Elados Smart Tunnel Dispenser

Manual and Reference Guide

9/16/2013

ECOLAB®

Elados Smart Tunnel Dispenser- Table of Contents

Elados Smart Tunnel Dispenser - System Overview

The Ecolab liquid chemical dispensers are specifically designed for servicing the washing needs of the commercial laundry industry. The dispensers work in conjunction with the proprietary Chemwatch software to manage the wash formulae, loading weights and chemical injections for your washing machines. They also combine to provide extensive reporting information and visual workplace dashboards for managing production, loading efficiency, turn times, run times, chemical costs etc.

The dispensing systems covered in this manual are for servicing tunnel or continuous batch washers (CBW), and all include proof of flow and ChemWatch reporting.

Note: there is a separate manual for the conventional washer extractor Ultrax dispensers

The Elados Smart Tunnel Dispenser starts with a base of 8 - 10 pumps, with an option to go up to 16. There is a pump dedicated for each chemical to each injection point in the tunnel washer (specific product and specific module). Each pump has its own flow switch or flow meter for proof of flow. It is important to identify which products will be dispensing through which pumps so the correct materials of construction for the corresponding pumps, fittings, and tubing are used.

Requirements for an Elados Smart Installation:

- High Speed Internet access to the Chemwatch computer is essential for remote access for troubleshooting and for the service representative or engineers to be able to adjust and monitor the system in real time. Internet access is also essential to allow for data to be transmitted from the local Chemwatch PC to servers that back up the data and host the Siteline website and reporting.
- Provide a dedicated electrical circuit / 120v, I phase, 60 hz, 30 amp (GFCI) with physical disconnect.
- Provide a clean open space able to accommodate our liquid feed system - wall mounting is preferred

Spare Parts and Service

Each Elados Smart dispenser is provided with a spare parts kit specifically designed to keep the dispenser maintained and running. A checklist of parts and quantities is included and it is important to reorder parts via your service representative immediately after use – this will prevent a situation where parts are not available when the Elados Smart needs repairing, or is inoperable. Any parts that are replaced within the warranty period should be saved and given to the service representative for a warranty claim from the manufacturer.

Your Ecolab Territory Manager is your first point of support for any questions or issues relating to the Elados Smart Tunnel Dispenser. Should you be unable to reach your assigned Territory Manager, the **Ecolab Technical Service Group can be reached at (800) 344 4142**.

Equipment Emergency:
Please contact Ecolab Customer Service (24 hrs/day) at 1-800-553-8683.

Elados Smart - Sequence of Operation

Formula Tracking:

The Elados Smart TDI has 3 signal methods for tracking Wash formula production. The three methods are referred to as Binary, Timed, and 10's 1's and 100's Mode.

1 - Binary Mode:

Binary mode is the preferred method to communicate to the Elados Smart system. This method does not rely on the accuracy of the washer output timers. Binary mode is the most reliable method and is generally the easiest to trouble shoot if something is not working.

In order to use binary mode, the washer will need to be able to turn all of its chemical signals on at the same time. The signals will be turned on for a set amount of time each time we use them; the standard is 10 seconds. Preferably you want the signals assigned to the first module of the tunnel. However, as long as they can all be configured to reference the formula number assigned to a single module, it can be made to work.

The number of outputs the washer has will affect the number of formulas that can be tracked. Each signal is assigned a binary value.

The following chart is an example of how the signals need to be programmed for the formula number you are going to run.

Washer Signal #	1	2	3	4	5	6	7	8
Binary Value	1	2	4	8	16	32	64	128
Formula # 1	**10 sec.**							
Formula # 2		**10 sec.**						
Formula # 3	**10 sec.**	**10 sec.**						
Formula # 4			**10 sec.**					
Formula # 5	**10 sec.**		**10 sec.**					
Formula # 70		**10 sec.**	**10 sec.**				**10 sec.**	
Formula # 85	**10 sec.**		**10 sec.**		**10 sec.**		**10 sec.**	
Formula # 135	**10 sec.**	**10 sec.**	**10 sec.**					**10 sec.**
Etc.								

2 - Timed Mode:

Timed mode uses a single input to communicate to the Elados Smart TdI system. With this method, only input number 1 is used and the signal is turned on for one second per formula number. For example, if you wanted formula 5 you would need to send a 5 second signal from the washer to the Elados Smart. I.e. 10 seconds = formula 10, 15 seconds = formula 15, etc. There are a couple of drawbacks to using Timed mode for communication. First, the timers on the washer need to be accurate to assure that the correct formula is identified. Second, if the washer goes into hold during the transmission of the signal, they usually turn off which will cause the Elados Smart to interpret the signal as two separate formulas. Finally, if you are trying to track large formula numbers, the signal time can become very long which makes the likelihood of error greater.

2 – 10's 1's and 100's:

This mode uses three inputs to communicate to the Elados Smart system. With this method, signal 1 is used for the 1's value, signal 2 is used for the 10's value, and signal 3 is used for the 100's value. I.e. formula 7 = signal 1 on for 7 seconds, formula 53 = signal 1 on for 3 seconds and signal 2 on for 5 seconds, formula 123 = signal 1 on for 3 seconds, signal 2 on for 2 seconds, and signal 3 on for 1 second.

Note Chemwatch does not have this mode, so this will need to be programmed at the dispenser. You will need to reset this if washer settings are downloaded from Chemwatch.

Chemical injections:

The Elados Smart can have up to 16 pumps installed. Each pump runs independently based on the signals received from the tunnel washer. The length of the signals from the washer designates the length of time the pump runs. The washer programming must be kept up-to-date with frequent calibrations in order to ensure the correct amount of product is dispensed. If the tunnel washer has ratio-metric capabilities depending on load weight, the chemical dispensed will reflect this. Keep in mind that unless Chemwatch receives actual weights, the Chemwatch reports will still base everything on theoretical values.

Elados Smart - PanelView Screen Controls

The Beckhoff HMI touch screen controller is the main user interface for communicating with the Elados Smart dispenser. During startup of the Elados Smart, the system is configured, primed and calibrated utilizing the HMI screen. Once the unit has been completely installed and configured, the screen can be used to monitor, test and troubleshoot the system.

- **Touch Screen Feature**

The Beckhoff HMI is a "touch screen". This means that the user simply touches an area of the screen to operate the panel, rather than typing on a keypad. Please note that touching the screen with dirt and or chemicals on your fingers is not recommended.

- **HMI Screens**

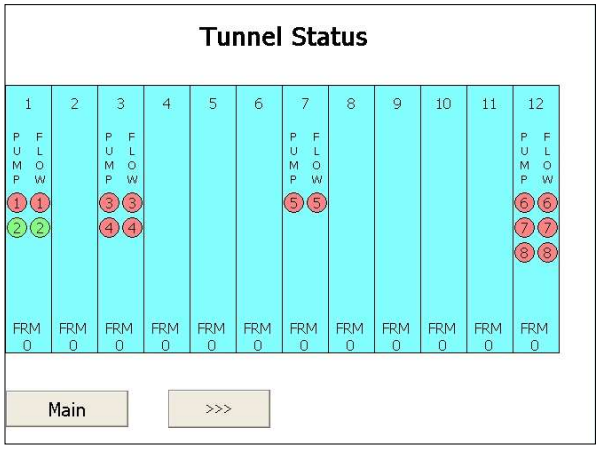
Each HMI screen is covered in this manual. The types of available screens are broken up into three sections: Main Menu, Secured Menu and Advanced Setup Menu. The Main Menu Section consists of screens used during normal operation; the Secured Menu Section is a password protected area comprised of numerous enabling and testing screens (for Plant Engineering and Ecolab personnel only); the Advanced Setup Section which is again password protected, is intended to only be used by Ecolab Personnel.

- **Main Screens (Main Menu)**

This is the Main Menu screen that is utilized during normal operation and monitoring of the Elados Smart. The buttons on this screen are known as "screen goto" buttons. Pressing any of the buttons will take the operator to the appropriate screen.

- **Tunnel Status Screen**

The Tunnel Status Screen is a real-time display that shows the individual modules of a tunnel washer.

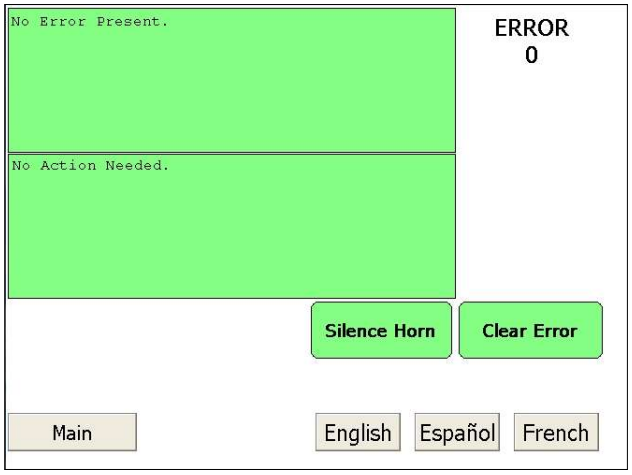


The module or compartment number is located near the top of the tunnel diagram. The formula number (FRM) is the formula being ran in each module of the tunnel. If actual weights are being obtained, they will display directly above the FRM. The pump and flow columns are displayed in the modules that each pump was configured in. The pump indicators will turn green when the pumps are energized, and the flow indicators will turn green when the flow switch sees sufficient flow. Only 12 tunnel compartments can be displayed on one screen. If there are more than 12 compartments, clicking on the >>> button will display the rest of the compartments.

Pressing the **MAIN MENU** button returns the operator to the Main Menu Screen.

- **Error Screen**

When any error occurs at the Elados Smart, the alarm horn sounds and the HMI screen displays the Error that occurred.



The appropriate alarm message (and number) will be displayed, along with a suggested corrective action to remedy the problem. Whenever an alarm occurs, you should note what pump and chemical the alarm occurred on. Then look at these areas for the source of the problem and determine if the related chemical was delivered to the tunnel. Unlike the Ultrax dispenser, in the Elados Smart, you are able to go to any of the screens to help with troubleshooting while unit is in alarm.

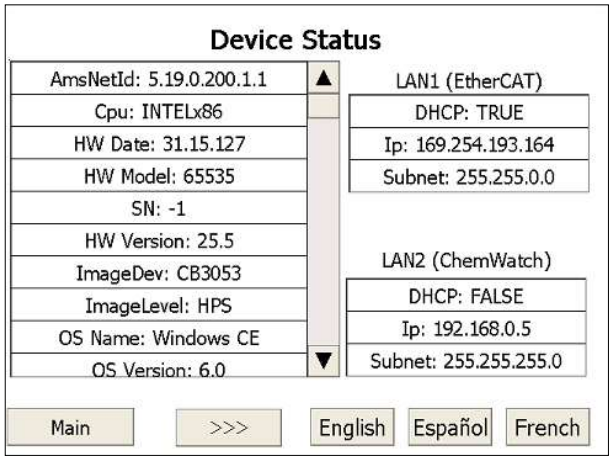
Pressing the **SILENCE HORN** button stops the horn/light from sounding/flashing, but does not clear the alarm. The Elados Smart will continue to pump to all modules of the tunnel during the troubleshooting process.

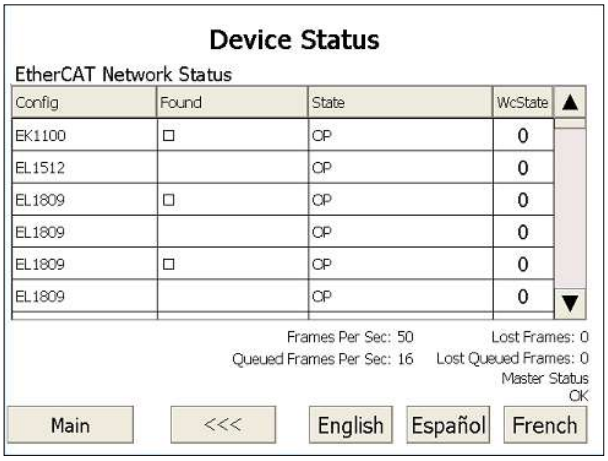
Once the alarm condition has been corrected, pressing the **CLEAR ERROR** button clears the alarm messages from the screen.

Pressing the **MAIN MENU** button returns the operator to the Main Menu Screen.

- **About Screen**

The About section is actually comprised of two screens. The first screen is very informative during initial setup in finding IP addresses numbers and AmsNetId number aka OPC Server in Chemwatch. The second screen is more for troubleshooting the Beckhoff components. Clicking the arrow button at the bottom of the menus toggles between the two screens.





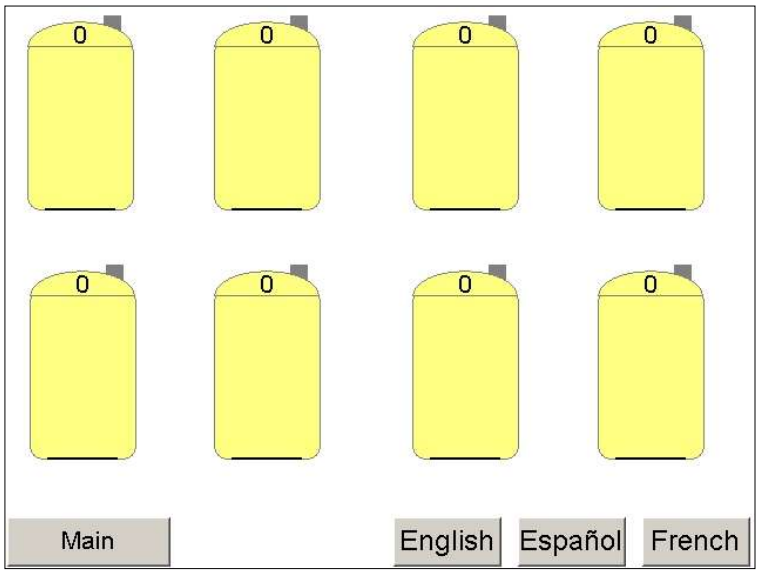
The AmsNetId (located on the first row of the table on the left) is the value that is entered into Chemwatch in the OPC Server field of the ChemWatch LFS Settings tab of the Ultrax LFS/OpTrax PLC page. The LAN1 (EtherCAT) values are for the Beckhoff EtherCAT network and are only needed for in depth troubleshooting. The LAN2 (ChemWatch) IP address is the IP of the dispenser on the network that the PC is attached to. This is the value that is used to remotely connect to the dispenser using CERHost.

The second screen is used for troubleshooting. The main thing on this page is that the I/O devices listed are all in an “OP” state.

Pressing the **MAIN MENU** button returns the operator to the Main Menu Screen.

- **Tank Levels Screen**

There is the option of installing Ultrasonic Level sensors with the Elados Smart system to allow for reading Bulk Tank levels. This is the screen that allows you to view the current level in the tanks.

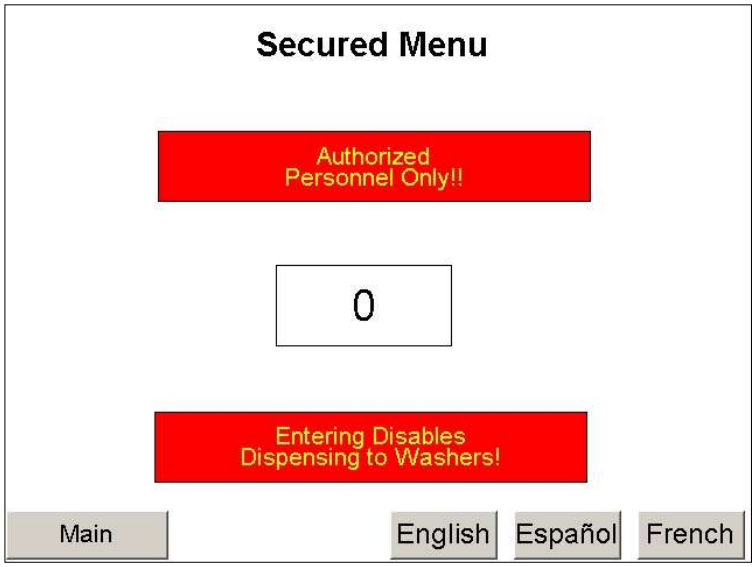


The number of gallons in the tank will be displayed at the top of each tank where the "0's" are in this picture. The shading level will change as the liquid level changes in the tank. Later in this manual we will discuss some of the configuration required when installing these tank sensors.

Pressing the **MAIN MENU** button returns the operator to the Main Menu Screen

- **Secured Screens Password Entry**

Pressing **SECURED MENU** from the main menu will send the operator to the Secured Screens Password Entry Screen.

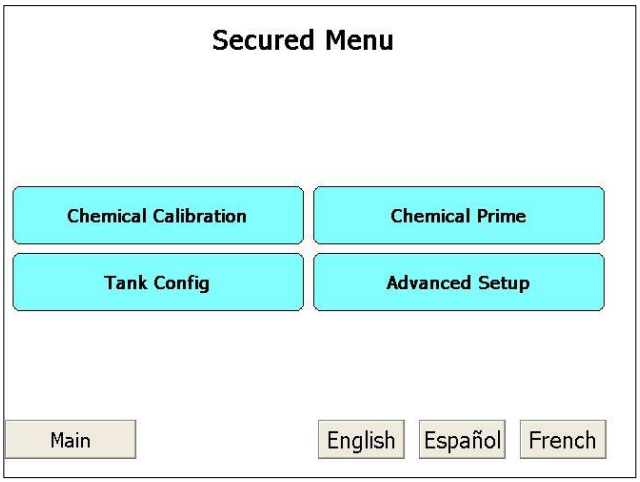


The Secured Area is password protected, and should only be used by either Ecolab personnel, or plant personnel that have a very good working knowledge of the dispenser. The password for this screen should be kept in a safe place. Pressing the box in the middle of the screen will bring up a secondary screen that resembles a keypad. Type in the correct password and press the Enter key to go to the Secured Menu.

** Note: Unlike the Ultrax dispensers, the Elados Smart Secured Area **is** accessible when the system is in an alarm or performing an injection and will **not** put the washer on hold.

- **Secured Menu**

The Secured Menu is password protected and accessed only by typing in the correct password at the Secured Menu Entry screen above.



Any one of the secured menu sub screens may be accessed by pressing the blue button associated with the screen you wish to access.

- **Chemical Calibration Screen**

Perform a calibration of the dispenser during startup and repeat on a regular basis after installation. The Calibration Screen checks to insure that the ounces per second being requested remain consistent.

Before starting the calibration procedure, it is important to have the calibration containers, gloves and safety glasses (or a face shield). Do not begin a calibration without having the appropriate safety equipment!

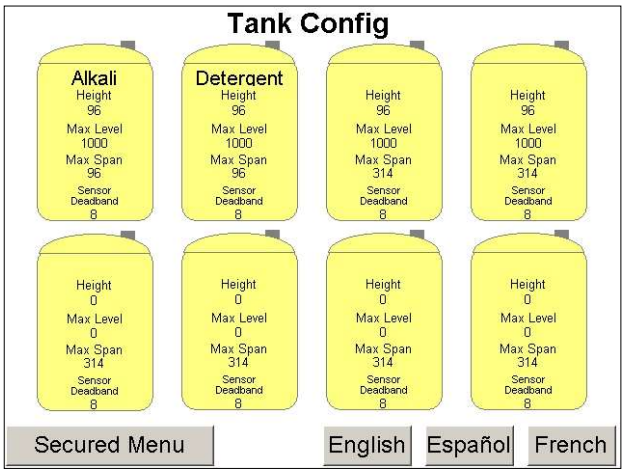
It is easier to calibrate if you have two people to perform the calibration, but is quite doable with the new Elados Smart system. The first thing to do is enable which chemicals you wish to calibrate by toggling the enable/disable cell. Next, click in the desired Calib Time cell and enter in seconds how long you wish the pump to run. Do this for each pump you wish to calibrate – this system can calibrate multiple pumps at the same time. Once the calibrations are enabled and the times are entered:

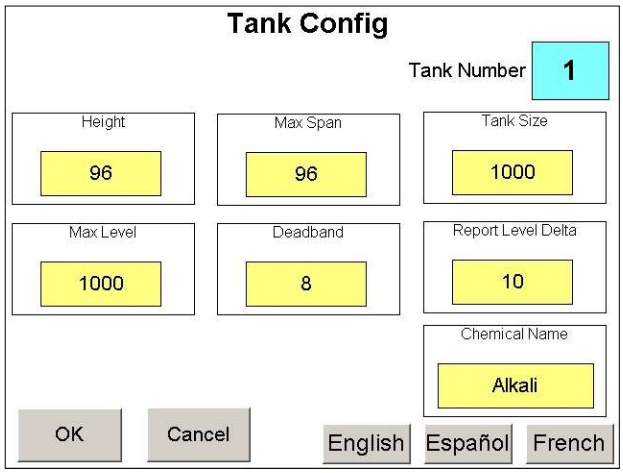
- turn the calibrate mode switch located on the remote calibration box to “Calib”. When in “Calib” mode, chemical requests by the tunnel are ignored.
- prepare your chemical collection points – making sure that valves are oriented correctly and containers are secure
- depress either the “Start Calib” button on the HMI screen or the button on the remote calibration box to begin calibration.
- when the calibration is finished, enter the corresponding measured ounces into the “Meas” cells on the HMI screen.
- Click the “Re-Calculate” button
- If the oz/sec values look ok, click the “Accept Calib” button. If the oz/sec are not as expected, please repeat the calibration procedure for those chemicals.
- Remember to return valves back and put the calibrate mode switch back to “Run”.
- If mode is left in “Calibrate”:
  - The first 3 chemical requests will be ignored
  - After 3 requests, the dispenser will alarm that you are in Calibrate mode
  - After 5 requests, the Calibrate mode will be ignored and the dispenser will pump the requested chemicals
- These oz/sec feed rates will need to be programmed into the tunnel washer control or be used to calculate the request times of the tunnel washer.

Pressing the **Secured Menu** button returns the operator to the **Secured Menu Screen.**

- **Tank Configuration**

The tank configuration screen is used if ultrasonic level sensors are installed on bulk tanks and/or day tanks at a facility.





To configure the tank level sensors three pieces of information are needed to get the tank level scaling correct:

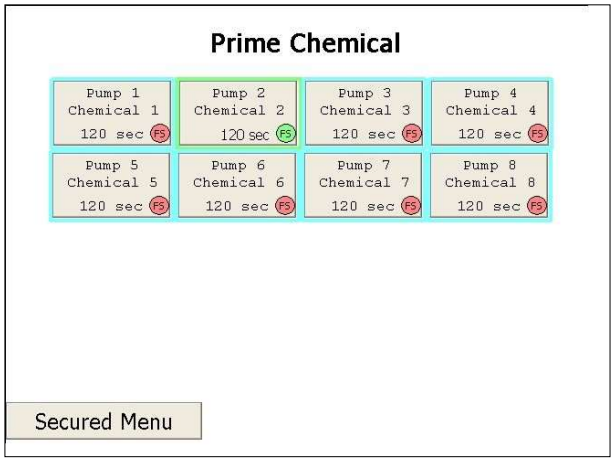
Height: which is the distance in inches from the level sensor to the bottom of the tank
Max Level: which is the distance from the bottom of the tank to the max fill level of the tank
Tank Size: which is the capacity of the tank at the max fill level

Once the tanks have been measured go to the tank configuration screen and click on the tank you wish to configure. This will bring up the setup screen where the data is to be entered. Simply click in each of the yellow entry cells and enter the correct values. Repeat this for each tank.

Pressing the **Secured Menu** button returns the operator to the **Secured Menu Screen.**

- **Prime Chemical Screen**

When a chemical runs empty, large air pockets will develop in the chemical feed lines, and it becomes necessary to re-prime the lines. The Prime Chemical screen is accessible by pressing the Chemical Prime button from the Secured Menu.



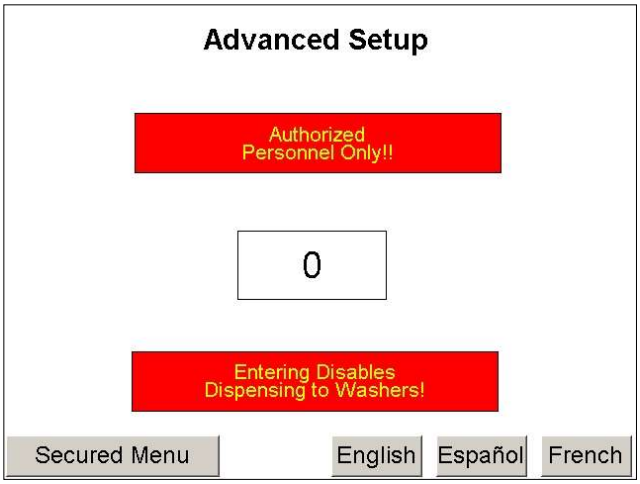
The Chemical Prime screen is used to prime the chemicals out to the tunnel and also aids in troubleshooting any flow related issues the system may have.
Important Note: The pump will run until either the button is pressed again or 120 seconds has elapsed.

When chemical has reached the pump, the flow switch input associated with the pump/chemical selected should be a solid green. This indicates the chemical is at the flow switch located at the pump and is free of air pockets. At this time, pressing the Pump button will stop the pump.

Pressing the **Secured Menu** button returns the operator to the **Secured Menu Screen.**

- **Advanced Setup**

The Advanced Setup Area is password protected, and is only accessible to Ecolab Personnel. This pass code should be kept secret, and should not be known by any plant personnel. The Setup area contains important system setup information, and changing the data in the Setup Area can greatly affect the operation of the system

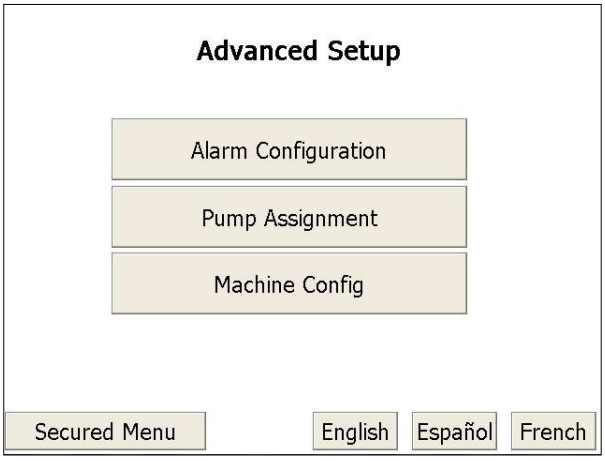


Clicking in the box in the middle of the screen will bring up a secondary screen that resembles a keypad. Simply typing in the correct password and pressing the Enter key will take the operator to the Advanced Setup Menu.

Pressing the **Secured Menu** button returns the operator to the **Secured Menu Screen.**

- **Advanced Setup Menu**

The Elados Smart Advanced Setup Menu provides access to the Alarm Configuration, Pump Assignment, and Machine Configuration screens.

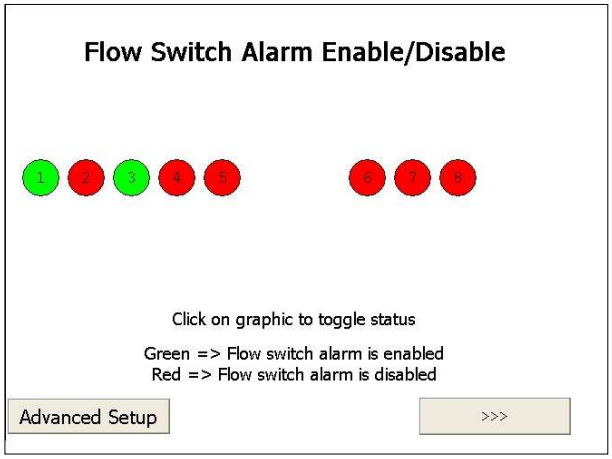


Once you have entered the advanced set up screen, simply press the button of the screen you wish to enter.

Pressing the **Secured Menu** button returns the operator to the **Secured Menu Screen.**

- **Alarm Configuration**

Enter the Alarm Configuration Screen by pressing the Alarm Configuration button from the Advanced Menu screen. This screen is where you can disable a flow switch until the issue can be resolved.



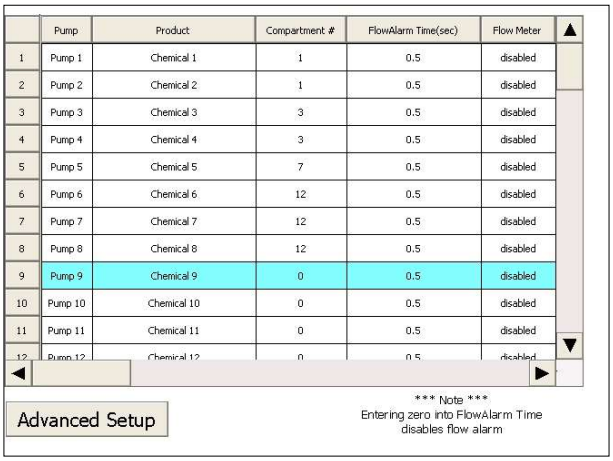
Once the Flow Switch screen has been accessed through the advanced menu, you will see a series of up to 16 circle indicators. Each of the circles has a pump number located in them, associating the box with a chemical pump. Only those pumps that have a tunnel compartment assigned to it will display.
If an issue is diagnosed with a flow switch, this screen allows you to disable the switch until the tunnel can be stopped, and the issue resolved. To disable a flow switch simply press the green circle of the switch you wish to disable and the box will turn red; this is an indication that the flow switch has been disabled. To re-enable a flow switch, touch the circle again and it will turn back to green indicating the switch is enabled.

Note: When a flow switch is disabled it will not alarm for loss of chemical flow. Make sure that once the issue is resolved that the flow switch is re-enabled.

Pressing the **Advanced Setup** button returns the operator to the **Advanced Menu Screen.**

- **Pump Assignment**

The Pump Assignment Setup screen can be accessed by pushing its button from the Advanced Setup Menu screen. This screen is used for setting up various attributes associated to the pumps



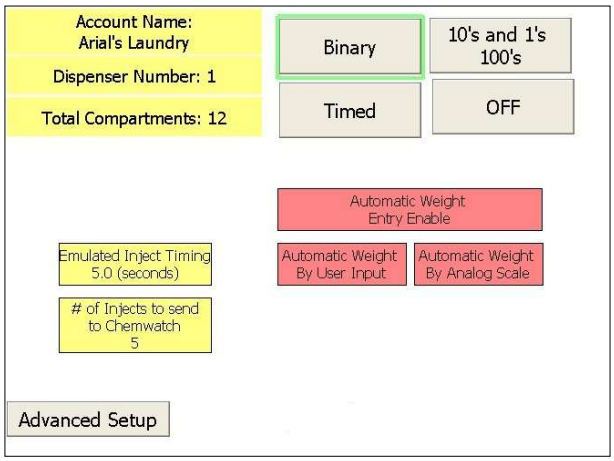
	Pump	Product	Compartment #	FlowAlarm Time(sec)	Flow Meter
1	Pump 1	Chemical 1	1	0.5	disabled
2	Pump 2	Chemical 2	1	0.5	disabled
3	Pump 3	Chemical 3	3	0.5	disabled
4	Pump 4	Chemical 4	3	0.5	disabled
5	Pump 5	Chemical 5	7	0.5	disabled
6	Pump 6	Chemical 6	12	0.5	disabled
7	Pump 7	Chemical 7	12	0.5	disabled
8	Pump 8	Chemical 8	12	0.5	disabled
9	Pump 9	Chemical 9	0	0.5	disabled
10	Pump 10	Chemical 10	0	0.5	disabled
11	Pump 11	Chemical 11	0	0.5	disabled
12	Pump 12	Chemical 12	0	0.5	disabled

- Product
  - Chemical names can be entered here by clicking in the cells. These will get overwritten if downloaded from Chemwatch. Note: downloading from Chemwatch creates extra spaces at the end of the text – recommend editing text here to remove spaces.
- Compartment #
  - Enter in the tunnel compartment # associated with corresponding pump. Doing this will activate the pump to display in numerous HMI screens.
- FlowAlarm Time (sec)
  - This is the time allowed before the flowswitch will alarm a no-flow alarm. The default is ½ sec. You may need to increase this for products that are more viscous. Be careful to not exceed pump-on time as this will defeat the no-flow alarm.
- Flow Meter
  - This is for an upcoming flow meter option and should be set as “disabled”.
- All other columns to the right are for upcoming options and should be left alone

Pressing the **Advanced Setup** button returns the operator to the **Advanced Menu Screen.**

- **Machine Config**

The Machine Config Setup screen can be accessed by pushing its button from the Advanced Setup Menu screen. This screen is used for setting up various attributes associated to the dispenser.



- Account Name
  - Clicking on this button brings up a keyboard popup box. The account name that is entered here will display on the HMI's Main Screen.
- Dispenser Number
  - Clicking on this button brings up a numerical keypad popup box. The dispenser number that is entered here will display on the HMI's Main Screen. This is convenient for remotely accessing accounts with more than one Smart Elados system.
- Total Compartments
  - Clicking on this button brings up a numerical keypad popup box. The Tunnel Status page will dynamically display this number of compartments.
- Emulated Inject Timing
  - This is the timing of when the dispenser sends Chemwatch the formula injection information.
- # of Injects to send to Chemwatch
  - This is how many injects to send to Chemwatch. This should be set to equal the number of compartments that have at least one chemical being injected. Chemwatch should be programmed with this same number of injects for each formula. If a formula doesn't have a chemical, simply put a 0 amount.
- Select the appropriate formula selection mode. Detailed descriptions are given at the beginning of this document.
- Automatic Weight Entry Enable
  - Clicking on this button will enable Automatic Weight Entry, which will send actual weights to Chemwatch for reporting purposes.
    - Select if obtaining weights via a manual AWE device or from a load cell.

Pressing the **Advanced Setup** button returns the operator to the **Advanced Menu Screen.**

ELADOS SMART ROUTINE MAINTENANCE CHECKLIST

PHYSICAL INSPECTION
(SHOULD BE PERFORMED DURING EACH VISIT)

1. Check the entire system for leaks/cracked fittings. Monitor the system as it is running, to see if the system is sucking air on the chemical suction lines or leaking on the delivery lines. Repair and replace as necessary.

2. Check the feed hoses going from the Elados Smart to the tunnel washer for bends or kinks (check at the dispenser, as well as at each injection point). Sometimes hoses can develop kinks in them over time; a kinked hose can prevent the dispensing system from properly delivering chemical to the tunnel.

3. Check the Elados pumps for leaks. If chemical is leaking from the body of the pump, tighten the bolts, being careful not to over tighten.

4. Verify that the air regulators are set properly.

ELADOS SMART ROUTINE MAINTENANCE CHECKLIST

OPERATIONAL INSPECTION
(SHOULD BE PERFORMED DURING EACH VISIT)

1. Each individual chemical should be primed. Verify that there are no air pockets in any of the chemical lines during priming.

2. Each flow switch should be checked for operation. During an injection to the tunnel, or while priming, monitor that each flow switch is turning on and off with the pump.

3. Look at the Tunnel Status Screen to verify that all pumps are turning on when the tunnel washer sends its chemical signals and that the formula numbers listed match the formulas in the tunnel washer.

4. Check to ensure that communication between the dispenser and Chemwatch PC is established. This can be done by viewing the washer's Workmix tab in "Reports & Setups" to confirm that the load information is current.

ELADOS SMART
Error Listing

ERROR NUMBER	DESCRIPTION OF ERROR	CAUSE OF ERROR	SOLUTION OF ERROR
169	Lost 24-volt DC power.	Either a fuse has blown, or the 24v DC power supply is bad.	Check fuses 1 & 3 at the bottom of the control cabinet. If they are ok, measure voltage at the power supply. Between the blue and brown wires should be 24vdc, and there should be 120vac between the white and black wires. If needed, a new power supply can be purchased at a local electrical supplier.
186 - 201	Loss of Chemical Flow for pump X.	The flow switch for pump X is not sensing enough flow.	Verify that the chemical drum/tote is not empty. Check the suction line to see if it has air in it. If so, re-prime the line from the Error Screen or Secured Menu/Prime Screen. Monitor the pump and valves for proper operation.

Elados Smart Tunnel Dispenser

>Listing of PLC Inputs & Outputs<

Card #	Part #	Description	Connections
1	EK1100	EtherCat Coupler	
2	EL1809	Input Card 16 ch	1 - 8 Formula Tracking 9 - Tunnel Status 10 - 24 VCD Check 11 - E-Stop 12-16 - Spare
3	EL1809	Input Card 16 ch	1-16 - Pump Feed Request
4	EL1809	Input Card 16 ch	1-16 - Flow Switch
5	EL2809	Output Card 16 ch	1-16 - Pump Relay Outputs
6	EL2624	Relay Output Card	1 - Horn Output 2 - Tunnel Hold 3 - Spare 4 - Calib Light