Flo™ system for this particular run of seed.
- 14. Emergency Stop Indicator:** This blinking display is activated when the system E-Stop button is activated.
- 15. “Final Batch Weight” Display:** Informs the operator of the weight of seed that has been recorded by the scale printer and has exited the Tri-Flo™ system during a given run of seed.
- 16. “SELECT OPERATION” Button:** Pressing this button allows the operator to choose between the Auto Treat and the Manual Treat/ Bypass modes of operation (right).

(Continued on page 22)



Main Screen Button Descriptions (continued)

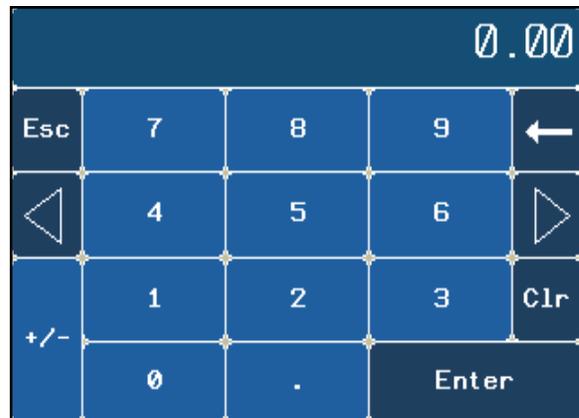
16. (Continued): In AUTO TREAT mode the operator would select the bin they want to pull seed from and enter a target weight for the run. Then press the “Start scale Fill from bin” if a standard bin was chosen or “Start scale fill from hopper” if pulling seed from a Manual Hopper. This starts the conveyors in the pre-determined order defined on the H.O.A. screen, opens the bin slide gate and begins to fill the Tri - Flo™ weigh hoppers. When the first hopper is filled and weighed it will begin to empty. Once the proximity switch on the treater detects the presence of seed it will start the treating process. In MANUAL TREAT / BYPASS mode the operator has two options. Manual Treat works the same as Auto Treat except the treater must be manually started on the main treater screen. Bypass mode is used when you do not want to treat the seed but still use the Tri - Flo™ system to weigh and record the amount of seed retrieved (This is only possible if the treater is equipped with the treater diverter option). To bypass the treater the operator must go to the H.O.A. screen and press the Bypass button in the lower right corner. This switches the diverter to bypass mode allowing the seed emptying from the Tri - Flo™ weigh hoppers to go directly to the outlet conveyor instead of the treater.

17. Current Conveyor Motor Status Indicator: Informs the operator if a particular conveyor motor is “ON” or “OFF.”

18. “Draft Size” Display: Is the seed weight that is to be loaded into each hopper before the system rotates and begins to fill the next hopper.

19. Weigh Hopper Display: Gives the operator a real time running weight total for each of the three individual hoppers.

20. “TARGET WEIGHT” Module: Pressing this button brings up a numerical key pad (right). This allows the operator to enter the amount of seed that is to be pulled in from the selected bin. The operator can also select to call in seed via seed count units (SCU) or seed weigh units (SWU). If SCU is selected, the system will base the units upon 140,000 seeds/unit and the seed count of the currently selected bin. If SWU is selected, the system will base the units upon 50 lbs/unit



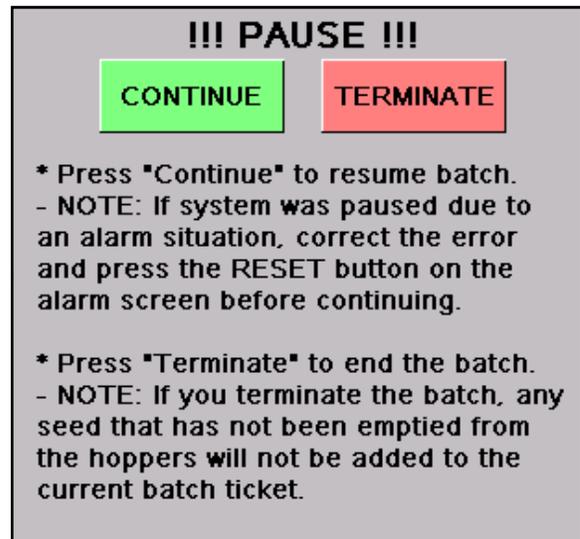
Main Screen Button Descriptions (continued)

21. “START SCALE FILL FROM BIN” Button:

Allows the operator to run seed in the auto mode from the bin. A verification screen (right) appears to verify the operator has a truck or trailer in place to receive the seed before they press “START” to continue the process.



22. “PAUSE” Button: Allows the operator to pause the ongoing process in the event of a set-up error or an alarm situation. Pushing this button will activate the “PAUSE” screen (right). Once the issue is resolved push “CONTINUE” to re-start the process. Or use the “TERMINATE” button.



23. Seed Proximity Indicator Display: Informs the operator when any one of the three hoppers is over full. Green indicates full.

24. Tri-Flo™ Weigh Hopper Slide Gate Indicators: Informs the operator of the status of the air-actuated slide gate located at the bottom of each hopper. Green indicating the open position and red for the closed position.

25. “CUSTOMER” Button: Pressing this button allows the operator to pre-enter the customer’s name. This name will be saved with the bin site report after each run of seed is made. When this button is pressed a keypad (right) will appear on the screen.



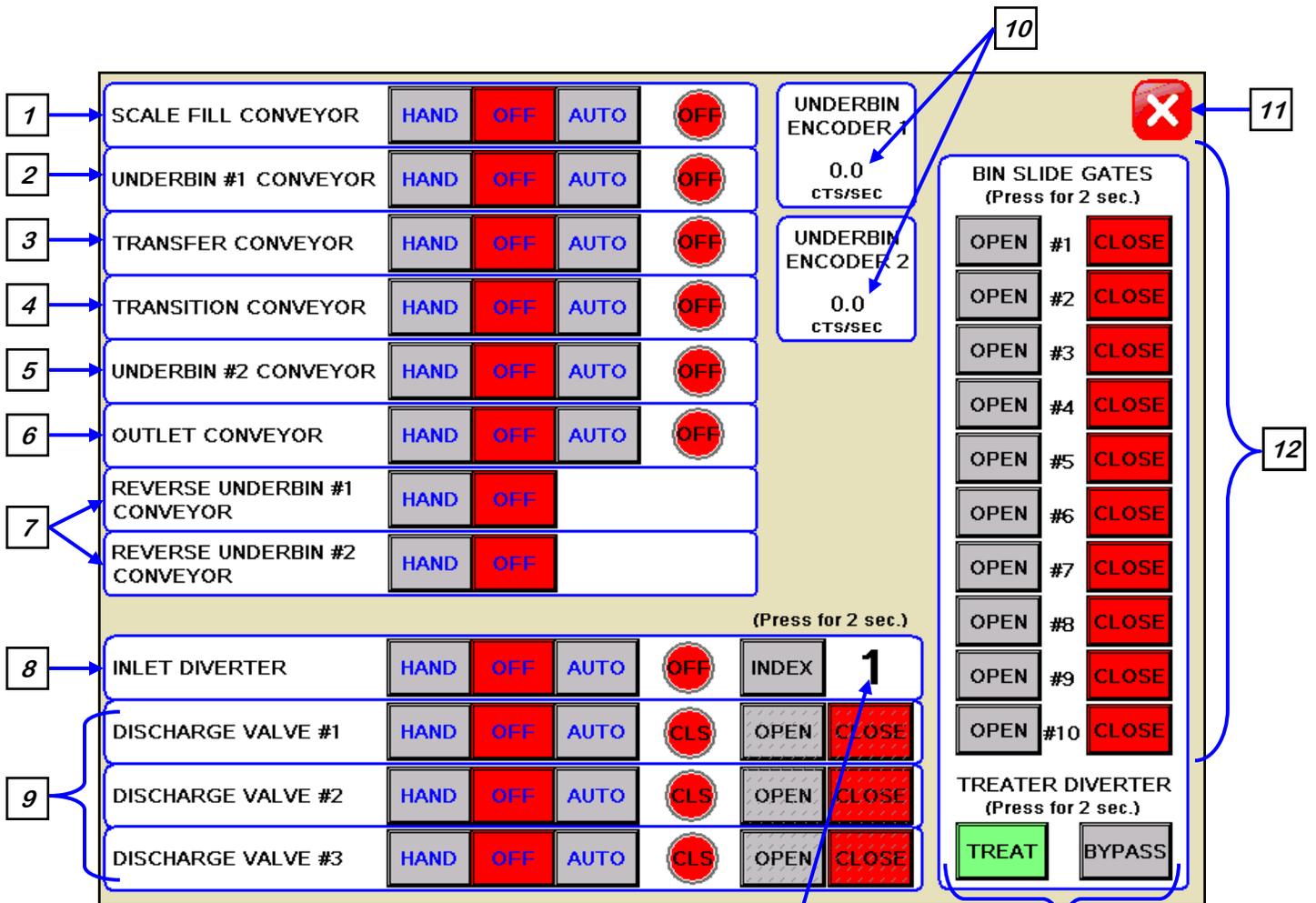
26. Tri-Flo™ “Inlet Diverter” Display: Informs the operator which one of the three weigh hoppers the diverter is in position to load seed into. The active hopper will be green.

“H-O-A” (HAND-OFF-AUTO) SCREEN

Hand-Off-Auto controls are provided for most of the automated devices in the system, and are accessed on this screen.



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 HAND/OFF 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.



H-O-A Button Descriptions

1. “SCALE FILL CONVEYOR” Control Module: This module controls the function of the scale fill conveyor. The “HAND” button will place the scale fill conveyor 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 mode unless all other needed devices are in the “AUTO” mode and the “START SCALE FILL” button is pressed on the Main screen.

2. “UNDERBIN #1 CONVEYOR” Control Module: This module controls the function of the underbin #1 conveyor. The “HAND” button will place the underbin #1 conveyor 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 mode unless all other needed devices are in the “AUTO” mode and the “START SCALE FILL” button is pressed on the Main screen.

3. “TRANSFER CONVEYOR” Control Module (optional): This module controls the function of the transfer conveyor. The “HAND” button will place the transfer conveyor 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 mode unless all other needed devices are in the “AUTO” mode and the “START SCALE FILL” button is pressed on the Main screen. This button will only be present if the Tri - Flo™ System has a transfer conveyor.

4. “TRANSITION CONVEYOR” Control Module (optional): This module controls the function of the transition conveyor. The “HAND” button will place the transition conveyor 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 mode unless all other needed devices are in the “AUTO” mode and the “START SCALE FILL” button is pressed on the Main screen. This button will only be present if the Tri - Flo™ System has a transition conveyor.

5. “UNDERBIN #2 CONVEYOR” Control Module (optional): This module controls the function of the underbin #2 conveyor. The “HAND” button will place the underbin #2 conveyor 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 mode unless all other needed devices are in the “AUTO” mode and the “START SCALE FILL” button is pressed on the Main screen. This button will only be present if the Tri - Flo™ System has a second underbin conveyor.

H-O-A Button Descriptions (continued)

6. “OUTLET CONVEYOR” Control Module: This module controls the function of the outlet conveyor. The “HAND” button will place the outlet conveyor 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 mode unless all other needed devices are in the “AUTO” mode and the “START SCALE FILL” button is pressed on the Main screen.

7. “REVERSE UNDERBIN CONVEYOR” Control Module (optional): This module operates in the manual mode only. Pressing the “HAND” button allows the operator to run the underbin conveyor in reverse. **ALWAYS ENSURE THE BELT IS IMMEDIATELY AND PROPERLY ALIGNED WHEN RUNNING IN REVERSE! BELTS WILL OFTEN SHIFT ALIGNMENT WHEN THEIR DIRECTION OF TRAVEL IS REVERSED. BE SURE TO RE-CHECK THE ALIGNMENT AFTER IT IS RETURNED TO THE FORWARD DIRECTION.** This module will only be present if the bin site system has the reversing option for the underbin conveyor.

8. TRI - FLO™ “INLET DIVERTER” Control Module : This module controls the function of the inlet diverter. The “HAND” button will place the inlet diverter 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 and would then be controlled by the Tri - Flo™ PLC program.

9. TRI - FLO™ “WEIGH HOPPER DISCHARGE VALVE” Control Module: This module controls the function of the hopper discharge valve located at the bottom of each of the three individual hoppers. The “HAND” button will place the discharge valve 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 and would then be controlled by the Tri - Flo™ PLC program.

10. Counts per Second Display (optional): This display shows the current counts per second that the underbin encoder is reading. This allows the bin site system to be sure that the underbin conveyor is running properly and that the belt is not slipping. This display will only be present if the bin site system has an underbin encoder on the underbin conveyor. If not working correctly, calibration of the seed flow will be effected.

11. Screen “EXIT” Button: This button is used to exit back to the previous screen. Its functionality is the same throughout the HMI display.

12. “BIN SLIDE GATES” Control Module: This module allows the operator to manually control the operation of the slide gates that are located underneath each bin. The bin slide gates will be opened and closed automatically when the operator presses the “START SCALE FILL” button on the Main screen.

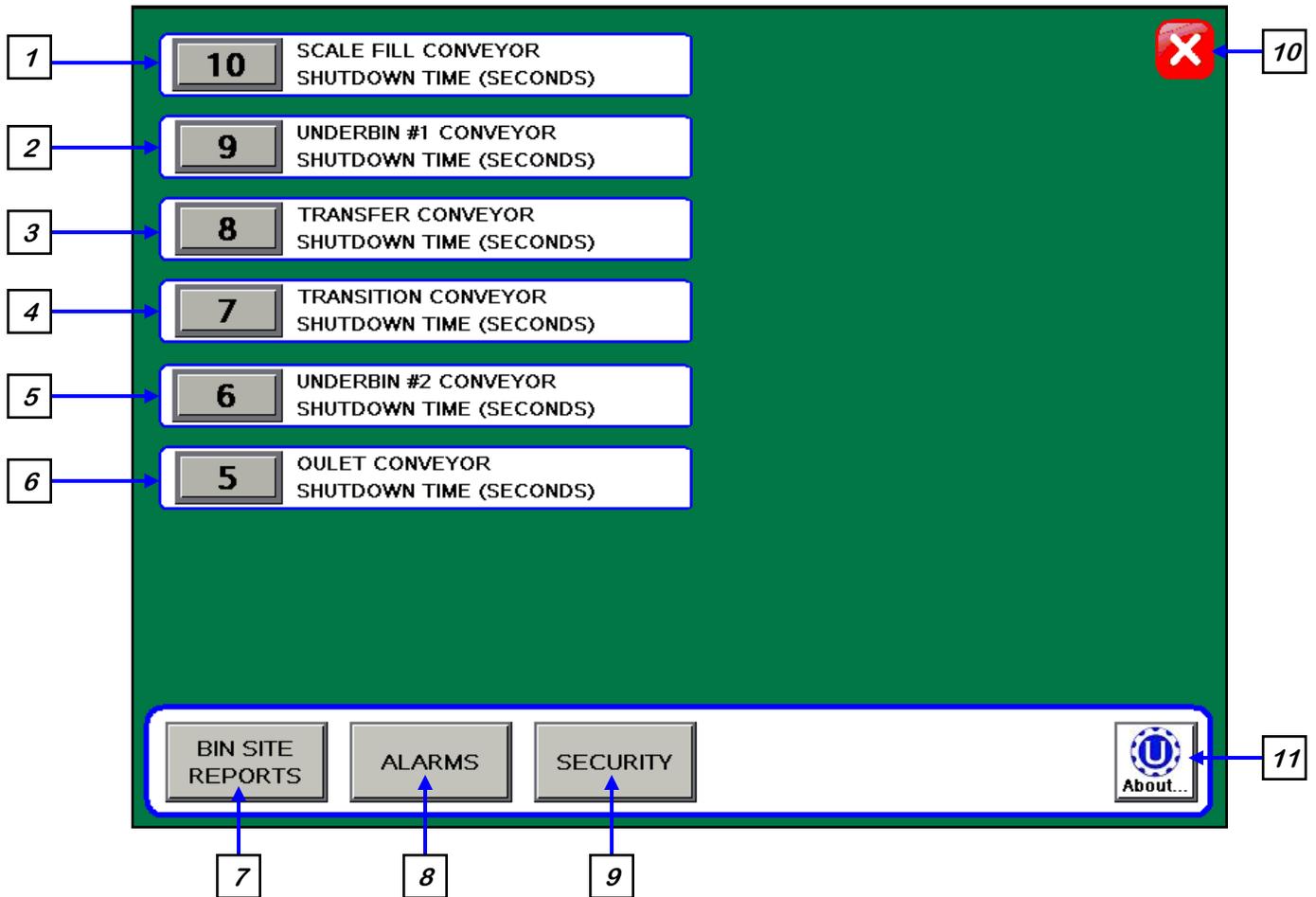
13. TRI - FLO™ INLET DIVERTER Index Display: Informs the operator which one of the three weigh hoppers the diverter is in position to load seed into. The active hopper will be green on the main screen.

H-O-A Button Descriptions (continued)

14. “DIVERTER” Control Module (optional): This module controls the function of the diverter. The module allows the operator to choose if the diverter is in the “TREAT” or “BYPASS” mode. In “TREAT” mode seed will be run through the treater and in “BYPASS” mode seed will be diverted so that it does not pass through the treater. This module will only be present if the Tri - Flo™ system has a diverter.

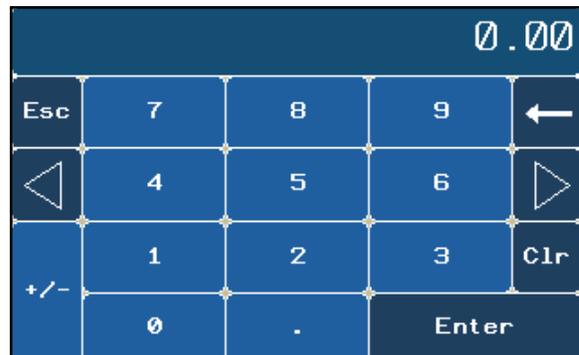
UTILITIES SCREEN

This screen allows the operator to set various system parameters and gives access to the “Reports”, “Security” and “Alarms” screens.



NOTICE

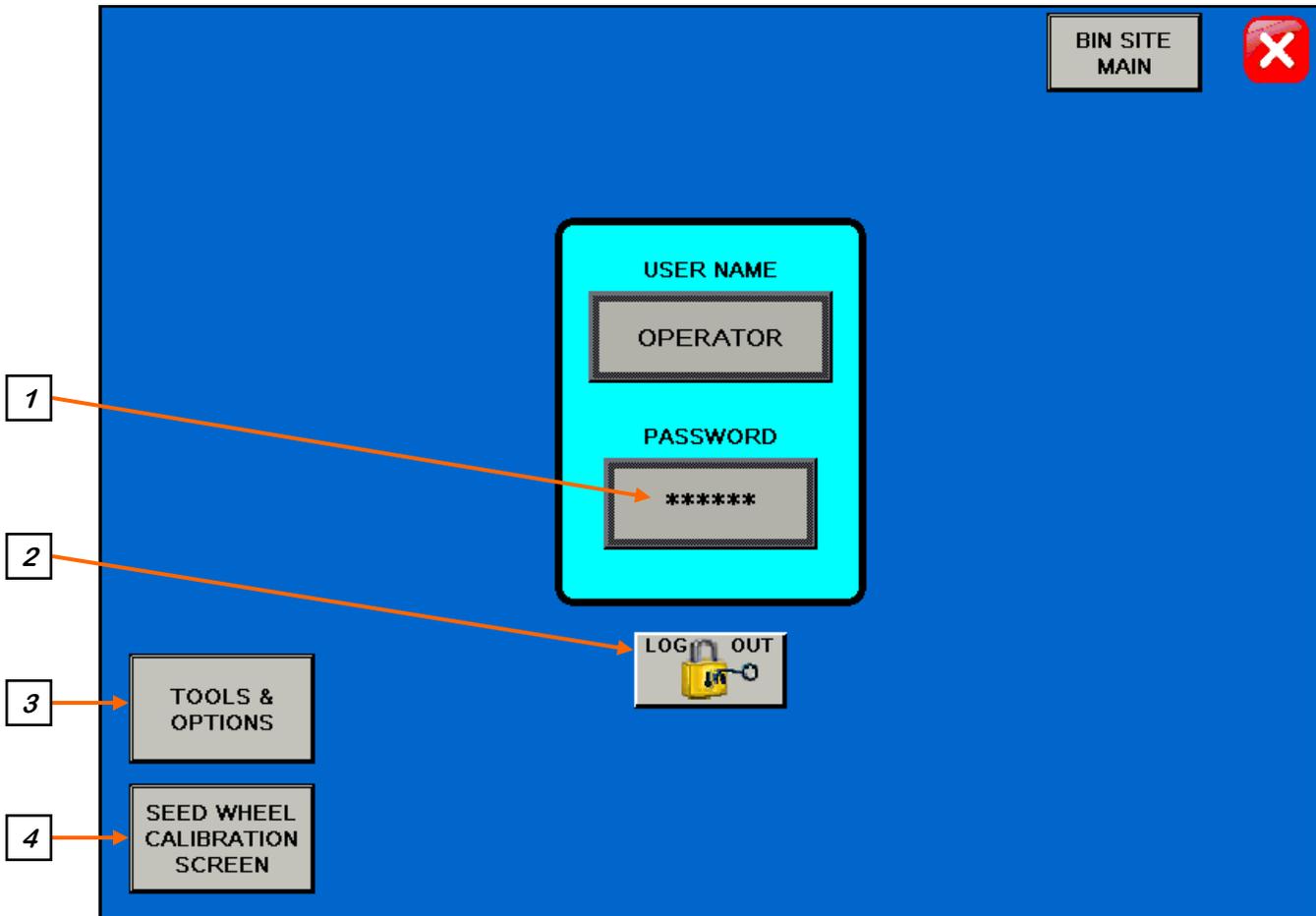
When buttons 1-6 are pressed, a numeric touch pad (right) will appear allowing the operator to enter in a number for that particular parameter.



Utilities Screen Button Descriptions

- 1. SCALE FILL CONVEYOR SHUTDOWN TIME:** Pressing this button allows the operator to adjust the shutdown time of the scale fill conveyor.
- 2. UNDERBIN #1 CONVEYOR SHUTDOWN TIME:** Pressing this button allows the operator to adjust the shutdown time of the underbin #1 conveyor. This timer will begin once the bin slide gate has closed and will allow the underbin conveyor to clean itself out.
- 3. “TRANSFER CONVEYOR SHUTDOWN TIME (optional):** Pressing this button allows the operator to adjust the shutdown time of the transfer conveyor. This timer will allow the Pro Box hopper to clean itself out. This button will only be present if the Pro Box hopper is being used.
- 4. “TRANSITION CONVEYOR SHUTDOWN TIME (optional):** Pressing this button allows the operator to adjust the shutdown time of the transition conveyor. This timer will allow the transition conveyor to clean itself out.
- 5. UNDERBIN #2 CONVEYOR SHUTDOWN TIME (optional):** Pressing this button allows the operator to adjust the shutdown time of the underbin #2 conveyor. This timer will begin once the batch is finished and will allow the underbin conveyor to clean itself out. This button will only be present if the Tri - Flo™ System has a second underbin conveyor.
- 6. OUTLET CONVEYOR SHUTDOWN TIME:** Pressing this button allows the operator to adjust the shutdown time of the outlet conveyor. This timer will always be set to the longest shutdown time to be sure all other conveyors and the treater have cleared themselves of seed and shutdown down.
- 7. “BIN SITE REPORTS” Button:** Pressing this button advances the operator to the Bin Site Reports screen.
- 8. “ALARMS” Button:** Pressing this button advances the operator to the Alarms screen.
- 9. “SECURITY” Button:** Pressing this button advances the operator to the Security screen.
- 10. Screen “EXIT” Button:** Pressing this button is used to exit back to the previous screen. Its functionality is the same throughout the HMI display.
- 11. “ABOUT USC” Button:** Pressing this button allows the operator see what software release is installed in the system.

SECURITY SCREEN



Security Screen Button Descriptions

1. "PASSWORD" Entry: The operator uses this input to obtain access to ALL options on this screen. When this button is pressed a keypad (right) will appear on the screen. The password is **"USC"** and should only be made accessible to personnel qualified to operate the Tri - Flo™ System. The User Name will stay "OPERATOR".



Security Screen Button Descriptions

2. "LOGOUT" Button: Pressing this button will log the operator out of the Security screen. However, the operator will be automatically logged out after 1 minute of no activity on the touch screen.

3. TOOLS & OPTIONS: Pressing this button will advance the operator to the Tools & Options screen.

4. SEED WHEEL CALIBRATION SCREEN (OPTIONAL): Pressing this button will advance the operator to the Seed Wheel Calibration screen (below). This option only appears if the Tri - Flo™ System is working in conjunction with a USC PLC based seed treater.

SEED WHEEL CALIBRATION X

SEED WHEEL CALIBRATION PROCEDURE BIN SITE MAIN

STEP 1: RUN OR TREAT A KNOWN WEIGHT OF SEED.
**A MINIMUM OF 2000 LBS(900 KGS) IS RECOMMENDED

STEP 2: ENTER THE ACTUAL WEIGHT OF THE SEED INTO THE "ACTUAL SCALE WEIGHT" NUMERIC INPUT.
ENTER THE "TOTAL LBS/KGS" READING INTO THE "TOTALIZER WEIGHT" NUMERIC INPUT.

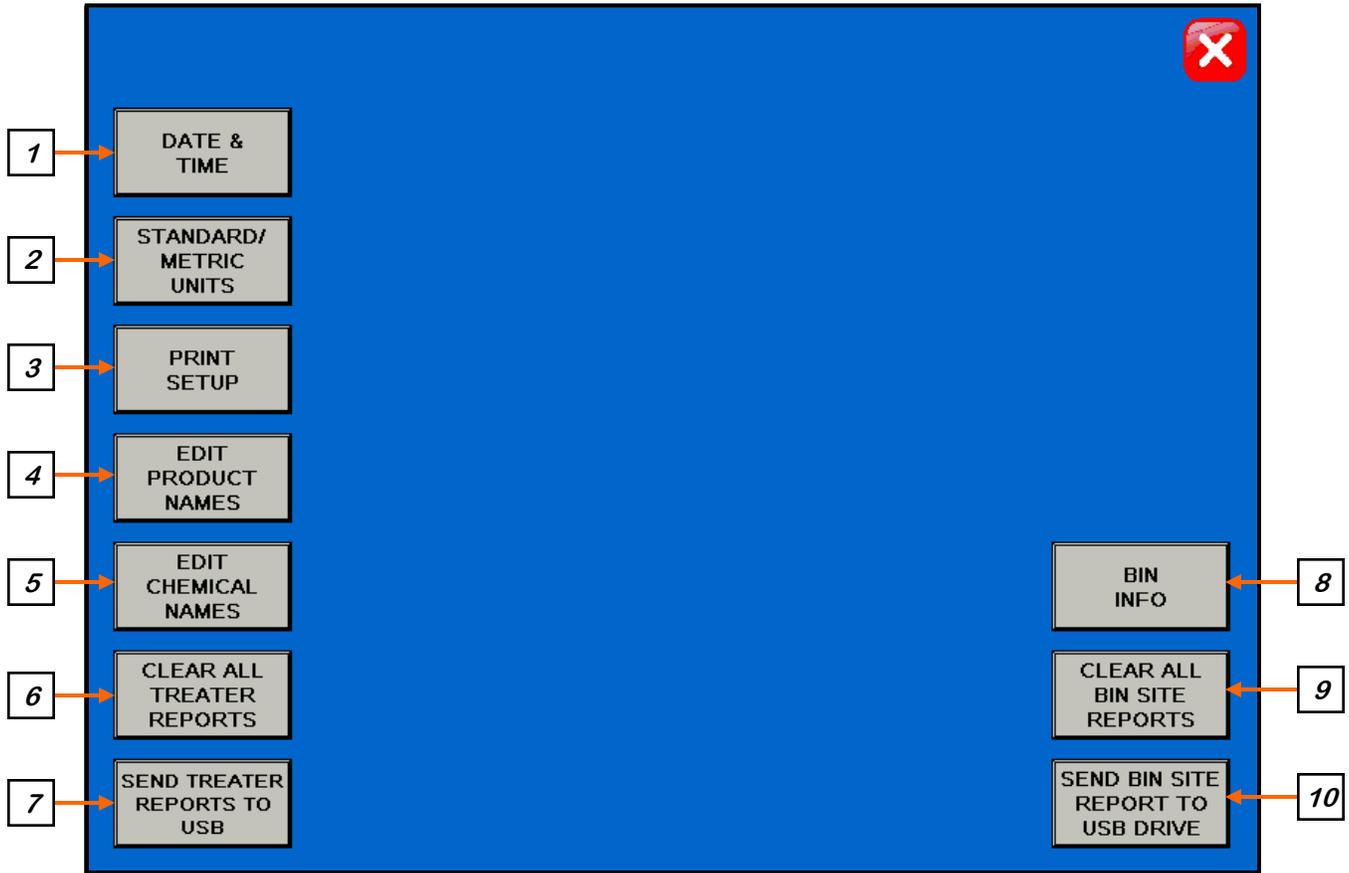
STEP 3: PRESS THE "APPLY" BUTTON TO COMPLETE THE CALIBRATION PROCESS.

ACTUAL SCALE WEIGHT APPLY TOTALIZER WEIGHT TOTALIZER (LBS)

1 1 0

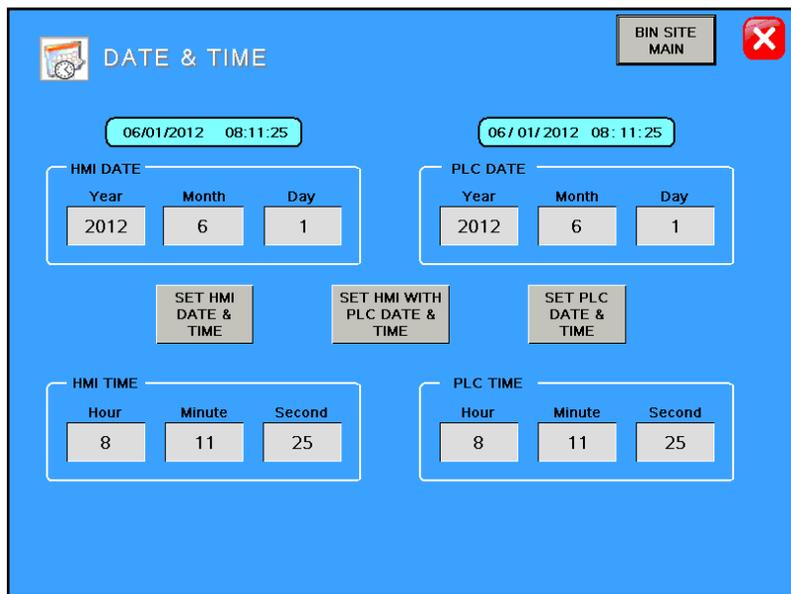
RESET

TOOLS & OPTIONS SCREEN



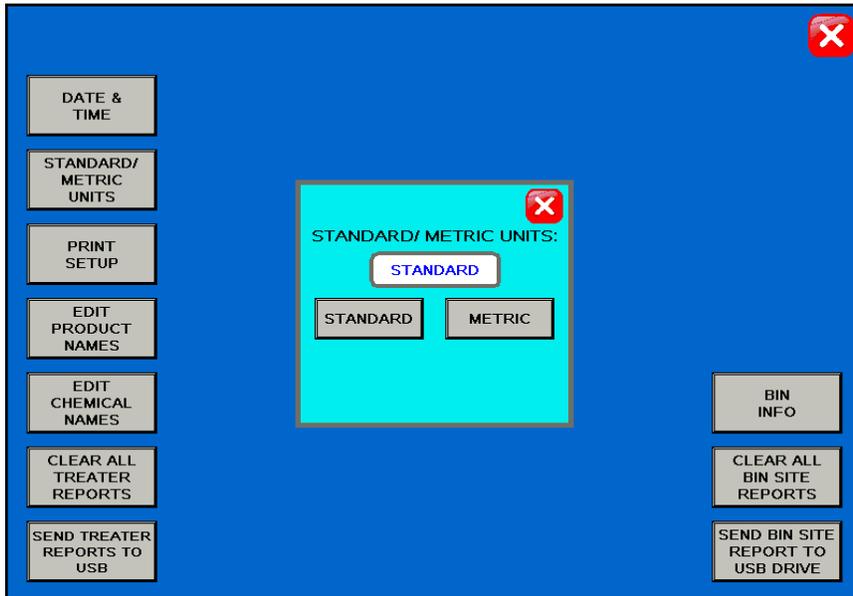
Tools & Options Screen Button Descriptions

1. DATE & TIME: This button advances the operator to a screen where the date and time can be changed. First set the PLC date and time. Next, press the button in the middle of the screen, this will automatically synchronize the HMI date and time to the PLC date and time. (right)



Tools & Options Button Descriptions (continued)

2. STANDARD/METRIC UNITS: Allows the operator to switch between Standard or Metric units of measurement. When this button is pressed a window will appear (below) which will allow the operator to select the desired units of measurement.



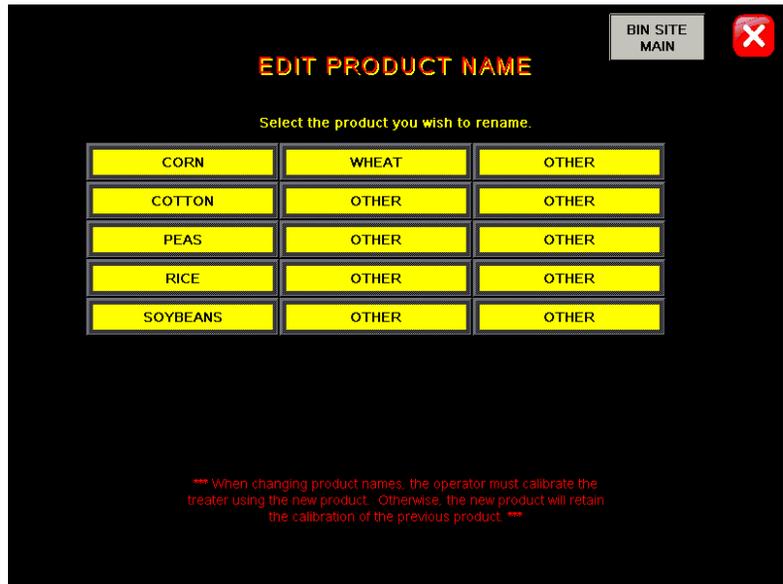
3. PRINT SETUP: Allows the operator to set up their personal company information which will be printed at the top of each report. Pressing the button will advance the operator to the screen below. The company information can be entered by selecting the blank space under each heading. The auto print function is for bin sites only.

A screenshot of a 'PRINT SETUP' form window. The window has a white background and a red 'X' icon in the top right corner. It contains several input fields: 'COMPANY NAME:', 'ADDRESS #1:', 'ADDRESS #2:', 'PHONE NUMBER:', and 'COMMENT:'. Each field is represented by a horizontal yellow bar. Below these fields, there is a line of text: 'The information above will be displayed on the printed reports.' At the bottom of the form, there is a checkbox labeled 'AUTO PRINT REPORT' which is checked with a black checkmark. In the top right corner of the form, there is a button labeled 'BIN SITE MAIN' with a red 'X' icon.

NOTE:

Tools & Options Button Descriptions (continued)

4. EDIT PRODUCT NAMES (optional): Allows the operator to change the product names to better fit their needs. Pressing the button will advance the operator to the screen below. By selecting one of the seed types, the operator can change the name of the product and the current calibration setting for the seed wheel.

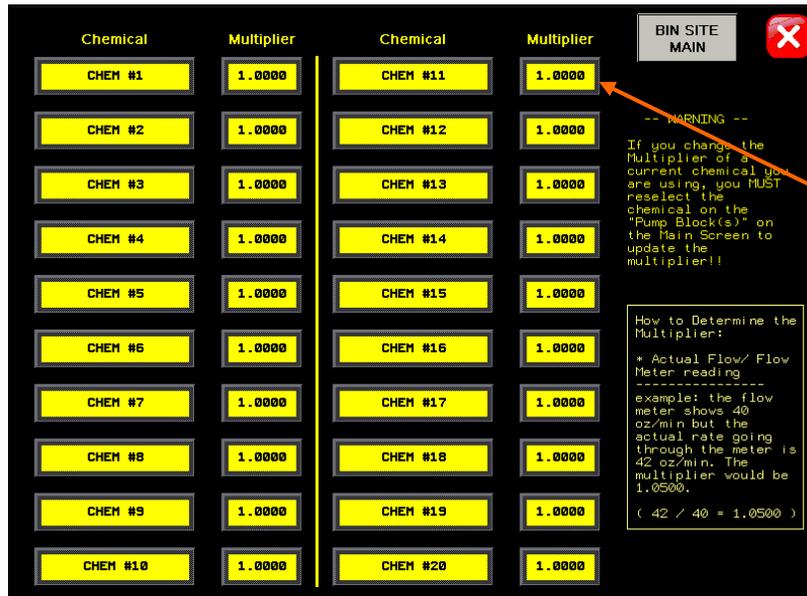


5. EDIT CHEMICAL NAMES (optional): Allows the operator to change the chemical names to better fit their needs. Pressing the button will advance the operator to the screen below. By selecting one of the chemical types, the operator can change the name of the chemical. This option only appears if the Tri - Flo™ system is working in conjunction with a USC PLC based seed treater.

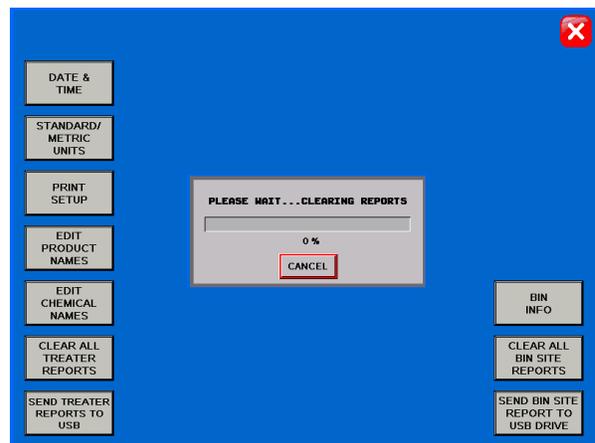
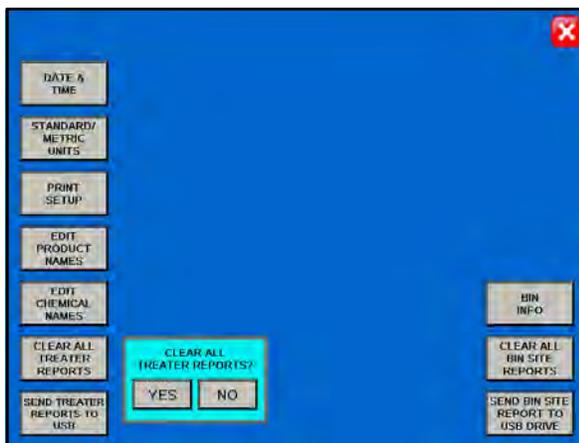


Tools & Options Button Descriptions (continued)

5. EDIT CHEMICAL NAMES (continued): This screen also allows the operator to recalibrate the flow meter by adjusting the multiplier for each chemical. This option only appears if the Tri - Flo™ system is working in conjunction with a USC PLC based seed treater.



6. CLEAR ALL TREATER REPORTS (optional): Pressing this button will open a window which will ask the operator if he or she wants to clear all saved treater reports. If “YES” is pressed then the reports will be permanently erased. This option only appears if the Tri - Flo™ System is working in conjunction with a USC PLC based seed treater.



7. SEND TREATER REPORTS TO USB: If a memory stick is present in the USB port, this button can be pressed and all the saved reports will be downloaded to the memory stick.

Tools & Options Button Descriptions (continued)

8. BIN INFO: Pressing this button will advance the operator to the Bin Info screen (below). This screen allows the operator to select the bin that the information is to be entered into. The operator will then be able to enter in the seed type, seed variety, lot number, seeds per pound, and cup weight of the seed in the selected bin. A keypad will appear when the button next to any of these options is pressed (right). After entering this information the “SAVE” button must be pressed for the bin site system to retain the information. The inventory of the bin may also be entered on this screen. Enter the amount of inventory that is to be added/subtracted into the “Amount to Adjust Inventory” box and then press and hold the “INCREASE INVENTORY” or the “DECREASE INVENTORY” box for 3 seconds. The total amount of inventory in the bin will be displayed in the white box above the amount to be adjusted.



BIN SITE MAIN
✖

SELECT BIN

BIN 1	BIN #1
BIN 2	BIN #2
BIN 3	BIN #3
BIN 4	BIN #4
BIN 5	BIN #5
BIN 6	BIN #6
BIN 7	BIN #7
BIN 8	BIN #8

MANUAL MANUAL HOPPER

CURRENT BIN INFO

BIN NAME:

SEED TYPE:

SEED VARIETY:

LOT NUMBER:

SEEDS / LB:

CUP WEIGHT: LBS

FLOW RATE: LBS/MIN

TRAVEL TIME: SEC

SAVE
CANCEL

0

LBS

DECREASE INVENTORY
0
INCREASE INVENTORY

Amount to Adjust Inventory (lbs)

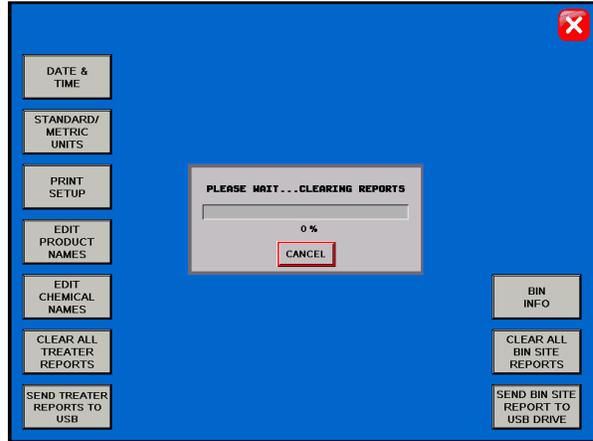
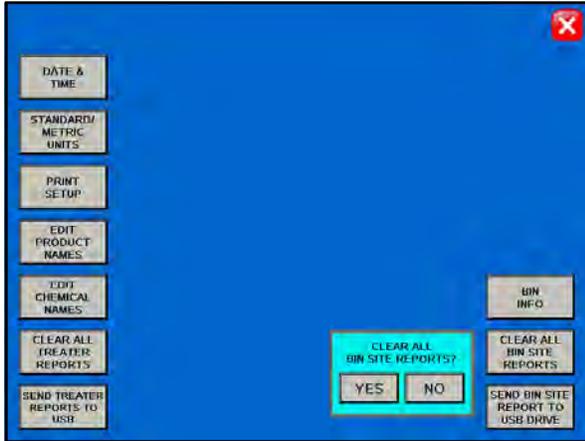
Press & Hold for 3 sec. Press & Hold for 3 sec.

Displays the total inventory in the selected bin.

Enter the amount of seed that is to be added here.

Tools & Options Button Descriptions (continued)

9. CLEAR ALL BIN SITE REPORTS: Pressing this button will open a window which will ask the operator if he or she wants to clear all the saved bin site reports. If “YES” is pressed then the reports will be permanently erased.



10. SEND BIN SITE REPORTS TO USB: If a memory stick is present in the USB port, this button can be pressed and all the saved reports will be downloaded to the memory stick.

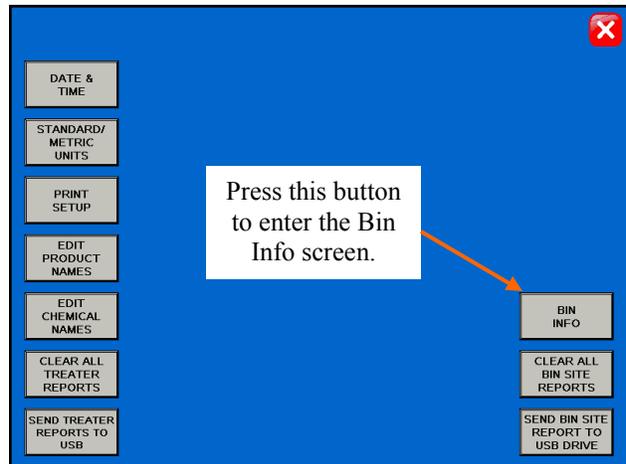
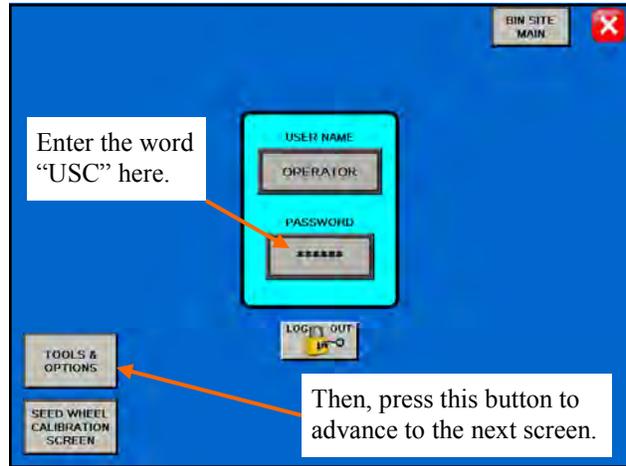
SECTION
E

OPERATION & CALIBRATION

LOADING SEED INTO BINS

Before seed is pulled out of the bins and run through the Tri - Flo™ System, information on each of the bins must first be entered into the Tri - Flo™ System. The following is a list of steps to perform to enter the bin information for each bin once seed has been loaded into that bin.

1. Load the seed into the bin. Take a seed sample for the cup weight of each bin at this time. Also, note the seed type, seed variety, lot number, seeds/lb, and total inventory in pounds of the seed that is loaded into the bin.
2. Press the “UTILITIES” button on the main screen of the Tri - Flo™ System.
3. Press the “SECURITY” button on the Utilities screen.
4. Press the “PASSWORD” box then, from the pop up window select the letters “USC” and press enter.
5. Press the “TOOLS & OPTIONS” button on the Security screen.
6. Press the “BIN INFO” button on the Tools & Options screen.
7. Select the desired bin to enter the information into. (page 35)
8. Enter the recorded seed type, seed variety, lot number, seeds/lb, and cup weight of the seed in the bin into their respective box. (page 35)
9. Enter in the total weight of seed that was added to the bin into the bin inventory section on the lower portion of the screen. The system will automatically subtract inventory after each run. Press the save button when all the information has been entered. (page 35)
10. When finished, exit back to the Main screen.



SETTING THE SEED FLOW RATE

The following is a list of steps for setting the seed flow rate. This must be completed before running the Tri - Flo™ system. Repeat steps 1 & 2 for each bin.

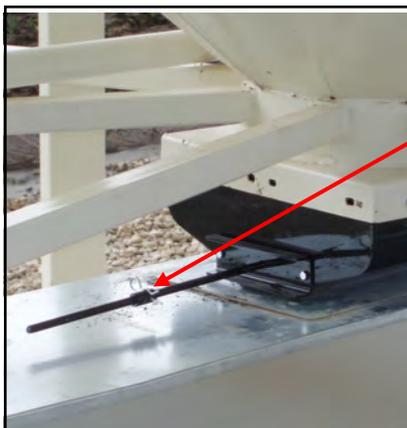
1. Set the manual gate on the bin to the fully open position. Once opened, this gate should be set in place and not moved through out the entire season. If this gate is adjusted during a run or between runs then it will effect the calibration of the system and the system will need to be re-calibrated. (page 44)
2. Set the stop for the air actuated slide gate on the bin. This stop controls how far the slide gate will open and the flow rate at which seed can exit the bin. To set the stop, adjust the position of the collar on the rod that exits the slide gate opposite of the air valve (below). Placing the collar closer to the slide gate will restrict flow and farther away from the slide gate will increase seed flow for the system. Once a collar location has been selected, use the hitch pin to lock the collar in place. If the stop is adjusted between runs then it will effect the calibration of the system and the system will need to be re-calibrated. (page 44)

NOTICE

It is recommended to initially place the collar closer to the slide gate and then move it farther away from the slide gate one hole at a time to increase the flow rate of the system. This will protect against overloading the underbin conveyor with seed.

Note: A minimum of 1500 pounds must be received without alarms for the system to calibrate flow rate for the first time. To accomplish this using the default settings as required, the Target Weight must be set at a minimum of 2000 pounds.

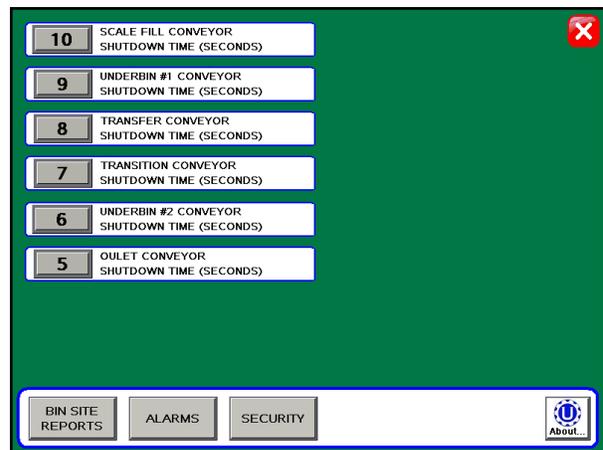
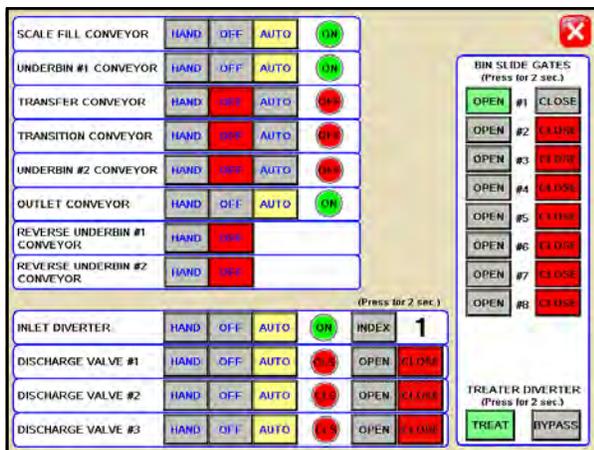
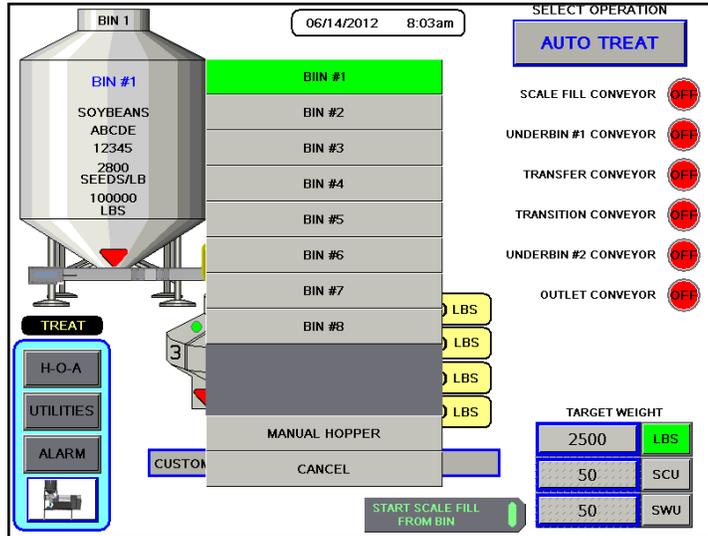
Move the position of the collar along this rod to adjust the flow of seed through the bin slide gate.



SCALE FILL FROM BIN

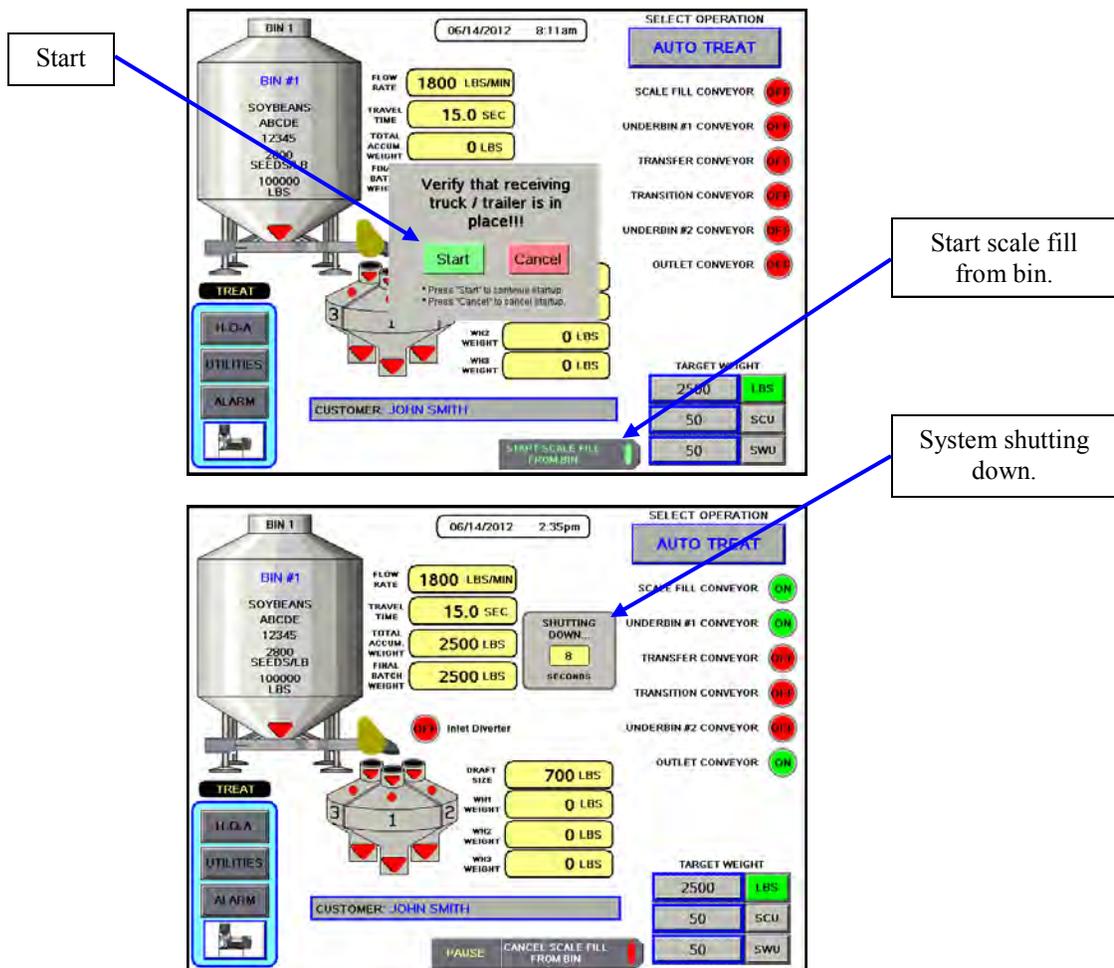
The following is a list of steps to use when running the Tri - Flo™ system in the Scale Fill From Bin mode of operation. This allows the operator to automatically fill the scale from the bin.

1. Select the bin that you wish to call seed from by pressing the image of the bin on the Main screen and then select the bin from the pop-up menu . (right)
2. Press “SELECT PROCESS” and then select either “AUTO TREAT” or ”MANUAL TREAT / BYPASS” mode of operation depending upon what you plan to do with the seed once it has been pulled from the bin and weighed by the Tri - Flo™ system.
3. On the Main screen, in the box labeled “TARGET WEIGHT” enter the amount of weight that is to be brought into the Tri - Flo™ hopper on this run. (right)
4. Press the box labeled “CUSTOMER” at the bottom of the Main screen and enter in the current customer’s name.
5. Under the H-O-A screen place all necessary conveyors into the “AUTO” mode of operation. (below left) Ensure that the diverter is in the appropriate position as well.
6. Under the Utilities screen, ensure that all settings are appropriate. (below right)



SCALE FILL FROM BIN (continued)

7. Return to the Main screen and press the “START SCALE FILL FROM BIN” button at the bottom of the screen. Then press “START” from the pop-up screen. This toggles the button to “CANCEL SCALE FILL FROM BIN” and activates the “PAUSE” button. The system will first turn on the scale fill conveyor and then the underbin conveyor. Once all needed conveyors are running, the slide gate for the selected bin will open and seed will flow through the conveyors to the Tri - Flo™ hoppers. (top)
8. As the Tri - Flo™ system is running, the main screen will display the total pounds of seed in each of the three weight hoppers, and the status of the conveyor motors. (middle)
9. The slide gate on the bin will automatically close once the target weight in seed passes through the slide gate. Once the gate closes, a window will appear notifying the operator that the batch is finishing. It will then be replaced with another window indicating amount of time before the system shuts down. The system will then shutdown the conveyors in reverse order of startup. This will ensure the conveyors have an opportunity to clean out any product from them. (bottom)



CALLING IN SEED FROM PRO BOXES

The following is a list of steps to use when running the Tri - Flo™ system using the “START SCALE FILL FROM HOPPER” button. This button will automatically move seed from the manual hopper, via the transfer conveyor, to the scale. The “START SCALE FILL FROM HOPPER” button is only available if the Tri - Flo™ system has a manual hopper.

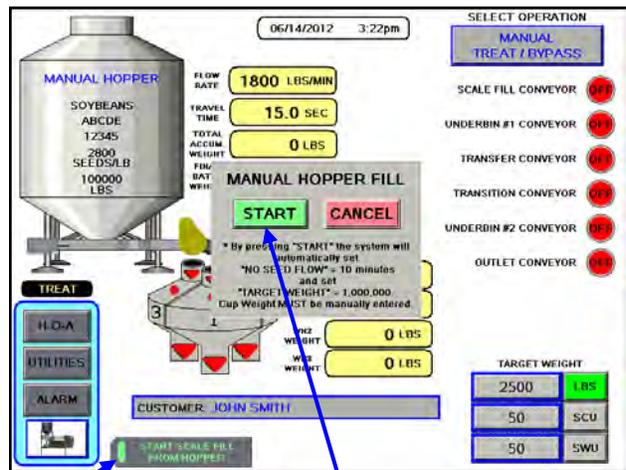
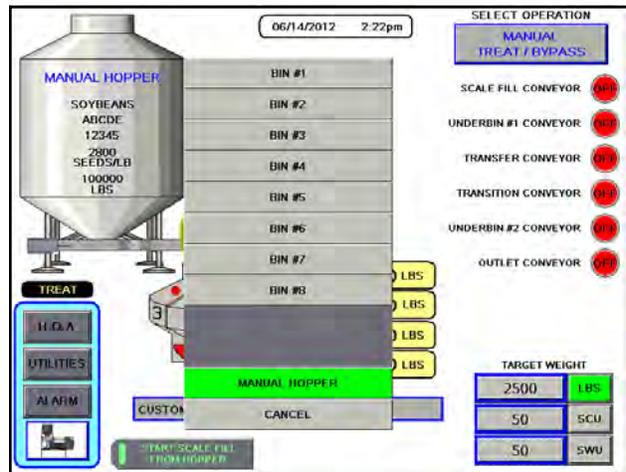
1. Under the H-O-A screen place all necessary conveyors into the “AUTO” mode of operation. Depending upon the setup of the equipment, some bin sites will require only the transfer conveyor or the scale fill conveyor to be in “AUTO” mode and some sites will require the transfer, underbin and scale fill conveyors to all be in the “AUTO” mode. Ensure that the diverter is in the appropriate position as well.

2. Under the Utilities screen, ensure that all settings are appropriate.

3. Press the image of the bin and select “MANUAL HOPPER” from the pop-up screen. (top)

4. Press “SELECT PROCESS” and then select either “AUTO TREAT” or ”MANUAL TREAT / BYPASS” mode of operation depending upon what you plan to do with the seed once it has been pulled from the Pro Box and weighed by the Tri - Flo™ system.

5. Press “START SCALE FILL FROM HOPPER” button at the bottom of the screen. Then press “START” from the pop-up screen. This toggles the button to “CANCEL SCALE FILL FROM HOPPER” and activates the “PAUSE” button. (page 42) The system will first turn on the scale conveyor, the underbin conveyor, then the transfer conveyor (if applicable) and the outlet conveyor. (bottom)

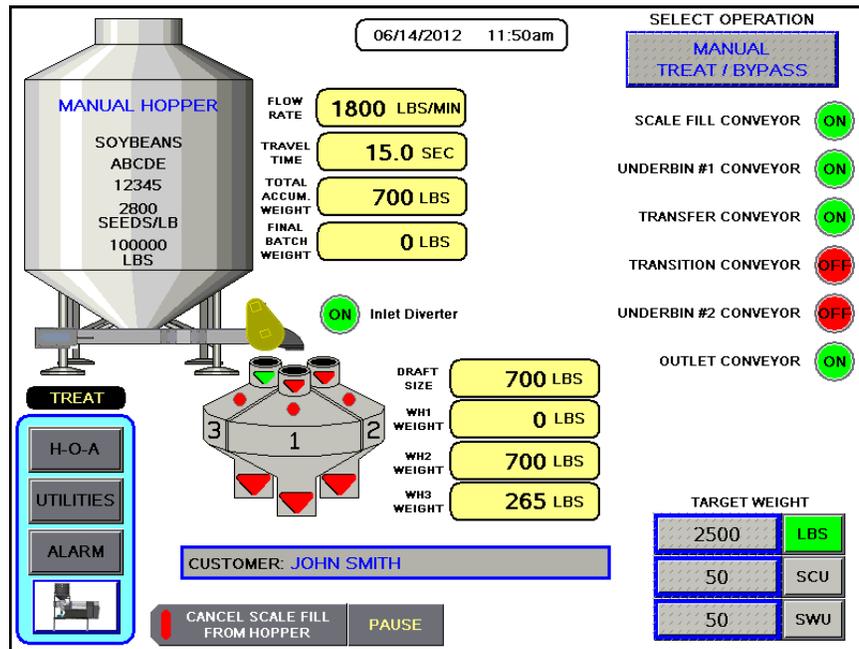


Start scale fill from hopper

Start

CALLING IN SEED FROM PRO BOXES (continued)

6. As the Tri - Flo™ system is running, the Main screen will display the total pounds of seed in each of the three Tri - Flo™ weigh hoppers. If the system needs to be stopped for a moment because of a problem, the “PAUSE” button can be pressed to halt the process. When ready to begin again, the “CONTINUE” button is pressed.
7. Once all of the seed has passed from the manual hopper, through the conveyors and through the weigh hoppers, press the “CANCEL SCALE FILL FROM HOPPER” button. At this point, the conveyors will shutdown in reverse order of startup.
8. The system will automatically print the report for the run from the scale head printer.



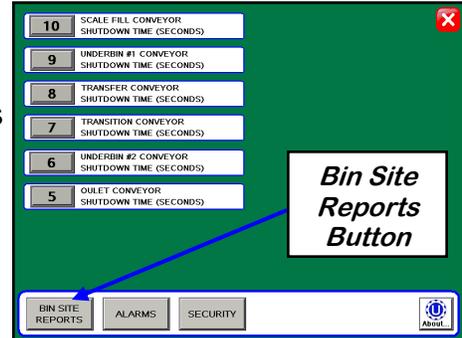
REPORTS

The following steps explain how reports are entered after a run has been completed.

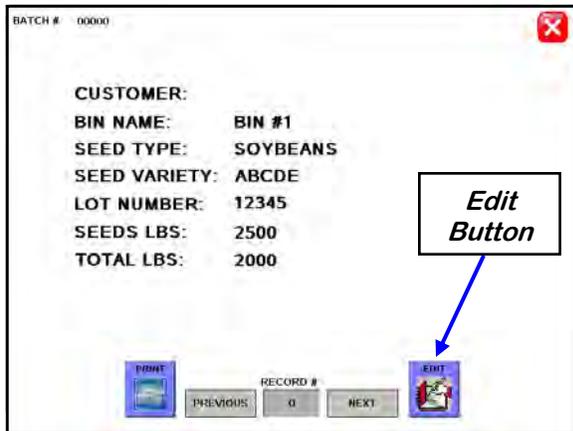
1. Once the Tri - Flo™ system finishes shutting down, a dialog box will appear (right), notifying the operator that the data from the run is being saved.



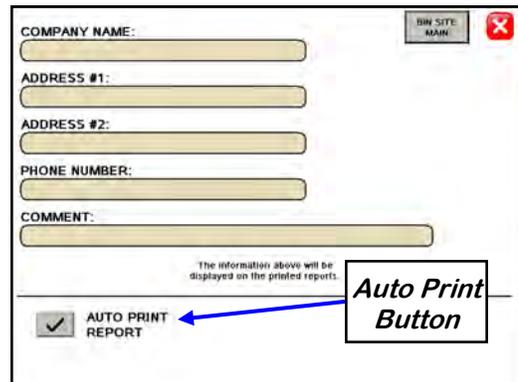
2. Once the data has been saved, the operator can view the report, print the report, and edit the customer name on the report by accessing the Bin Site Reports screen. To reach the Bin Site Reports screen, press the “UTILITIES” button on the Main screen and then press “BIN SITE REPORTS” button on the bottom of the Utilities screen. (right)



3. Under the Bin Site Reports screen, the customers information and seed information can be recorded and saved for later use. Press the “EDIT” button to change the customer name. (below) Pressing the cell next to the customer name will bring up a keypad which will allow the operator to enter in the information. When finished the operator can press the “OK” button to save the data. The “PRINT” button can be pressed to print the data for the customers records. Then press the “X” in the top right corner of the screen and exit back to the Main screen.



4. The operator can choose to have the system automatically print a copy of the record for each run by pressing the “SECURITY” button under the Utilities screen to advance to the Security screen. Then enter in the Password of “USC” and select the “TOOLS & OPTIONS” button. (page 28) Select the “PRINT SETUP” button and finally check the “AUTO PRINT” box. (right)



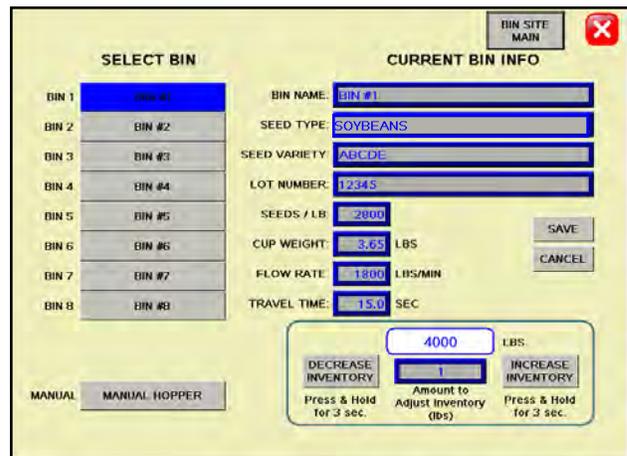
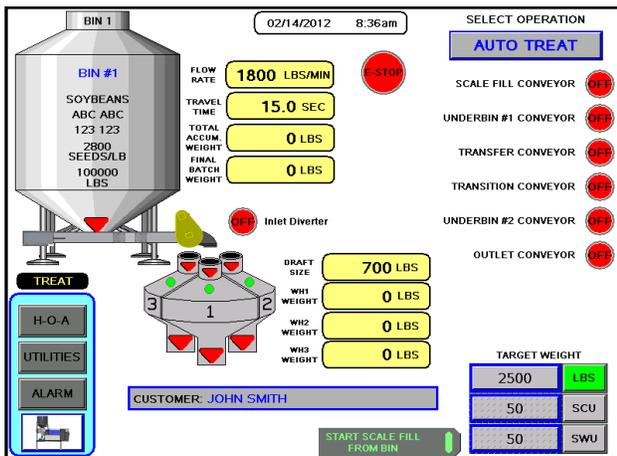
TRI - FLO™ CALIBRATION

Once the initial calibration is established, the system continuously updates the seed flow rate. The calibration is based upon time and weight. The system first calculates the amount of time it takes for the seed to travel from the bin slide gate to the first Tri - Flo™ weigh hopper. This is called the travel time. Then the system calculates how long it takes to fill the first weigh hopper. This allows the system to calculate the seed flow rate of pounds per minute. Finally, the system uses the travel time and seed flow rate to calculate the amount of seed in the conveyors at any given time. Once this weight is known, it will automatically close the bin gate at the appropriate time to reach the target weight of seed that the operator has entered.

Initial calibration procedure:

1. Set the bin collar in the fourth hole from the end of the rod in. This sets the Flow Rate at approximately 1200 pounds. Adjust as needed (each hole adjusts up or down by approximately 200 pounds). These figures are based on Soybeans.
2. From the main screen check the Flow Rate to verify it is at the default setting of 1800 lbs/min and the Travel Time is at it's default of 15.0 sec. Then set your Target Weight at a minimum of 2000 pounds. At the end of the run the Final Batch Weight must be a minimum of 1500 pounds. For the system to be able to record the calibration the first two Tri - Flo™ hoppers must be weighed full and the third is in the process of filling with no alarm faults. After the run, check to see if the Flow Rate and Travel Time have changed from the default settings. If they have the system has been successfully calibrated. Each bin must be individually calibrated.

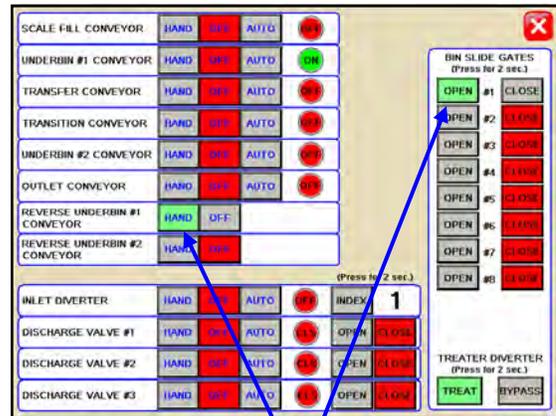
NOTE: If you change the location of the bin collar or the bin runs out of seed before the Target Weight is reached the system will need to be re-calibrated.



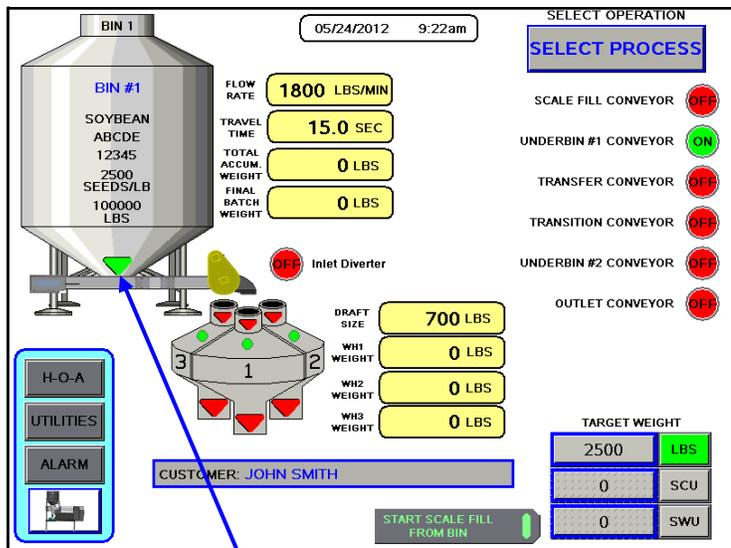
UNDERBIN OPERATION IN REVERSE MODE

The following is a list of steps to use when running the Tri - Flo™ system using the “Reverse” mode. This mode of operation will allow the operator to clean out the underbin conveyor and to remove any excess seed from the bins at the end of the treating season. **ALWAYS ENSURE THE BELT IS IMMEDIATELY AND PROPERLY ALIGNED WHEN RUNNING IN REVERSE! BELTS WILL OFTEN SHIFT ALIGNMENT WHEN THEIR DIRECTION OF TRAVEL IS REVERSED.** The “REVERSE UNDERBIN CONVEYOR” for the underbin conveyor will only be present if the Tri - Flo™ system has the reversing option for the underbin conveyor.

1. Place a conveyor and seed storage container under the reversing end of the underbin conveyor to catch seed as it exits the underbin conveyor. Turn that conveyor motor on.
2. Under the H-O-A screen place the “REVERSE UNDERBIN CONVEYOR” operation in the “HAND” mode. (top) Ensure that the belt on the underbin conveyor is correctly aligned.
3. Then, manually place the desired bin slide gate to the “OPEN” position. (top)
4. The Tri - Flo™ Main Screen will show the underbin conveyor on and the bin slide gate in the open position. (bottom)
5. Once all seed has passed through the underbin conveyor and into the seed container, place the open bin slide gate back to the “CLOSED” position.
6. Allow the underbin conveyor to run for at least 15 seconds. This will allow the underbin conveyor to clean itself out. Then place the underbin conveyor motor back to the “OFF” position.



Press the “HAND” button and then place the bin slide gate to the “OPEN” position.



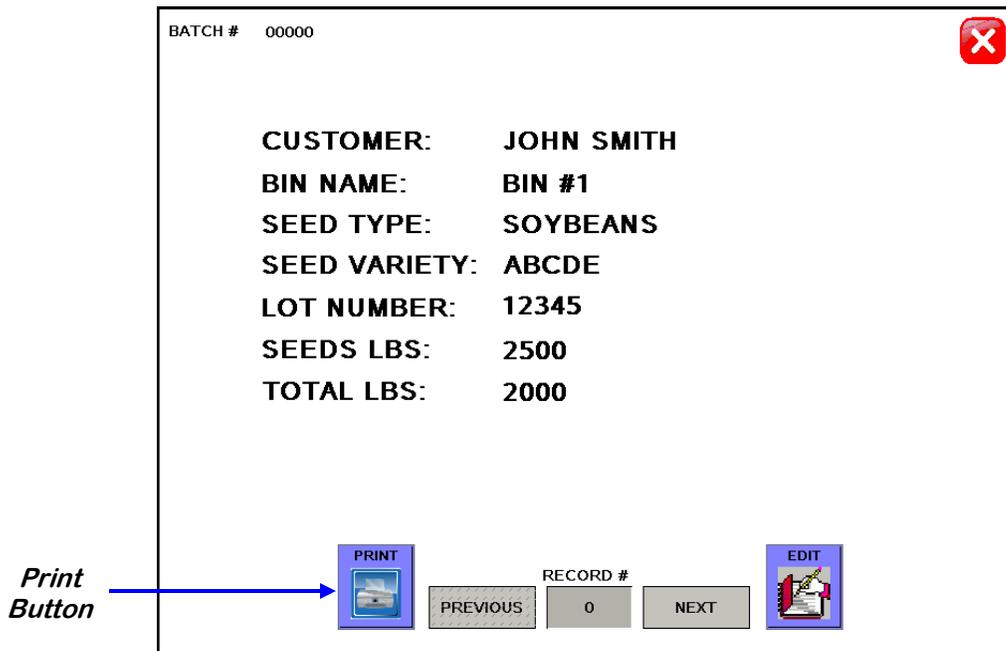
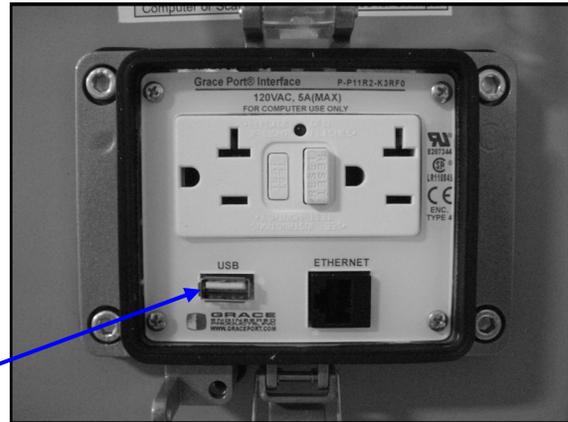
Slide Gate Indicator.

PRINTING & DOWNLOADING REPORTS

The USB port located on the side of the main control panel, allows the operator to print reports or down load reports to a Compact Flash device.

When a printer is hooked to the USB port, the operator can print a report by pressing the print button located on the Reports screen.

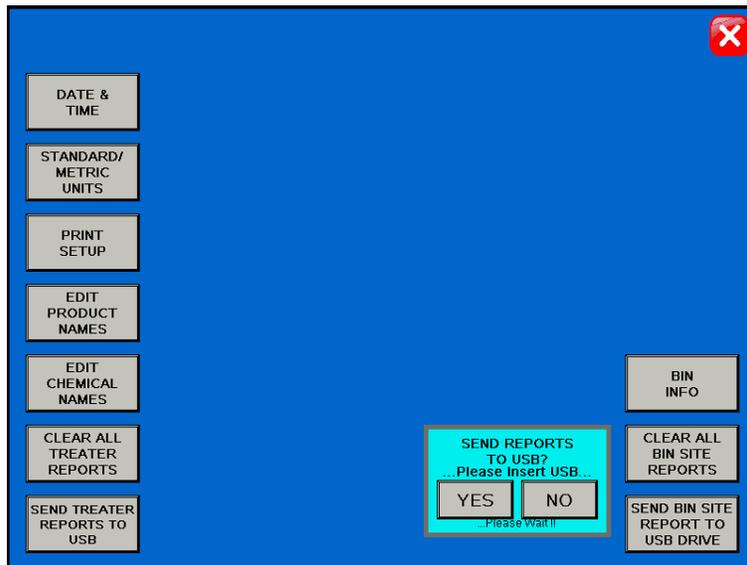
USB Port



DOWNLOADING REPORTS

Use the following steps to download reports to a computer.

1. Insert a Compact Flash device into the USB port. The Flash device must be in Fat 32 format.
2. Advance to the Tools & Options screen.
3. Press the “SEND BIN SITE REPORT TO USB” button. A confirmation window will appear. Press the YES button and all the reports will automatically copy to the compact flash device.



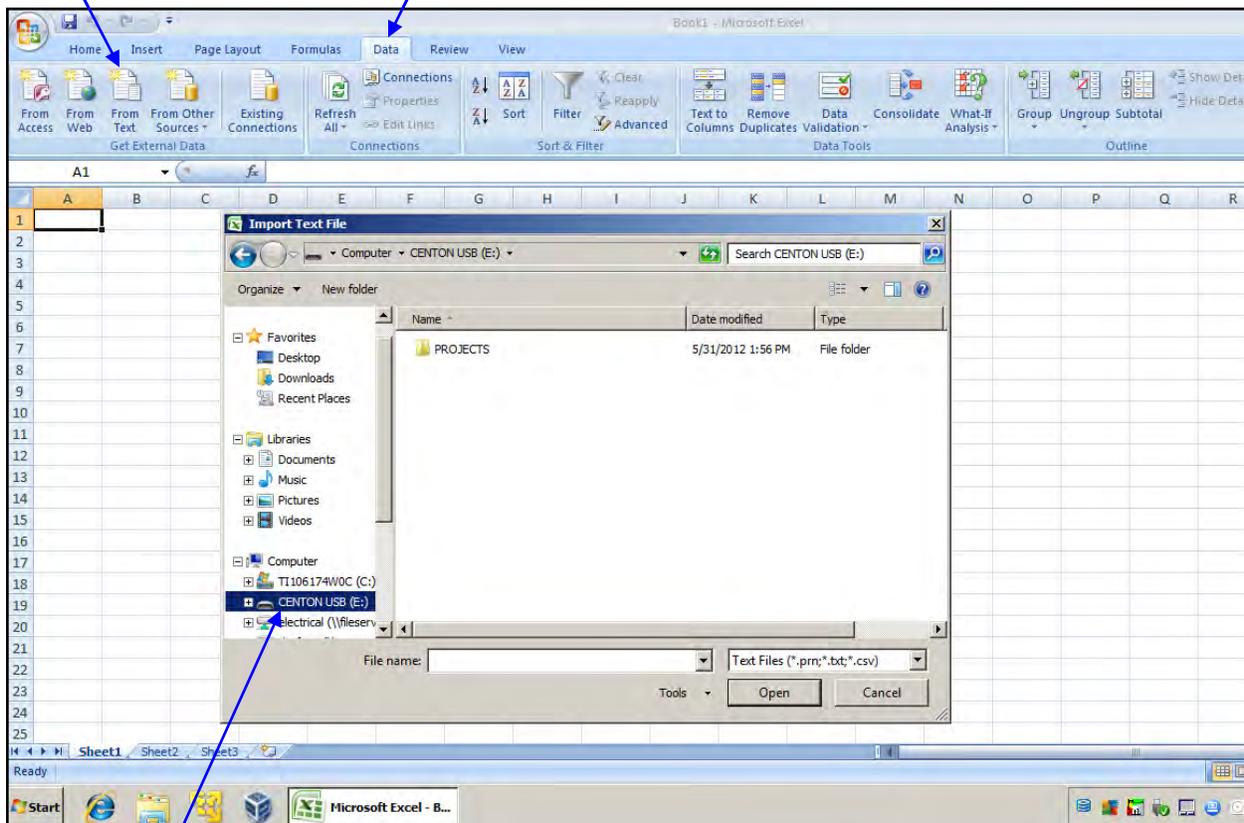
4. Remove the compact flash device from the control panel and insert into your computer.

DOWNLOADING REPORTS (continued)

5. Start Microsoft Office Excel. From the top menu select DATA then FROM TEXT.
6. From the Input Text File screen select the appropriate external drive. Then select the folders PROJECTS / HMI_MCP / DATA / ALARM / EVENGROUP1. Select the file you want to work with and the Text Import Wizard window will open.

FROM TEXT

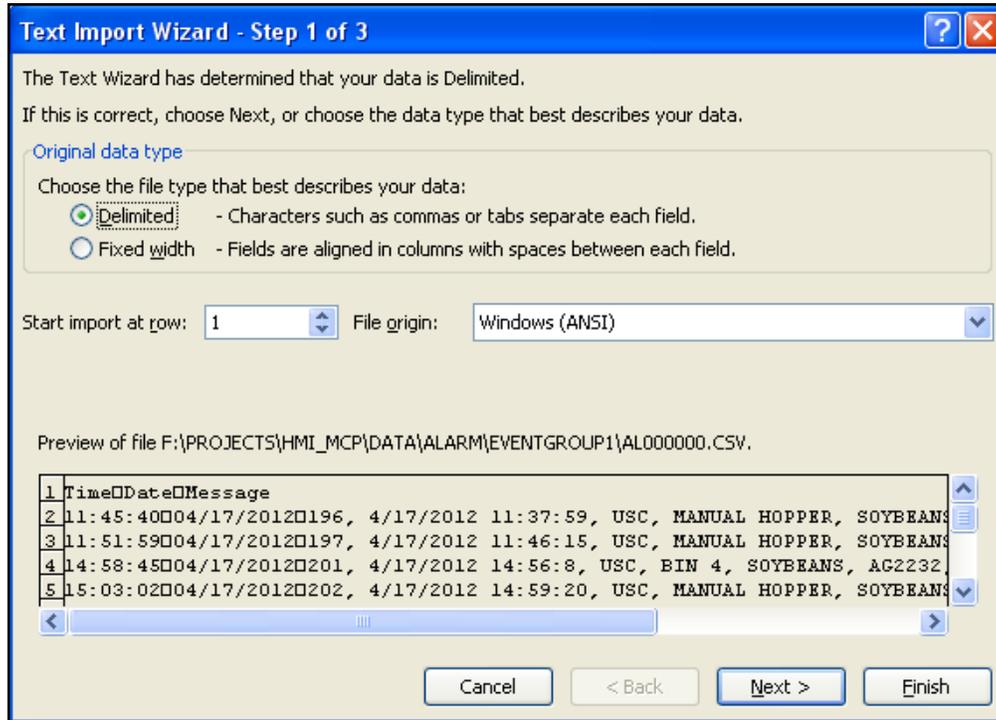
DATA



EXTERNAL DRIVE

DOWNLOADING REPORTS (continued)

7. Click Next.

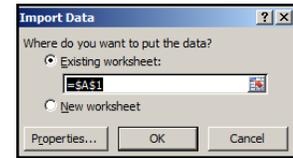


8. Select "Comma" as the Delimiter. Then click Next.

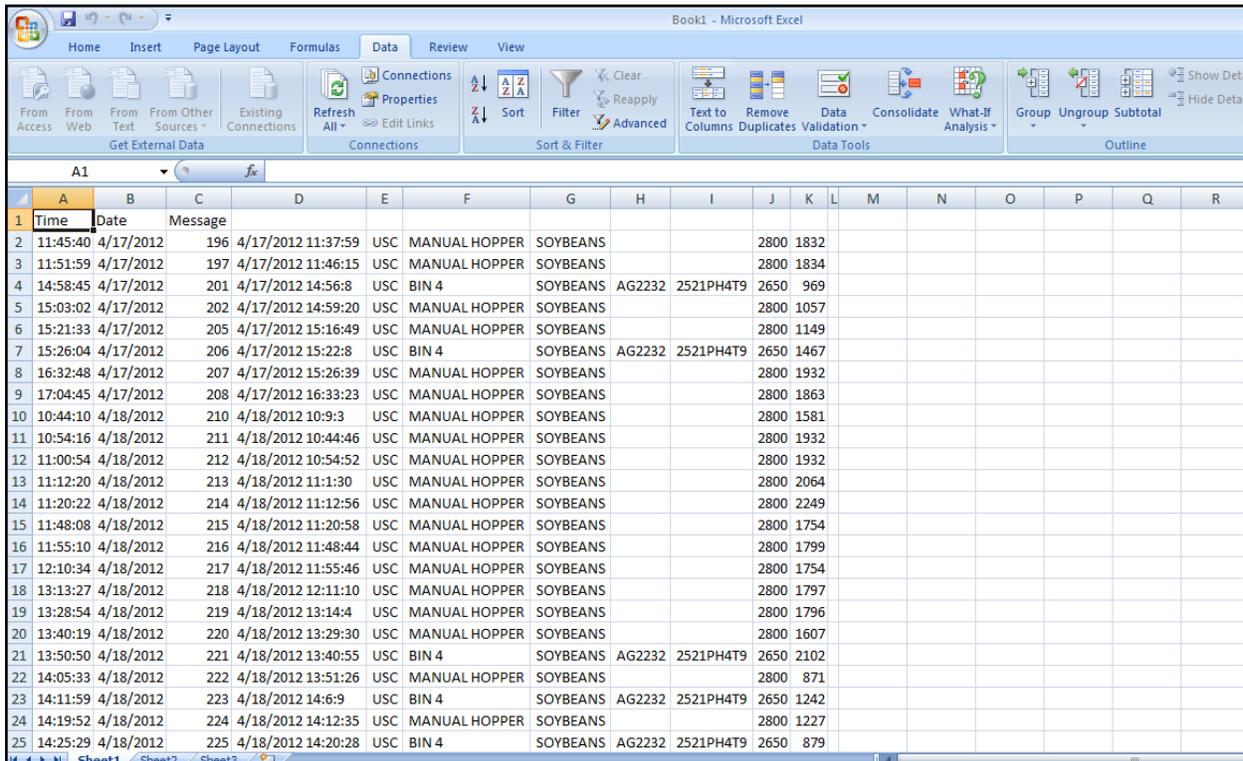


DOWNLOADING REPORTS (continued)

9. Click Finish and the Import Data window appears. Click OK.



10. The Report conversion process is complete. In the File menu, click Save As and file the report.



**SECTION
F**

TROUBLESHOOTING & ALARMS

TROUBLESHOOTING

Below is a table describing the most frequent problems and solutions with the USC Tri - Flo™ bin site system. For further assistance, contact your local USC dealer.

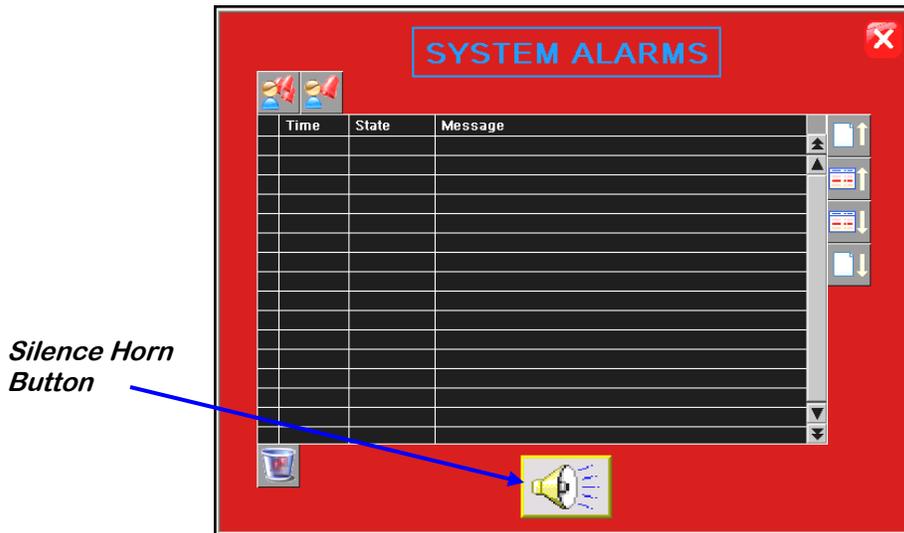
Problem	Possible cause	Solution
Tri - Flo™ : Minimum flow rate alarm.	1. Running too low capacity.	1. Adjust your air gates or manual gates.
Tri - Flo™ : ***** on the PLC touch screen on one of the hoppers.	1. In UTreat 1.2.3 version and forward this means it is a negative indicator weight.	1. Zero scale.
Tri - Flo™ : Indicator weight shows two pounds in bin after run.	1. Tri - Flo™ did not empty completely.	1. Open gates on the Tri - Flo™ and zero scales.
Tri - Flo™ : Scale will not zero out.	1. Scale is in filing mode.	1. Exit filling mode then end run. Needs to be in shipping mode.
Tri - Flo™ : Even when all three scales are zeroed on Batch, the next batch gives ***** on one of the hoppers with an overweight Alarm.	1. Tri - Flo™ was not emptied before zeroed. 2. Wind drafts.	1. Open gates and zero scale. 2. Close doors.
Tri - Flo™ : If there are five pounds in the hopper, the system will not go into shutdown mode.	1. Hoppers are not empty.	1. Open and close the gate hopper.
System is not consistently calibrating correctly.	1. Bin slides gates or manual gates have been moved. 2. Underbin conveyor belt is slipping. 3. Bin slide gate is not consistently opening to the same point. 4. The operator is pressing the "Cancel Scale Fill" button before the run ends.	1. Ensure that the slide gate collar and manual gate is locked into place. Then recalibrate. 2. Tighten the underbin conveyor belt. 3. Check for any obstruction that may be restricting the movement of the slide gate. 4. Allow the system to shutdown on its own.
System calibration for currently selected bin is incorrect.	1. System is too far out of calibration to recalibrate automatically.	1. Recalibrate the system. (see page 44)

TRI-FLO™ CONTINUOUS BATCH WEIGHING SYSTEM

Problem	Possible Cause	Solution
No air gates will open or close when their corresponding button is pressed on the touch screen.	<ol style="list-style-type: none"> 1. No air or not enough air is being supplied to the solenoid bank on the side of the control panel. 2. The bin site PLC may be off. 	<ol style="list-style-type: none"> 1. Ensure that at least 100 psi of air is being supplied to the solenoid bank. 2. Ensure that the bin site control panel has power to it, is "on" and that all of the breakers inside the panel are "on" as well.
Diverter is leaking seed through bypass side while in "treat" mode of operation.	<ol style="list-style-type: none"> 1. Too low of air pressure to actuate the diverter. 2. An obstruction in the diverter is stopping correct placement of the diverter plate. 	<ol style="list-style-type: none"> 1. Ensure that at least 100 psi of air pressure is present at the diverter. 2. Remove obstruction.
Scale is reading incorrect weight.	<ol style="list-style-type: none"> 1. Something is touching the scale. 2. Scale needs recalibrated. 	<ol style="list-style-type: none"> 1. Ensure that the area around the scale is clean and that nothing is leaning on or resting on the hopper. 2. Zero scale. If still incorrect, have a professional scale technician recalibrate the scale.
Air gate is opening when it should be closing and vice versa.	<ol style="list-style-type: none"> 1. Air lines to the air gate are reversed. 	<ol style="list-style-type: none"> 1. Exchange air line for the proper solenoid on the back of the solenoid bank.
The touch screen has warning triangles on each button.	<ol style="list-style-type: none"> 1. The bin site PLC may be off. 	<ol style="list-style-type: none"> 1. Ensure that the bin site control panel has power to it, is "on" and that all of the breakers inside the panel are "on" as well.
Solenoids are making a buzzing sound when air gates are actuated.	<ol style="list-style-type: none"> 1. Moisture in the air system. 2. Electric actuator on solenoid bank may be faulty. 	<ol style="list-style-type: none"> 1. Remove moisture from the air lines. 2. Replace the electronic actuator on the solenoid.
Conveyor will not start in "HAND" or "AUTO" mode.	<ol style="list-style-type: none"> 1. Conveyor motor starter is tripped. 2. Conveyor is clogged. 	<ol style="list-style-type: none"> 1. Reset motor starter. 2. Remove obstruction or debris.
No scale reading on the weigh hopper indicator on the touch screen.	<ol style="list-style-type: none"> 1. Scale head is unplugged. 	<ol style="list-style-type: none"> 1. Ensure that the scale head has power and is turned on.
Air gate will not close fully.	<ol style="list-style-type: none"> 1. Something is obstructing the air gate from closing. 2. Air pressure to the gate is not strong enough. 	<ol style="list-style-type: none"> 1. Remove obstruction. 2. Ensure that the air gate has at least 100 psi of air being supplied to it.

SYSTEM ALARMS - FAULTS

The table below and on the following pages provides a general description of all the system alarms (faults & warnings) of the Tri - Flo™ System. When a fault or warning condition is detected by the system, the Alarms screen will pop-up describing the cause of the Alarm or Fault. Any motor fault will activate the alarm screen on the operator control panel. If running, the system will then progress to the controlled shutdown state. A warning will alert the operator of a system condition which needs attention or correction. The alarms are reset when the fault condition is cleared. The horn is silenced by pressing the “Silence Alarm” button on the Alarms screen. For further assistance, contact your local USC dealer.



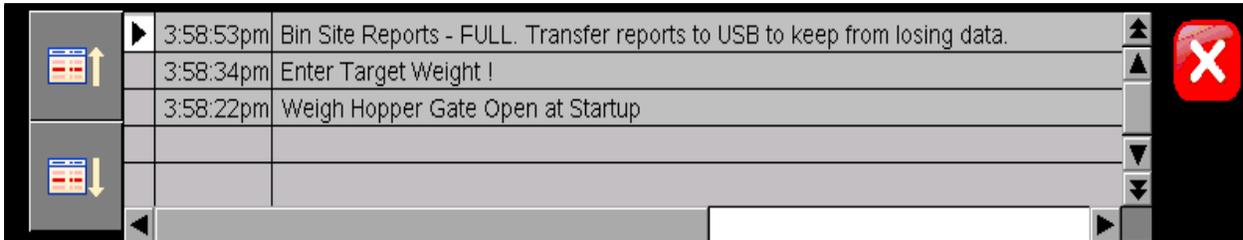
Alarm - Fault	Possible Cause	Solution
TRIFLO INLET DIVERTER LIMIT SWITCH 1 FAIL ALARM TRIFLO INLET DIVERTER LIMIT SWITCH 2 FAIL ALARM TRIFLO INLET DIVERTER LIMIT SWITCH 3 FAIL ALARM	<ol style="list-style-type: none"> 1. Limit switch out of adjustment 2. Inverter did not fully rotate to the next hopper. 3. Limit switch failed. 	<ol style="list-style-type: none"> 1. Check adjustment on limit switch. 2. Manually rotate diverter to determine the problem. 3. Replace limit switch.
TRIFLO WH1 DISCHARGE VALVE ALARM TRIFLO WH2 DISCHARGE VALVE ALARM TRIFLO WH3 DISCHARGE VALVE ALARM	<ol style="list-style-type: none"> 1. Air not on. 2. Limit switch out of adjustment. 	<ol style="list-style-type: none"> 1. Check to see if the main incoming air valve is open. 2. Adjust limit switch.

TRI-FLO™ CONTINUOUS BATCH WEIGHING SYSTEM

Alarm - Fault	Possible Cause	Solution
TRIFLO WH1 HIGH LEVEL TRIFLO WH2 HIGH LEVEL TRIFLO WH3 HIGH LEVEL	1. Weigh hopper is over full.	1. Empty hopper manually or move seed away from limit switch paddles by hand.
TRIFLO WH INLET DIVERTER FAULT ALARM	1. Motor over voltage tripped.	1. Reset overload.
Underbin Conveyor Motor Fault	1. Underbin Conveyor motor auxiliary contact was not sensed after being energized to run. 2. Underbin Conveyor motor has been shutdown while in Auto mode of operation.	1. Verify that the motor starter has power, is turned on and that the overload is not tripped. 2. Verify that the Underbin Conveyor was not turned "Off" while the system was in Auto mode of operation.
Scale Fill Conveyor Motor Fault	1. Scale Fill Conveyor motor auxiliary contact was not sensed after being energized to run. 2. Scale Fill Conveyor motor has been shutdown while in Auto mode of operation.	1. Verify that the motor starter has power, is turned on and that the overload is not tripped. 2. Verify that the Scale Fill Conveyor was not turned "Off" while the system was in Auto mode of operation.
Transition Conveyor Motor Fault	1. Transition Conveyor motor auxiliary contact was not sensed after being energized to run. 2. Transition Conveyor motor has been shutdown while in Auto mode of operation.	1. Verify that the motor starter has power, is turned on and that the overload is not tripped. 2. Verify that the Transition Conveyor was not turned "Off" while the system was in Auto mode of operation.
Transfer Conveyor Motor Fault	Transfer Conveyor motor auxiliary contact was not sensed after being energized to run.	Verify that the motor starter has power and is turned on.
Bin Site SURGE SUPPRESSOR-FAILED!!!	L1 of the Surge protector will no longer protect the electrical panel against voltage surges.	Replace the Surge Protector.
Underbin Conveyor - check for belt slippage/check speed sensor	1. Underbin Conveyor belt is slipping. 2. Underbin Conveyor Speed encoder is not working correctly.	1. Tighten and adjust the Underbin Conveyor belt as necessary. 2. Verify that sensor is tight to shaft and wiring is correct. If yes to both, then replace sensor.

SYSTEM MESSAGES

The table below provides a general description of all the system messages that could occur. When a warning condition is detected, a window will appear (below) notifying the operator that the system will not start because of a certain condition. When the condition has been corrected, the “START SCALE FILL FROM BIN” button can be pressed to start the system.



Message
TRIFLO INLET DIVERTER IS NOT IN AUTO
TRIFLO WH1 DCV IS NOT IN AUTO
TRIFLO WH2 DCV IS NOT IN AUTO
TRIFLO WH3 DCV IS NOT IN AUTO
TRIFLO WEIGH HOPPER IS NOT EMPTY
ALL THREE TRIFLO SCALES MUST BE ZERO TO START
SCALE COMMUNICATIONS ERROR
Scale Fill Conveyor Not In Auto For Startup
Transition Conveyor Not In Auto For Startup:
Underbin Conveyor Not In Auto For Startup
Diverter in Treat position at Startup
Enter Target Weight!
Diverter in Bypass Position at Startup
Bin Site Reports - FULL. Transfer Reports to USB to keep from losing data.
Treater Auto Start Failed - Correct problem and press the Treater Startup button.
BIN SITE SYSTEM CONFIGURATION ERROR. Please contact USC tech support.
Transfer Conveyor Not in Auto For Startup.
Please select desired Bin for Startup.
Scale Fill Manual in Operation.

**SECTION
G****MAINTENANCE**

Proper maintenance of your Tri - Flo™ System is critical for peak performance, reliability and accuracy of this system. The following is a guideline for the type of maintenance and servicing that should be performed on this unit. Your environment and uses may require additional maintenance and service beyond this list to assure a reliable and safe unit. The operator of this unit has ultimate responsibility to identify areas of concern and rectify them before they become a hazard or safety issue. There is no substitute for a trained, alert operator.



Do not put this unit into operation with any questionably maintained parts. Poor performance or a hazard may occur.

BIN SLIDE GATES

- Inspect all welds and structural components for bends, cracks and damage.
- Test slide gates for proper actuation with control panel.
- Remove air to gates and manually open and close gates. Check for any friction while gate is sliding.

UNDERBIN CONVEYOR

- Inspect all welds and structural components for bends, cracks and damage.
- Clean out any build up of debris from the clean out door.
- Check the conveyor belt tension and alignment. (page 58)
- Check the drive belt tension and alignment. (page 60)
- Grease all necessary bearings.
- Remove yellow guard and check chain tension.
- Check for proper operation of conveyor while in reverse mode. Align if necessary.
- Check encoder for tightness to shaft and proper signal to control panel.

SCALE FILL CONVEYOR

- Inspect all welds and structural components for bends, cracks and damage.
- Clean out any build up of debris from the clean out door.
- Check the conveyor belt tension and alignment. (page 58)
- Check the drive belt tension and alignment. (page 60)
- Grease all necessary bearings.
- Remove yellow guard and check chain tension.

TRI-FLO™ WEIGH HOPPER, SLIDE GATE & SCALE HEAD

- Inspect all welds and structural components for bends, cracks and damage.
 - Check for binding on scale components.
 - Check wiring from scale to scale head for any damage or kinks.
 - Test slide gate for proper actuation with control panel.
 - Check slide gate sensors for correct positioning and signal.
 - Have scale professionally re-calibrated as necessary.
-

CONTROL PANEL & AIR SYSTEM

- Drain water from compressor daily.
 - Drain air dryer every 40 hours of operation.
 - Test all air solenoids for correct actuation.
 - Inspect all exterior wiring for any kinks or damage.
-

PRO BOX HOPPER & TRANSFER CONVEYOR (optional)

- Inspect all welds and structural components for bends, cracks, and damage.
 - Clean out any build up of debris from the clean out door.
 - Check the conveyor belt tension and alignment. (page 58)
 - Check the drive belt tension and alignment. (page 60)
 - Grease all necessary bearings.
 - Remove yellow guard and check chain tension.
-

DIVERTER (optional)

- Inspect all welds and structural components for bends, cracks, and damage.
 - Test diverter gate for proper actuation with control panel.
 - Clean diverter tubing of any obstructions.
 - Grease all necessary bearings.
-

TRANSFER CONVEYOR (optional)

- Inspect all welds and structural components for bends, cracks and damage.
- Clean out any build up of debris from the clean out door.
- Check the conveyor belt tension and alignment. (page 58)
- Check the drive belt tension and alignment. (page 60)
- Grease all necessary bearings.
- Remove yellow guard and check chain tension.

CONVEYING BELT TENSION AND ALIGNMENT

The tension and alignment of the belt should be checked weekly, or more often if required, to be sure that it does not slip or run to one side. A properly tensioned belt will not slip when it is operating. Operating the belt with less slippage will increase the belt life and causes less stress on bearings, pulleys and shafts.

To maintain the belt, follow this procedure:

NOTICE Place all controls in neutral or off, stop motor and disable power source before working on belt.

1. Use the take-up bolts located at the tail to set the tension of the belting.
2. If the belt needs to be tightened to prevent slippage, use the take-up adjustments on the tail end only.
3. The belt is tightened by turning both take-up adjustments an **equal** number of turns.
4. Use the drive roller to check the alignment. The belt should be centered.
5. Turn the belt 1/2 revolution when the belt is new and check the drive and tail roller. If out of alignment, the belt will move to the loose side. Loosen the jam nut and use the adjustment bolts on both sides to tighten the belt. When the belt is properly adjusted tighten the jam nuts on both sides .
6. Run and check again. Check frequently during the first few minutes of operation and then several times during the first 10 hours. The belt normally seats itself during the first 10 hours of operation and can be checked weekly after that.
7. The belt is properly aligned when the belt runs in the center of the head and tail rollers.

*Use this bolt to
tighten the belt*

*Tighten jam nut
after adjustment*



CONVEYING BELT ALIGNMENT

1. A misaligned belt will track toward the loose side. Set the tracking by loosening the jam nut on the tight side and using the bearing position bolt to move the end of the head roller toward the tail. Tighten the jam nut when the belt is centered on the head roller.
2. Run the belt and check the tracking again. Loosen the tight side slightly again if required. Repeat the adjusting and checking procedure until the belt centers on the input end roller and remains centered when running.
3. Always repeat this aligning procedure when installing a new belt. Check frequently during the first 10 hours of operation. After 10 hours, the belt is normally seated and checking the alignment can be done less frequently.

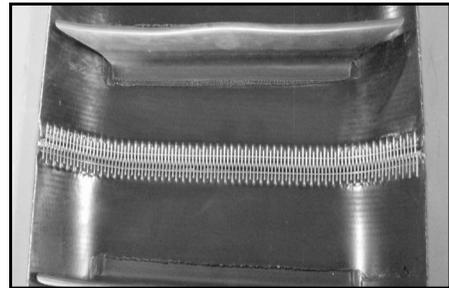
*Use this bolt to
tighten the belt*

*Tighten jam nut
after adjustment*



BELT REPLACEMENT

1. Rotate the belt until the seam is visible.
2. Move the tail roller to its loosest position.
3. Pull all the slack to the seam area.
4. Remove the wire connector and open the belt.
5. Attach one end of the replacement belt to the belt end being removed.
6. Pull the old belt out and the new belt will be threaded into place.
7. Disconnect the old belt.
8. Connect the ends of the new belt together and secure.
9. Set the belt tension.
10. Check and set the belt alignment. (see above)



Belt Seam



Check alignment

DRIVE BELT TENSION & ALIGNMENT

Power to the conveying belt is transmitted through a V-belt. The V-belt drive system must be maintained at the proper belt tension and pulley alignment to obtain the desired performance and life. When maintaining the belt drive system for the electric drive model, follow this procedure:

NOTICE Turn motor off and unplug power cord or turn off power and lock out the master panel before starting maintenance on drive belt system.

Drive Belt Tension

1. Push on the center of the belt span with a force of approximately 5 to 10 lbs.
2. The belts will deflect approximately 1/4 to 1/2 inch when properly tensioned.
3. Move the motor up, using the adjustment bolts, to set drive belt tension (right).
4. Close and secure guards.



Motor base adjustment

Drive Belt Alignment

1. Lay a straightedge across the pulley faces to check the alignment (right).
2. Use the pulley hub or the motor mounting plate slots to move the pulley to the required position for alignment.
3. Tighten hub bolts to secure pulley on shaft.
4. Check belt tension
5. Close and secure guards.



Lay a straightedge across pulley faces

Drive Belt Replacement

1. Lower motor to its loosest position.
2. Remove old belt and replace with a new one.
3. Raise motor to set the belt tension.
4. Check pulley alignment. Adjust if required.
5. Close and secure guards.

When storing the Tri - Flo™ System for long periods of time, the following procedures must be followed to reduce the chance of rust, corrosion and fatigue of the Tri - Flo™ System. You can also use these steps when storing the machine for the winter.



A dust mask and protective rubber gloves shall be used when cleaning the machine.

UNDERBIN CONVEYOR

1. Disconnect power.
2. Thoroughly wash the entire machine to remove all dirt, mud, debris or residue.
3. Remove yellow covers and remove any debris or build-up.
4. Remove clean out doors and thoroughly remove any debris or build-up inside of the conveyor. Ensure that the bottom pan of the underbin conveyor is free of seed.
5. Lubricate all grease fittings and chain. Make sure that all grease cavities have been filled with grease to remove any water residue from the washing. This also protects the bearing seals.
6. Re-connect power and run the underbin conveyor to help remove any additional debris. Compressed air can be used to blow out any foreign material.
7. Cover the electric motor with a water proof tarpaulin and tie securely in place.

TRI-FLO™ WEIGH HOPPER & SLIDE GATE

1. Thoroughly clean the weigh hopper to remove all residue from the equipment.
2. Clean the slide gate of any seed or residue that may have built up.

SCALE FILL CONVEYOR

1. Disconnect power.
 2. Thoroughly wash the entire machine to remove all dirt, mud, debris or residue.
 3. Remove yellow covers and remove any debris or build-up.
 4. Remove clean out doors and thoroughly remove any debris or build-up inside of the conveyor.
 5. Lubricate all grease fittings and chain. Make sure that all grease cavities have been filled with grease to remove any water residue from the washing. This also protects the bearing seals.
 6. Re-connect power and run the scale fill conveyor to help remove any additional debris. Compressed air can be used to blow out any foreign material.
 7. Cover the electric motor with a water proof tarpaulin and tie securely in place.
-

PRO BOX HOPPER & TRANSFER CONVEYOR (optional)

1. Disconnect power.
2. Thoroughly wash the entire machine to remove all dirt, mud, debris or residue.
3. Remove yellow covers and remove any debris or build-up.
4. Remove clean out doors and thoroughly remove any debris or build-up inside of the conveyor.
5. Lubricate all grease fittings and chain. Make sure that all grease cavities have been filled with grease to remove any water residue from the washing. This also protects the bearing seals.
6. Re-connect power and the transfer conveyor to help remove any additional debris. Compressed air can be used to blow out any foreign material.
7. Cover the electric motor with a water proof tarpaulin and tie securely in place.
8. Tarp or place the cover on top of the pro box hopper to keep out any dirt or unwanted pests.

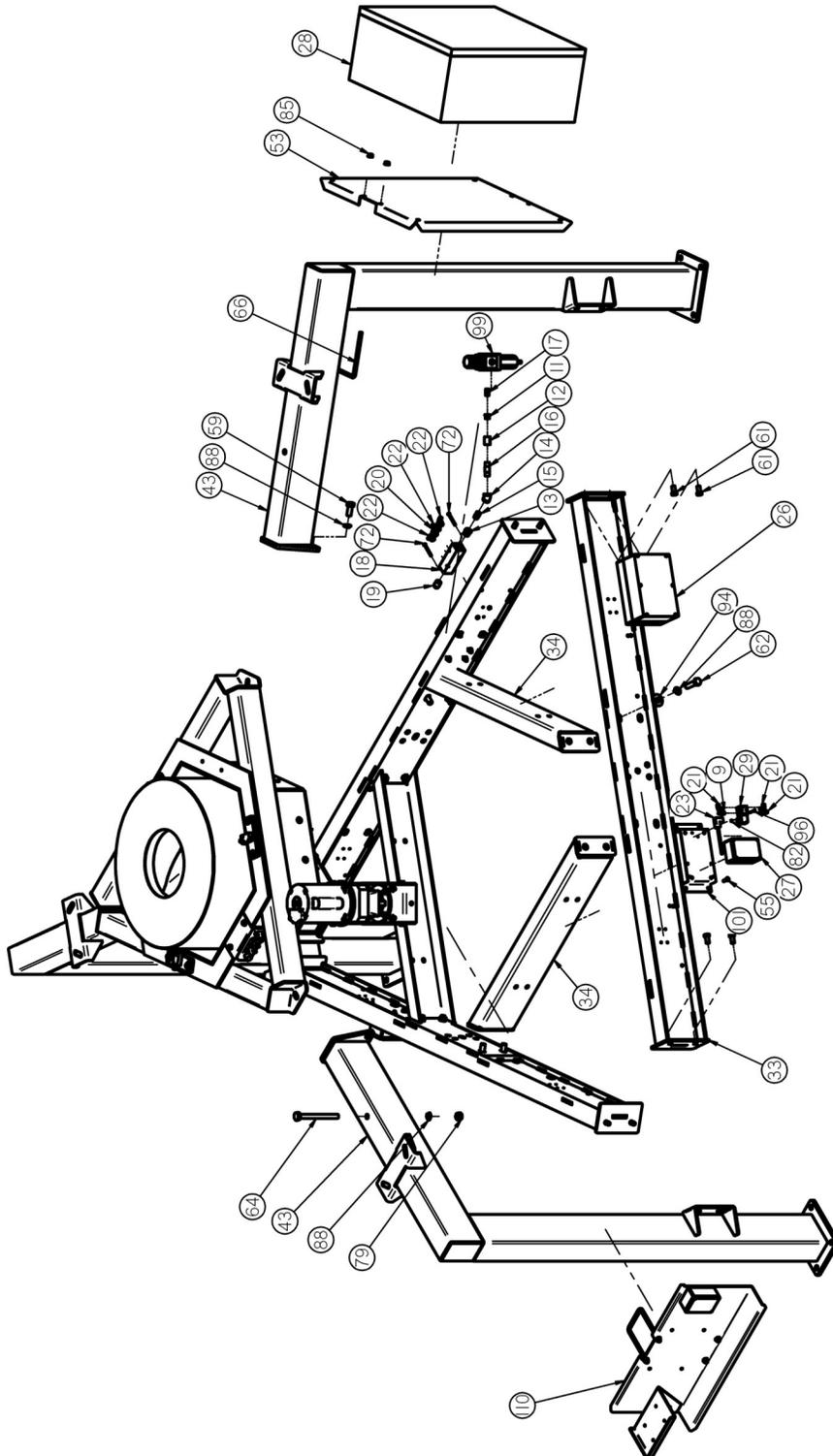
FINAL

1. Store all portable components of the Tri - Flo™ System inside a protective building to keep them from being exposed to the weather.
2. Disconnect power to the machine and all of the components.
3. Ensure all moisture has been removed from the airlines.
4. Disconnect the supply air line to the bottom of the solenoid bank and place a plug in the fitting to keep moisture out of the system.

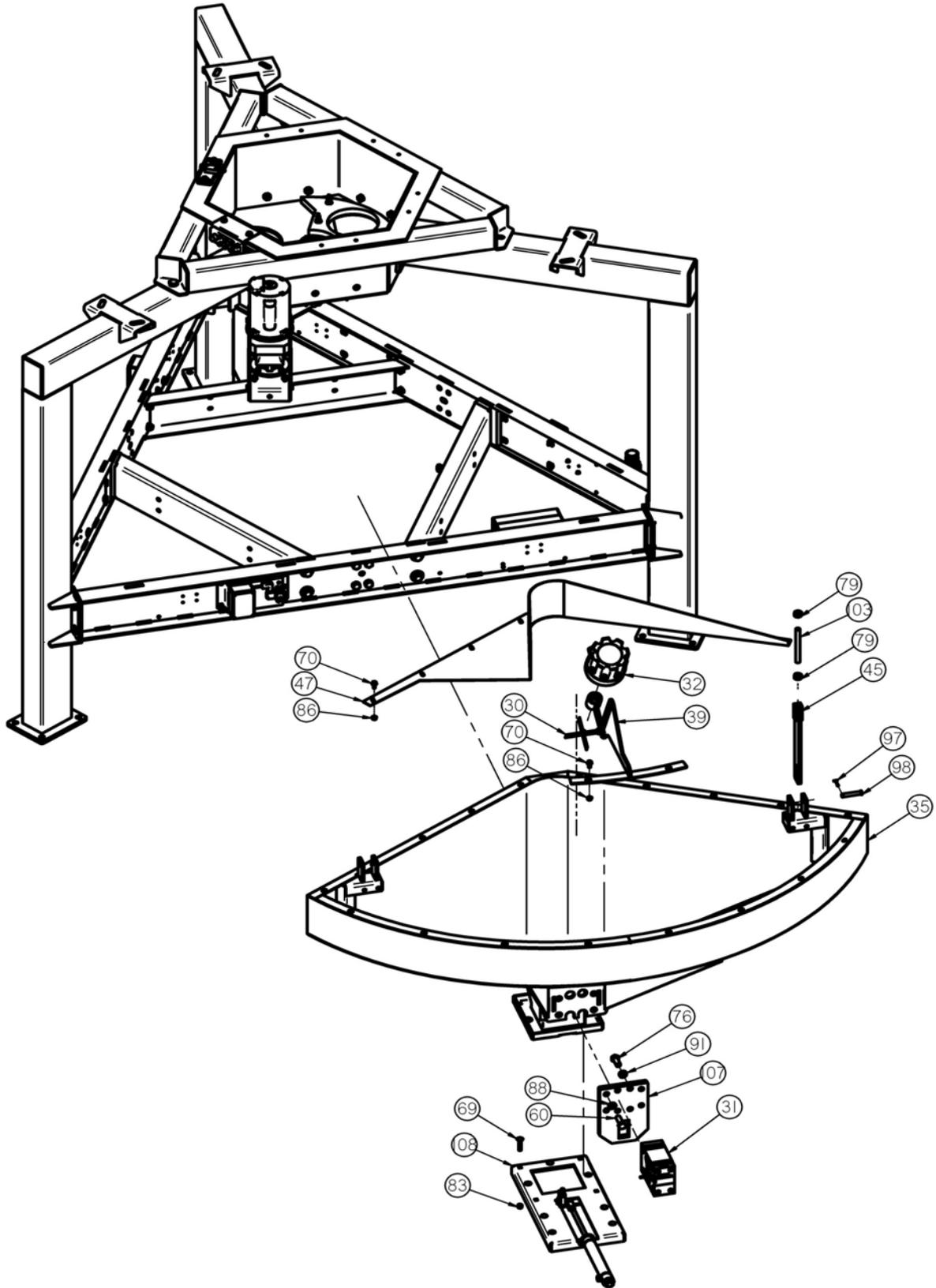
SECTION
I

MECHANICAL DRAWINGS

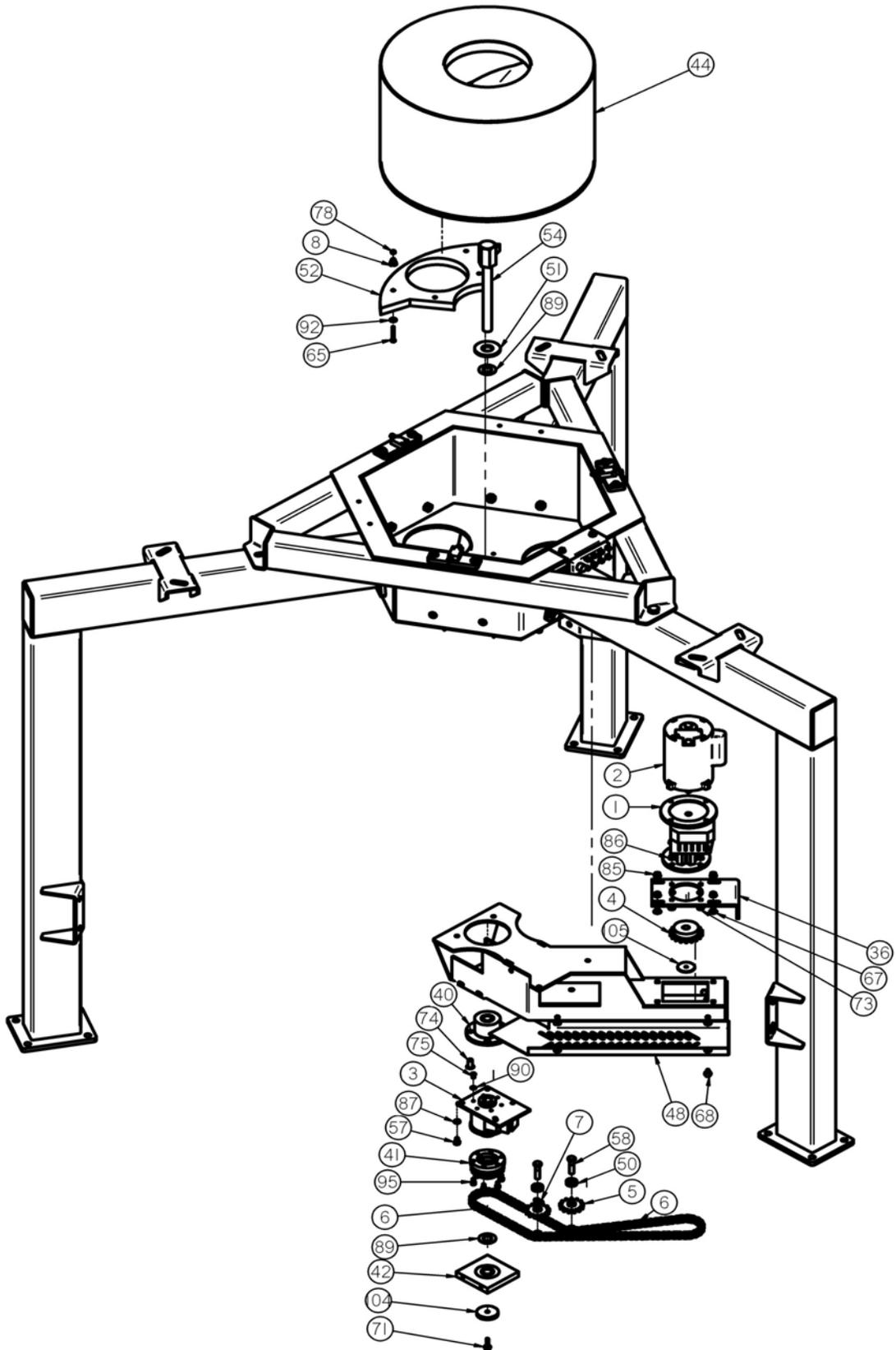
Tri - Flo™ Frame and Electrical Panel mounting



Tri - Flo™ Weigh Hoppers and Load Cells



Tri - Flo™ Inlet Diverter



Tri - Flo™ Parts List

Item #	Part #	Description	Qty
1	01-01-0039	GBOX IL 61.8:1 56C OTP 56C INP	1
2	01-01-0104	MTR .33HP 1725RPM 56C 1PH TENV	1
3	01-01-0142	CLUTCH WRAP SPG CB-7	1
4	01-02-0110	SPKT 18T 50P 0.750ID KWY	1
5	01-02-0115	SPKT 13T 50P .500ID IDLER	2
6	01-04-0002	CHAIN RLR 50	1
7	01-04-0005	#50 CNTG LINK	1
8	01-04-0054	SPG CNCL COMP .25ID X .045 X 1.25	4
9	02-02-0049	FLTR EXHAUST BRZ .125 NPT	3
10*	02-03-0017	TBG .375 OD POLYE COMP	1
11	02-04-0010	FTTG BUSH .375NPT X .250NPT BRSS	1
12	02-05-0004	FTTG CPLG .375 NPT X 1.50 FM SS	1
13	02-05-0017	REDUCER .500NPT X .375 NPT 304SS	1
14	02-06-0007	ELBOW, .375-18 NPT, 45 DEG. SS	1
15	02-07-0001	NIPPLE, .375 NPT SCH. 40 304 SS	1
16	02-07-0003	PIPE, .375-18 NPSM STRAIGHT, 2.0 SS	1
17	02-07-0018	NIPPLE, .250-18 NPT, SCH. 40 SS, 1.0	1
18	02-09-0019	FTTG MNFLD 4X.375NPTX.500NPT ALUM	1
19	02-14-0001	FTTG PLUG SQHD .500 NPT SS	1
20	02-14-0006	PLUG 3/8" NPT SS SQ HEAD	1
21	02-16-0046	FTTG PUSH 90 DEG .250 OD X .125 NPT	9
22	02-16-0049	FTTG PUSH 90 DEG .25 OD X .375 NPT	3
23	03-07-0110	CBL PWR SELINOID 3M BLK	3
24*	03-08-0212	CONN TRCK 8MB12Z-5P3-CS19	1
25*	03-10-0125	SW LMT SCHDR XCMD21202C12	3
26	03-11-0064	ENCL 9.5X6X4 POLY HOF Q241612PCD	1
27	03-11-0081	ENCL 4.5X3X2 POLY HOF Q1286PCD	3

Tri - Flo™ Parts List (continued)

Item #	Part #	Description	Qty
28	03-12-0177	PNL CNTL TRI-FLO SEED WHEEL	1
29	03-17-0080	VLV SOL MAC 45A-AA1-DDAJ-1KJ	3
30	03-19-0017	PDL 4 VANE LVL INDI PN 1-4156	3
31	03-19-0042	LDCL VISHAY 1320 2200LB CLASS III	3
32	03-19-0049	MONITOR KA LEVEL INDICATOR 2SPDT 24VDC	3
33	05-03-0900	WDMT LEG BRACE CNTNS FLOW SYSTEM	3
34	05-03-1008	WDMT BRACE LDCL PLT	3
35	05-03-1032	WDMT HOPP WEDGE 30 UNIT OPEN TOP	3
36	05-03-1063	WDMT BRKT GBOX MNT SLTR DRV	1
37*	05-03-1076B	WDMT SLTR HSG CNTNS FLOW SYSTEM SMW	1
38*	05-04-0098	WDMT SLTR DRV CNTNS FLOW SYSTEM	1
39	05-04-0114	ASSY LVL INDI ADJ	3
40	05-04-0118	ASSY SLTR BRG HSG CNTNS FLOW SYSTEM	1
41	05-04-0119	ASSY SPKT 5018	1
42	05-04-0120	ASSY LOWER SHAFT CNTNS FLOW SYSTEM	1
43	05-05-0066	WDMT LEG CNTNS FLOW WH SYS OPEN TOP	3
44	05-07-0389	WDMT SLTR SPOUT CNTNS FLOW SYS 30U	1
45	05-07-0441	WDMT HOPP SUPP STOP TRI-FLO OPEN TO	6
46*	05-07-0466	WDMT HOPP EXT	2
47	05-07-0467	WDMT HOPP EXT W MTR AREA	1
48	05-10-3749C	GRD SLTR CHAIN DRV	1
49*	05-10-3772	PLT ADJ SPG WRAP CLUTCH SLIDE	1
50	05-10-3811	WSHR .500 ID X 1.25 OD X .375 THK	2
51	05-10-3821	WSHR .25THK X 1.313ID X 3.00OD	1
52	05-10-3823	PLT UHMW 7.0 ID DIST SLIDING SEAL	1
53	05-10-3968	BRKT TRI-FLO PNL	1
54	05-11-0309B	SHAFT SLTR DRV 1.75 HEX	1

Tri - Flo™ Parts List (continued)

Item #	Part #	Description	Qty
55	06-01-0007	BOLT, .250-20 X 1 UNC ZP GRADE 5	12
56*	06-01-0012	BOLT .313-18 X 1.00 ZP GR5	6
57	06-01-0014	BOLT, .375-16 X 1/2 UNC ZP G5	4
58	06-01-0027	BOLT .500-13 X 2.00 ZP GR5	2
59	06-01-0031	BOLT,.625-11 G5 ZP 1.50	6
60	06-01-0032	BOLT, .625 X 11 X 2" UNC ZP GRADE 5	12
61	06-01-0069	BOLT .500-13 X 1.00 ZP GR5	12
62	06-01-0075	BOLT, .625 X 11 X 2.50" UNC ZP GRADE 5	12
63*	06-01-0094	SCRW PAN HD 8-32 X 1.00 ZP	8
64	06-01-0096	BOLT .625-11 X 7.00 ZP GR5	3
65	06-01-0097	BOLT .250-20 X 2.00 ZP GR5	4
66	06-01-0113	BOLT U .375-16 X 4.00 X 6.625 ZP	2
67	06-01-0115	BOLT CRG .375-16 X 1.00 ZP GR5	5
68	06-01-0124	BOLT, FLG .375-16 UNC ZP GRADE 5; 3/4" LG	9
69	06-01-0136	BOLT CRG .375-16 X 2.00 ZP GR5	12
70	06-01-0138	BOLT, FLG .315-18 UNC ZP GRADE 5; 3/4" LG	31
71	06-01-0189	BOLT, FLG .375-16 UNC ZP GRADE 5; 1-1/4" LG	7
72	06-01-0203	SCRW MACH 10-32 X 2.25 ZP SLTD RD	2
73	06-01-0223	BOLT CRG .313-18 X 1.00 ZP GR5	4
74	06-01-0224	BOLT CAP .500-13 X 1.00 BTNH	4
75	06-01-0225	BOLT CAP .313-18 X .500 BTNH	6
76	06-01-0228	BOLT M16-2.00 X 40MM FTH	12
77*	06-01-0230	BOLT M16-2.00 X 50MM FTH	12
78	06-02-0001	NUT FULL .250-20 ZP GR5	4
79	06-02-0005	NUT, .625-11 UNC ZP GRADE 5	15
80*	06-02-0030	NUT KLOCK 10-32 ZP	2
81*	06-02-0034	NUT 8-32 K-LOCK ZP	8

Tri - Flo™ Parts List (continued)

Item #	Part #	Description	Qty
82	06-02-0052	NUT LOCK 4-40 CS MMC# 90675A005	6
83	06-03-0003	NUT NYL LOCK .375-16 ZP GR5	12
84*	06-03-0004	NUT NYL LOCK .500-13 ZP GR5	2
85	06-03-0014	NUT LOCK FLG .375-16 ZP GR5	9
86	06-03-0019	NUT LOCK FLG .3125-18 ZP GR5	40
87	06-04-0003	WSHR LOCK SPLT .375 ZP	4
88	06-04-0005	WASHER, .625 LOCK ZP	33
89	06-04-0016	WSHR THRST 1.0 X 1.99 X .088 PCMPST	2
90	06-04-0017	WSHR LOCK EXTNL .313 ZP	6
91	06-04-0018	WSHR LOCK SPLT M16 ZP	24
92	06-05-0001	WASHER, FLAT .250	4
93*	06-05-0004	WSHR FLAT .375 ZP	6
94	06-05-0006	WASHER, .625 FLAT ZP	12
95	06-06-0077	SCRW SH .3125-18 X .500 BO	6
96	06-06-0079	SCRW MACH 4-40 X1.25 PHLP PHD	6
97	06-09-0018	.125 X 1.50 ZP COTTER PIN	6
98	06-09-0058	PIN CLVS .500 X 2.75 PLN	6
99	07-03-0013	REGL DIAL FLTR DRAIN .25 NPT	1
100*	10215E	PLT DIST PROOF SW BRKT CS	3
101	1021DC	PLT VLV MNT	3
102*	1021F5	BRKT CONN TRCK	1
103	10220B	ROD FTH .625-11 HOPP SUPP STOP TRI-FLO	6
104	10224D	WSHR	1
105	102256	PLT WSHR	1
106*	10233F	PLT TRI-FLO SHIPPING BRKT	3
107	102349	PLT LDCL ATTACH	3
108	12-04-0023	SLIDE GATE 6.00 SQ TRI-FLO SIMPLE	3

Tri - Flo™ Parts List (continued)

Item #	Part #	Description	Qty
109*	13-05-0211	KIT TRI-FLO FORK POCKETS	1
110	13-10-0019	KIT BOLT INDI PNTR ESTP	1

SECTION
J

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. Manufacturer does not warrant against casualties or damages resulting from misuse and/or abuse of product(s), 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 incidental, special, 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 USC, LLC. 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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