

# Ultrax

## Manual and Reference Guide

AUGUST 2013



**ECOLAB**<sup>®</sup>

# **Ultrax - Table of Contents**

1. System Overview
2. Sequence of Operation
3. Panel Operation
4. Common Ultrax Error Messages
5. Preventative Maintenance

## Appendix

- a. Complete list of error messages
- b. List of PLC I/O

## Ultrax - System Overview

The Ultrax liquid feed dispensers are specifically designed for servicing the washing needs of the commercial laundry industry. The Ultrax works 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 Ultrax units covered in this manual are for servicing “conventional” washer extractors, and include:

Ultrax Chemical Dispenser Overview	Ultrax	Ultrax 6	Ultrax 2000	Ultrax Lite
Number of Conventional Washers Serviced	16	6	8	6
Number of Chemicals Dispensed	16	12	10	10
ChemWatch Reporting (with ChemWatch PC)	Yes	Yes	Yes	Yes
Safety Features Including Isolation Valves	Yes	Yes	Yes	Yes
Beckhoff Control with Color Touchscreen	Yes	Yes	Yes	Yes
Oval Gear Flowmeter	Yes	Yes	Yes	No
Centrifugal Pump for Concurrent Flushing/Dispensing	Yes	Yes	No	No
Double Diaphragm Pump for Metering of Chemistry	Yes	Yes	Yes	Yes
Proof of Flow	16	6	8	1
Proof of Delivery	16	6	8	0

**Note:** there is a separate manual for the tunnel or continuous batch washer Ultrax dispensers

**Ultrax :** Top of the range dispenser typically services 12 washers with 12 chemicals, but can be set up to serve up to 16 washers with up to 16 chemicals, proof of flow to each washer, double diaphragm pump for metering of chemistry, centrifugal flush pump for rapid delivery to multiple washers (less hold time) and oval gear flow meter.

**Ultrax 6:** Top of the range dispenser serves 6 washers with 12 chemicals, proof of flow to each washer, double diaphragm pump for metering of chemistry, centrifugal flush pump for rapid delivery to multiple washers (less hold time) and oval gear flow meter.

**Ultrax 2000:** Dispenser built for laundries with smaller washers (<450#) or lower chemical dosages serves 8 washers with 10 chemicals, proof of flow to each washer, double diaphragm pump meters and delivers chemistry (no centrifugal flush pump) and oval gear flow meter.

**Ultrax Lite:** Dispenser built to service smaller conventional washers (<450#) in a tunnel account and provide ChemWatch reporting for tunnel if using peristaltics etc. Serves 6 washers with 10 chemicals, proof of flow to distribution manifold, double diaphragm used in timed mode (chamber size cycles) to meter chemistry and deliver (no centrifugal pump and no flowmeter).

### Requirements for an Ultrax 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. This could include adjusting chemical injection quantities to assure finished good quality or making a configuration change to allow the system to run until a service representative can be in the facility. 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 Sitaline website and reporting.

- Provide Hot, Soft Water / 20 gpm @ 165F, 50 psig, 3/4" FNPT w/ valve
- Provide Cold, Soft Water / 20 gpm @ 65F, 50 psig, 3/4" FNPT w/ valve
- Provide a dedicated electrical circuit / 120v, I phase, 60 hz, 25 amp (GFCI) with physical disconnect.
- Provide compressed air (ULTRAX only) / 30 scfm @ 90psig, 3/8" FNPT w/ valve
- Provide a clean open space able to accommodate our liquid feed system - wall mounting is preferred

### Spare Parts and Service

Each Ultrax is provided with a spare parts kit specifically designed to keep the Ultrax maintained and running during emergency repairs. 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 Ultrax needs to be repaired or worse still 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 issues with the Ultrax or support required in performing troubleshooting or maintenance tasks. Should you be unable to reach your assigned Territory Manager, the **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.

### **Chemical Spill Emergency:**

1. Immediately evacuate the area.
2. Refer to Safety Data Sheet (SDS)
3. Call 911
4. Refer to your Emergency Response Plan to determine whether or not to contact the appropriate Local and State agencies to report the chemical spill

# Ultrax - Sequence of Operation

## How the washers are programmed:

When a washer is loaded, and a formula is selected and run, this is the process that occurs. One of the first steps in the formula must be the formula identification step “AFS – Auto Formula Select”, in which the washer is programmed to inform the Ultrax exactly what formula number it is running. At that time, the formula number is stored in the Ultrax’s memory, and nothing physically happens at the Ultrax.

The washer continues to run its formula, when it comes to the first injection the washer tells the Ultrax “I’m ready for injection one”. The Ultrax knows which chemicals are required for that injection based on the formula number previously indicated by the washer. Note that different washers can be different sizes, or have different formulas using the same number (i.e. Washer 1’s formula 6 could be colored pants, while washer 2’s formula 6 could be bar mops). The Ultrax knows exactly what chemicals are needed at each washer, for each injection, for every formula.

The washer continues through its formula, calling for injections as needed. Note that an “injection” can consist of multiple chemicals, such as “soap”, “alkali”, or “sour” and “softener”. The washer calls for injections in sequence (injection one, two, three, etc.) until the formula is complete. One of the final steps in the program is the end of formula signal “EOF – End of Formula”. This is a designated formula number that notifies the Ultrax that the washer’s formula is complete. This signal zeroes out the injection numbers at the Ultrax, and is used in the ChemWatch software to calculate formula run times, as well as washer down times.

## Chemical injections:

When a washer actually calls for an injection of chemical, the Ultrax should already know what formula is being run at the washer. Each formula at every washer has a “data table” consisting of all of the chemical quantities (in ounces) for each injection. When a washer calls for chemical, the Ultrax refers to that table for the chemicals quantities. When an injection occurs, there are four major steps that take place:

- **Pre-flush**

As soon as the Ultrax recognizes an injection request, the washer is put on hold. The water flush valve opens, allowing water to flow from the tempered water tank to the chemical manifold. The appropriate diverter valve opens, allowing flow to one of the washers. The air double diaphragm pump “DD Pump” turns on, and begins pumping tempered water out to the washer. This step is intended to perform a “pre-flush” of the chemical manifold, the flow meter, the DD pump, and the diverter valve. This step lasts for ten seconds.

- **Chemical injection**

When the pre-flush is complete, the water flush valve closes, and the appropriate chemical valve opens. The amount of chemical being pumped is measured down to a fraction of an ounce by the flow meter. When the required amount of chemical has been pumped through the flow meter, the chemical valve closes and the water flush valve re-opens. If multiple chemicals are required in an injection an additional ten-second “pre-flush” will occur. The water flush valve will again close, and the next chemical valve will open. There is always a ten second pre-flush in between chemicals.

- **Post-flush**

Once the last chemical has been pumped, the chemical valve closes, and the water flush valve re-opens. The DD pump then flushes the system one final time. The post-flush is identical to the pre-flush, except it last for thirty to sixty seconds, instead of ten. Times are longer on the Ultrax 2000 and Ultrax Lite, as the chemistry must be pushed all the way to the washfloor using only the DD Pump.

Note that all throughout the pre-flush, chemical injection and post-flush steps the DD pump runs, and the appropriate diverter valve remains open. When the post-flush is complete, the diverter valve and water flush valve close, and the DD pump stops. The washer hold is disabled at this point, allowing the washer to continue through its cycle.

- **Final flush (not included in Ultrax 2000 and Ultrax Lite)**

As soon as the diverter and water flush valves close, and the DD pump stops, the appropriate washer flush valve opens and the electric flush pump turns on. This step is to ensure that the chemical gets all the way to the washer. The length of time that the electric pump flushes water to the washer varies, depending on how far the washer is from the Ultrax. When the final flush step is done, the injection is complete.

Note that the Ultrax 2000 and Ultrax Lite do not have the final flush feature. Instead, the DD pump pushes the chemical all the way to the washfloor.

Pumping to multiple washers:

If a second washer calls for chemical while the Ultrax is pumping to the first washer, the second washer will immediately be put into hold. A few seconds after the electric pump begins the final flush to the first washer, the system will begin the pre-flush to the second washer. The system can flush (with the electric pump, through the washer flush valve) to one washer, and pump chemicals (with the DD pump, through the diverter valve) to another simultaneously. This speeds up washer turnover, and decreases washer hold time.

This feature is not available on the Ultrax 2000 and Ultrax Lite, which typically services smaller wash floors.

System self-checks:

During the course of an injection, the Ultrax has several ways of checking that the system is functioning normally. Below is a brief description of the most common error messages that occur at the Ultrax. These alarms will be covered in greater detail in the “Troubleshooting” section of this manual.

The flow meter measures chemical flow in gallons per minute. If, during the chemical injection steps this flow rate drops below the set amount, the system will alarm, showing “loss of chemical flow” as the problem.

The flow switch verifies that there is flow, and that it is going to the correct washer. If, during the pre-flush, chemical injection or post-flush steps, the flow switch does not see flow, the system will alarm, showing “The flow switch is not sensing flow out to the washer listed”.

During the final flush step, the flow switch again verifies that there is flow, and that it is to the correct washer. If there is a loss of flow here, the system will alarm, and “Washer x flow switch is not seeing flow during the final flush step (electric pump)” will be the message. (This alarm is not on Ultrax 2000 and Ultrax Lite units)

If, for some reason an injection was called for, but the washer had not communicated what formula number the washer is running to the Ultrax, the system will alarm and the message “Washer x called for an injection without a formula number. No chemicals will be pumped” will appear.

# Ultrax - Panelview Screen Controls

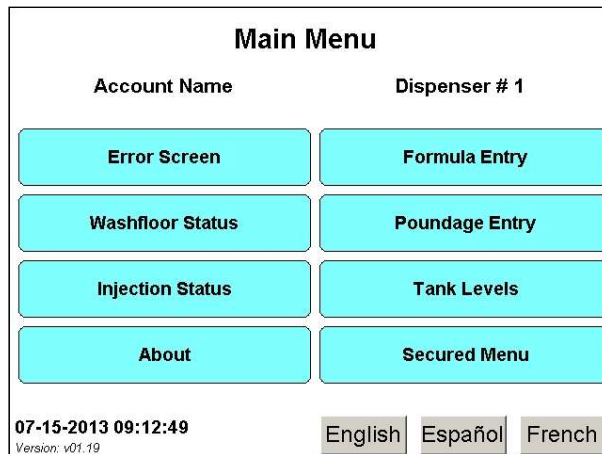
The Beckhoff HMI (Human Machine Interface) touch screen controller is the main user interface to communicating with the Ultrax. During startup of the unit, the system is configured and calibrated utilizing the HMI. Once the Ultrax system is operational, the HMI screen can be used to monitor, test and troubleshoot the system. **\*\*Note\*\*** touching the screen with dirt or chemicals on your fingers is not recommended.

- **Beckhoff HMI Screens**

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

- **Main Screens (Main Menu)**

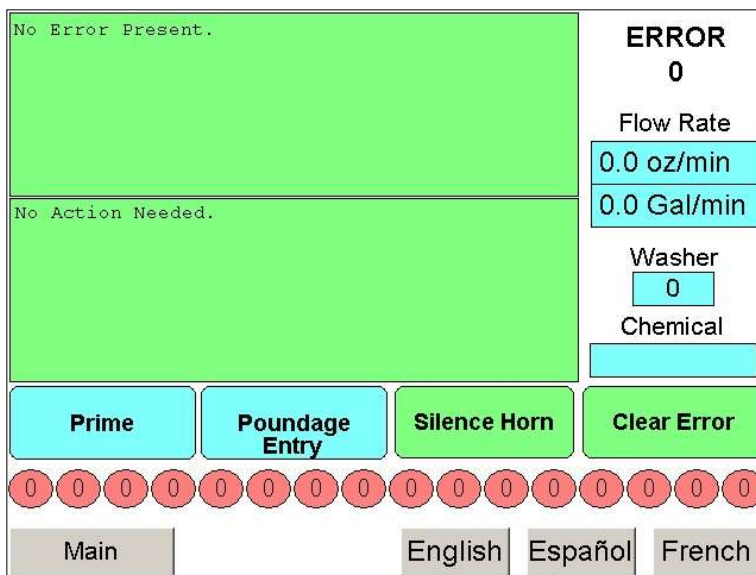
This is the Main Menu screen that is utilized during normal operation and monitoring of the Ultrax. The buttons on this screen are known as “screen go to” buttons. Pressing any of the buttons will take the operator to the appropriate screen. Clicking on any of the language buttons will display current screen in selected language.



Descriptions of each of the individual screens listed on the main menu will follow later in the manual.

- **Error Screen**

When any error occurs at the Ultrax, three things happen simultaneously. First, the system may shut down, depending on the error; also whatever the Ultrax was in the middle of doing will be stopped until the alarm is acknowledged. Second, the alarm horn (or light, if applicable) will energize, alerting the plant personnel of the alarm. Third, the screen will display 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, it is very important to note which washer was being pumped to, and what chemical was being pumped.

Pressing the **Silence Horn** button stops the horn / light from sounding / flashing, but does not clear the alarm. The alarm will be off for 3 minutes to allow for the operator to troubleshoot the system. If the alarm has not been reset in 3 minutes it will sound / flash again to remind them there is a problem.

Once the alarm condition has been corrected, pressing the **Clear Error** button clears the alarm messages from the screen, and restarts the system where it left off when the alarm occurred.

The flow rate is displayed to aid in troubleshooting. The **Prime** button restarts the air pump, and begins pumping the chemical that was being called for, to the washer that was calling for it.

The red circles with “0” in them are indicators of flow going through the flow switches. The “0” is a place holder for the actual washer number that will be displayed when in operation. The circles will turn green when sufficient flow is going through the flow switch to activate it. This is another tool to help in troubleshooting the system if an alarm occurs.

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

\*\* Note: when the Ultrax is in an alarm state (horn/light on, and an error message up on the screen), any washer that calls for chemical will be put into hold, and will not receive any chemical until the alarm condition is resolved. It is very important that the plant personnel recognize an alarm as a warning that the washers are not receiving any chemicals!

- **Washfloor Status Screen**

The Washfloor Status Screen is a real-time display of all of the washers, current formula numbers, injection numbers and operation counters for each washer.



The formula number is the number being run out at the washer (i.e. formula 1=bar mops, formula 6=colored pants, etc.). The injection number is the last injection that was called for (injections one, two, three etc., up to a maximum of 8).

- **Injection Status Screen**

When monitoring the Ultrax for correct operation, the Injection Status Screen is the best place to watch. This screen represents a real-time display of exactly what the system is doing. While the system is pumping, the washer number, formula number, chemical name and quantity are all displayed on this screen.

The screenshot shows the 'Injection Status' screen with the following data:

Parameter	Value
Washer Number	0
Formula Number	0
Injection Number	0
Flow Rate (oz/min)	0.0
Flow Rate (Gal/min)	0.0
Dispensing Mode	Metered
Now Chemical	
Desired Amount	0.0
Actual Amount	0.0
Status	Idle

At the bottom of the screen, there is a row of 15 red circles, each containing a '0'. Below this row are four buttons: 'Main', 'English', 'Español', and 'French'.

During the course of an injection, various informational fields will be displayed. The status field will display if dispenser is in pre-flush, dispense, or post-flush. The current flow rate is also displayed, whether it is water or chemical.

The red circles with “0” in them are indicators of flow going through the flow switches. The “0” is a place holder for the actual washer number that will be displayed when in operation. The circles will turn green when sufficient flow is going through the flow switch to activate it.

- **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.

**Device Status**

AmsNetId: 5.19.0.200.1.1 ▲	LAN1 (EtherCAT)
Cpu: INTELx86	DHCP: TRUE
HW Date: 31.15.127	Ip: 169.254.193.164
HW Model: 65535	Subnet: 255.255.0.0
SN: -1	
HW Version: 25.5	
ImageDev: CB3053	LAN2 (ChemWatch)
ImageLevel: HPS	DHCP: FALSE
OS Name: Windows CE	Ip: 192.168.0.5
OS Version: 6.0 ▼	Subnet: 255.255.255.0

Main <>>> English Español French

**Device Status**

**EtherCAT Network Status**

Config	Found	State	WcState	▲
EK1100	<input type="checkbox"/>	CP	0	
EL1512		CP	0	
EL1809	<input type="checkbox"/>	CP	0	
EL1809		CP	0	
EL1809	<input type="checkbox"/>	CP	0	
EL1809		CP	0	▼

Frames Per Sec: 50      Lost Frames: 0  
 Queued Frames Per Sec: 16      Lost Queued Frames: 0  
 Master Status  
 OK

Main <<<< English Español French

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 (Ether CAT) values are for the Beckhoff Ether CAT 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.

- **Manual Formula Entry Screen**

This screen is used if there is a need to manually change the formula that a washer is currently running. Formula numbers can be changed by clicking on the yellow entry cell to the right of the desired washer. This will bring up a secondary screen that resembles a keypad. Simply type in the formula number, and press the Enter key. The primary purpose of this screen was for old washers with chart controls.

Formula Entry				
Washer 1	1	Washer 2	0	
Washer 3	0	Washer 4	0	
Washer 5	0	Washer 6	0	
Washer 7	0	Washer 8	0	
Washer 9	0	Washer 10	0	
Washer 11	0	Washer 12	0	
Main		English	Español	French

\*\* Note: **VERY IMPORTANT!!!** Be extremely careful when entering in the formula numbers for the washers! If a washer was running a formula, and the formula number is changed in the middle of the formula, the wrong chemicals will be pumped to the washer. When entering in formula numbers, double check that the correct numbers have been entered.

- **Poundage Entry Screen**

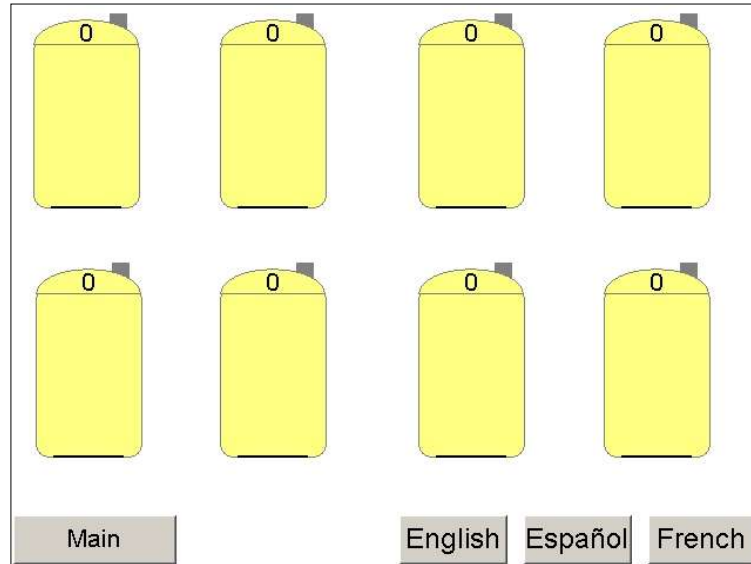
Poundage Entry / Automatic Weight Entry “AWE” is used to enter the actual load weight of loads being run in the washers. This is to allow for better reporting information in ChemWatch that is based on actual load weights instead of target load weights.

The screenshot shows a software interface titled "Poundage Entry". On the left, there are five input boxes labeled "Sling 1" through "Sling 5", each containing the number "0". Below these is a "Total" box containing "0". To the right, there is a "Formula" box with "0" and a "Washer" dropdown menu currently showing "0". The dropdown menu lists "Washer 1" through "Washer 6". At the bottom, there are three buttons: "Main", "English", "Español", and "French".

The operator must select the washer, then enter the formula number, and weight of the load that is going to be run in that washer. This screen allows the operator to enter up to 5 sling weights. The weights will be totaled and displayed in the Total box. To enter a weight you touch the box of the desired sling you wish to enter and a numeric keypad will come up on the display. Enter the desired weight and then press the enter key. When the washer is started the system compares the formula number entered in the AWE screen to the signal sent from the washer and if they match the system will accept the formula number and the weight. If the two formula numbers do not match the system will alarm, and set the current formula to the washer’s EOF and then tell the operator on the error screen that they need to correct the AWE data and start the washer over from the beginning. The washer will not get chemical because the formula number was set to the EOF and if they do not reset the formula they will continue to get alarms when the washer requests chemical.

- **Tank Levels Screen**

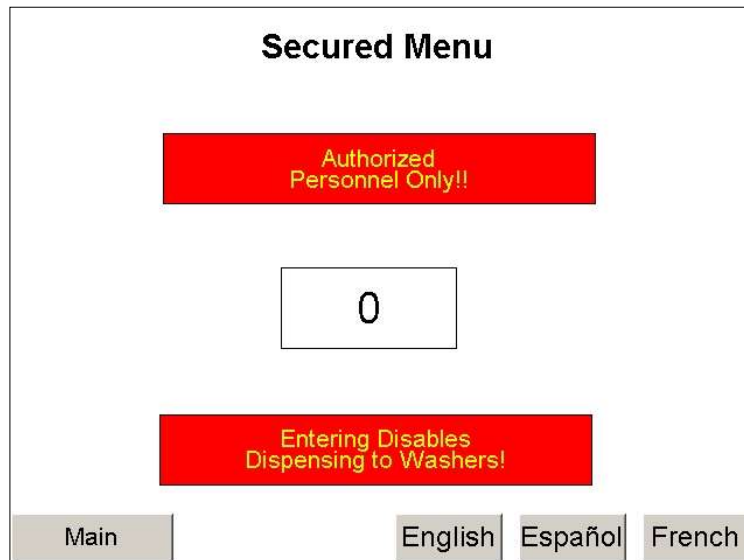
There is the option of installing Ultrasonic Level sensors with the Ultrax system to allow for reading Bulk Tank levels. This is the screen that allows you to view the current level in the tanks.



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.

- **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 Ultrax. The password for this screen should be kept in a safe place. Pressing the blue 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: The Secured Area is only accessible when the system is at rest. The Secured Area is **not** accessible when the system is performing an injection, and pumping chemicals.

\*\* Note: Once the operator has accessed the Secured Area, the system will be at rest, and will not process any chemical requests. Any washer that calls for chemistry will be put on hold, but chemicals will not be pumped to the washfloor until the operator has exited the Secured Area.

***Warning!: the Secured Area Menu should NEVER be used as a soft lock out when performing maintenance – proper mechanical lock out tag out procedures should always be followed to prevent risk of exposure to chemicals.***

## Secured Area (Main Menu)

The Secured Area is password protected, and accessed only by typing in the correct password at the Password Entry Screen above.

Secured Menu	
Chemical Calibration	Diverter Valve Test
Chemical Prime	Flush Valve Test
AWE Setup	Tank Config
Ultrax Options	Advanced Setup
<b>WARNING!</b> Dispensing to Washers Is Currently Disabled!	
Main	English Español French

- **\*\* Note:** Once the operator has accessed the Secured Area, the system will be at rest, and will not process any chemical requests. Any washer that calls for chemistry will be put on hold, but chemicals will not be pumped to the washfloor until the operator has exited the Secured Area.

## Chemical Calibration

A calibration of the Ultrax is performed during startup, and should be performed on a regular basis after installation. The Calibration Screen checks the calibration of the Ultrax's flow meter, which sends pulses to the processor as chemicals are being pumped.

Chemical Calibration			
Chemical	K	Oz	▲
Alkali	6.2	6.2	
Detergent	6.2	6.2	
Alkali	6.2	6.2	
Detergent	6.2	6.2	
Sanitizer	6.2	6.2	
Sour	6.0	6.2	
Soft	6.2	6.2	
Chemical 8	6.2	6.2	
Chemical 9	6.2	6.2	
Bacstat	6.2	6.2	▼

Flow Rate: 0.0 oz/min  
0.0 Gal/min

Selected Chemical: Alkali

Desired Amt (oz's) 0.00

Actual Amt (oz's) 0.00

Flush Prime Chem

Start Calib Accept Calib

Secured Menu English Español French

***Do not begin a calibration without having the appropriate safety Personal Protection Equipment (PPE)!***

To begin a calibration make sure the calibration bucket is attached to the lid on the right hand side of the Ultrax. Then a chemical must be selected by pressing the name of the chemical that is to be calibrated. The selected chemical will appear in the "Selected" box. Press the "Desired Amt" box, and a secondary screen will appear resembling a keypad. Type in the desired number of ounces by typing the number and pressing enter. Once the correct number of ounces has been entered, press **Start Calib** to begin the calibration. The system will perform a pre-flush and then pump the requested amount of chemical into the calibration bucket, and then perform a post-flush. This process works exactly like an actual injection. Once the calibration has been completed, measure the actual amount of chemical that has been pumped into the calibration bucket.

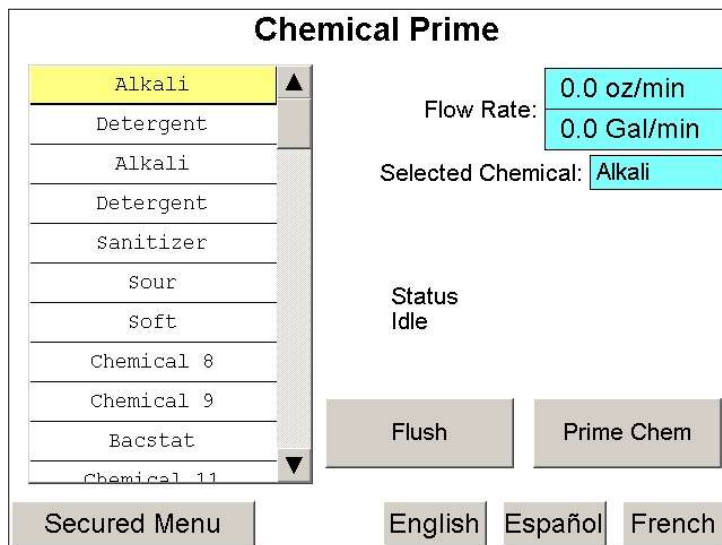
The "K-factor refers to the number of pulses per ounce the flow meter sends to the processor. When a chemical is pumped the Ultrax will use this setting to calculate the number of pulses required from the flow meter to receive the desired chemical quantity. Typically, the K-Factor stays in the 5.5 - 7.0 range. If numbers outside of these are required to get a chemical to measure correctly, there may be a problem with the flow meter, water flush solenoid or hard water deposits within the system

**\*\* Warning: Do not exit the calibration screen or enter a Pumped Amount until the system has stopped pumping.**

**\*\* Important:** Once a calibration has been completed the operator must press the "Actual Amt" box, and type in the amount of chemical that was actually pumped. The system then automatically calculates and displays the calibration values for that chemical. If the values are acceptable, click the **Accept Calib** button to write the values to memory.

- **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 Chemical Priming Screen is accessible from the Secured Menu.

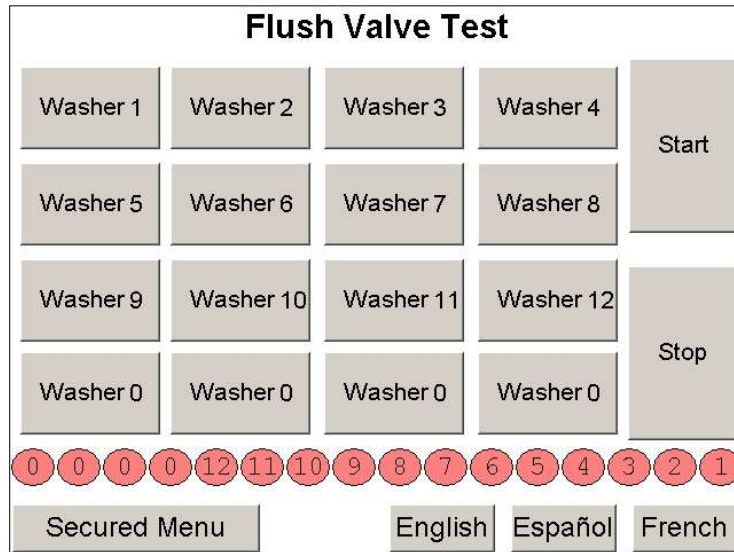


As soon as the Priming Screen is accessed, the air diaphragm pump starts pumping, and the water flush solenoid valve opens, pumping tempered water to the drain. To select a chemical, press the up / down arrow buttons to view different chemical names then press the desired chemical. The "Selected Chemical" box will display the name of the chemical that has been selected. Depressing the **Prime Chem** button will prime the selected chemical (the water flush solenoid valve closes, and the chemical valve opens, pumping chemical to the drain). Once the chemical line has been primed, letting go of the button returns the system to the water flush mode.

\*\* Note: it is very important to pay close attention to the prime screen when pumping chemicals. If you exit the screen, the air diaphragm pump will stop pumping immediately. If you are pumping chemical, and you exit the screen, all of the feed lines will be filled with that chemical. Also, make sure that sufficient water flushes are performed after each chemical is primed. Make sure that the system is properly flushed after using the Prime Screen.

- **Flush Valve Test (not in Ultrax 2000 and Ultrax Lite)**

Performing a manual flush valve test simulates the final flush that is performed after chemicals have been dispensed. The electric flush pump turns on, and the flush solenoid opens, pumping water through the flow switch and out to the washer. This is an excellent way to test the electric pump, flush solenoids, and flow switches.



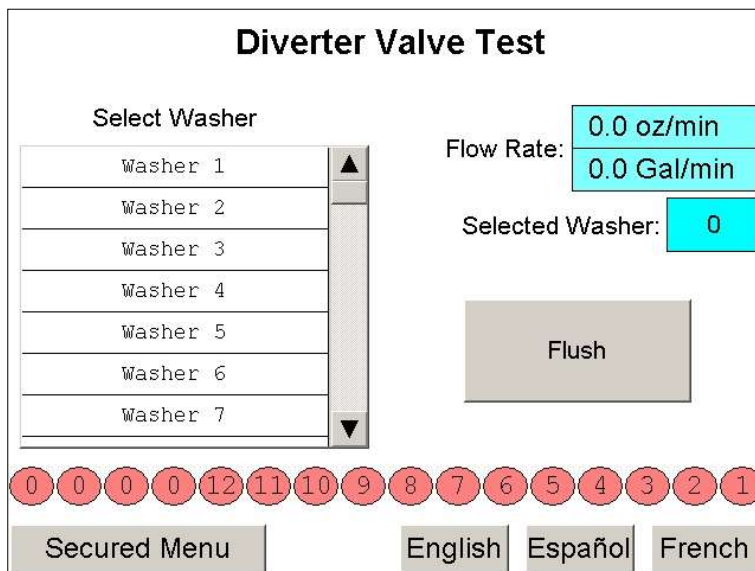
Pressing the button associated with the applicable washer number will highlight the button and start the pump. Simply press the button again to deactivate the flush. It is possible to flush to multiple washers simultaneously.

The red circles are indicators of flow going through the flow switches. The circles will turn green when sufficient flow is going through the flow switch to activate it.

**\*\* Note:** During a manual washer flush, the flow switch looks for flow just like a real injection. If for any reason there is no flow, the system will alarm, just like it would during an injection. This is to avoid damaging the centrifugal pump.

- **Diverter Valve Test Screen**

This screen allows the operator to manually operate the diverter valves. This is a good way to test if the diverter valve is functioning for the washer that has been selected.

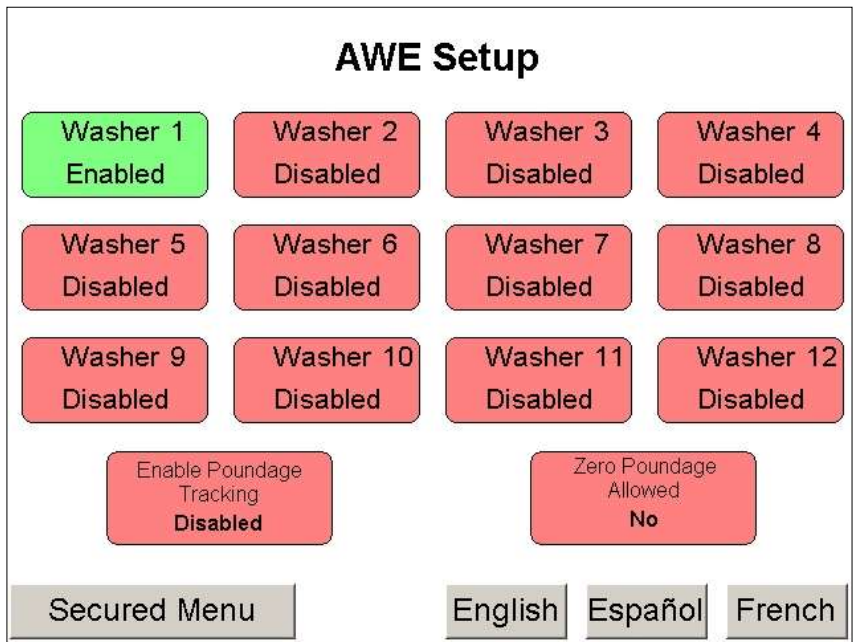


Select the washer number you wish to test by pressing the up / down arrow buttons to view different washers. Click on the desired washer and the “Selected Washer” box will show the washer number that has been selected.

In order to test whether the valve is actually open, pressing the **Flush** button will turn on the double diaphragm pump and flush water through the flow switch. The flush to washer button is a toggle button so you will need to press it again to stop flushing. The circles will turn green when sufficient flow is going through the flow switch to activate it. You should therefore see the circle turn green for the washer valve you are testing while the pump is running. You should see only one green circle at a time because only one valve should be open during this test.

- **AWE Setup**

The AWE Setup entry screen allows you to enable and disable poundage entry for the whole system or by individual washer.

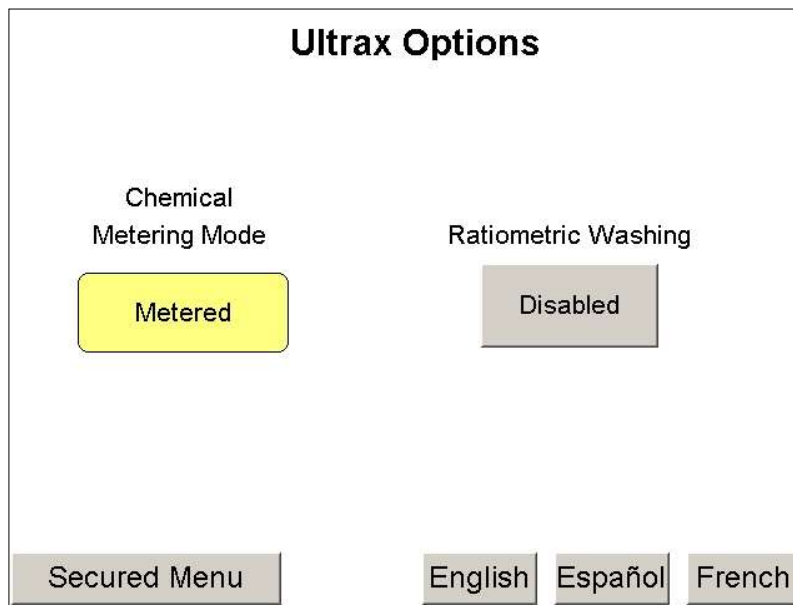


To enable / disable a washer just touch the button for the appropriate washer and it will toggle between enabled / disabled. The box will be green if it is enabled and it will turn red if it is disabled.

**\*\* Note:** The poundage entry should be enabled and disabled using the ChemWatch computer. This screen was added to the dispenser display for trouble shooting and emergency purposes only.

- **Ultrax Options Screen**

The Ultrax options screen is used for enabling / disabling some of the settings in the system in the event of issues that requires parts being ordered or to get the system running until a service representative can travel to the facility.



**Chemical Metering Mode:**

This refers to the metering mode of the system. The system in normal operation should be set to metered mode and but has the capability to run in timed mode. Timed mode is used when there is a problem with the flow meter that cannot be resolved without ordering parts. This mode will bypass the normal operation of the flow meter and pump chemical based on the oz per sec that has been setup via calibration or the ChemWatch computer.

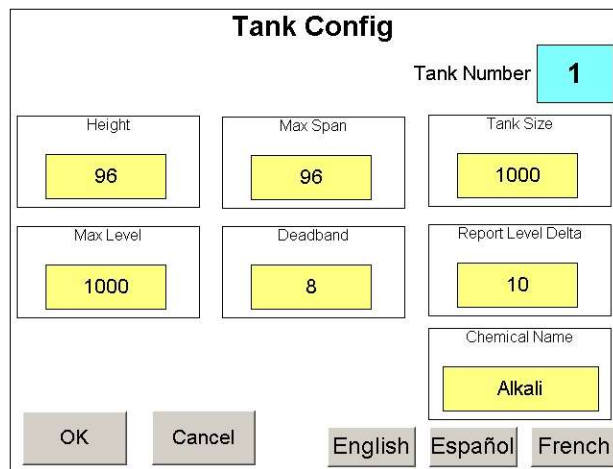
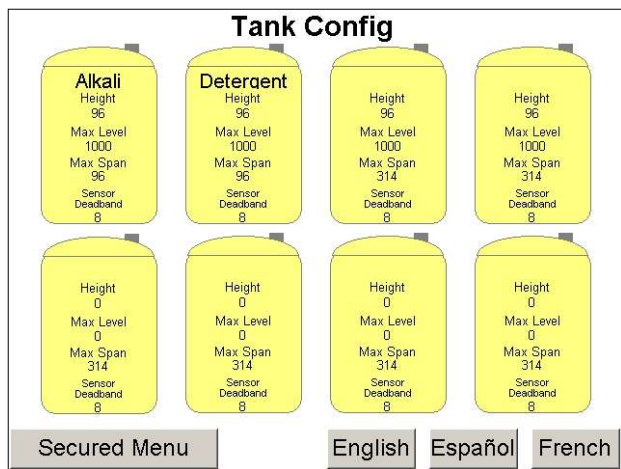
**\*\*Note:** It is recommended that the oz/sec be setup when the Ultrax system is installed or on a routine service visit so they are ready in the event of a problem.

**Ratiometric Washing**

This feature can also be referred to as ratio dosing. The Ultrax system is capable of adjusting the percentage of chemicals that it will feed to a washer based on the actual weight of the load. This requires a number of parameters to be configured in the ChemWatch software and a method of getting the load weights automatically into ChemWatch at the start of the formula. This can be accomplished via AWE “Actual Weight Entry” or communication with a rail system. This Enable / Disable feature for ratio dosing is located in the dispenser display to allow for enabling/disabling this feature if the ChemWatch computer fails.

- **Tank Configuration**

The tank configuration screen is used if ultrasonic level sensors are installed on bulk tanks and 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:** This is the distance in inches from the level sensor to the bottom of the tank

**Max Level:** This is the distance from the bottom of the tank to the max fill level of the tank

**Tank Size:** This is the capacity of the tank at the max fill level

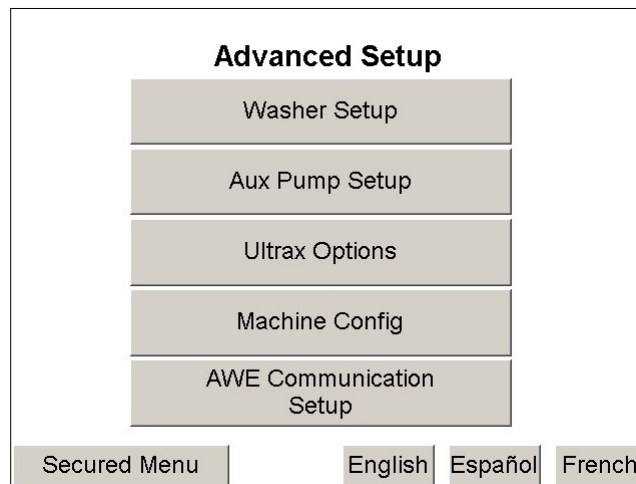
Once the tanks have been measured go to the tank configuration screen and click on the tank you wish to configure. This will bring up the setup screen where the data is to be entered. Simply click in each of the yellow entry cells and enter the correct values. Repeat this for each tank.

- **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.

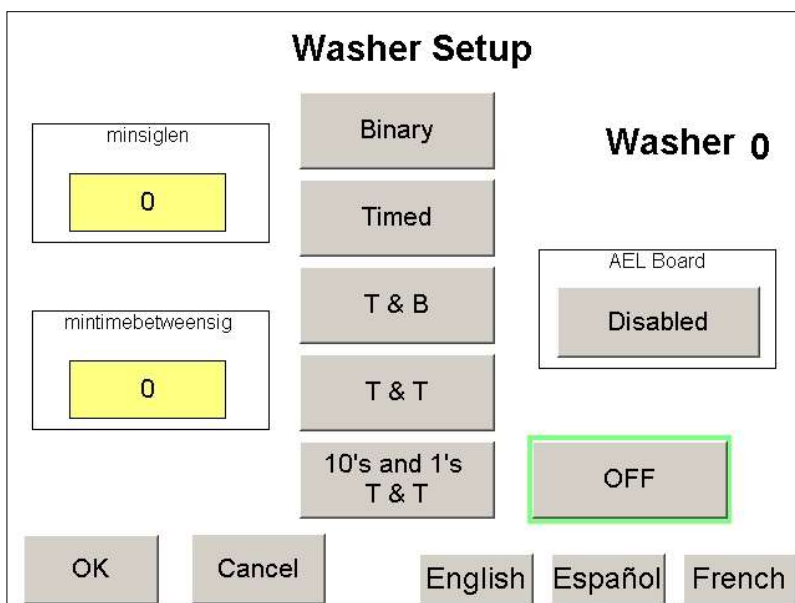


- **Washer Setup Screen**

The washer setup screen is accessed from the advanced setup screen. The washer setup screen is used to adjust parameters for the washer communication signals to the Ultrax.



When you touch the washer setup button from the advanced setup screen it will take you to this washer selection screen. Click on the desired washer and this will take you to the desired washer setup screen shown on the next page.



Washer Mode:

The washer mode should be changed from the ChemWatch computer unless you are just performing a test and are changing it back. Otherwise the next time settings are downloaded from the computer your washer mode will be changed to the current setting in the computer. Valid signal modes are Binary, Timed, T&B (Timed and Binary), T&T (Timed and Timed), and 10's and 1's T & T.

minsiglen:

Minimum Signal Length is the duration of time a signal must be turned on for in binary, timed & T&B modes.

mintimebetweensig:

Minimum time between signals is the time between signals from the washer before the second is recognized as a valid signal. If two requests come from the washer within this time, the second signal will be ignored.

AEL Board:

AEL board is a type of output board that is an option in some Braun washers. If the washer has the AEL board in it an acknowledge signal needs to be sent to the washer to tell the washer that the Ultrax has received the signals. By touching the AEL Board button it will toggle between enabled and disabled. This enables a segment of programming that works with this washer setup but may cause a problem with other washers so only enable it when necessary.

## Explanation of the Washer to Ultrax Signal Modes

Currently there are four different modes that a washer can send signals to the Ultrax feed systems. These modes are referred to as Binary, Timed, T & B, and T & T. It is important that we understand how each of these methods work in order to determine which one can be used for the washer that is being hooked up.

### 1 - Binary Mode:

Binary mode is the preferred method to communicate to the Ultrax systems. 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 all be turned on for a set amount of time every time we use them. Standard is 10 seconds.

The number of outputs the washer has will affect the number of formulas that can be identified. Each signal is assigned a binary value and the last signal is used as what is referred to as the AFS/EOF signal.

AFS – Auto Formula Select

EOF – End of Formula Select

The end of formula is simply a formula number that has a special meaning. It represents the washer has finished its wash cycle.

The following chart is an example of how the signals need to be programmed for the formula number you are going to run. Take note that the AFS/EOF signal is turned on for each formula. In this example the machine has 8 signals and could signal up to formula 127. However the Ultrax is standard with only 40 formulas unless custom programming is done in it. If you only had 5 signals then the 5<sup>th</sup> signal would have to be your AFS/EOF and you would be limited to 15 formulas.

For example: Formula 5 would require signals 1, 3, & 8

Signal 1 = 1, Signal 3 = 4 Thus 1 + 4 = 5 and Signal 8 = AFS/EOF and identifies it as a formula request.

Washer Signal #	1	2	3	4	5	6	7	8
Binary Value	1	2	4	8	16	32	64	AFS/EOF
Formula # 1	<b>10 sec.</b>							<b>10 sec.</b>
Formula # 2		<b>10 sec.</b>						<b>10 sec.</b>
Formula # 3	<b>10 sec.</b>	<b>10 sec.</b>						<b>10 sec.</b>
Formula # 4			<b>10 sec.</b>					<b>10 sec.</b>
Formula # 5	<b>10 sec.</b>		<b>10 sec.</b>					<b>10 sec.</b>
Formula # 6		<b>10 sec.</b>	<b>10 sec.</b>					<b>10 sec.</b>
Formula # 7	<b>10 sec.</b>	<b>10 sec.</b>	<b>10 sec.</b>					<b>10 sec.</b>
Formula # 8				<b>10 sec.</b>				<b>10 sec.</b>
Etc.								

## Chart 1

The following chart shows how the washer signals will need to be programmed for the chemical injection requests. Take note that the only difference is that the AFS/EOF signal is NOT turned on when requesting an injection.

Washer Signal #	1	2	3	4	5	6	7	8
Binary Value	1	2	4	8	16	32	64	AFS/EOF
Injection # 1	<b>10 sec.</b>							
Injection # 2		<b>10 sec.</b>						
Injection # 3	<b>10 sec.</b>	<b>10 sec.</b>						
Injection # 4			<b>10 sec.</b>					
Injection # 5	<b>10 sec.</b>		<b>10 sec.</b>					
Injection # 6		<b>10 sec.</b>	<b>10 sec.</b>					

## Chart 2

### **2 - Timed Mode:**

Timed mode is rarely used. Timed mode has been replaced in most locations by T & T mode. Timed mode was originally created for Braun washers that can only turn on one signal at a time.

Timed mode requires 7 washer signals and the timer on the washer must be accurate and consistent.

Formulas are identified using the 7<sup>th</sup> signal (AFS/EOF) on a timed basis. Each second the signal is turned on represents a formula number.

- i.e. Signal 7 (AFS/EOF) for 1 second = Formula 1
- Signal 7 (AFS/EOF) for 2 seconds = Formula 2
- Signal 7 (AFS/EOF) for 12 seconds = Formula 12
- Etc.

Injections are identified using the other 6 signals.

- Signal 1 for 10 seconds = Injection 1
- Signal 2 for 10 seconds = Injection 2
- Signal 3 for 10 seconds = Injection 3
- Signal 4 for 10 seconds = Injection 4
- Signal 5 for 10 seconds = Injection 5
- Signal 6 for 10 seconds = Injection 6

### **3 – T & B Mode:**

T & B stands for Timed and Binary. A timed signal is used to identify the formula and a binary signal is used to identify the injections. This method has been typically used on American LTRONs with a Pioneer 2000 controller and Milnor washers with EP Plus controllers that can turn on a maximum of three signals at one time.

If you have a limited number of signals that can be turned on at one time and an accurate machine timer this is a good choice. This limits the amount you are being dependant on the machine timer and gives you

some of the benefits of Binary Mode. You only need 4 washer signals and the ability to turn at least two on at the same time.

Signal 4 would be the AFS/EOF signal and the formula number is selected in the same fashion as in Timed Mode. You program signal 4 (AFS/EOF) for 1 second per formula number you are identifying. Signal 4 for 9 seconds = Formula 9.

Signals 1, 2, & 3 are used in binary mode to identify the injections. Refer to Chart 2 in the Binary Mode section for the signal programming for your injection requests.

#### **4 – T & T Mode:**

T & T stands for Timed and Timed. A timed signal is used to identify formulas and a second timed signal is used to identify injections. This method can be the simplest to wire and program, but it is **critical** that the washer output timers be accurate. This method was created originally for Braun washers to replace Timed Mode because if the additional supply board was not installed you could only get 4 injections. It was decided that we trusted the timer for the formula, so we should be able to trust it for the injections.

Typically signal 2 is used for identifying the formula and signal 1 is used to identify injections. However, make sure you verify this when going into an existing location because in some locations it was done in reverse.

Formulas are identified using signal 2 (AFS/EOF) on a 1 second time basis the same as in Timed and T & B Modes. Signal 2 for 5 seconds = Formula 5 etc.

Injections are identified using signal 1 on a 1 second time basis.

Signal 1 for 1 second = Injection 1

Signal 1 for 3 seconds = Injection 3

#### **5 – 10's and 1's T & T Mode:**

10's and 1's Timed and Timed mode is an option that can be used if there are not enough signals available for binary, but you have high formula numbers. By utilizing 3 signals, formula 99 can be selected in only 9 seconds. The formula number desired = (Signal 1 length) + (Signal 2 length)\*10. The latch, or Signal 8 should be programmed to be on for the longer of the signal lengths.

Formula 1 => Signal 1 and 8 on for 1 second

Formula 15 => Signal 1 and 8 on for 5 seconds and Signal 2 on for 1 second = (5) + (1)\*10 = 15

Formula 97 => Signal 1 on for 7 seconds and Signal 2 and 8 on for 9 seconds = (7) + (9)\*10 = 97

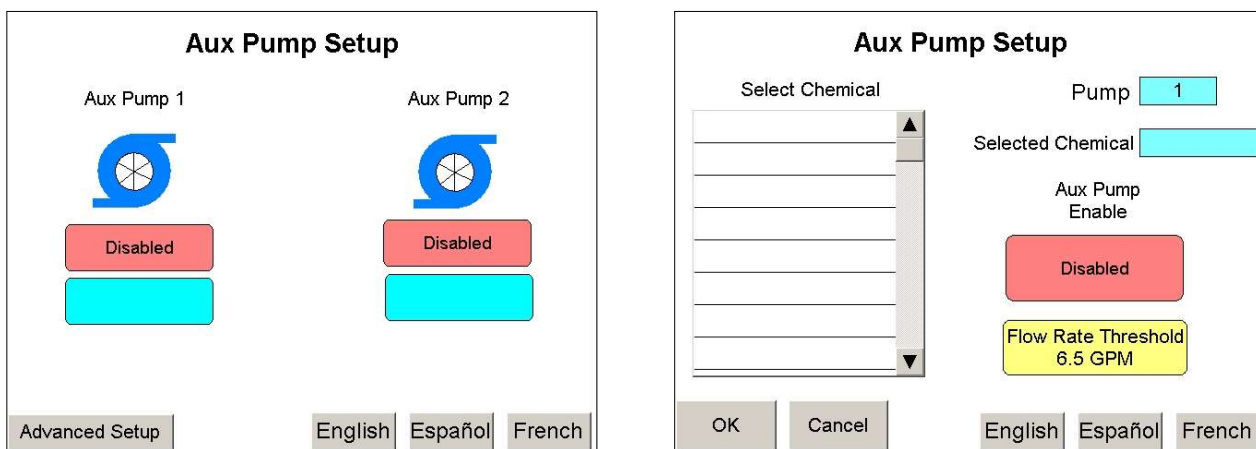
Injection 1 => Signal 1 on for 1 second

Injection 4 => Signal 1 on for 4 seconds

**\*\*Note\*\*** Chemwatch does not have a mode 5, so this will need to be programmed at the dispenser. You will need to reset this if washer settings are downloaded from Chemwatch.

- **Auxiliary Pump Setup**

The Ultrax system has the ability to use an auxiliary pump “booster pump” with products that are difficult to pump. The Aux Pump Setup screen is used to configure these pumps’ operation.

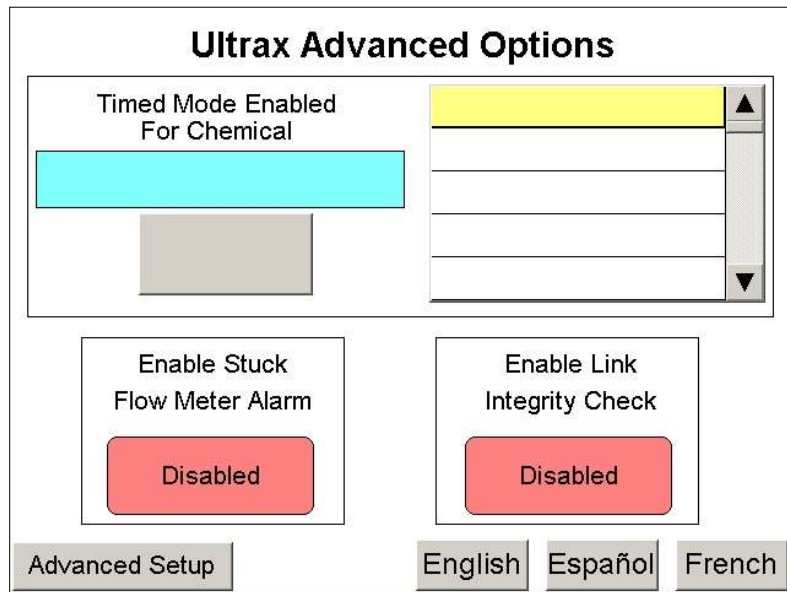


Up to two chemicals can have auxiliary pumps installed on them. When in the auxiliary pump screen touch the box with the chemical names listed in it for the pump to be configured. Use the Up & down arrows to move the cursor to the desired chemical and then select it. The chemical name will appear in the selected box for that pump. After selecting the chemical, press the disabled button and it will toggle to read enabled, at this time the booster pump will be active.

**\*\* Note:** The Flow Rate Threshold is used in the logic for determining when the system is out of chemical. When you enable a booster pump this value typically needs to be increased. If the flow rate exceeds this value the Ultrax assumes it is air and does not count that flow. When a booster pump is installed this typically needs to be increased to handle flow rate spikes when the booster pump turns on.

- **Ultrax Option Selection**

The Ultrax system has a second set of Ultrax Options that are accessed from the Advanced Setup Menu.



Timed Mode for Chemical:

The Ultrax system can be configured to feed a single chemical on a timed basis in case there is a single chemical that cannot be read by the flow meter.

Enable Stuck Flow Meter Alarm:

This is an optional alarm that tests for false flow meter readings when the system is at rest. The alarm was created for systems that have a ChemTec piston style flow meters on them. The piston on the flow meter could at times become stuck in an up position giving false flow readings. If this is enabled and the flow meter continues to give flow readings 15 seconds after the system is at rest the alarm will occur.

Enable Link Integrity Check

This is an optional communication test between the ChemWatch computer and the Ultrax system. When this is enabled the Ultrax system changes a piece of memory data and expects a response from the computer within 15 seconds. This test is performed once an hour when enabled. This needs to be enabled from the ChemWatch computer for it to operate correctly. This option is only provided on the PanelView in case the ChemWatch computer fails so that you have the ability to disable it until the computer is repaired.

- **Machine Config**

Account Name New Account	Configure as AWE: FALSE
Dispenser Number: 1	AWE Formula Check FALSE
Total Washers: 12	
Error 154 Timed T#3s0ms	Error 141Hi Lim 4.2 GPM
Error 154 Metered T#3s0ms	Error 141 Lo Lim 0.5 GPM
	Max Flow Rate 1000.0 Oz/Min
Advanced Setup	

The Account Name can either be input by clicking on the button, or by sending down from Chemwatch.

The Dispenser Number is set here and is only displayed on the Main Menu page.

The Total Washers changes the Washer Status Screen to 6, 12, or 16 washers.

The Error 154 settings are the time from when the pump starts pumping to when the flow switch is looked at before alarming a flow switch alarm. This time can be set for both Timed mode and Metered mode. The default is 3 seconds.

Error 141 is a loss of flow seen by the flow meter alarm. This alarm can be generated by the flow meter spinning too fast (air in the line) or too slow (plugged line). These “alarm limits” can now be changed on this page. If you are seeing flow meter alarms on a consistent basis that you believe are false alarms, you could try increasing this range slightly. Do not change this value too much as the dispenser would never alarm when product wasn’t being properly delivered.

Max Flow Rate is the instantaneous value at which anything above this flow rate is assumed to be an air bubble and is ignored in the measured product amount.

## COMMON ULTRAX ERROR MESSAGES

**ALARM:** “Loss of chemical flow, the flow meter is seeing a flow rate of < .3 gpm”

**CAUSE:** The flow meter is seeing a flow rate of < .3 gpm during a chemical injection.

**SOLUTION:** Either that chemical is empty, or there is excessive air in the line, causing erratic flow rate readings. Check chemical drum first, then check the system for air leaks. Sometimes a small amount of air will develop in the line after changing drums. Also, monitor the flow rate on the panel view while chemical is being pumped.

**ALARM:** “The flow switch is not seeing flow out to the washer”

**CAUSE:** The flow switch to that washer is not seeing adequate flow while the system is pumping chemical to that particular washer.

**SOLUTION:** Either that chemical is empty, there is excessive air in the line, the diverter valve did not open, or the flow switch is bad. The flow switch is a spring-loaded contact, with 24vDC across it. The flow switch can be verified by monitoring the lights on the panel view that represent the flow switches.

**Note** that when a chemical drum runs dry, depending on whether the flow meter or flow switch sees it first, either of these first two alarms will occur.

**ALARM:** “Washer X requested an injection without selecting a formula first. **THE WASHER WILL NOT GET CHEMICAL!**”

**CAUSE:** When a formula is run at a washer, it should: 1. Select a formula number, 2. Call for chemical injection(s). If the first step is bypassed, or missed, when an injection is called for, the Ultrax does not know what formula the washer is running, and will not pump any chemical. If the washer is not restarted from the very beginning, this alarm will occur for every injection during that formula, and will not receive any chemicals.

**SOLUTION:** The washer needs to be restarted from the very beginning, and should be verified that the Ultrax did receive the correct formula number during the first step. The formula number that each individual washer is currently running is available on the Ultrax’s “Washfloor Status” screen.

**ALARM:** “Washer X flow switch is not seeing flow during the final flush (electric pump)”

**CAUSE:** The electric pump is flushing to washer X, but the flow switch is not seeing flow.

**SOLUTION:** During the final flush, the electric pump pushes water and chemical to the washer through the flush solenoid, and flow switch. If the flow switch does not see adequate flow, this alarm will occur. This could be caused by the flush solenoid going bad, the electric pump failing, the flow switch going bad, or a hose being kinked between the Ultrax and the washer. The same indicators used above for the flow switches can be used in troubleshooting.

**ALARM:** “Washer X is sensing flow when the chemical is being pumped to another washer”

**CAUSE:** The Diverter valve for washer X is stuck open or the flow switch for washer X is stuck on.

**SOLUTION:** Check the diverter valve by going into the secured menu screen and running a diverter valve test if you pump to a washer downstream of washer X and the flow switch comes on then change the valve if the flow switch light is always on then take the flow switch apart and make sure the shuttle is not stuck or the spring is bad.

**ALARM:** “Washer X was started with an invalid load weight the washer will be held until the problem is resolved.

**CAUSE:** The weight of the load being run was not entered before the washer was started.

**SOLUTION:** Silence the horn and press the poundage entry button on the panel view enter the load weight for the washer the alarm corresponds with then press clear error.

## **ULTRAX ROUTINE MAINTENANCE CHECKLIST**

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### **PHYSICAL INSPECTION (SHOULD BE PERFORMED DURING EACH VISIT)**

1. Check entire system for air leaks / cracked fittings. Monitor system as it's running, to see if the system is sucking air at any hose connections. Repair and replace as necessary.
2. Check the feed hoses going from the Ultrax to each washer for bends or kinks (check at the Ultrax, as well as at each washer). Sometimes, hoses can develop kinks in them over time; a kinked hose can prevent the Ultrax from properly delivering chemical to the washer.
3. Check the air diaphragm pump for air leaks. If air is leaking from the body of the pump, tighten all of the bolts that hold the pump together. It is normal for these bolts to loosen over time, with the vibration of the pump.
4. Verify that the air regulators are set properly. The main regulator (below the control cabinet) should be set at 80 psi. The secondary regulator (inside the control cabinet) should be set 55 psi. This secondary regulator sets the air pressure that is used to open the Teqcom valves.
5. Verify that the water in the tempered water tank is hot to the touch, but not unbearably hot (approximately 95 - 105 degrees F).
6. Check the hardness of the water in the tempered water tank. Hard water will build up in the system, and cause severe blockage, if the problem is not spotted early.
7. Check the moisture separators on the incoming pressurized airline, to assure that they are functioning properly, and not allowing any moisture through to the air diaphragm pump. Also check the filter inside the pressure regulator.
8. Unscrew the water filter, and change the screen as necessary.

## **ULTRAX ROUTINE MAINTENANCE CHECKLIST**

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### **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. Note the flow rates of each chemical (including water), and log them in the Maintenance Log inside the control cabinet. Maintaining a log of flow rates can help pinpoint numerous problems, such as a defective chemical solenoid, flush solenoid, blockage in the system or a problem with the flow meter.
2. Check for diverter valve failure. Diverter valves should be manually fired from the “Diverter Valve Test” screen. There is also a feature that allows you to manually pump water through the diverter valve, to verify that the valve is actually opening. Use this feature to pump water through each diverter valve, and verify operation of each flow switch. Verify that while you are manually pumping to each washer that only the flow switch indicator for the washer you are pumping to is turning on. If any additional indicators are turning on check the diverter valve and the flow switch for the washer number that was not being pumped to.
3. Run the “Injection Detail” report at the reporting computer for all washers, for at least the last week’s data. Inspect the data to assure that all of the data looks ok. This helps assure that all of the supply outputs are working on all of the washers.
4. Check for leaking chemical valves. Enter the Chemical Priming screen in the Secured Area. The air diaphragm pump will turn on and flush water directly to drain. Let the water flush to the drain for a minute or two to rinse out any chemical that may be in the drain line from calibrations or chemical priming. After the system has flushed catch a sample of the water being pumped out of the drain hose. Check the pH, chlorine level and for suds in the sample. Do the same tests on the water in the flush tank and compare your readings. The readings should match. If they do not then there is potentially a leaking chemical valve.

# ULTRAX

## Error Listing

ERROR NUMBER	DESCRIPTION OF ERROR	CAUSE OF ERROR	SOLUTION OF ERROR
1,10,20,30, 40,50,60,70, 80, 90, 100,110	Formula request from washer X is less than or equal to zero.	Wrong input from washer number X. Bad or damaged Wire.	Rerun formula from first step. Verify the formula programming. Contact service representative if the problem persists.
2,11,21,31, 41,51,61,71, 81, 91, 101, 111	Formula request from washer X is greater than the allowed maximum.	Wrong input from washer number X or a programming mistake.	Rerun formula from first step. Verify the formula programming. Contact service representative if the problem persists..
3,12,22,32, 42,52,62,72, 82, 92, 102, 112	Injection request from washer X is greater than the allowed maximum of six (seven or greater).	Wrong input from washer number X or a programming mistake.	Rerun formula from first step. Verify the formula programming. Contact service representative if the problem persists.
4,13,23,33, 43,53,63,73, 83, 93, 103, 113	Washer X washer class is less than or equal to zero.	Wrong information stored in the ChemWatch computer for washer number X.	Note error and contact Service Representative.
5,14,24,34, 44,54,64,74, 84, 94, 104, 114	Washer X washer class is greater than the allowed maximum of four.	Wrong information stored in the ChemWatch computer for washer number X.	Note error and contact Service Representative.
6,15,25,35, 45,55,65,75, 85, 95, 105, 115	Washer X requested an injection without selecting a formula first. Washer WILL NOT get chemical!	Wrong input from washer number X or a programming error.	Rerun formula from first step. Verify the formula programming. Contact service representative if the problem persists.

<b>ERROR NUMBER</b>	<b>DESCRIPTION OF ERROR</b>	<b>CAUSE OF ERROR</b>	<b>SOLUTION OF ERROR</b>
7	The maximum allowed injection is set less than or equal to zero.	Wrong information stored in the ChemWatch computer.	Note error and contact Service Representative.
123	Ultrax CPU battery is low N/A on the Beckhoff unit	Major Error.	Note error and contact Service Representative.
136	The current washer number being pumped to has a value less than or equal to zero.	Wrong information stored in the ChemWatch computer.	Note error and contact Service Representative.
138	The offset used to search for chemical quantity information is less than zero.	Wrong information stored in the ChemWatch computer.	Note error and contact Service Representative.
139	The quantity being pumped is less than zero (negative)	Wrong information stored in the ChemWatch computer.	Note error and contact Service Representative.
140	The chemical quantity requested exceeds the maximum limit	Wrong information stored in the ChemWatch computer.	Note error and contact Service Representative.
141	Loss of chemical flow. The flowmeter is seeing a flowrate of 0.3 gal/min or less.	A chemical drum has probably run dry, or the suction line has lost its prime. If not, there may be a problem with a valve, or the supply pump.	Verify that no chemical drums/totes have run empty. Check all suction lines, to see if any have air in them. If so, re-prime the line from the Secured Screens, and monitor the flow rate while priming. Monitor the chemical valves, and the supply pump for proper operation.
154	The flow switch is not sensing flow out to the washer number listed below.	A chemical drum may have gone dry, or a suction line may have lost its prime. There could also be a problem with a valve, the supply pump, or the flow switch.	Verify that no chemical drums have run empty, and that there is no air in any of the suction lines. If the problem persists, go into the Secured Screens, and go to the Diverter Valve Test Screen. Manually open the diverter valves, and flush water through them with the supply pump. Verify that the appropriate flow switch is sensing flow. Monitor the diverter valves, and the pump.

<b>ERROR NUMBER</b>	<b>DESCRIPTION OF ERROR</b>	<b>CAUSE OF ERROR</b>	<b>SOLUTION OF ERROR</b>
155-166	Washer X flow switch is sensing flow when chemical is being pumped to the washer number listed below.	Something is wrong with the flow switch that checks for flow to washer X. It is seeing flow when it is not supposed to.	Take the system down, and disassemble the flow switch for washer X. The spring inside has probably either broken, or slipped down around the shaft inside of the flow switch. Either replace the spring, or put it back on top of the shaft. If the flow switch is in working order check the diverter valve For washer X to insure the bellow is not broken or torn or the valve is stuck on.
169	Lost 24-volt DC power.	Either a fuse has blown, or the 120v AC to 24v DC power supply is bad.	Check the fuses at the bottom of the control cabinet. If they are all ok, measure voltage at the power supply. The blue and brown wires should be 24v DC, and there should be 120v AC across the transformer. A new power supply can be purchased at a local electrical supplier, if needed.
170	The tempered water tank is out of water.	There is a timer on the water tank. Once the water level starts to go down, the fill valve will open X seconds later. If the tank is not full in X seconds, the system will alarm.	The error most likely occurred because the water pressure dropped, for whatever reason. If the tank is completely empty however, there is a possibility with either the fill valve or the float is malfunctioning. If needed, the tank can be manually refilled with a hose, but only as a last resort.
175	PLC incremented more than 10 times for the current injection.	Incorrect data stored in the reporting computer.	Note the error, and contact Service Representative.
211 Thru 222	Washer X was started with an invalid load weight. "The washer will be held until the problem is corrected.	A load weight was not entered or there is a problem with programming.	Enter the load weigh and clear the error or check programming.

**Ultrax 16 Liquid Feed System**  
**>Listing of PLC Inputs & Outputs<**

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<b>Card #</b>	<b>Part #</b>	<b>Description</b>	<b>Connections</b>
1	EK1100	Ether Cat Coupler	
2	EL1512	2 Ch High Spd Cntr	Flow meter
3	EL1809	Input Card 16 ch	1 - 8 Washer 1 9 - 16 Washer 2
4	EL1809	Input Card 16 ch	1 - 8 Washer 3 9 - 16 Washer 4
5	EL1809	Input Card 16 ch	1 - 8 Washer 5 9 - 16 Washer 6
6	EL1809	Input Card 16 ch	1 - 8 Washer 7 9 - 16 Washer 8
7	EL1809	Input Card 16 ch	1 - 8 Washer 9 9 - 16 Washer 10
8	EL1809	Input Card 16 ch	1 - 8 Washer 11 9 - 16 Washer 12
9	EL1809	Input Card 16 ch	1 - 8 Washer 13 9 - 16 Washer 14
10	EL1809	Input Card 16 ch	1 - 8 Washer 15 9 - 16 Washer 16
11	EL1809	Input Card 16 ch	Washer 1 - 16 Flow Switch
12	EL1809	Input Card 16 ch	1 Tank Low Lvl 2 Tank High Lvl 3 24 VDC Check 4 Aux Pump
13	EL9410	E-Bus Power Supply	
14	EL2809	Output Card 16 ch	Washer 1 - 16 Washer Hold
15	EL2809	Output Card 16 ch	Chemical 1 - 16
16	EL2809	Output Card 16 ch	Washer 1 - 16 Diverter Valve
17	EL2809	Output Card 16 ch	Washer 1 - 16 Flush Valve
18	EL2809	Output Card 16 ch	1 Pump 2 Aux Pump 1 3 Aux Pump 2 6 Drain Valve 7 Calib Solenoid 8 Flsh Solenoid
19	EL2624	Relay Output Card	1 Horn Output 2 Tank Fill 3 DD Pump 4 Flush Motor

**Ultrax 12 Liquid Feed System**  
**>Listing of PLC Inputs & Outputs<**

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<b>Card #</b>	<b>Part #</b>	<b>Description</b>	<b>Connections</b>
1	EK1100	EtherCat Coupler	
2	EL1512	2 Ch High Spd Cntr	Flowmeter
3	EL1809	Input Card 16 ch	1 - 8 Washer 1 9 - 16 Washer 2
4	EL1809	Input Card 16 ch	1 - 8 Washer 3 9 - 16 Washer 4
5	EL1809	Input Card 16 ch	1 - 8 Washer 5 9 - 16 Washer 6
6	EL1809	Input Card 16 ch	1 - 8 Washer 7 9 - 16 Washer 8
7	EL1809	Input Card 16 ch	1 - 8 Washer 9 9 - 16 Washer 10
8	EL1809	Input Card 16 ch	1 - 8 Washer 11 9 - 16 Washer 12
9	EL1809	Input Card 16 ch	1 - 16 Flow Sw.
10	EL1809	Input Card 16 ch	1 Tank Low Lvl 2 Tank High Lvl 3 24 VDC Check 4 Pump OverLoad 5 E-Stop
11	EL9410	E-Bus Power Supply	
12	EL2809	Output Card 16 ch	Washer 1 - 16 Washer Hold
13	EL2809	Output Card 16 ch	Chemical 1 - 16
14	EL2809	Output Card 16 ch	Washer 1 - 16 Diverter Valve
15	EL2809	Output Card 16 ch	Washer 1 - 16 Flush Valve
16	EL2809	Output Card 16 ch	1 Pump 2 Aux Pump 1 3 Aux Pump 2 6 Drain Valve 7 Calib Solenoid 8 Flsh Solenoid
17	EL2624	Relay Output Card	1 Horn Output 2 Tank Fill 3 DD Pump 4 Flush Motor