



Proficiency iFIX 6.5

Sample System



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iFIX High Performance HMI Sample System

If you are a Systems Integrator or end customer, you can use this Sample System to jump start your own application development. If you are a GE Digital Partner or System Integrator, you can use this Sample System to demonstrate the capabilities of iFIX.

High Performance HMI is an ISA 101 standard where the HMI screens are simple and uncluttered, and immediately recognizable. This allows abnormal conditions to stand-out from normal operation, providing appropriate and timely information for the Operator to have confidence in the correct action to take.

Installing the Sample System will add the iFIX Sample System icon on your desktop, which will launch a custom SCU file. You can also launch the Sample System from the iFIX Start-up menu.

NOTE: When configuring a new iFIX system with Configuration Hub, and you want to use the Sample System, make sure you start iFIX first before starting the Sample System.

All of the High Performance Dynamos created for the Sample System are installed by default in the Dynamo Sets folder, and you can use them in your own applications. As you explore these new visual elements, you will find that many Dynamos are pre-populated with tag and field references so that you'll know how to update them with the appropriate fields. You can use actual tag and field names, or use tag group or model symbol references for picture replacement. The new Dynamo Sets include:

- Alarming
- L1_Buttons
- L1_Gauges
- L1_Pumps
- L1_Valves
- L2_Pumps
- L2_Valves
- MomentaryPB
- PBC_Reset_Button
- PBC_Review
- PBCAlarms
- PBCAlarmSetPointEntry
- PBCButtons
- PBCDataHolds
- PBCGauges
- PBCInstruments
- PBCToggles
- RMOW_GaugesX
- RMOW-HP
- Sparklines
- Waterloo

Running the Sample System

To start the Sample System, click on the iFIX Sample System icon on your desktop, or in the iFIX Start Menu. This launches the Sample System as its own iFIX Project.

NOTE: When configuring a new iFIX system with Configuration Hub, and you want to use the Sample System, make sure you start iFIX first before starting the Sample System.

The opening picture is named Vertical.grf; this picture provides the ability to select the specific sample system you are interested in. Click on either Juice Plant or Water Plant to start that vertical. The first time you click on either plant after starting iFIX will start the operation for that plant.

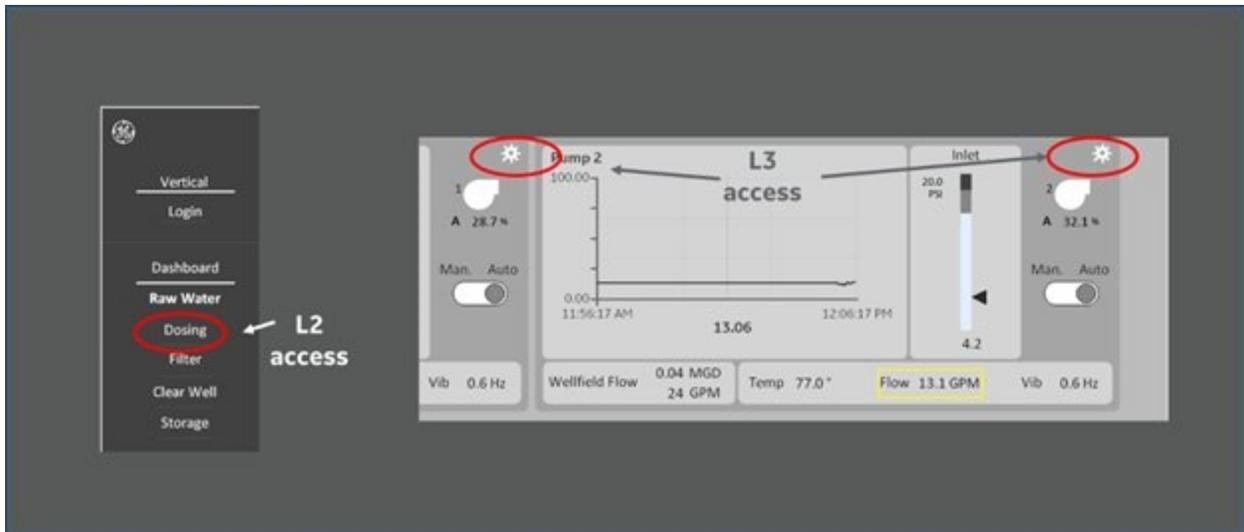


Initial View

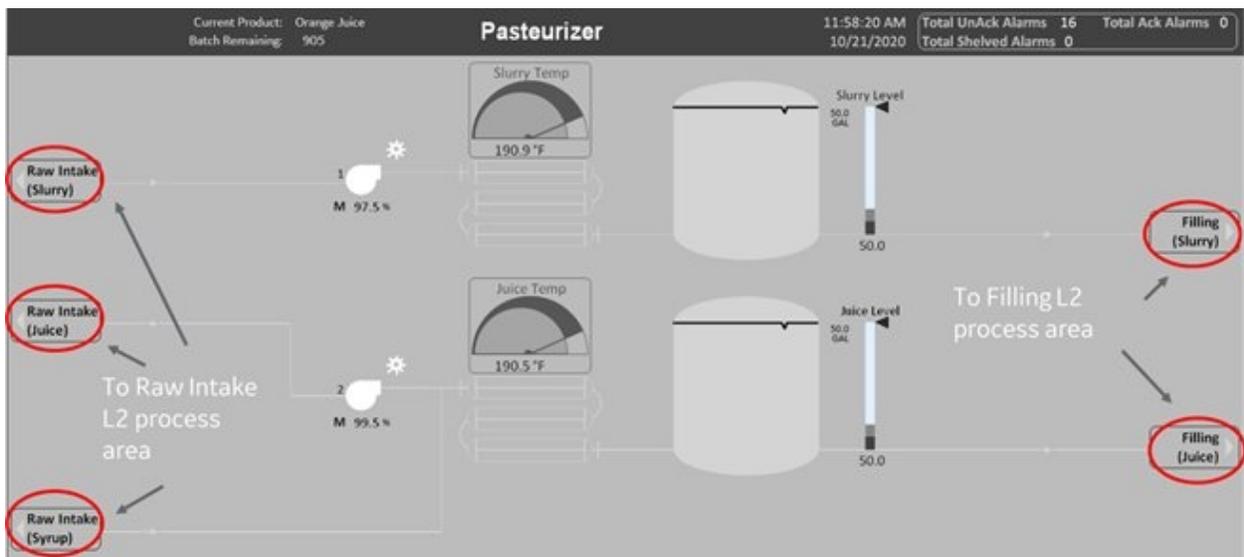
The initial view for either plant is the Level I (L1) dashboard for that plant. To see the other plant, click on Vertical in the top left Navigation bar to go back to option screen

The Sample System was designed to be linear. In that regard, all devices are dependent on the device that is preceding it. Visit the specific description of each Vertical sample application to view the specific features used in that plant and explore devices.

To access the Level II (L2) screen of each process area, you can either use the Navigation bar on the left or click on the process area. Clicking on the gear Dynamo in the top right corner of each component in L2 (as shown in the following figure) will open the appropriate Level III (L3) Popup screen.



Additional navigation is available in the Juice Plant to move between L2 screens by clicking on the process area immediately before or after the area you are currently viewing. See the following figure for an example.



Sample System UI Overview

Top Title Bar

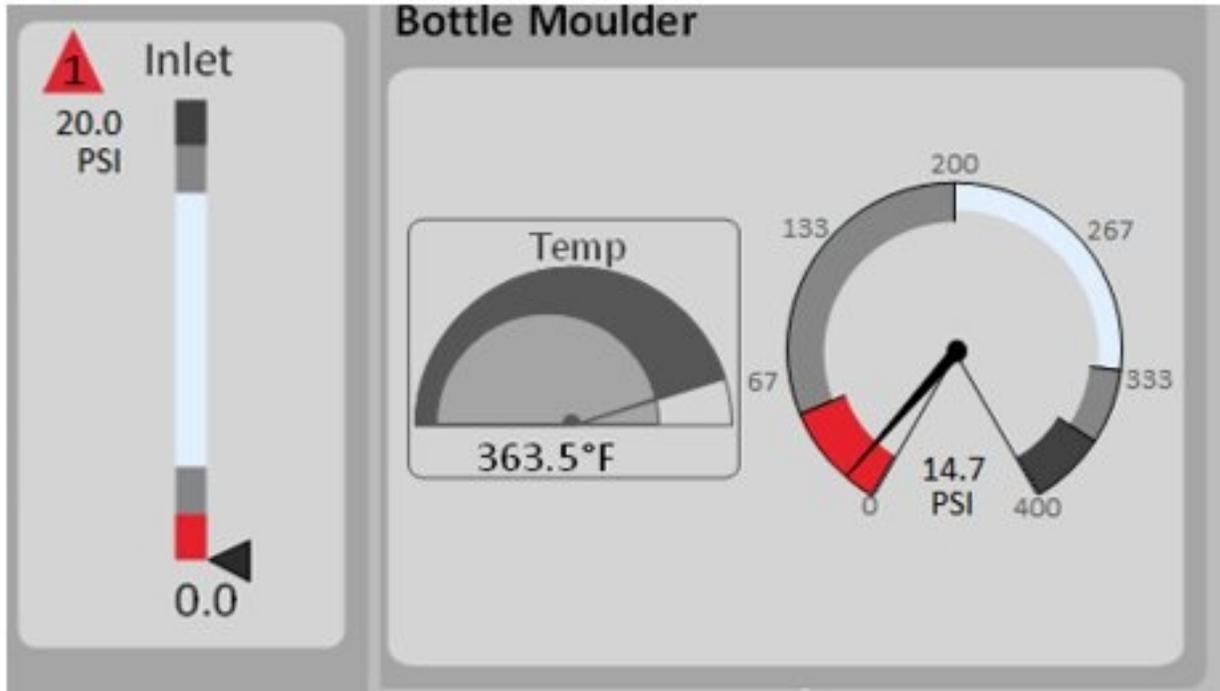
At the top of each screen you see the top title bar, that features the logo to the far left, the title of the process area you are viewing, and the alarm summary information. This alarm summary information is specific to the plant you are viewing and includes the following counters for informational purposes:

Total Unack Alarms = Total Unacknowledged Active Alarms
 Total Ack Alarms = Total Acknowledged Active Alarms
 Total Shelved Alarms = Total Shelved Active Alarms

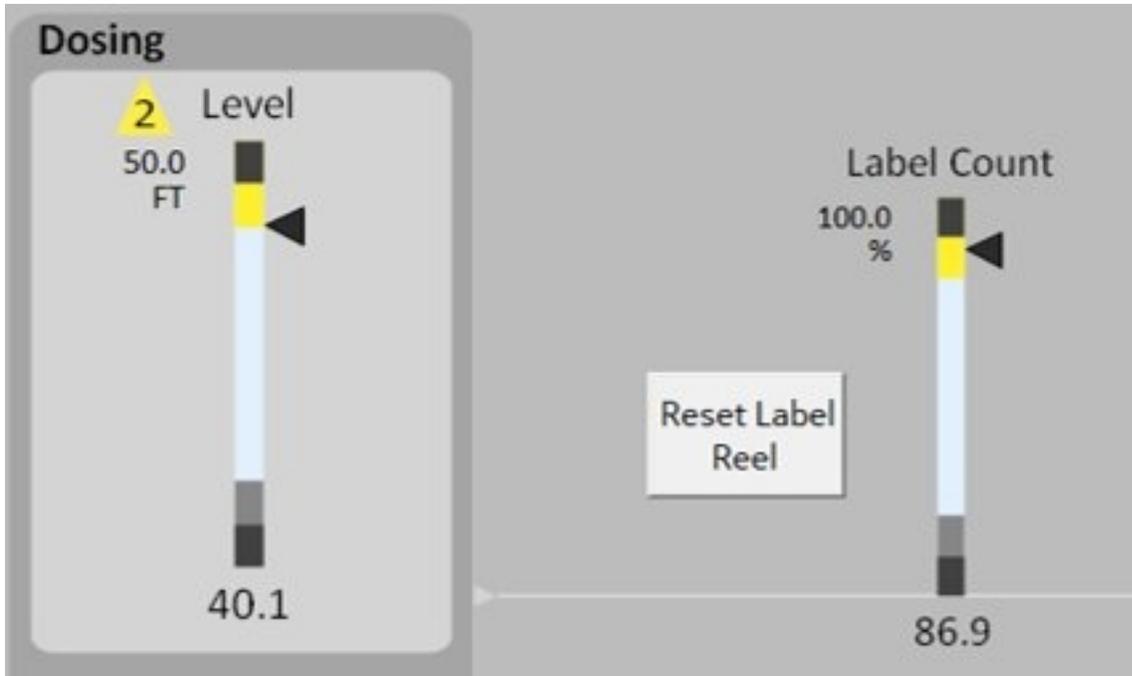
Alarm Status

Alarm status is dictated by the settings in the tag database. In the High Performance HMI screens, the eye is drawn immediate to abnormal conditions through the introduction of warmer colors, like red and yellow, along with other information to help the operator take quick corrective action:

Lo Lo or Hi Hi alarms: text is red in the alarm summary grid, show as red on the vertical and dial gauges, and may have a red triangle with a "1" in it. See the following figure for an example.



Lo or Hi alarms: text is yellow in the alarm summary grid, show as yellow on the vertical gauges, and may have a yellow triangle with a "2" in it. See the following figure for an example.



Normal conditions or when the values for a tag are operating between lo and hi alarm limits (normal operating range and OK status) are gray scale so as not to draw the eye. See the following figure for an example.

Filter						
Current Alarms						
Ack	Time In	Status	Tagname	Value	Description	
	17:16:41:529	LOLD	FB_BOTTLES_UNDERDSE	15	Bottle Moulder - Pressure	
	17:16:41:529	OK	FB_PASTEURIZER_JUICE_LEVEL	50	Pasteurizer Juice - Level	
	17:16:41:529	HI	FB_ORANGE_JUICE_LEVEL	87	Packaging - Label Count	
	17:16:41:529	OK	FB_ORANGE_JUICE	37	Raw Intake - Orange Juice Level	
	17:16:41:529	OK	FB_PASTEURIZER_SLURRY_LEVEL	50	Pasteurizer Slurry - Level	
	17:16:41:529	OK	FB_SYRUP	26	Raw Intake - Simple Syrup Level	
	17:16:41:529	OK	FB_RAW_PUMP_OOS	IN SERVICE	Raw Intake Pump - Service Status	
	17:16:41:529	OK	FB_PASTEURIZER_PUMP_OOS	IN SERVICE	Raw Intake Pump - Service Status	
	17:16:41:529	OK	FB_PASTEURIZER_PUMPS_OOS	IN SERVICE	Raw Intake Pump - Service Status	
	17:16:41:529	OK	FB_SUGAR	79	Raw Intake - Sugar Level	
	17:16:41:529	OK	FB_PACKING_TEMP	208	Packaging - Shooting Temp	
	17:16:41:529	OK	FB_ORANGE_SLURRY	56	Raw Intake - Orange Slurry Level	
	17:16:41:529	OK	FB_FILLING_SLURRY_TEMP	180	Filling Slurry - Temp	
	17:16:41:529	OK	FB_FILLING_JUICE_TEMP	181	Filling Juice - Temp	
	17:16:41:529	OK	FB_CHERRY_SLURRY	41	Raw Intake - Cherry Slurry Level	
	17:16:41:529	OK	FB_CHERRY_JUICE	86	Raw Intake - Cherry Juice Level	

Total Alarms: 16 Filter: Area In "FOOD" Sort: Priority, Descending Shelved: False Run

Security and the Sample System

Security is enabled, therefore you will need to sign in, in order to complete certain tasks or to leave iFIX. The default login accounts are as follows:

- Username: admin
- Password: admin

NOTE: The admin user has Verify & Perform rights for E-Signature and the ability to change from Run to Configure mode in iFIX.

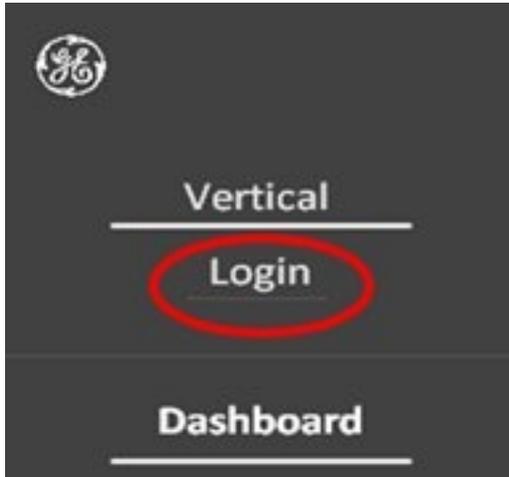
- Username: oper
- Password: oper

NOTE: The oper user has Perform Rights for E-Signature.

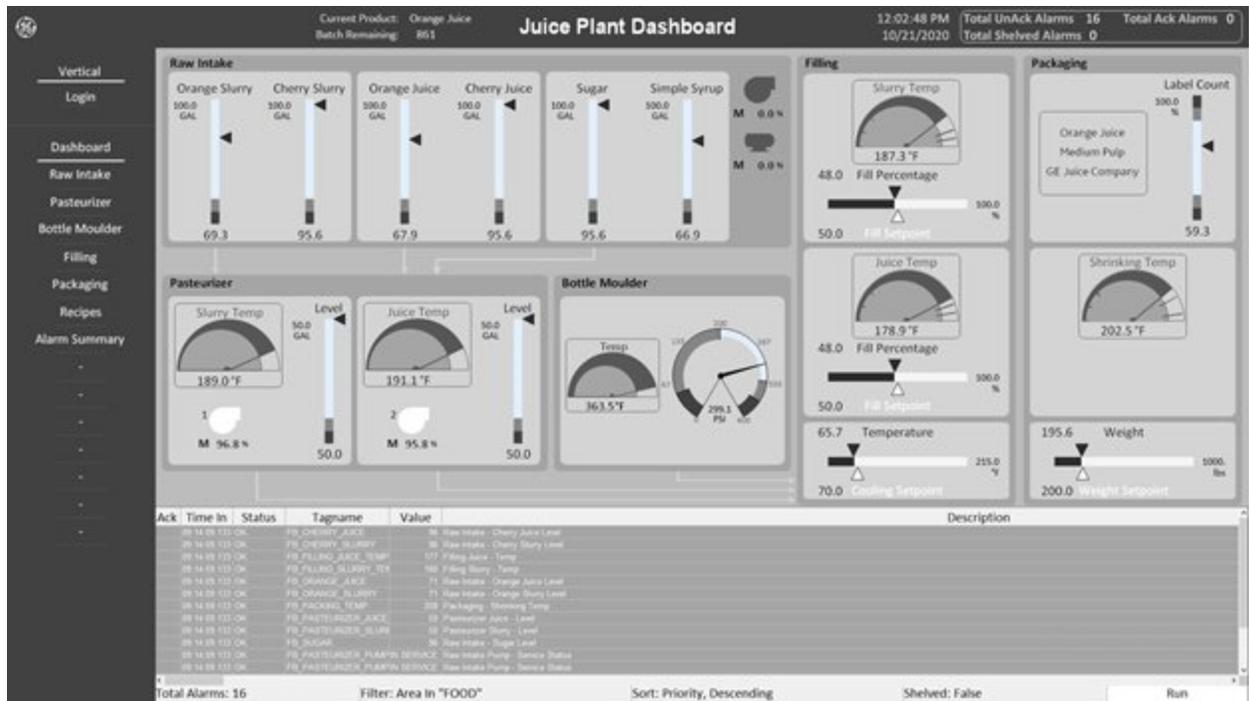
These user names are case sensitive. The login buttons are located on the navigation bar in both plants, as well as on the initial vertical screen.

If you need to change from Run to Configure mode, you'll need to log-out and log-in as the admin user. Click Login at the top of the left-hand Navigation bar, and use the credentials provided above.

TIP: Ctrl-W is the keyboard shortcut to toggle between Run and Configure mode in iFIX.



Juice Plant



Important Notes

The Juice Plant introduces Alarm Areas. Each of the L2 process areas will only show the alarms for that process area. To see all alarms, visit Alarm Summary.

The system may drop into a “NO PRODUCTION” state indicated at the top near the title. When this occurs, you will notice a popup indicating the L2 process area that caused the issue, and the component (for example: Raw Intake – Orange Juice Tank Critical Low Level).

When this occurs, you can navigate to that L2 process area that causes the issue and rectify the problem. Once rectified open the “Recipes” screen and redownload the recipe. Or, if you prefer, you can press the “Resume Production” button at the top of the screen, and this will attempt to remedy all issues. Be aware that this action may not immediately fix all issues and you may have to press it again.

There are 2 main things that the system does not automate in its entirety. Those two things are the Simple Syrup Tank (Raw Intake screen) and the Label Count (Packaging Screen). Ensure to keep an eye on these two items if you want to keep the system in a production state.

Raw Intake

Raw intake is the beginning of the plant. Here you will see a total of 6 tanks. Five (5) of these tanks will automatically refill on their own as this would represent a manual process. The tanks that refill themselves are: Orange Slurry, Cherry Slurry, Orange Juice, Cherry Juice, and Sugar.

The other tank, Simple Syrup, will only increase if the pump is placed into a running mode (click the gear in the top left, ensure it is “In Service” and “Start”). When doing so, the tank will begin to fill up and the pump will turn itself to “Stop” position and then off after the tank has reached 100.0 gallons.

There is a mixer on-screen that when turned on it will reduce a random amount of sugar from the sugar tank and will turn for approximately 2 minutes and then turn itself off in order to simulate a real life situation in which we would mix sugar in a pot to turn it into syrup.

All Tanks on this screen will reduce their level if the corresponding pasteurizer is running (see next screen). If the pasteurizer is running, they will begin to reduce their level and automatically refill as indicated above.

Pasteurizer

There are two different types of pasteurizers. The purpose of the pasteurizers is to bring the juice/slurry to an appropriate temperature as to kill any harmful bacteria. We can fill up the pasteurizer levels by turning on the corresponding pump. Simply start the pump to begin fill up. If you receive an error, its likely due to the “Raw Intake” tanks being at a low level. Simply head to that screen, rectify the problem, and you should be allowed to start the pumps.

From the Pasteurizer, you can see the new additional Dynamos not found in the water plant. This is the ‘half-moon gauge’ or the ‘dial gauge’. The purpose of this gauge is to give the user an idea of the limits where the gauge should fall between. On the “Dashboard” we can see there are two types of half moon gauges. Some with alarm limits and some without. This is to show that the dynamos can support both types of applications.

Bottle Moulder

In the Bottle Moulder we utilize three (3) different types of inputs. The idea is the bottler will produce bottles dependent on the selected recipe (see the recipe screen) and adjusts the pressure accordingly. We use a KPI chart to indicate temperature fluctuations and monitor the pressure using a 'speedometer' gauge. The speedometer gauge is a very useful tool as it has raised levels of alarm areas to clearly indicate changes in level as well as numbers surrounding the outside to give the operator an idea as to where the limits are located. In short, this is simply the vertical gauge being bent inward on itself.

Filling

Here is where a lot of information is held. Firstly, there is a PID style display as we can see three (3) sets of bottles. These bottles will adjust height and color according to the loaded recipe (see recipe screen). Secondly, we can see the current temperatures of the slurry/juice as well as the desired setpoints and deliverables associated to that machine and recipe. Lastly, there is a temperature as the bottles are sprayed with a cooling mist to bring their temperature down to an appropriate consumption level.

In the top left we can see the progress of our current production and how many we have made, and how many batches are left to be made.

Packaging

Here we have the labeler and shrink wrap machine. The labeler is one of the key machines in the process as if the labeler runs out of labels the process will be forced to stop. This is normally a manual process so to represent that we added a button in which the user can reset the label reel. The labels text is set from the recipe screen and can be displayed here below the labeler to indicate what is currently being printed.

The shrink wrap is just a heated machine in which the packaging material is heated to shrink and contain the product.

Lastly, we have a weight station where we weigh the product to ensure all bottles were filled properly. This is the last step of the process.

Recipes

This is the heart of the process. This is a custom VBA form that prompts the user for all the various setpoints necessary for the process to run. The system does have four (4) predesigned recipes for the different levels of pulp, although the user can manually type in a value. The system will adjust the slurry and juice if a user is to change either (i.e. if user types in 30 for slurry, the system will change the juice to 70 as they must equal 100).

The user is to specify the bottle size (12oz, Liter, Gallon), Flavor (Orange, Cherry) and Batch Size (0 – 2000). The user can also manipulate the label that will be printed. The label and the recipe used are persistent until changed, or iFIX is stopped and re-started, then it will restart on the default setting.

Once the user is satisfied with the recipe, they have created they will have to press the "Download Recipe" button. You will be prompted to sign in as this is going to showcase the E-Signature capabilities of iFIX. The user is required to provide a comment and then sign in (see the user name and password section above). Likewise, if the user would like to stop production then they can open this screen and press

the “Stop Production” button. In doing so they will be prompted for dual signatures. This time they will need to be performed by both the operator and supervisor (admin).

Alarm Summary

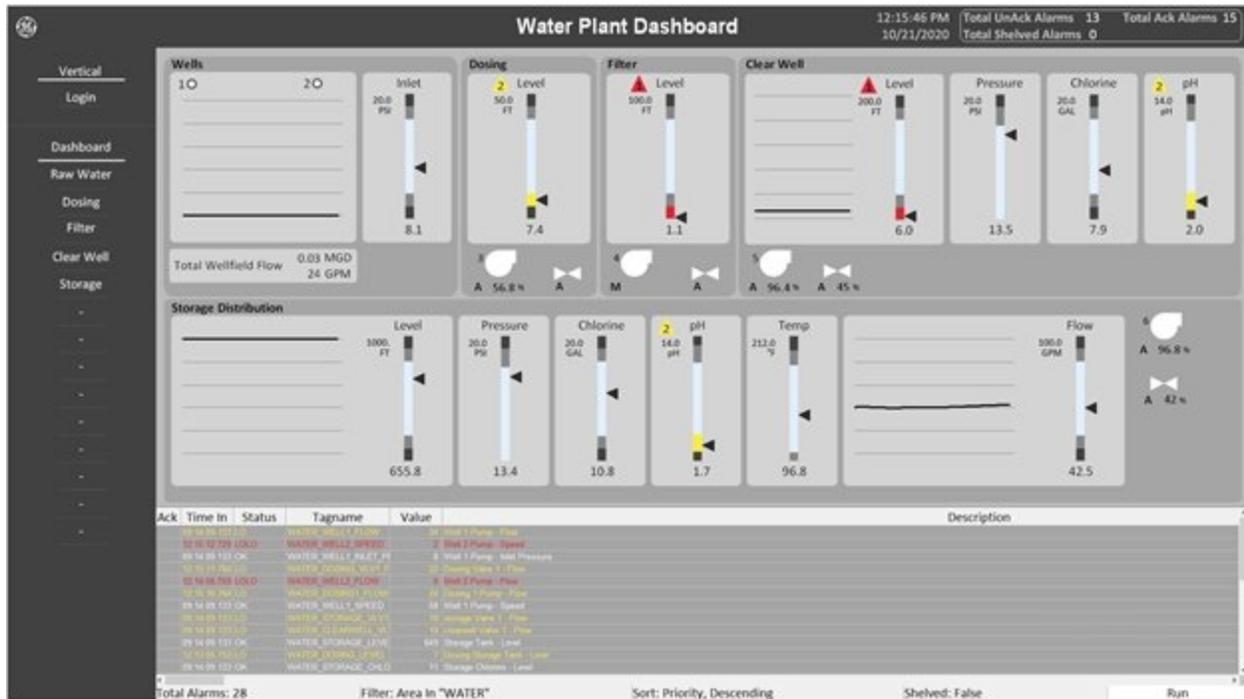
Here we can see an alarm summary of the entire Juice Plant, including all alarms and their current status. When an alarm is acknowledged and no longer in an alarm state it will automatically clear itself from the list. If the user has elevated privileges (admin) they will be able to shelve certain alarms (not all alarms may be shelveable).

If the user shelves an alarm they will be prompted with a popup stating how long to shelve it for with five (5) presets (2, 4, 6, 8, 10 minutes) or they user can pick a custom time (1 – 10 minutes).

Once they shelve the alarm it will be moved to the lower section and wait there for the remaining duration as indicated in the second (2nd) column.

In the top left of the screen there is a filter option. Here is another custom VBA form in which the user can select to filter out specific areas and even type in a custom one if they would prefer. For instance, you can type in “Water” and you will be able to see alarms from the water plant even though it is a separate Alarm Area.

Water Plant



Raw Water

Raw water is the beginning of the plant and one of the best places to showcase automation. When iFIX starts, both pumps are placed into Automatic mode and the ‘Total Flow Setpoint’ is set at 25 GPM. Bear in

mind that the pumps are only able to achieve approximately 44GPM each, so the setpoint should always be set in the ranges of 10-30 per pump running.

To see basic process control, navigate to the L3 control screen and place one of the pumps into Manual mode. When placed in Auto mode, the pump will attempt to load balance and over time they will match each other's speed. However, if you place the opposing pump in Manual, as you ramp the speed of the pump up, the other pump's speed will retreat so that the flow is maintained. The pumps in this system, when in automatic mode, will not turn off; they will simply reduce to an idle situation and stay as low as possible.

You may adjust the setpoints on the pumps and observe how the vertical bar graphs will adjust to the changes you are making.

Dosing

Dosing consists of a modulating pump and non-modulating valve. Here is where some adverse effects may be observed. Due to how the simulation logic is written, it is designed to be as realistic as possible. The pump, when placed into automatic mode, will try to drive itself to match the output of the Raw Water screen. You will see the 'Total Flow Setpoint' field, however, this will not be met as it will try to achieve the flow set by the previous device.

The purpose of showing the field is if the entire plant, or most of it, is placed into automatic mode, they should all drive after that desired setpoint. However, if you are placing the previous device in manual and forcing the device to speed up (in this case, Raw Water total output) then the dosing pump will attempt to match it. Logically, this makes sense as the water comes into the plant. We need to increase the chemicals being added so that the system produces the same quality of water.

The non-modulating valve also may behave differently, in the regard that the flow is directly proportional to that of the pump. Obviously, if the pump isn't running there shouldn't be any flow going across the valve. Therefore, if you open the valve, the flow shouldn't change until the pump's flow begins to increase.

Filter

The Filter screen consists of a non-modulating pump and valve. Here the pump and valve do not have automatic mode and will simply drive to full force regardless of all other features. This screen is useful in showing that the supplied Dynamos support a wide range of functionality and situations.

Clear Well

This is the first time we observe a modulating valve. The pump here will behave just like that as observed in the Dosing section, in that it will chase the filter flow in automatic mode.

The valve, however, has the capability of being placed in automatic mode. When doing so the valve will limit or allow more water to pass through to achieve the desired flow rate. This will always be to match the plant flow. For instance since the filter is running at an 'all or nothing' mentality due to it being non-modulating, we need some means of limiting the flow.

If the Clearwell pump is placed into automatic mode, it will speed up to keep with the flow coming out of the filter. The valve will observe this and begin to restrict its open percentage in order to drop the flow so to match that of the 'Total Flow Setpoint'.

Storage Distribution

This will behave identically to the Clearwell screen. Here it will drive off of Clearwell, but everything else will be very similar to what is found in the Clearwell L2 process screen.