396-001770 SureFire QuickDraw User Guide

11.19.2018

Instructions on how to operate the SureFire QuickDraw Spray Tender system.
Contains screenshots and written explanations and instructions.

Table of Contents

System Overview

The QuickDraw spray tender system makes the process of tendering your sprayer less time-consuming, more accurate, and more consistent, and provides a historical record of each batch. The system allows the batching of either 4 or 6 bulk products, depending on which model was purchased, plus 5 manual products. The QuickDraw controller along with the accompanying iPad app work together to simplify the management of your sprayer batches. Configuration of recipes can be handled in either the QuickDraw controller or on the QuickDraw iPad app. The QuickDraw app is the preferred method for recipe configuration due to its portable nature and ease of use. The QuickDraw app communicates with the QuickDraw controller via WIFI. The QuickDraw controller takes these recipes and automatically handles the calculations and measurements necessary to complete a batch that ends up in the sprayer. Once a batch is completed, the information for that batch is logged in the controller. The QuickDraw app can then be used to load the historical information out of the controller. This historical data can then be sent by email as a csv file that can be opened with Excel or as a PDF report.

The QuickDraw manages bulk liquid products automatically. These are products stored in bulk containers or shuttles. The QuickDraw also calculates the correct amount of manual measured products in a batch. Manual measured products include small-package liquids, dry flowables, and powders. Each recipe can include up to 5 manual products.

Mass Meter Description

The QuickDraw takes advantage of mass meter technology to provide accuracy to the spray tendering system. The mass meter in the QuickDraw uses the Coriolis Effect to determine the mass and density of the product running through it. This can then be converted to volume and used for batching a specific volume amount. Other flowmeter technologies have the disadvantage of being affected by density and/or temperature changes whereas the mass meter accuracy and repeatability is not affected by changes in viscosity due to temperature and changes in density due to product differences. In a batching system like the QuickDraw where product is diluted immediately by loading directly into a carrier stream, calibration is not feasible. The mass meter allows the QuickDraw to be accurate from product to product and from run to run and from morning to afternoon without recalibration.

QuickDraw and iPad

The QuickDraw is designed to be used with an iPad. Creating and editing recipes, managing farms, fields, and products, configuring totes, and setting up batches can all be done on the QuickDraw controller or the QuickDraw iPad App. Batch history must be downloaded to the iPad to be accessible outside the controller. If an iPad is temporarily unavailable, the QuickDraw controller is fully functional without the iPad.

Venturi and Pump Suction Configuration

The QuickDraw is available in two configurations, Venturi Suction and Pump Suction. In **Venturi Suction** the transfer pump is located on the QuickDraw inlet. It pushes water across a venturi to create suction which draws chemical products through the mass meter and into the batch. In a **Pump Suction** setup, the transfer pump is located on the Quick Draw outlet. Suction from the pump is utilized to draw chemical products through the mass meter and into the batch.

The QuickDraw should only be used with a wet-seal pump.

Valve #1/Tote #1 is a larger valve than the other product valves and should be connected to the highest volume product or to the thickest, hardest-flowing chemical. Valve #6 / Tote #6 can also be set up with a large valve option.

It is essential before each batch is run to verify that the recipe being used has the chemicals matched correctly with the valves they are connected to, as shown on the QuickDraw Run Screen.

Batches less than 100 gallons may not have time to dispense all the chemicals desired before the Total Carrier amount has been pumped. The carrier is pumped at approximately 40 gallons per minute while the products are being dispensed through the Venturi system. Also, batches that have 35% or more of the batch volume from the chemical products may not complete. The message *Batch Unlikely to Complete, >65% of the Total Batch needs to be carrier in order to guarantee batch success* will display if such a batch is set up.

Air Leaks The QuickDraw will not work properly if there are any air leaks in the plumbing on the suction side (from totes or shuttles to the pump). Air leaks will create pump priming problems and will cause the flowmeters to behave erratically. It is essential that all hoses and connections be airtight.

QuickDraw Controller

Menu Screen
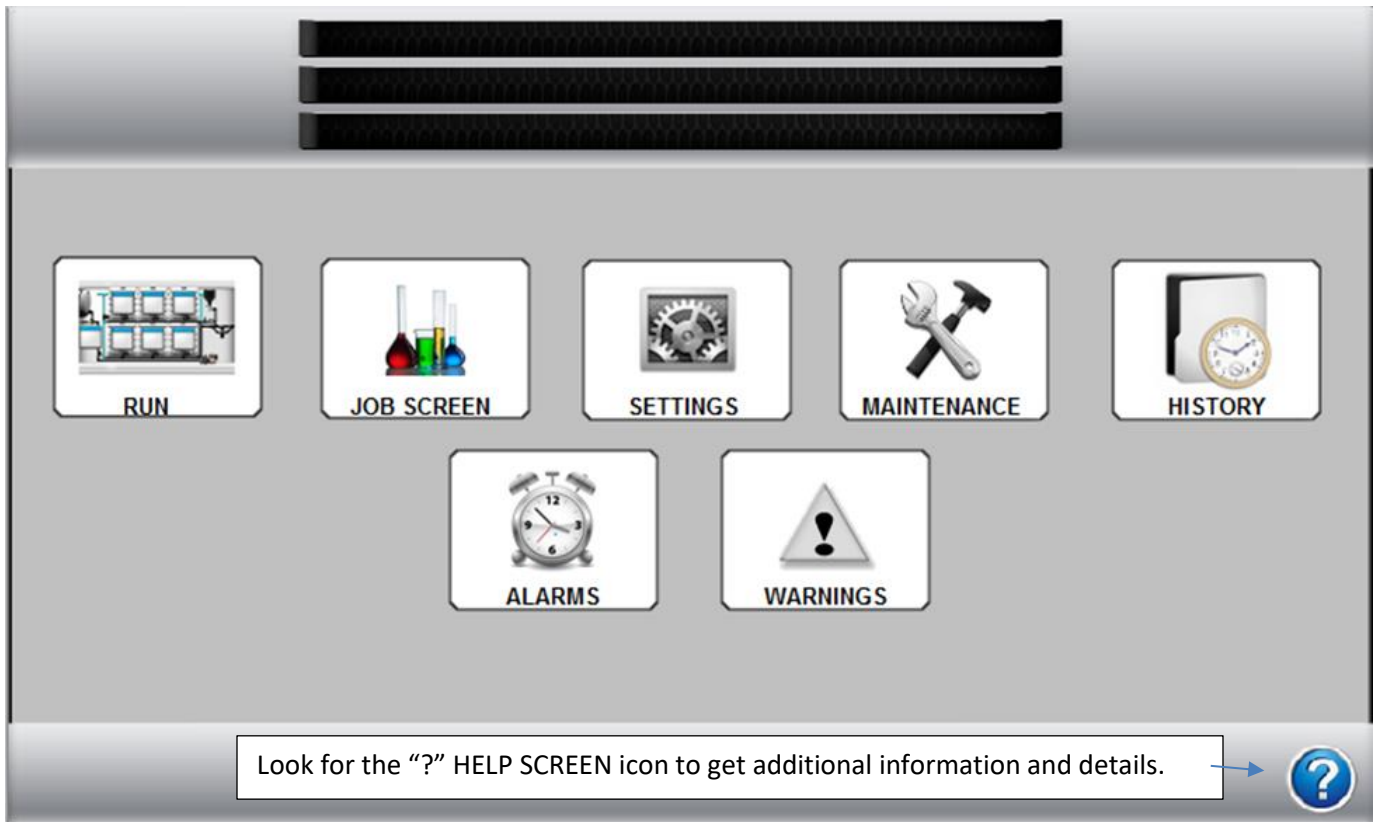
When the Power is turned on, QuickDraw defaults to the RUN SCREEN. Navigate to the MENU SCREEN by pressing "MENU SCREEN" in the bottom right corner.

Menu Screen:

This screen allows access to the different sections of the controller.

RUN: Gives access to the main operational screen that shows live data during batch operation. All the operational and data management screens are available from here.

JOB SCREEN: Shows the job screen that is used to set up the current job that will be batched out. From here a new recipe can be created or an existing recipe can be loaded and edited.

SETTINGS: Global settings to the controller are changed here.

MAINTENANCE : This screen allows access to maintenance items that rarely need accessed.

HISTORY: Allows access to the historical log stored in the controller.

ALARMS: Alarms will prevent a batch from running. Press the **ALARMS** button to go the **ACTIVE ALARMS** screen to resolve the issue to continue running a batch.

WARNINGS: A batch will continue running with Warnings, but there may be a problem with completing the batch as desired. Press **WARNINGS** to see **ACTIVE WARNINGS** to resolve any issues.

Alarms and Warnings

ALARMS will prevent a batch from running and must be resolved before continuing.

WARNINGS will not stop a batch but should be resolved to prevent a problem.

Get Started

1. Download the QuickDraw iPad app. See pages 36-38. Check for updates if you have the app.
2. Open the QuickDraw iPad app. Start with **Operations.** See page 42. Set up **Farms** and **Fields**. Farms and Fields can be added/edited later with the QuickDraw app or on the QuickDraw controller.
3. On the **Operations** page, press **Add/Edit Product,** then press **Find Chem**. Initially, there are no products on the iPad. Tap on **Create New** and enter the Name of the chemical in the top area, enter EPA ID and Common Name if desired. Select the Default Rate Units (this can be changed later for any given use of this chemical). Press **Save** when finished.
4. In Operations, set up **Default Email** for sending exported information or batch histories.
5. Create a **new recipe** and **set up totes**. *(Note: If the same set of chemicals will be regularly used, a base recipe can be set up to store this configuration. This base recipe can use the QuickDraw Duplicate Recipe feature to make variations of the recipe using this same set of chemicals.)* **RECIPES: New** See pages 40 and 41. Put in the **Recipe Name and Carrier Name**. **Total Gallons, App Rate, Carrier Rate, Calculation Mode, Total Acres, and Carrier Preload** can be set now or later. Press on the **blue box** at the top of each tote to set up the tote with the correct product. Be sure the product is associated with the correct Tote Number. *Tote 1/Valve 1 is a larger valve and should be used with larger volume or harder flowing products.* Press **Find Chem**, select the chemical, then press **Load to Tote.** Set the **Rate** and Mixing **Order**. **Delay** is not needed. **Prod Rinse** on the Job Screen will set a rinse cycle between products being added. Add Manual Products (non-bulk, powder, or low volume amounts) on the next screen. Include Manual Products in the Order. **Save** when finished.
6. Set up the WIFI connection between the iPad and the QuickDraw controller. The controller must be turned ON to do this. On the iPad, go to **Settings—WIFI—Choose a Network.** Default Network is *QuickDraw*, Default Password is *SureFire*. These can be changed on the Settings page of QD controller.
7. **Sync** the iPad and controller. On the iPad, press **Operations**. Press **Sync Farms, Sync Fields, Sync Products, and Sync Recipes** (these need to be done one at a time).

Running a Batch

1. Turn on the QuickDraw controller.
2. Open the **Job Screen**. Select the **Farm, Field,** and **Recipe.** Enter the **Temp, Wind Direction and Speed.** Enter **Preload Volume** if you want to put some carrier in the tank first.
3. Verify **Product Names and Tote #s**. Be sure that the products are matched with the correct Tote/Valve numbers.
4. Verify correct **Rates.** Rates can be changed on this screen to be effective for this batch.
5. Verify the **Order** that products will be added. If **Order** needs to be changed, press **EDIT RECIPE. Prod Rinse** 3 seconds. **Final Rinse** should be at least 10 seconds. These are the Default and Minimum settings. Longer times may be used.
6. Verify **Calculation Mode** and Acres, Volume, and Application Rate.
7. Verify that **Prod Volume** and **Total Gallons** for each product appears reasonable for this batch and that there is enough product in each tote to complete the batch.
8. Verify that all tote valves are in correct position and that all hoses are connected properly.
9. When all is ready on the **Job Screen**, press **RUN** to return to the RUN SCREEN.
10. Start the pump when ready to run the batch, and then, on the **RUN SCREEN**, press **START.**

Run Screen
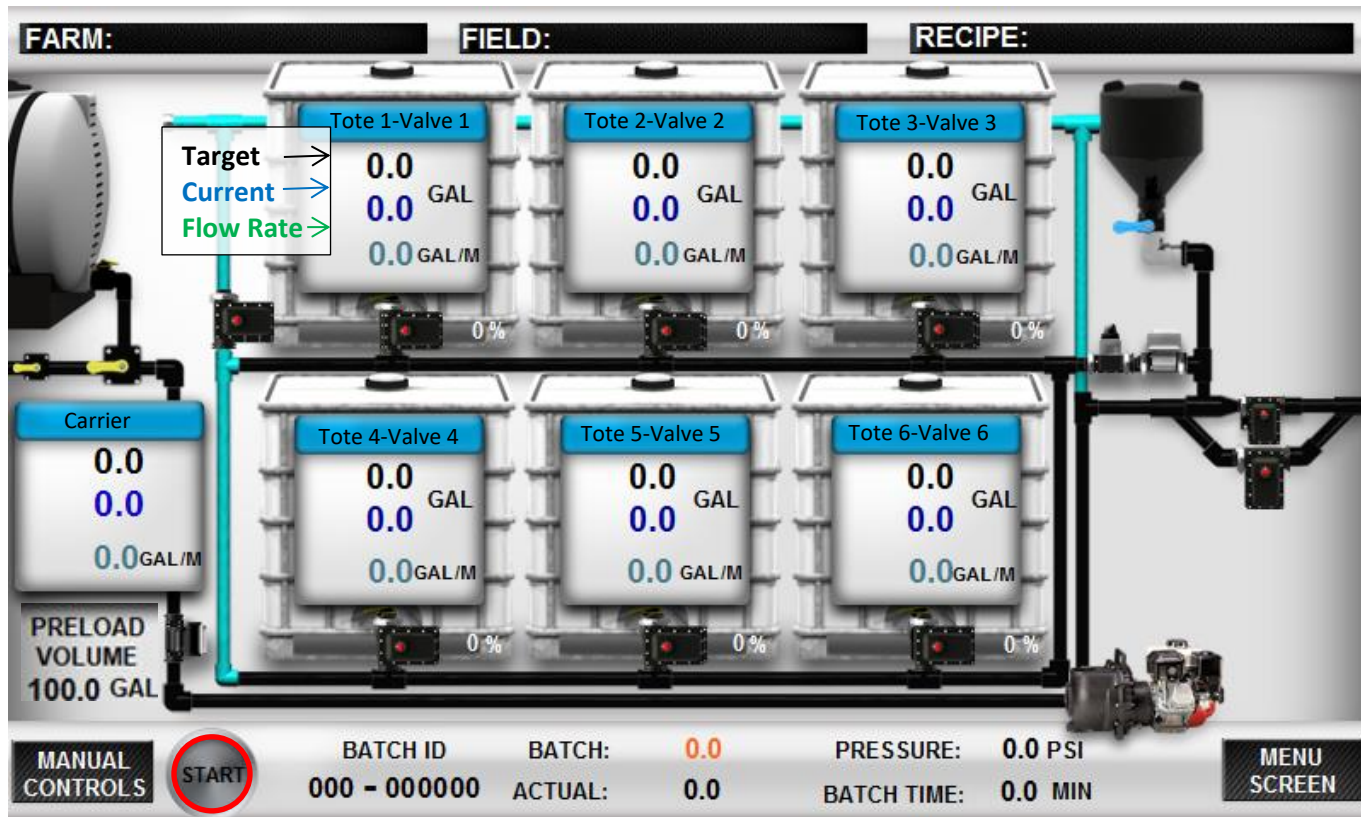
RUN SCREEN:

This screen contains all the real-time data that occurs during operation. Each box on the screen represents one of the shuttles or totes that can be hooked up to the system. Each shuttle also corresponds with a specific product valve on the QuickDraw. The numbering of the totes on the screen starts in the top left and ends in the lower right tote on the screen. The corresponding valves on the side of the QuickDraw are 1 to 6 starting from the large valve at the bottom and counting up from there. The seventh tote by itself to the left shows the carrier flow information. **Press on a tote** to bring up the *TOTE SETUP SCREEN.*

Each tote above has 3 lines of information. The **black number** in each tote contains the **target value** for this batch and is the result of the calculations on the Job Screen. The **blue number** in each tote contains the **current total value** (running total) that has been dispensed for this batch from that tote. This number will increase as the product in that tote is being dispensed. The system will switch to the next product in the sequence once the blue number equals the black number. The **green number** shows the **flow rate** of the product into the batch, so it will show how fast the product is added into the batch. *The units displayed for these three numbers are determined by the "Volume Units" selected for that product on the Recipe screens. So, your prescription or rate/acre could be in oz, but if gallons is selected for volume units, it will display in gallons here.*

The bottom of the screen contains the information about the entire batch. The **batch id** is a **unique number created for every batch** that can be used to tie this batch with other data that is being used elsewhere. Both sets of data can be correlated by using the batch id.   The **orange number** is the **calculated target total batch size** for this batch. This will be the **final batch size** that is loaded. The **black number in the bottom** that has the label **ACTUAL**: will count up as the batch is running and **the batch will complete when it reaches the target**. The pump

pressure is shown under **PRESSURE** and is a **monitor-only value** for troubleshooting but does not have any control of the process. The **BATCH TIME** displays how long the batch took to complete.

The **START** button is used to initiate a batch. Once initiated, this button changes from START to **PAUSE**. Once the batch is active, pushing the PAUSE will put the process into a paused state. The pump will continue to run but the valves will be closed. Pushing the PAUSE also causes another window to pop up that gives you the choice to **RESUME, SKIP PRODUCT,** or **TERMINATE** the batch. If the batch needs to be terminated, push the TERMINATE button. If the batch needs to continue, then push the RESUME button. (See screen below)

When alarms occur, an **ALARM RETRY** button appears on the lower right corner of the screen. The alarm also puts the process into a pause state and closes all valves and shuts off the pump if the pump supports the auto shutoff. Fix the issue, then start the pump, and push ALARM RETRY to continue the batch. The batch will pick up from where it was and finish the previously started batch. If the alarm continues to happen or you are unable to determine the issue, contact SureFire for technical support. The batch can also be terminated from the alarm state by pushing the PAUSE button, and then by pressing TERMINATE.

MANUAL CONTROLS: Press **MANUAL CONTROLS** to go to the *Manual Operation and Debugging Screen.* This is not necessary for normal operation but may provide useful information for troubleshooting.

MENU SCREEN: Press **MENU SCREEN** to return to the main menu screen.
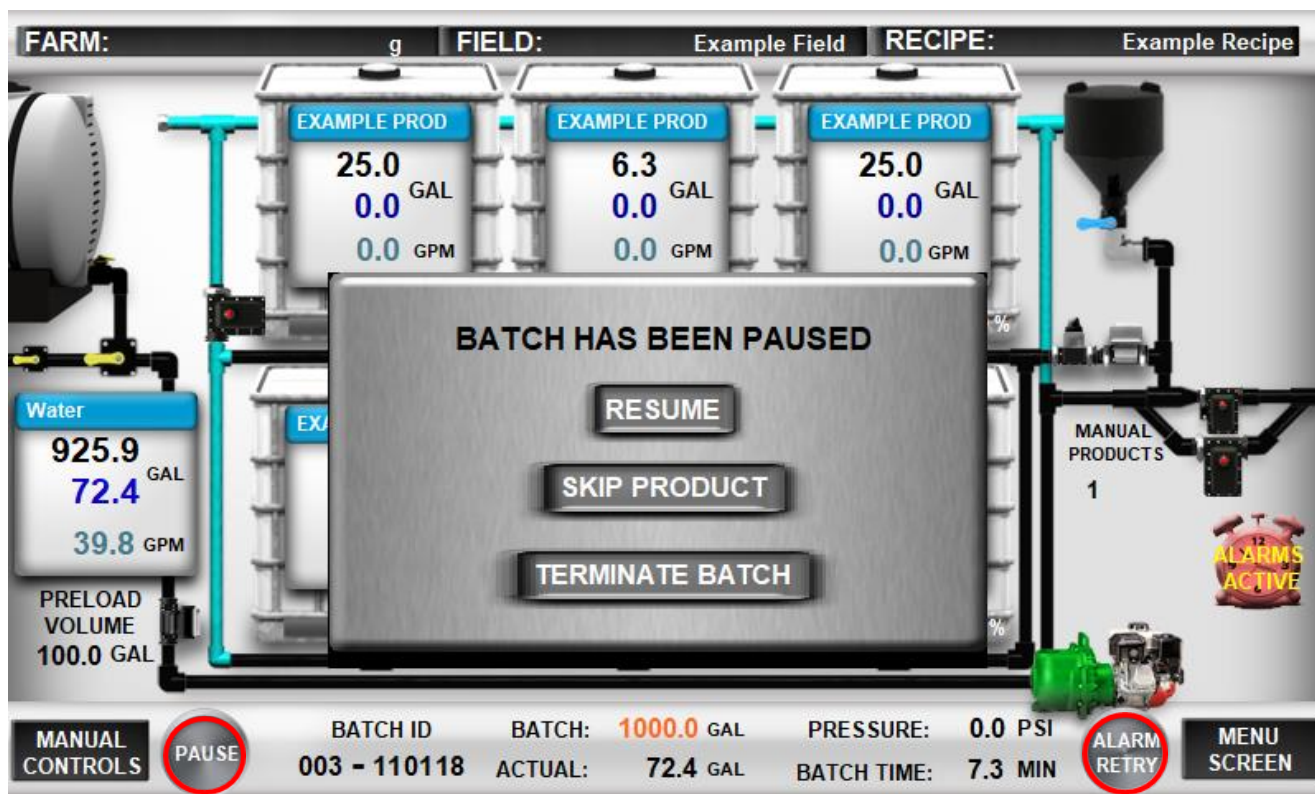
Run Page Help

Farm/Field/Recipe Header
Touch the header to change the selected Farm, Field, or Recipe

Start/Pause
This button toggles the system start or pause.

Alarm Retry
This button appears if the system has paused due to an alarm failure. Pushing the button allows the system to restart and try again. Start pump before re-trying.

Warnings & Alarms Active
Push these buttons in order to see what alarms and warnings are active. They will only be visible if there are active alarms or warnings.

Tote Values
The top number (black) represents the setpoint.
The middle number (blue) represents the actual amount batched.
The bottom number (aqua blue) displays current flow rate.

Pressure
Displays the current system pressure

Batch Time
Displays the current time elapsed for the current batch

Job Screen

PRELOAD VOLUME	FARM: g					TEMP	58.0 °F
100.0 GAL	FIELD: Example Field					WIND DIR & SPD	NE ▼ 6.0 MPH
	RECIPE: Example Recipe						

	PRODUCT NAME	RATE		ORDER	PROD VOLUME		TOTAL		
Carrier:	Water	9.3	GPA				925.9	GALLONS	PROD RINSE
Tote #1:	EXAMPLE PROD	2.00	PT/AC	5	25.0	GAL	25.0	GALLONS	3 SEC
Tote #2:	EXAMPLE PROD	8.00	OZ/AC	2	6.3	GAL	6.3	GALLONS	
Tote #3:	EXAMPLE PROD	0.25	GPA	3	25.0	GAL	25.0	GALLONS	FINAL RINSE
Tote #4:	EXAMPLE PROD	10.00	OZ/AC	4	7.8	GAL	7.8	GALLONS	
Tote #5:	NO PRODUCT	0.00	GPA	0	0.0	GAL	0.0	GALLONS	10 SEC
Tote #6:	NO PRODUCT	0.00	GPA	0	0.0	GAL	0.0	GALLONS	
Man Add #1:	EXAMPLE PROD	1.00	lbs/AC dry	1	100.0	LBS	10.0	GALLONS	SELECT RECIPE
Man Add #2:	NO PRODUCT	0.00	GPA	0	0.0	GAL	0.0	GALLONS	
Man Add #3:	NO PRODUCT	0.00	GPA	0	0.0	GAL	0.0	GALLONS	SAVE RECIPE
Man Add #4:	NO PRODUCT	0.00	GPA	0	0.0	GAL	0.0	GALLONS	
Man Add #5:	NO PRODUCT	0.00	GPA	0	0.0	GAL	0.0	GALLONS	

CALCULATION MODE	TOTAL ACRES	TOTAL VOLUME	APPLICATION RATE	Edit Recipe	Run
Area & App Rate ▼	100.0	1000.0 GAL	10.0 GPA		

The **Job Screen** is for setting up and verifying the batch to be run. This screen allows for the selection of a **Farm**, a **Field**, and a **previously saved recipe or creation of a new recipe**. The **wind speed**, **wind direction**, and **temperature** can also be entered on this screen to be logged with this batch when the batch is completed. Once a batch is completed, all the information on this screen along with product EPA Registration numbers and actual totals batched for each product are logged to a log file in the controller. This historical information can then be retrieved using the iPad QuickDraw app. Refer to the Wireless Control section of this manual.

Recipes consist of automated bulk products and manually added products. The automated bulk products are the products that are connected to the QuickDraw product valves. These products hook up directly to valves 1-4 or 1-6 depending on the QuickDraw model. The system can pull in bulk products automatically as long as the total amount required for that product for the batch is greater than 0.5 gallons on a Venturi model or 1.0 gallons on a Pump Suction model. Anything that is in powder form or less than the minimum stated above would be considered a manually added product. The process will pause when it gets to these products in the cycle and allow for the operator to use the optional *Swing Down* eductor system available from SureFire or the operator can use the inductor system on their sprayer, if available, to add these products to the batch. Once they have finished adding these products, then they tell the controller how much they actually added and tell the batch to continue to the next product (two taps on the screen will do this). *Do not delay in adding the manual products, as carrier is being pumped at 40 GPM during this time. A delay (especially on a small batch) could result in all the carrier being pumped before all the chemicals are added. If there will be a delay, **PAUSE** the batch.*

The recipe information used to create a batch is as follows.

PRELOAD VOLUME: An amount can be entered here if the operator wishes to preload an amount of the carrier before any product is loaded. A warning will be generated if the preload amount is too large for the batch size.

PRODUCT NAME: The name of the product used in the recipe.

RATE: The application rate/acre of each product. The units are set on the Edit Recipe Screen under Volume Units. *The Rate can be changed here for a particular batch.*

ORDER: This is the order that the products get loaded (as determined by the operator). Products are set up in the recipe based on which valve they are hooked up to (i.e. Product 1 is Valve 1, Product 2 is Valve 2 etc). *Products **do not** have to be loaded in valve order. The load order is set on the Recipe screen by the operator and products can be loaded in any order, regardless of valve number, or regardless of whether it is an Automatic or Manual product.* This allows the recipe to call for a manual product first and then go through the bulk automated products and then back to a manual product again or load them in any order the operator chooses.

PRODUCT VOLUME: This column displays the amount of product necessary in the selected totalizer units for that product. This is calculated by taking the number of acres times the rate entered and then converting from the rate units to the totalizer units. For example, if the rate is 32 Oz/Acre, the batch size is 100 Acres, and the totalizing units for the product is in gallons, then the product volume is 32(oz/acre) * 100(acre) / (128 oz/gal) = 25 gal

TOTAL: This column shows the total amount needed for this batch for this product in the total batch units (either gal or liters). For example, if a batch needs 200 pts of product, then the total will read 25 GAL)200 / 8).

PROD(UCT) **RINSE** (TIME**)**: This sets the rinse time before each product is batched. If this is set to 3 seconds, the rinse valve will be open for 3 seconds prior to the product valve opening which will rinse the common header for that time period. **The default and minimum time is 3 seconds**. **FINAL RINSE** sets a final post rinse time (**default**

and minimum is 10 sec). When the last product has been completely batched, the rinse valve will remain open to make sure all products are rinsed out of the system.

Calculation Mode: The information at the bottom of the screen is used to calculate the size of the batch from the recipe that was loaded. There are 4 different ways to calculate batches that can be chosen from the drop-down menu, and they are as follows.

1. **Gallons and Application Rate**: This setting will be used when filling the sprayer tank full. This uses the **gallons** box and the **application rate** box to come up with the number of acres needed for this batch. Then all the product amounts are calculated. From this information, the carrier amount is determined by subtracting all the product amounts from the total gallons.
2. **Acres and Application Rate**: Use this mode when spraying a known area requiring less than a full sprayer tank. This uses the **acres** box and the **application rate** box to calculate how many gallons of product are necessary. Then the number of acres is used to calculate how much of each product is needed for this batch. From this information, the carrier amount is determined by subtracting all the product amounts from the total gallons.
3. **Volume**: This method does no math. The total amount that needs batched is entered into the column where the rate is normally entered. This amount is entered in the units set up by the Total column. The batch will still be automatically batched out, but the controller does no math on the batch.
4. **Acres and Carrier Rate**: This uses the **carrier rate** box and the **acres** box. This mode is used if you want to specify how much carrier is going to be applied per acre instead of specifying the overall application rate. The application rate that gets entered into the sprayer is calculated in this case instead of set.

Edit Recipe: The only things that can be changed on the Job Screen are the items in the black boxes. Rate, Calculation Mode, and Calculation Variables (acres, application rate, total gallons) can be changed on the Job Screen. To change other variables, press **EDIT RECIPE**. Changes made on the Job Screen apply only to the current job and are not permanent changes to the recipe. Permanent changes to the recipe must be made at the EDIT RECIPE screen and saved by pressing SAVE RECIPE.

Run: Returns user to the RUN screen (does not start the batch)

Job Screen Help

Farm/Field/Recipe Header
 Touch the header to change the selected Farm, Field, or Recipe
Products
 Touching the products brings up a series of pages that give the user the ability to
 further change the recipe. The product, order, and units can be changed
 from there, instead of just the rate and rinse times.
Rate
 The amount (in the selected units) that will be applied per acre.

Order
 Specifies when the product will be added (1 is the first to be added, 2 is the second, etc)
Prod Volume and Total
 Product volume specifies the total amount of product that will be added in selected totalizer units. Total shows the same amount in gal or liters (whichever is the selected carrier unit).
Calc Mode/Acres/Volume/App Rate
 Depending on which calculation mode is used, the user can change acre, volume, and app rate numbers to calculate load size and product totals.
Warnings & Alarms Active
 Push these buttons in order to see what alarms and warnings are active. They will only be visible if there are active alarms or warnings.
Prod Rinse
 The amount of time (in sec) that product valve manifold will be rinsed before moving to the next product.
Final Rinse
 The amount of time (in sec) that product valve manifold will be rinsed after the final product has been added.

Manual Products

Manual Products are products in a batch that are **not** added through one of the automatic valves. These products are added through the optional Swing Down eductor that is available with the QuickDraw or through the sprayer's inductor or that are added directly to the sprayer tank. Manual products are included in the recipe and appear in the historical batch record. Manual products may be dry or powder products, or they may be liquid products that do not come in bulk containers or that will have less than 0.5 gallons (1.0 gal on Pump Suction model) in a batch. (Liquid products that are in a tote connected to one of the valves, but which are scheduled to have less than 1 gallon in a batch, may be run through the automatic product part of the recipe, but it is recommended they be added as a manual product.)

As the recipe is put together, the **Order** of the manual product(s) is entered. The manual product(s) can be set up to load in whatever order the operator desires. When the batch is being run, the following message will appear on the controller screen and on the iPad QuickDraw App. **The carrier will continue to be pumped at 40 GPM while the manual product is added**. The QuickDraw will continue to complete the batch after the operator presses **Required Amt Added** (or enters something else in the *Actual Product Loaded* box) and presses **Finished**. (If, for some reason, there is going to be a substantial delay in adding the manual product, press **PAUSE** on this screen to stop the carrier flow until the manual product can be added. Then, the batch can be RESUMED.)

Edit Recipe Screens

Press ARROW to move to more Totes / Products

Enter **RATE**.
Select **RATE UNITS**.
Enter **LOAD ORDER**

Press ARROW to move to Totes 1-3.

Press ARROW to move to more Manually Added Products

The **EDIT RECIPE** screens can be used to create a new recipe or edit an existing recipe. All the same information that was on the job screen above shows up on this screen also, though everything on this screen can be edited. A recipe can be edited on these screens and those changes are active for the recipe until a recipe is loaded, but those changes are not saved permanently unless the "**SAVE RECIPE**" button is pressed. Each column represents one product and the settings that are necessary to batch that product. The settings are used as follows.

PRELOAD VOLUME: An amount can be entered here if the operator wishes to preload an amount of the carrier before any product is loaded. A warning will be generated if the preload amount is too large for the batch size.

Blue portion of product box displays the **Tote Number and product name**. Pressing this part of the product column allows selection of a new or different product. Press the arrow to the left or right of the blue boxes to move to a screen showing the other totes or manual products.

RATE: The application rate/acre of each product.

RATE UNITS: The units the rate above is entered in. Options available are: GPA, OZ/AC, PT/AC, QT/AC, LBS/AC dry OZ/AC dry, L/AC, mL/AC, or Pt/100, Qt/100, Gal/100 or lbs/100. (lbs/100 is for a product that will be added as lbs of product per 100 gallons (liters) of mix.)

LOAD ORDER: This is the order that the products get loaded (as determined by the operator). Products are set up in the recipe based on which valve they are hooked up to (i.e. Product 1 is Valve 1, Product 2 is Valve 2 etc.). *Products **do not** have to be loaded in valve order. The load order is set here by the operator. Products can be loaded in any order, regardless of valve number, or regardless of whether it is an Automatic or Manual product.* This allows the recipe to call for a manual product first and then go through the bulk automated products and then back to a manual product again or load them in any order the operator selects here.

PROD RINSE: This sets the rinse time before this product is batched. For example, if this is set to 3 seconds, the rinse valve will be open for 3 seconds prior to the product valve opening which will rinse the common header for that time period. The default and minimum is 3 seconds. It can be set for a longer time.

FINAL RINSE: After the last product has been completely batched, the rinse valve will remain open for this many seconds to make sure all products are rinsed out of the system (default/minimum is 10 seconds).

VOLUME UNITS: These are the units that will be used for the VOLUME row. The controller will only allow selection of units that make sense with previous selections. These units will be used in the Historical Log for this batch.

VOLUME: This row displays the amount of product necessary in the selected totalizer units for that product. This is calculated by taking the number of acres * rate entered and then converting from the rate units to the totalizer units. For example, if the rate is 32 Oz/Acre, the batch size is 100 Acres, and the totalizing units for the product is in pints, then the product volume is 32(oz/acre) * 100(acre) / (16 oz/pt) = 200 pts

TOTAL GALLONS: This column shows the total amount needed for this batch for this product in the total batch units (either gal or liters). For example, if we take the 200 pts from the example in PRODUCT VOLUME and convert it to GAL, then the total will read 25 GAL.

Farm and Field Selection Search Screen

This screen is brought up by clicking on Farm or Field in the Recipe, Job, or Run screens. Typing in the filter box brings up a "starts with" type search and displays only those farms or fields to narrow the search. Selected Farm and Field are saved with the Batch information in the history file.

Press on the button beside the Farm or Field name to highlight that Farm or Field. Push SELECT to use that Farm or Field.

Push CREATE NEW to create a new Farm or Field.

Push EDIT to edit an existing highlighted Farm or Field

DELETE will delete the highlighted Farm or Field.

CANCEL returns to the previous screen with no action being taken.

Farm and Field information are not saved with Recipes. Farm and Field information are saved in the historical record with each batch that is run.

Load Recipe Selection Screen

This screen is brought up by clicking the Recipe name in the Job Screen. Typing in the filter box brings up a "starts with" type search and displays only those recipes to narrow the search. The controller will store up to 255 recipes. If more recipes are added, the first recipes that were saved will be overwritten.

To create a new recipe on the QuickDraw controller:

1. Enter the Recipe Name on the screen shown above.
2. Press CREATE.
3. Enter the information for the recipe.
4. SAVE RECIPE.

Tote Setup Screen

This screen is the **TOTE SETUP** screen. Get to this screen by pressing on one of the totes on the Run Screen. This gives the ability to manage what product is in a specific tote. The product shown for each tote is the same as what gets set up for that product in a recipe. This is where product-specific information can be edited. Changes made here to Name, EPA ID, and Rate Unit will change the Product defaults.

*Update the **Amount Left in Tote** when a tote is first connected or refilled so the QuickDraw will know if there is enough product to complete a batch. Check here as batches are run, to verify that the amount shown here matches what is left in the tote.*

The available information is as follows.

FULL NAME: This contains the name for this product.

EPA ID: This contains the EPA registration number for the specific product. The iPad app that can be used with the controller makes the management of this information easy.

RATE UNIT: The desired rate unit can be selected here. Options available are: GPA, OZ/AC, PT/AC, QT/AC, LBS/AC dry OZ/AC dry, L/AC, mL/AC, or Pt/100, Qt/100, Gal/100 or lbs/100. (lbs/100 is for a product that will be added as lbs of product per 100 gallons (liters) of mix.)

AMOUNT LEFT IN TOTE: This is a running total of how much product is left in this tote. *This value needs updated when a new shuttle is placed on the trailer, or when the tank that is used is filled*. Then as batches are run, this value will decrease for the batch amount. If the amount needed for a batch is higher than the value in this box, then a **NOT ENOUGH PRODUCT TO COMPLETE BATCH** warning will be displayed. The Shuttle Inventory Alarms can be DISABLED on the SYSTEM SETTINGS screen.
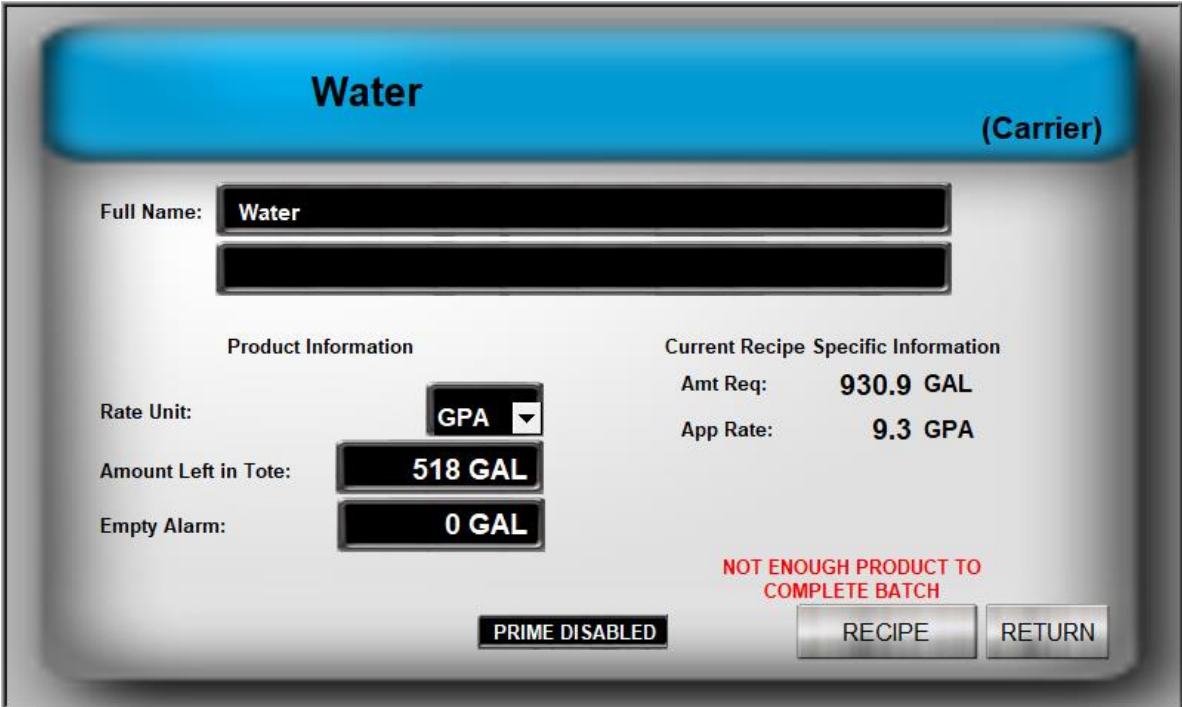
EMPTY ALARM: If this value is greater than zero, a **PRODUCT LOW** warning will show when the Amount Left in Tote number gets below this value. If this is left at 0, no EMPTY message will be displayed. The Shuttle Inventory Alarms can be DISABLED on the SYSTEM SETTINGS screen.

The product can be changed by using the **CHG PRODUCT** button.

Prime Disabled/Enabled: Press on this button to toggle between Prime Disabled and Prime Enabled. The default setting is Prime Disabled**. This should be switched to PRIME ENABLED when a new tote is first used or when a tote has run empty.** This will allow the system to run longer (to prime) before timing out for a No Flow condition. PRIME ENABLED will automatically switch back to PRIME DISABLED after the batch is run.

The other information on the screen is informational and related to the current recipe.

Carrier Setup Screen

Full Name: Enter the name for the Carrier. This will appear on the Run screen and in the historical files.

Rate Unit: The desired rate unit can be selected here. This can be set to GPA or L/AC.

Amount Left in Tote: This is a running total of how much carrier is left in the supply tote. *This value needs to be updated when the carrier tank is filled.* Then as batches are run, this value will decrease for the batch amount. If the amount needed for a batch is higher than the value in this box, then a **NOT ENOUGH PRODUCT TO COMPLETE BATCH** warning will be displayed.

Empty Alarm: If a value greater than 0 is entered here, a **CARRIER NEEDS REFILLED** warning will be displayed when the amount left in the carrier supply tank drops below this value. If this value is left at 0, no Carrier Empty alarm will be displayed.

Prime Disabled/Enabled: Press on this button to toggle between Prime Disabled and Prime Enabled. The default setting is Prime Disabled. This should be switched to **PRIME ENABLED** when a new tote is first used or when a tote or carrier supply tank has run empty. This will allow the system to run longer (to prime) before timing out for a No Flow condition. PRIME ENABLED will automatically switch back to PRIME DISABLED after the batch is run.

RETURN: Goes back to the RUN screen.

Pre-treating Carrier Water

For users who are mixing batches that contain AMS and/or other treatment for the water carrier, it is possible to pre-mix this in the water and not have to do that step for every batch.

A recipe may even be set up for the pre-mixing process. Create the recipe with the products that will be added to the water for the pre-treating. Run this batch and load it into the carrier supply tank.

When using pre-treated water, use the same recipe that you would use if you were going to manually add the AMS or other treatment. Set up the AMS or other treatment as a Manually Added Product with Load Order of 1. When the batch gets to the point where it wants this Manually Added Product, simply push the two buttons to say the correct amount of product has been added. The batch will continue mixing the automatic products. With the AMS or other treatment on the recipe as a Manually Added Product, it will be shown in the Historical Batch Report.
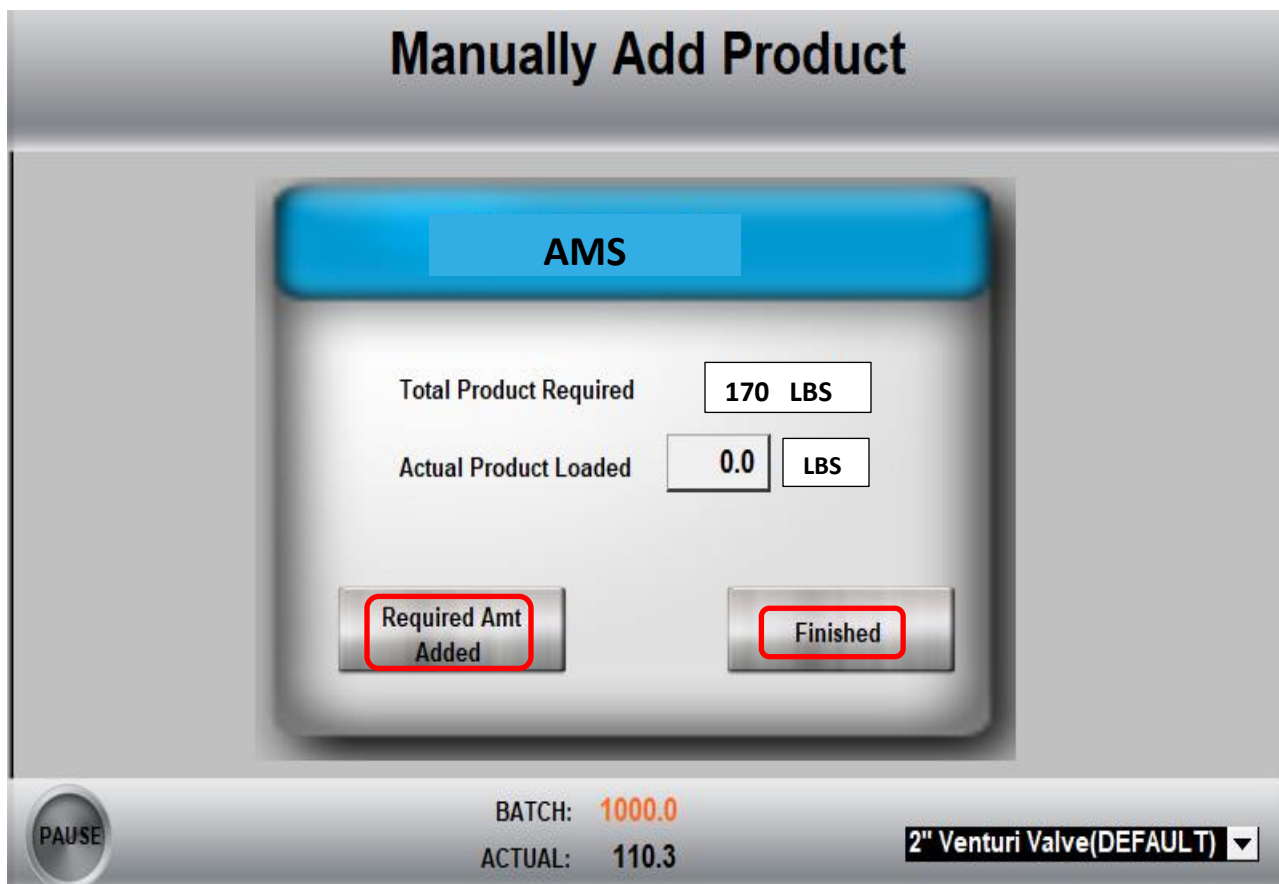
Using the Product Hose Rinse Cycle

The QuickDraw Product Hose Rinse Cycle allows you to rinse the product connection or entire product hose from the tote.

1. Prior to starting the batch, go to "Manual Controls" page (button on bottom left hand corner of "Run" Screen) press the "Product Hose Rinse Cycle" button to enable. It will turn green when enabled. This enables the rinse cycle for one batch.
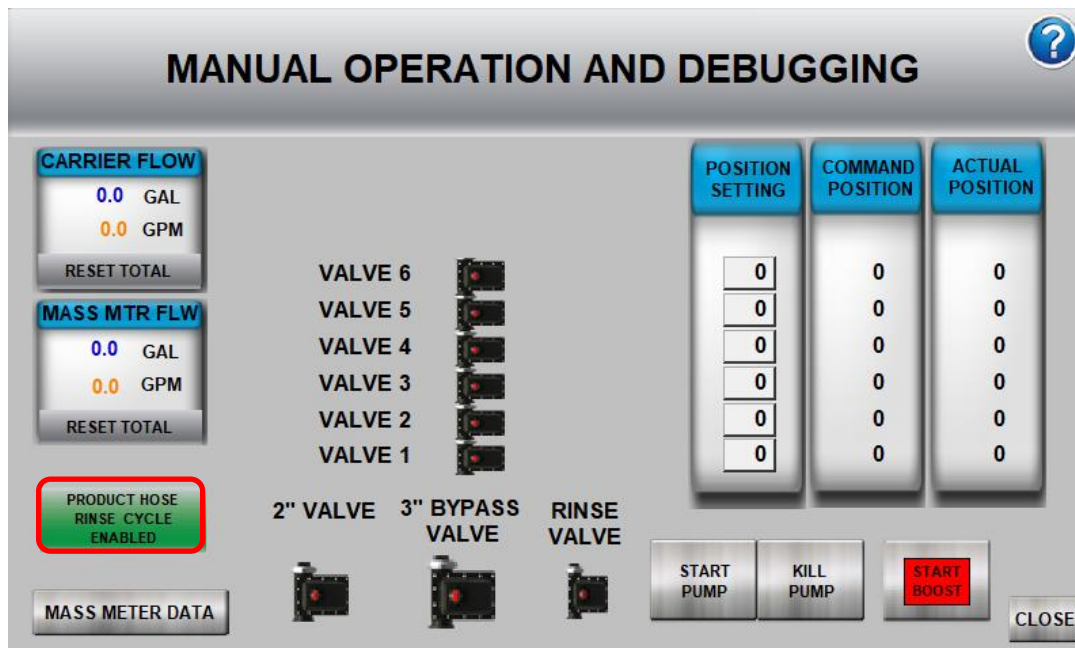
2. At the conclusion of the batch the Product Hose Rinse Cycle Control Screen will appear.
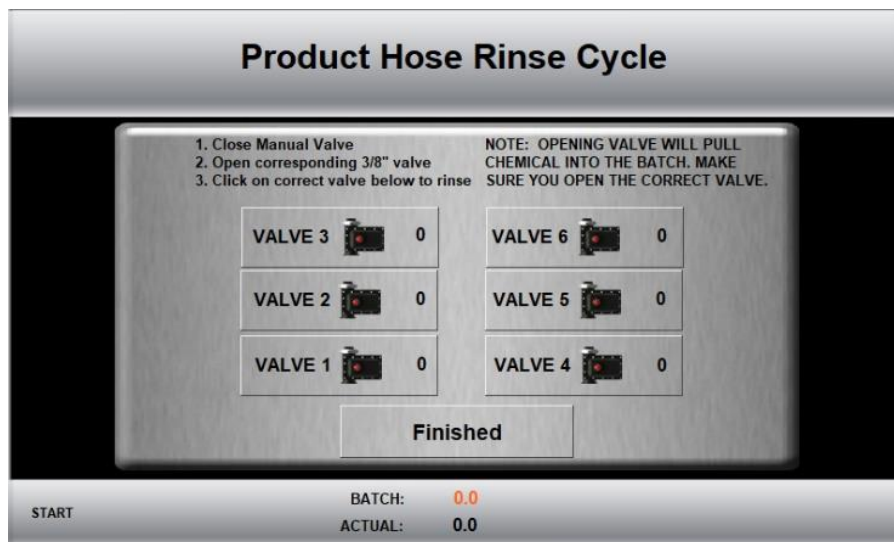
ATTENTION: Close valve on product tank or hose before pressing valve button on this screen. Pressing button without closing tank or hose valve will draw additional chemical into the batch.

Press the button of the product valve you would like to rinse. Press the button a second time to close the valve once rinse is complete.

Once rinse(s) is/are complete, press Finished. QuickDraw will complete the remainder of the batch.

Accessory Rinse Kit Options: Product Hose Rinse Kit – 606-01-400300

Connects to auxiliary water port on QuickDraw. Provides 2" Male Cam-Lever Coupler to connect to product hose. Water flush completely rinses product hose into sprayer batch.
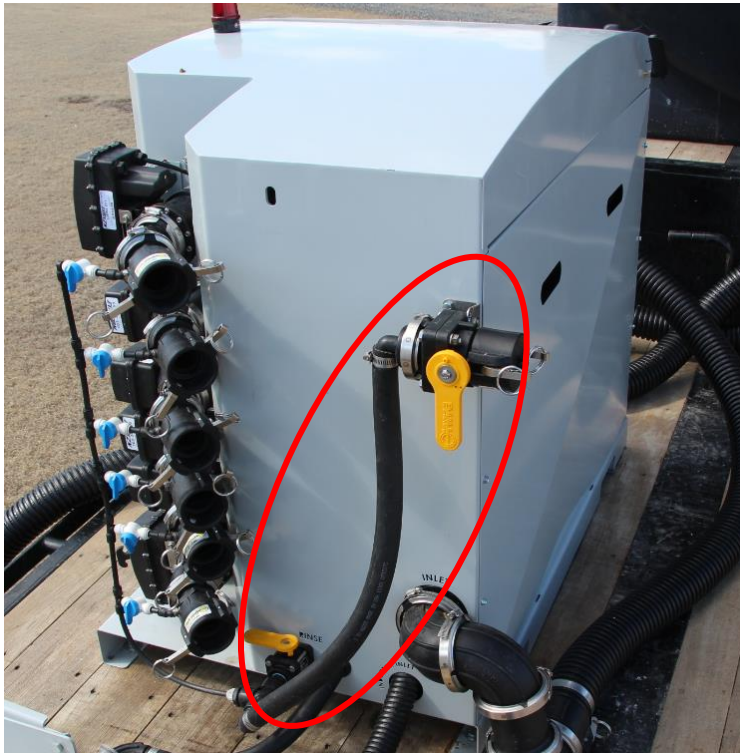
Connection Kits with Rinse Manifold

> 606-01-400150 – 2" QuickDraw 2" Full Port Product Valve Shuttle Connection Kit with Rinse Manifold
>
> 606-01-400200 – QuickDraw 1-1/2" Standard Port Product Valve Shuttle Connection Kit with Rinse Manifold

Close valve on product hose. Open 3/8" quarter turn valve to rinse area between QuickDraw Product Valve and Valve on Product Hose. Product hose remains full of chemical and should be removed with bulk chemical tank.

Manual Operation and Debugging
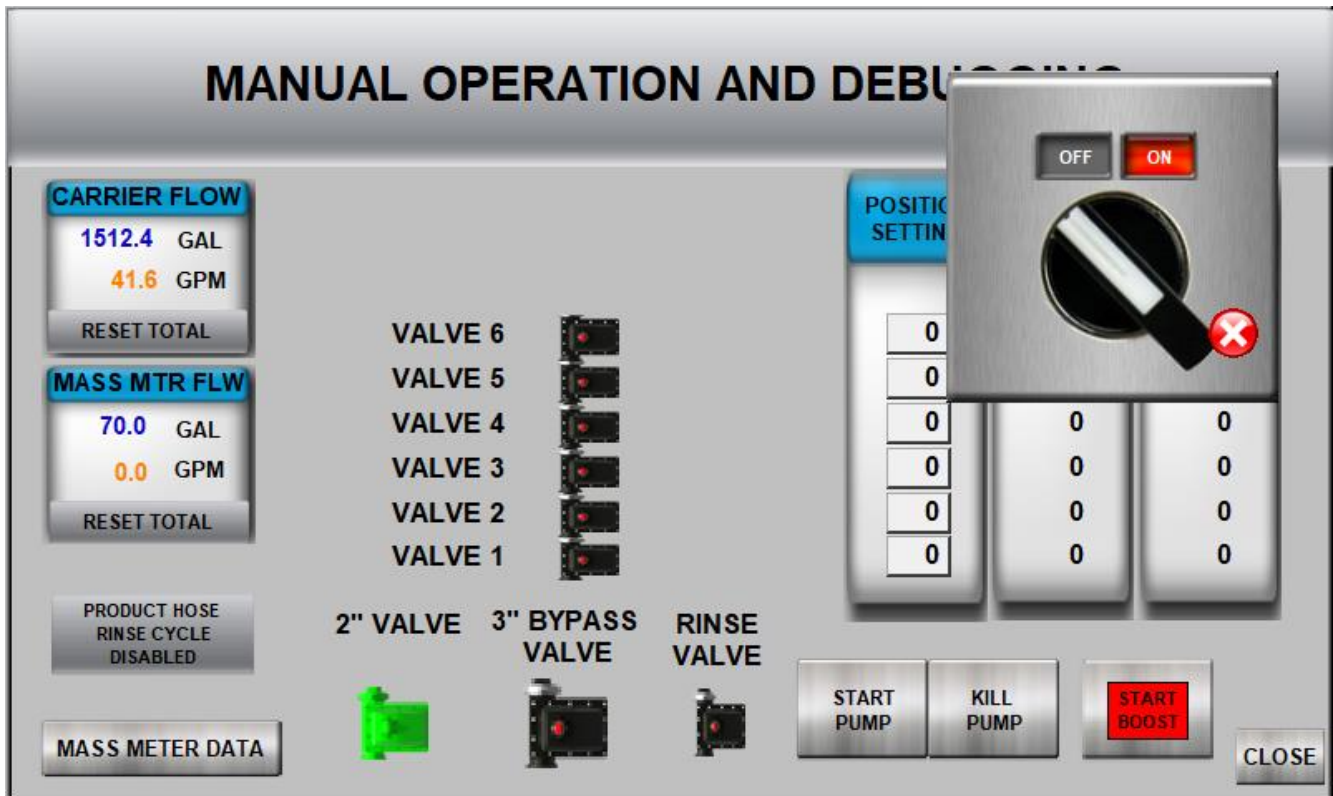
This is the **Manual Operation and Debugging** screen. This screen is useful for checking valves that may or may not be working, double checking valve addressing, and for running a manual batch. Anything that gets run manually does not get logged because the controller has no idea what products or amounts are being introduced into the system, but **a fully manual batch can be run using this screen**. *NOTE: Care must be taken when using this screen even during a batch, because any changes to these settings during a batch will affect the batch.*

First, the **valve stack** is shown to give indication of the status of each valve. Pressing on a valve brings up a virtual switch that can be used to turn on that valve. Switching the popup to **ON** will cause the valve to open to 100% and switching the popup to **OFF** will set the percentage to 0% and close the valve. The position setting column can be used to adjust the position of the valve. To adjust the position, first click on the valve number you want to adjust, then turn on the valve, and finally set the valve position box to the desired position. The **COMMAND POSITION** will show the value being sent to the valve. During a batch these will update automatically. The **ACTUAL POSITION** column shows the position that the valve communicates back to the controller. All three columns should read about the same number once the valve has stopped moving. Note that the command position can be set after the valve has been turned on with the popup.

Second, the left-hand side of the screen shows the **flow information**. These boxes show the flow rate and total information for each flowmeter. Each meter also has a manual **RESET** button so that you can reset the value as needed and see your own flow total.

The **Mass Meter Data** button in the lower left corner will take you to in-depth data regarding the mass meter (see picture below). This information may be helpful to Tech Support.

Finally, the bottom of the screen has the control for the **2" Venturi Valve**, the **3" Bypass Valve** and the **1" Rinse Valve**. Pressing the respective valve will pop up the switch window that can be used to manually open and close that valve. There is also a **KILL PUMP** button that will shut down the pump if you have the harnessing and wiring done to enable the pump kill feature. Pressing the **START PUMP** will start the pump if the system is wired for remote starting (*for use with electric motor drive pumps only*).

Product Hose Rinse Cycle: Use the optional Product Hose Rinse Kit to provide easy rinse of chemical hoses. Disconnect hose from Tote, connect to Rinse Port, Enable Product Hose Rinse Cycle.

System Settings

This screen contains the global settings for QuickDraw. The settings are as follows.

QuickDraw Identifier: If using more than one Quick Draw, give each one its own Identifier.

WIFI Setup This can be used to customize the SSID and passcode for your QuickDraw. This (SSID) is the Network to which your iPad will connect, and the Password it will need to connect. If using two or more QuickDraws in the same immediate area, they may each need to have a unique SSID.

Hide History Full Alarm The history is set up with a FIFO (first in, first out) buffer. When the buffer of 100 batches fills up, the first batch will be overwritten if record 101 is added. An alarm alerts the user when the buffer is full (so the user can record the info manually or retrieve the history with the iPad before the next batch overwrites the info). If this box is checked, the system will not alarm the user. When the history is downloaded to the iPad (if successful), the controller will clear the buffer.

Battery Voltage shows the power supply voltage to the controller. Voltage less than 10 V will cause problems for the controller. An alarm will appear, and the batch will not run.

Shuttle Inventory Alarm: If ENABLED, the controller shows a warning when the level of the shuttle or bulk container gets below what is required for a batch. The **Shuttle Empty Alarm**, when ENABLED, will show a warning when the shuttle or bulk storage level drops below the empty warning level which is operator settable on the Tote Screen.

Pump Start Mode: Typically, only important on electric pump control. When set as momentary, the output is only on for 3 seconds when the batch start is pressed. When set to maintained, the pump start output is on as long as the batch is active. Maintained is the correct choice for hydraulic pumps and probably the best choice for

electric also, but it depends on the user's motor control center. If they have start-stop push-button setup, they may need to use the momentary selection.

Pulses Per Gal Carrier Flow should be set at 13.7 unless usage indicates a change.

Default lbs/gal should be set at 10.0. This is used to convert dry ingredients that are added to the mix to gallons for a batch volume measurement.

Boost Pump: This selects the product during which you would like the optional boost pump output to be active. Some extra harnessing is necessary to make use of this option.

TIME SET and **DATE SET.** This sets the time and date for the log file for historical reporting of batches.

Valve Enable/Disable. Here, the **Product Valves** can be **ENABLED** or **DISABLED.** These are used if there is a problem with a valve and the system needs to be able to run batches without that valve. Disabling the valve removes it and the product attached to it from availability for batches.

Valve Close Time: How long the valve takes to close. If the batch is overshooting the target, increase this number because the valve needs more time to get closed on time. If the batch is undershooting, lower this value. 1" valve default is 1.5 seconds, 2" valve default is 3.2 seconds.

Manual Product Valve Select: Typically, set for 2" to use Venturi suction. To set the QuickDraw in bypass mode, select 3".

Remote Settings takes you to the Remote Communication Setup screen.

RUN takes you to the Run Screen. **Menu Screen** takes you to the main Menu Screen.

Help   CLOSE

Pulses per Gal
Enter the number of pulses per Gal of the flow meters. Default for the Carrier Flow Meter is 13.7.
WIFI Setup
WIFI SSID name and password can be changed here.
Date/Time
The user can set the correct date and time here. The Date and Time needs
to be set so that historical searches work correctly.
QuickDraw Identifier
This is used to keep track of different QuickDraws if more than one is in operation. This
value is written to the log file for each batch.
Default lbs/gal
This setting is used to convert dry products to liquid for the carrier amount needed calculation.
Shuttle Inventory and Empty Alarm Enable/Disable
Toggle whether or not to get tote inventory warnings and empty alarms. If no flow is detected
on the flow meter, the system will still alarm and pause the batch. This just stops alarms based
off of inventory amounts.
Product Valve Enable/Disable
If the user wants to disable the system from opening a valve, regardless of recipe, it is done here.
Valve Close Time
The Valve Close Time setting sets how long the valve takes to close. If the batch
is overshooting the target, then increase this setting because the valve needs more time
to get closed on time. If the batch is undershooting, lower this value because the valve
is staying open too long. 1" valve default is 1.5 seconds, 2" is 3.2 seconds.
Hide History Full Alarm
 If selected, the system will overwrite old hist records without warning.

Remote Communication Setup

Optional Remote Communication capabilities. Enter EMAIL address(es) to receive a report as each batch is completed.

Historical Data Screen

This is the **HISTORICAL DATA** screen. This screen is used to look at the logged batches that are still stored in the controller. *Once the historical data is uploaded to the iPad app, the data is no longer available on the controller.* Use the **SELECT** button to bring up the **Historical Filter** screen. Historical data can be searched by **date** (yyyy-mm-dd), **batch id** (xxx-mmddyy), or **field name**.

Maintenance Screen

DO NOT RESET VALVE ADDRESSES UNLESS DIRECTED BY SUREFIRE SUPPORT!

Maintenance and Troubleshooting

Valve troubleshooting: If valve shows communication fail or "**COMM FAIL**" check the following. First, make sure it is connected to the wiring harness and that there are no obvious problems with the connector on the harness or on the valve. Second, go to the Manual Controls section from the run screen. Use the controls there to try to control the valve. If the valve is still not functional, then try unplugging another valve and plug the valve that is not working into that connector. If the valve works then the valve is ok, but something is wrong with the harness. If the valve is still not functional, most likely the valve has an issue and needs to be replaced.

Valve replacement: First, make sure all the valves are enabled on the system settings screen. Plug in the new valve. Once the new valve is detected the QuickDraw controller screen should change to a **Valve Commission** screen. If the valve number shown on this screen matches the valve that is missing, then hit **CONTINUE** to address the new valve. If it is not, then enter the correct valve number and press CONTINUE. This will configure the valve to the correct valve number. After configuring a new valve, go to the **Manual Controls** screen from the **Run** screen and make sure all valves are operating and that they are operating in the correct position. Make sure that valve 1 is 1 and 2 is 2 and so forth.

Flowmeter troubleshooting: Leaks on the suction side of the system may introduce air into the system which causes the carrier flowmeter to jump around, show empty pipe, or sometimes to show extremely high values. The display will probably show *Carrier Flow Fail* in this case. Look at the carrier flowmeter LCD screen to help see what is happening. If values are highly erratic or zero when the pump is pumping, air leak upstream may be an issue. The same can be said for the product flowmeters as well, but the user will need to look at the flow rate on the controller screen, as there is no readout directly on the product meter.

Air leaks on the suction side of the system will cause erratic flowmeter operation. Air leaks may also create problems with the pump being able to prime. The QuickDraw unit is checked for air leaks at the factory before shipping. The user needs to check all field-connected fittings from the totes or shuttles to insure there are no air leaks in those lines.

Mass Meter Troubleshooting

Communication Issues:

If the controller says **Mass Meter Comm fail**, then the controller is not able to talk to the mass meter.

1. Open fiberglass box on left wall of QuickDraw enclosure
    a. Are all the wires connected? If not, contact SureFire for help.
    b. Is the red light on? If it is then power is good to the communication module in the fiberglass box. If not, check that the wire from the fiberglass box is plugged into the QuickDraw harness correctly.
    c. If the red light is on, connect a voltmeter to the black and red wires top and bottom. The top set of red and black should read 24VDC. The bottom set of red and black should read 15VDC. Contact SureFire Support if this is not present.
    d. Does the red light blink? If so, then communication should be ok. If not, then contact SureFire.

Air in meter issues:

If the controller blinks "**Air In Mass Meter**" occasionally, that is normal operation.

If the controller says "Excessive Air In Mass Meter" then the product that was pumping may be empty, or a leak may exist between the product valve on the QuickDraw and the chemical shuttle or tote.

Miscellaneous Issues:

Carrier Flow Meter Reading Failure or Erratic Flow Rate.

Problem: Carrier flow does not register, registers as reverse direction flow, or registers very erratic flow rate on the meter display. At initial observation, this appears to be a problem with the 3" carrier flow meter.

Further investigation may lead to the observation of air (milky color and/or foamy) in the sprayer/batch tank.

The 'Brackets' picture below the 3" carrier flow meter display indicate the meter is registering reverse direction flow. (See picture on next page)

These symptoms most likely are result of a worn transfer pump that is generating turbulence and/or incorporating air into the carrier stream. The turbulence and/or air result in the meter being unable to measure flow correctly.

Solution: Replace or rebuild the transfer pump.

Slow Chemical Flow due to sprayer fill strainer causing back pressure

Some sprayers use a strainer on the fill side. If this strainer plugs up it will cause back pressure on the QuickDraw outlet. The venturi may have a high pressure of 30 psi created by the pump, but a low pressure that is 20 psi due to the sprayer strainer being plugged. In this case, the chemical flow rate will nearly stop. Specifically, with a back pressure of 20 psi, I saw the chemical flow rate slow down to 1.5 GPM. On every batch, the flow rate would start near normal, then slowly decline and almost stop entirely as the strainer become more and more plugged. In the instance we saw this problem the customer was spraying fertilizer, which contributed to strainer plugging much more than water. This specific problem can only happen with a venturi. It does not apply to a QD using pump suction to move chemicals.

Symptoms: Chemical Flow Rate Decreases or Stops

Resolution:

1. Inspect sprayer fill strainer and clean.

2. Consider a larger strainer.

3. Consider straining the carrier before it enters the QD cabinet. A plugged filter before QD is a hassle but will not cause slow chemical flow.

4. Install a pressure gauge (roughly 60 psi will work well) on the QD outlet to the sprayer. This can serve as a diagnostic tool and warning the sprayer strainer is becoming plugged.

Other Support Publications

For the most comprehensive and current support publications go to:

QuickDraw Spray Tenders **@** *SureFire Support Website (some items may require login)*

396-001770 QuickDraw Spray Tender System Rev 01.22.2015

2018 QuickDraw Sales Guide

QuickDraw Sales Brochure

396-2944Y1 QuickDraw Pump Stop Help

396-2985Y1 QuickDraw Rinse Manifold Instruction Sheet

396-3062Y1 - QuickDraw Swing-Down Eductor Instructions

396-3275Y1 QuickDraw Chem-Blade ES Induction System Instructions

396-3699Y1 Updating QuickDraw Controller Software

396-3906Y1 - QuickDraw Plant Mounting Kit Instructions

396-4020Y1 QuickDraw Product Hose Rinse Kit Instructions

396-4031Y1 - QuickDraw Pump Power-Start-Stop Wiring Instructions

396-4097Y1 - QuickDraw Venturi to Pump Suction Conversion Instructions

QuickDraw Simulator Quick User Guide

QuickDraw Winterization Procedure

QuickDraw Solar Panel Guidelines

QuickDraw Carrier Flowmeter Failure or Erratic Flow Rate

QuickDraw Low Battery Voltage

Slow Chemical Flow due to Sprayer Fill Strainer Causing Back Pressure

Slow Chemical Flow due to Swing-Down Eductor Valve Open

How to Set Up QD Max Controller with V1.5.0 and later software

208-05-2326Y1 QuickDraw Max Wiring Harness

208-05-2326Y5 3273Y2 3228Y2 QuickDraw Wiring Harnesses

208-05-3360Y1 QuickDraw Lite Wiring Harness

208-05-3363Y1 QuickDraw Lite CAN Valve Adapter

QuickDraw Lite With Venturi - Models and Dimensions - Revised 01.22.2018

QuickDraw Lite with Venturi - Exploded Drawing - Revised 1.22.2018

QuickDraw Lite Controller Setup Video

QuickDraw Accessory Kit List

Chemical Connection Kits

606-01-400200 1 ½" Standard Port Product Valve Shuttle Connection Kit with Rinse Manifold

606-01-400150 2" Full Port Product Valve Shuttle Connection Kit with Rinse Manifold

606-01-various other connection kits

QuickDraw Accessories

606-01-400300 QuickDraw Product Hose Rinse Kit

606-02-100200 QuickDraw Swing-Down Eductor Kit with Venturi

606-02-100400 QuickDraw 30-gallon Chem-Blade ES Eductor Kit—NO 3" Bypass

606-02-100500 QuickDraw 30-gallon Chem-Blade ES Eductor Kit- with 3" Bypass

 606-03-100100 QuickDraw 3" Flange Connection Kit for 3" Pump

606-03-200100 QuickDraw Carrier Tank Refill Kit (use when 3' pump is being used to fill carrier tank)

606-03-300100 QuickDraw Air Flush Kit

606-05-200100 Quick Draw Auxiliary Large Display Kit

606-05-300100 QuickDraw Remote Connectivity Kit

606-05-300200 One Year Data Service Subscription for QuickDraw Max

606-06-100100 QuickDraw 5" Lift Kit

606-06-100200 QuickDraw Plant Mounting kit ---48W x 32D x 40H

Other accessories are available

Upgrade and Conversion Kits

606-07-100100 Venturi to Pump Suction Conversion Kit

606-07-100200 4-Product to 6-Product Upgrade Kit

606-07-100300 4-Product to Double Large Valve 6-Product Conversion Kit

606-07-100400 6-Product to Dual Large Valve 6-Product Upgrade Kit

604-900100   QuickDraw Lite Simulator Kit for Demo Units

Accessory Kit List (Harnesses)

Item Number	Item Description
208-05-2326Y5	QuickDraw Wiring Harness
208-05-3228Y2	25' Extended QuickDraw Wiring Harness - for special use only
208-05-3273Y2	10' Extended QuickDraw Wiring Harness - for special use only
208-05-2414Y1	QuickDraw Pump Stop Wiring Harness Set (contains 2 harnesses)
208-05-2430Y1	QuickDraw Electric Start Gas Engine 12 Volt Supply Harness (does not start pump)
208-05-2431Y1	QuickDraw electric motor drive pump start harness
208-05-3237Y1	78" Ethernet RJ45 to M12 Adapter Cable
208-05-3944Y1	QuickDraw Gas Engine Push Button Start
208-05-4022Y1	Optima Battery 8022-091 75/25 RedTop Starting Battery
208-05-various	Many more specialty harnesses

The accessory harnesses listed below all attach to the main QuickDraw harness, 208-05-2326Y1.

Power harness extensions from vehicle battery

480 MP Extension Harnesses   206-02-xxxxxx

QuickDraw has an internal battery to guarantee adequate power while running. However, it <u>MUST</u> be charged from the vehicle electrical system. Each QuickDraw includes a 20' power harness (205-2213Y1) to attach to the vehicle battery. If mounted further from the vehicle battery than 20' and/or crossing a trailer hitch, customer will need an extension harness.

Power harness to supply electric start gas engine transfer pump

QuickDraw Electric Start Gas Engine 12 Volt Supply Harness   208-05-2430Y1

The QuickDraw battery can be used to supply power for an electric start gas engine transfer pump. There is a 480 MP connector on the QuickDraw harness that attaches to this harness. It makes wiring an electric start transfer pump fast and easy without the need for an extra battery or wiring back to the vehicle battery. The harness is 15 feet long.

Pump Stop Harness (for electric or gas engine driven pump)

QuickDraw pump stop harness   208-05-2414Y1

QuickDraw has the ability to turn off the transfer pump. This harness provides a connection to a relay in the QuickDraw harness. The relay is normally closed, it then opens for 10 seconds when the pump is commanded to stop. Connect the harness to any wire on the engine that requires power for the pump to run. Comes with 4 mm bullet terminals which fit some pumps on the market.

Pump Start Harness (for electric driven pumps only)

QuickDraw electric motor drive pump start harness   208-05-2431Y1

QuickDraw can start an electric motor driven transfer pump. This harness provides a connection to a relay in the QuickDraw harness. The relay is normally open, it then closes for 1 second when the pump is commanded to start. Recommended for use along with the pump stop harness above.

QuickDraw iPad App

The iPad App is not necessary to operate the QuickDraw in the field, but it does provide many convenience features, and *the QuickDraw is intended to be used with an iPad*. The iPad App is also the method necessary to download the Historical Data from the QuickDraw controller.

With the iPad App, new recipes can be created, existing recipes can be edited, and products can be entered and set up. These recipes and product information can then be downloaded to the QuickDraw controller via WIFI. Farm and field information can be set up in the iPad and transferred to the QuickDraw controller. Information that has been set up in the QuickDraw controller can be transferred to the iPad during the sync process.

The QuickDraw controller keeps a historical log of each batch that is run. This information is stored in the controller with a unique Batch-id for each batch. The controller can store up to 100 batches in the controller memory. If this memory becomes full, each new batch will overwrite the oldest batch in memory. Typically, the user would download the Historical Data to the iPad before this memory becomes full. When the Historical Data is downloaded to the iPad, it is erased from the QuickDraw controller. Once the Historical Data has been transferred to the iPad, it can be sent by email as a CSV file which can be opened in Excel, or as a PDF document.

iPad App Install

Click on App Store on your iPad.

After you have the QuickDraw app, check back periodically for updates.

Next, type "surefire quickdraw" into the search box in the top right corner.
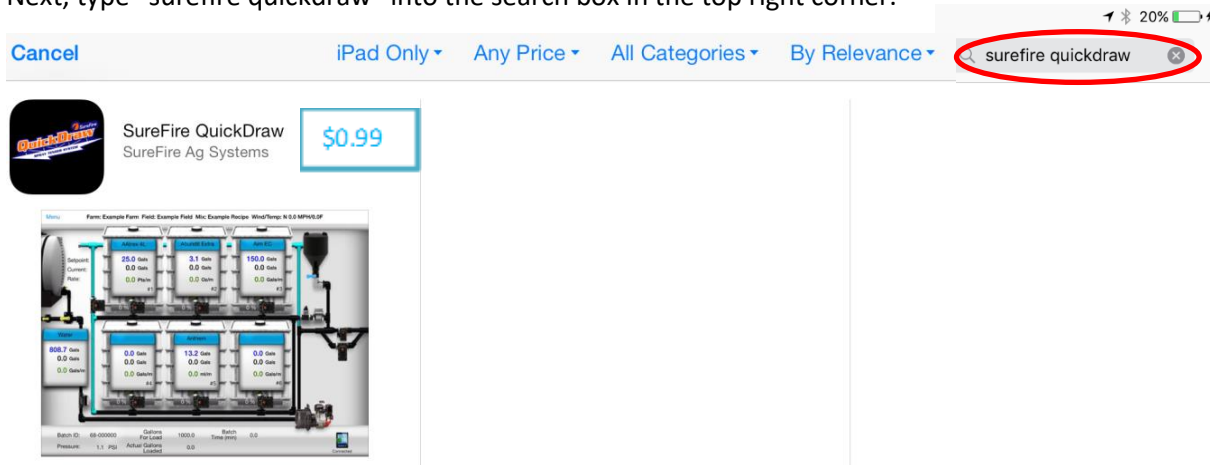
Click on the App.
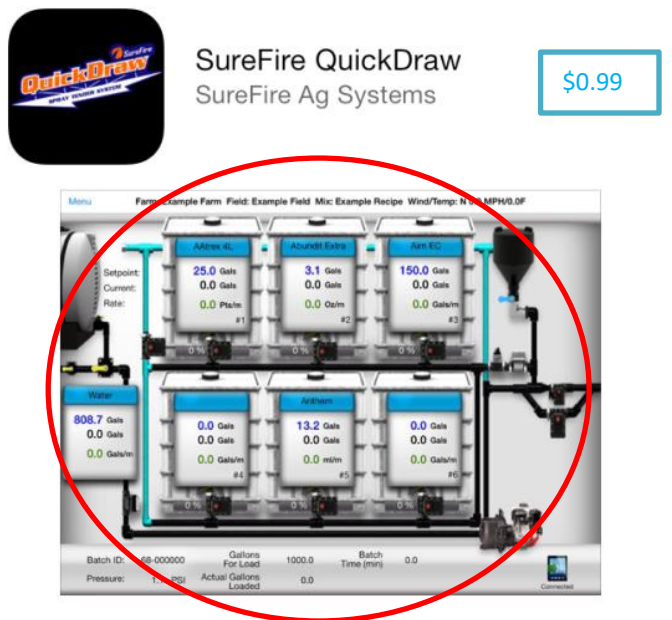
Click on the $0.99 and follow the Apple instructions to download the App

Description

The SureFire QuickDraw App works in conjunction with the QuickDraw Automated Spray Tender System from SureFire Ag Systems. The App allows the sprayer operator to create spray recipes and move them to the Spray Tender System via wireless connection. The App accesses spray batch logged data from the QuickDraw including volumes loaded, environment conditions, field and farm identification.

iPad App Main Menu

Overview QuickDraw iPad Main Menu.

OVERVIEW opens a screen that shows the QuickDraw controller RUN SCREEN. If connected by WIFI to the QuickDraw controller, this screen will show what is happening as a batch is running.

RECIPES gives the option to EDIT or create a NEW recipe on the iPad.

OPERATIONS opens a screen where you can manage Farms, Fields, Products, and Recipes. These items can be added, edited, synced, or exported from the Operations screen.

HISTORY gives you access to the historical batch records. You can search the historical data that is on the iPad, get new historical data from the controller, and email historical data from this screen.

WIFI shows what your iPad WIFI is connected to.

The **OVERVIEW** screen shows the controller Run Screen when the iPad and controller are WIFI connected.

The screen will update as a batch is running.

If the recipe contains a Manual Product, the Manual Product Add screen will show on the iPad and the Manual Product addition can be verified on the iPad.

Pressing **MENU** in the upper left corner will show the Menu choices along the left side.

Recipes

Pressing **RECIPES** from the main menu of from one of the side menus will give you a choice to make a **New** recipe or to **Edit** an existing recipe.

When creating a **New** Recipe, fill in the **Recipe Name** and **Carrier Name.** The bulk products in shuttles or totes are set up on the first screen. To add a manual product or a product with less than 1 gallon for a batch, select **Man. Prods** in the upper right corner.

The other items at the top of the first screen (Total, Gals, Gals/Ac, Carrier Rate, Calc Mode, Total Acres, and Carrier Preload) can be set now or can be edited later when running an individual batch.

 Click on the blue box at the top of each tote to add a new product to the recipe. This brings up the following box.

Click on **Find Chem**.

This opens the Product List to select a product. After selecting the product, click on **Load To Tote**.

Save the recipe when finished. **Sync Recipes** to controller when connected with WIFI.

Recipes

Here, the product Tremor has been selected. It will be added to the recipe by pressing **Load To Tote**.

After a product has been added to the recipe, the **Rate, Order,** and Delay can be entered. Any of these items may be edited later from the iPad or from the controller (after the recipe has been synced to the controller). **Order** is the order in which the products will be added to the batch. There must be one sequential set of numbers beginning with 1 and including all the products in totes plus any manually added products. The **Delay** is no longer used. This will be set for each batch in the **Prod Rinse** box on the Job Screen.

Press **New** to start a new recipe.

Press **Save** to save a recipe that has been entered.

Press **Duplicate** if you would like to make minor changes to an existing recipe and still save both recipes. Pressing **Duplicate** will bring up a screen where you select an existing recipe. When that recipe comes to the screen, change the name to the name for the new recipe, make any changes to the recipe, and press **Save**. The original recipe and the new changed recipe will now both be in the recipe list. This saves time by not having to add and set up every product for the new recipe when much of it is similar to an existing recipe.

Operations
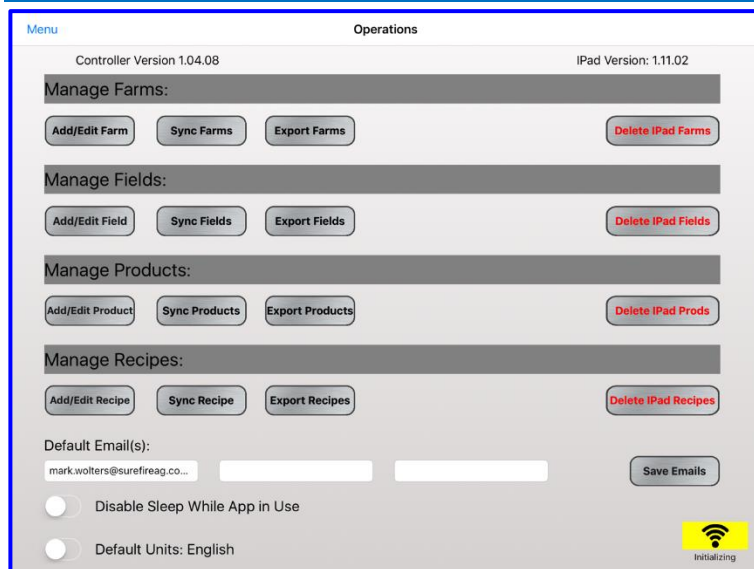
Pressing **Operations** from the main menu or from one of the left-side menus will bring up the screen to manage farms, fields, products, and recipes. Here, Farms, Fields, Products, and Recipes can be added, edited, synced with the controller, or exported and emailed.
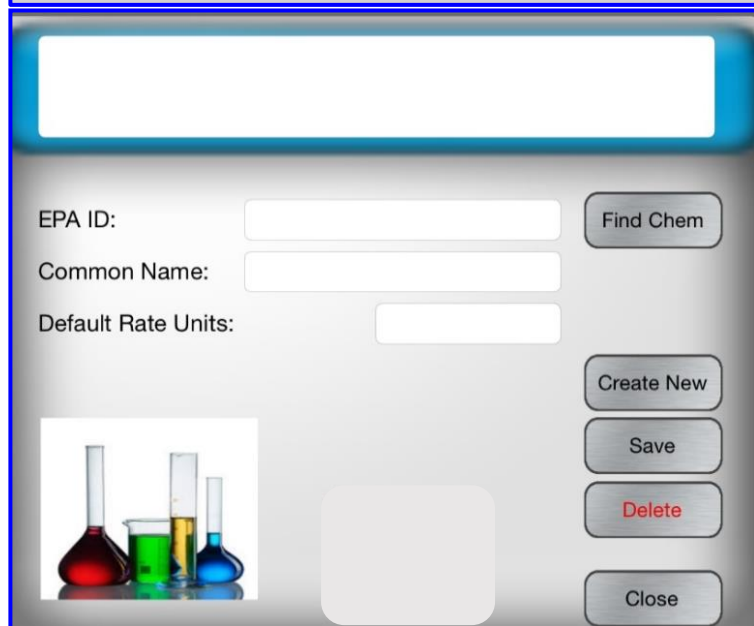
To **Add/Edit** a product use this pop-up screen. **Find Chem** brings up the list of products that are on the iPad.

Create New if the product is not in the Product List.
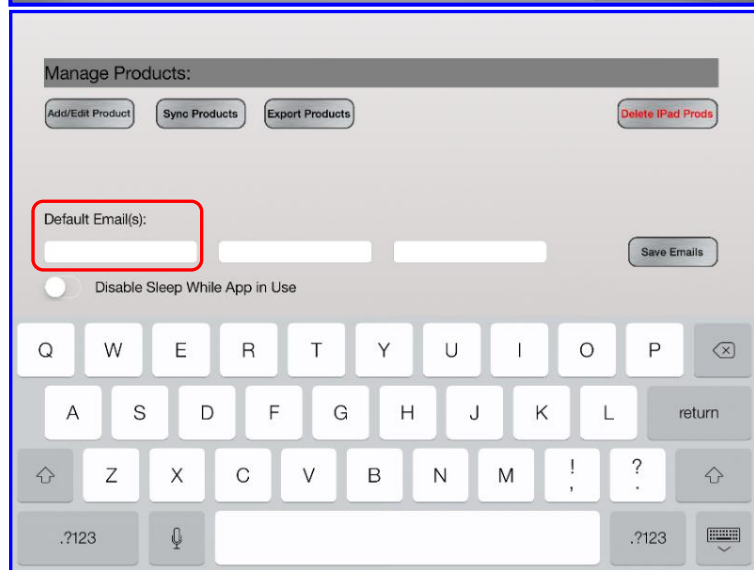
Tapping in a white box by **Default Email(s)** will bring up the keyboard to enter email addresses where you want to send exported data. The data is exported in a .qdd file which can be emailed to another iPad and imported into the QuickDraw App on that iPad. To import the data on a second iPad, tap the QDD file in the email to download the file. Then, touch and hold the QDD file icon to bring up the screen that will have the option to **Open in QuickDraw**. Press this to complete the import process.

QuickDraw App Data Hierarchy

Import/Export File

The .qdd file extension is just a comma separated value file (csv) with a different extension name. It is changed so when the file is selected in an email, the QuickDraw app is one of the options brought up to open the file, which then prompts the user about importing. At this point, a person could the open the file and alter it in Excel or a text editor but importing an altered file could have serious consequences on the user's database unless everything is formatted properly.

Products

The QuickDraw controller can hold 255 products. If a sync is attempted when the iPad has more than 255 products, it will import 255 and then signal that the controller is full. Products that only exist in the iPad will appear blue when searching through the product list. If during a sync process a product key gets changed in the iPad, the program will search mixes and adjust it, so the proper product key is used in the mix.

On a product import (QDD file import into iPad):

-If a product with that EPAID exists in iPad, any changes in the imported product will overwrite iPad product (if a default unit is changed, that will not disturb any units in recipes where it is used). IT WILL NOT CREATE A SECOND VERSION.

-If the EPAID is blank, it will search if product name exists and will do the same as above.

-New products will be stored for syncing to controller.

On a product sync:

-Duplicate names can be created in the iPad and Controller, but the iPad will not allow the creation of a product that has the same EPAID as an already existing product.

-If existing product has changed in both controller and iPad, the user will be prompted which to use.

-If a product is deleted in the iPad, but not the controller (or vice versa), the user will be prompted if they wish to delete it in the other. If answer is no, it will be restored in the unit that had it deleted. Products can only be deleted if they are not used in mixes.

-New products in the controller or iPad will automatically be transferred to the one that doesn't have it.

Recipes

The QuickDraw controller can hold 255 recipes. If a sync is attempted when the iPad has more than 255 recipes, it will import 255 and then signal that the controller is full. Recipes that only exist in the iPad will appear blue when searching through the product list.

On a recipe import (QDD file import into iPad):

-If a recipe with that name exists in iPad, any changes in the imported recipe will overwrite iPad recipe. IT WILL NOT CREATE A SECOND VERSION.

-New recipes will be stored for syncing to controller

-If a single recipe is exported using the iPad, it will also generate a Prod.qdd file containing all the products in that single recipe. The product file needs to be imported before the recipe file.

-If for some reason a recipe gets imported with a product that doesn't exist in the iPad, it will be assigned with a key of 65535 which will prompt the user to select a valid product when the recipe is opened for edit. The recipe will not be synced with the controller until a valid product is entered.

On a recipe sync:

-To maintain data integrity, a product sync is done first.
-Duplicate names can be created in the Controller, but not in the iPad.
-If existing recipe has changed in both controller and iPad, the user will be prompted which to use.
-If a recipe is deleted in the iPad, but not the controller (or vice versa), the user will be prompted if they wish to delete it in the other. If answer is no, it will be restored in the unit that had it deleted.
-New recipes in the controller or iPad will automatically be transferred to the one that doesn't have it.

Farm/Field

The QuickDraw controller can hold 1,000 farms and 1,000 fields. If a sync is attempted when the iPad has more than 1,000 farms/fields, it will import 1,000 and then signal that the controller is full. Farms/fields that only exist in the iPad will appear blue when searching through the product list.

On a farm/field import (QDD file import into iPad):

-If a farm/field with that name exists in iPad, the farms/field will remain in the iPad. IT WILL NOT CREATE A SECOND VERSION.

On a sync Farm/Field:

-Duplicate names cannot be created in the iPad, but they can in the controller.
-If existing farm/field has changed in both controller and iPad, the user will be prompted which to use.
-If a farm/field is deleted in the iPad, but not the controller (or vice versa), the user will be prompted if they wish to delete it in the other. If answer is no, it will be restored in the unit that had it deleted.
-New farms/fields in the controller or iPad will automatically be transferred to the one that doesn't have it.

QuickDraw Plumbing

External Plumbing Fittings

INLET: Connect hose from pump. M300 Flange

RINSE: Connect hose for rinse water outside the cabinet.
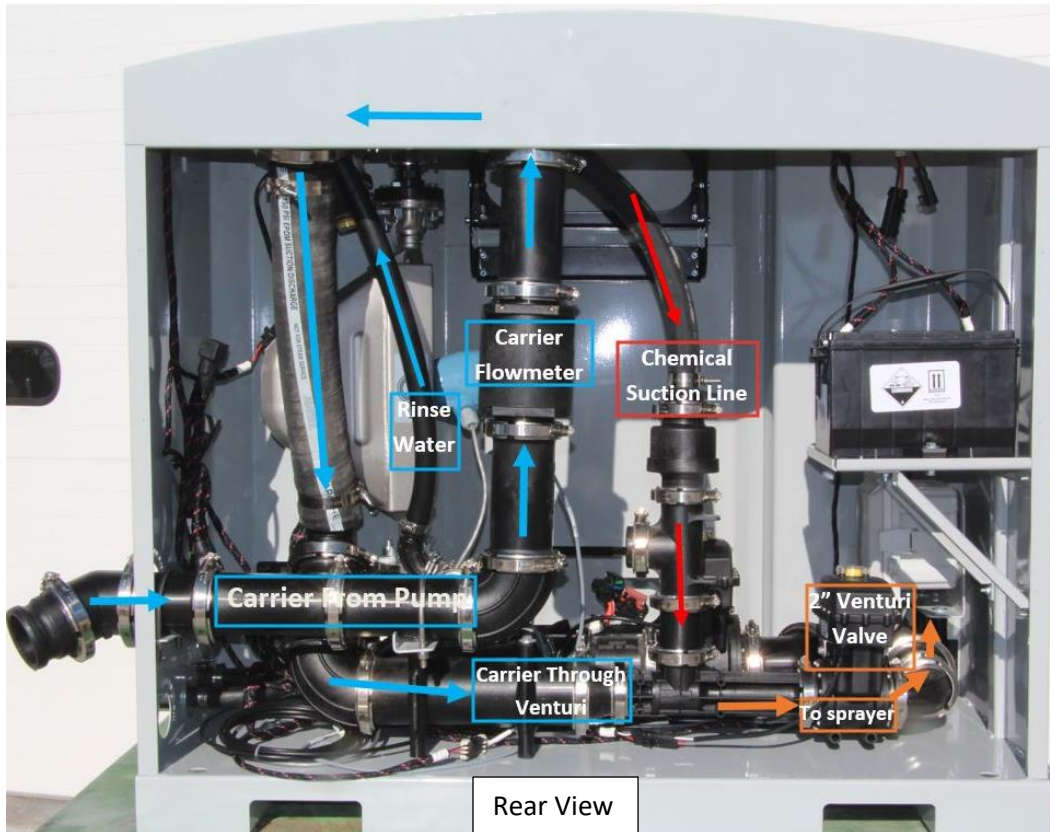
Inlet and outlet ports for optional eductor (inductor)

E-STOP: Push to close all valves and stop batch process.

Twist to reset after pushed.

Product 1 Valve: M220 Flange

Product 2-6 Valves: M200 Flange

OUTLET: Out to sprayer

Carrier/Product Plumbing and Flow

Rear View

When products are being added to a batch, the 2" valve is open so carrier flows through the Venturi (40 gpm). This creates a vacuum to suck each product from the tote as the valve for that product is opened. As it comes from the tote, the product passes through the Mass Motion flowmeter. The product then mixes with the carrier on the sprayer.

When all products have been added, the 2" valve closes, and the 3" bypass valve opens to allow full carrier flow (180-220 gpm depending on pump).

Front View
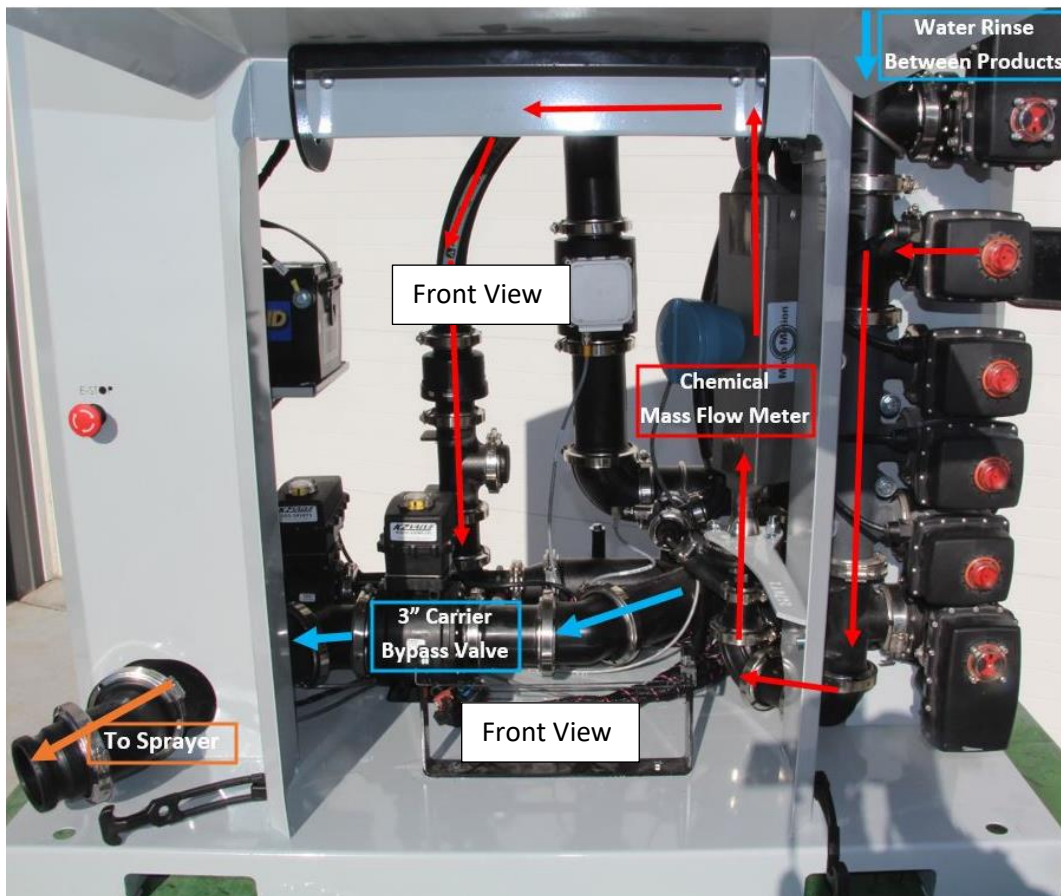
QuickDraw Max Dimensioned Drawing

[48.35in]
1228.08mm

[12.00in]
304.80mm

[30.71in]
780.01mm

12" OF CLEARANCE
NEEDED FOR EXTERIOR
QUICKDRAW PLUMBING
COMPONENTS

TOP VIEW

[43.51in]
1105.27mm
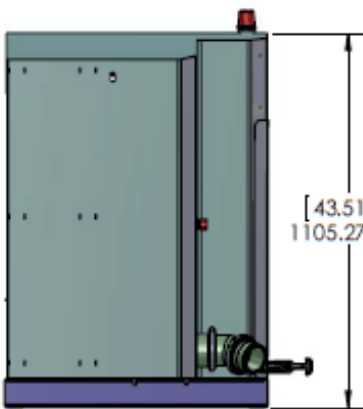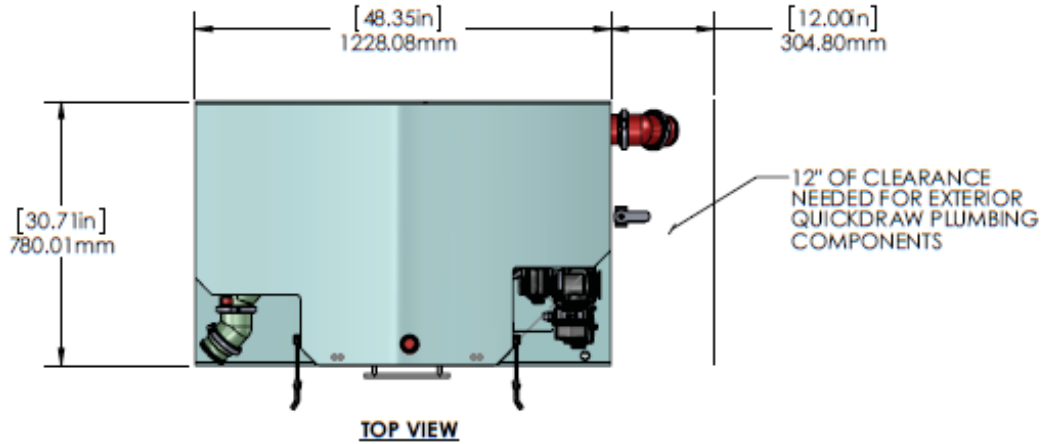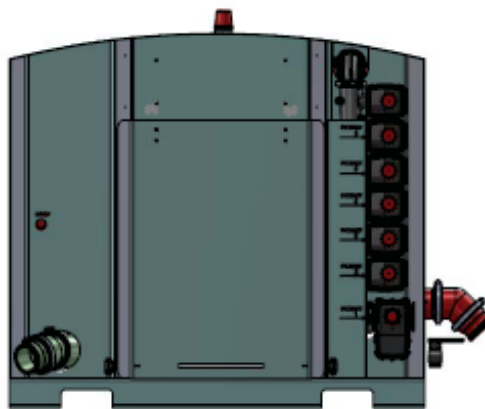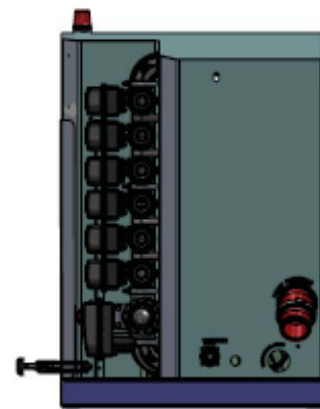
LEFT SIDE

FRONT

RIGHT SIDE
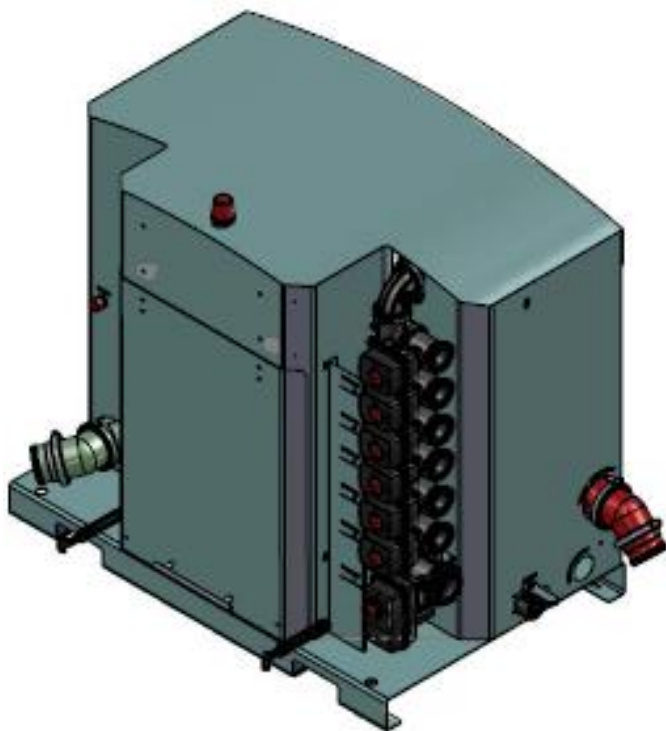
Floor Mounting – Holes across the front and back are 42 5/16" center to center.

Holes along the left and right sides are 28 7/16" center to center.

QuickDraw Max Connection Kits

First Table

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	100-075050RB	3/4" MPT x 1/2" FPT Reducer Bushing	1
2	100-075NIP-SH	3/4" Short Poly Nipple	1
3	100-075PLUG	3/4" Pipe Plug	1
4	100-075TEE	3/4" Poly Tee	1
5	102-200VSFCF	200 Series Manifold x 2" Male Quick Coupler Std Port Valve	1
6	105-200BRB	2" Manifold x 2" HB	1
7	105-220MPT-025	2" Full Port Manifold x 2" MPT with 1/4" Tapped Hole	1
8	105-150G	1 1/2" EPDM Gasket	1
9	105-200G-H	(FOR FC220s) 2" EPDM Manifold Gasket for 220 Series Manfiold Fittings	1
10	105-FC200	2" Manifold Clamp	1
11	105-FC220	2" Full Port Manifold Clamp	1
12	106-200C	2" Female Coupler x 2" HB	1
13	106-200D	2" Female Coupler x 2" FPT	1
14	113-06-038050	QC to MPT - 3/8" QC x 1/2" MPT	1
15	113-16-038025-45	3/8"QC x 1/4" MPT (Nickel Plated Brass) - 45 Degree	1
16	113-21-038038038	3/8"QC x 3/8"QC x 3/8" Stem TEE	1
17	113-50-038038	Valve - 3/8" QC x 3/8" QC	1
18	280-200-ENF-0002	2" Enforcer Fertilizer Solution Hose	1
19	281-038	3/8" OD Tube - 24"	1
20	350-TC231	T-Bolt Hose Clamp - 2.31 - 2.62" Diameter (fits 2" Enforcer)	2

Second Table

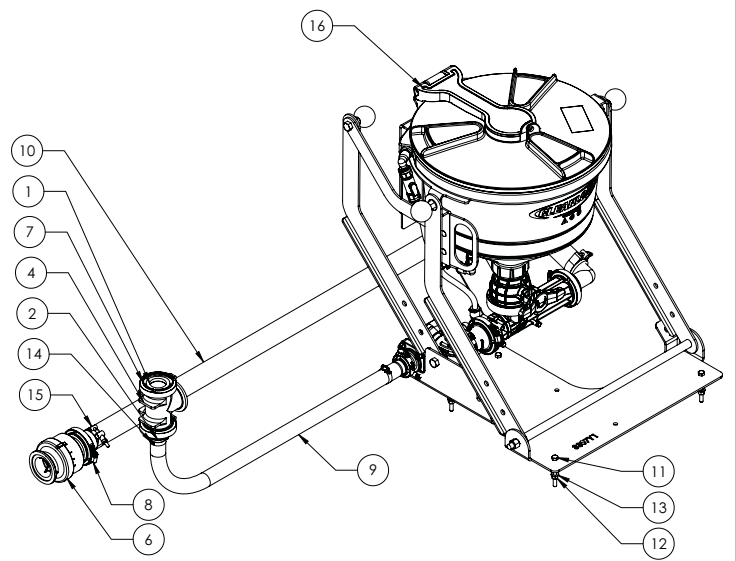| ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	102-200VSFCF	200 Series Manifold x 2" Male Quick Coupler Std Port Valve	1
2	105-150G	1 1/2" EPDM Gasket	2
3	350-TC181	T-Bolt Hose Clamp - 1.81 - 2.06" Diameter (fits 1 1/2" Enforcer or AG200)	2
4	105-200MPT-025	2" Manifold x 2" MPT (Tapped)	1
5	105-FC200	2" Manifold Clamp	2
6	105-200150BRB	2" Manifold X 1-1/2" Barb	1
7	106-200D	2" Female Coupler x 2" FPT	1
8	113-16-038025-45	3/8"QC x 1/4" MPT (Nickel Plated Brass) - 45 Degree	1
9	113-21-038038038	3/8"QC x 3/8"QC x 3/8" Stem TEE	1
10	113-50-038038	Valve - 3/8" QC x 3/8" QC	1
11	106-200150C	2" Female Coupler x 1-1/2" HB	1
12	281-02-038	Bulk 3/8" OD Poly Tubing - 6" Lengths	1
13	280-150-ENF-0002	1-1/2" Enforcer Fertilizer Solution Hose	1

QuickDraw Swing-Down Inductor Kit
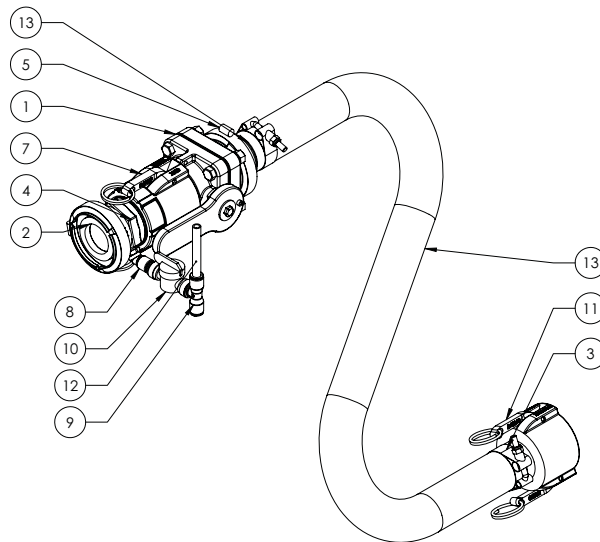
REVISIONS

REV.	DESCRIPTION	DATE
A-01	Original Drawing	9/2/2016
A-02	Added Dimension Sheet	3/8/2017
A-03	Added Dimension Sheet	3/8/2017
A-04	Changed QuickDraw Cabinet Rinse Plumbing	12/21/2017

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	105-150G	1 1/2" EPDM Gasket	2
2	105-200100BRB	2" Flange x 1" Hose Barb	1
3	105-200G-H	(FOR FC220s) 2" EPDM Manifold Gasket for 220 Series Manifold Fittings	1
4	105-200TEE	2" Flanged Tee Fitting	1
5	105-220150BRB	2" Full Port Manifold x 1 1/2" HB	1
6	105-220CV	2" Manifold Check Valve	1
7	105-FC200	2" Manifold Clamp	2
8	105-FC220	2" Full Port Manifold Clamp	1
9	280-100-AG200-Eductor	1" AG200 Hose	15
10	280-150-ENF-Swing Eductor	1-1/2" Enforcer Fertilizer Solution Hose	15
11	300-050300-5	5/16" x 3" G5	4
12	321-05	5/16" Nylock Nut	4
13	330-05	5/16" Flat Washer	4
14	350-1608	1" Hose Clamp	2
15	350-TC181	T-Bolt Hose Clamp - 1.81 - 2.06" Diameter (fits 1 1/2" Enforcer or AG200)	2
16	476-3313Y1	QuickDraw Venturi Eductor BOM	1

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN MM
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL **Steel**

FINISH

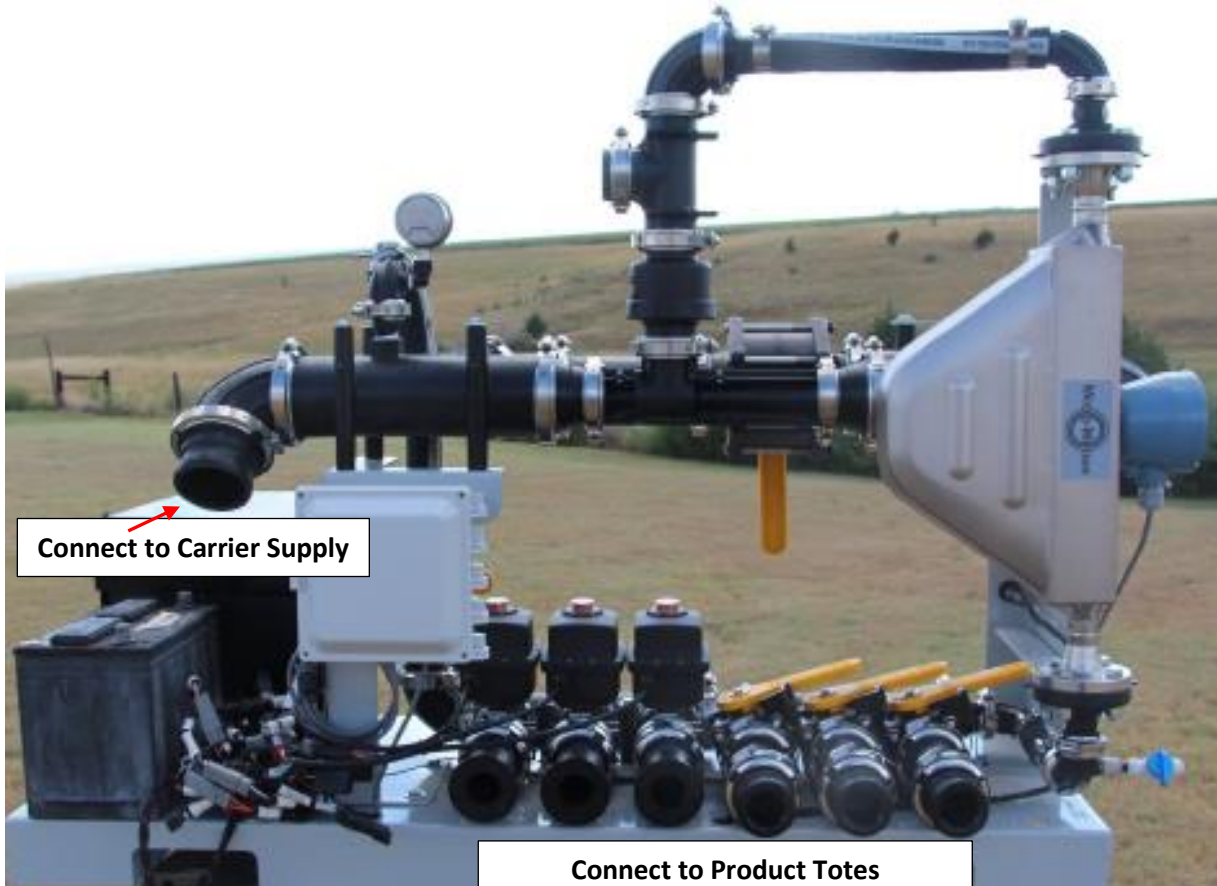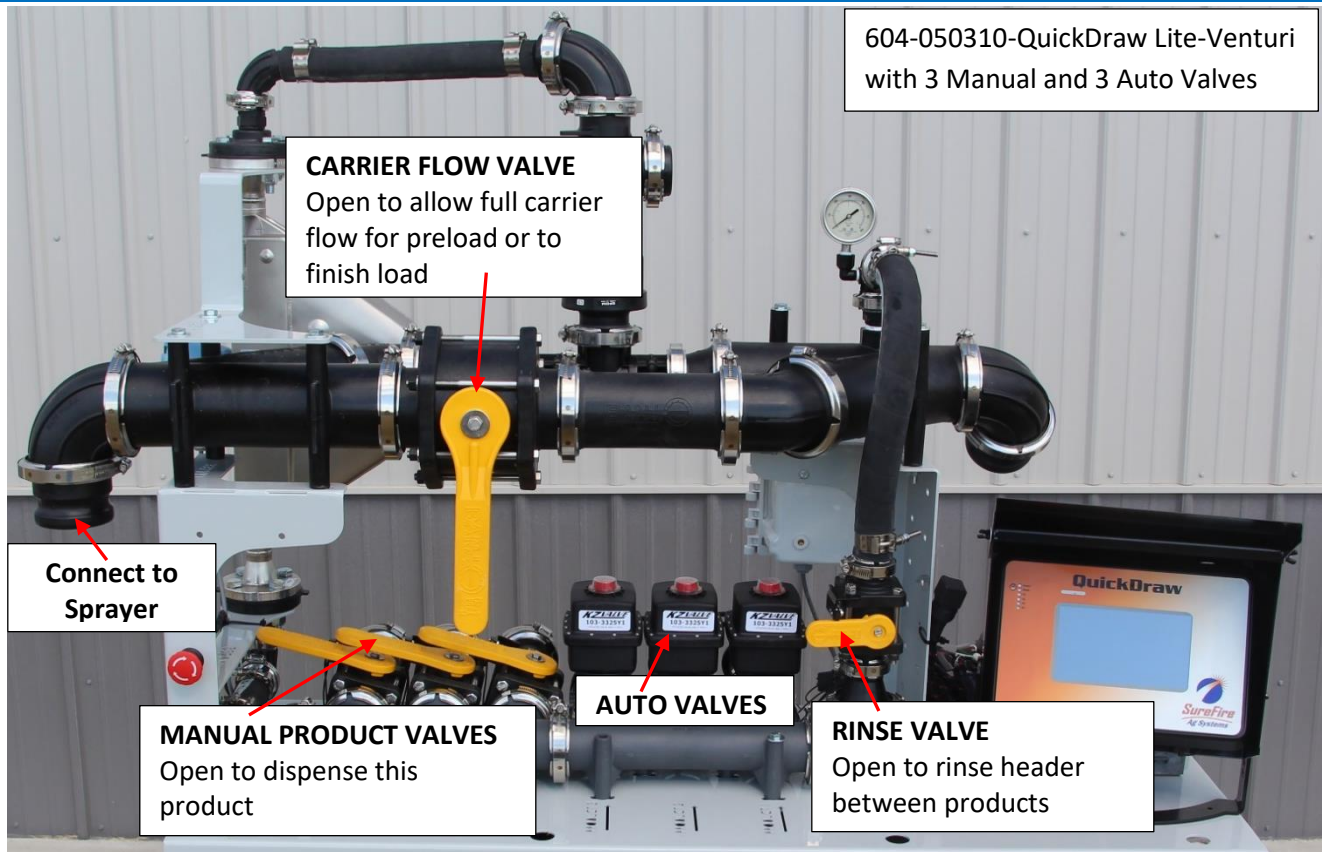|	NAME	DATE
DRAWN	Cedric Green	9/2/2016
LAST SAVED		12/21/2017
ENG APPR.		
MFG APPR.		
PROJECT	Spray Tender	

PROPRIETARY AND CONFIDENTIAL
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Third Angle Projection

SureFire Ag Systems

TITLE:
QuickDraw Swing-Down Eductor Kit w/ Venturi

SIZE **B** | DWG. NO. 606-02-100200 | REV A-04

SCALE: 1:8 | WEIGHT: | SHEET 1 OF 2

DO NOT SCALE DRAWING

[28.74in] 730.10mm

[27.40in] 696.05mm

3307Y1

[22.50in] 571.50mm

[26.74in] 679.32mm

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN MM
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL **Steel**

FINISH

	NAME	DATE
DRAWN	Cedric Green	9/2/2016
LAST SAVED		12/21/2017
ENG APPR.		
MFG APPR.		
PROJECT	Spray Tender	

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Third Angle Projection

DO NOT SCALE DRAWING

SureFire Ag Systems

TITLE:
QuickDraw Swing-Down Eductor Kit w/ Venturi

SIZE **B** | DWG. NO. 606-02-100200 | REV A-04

SCALE: 1:4 | WEIGHT:

QuickDraw Lite

604-050310-QuickDraw Lite-Venturi with 3 Manual and 3 Auto Valves

CARRIER FLOW VALVE
Open to allow full carrier flow for preload or to finish load

Connect to Sprayer

MANUAL PRODUCT VALVES
Open to dispense this product

AUTO VALVES

RINSE VALVE
Open to rinse header between products

Connect to Carrier Supply

Connect to Product Totes

QuickDraw Lite Operation

From the **MENU** screen you can access the other controller screens.

RUN PAGE brings up the **MANUAL PRODUCT** screen.

RESET TOTAL sets the Total at 0.00 GAL. Do this before loading each product.

AUTO PRODUCTS takes you to the Automatic Products screen shown to the left.

Enter the **SETPOINT** for the amount of each product in the batch.

Push **RESET TOTAL** for each product or **RESET ALL** to bring each Total back to 0.00.

Push **START** to automatically load a product. The controller will open and close the valve to get the correct amount.

After each product, open the rinse valve for 3-5 seconds to rinse the plumbing.

AUTO PRODUCTS PAGE 2 takes you to the screen for Valves 4, 5, and 6.

MANUAL CONTROLS brings up the Manual Operation and Debugging Screen.

Running a Batch with QuickDraw Lite

Calculate the amount of each product that will be needed in the batch.

Products can be loaded in any order.

Open the carrier flow valve for preloading and for finishing the batch with carrier.

Close the carrier flow valve when loading products.

Open the rinse valve for 3-5 seconds between products.

Enter the SETPOINTS for AUTO PRODUCTS before starting the batch. RESET TOTALS (to 0.00) for each product. (*Setpoints can be entered or changed and Totals can be reset while the batch is running, but not while that product is being loaded.*) An AUTO PRODUCT that is loading can be stopped by pressing STOP on that product.

To Load MANUAL PRODUCTS

1. Go to the **MANUAL PRODUCT** screen (RUN PAGE).
2. Press **RESET TOTAL** (to 0.00)**.**
3. Open the valve for the product. Close the valve when the desired amount has been loaded.
4. Open the **rinse valve** for 3-5 seconds to flush the header.
5. Repeat Steps 2-4 for all Manual Products.

To Load AUTO PRODUCTS

1. Go to the **AUTO PRODUCTS** screen (RUN PAGE > AUTO PRODUCTS).
2. Press **RESET ALL** or **RESET TOTAL** to set the Totals to 0.00.
3. Enter the **SETPOINT** for the desired amount of each product (if not already entered).
4. Press **START** for the product. The valve will close automatically when it reaches the setpoint.
5. Open the **rinse valve** for 3-5 seconds to flush the header.
6. Repeat steps 4 and 5 for each Auto Product.

    After all products are loaded, open the Carrier Flow Valve until the batch is completed.

    Kill the pump when the batch is complete.

QuickDraw Lite Warnings and Alarms

WARNINGS will not stop a batch but should be resolved to prevent a problem.

ALARMS will prevent a batch from running and must be resolved before continuing.

QuickDraw Lite Manual Operations and Debugging

MANUAL OPERATION AND DEBUGGING

	POSITION SETTING	COMMAND POSITION	ACTUAL POSITION
VALVE 6 — VALVE DISABLED	0	0	0
VALVE 5 — VALVE DISABLED	0	0	0
VALVE 4 — VALVE DISABLED	0	0	0
VALVE 3	0	0	0
VALVE 2	0	0	1
VALVE 1	0	0	0

CARRIER FLOW
0.0 GAL
0.0 GPM
RESET TOTAL

MASS MTR FLW
0.00 GAL
0.0 GPM
RESET TOTAL

MASS METER DATA   START PUMP   KILL PUMP   CLOSE

To manually operate a valve, press on that valve on this screen. An ON/OFF switch will appear. Press ON to open the valve. Press the valve again to bring back the switch. Press OFF to stop the flow.

Manual Control Help

Carrier/Mass Meter Flow
Displays flow rate and a resetable totalizer for each meter.

Valve Icons
Touching the valve brings up a control switch and allows the user to manually open a valve. Off to the side of the product valves position setpoint, command, and actual position are displayed. Once a product valve is opened, the user can click on position setting and regulate the opened valve by entering a percentage open.

Start/Kill Pump
If the pump control is wired into the controller, the pump can be stopped and started off of these buttons.

Valve Error Message
If a product valve is experiencing communication, "Comm LOS" (Loss Of Signal) will be displayed by the valve.

MASS METER DATA

Tube Frequency	0.00	Hz	Mass Flow	0.00	lbs/min	
Left Pickoff	0.00	mV	Mass Total	0.0	lbs	
Right Pickoff	0.00	mV	Mass Inventory	0.0	lbs	
Drive Gain	0.00	%	RESET TOTALS			
Product Density	0.00	lbs/gal	Flow Rate	0.00	GPM	
Temperature	0.00	°F	Volume Total	0.0	GAL	
Pressure	0.00	PSI	Volume Inventory	0.0	GAL	

QuickDraw Lite System Settings
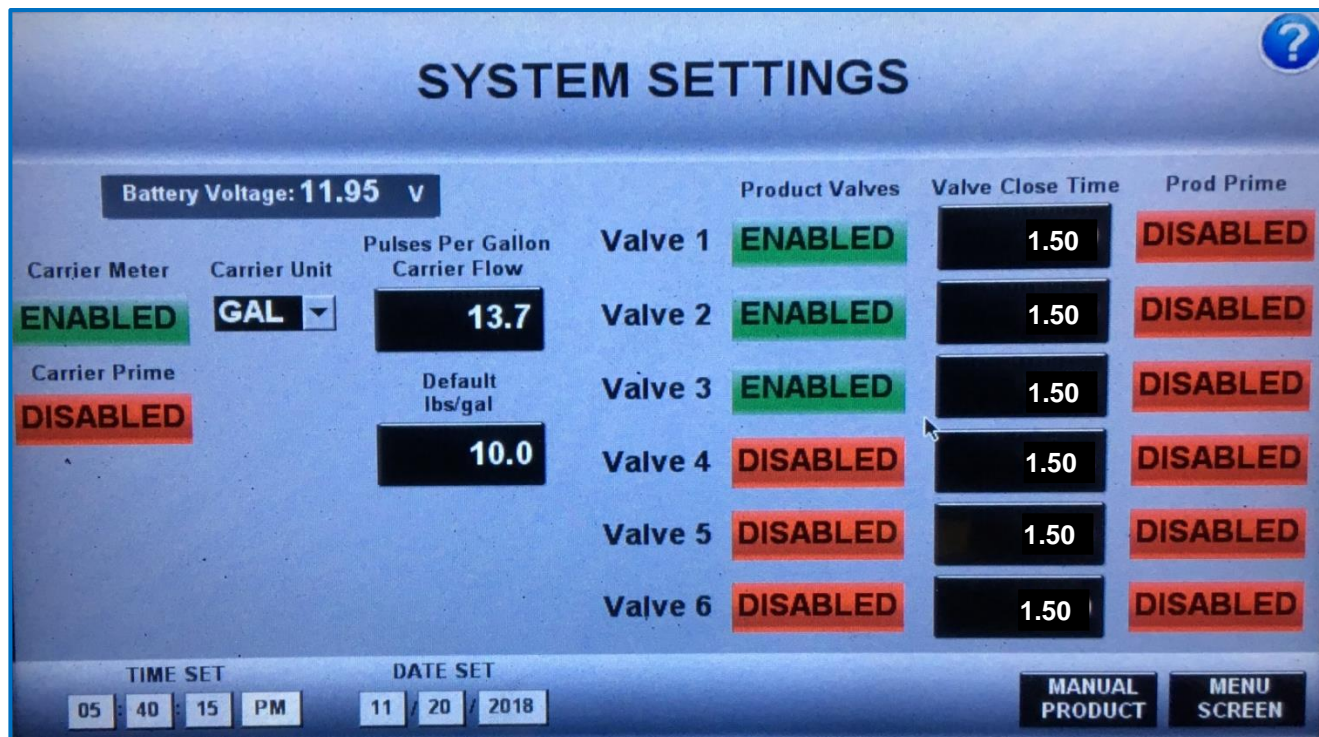
If a flowmeter is installed for the Carrier, set **Carrier Meter** to **ENABLED.** Adjust Pulses per Gallon as needed.

When Carrier supply has run empty or when starting with empty lines set **Carrier Prime** to **ENABLED** so the controller will give it time to prime before shutting down for a flow error.

Set electric automatic valves to **ENABLED.** Default **Valve Close Time is 1.5 seconds.** If the batch is overshooting the target, increase this number because the valve needs more time to get closed on time. If the batch is undershooting, lower this value. 1" valve default is 1.5 seconds.

When connecting a new tote, set **Prod Prime** to **ENABLED** on the first batch, so the controller won't time out before the hose gets filled with the new product.

QuickDraw Lite Maintenance Screen

DO NOT RESET VALVE ADDRESSES UNLESS DIRECTED BY SUREFIRE SUPPORT !

Glossary of Terms

Batch—A combination of carrier (water) plus chemicals that will be measured and put in the sprayer at a specific moment in time for a specific use.

Calculation Mode—The method that the QuickDraw controller will use to calculate the amount of carrier and the amount of each product (chemical) that is needed for a batch. The 4 modes are Gallons and Application Rate, Acres and Application Rate, Volume, and Acres and Carrier Rate.

Carrier—Typically water. Could be a liquid fertilizer product that is used as the carrier liquid in a spray batch.

E-stop—Emergency stop. Push the red button on the front of the QuickDraw cabinet to close the valves and stop the loading process. If wired to do so, this will also kill the pump. Twist to reset.

Final Rinse—A flushing of the product valve stack header after all chemicals have been dispensed. The Default and Minimum is 10 seconds. It can be set for a longer time if desired.

History—The record of each batch that is made. Contains Batch ID number, Farm, Field, Recipe, Date, Time, Wind Speed and Direction, Temperature, Products used, rate per acre and total amount of each product, rate per acre and total amount of carrier, name and EPA ID of each chemical product, Total volume of batch, application rate intended for batch, and number of acres batch was mixed for. The history can be transferred from the controller to the iPad, and then emailed as a PDF or as a csv file.

Job—All the information needed to create a batch. The job has the information of Farm, Field, Recipe, carrier and product (chemical) names and rates, mixing order, pre-rinse time, volume of product to use, how much carrier to preload to the sprayer, calculation mode used, total acres, total volume, application rate.

Manual Products—These products include small-package liquids, dry flowables, and powders. Each recipe can include up to 5 manual products. They are part of the recipe and are manually added to the batch. Also, low-volume liquids will be added manually (Venturi Suction system—0.5 gal or less. Pump Suction system—1.0 gal or less.)

Mass Meter—The Micro Motion mass flowmeter used to measure the product dispensed.

Mix—Same as recipe.

Pre-Load—An amount of carrier that will be pumped into the sprayer before any chemicals are added.

Prod Rinse—A flushing of the product valve stack header with carrier prior to the addition of a chemical. Designed to prevent any unwanted mixing of chemicals prior to reaching the sprayer. Typically, this is set as a 3-5 second rinse. The Default and Minimum is 3 seconds. It can be set longer if desired.

Product—A chemical (could be a herbicide, insecticide, pesticide, etc.) that will be mixed into a spray batch. A product can either be in a tote attached to a QuickDraw valve to be automatically dispensed into the mix or can be a manually added product (can be liquid or dry).

Pump Suction—The transfer pump is located on the Quick Draw outlet. Suction from the pump is utilized to draw chemical products through the mass meter and into the batch.

Recipe—A set of instructions that tells which carrier and which products (chemicals) to use, the rate per acre to use, the order in which they should be added, and the pre-rinse time for each product.

SSID—The WIFI network name to which the iPad will connect to interact with the QuickDraw controller.

Tote—Tote, shuttle, or tank that holds a chemical that is connected to one of the QuickDraw valves and that will be metered automatically into a batch.

Venturi Suction-- The transfer pump is located on the QuickDraw inlet. It pushes water across a venturi to create suction which draws chemical products through the mass meter and into the batch.

INDEX