

# 396-3052Y1



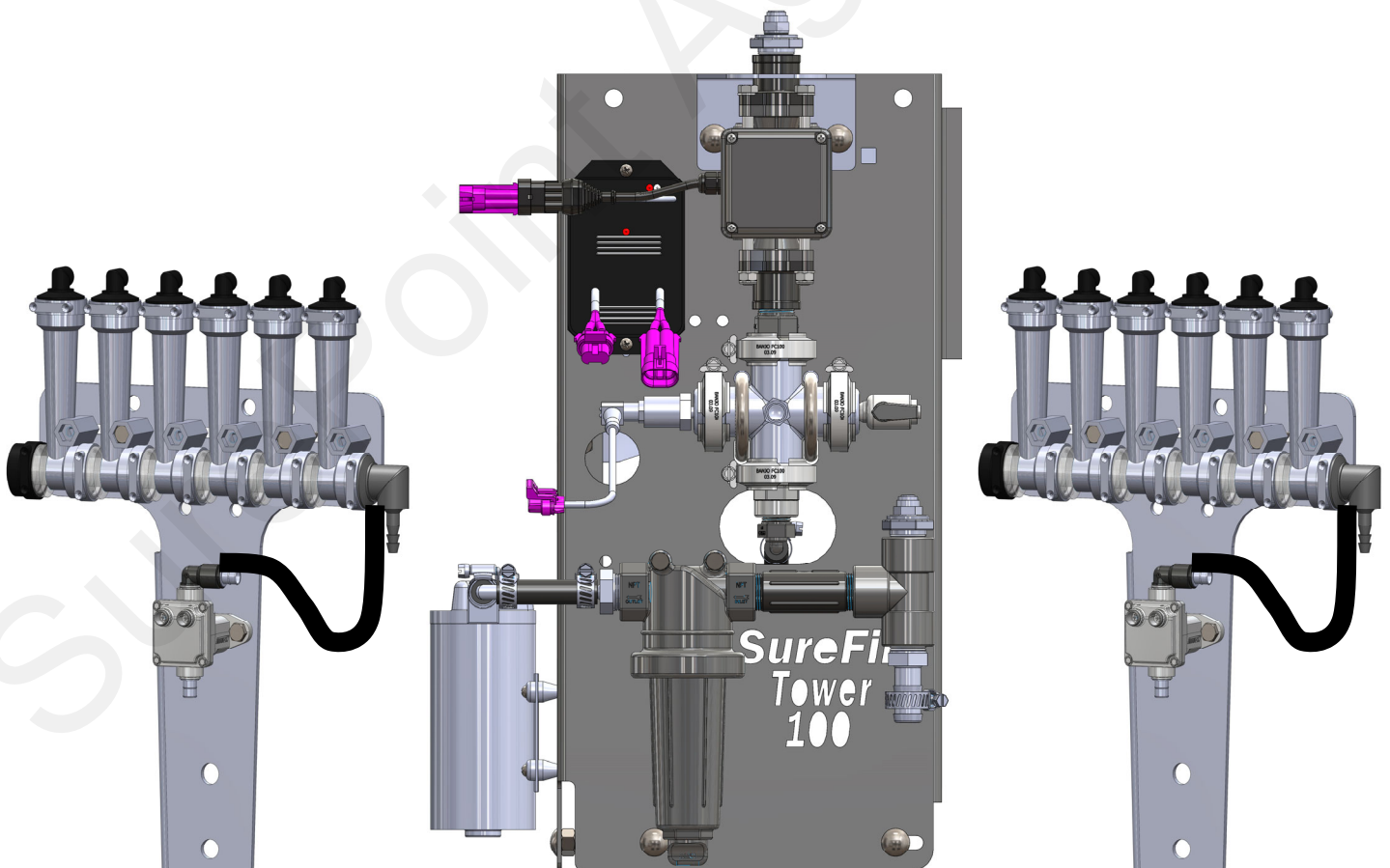
## NUTRISPHERE-N<sup>®</sup>

Nitrogen Fertilizer Manager



## VERDESIAN

### *SurePoint Catalyst™ Electric Pump System*



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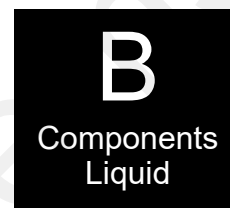
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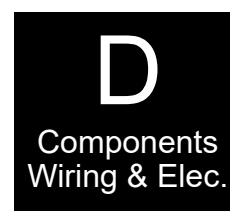
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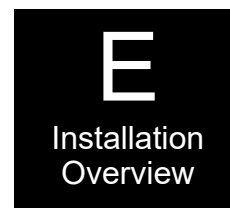
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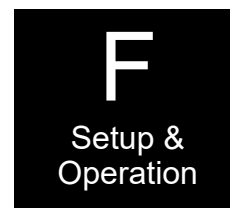
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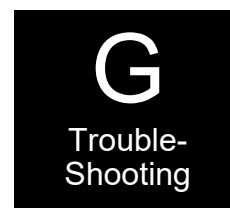
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# Read Me First

The SurePoint *Catalyst™* system is designed to give accurate and even row-to-row distribution of NutriSphere-N NH<sub>3</sub> at a normal rate of 32 oz/acre. It has the capacity to deliver higher rates if desired.

## **Note: Ounces/acre, not gallons/acre.**

The Ag Leader display can be set to measure this product in fluid ounces or in gallons.

Ounces per acre means a very small amount of liquid is being pumped and distributed. At 6 mph on 30" row spacing, a rate of 32 oz/acre means that each row has a flow of just under 1 oz/min. On a 12-row implement, the total amount being pumped, therefore, is less than 12 oz/min. The SurePoint *Catalyst™* system is engineered to accurately and evenly distribute this flow.

## **Low Flow Electromagnetic Flowmeter**

The SurePoint *Catalyst™* system utilizes an electromagnetic flowmeter (with no moving parts) that is designed and built to accurately measure flows down to 10 oz/min. SurePoint has proven the reliability and accuracy of the electromagnetic flowmeter by years of use in the field with thousands of flowmeters.

## **Dual Metering Tube Distribution**

The low flow to each row will be evenly distributed through metering tubes that have an opening of 0.080" in diameter. An orifice that could distribute this flow would be 0.015" or less in diameter. An orifice of that size is easy to plug. The 4 to 5 times larger diameter of the tube greatly reduces the risks of plugging.

The use of two tubes to each row (dual tube system) means that this system has the ability to handle a wide variation of rates and speeds (from 5 to 10 mph) and to do this under a wide range of temperature changes where the viscosity of the product changes.

## **Flow Indicators**

The flow for each row will pass through a flow indicator that has a ball that will float to indicate flow to that row. This will give an immediate visual indication of flow to each row. While the flow indicators give a good indication of the flow to each row, they are not always an indicator of the exact flow to each row. Only a catch test will verify the evenness of the row-to-row distribution.

## **Tool Box**

Each *Catalyst™* system comes with a built-in tool box that contains mission-critical spare parts to reduce equipment downtime.

## **Product Tank**

The *Catalyst™* comes with either a 55 gallon or a 110 gallon tank. The large tank would allow over 400 acres of application at the 32 oz/acre rate.

## **Rinse Tank**

Each system comes with a 3-gallon rinse tank that can be filled with RV anti-freeze to allow the system to be flushed when it will not be used for a few days and to be protected from freezing after the rinse.

## **Electric Section Valves**

Implements that are 60' wide or wider can be split into 2 sections to allow section control. Standard single section setups are equipped with electric shutoff valves on each flow indicator manifold set to allow for a quicker return to Target Rate when application resumes. Two-section systems will have the same manifold shutoff valves but can be configured so the valves on the left half of the implement will function as Section 1 and the valves on the right half as Section 2.

*(Note: Due to the low flow rates with this product, on a 20' wide section flow control may be erratic under 6.5 mph at the 32 oz/acre rate.)*

# Getting Started

## A

### Introduction

This manual contains the information for the SurePoint Tower 100 *Catalyst* system for NutriSphere-N NH<sub>3</sub>.

Changes to components or configuration settings may be made to improve the operation of the system.

Go to Section F for the instructions on setting up your display.

## General Information

You have purchased a SurePoint NutriSphere NH<sub>3</sub> application system for your equipment. This system can be controlled by:

- John Deere Rate Controller
- Ag Leader Liquid Product Control Module
- Trimble Field-IQ Rate and Section Control Module
- Case IH Pro 700 with AccuControl
- SurePoint Commander II controller

*Note: SurePoint Ag Systems also has the SurePoint Torpedo system, a complete anhydrous ammonia application system. See [www.SurePointag.com](http://www.SurePointag.com) for more information.*

## Basic Installation Steps

1. Have your control module and display in the cab connected and set up by the dealer for your display and controller. *To apply anhydrous ammonia and NutriSphere-N NH<sub>3</sub> you will need 2 Liquid Product Control Modules, one for the anhydrous ammonia and one for the NutriSphere-N NH<sub>3</sub>.*
2. Open the packages and familiarize yourself with the components. See the System Overview Examples on the following pages to see the big picture of how SurePoint systems are installed. Refer to manual sections B & D for component information.
3. Mount the Tower and tank on your equipment.
4. Install the plumbing kit including flow indicator columns, check valves, and metering tube plumbing to each row unit delivery point. See section B for information on these components.
5. Attach harnesses as shown in Section D.
6. Set up Controller for SurePoint system as shown in Section F.
7. Fill system with water, conduct initial operation and tests per Section F.
8. Winterize system with RV Antifreeze if freezing temperatures are expected.

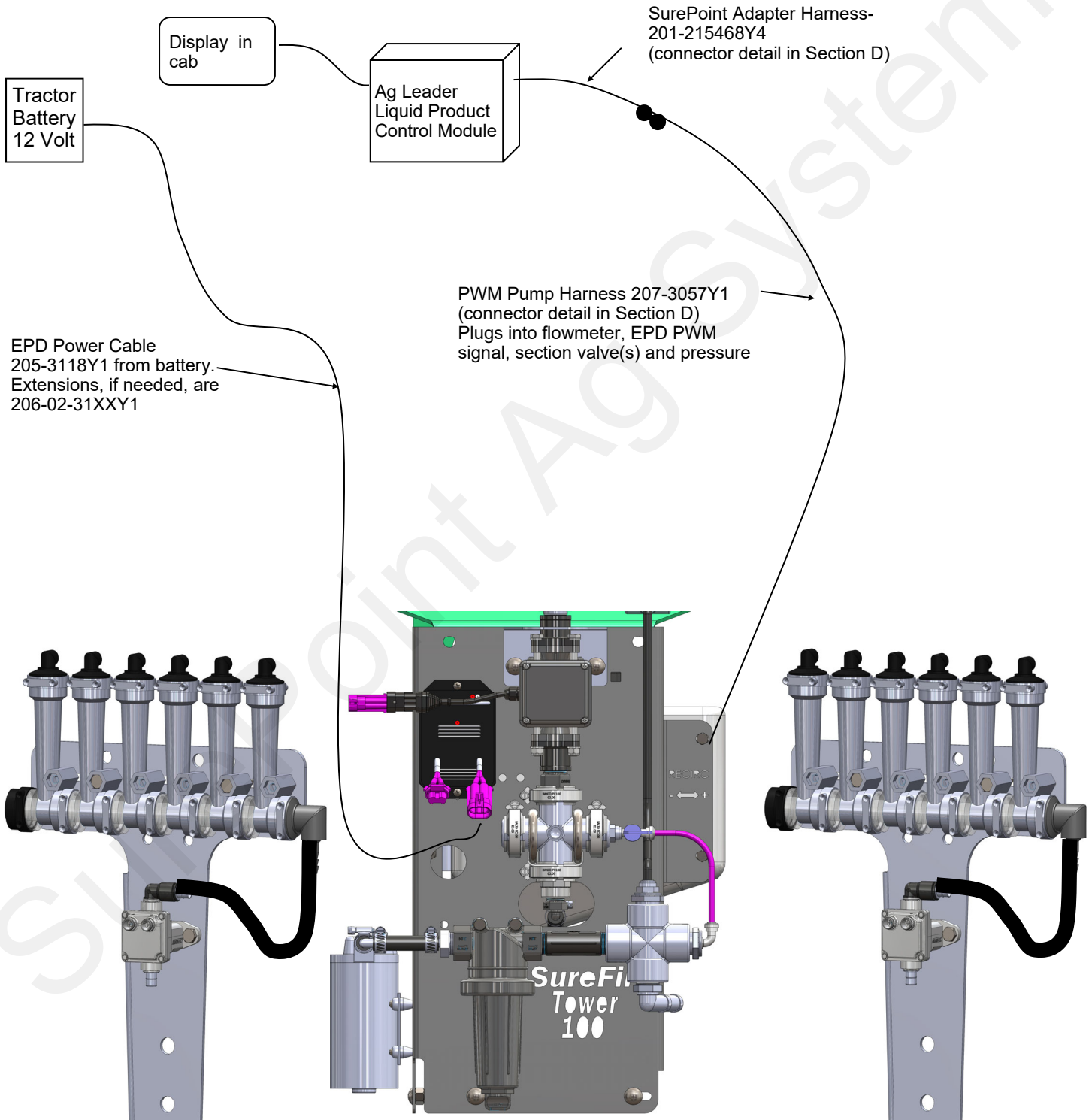
# System Overview

# A

Introduction

The following gives a layout of the SurePoint Tower 100 *Catalyst* system with these components:

- Controller display in cab (Ag Leader Integra)
- Ag Leader Liquid Product Control Module
- Tower 100
- Flow Indicators with a ZIP valve on each manifold



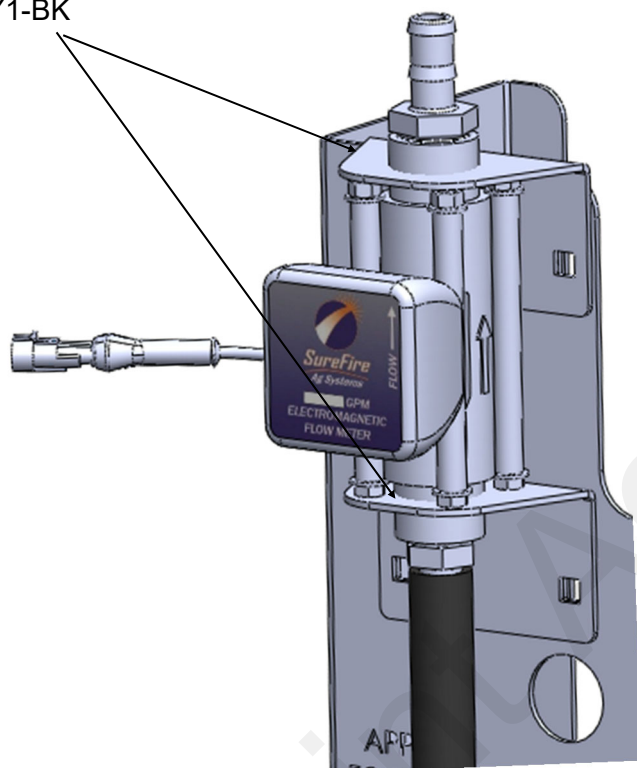
# Electromagnetic Flowmeter

204-01-4621CUF05  
0.08 to 1.6 GPM (10 oz/min to 205 oz/min)

B

Components  
Liquid

Mounting Bracket,  
Used in Tower 100  
410-2106Y1-BK



Electromagnetic flowmeters are superior to traditional turbine flowmeters in two basic ways. First, they have no moving parts. This translates into no wear items or potential for contaminants to jam a spinning turbine.

Second, electromagnetic flowmeters detect the flow by electrically measuring the velocity of the liquid, which makes them independent of viscosity or density of the fluid measured. They are extremely accurate using the standard calibration number. SurePoint still recommends you perform a catch test to verify the system is properly installed and configured.

*This flowmeter is rated down to 10 oz/min, but will accurately measure flows down to 8 oz/min. Below that rate, the flowmeter may not give a continuous pulse output.*

*On the Ag Leader Integra, the flow cal number will be set at 22,710 pulses per gallon. The NutriSphere-N NH3 product can be set up to show fluid ounces or gallons on the Ag Leader display.*

**Caution: Before welding on the implement, disconnect the flowmeter or damage to the flowmeter electronics may occur.**

**Do not power wash the flowmeter. High pressure spray directed at the back edge of the face plate or at the wire connector may allow water into the flowmeter electronics.**

## Section Valves and Flow Indicator Manifold Shutoff Valves ZIP Valves

# B

Components  
Liquid



ZIP valve on right shown with both electrical connectors plugged in (if daisy-chaining from one to the next). Outlets can be plumbed with a variety of fittings depending on the particular scenario.



### Flow Indicator Manifold Shutoff Valves

Single-section systems will have electric shutoff valves (ZIP Valves) on each bank of flow indicators. These valves will be controlled by the Section 1 Connector. A 4' Y Adapter Cable (201-215604) will be plugged into the Section 1 connector on the Pump harness (207-215223Y2). One end of the Y will connect to the valves on the left side of the machine, the other end of the Y will connect to the valves on the right side of the machine.

### Section Control

Some systems (60 ft. and wider) may be set up as 2-section implements, so half of the applicator can be shut off in an overlap situation.

These systems will still have the flow indicator shutoff valves, but the valves on the left half of the machine will be plugged into the Section 1 connector on the harness and the valves on the right half of the machine will be plugged into the Section 2 connector.

Implements less than 60 feet wide need to be configured as one section for the NutriSphere N-NH3 product, since the output for narrower sections will drop below the range of the flowmeter at lower speeds.

### 3-Pin Wiring Connector:

Pin A—Red, 12 Volts +

Pin B—Black, Ground -

Pin C—White, Signal

12V=on ; 0V=off

# Pressure Sensor

The Tower 100 comes equipped with a 0 to 5 volt 100 psi pressure sensor to work with your controller. This sensor for the Ag Leader system is a 3-wire type sensor. The Commander II uses a 2-wire sensor. The sensor has a 1/4" MPT fitting.



Your display will show the system pressure on the in cab screen.

**The pressure reading is only for informational purposes and is NOT used in the flow control process.** Flow control uses the flowmeter feedback only.

The pressure sensor is very helpful to optimize system performance and troubleshoot any issues.

The pressure transducer is factory calibrated and will display a very accurate pressure reading on your display. No manual gauge is required.

*When attaching connector to pressure sensor, make sure pins are aligned so they are not bent. When setting the Pressure Sensor calibration in the display, unplug the sensor so it will properly set the 0 point at 0.0 volts.*

Pressure Sensor (3 wire type) with harness  
521-05-050150

3-wire sensor  
Pressure Calibration:  
50 mv/psi

# Pump Priming and Air Bleed Valve

An air bleed valve is included with each pump to aid in system priming. It is shipped in the pump accessories bag and must be installed during system installation.

## Why use an air bleed valve:

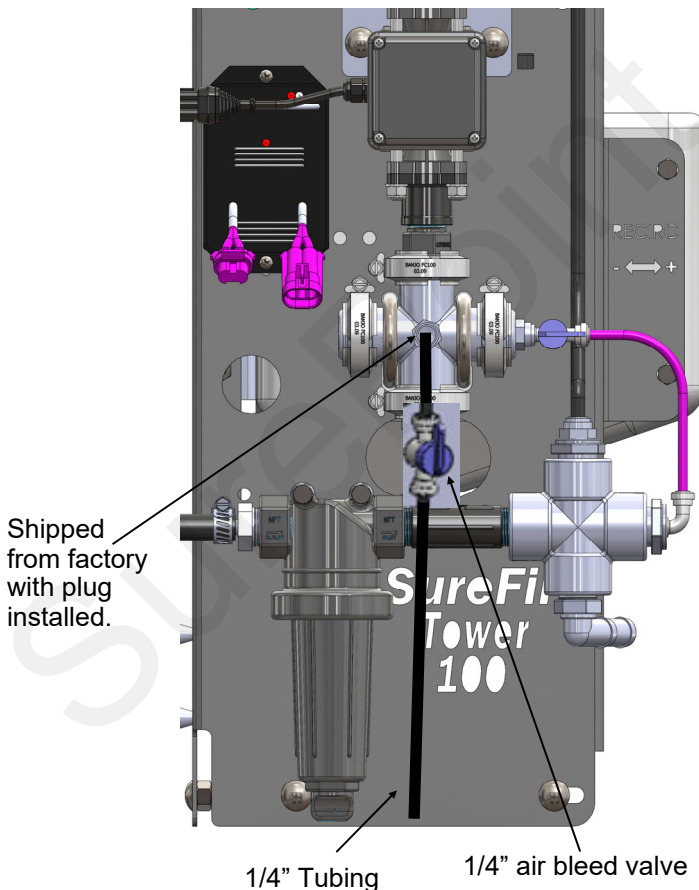
Your system is equipped with a row shutoff valve on each row. These valves do not let air escape from the system. 12 volt liquid pumps are not good air compressors. Therefore, the pump can struggle to prime due to air trapped on the outlet side of the pump.

The air bleed valve is a small 1/4" valve that when opened lets air escape from the pump outlet at zero pressure. Open until liquid comes out and then close the valve.

## How to install the air bleed valve:

Remove the 1/4" plug from the quick connect fitting on the center cross on the Tower (see picture). Next, insert the 1/4" tubing in the quick connect fitting. Run the 1/4" tubing to an easily accessible spot on your equipment. Next, cut the tubing and push the 1/4" valve onto the tubing. Finally, run the tubing to a low location where any product that escapes will run on the ground.

**Be sure the air bleed valve tube does not become plugged with dirt or it will not allow air to bleed.**





# Product Distribution



To assure proper and even distribution to each row, the product being applied must be metered to each individual row. This metering is done by using metering tubes which create back pressure so an equal amount of liquid is applied to each row.

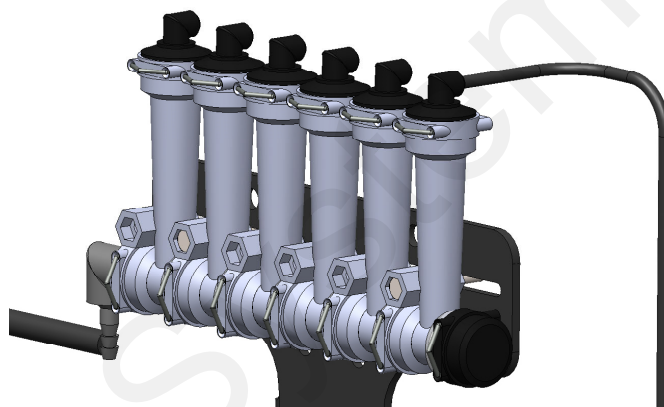
## Floating Ball Flow Indicator & Manifold System

Flow indicators give a clear visual signal that liquid product is flowing to each row. These indicators use an o-ring and wire clip connection to snap together in any configuration necessary.

The flow for each row will pass through a flow indicator that has one or two balls that will float to indicate flow to that row. This will give an immediate visual indication of flow to each row. While the flow indicators give a good indication of the flow to each row, they are not always an indicator of the exact flow to each row. Only a catch test will verify the evenness of the row-to-row distribution.

*For most applications of NutriSphere-N NH3 at 32 oz/ acre, the Green Plastic ball gives a good flow indication. If a heavier ball is needed, use the Red ball.*

*On this low-flow system, the flow appears to be more stable if only one ball is used.*



### Parts List

#### Complete Columns

701-20460-920-GR-V Single Low Flow Column with 1/4" QC - 90 Degree Outlet

#### Fittings

701-20516-00 ORS x 1/4" QC - 90 Degree

701-20521-00 Wilger End Cap  
701-20523-00 ORS Male x ORS Female x 3/8" FPT - Isolator  
701-20525-00 ORS Male x ORS Male x 1" FPT - Tee

#### Brackets & U-Bolts

400-1037A1 3-6 Row Bracket  
400-1036A2 7-12 Row Bracket  
400-2011A1 White Backer Plate for 3-6 Row Bracket  
400-2010A1 White Backer Plate for 7-12 Row Bracket  
400-1315A2 Flow Indicator Bracket, 6-8 in wide hitch mount

#### Service Parts Only

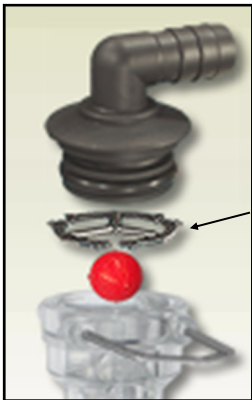
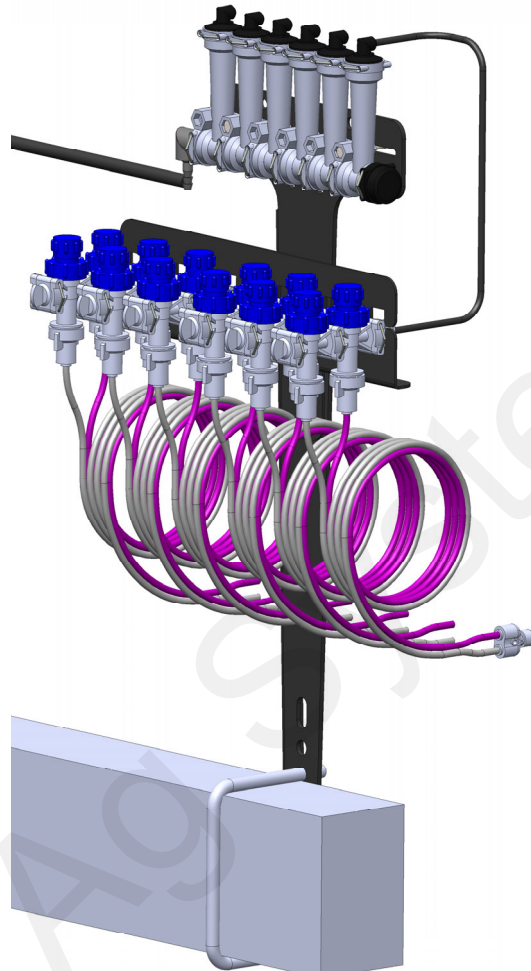
701-20470-00 Low Flow Column  
701-20460-04 Wilger Lock U-clip  
701-20460-05 Flow Indicator Ball - 1/2" SS Ball  
701-20460-06 Flow Indicator Ball - Maroon Glass  
701-20460-07 Flow Indicator Ball - Red Celcon  
701-20460-08 Flow Indicator Ball - Green Poly  
701-20460-09 Flow Indicator Ball - Black Poly  
701-20460-15 Viton O-Ring for column & fittings  
701-40225-05 Viton O-Ring for Orifice



# Flow Indicators and Dual Check Valves

**B**  
Components  
Liquid

Some systems may have a dual check valve system with two metering tubes as shown at the right. On this system, flow can be directed to the small tube, or to the large tube, or to both tubes by opening or closing the valves by twisting the blue caps.



Ball retainer—If top is removed, be sure that the ball retainer is in place when top is reinstalled.

Assembly of top of flow indicator tube

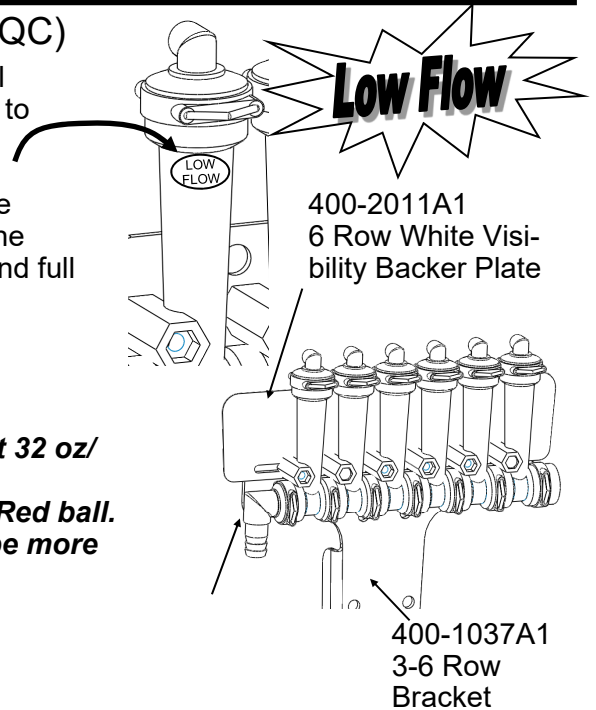
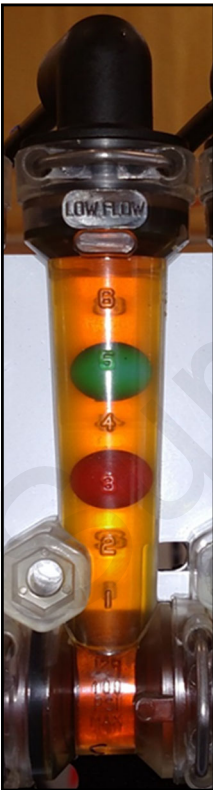
## Low Flow Column (mostly 1/4" QC)

The low flow column has a smaller internal diameter. This means a heavier ball can be used to monitor a smaller flow.

Externally, the low flow column can only be identified by "Low Flow" molded into one side of the column. All the same fittings work with low flow and full flow columns.

## Floating Balls

**For most applications of NutriSphere-N NH<sub>3</sub> at 32 oz/acre, the Green Plastic ball gives a good flow indication. If a heavier ball is needed, use the Red ball. On this low-flow system, the flow appears to be more stable if only one ball is used.**



# Metering Tube Plumbing Kits

# B

Components  
Liquid

The SurePoint *Catalyst* Tower 100 NutriSphere-N NH3 system comes with a dual metering tube distribution system. These plumbing kits will contain everything you need to distribute product from the flowmeter outlet down to the ground application device.

For most applications of NutriSphere-N NH3 at 32 oz/acre on 30" rows, the purple tube will be the tube that is used. When applying in cold weather and/or at high speeds, it may be necessary to use the blue tube. The system will work at pressures up to 50 PSI, but for prolonged use above 45 PSI, consider switching to a larger tube.

## Dual Advantage of Dual Metering Tube

Metering tube provides a larger passage way diameter than a comparable orifice. Typical NutriSphere-N NH3 applications apply around 1 to 1.5 oz/min/row. An orifice for this rate would have a 0.015" diameter opening. The SurePoint system uses metering tubes with diameters of 0.080" (Purple) and 0.096" (Blue). This 12' tube with more than three times the diameter creates a system resistant to plugging while providing excellent row to row distribution.

By using two metering tubes, the system can provide the proper system pressure as the product properties change due to temperature, mixtures and other factors.



Standard Orifice

Metering Tube

## Field Operation of Dual Metering Tube

The best tube to use may change based on temperature, application speed, and product batch.

**SurePoint recommends you start with the Purple tube** (for typical 32 oz/ac and 30" row spacing). Conduct a manual test with a simulated speed and target rate to determine your system pressure. Recommended pressure is between 10-40 PSI.

The system will operate up to 55 PSI. If prolonged application with pressures above 45 PSI is anticipated, consider changing to the blue tube. (Shortening the purple tube will also reduce pressure. All tubes must be the same length.)

If the pressure is below 10 PSI in the purple tube (this would probably be on low speed applications with warmer temperatures where the product is thinner), consider getting a set of gray tubes (0.060"). The system will operate in the 5 to 10 PSI range, but as the pressure decreases, row-to-row variation may increase. Only a catch test will verify row-to-row distribution.

*Note: Flow tests with water will have very different pressure readings than what the system will have with NutriSphere-N. The pressure will be much less with water for a given flow than with NutriSphere-N.*

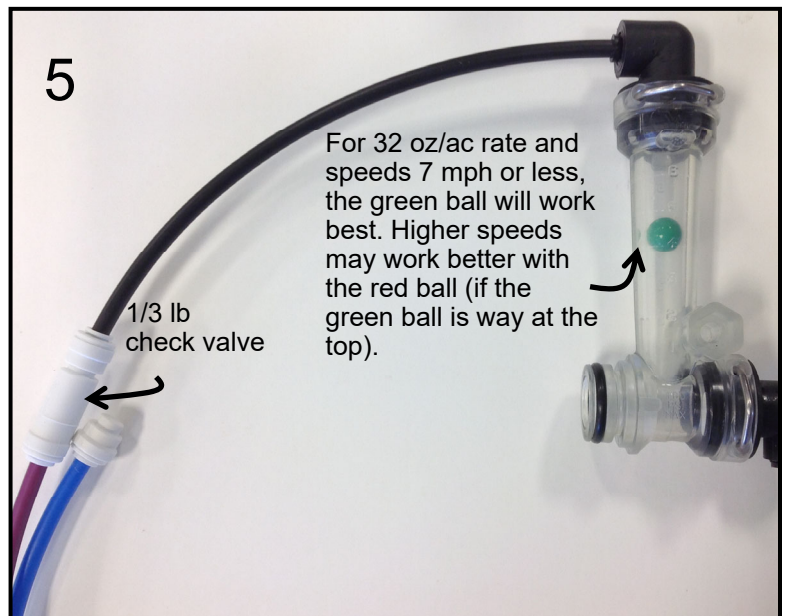
## Typical plumbing setup

Your shanks and plumbing setup may vary from those shown here.

The 4' green tube delivers the product to the shank.

1. Slide a 2' piece of 3/8" hose over the green tube along with 2 clamps.
2. Slide the green hose in the tube on the shank as far as it will go.
3. Slide the 3/8" hose down over the tube. Clamp 3/8" hose at the top and at the bottom.
4. Connect purple tube to green tube with 1/4" QC x 1/4" QC. Cap both ends of the blue tube. Blue tube will be used when cold weather and/or high speeds create too high pressure in purple tube.
5. Connect purple tube to appropriate length of black tube with 1/3 lb 1/4" QC check valve. Connect this black tube to top of flow indicator.

**B**  
Components  
Liquid



# Shanks and Knife Points available from SurePoint Ag Systems

SurePoint Ag Systems and Verdesian have worked closely with an established shank manufacturer to develop a shank and several knife points that will deliver the anhydrous ammonia and NutriSphere-N NH3 where it needs to go. They will be able to advise users on the best setup for their application scenario.



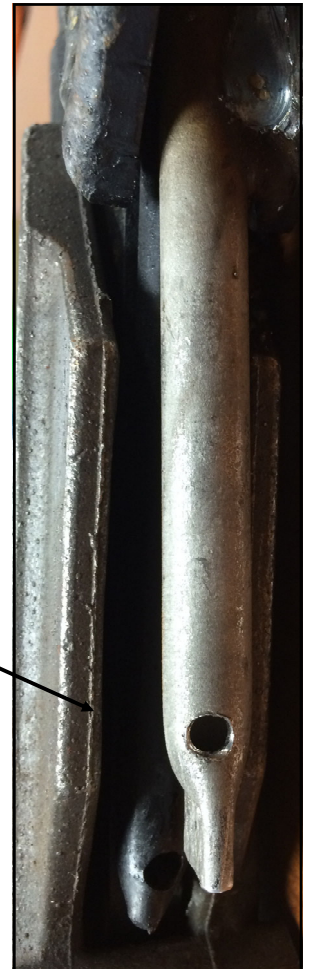
The knife on the left is for no-till conditions. On the right is a less aggressive point for tilled soil.

Anhydrous tube

NutriSphere tube

Insert a piece of green 1/4" tube inside the NutriSphere tube and push it down so the end of the green tube is at the top of the outlet hole. (See instructions on previous page.) To protect the green 1/4" tube, slide a 2-foot long piece of 3/8" hose over the green tube and clamp this hose to the top of the NutriSphere tube.

Your application setup may be different. Generally, insert the green 1/4" tube into the tube through which the NutriSphere-N NH3 will be applied.



Sample of available knife profiles



## Toolbox (no tools, just spare parts)

**B**

Components  
Liquid

A toolbox containing critical items will be included with each system. The toolbox will contain:

### QTY

- 1 12 volt electric pump
- 2 flow indicator columns
- 10 size 6 hose clamps
- 1 3/8" HB 90 degree electric pump fitting
- 1 3/8" HB straight electric pump fitting
- 2 40 Amp fuses
- 1 1" Tee Strainer gasket-FKM
- 2 Clips for electric pump
- 4 QC 1/4" End Stop White Poly Cap
- 6 QC to QC—1/4" QC x 1/4" QC
- 2 Check Valve—1/3 lb—1/4" QC x 1/4" QC



SurePoint Ag Systems



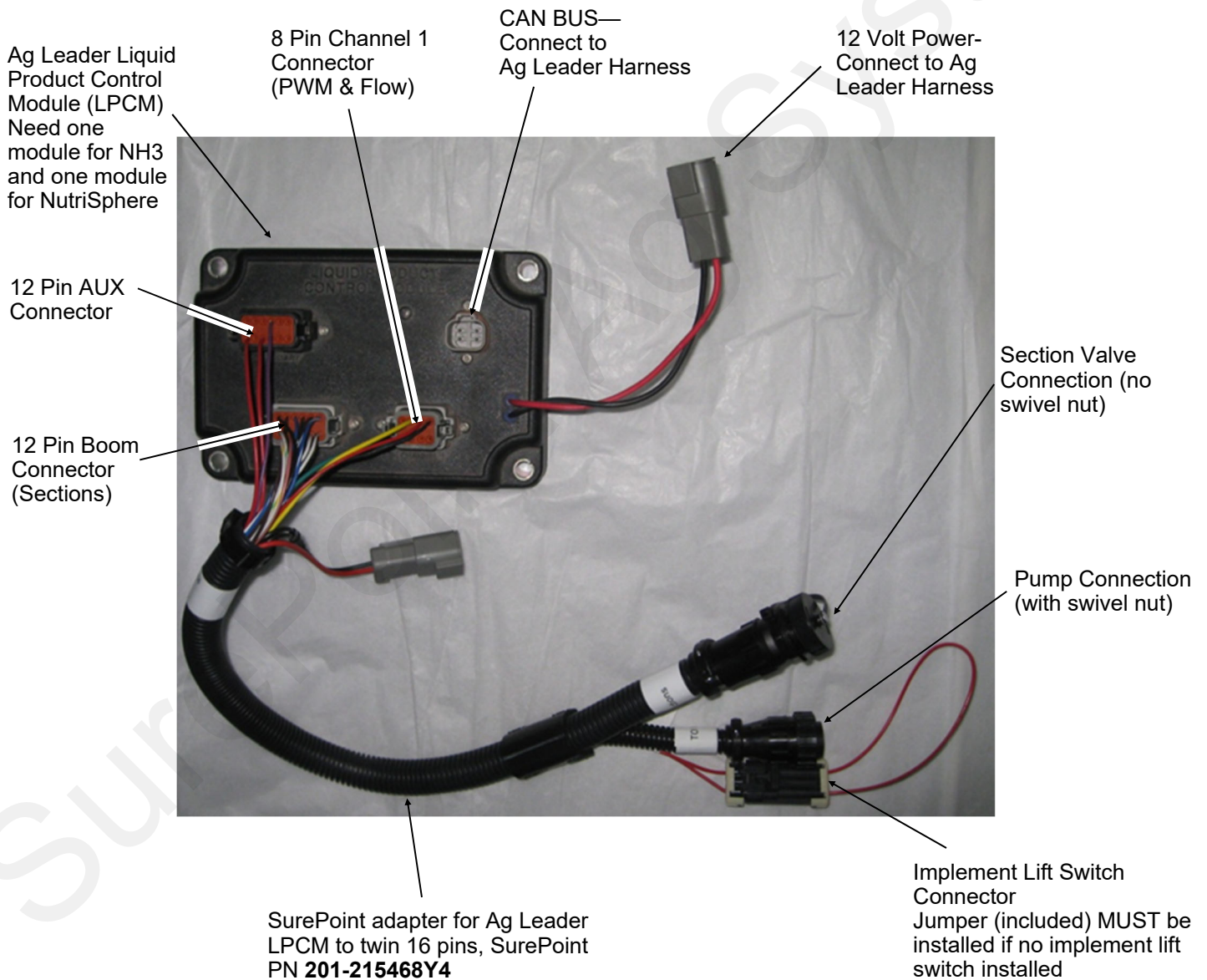


# Ag Leader Liquid Product Control Module

The SurePoint Catalyst System begins at the Ag Leader Liquid Product Control Module. The picture below shows this control module. You will need to purchase this module from your Ag Leader dealer. You will need one module to control the anhydrous application and another module to control the NutriSphere-N NH3 product.

The rate controller has four harness connections. The function of each connection is labeled in the picture below and on the next page. The following pages show a system diagram for single section configuration. Detailed harness drawings follow for information and troubleshooting.

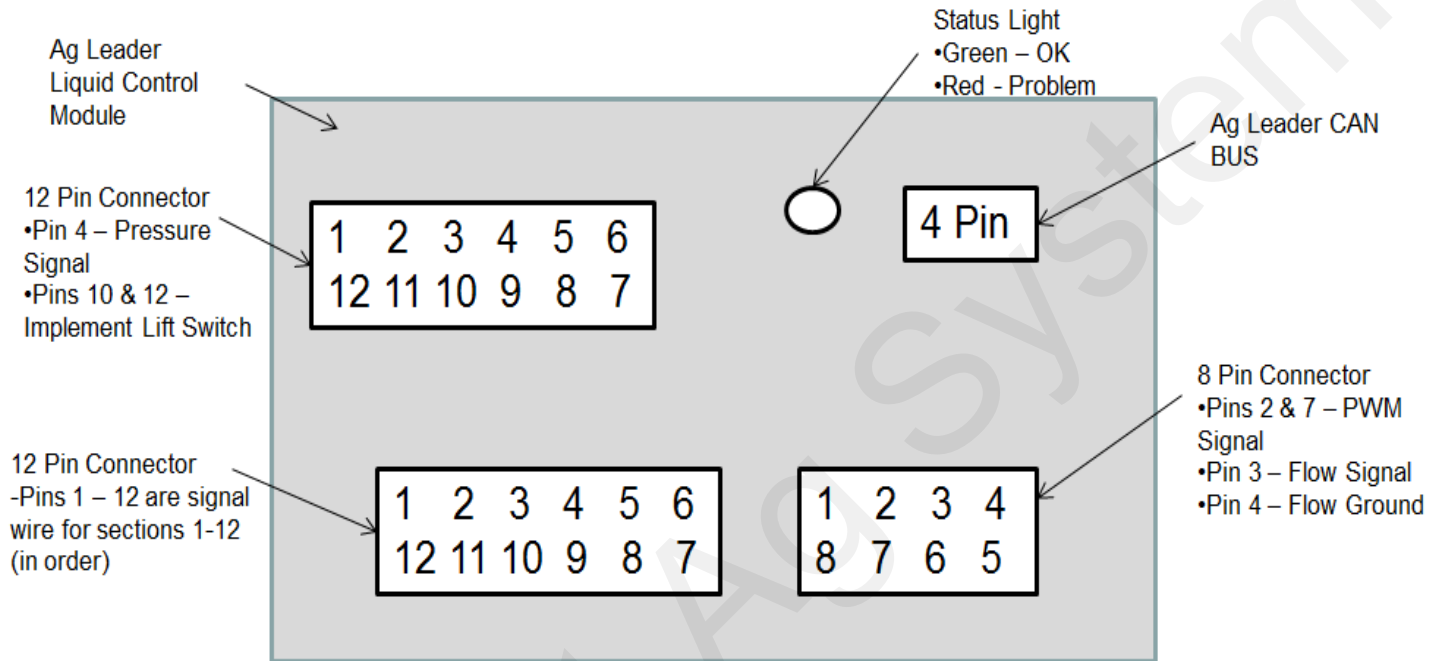
Instructions for setting up the Ag Leader in cab display are in Section F. Detailed screen shots of the display are included showing exactly what settings are required and recommended for the SurePoint Catalyst System.



# Ag Leader Liquid Product Control Module



This chart shows you the output functions by pin location on the Ag Leader Liquid Product Control Module. Use this information to verify if the Ag Leader system is providing the correct output. If the module is not providing the correct output, contact your Ag Leader dealer to repair the problem. Also review any applicable settings on the display to verify the system is properly set up.



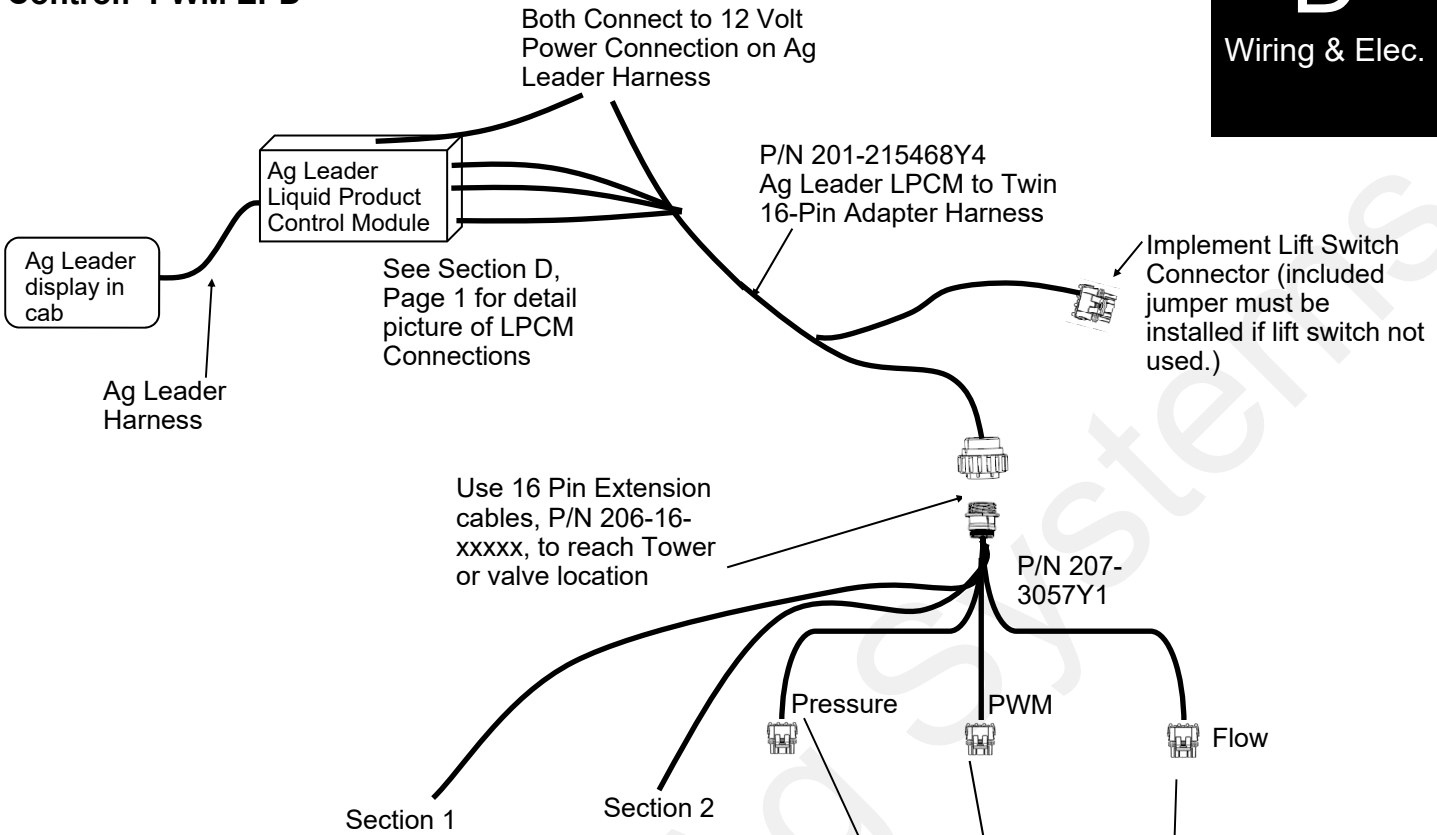
## Common Troubleshooting:

**PWM Signal to Pump:** Pin 2 to 7 should have 0-12 volts to turn pump on. Use manual mode to increase signal. Should get up to 12 volts after holding increase button.

**Flow meter Tap Test:** Pins 4 and 3 are Flow Ground and Signal. If no flow is registering on the display, you can tap between these two pins with a short wire. This produces a pulse. The display should indicate a flow when this is done rapidly.

# Tower & Ag Leader Control Layout


Control: PWM EPD

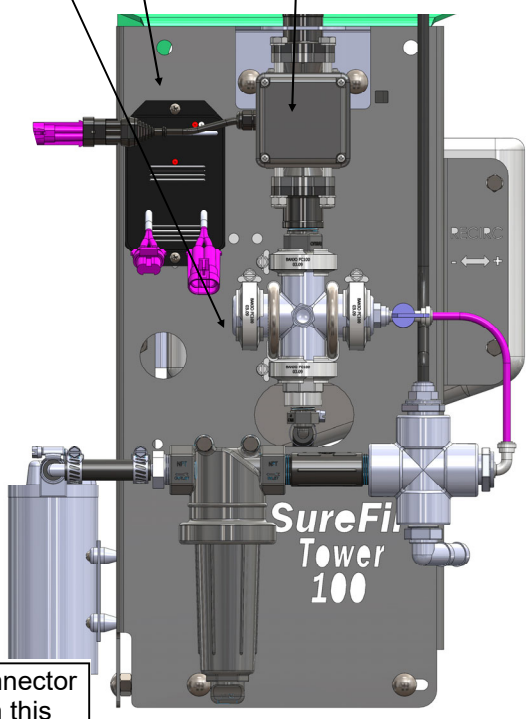


If using two section valves you will connect Sections 1 and 2. (Implements less than 60' wide will be configured as 1 section.)

Can use 3-Pin Weatherpack Extension cables to reach section valves if needed.

If implement is set up with just one section, you will use the Section 1 connector to connect to the Flow Indicator Manifold Shutoff valves. A 4' Y Adapter Cable (201-215604) will be connected to the Section 1 connector on 207-3057Y1. One Y connector will supply the valves on the left side. The other Y will supply the valves on the right side.

 Means connector not used in this configuration.

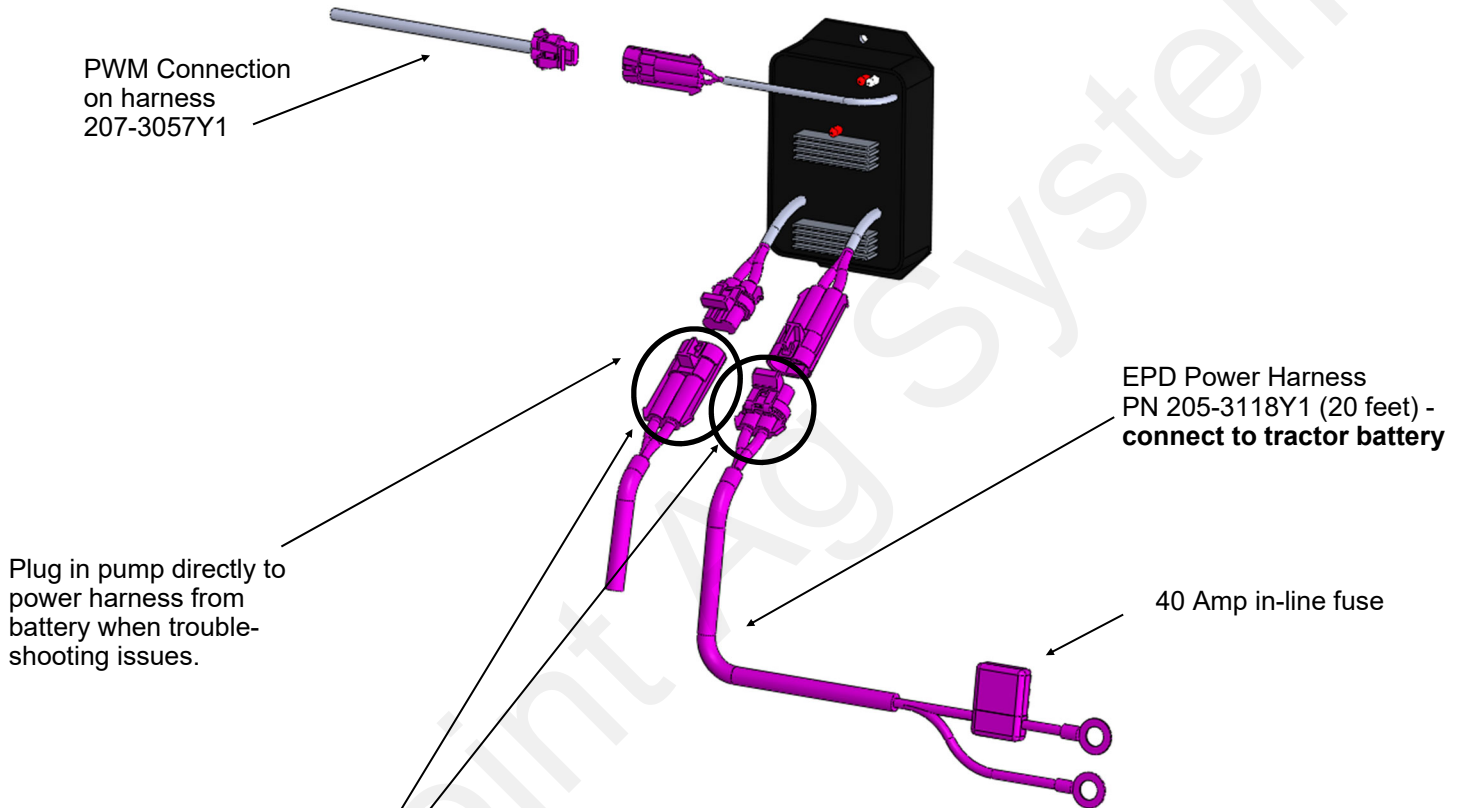


# 40 Amp PWM EPD (Pulse Width Modulated Electric Pump Driver)

Item Number: 205-19024 with Anderson connectors  
Replaces 205-18385 with 480 MP connectors



The Electric Pump Driver powers the electric pump by providing a pulse width modulated signal to control pump speed. It needs to have a power connection and wiring capable of carrying up to 40 amps of current. **It must be connected directly to the tractor battery.** SurePoint recommends 10 gauge (or heavier) wire if extending harnesses in the field.



Plug in pump directly to power harness from battery when troubleshooting issues.

EPD Power Harness  
PN 205-3118Y1 (20 feet) -  
**connect to tractor battery**

40 Amp in-line fuse

### Troubleshooting Tip:

If the pump won't run, connect the power and pump connector directly together to give pump full 12 volts directly from battery. This will tell you if the pump is the problem or if something else is wrong. The pump will be running at full speed, so don't leave it connected this way for long.

Use EPD **Power Harness Extensions** as needed  
(These have Anderson Connectors)

		Wire Size
206-02-3120Y1	1' Extension	10 gauge
206-02-3121Y1	5' Extension	10 gauge
206-02-3122Y1	10' Extension	8 gauge
206-02-3123Y1	20' Extension	8 gauge
206-02-3124Y1	30' Extension	30' and longer—6 gauge
206-02-3125Y1	40' Extension	
206-02-3126Y1	50' Extension	
206-02-3127Y1	60' Extension	
206-02-3128Y1	2' Anderson Ext w/ Power Switch-8 AWG	

SurePoint recommends a single long extension harness as multiple connectors will reduce voltage, increase current and hurt performance of your electric pump system.

SurePoint Ag Systems



SurePoint Ag Systems



## SurePoint Catalyst Verdesian NS-N NH3 and Trimble—Harness hookup

Harnesses for your particular system may vary from the list here. Not all of these harnesses will be used on all systems.

# E

Installation  
Overview

205-3118Y1	Anderson 40 Amp Fused Power Harness (connect to battery)
206-02-312_Y1	Anderson Extension Cable (to extend harness from battery to Tower)
206-03-1_ _ _ _ _	3-pin Extension Cable (as needed)
206-16- _ _ _ _ _	16-pin Extension Cable (as needed)
201-215468Y4	Connects to Ag Leader Liquid Product Control Module and 16-pin PUMP connects to 207-3057Y1.
207-3057Y1	Tower Final Harness to pump, flowmeter, EPD, etc...
201-3130Y1	480 MP Tower x Anderson Adapter Cable—Connect EPD to pump
201-215604	4' Y Adapter Cable—1 WP Shroud to 2 WP Tower To connect Boom 1 connector to Left side and right side Zip valves (On 1-section implement, all Zip Valves run from Boom 1 connector—this harness splits that harness to go the left side and to the right side of the implement)
201-3158Y1	Zip Valve WP Section Cable—Connect to Boom 1 or Y adapter from Boom 1 and then to Zip Valve (on 2-section implement could be Boom 2 to Zip Valve)
201-3161Y1	Zip Valve Termination Plug. Screw this onto open connectors on ZIP Valve.
201-3193Y1	Boom 1 WP connector to 2 Zip Valve MP12 connectors
201-3200Y1 to 3203Y1	Zip Valve to Zip Valve Connector cable (used if daisy-chaining Zip Valves)

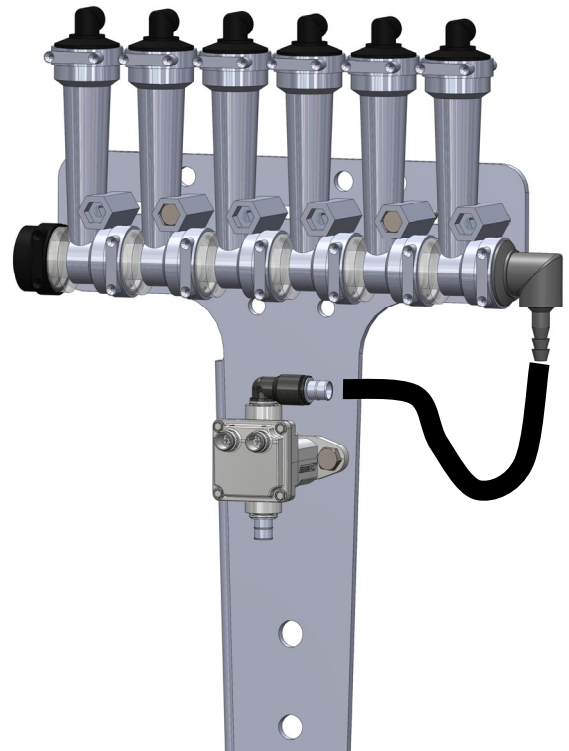
### Zip Valve Mounting

Picture at right shows ZIP Valve mounted on Flow Indicator Bracket.

Mount ZIP Valve to Flow Indicator Bracket with 1/4" bolts. Use washer and nylock nut.

Plumb flow from flowmeter into bottom of valve. From top of valve plumb to flow indicator with 3/8" hose.

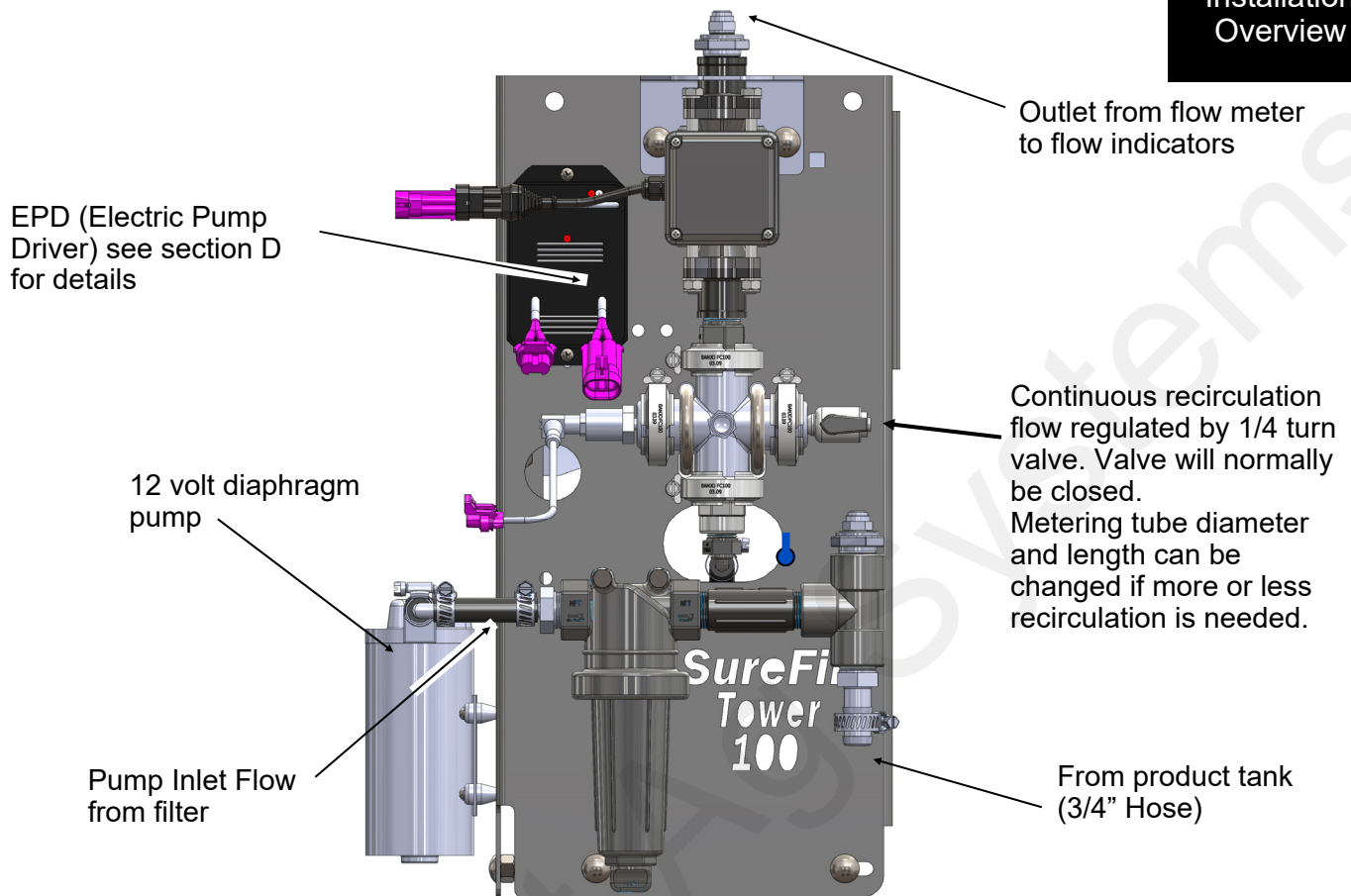
Connect wiring harness to valve. Wiring harness connectors are keyed so they only fit on one of the connectors.



# Tower 100 *Catalyst* Plumbing Overview & Valve Operation

# E

Installation  
Overview



## Do I need recirculation flow?

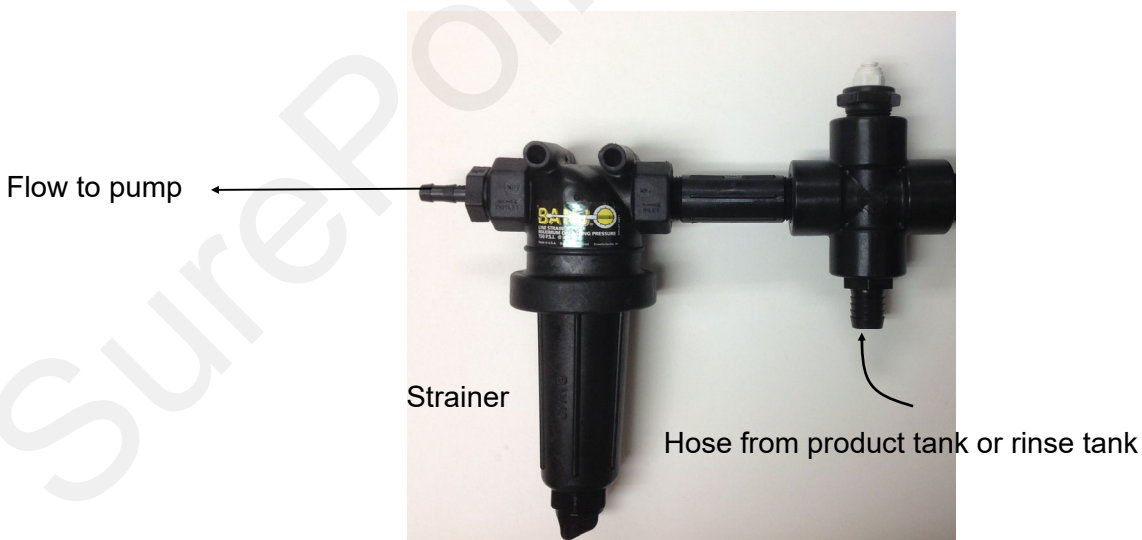
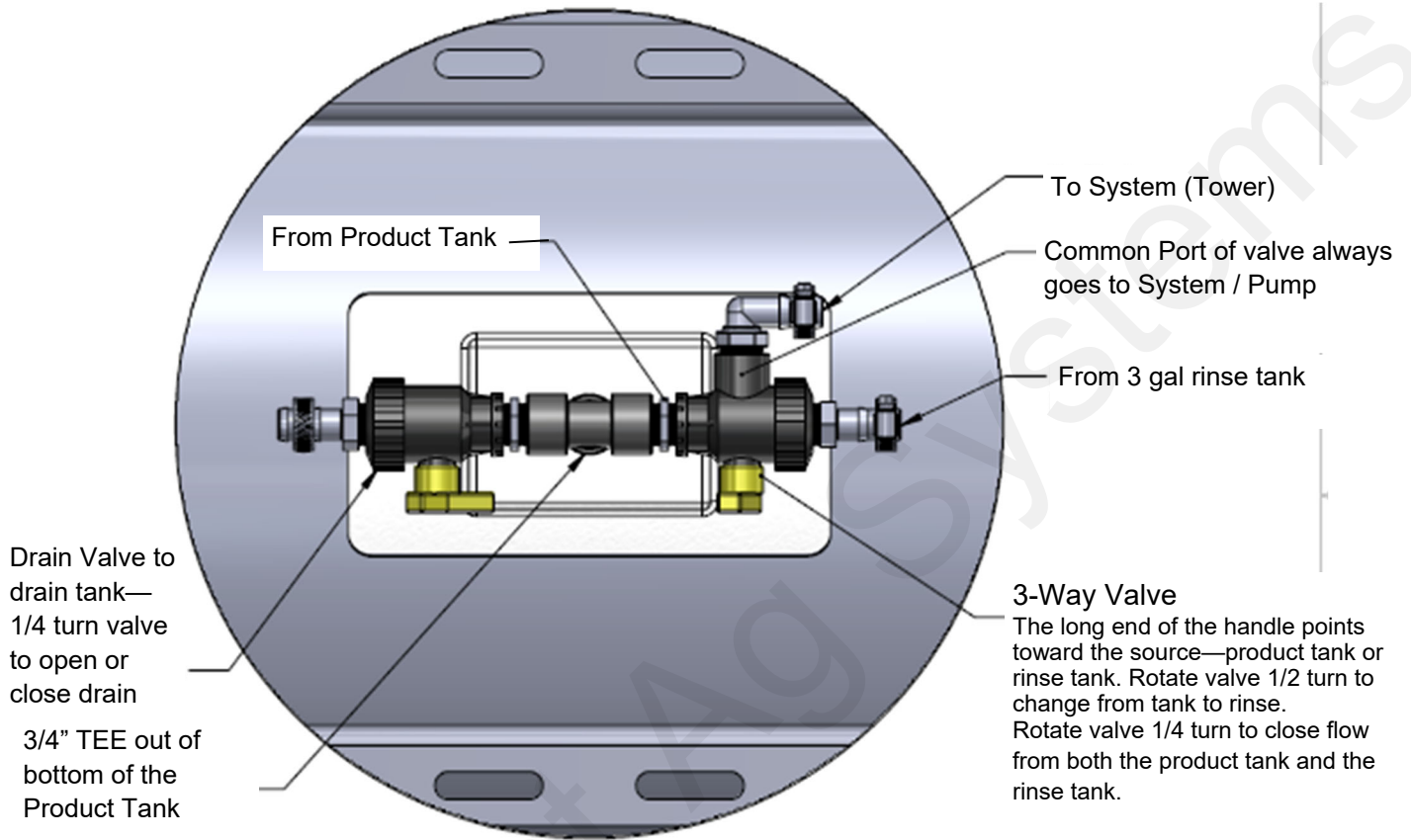
Recirculation flow allows the pump to run faster than if the total pump flow was applied to the ground. This may be helpful when operating at very low flow rates. This system will typically operate with the recirculation valve closed. The metering tube on the recirculation loop can be changed to allow for more or less recirculation. Too much recirculation can result in unstable flow reading on the display.



# Tower 100 *Catalyst* Plumbing Detail

(Bottom of Product Tank)

**E**  
Installation  
Overview

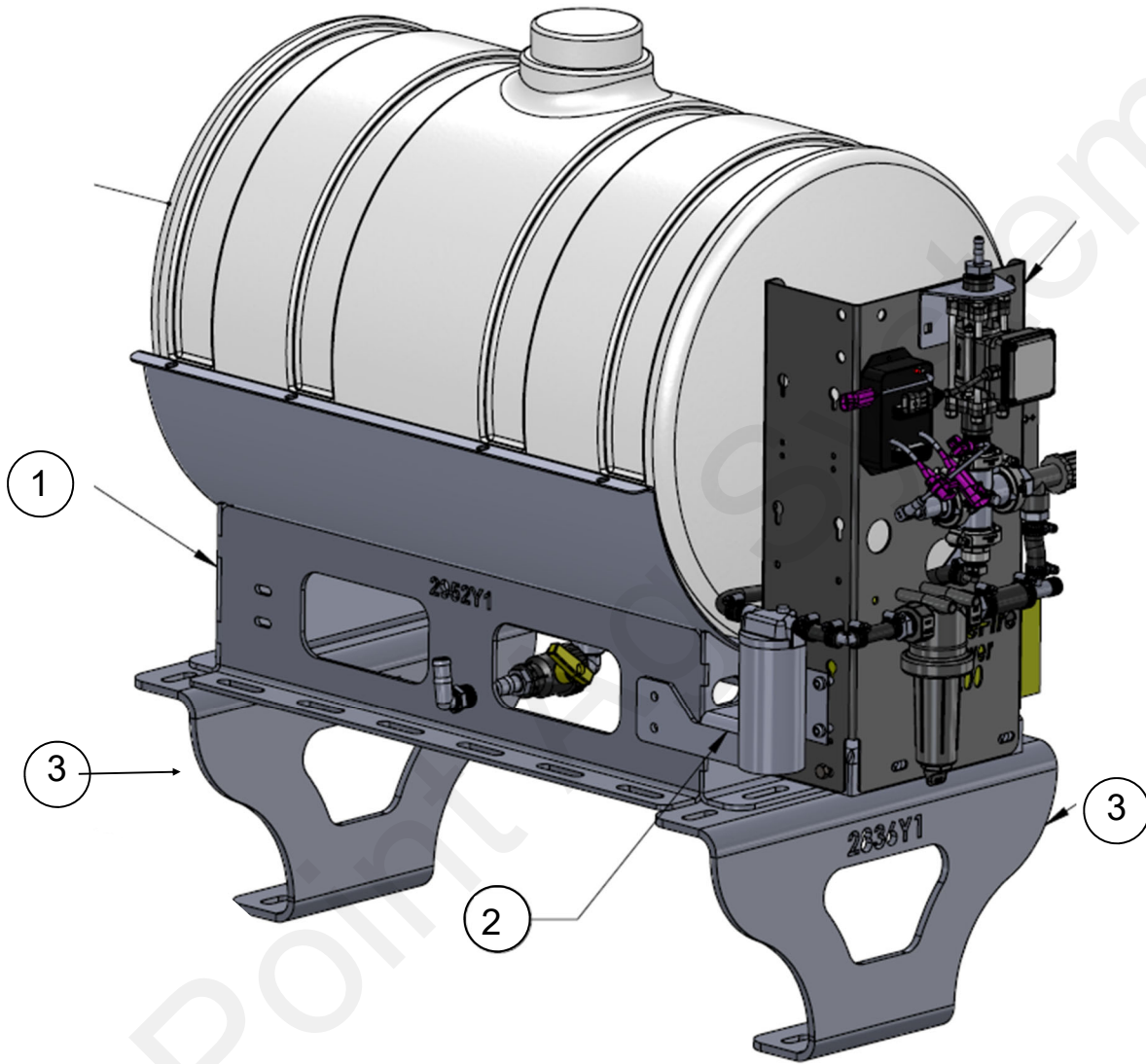


# Tower 100 Mounting Options

# E

Installation  
Overview

Various brackets and u-bolts are available to provide a way to mount the Tower 100 to almost any implement.  
Your SurePoint configuration specialist will get your implement information at ordering time and make sure that all of the hardware needed for your system is included.



ITEM NO.	Part Number	Description	QTY
1	421-2952Y1	55 gal/24" DIA tank cradle	1
Or	421-2956Y1	110 gal tank cradle	1
2	420-2957Y1	Tower 100 Mount Bracket	1
3	420-2836Y1	Tank Stand (12" tall)	2
Or	420-2986Y1	Tank Stand (6" tall)	2

A variety of U-bolts are available to fit various sized bars.

# Ag Leader Integra Setup

# F

Setup &  
Operation

Ag Leader technology is a very flexible control platform with many capabilities. This section will show you the necessary steps to set up your Ag Leader display to control a SurePoint Tower Catalyst System.

Follow the general directions in your Ag Leader Integra Operators Manual (esp. under Configuration and Liquid Rate Control). This manual will show you the specific numbers and settings to use with your SurePoint Catalyst system.

For any particular application, the numbers may need to be adjusted in the field to optimize performance.

**Configuration Setup**

Vehicle Case 1

**Implement: Generic NH3 Bar**      **Controller: DirectLiquid**

Full Swath: 40 ft      Serial Number: 2012751094

Sections: 2      Device: DirectCommand

Type: Liquid

Flow Meter Cal (pls/gal) 22710.00

Vehicle Offsets

Speed Input

Auxiliary Input

Automatic Swath Control

Equipment Settings

Offsets

Calibrate Pressure

Controller Settings

**Speed Input**

Primary Source

Manual Speed ▼

Manual Speed

6 mph

**Equipment Configuration Settings**

Rate Outside of Field

Zero ▼

Rate Change Look-Ahead

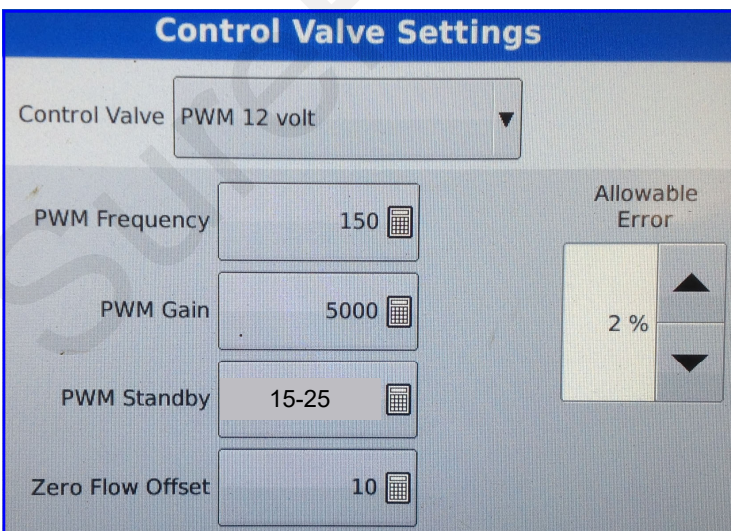
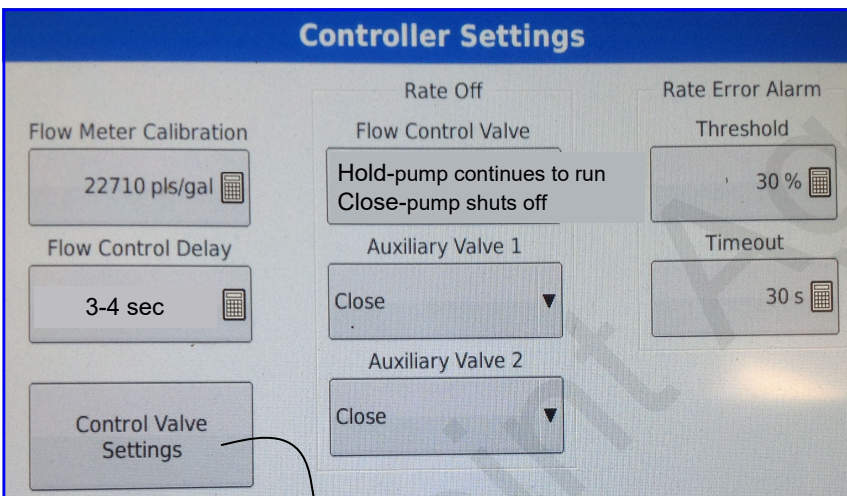
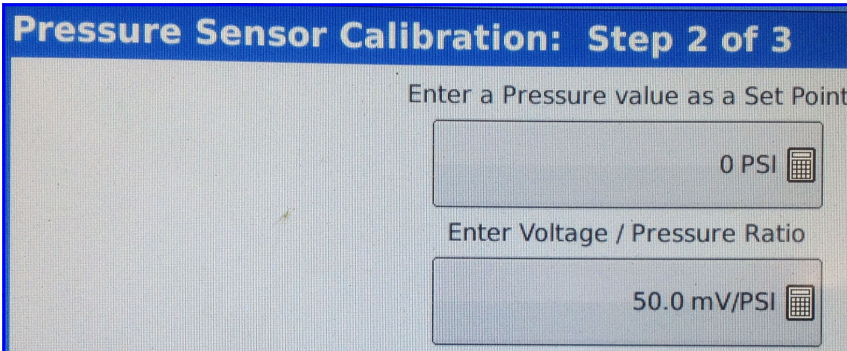
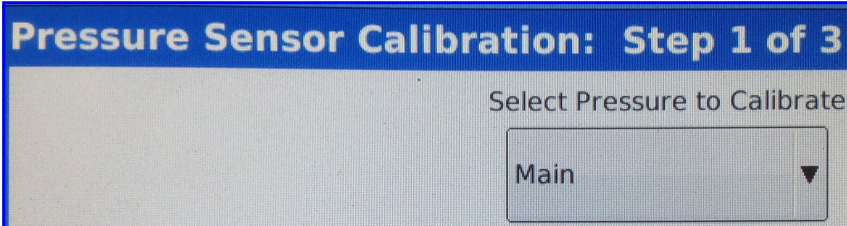
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Rate Display Smoothing

# Setup -

# F

Setup & Operation



### Controller and Control Valve Settings:

**Flow Meter Calibration: 22710 pls/gal**

**Rate Off Flow Control Valve**-Set at **Close** to turn pump off at end of row. Set at **Hold** to have pump continue to run at the end of the row to achieve quicker return to Target Rate on return to the field.

**Flow Control Delay**-Set this at 3-4 sec to allow system to start up without the controller chasing the rate up and down when flow first starts or resumes.

**Timeout**-Set to 30 sec when first starting system or when Troubleshooting. Can be set lower during normal operation.

**Control Valve: PWM 12 volt**

**PWM Frequency : 150**

**PWM Gain**-start at 5000. This can be increased to allow controller to adjust more quickly to speed or rate changes. If set too

high, the system may not lock on to rate as well in normal operation across the field. (Adjust in increments of 500.)

**Allowable Error**-Set at 2 or 3%. At 3%, the controller would not make any adjustments if the applied rate is between 31 and 33 oz/acre on a 32 oz/acre Target Rate.) If set too low, the controller may overreact to every small deviation from Target and actually end up with more oscillation.

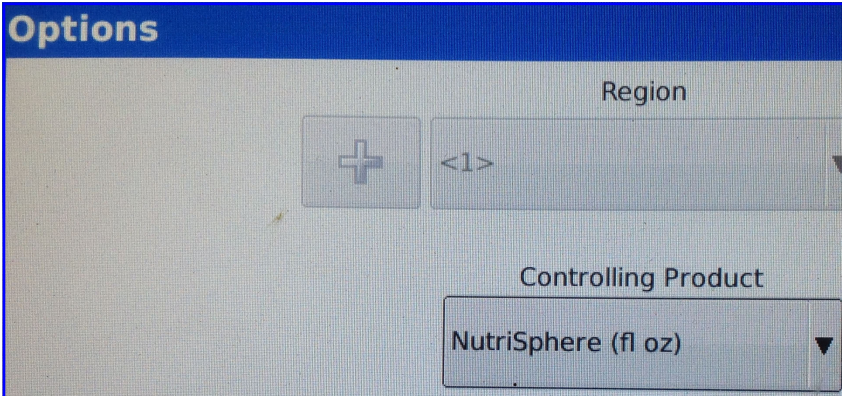
**PWM Standby**-This is the speed at which the pump will run at the end of the row when Flow Control Valve is set to Hold. Normally this will be between 15 and 25, just at or above the normal operating PWM Duty Cycle.

**Zero Flow Offset**-Start at 10. This sets the minimum PWM Duty Cycle at which the pump will run. If this is too high, the pump may not be able to slow down enough at low speeds. If set too low, the pump takes longer to reach operating speed on first startup.

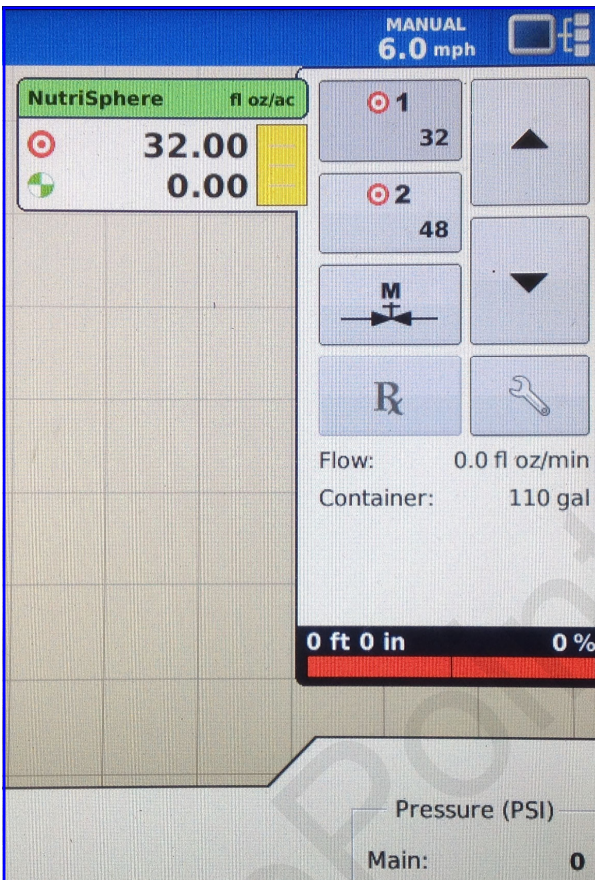
# Setup - System

# F

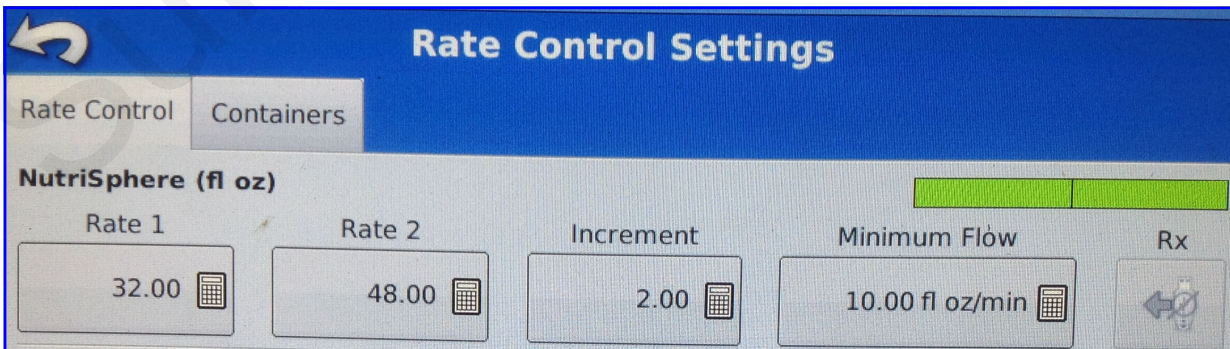
Setup & Operation



In normal operation, set the NutriSphere N-NH3 product to measure in fl oz, and set the Target Rate at 32 oz/acre. If setting the Controlling Product to measure in gallons, the rate would be 0.25 gal/acre for a 32 oz/acre rate.



Set the **Minimum Flow** at 10 oz/min. This is the bottom rated end of the flowmeter.

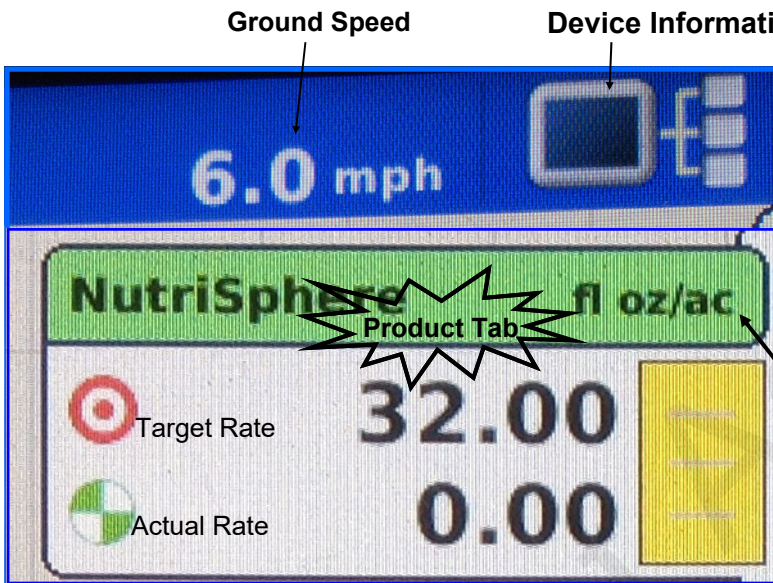


## Ag Leader Display Setup (Continued)

The Grid button in the lower left corner of the screen brings up the Map screen for Run Time Operations.



The **Product Tab** is in the upper right corner of the Map screen.



**Device Information (Diagnostic) Button**-Press on the Device Information Button, then highlight the item marked **DC Liquid**, then press the **Diagnostics** button. The Liquid Diagnostics screen contains the Active Controller Name and Serial Number of the module. Also included are Main (1) and Auxiliary (2) Pressure readings, and Flowmeter Signal Frequency and Pulse Count. This can sometimes be useful troubleshooting information. The **PWM Duty Cycle** gives helpful information about the speed of the pump.

Press the **Product Tab** to bring up an extended view.

Liquid Diagnostics	
Controller Name	DirectLiquid
Serial Number	2012751094
Main Pressure (kPa)	3
Agitation Pressure (kPa)	N/A
Auxiliary Pressure (kPa)	0
PWM Duty Cycle (%)	0
Flow Meter Signal Frequency (Hz)	0
Flow Meter Pulse Count	0

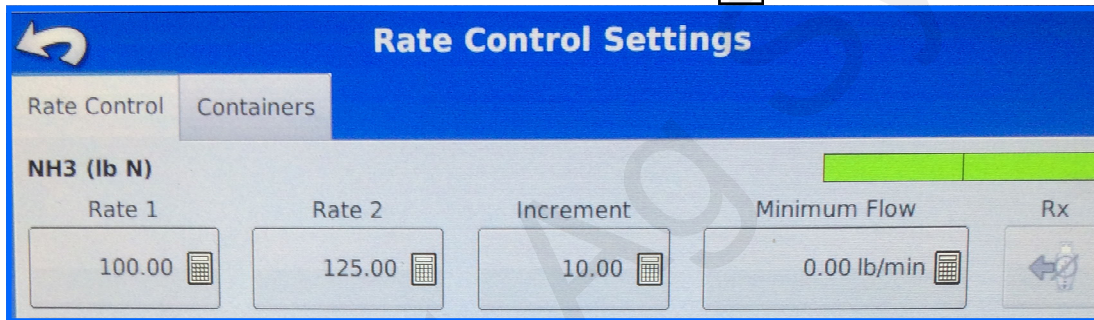
See the next page for further explanation of the items available on the Map screen.

# Map Screen Product Control Toolbox



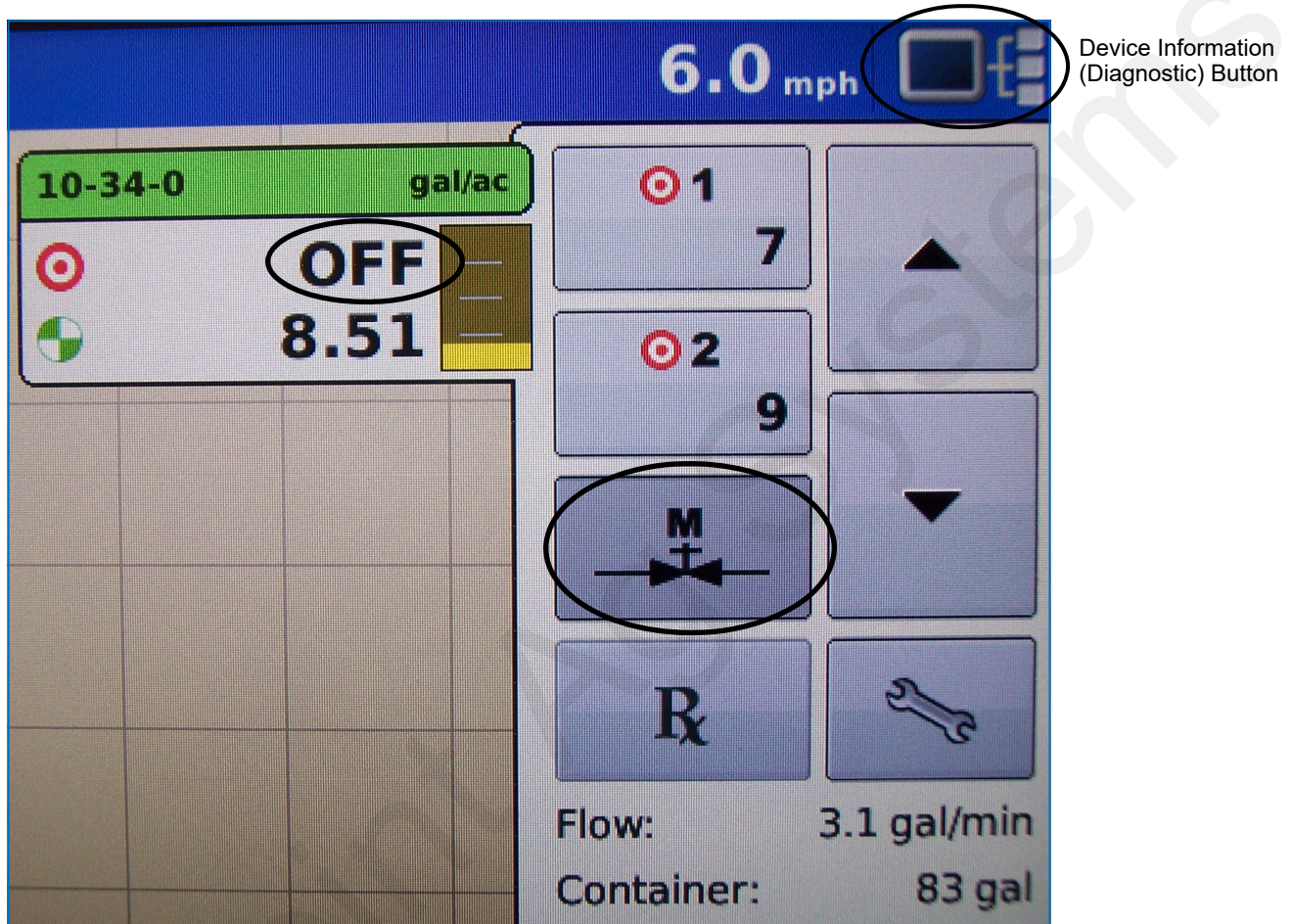
- A** Product
- B** Target Rate
- C** Actual Rate
- D** Rate 1 button
- E** Rate 2 button
- F** Manual Valve Control
- G** Prescription button
- H** Rate Increase arrow
- I** Rate Decrease arrow
- J** Rate Setup button

Set Rate 1, Rate 2, and Increment here:



# Initial Operation Instructions - Integra- Manual

**SurePoint highly recommends you perform these exact steps with water to verify system is correctly installed and ready for field use.**

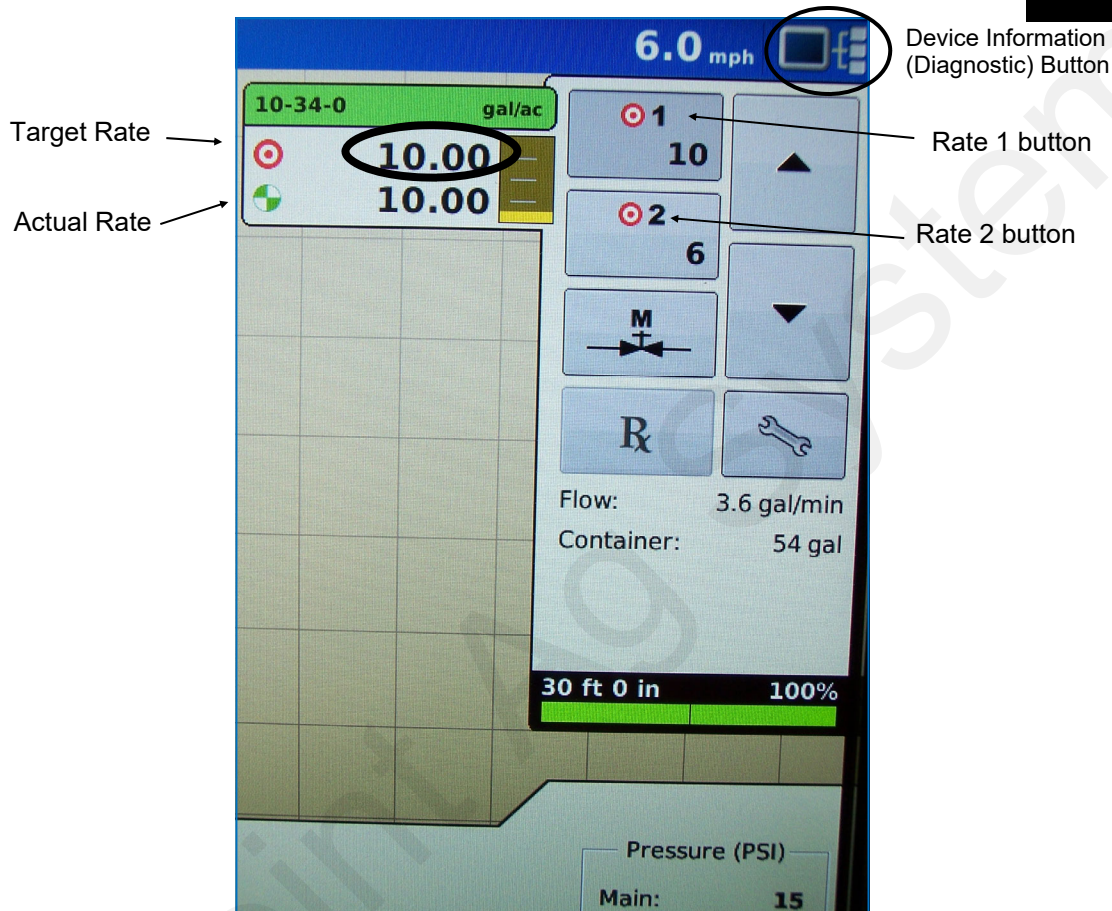


1. To operate manually, turn AutoSwath OFF.
2. Enter manual mode by pushing the “M” button in the upper right corner of the screen. You can tell you are in manual mode when the “Target” Rate says “OFF”.
3. If using implement lift switch, move implement switch to lowered position. If not using implement switch, jumper must be installed (see wiring diagram in section D).
4. On the Switch Box, turn the master switch On. Turn section switches On and Off to check proper section valve operation. Leave all section valves On.
5. Use up arrow on right side of screen to increase flow. Does “Flow Rate” display a flow rate? Is it stable after the system is primed? Do increase & decrease buttons increase & decrease flow?
6. When you can increase and decrease flow using the arrows, you are ready to move to the next step.
7. Conduct a catch test to verify the flowmeter calibration is correct. It is unusual if the Flow Cal number needs to be changed. (The most accurate method to measure the volume of water run is to place a container under every nozzle and add together the amount from each nozzle. This assures that 100% of the water is collected and that all rows are equal. At a minimum, collect water from 4-6 rows. **NEVER base a calibration on a single row catch.** It is important to perform this procedure at a flow rate similar to that which will be used in the field.)



# Initial Operation Instructions - Integra - Auto

**SurePoint highly recommends you perform these exact steps with water to verify system is correctly installed and ready for field use.**

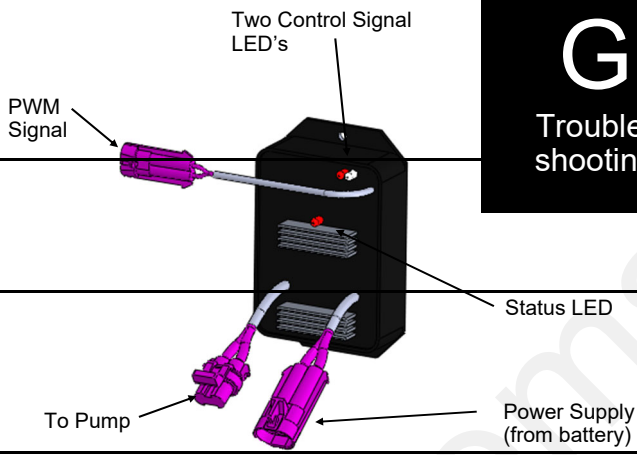
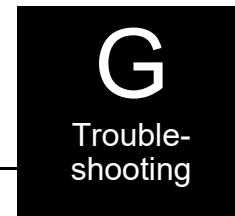


*Be sure that AutoSwath is OFF to operate system manually.*

1. Push the grid button in the lower left corner to return to the main Run screen. Verify a speed in MPH is shown. If not, return to setup and enter a manual ground speed.
2. Look at the Extended Product Tab in the upper right corner. Push the “Rate 1” or “Rate 2” button to enter Auto mode. You can tell you are in Auto mode when a rate is displayed under “Target”.
3. Turn on Master and Section switches. The system should begin to pump liquid now in automatic control mode. Is the flow in GPM stable? Is it applying at the correct rate? (actual rate = target rate?)
4. Change rate using screen buttons for Rate 1 & Rate 2. Does actual rate change to equal new target rate?
5. Close 1 section valve, does flow decrease? Does applied rate still equal target rate?
6. Change speed and target rate to minimum and maximum values. Does system perform at these values? Does the system pressure seem reasonable (remember fertilizer will increase pressure over water)?

# Electric Pump Won't Run

## EPD Status Lights



Status LED	Status Description	Troubleshooting Steps
<b>On Steady</b>	<b>Power input is good and PWM input Signal is detected</b>	<b>No Problem, Typical operating condition.</b>
<b>Steady Blink</b>	<b>Power input is good and PWM signal is not detected</b>	<b>Typical 'Off' Condition. If pumps should be on:</b> <ol style="list-style-type: none"> <li><b>1. Inspect wiring and connectors</b></li> <li><b>2. Check voltage at PWM connector to EPD, should be 1-12 volts to turn on.</b></li> <li><b>3. Check voltage on PWM wires at 37 pin connector, pins 15&amp;16.</b></li> </ol>
Blink once, pause, blink once, pause	Open circuit between motor output and motor.	Check harness and connectors to motor. If using two motors, plug each in separately directly to EPD (bypassing Y-harness)
Blink twice, pause, blink twice, pause	Output short circuit detected.	<ul style="list-style-type: none"> <li>• Check motor wiring</li> </ul>
Three blinks, pause, three blinks, pause	Overcurrent condition	<ul style="list-style-type: none"> <li>• Check total load</li> <li>• Clean cooling fins on EPD</li> </ul>
<b>Four blinks, pause, four blinks, pause</b>	<b>Input power fault. Low voltage condition in power to EPD.</b>	<b>Unplug battery power from EPD to reset. Check power cables and connections for quality. Be certain that power cable connects directly to battery and has a solid clean connection.</b>
Five blinks, pause	Input frequency out of range.	Check PWM Settings on Rate Controller.
<b>Control Signal LEDs</b>		
<b>Light intensity varies</b>	<b>Off - No PWM Signal 100% brightness - Maximum PWM input signal</b>	

# Electric Pumps Won't Run (continued)

# G

Trouble-shooting

## Electric pump will not turn on

### EPD flashing 4 times

1. Find the EPD (electric pump driver) shown above. Should have a steady blinking light in the middle when pumps should be off. If Status LED is flashing 4 times, then pausing, EPD has tripped due to low voltage condition. Unplug the Power Supply to the EPD to reset. Check Power Supply cables to EPD to insure solid connections and good electrical path.

### No Lights on EPD

1. There should be a steady blinking light in the middle of the EPD. If no light is ON, check the 40-amp fuse in the EPD harness near the battery. Use a voltmeter to verify that there is 12-13 volts at the Power Supply connector that plugs into the EPD.

### Will the pump run?

1. Connect the two large connectors that are plugged into the bottom of the EPD to each other (bypass the module and supply 12 volts directly to pump).
2. Does the pump run? If not, check the 40 amp fuse in the EPD harness near the tractor battery. Inspect harnesses and connections.

## Electric pump only runs with 12 volts direct from battery

1. Connect pumps and power harness back to EPD.
2. Go to Rate Control Detail screen to investigate this issue.
3. Turn system on and push the increase button.
4. Remove PWM valve connector and check voltage. You will need 1-12 volts to turn pumps on.
5. If 1-12 volts is not present, check harnesses and review control valve type setup.
6. Go back to the Liquid Product Control Module. Check voltage between pins 2 and 7 of the eight-pin connector. The voltage should be between 6-12 volts after holding increase button in manual mode.
7. If you cannot get voltage at pins 2 and 7, contact your Ag Leader dealer for further assistance.

## Section Valve(s) will not move

1. Go to Rate Control Detail to investigate this issue.
2. Turn section valve switches on switch box On and Off. Do you have a problem with one or all the valves?

Pin	Function
A	+ 12 V Constant
B	Ground
C	+ 12 V Signal

3. Check the harness connection to that valve. It is a 3-Pin Weather Pack connector. See Section D for wiring diagrams

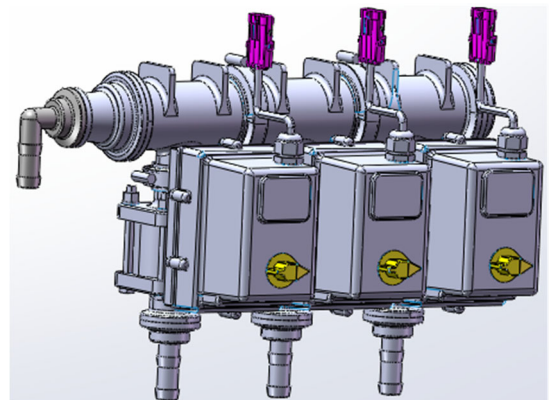
4. Check voltage pin A to Pin B. Must be 12 volts, if not, go back to 2-pin power connector

to SurePoint 215468Y4 harness and check voltage.

5. If voltage is present on pins A&B of 3-pin connection to valve, then check pin C to Pin B. This should be 12 volts when the valve is commanded on or open, this should be zero volts when valve is off or closed.

6. If signal voltage is not present to open valve, use diagrams to check at the 16-pin , then the 12-pin on the Ag Leader Liquid Product Control Module for voltage on the proper pin for that section.

7. If constant voltage (Pins A&B) and switched voltage (Pins C&B) are present, inspect, repair or replace the valve.



# Application Rate & Flow Troubleshooting

# G

Trouble-  
shooting

## Application Rate Fluctuates

*Due to the very low application rate used on this system, pump speed changes must be made very slowly since even small changes in pump speed will result in a relatively large change in flow. The controller will be set with a lower Integral Gain so that it can lock onto the rate without continually overshooting and undershooting. This means that the controller will react slower on startup and on larger speed changes.*

*Any system will have minor rate fluctuations going across the field. The Rate Smoothing feature on the controller allows these normal variations to occur without showing on the display.*

First, you need to determine if the fluctuation is caused by the controller sending fluctuating signals to the valve.

1. **Inspect & clean pump inlet strainer.** Strange flow rate fluctuations are very often due to an obstruction to the pump inlet. Inspect plumbing from tank to pump.

OR

1. Go to Rate Control Detail Screen as shown in Initial Operation, Section F.
2. Turn the system on and watch the flow in GPM.
3. Is the flow steady within a very small range? For example a fluctuation from 2.3 to 2.5 GPM would be considered normal. A fluctuation from 2-3 GPM is a problem. If only a small normal fluctuation is seen, skip steps 4-8 and proceed to "Application Rate Fluctuates in Field ..... " below.
4. If there is a large fluctuation, observe the system flow. Is the discharge a steady stream? Are the flow indicator balls floating steady?
5. If visually the flow is steady, but the display reports a fluctuation in GPM, inspect the flowmeter. See section B for flowmeter information.
6. If visually the flow is unsteady, the flowmeter is working correctly reporting a flow problem. Is the pump turning steady or surging?
7. Look for any type of obstruction in the pump inlet. Clean the strainer. If continually plugging the strainer, investigate product quality and necessary strainer size.

## Application Rate fluctuates in field, but flow in manual mode is stable.

This problem indicates the PWM gain needs changed. The system is surging because the Liquid Product Control Module is moving the pump driver too much.

1. Go to Controller Settings.
2. Change the settings by reducing the PWM gain (start with increments of 500).

## Application Rate is slow to get to the Target Rate

1. You may need to increase the valve calibration. Go to Controller Settings.
2. Change the settings by increasing the PWM gain. SurePoint recommends a PWM gain of 5000 for electric pump Catalyst systems.
3. If the system is slow to get to Target Rate when starting, increase the Zero Flow Offset (see page 27).

## No Flow shown on Ag Leader display but liquid is being pumped

1. Unplug flowmeter. With voltmeter, check for 12 volts between pins B&C of flowmeter connector (on main harness PN 207-3057Y1). If 12 volts not present, inspect wiring harness and troubleshoot all connections per schematic (see Section D).
2. If 12 volts is present, then conduct a tap test. Go to setup and change the flow cal to 100. Have a second person watch GPM on the Rate Control Detail screen while other person taps (use a short piece of wire or a paper clip) between pins A&C of flowmeter connector (on 3057Y1 harness). A flow value should show up indicating the wiring is not damaged.
3. If the display responded to the tap test, your wiring to that point is good. If still not fixed, inspect adapter harness and test continuity per schematic (see Section D).
4. Replace flowmeter.

Flow Information at 32 oz/acre rate and 30" row spacing									
Pump Output (gal/min and oz/min)									
MPH	Oz/min/ row	20' GPM	20' OPM	30' GPM	30' OPM	40' GPM	40' OPM	60' GPM	60' OPM
4	.65	.04	5.2	.06	7.8	.08	10.4	.12	15.6
5	.81	.05	6.5	.08	9.7	.10	13	.15	19.4
6	.97	.06	7.8	.09	11.6	.12	15.5	.18	23.2
7	1.13	.07	9.0	.11	13.6	.14	18.1	.21	27.2
8	1.29	.08	10.3	.12	15.5	.16	20.6	.24	31.0
9	1.45	.09	11.6	.14	17.4	.18	23.2	.27	34.8
10	1.62	.10	13.0	.15	19.4	.20	25.9	.30	38.8
		Below flowmeter rated range							

# Recommended Care and Maintenance

# H

Maintenance  
& Parts

## Winterization

SurePoint recommends flushing your product pump and complete system with adequate amounts of water first. Next, use RV antifreeze to winterize your system by pumping an adequate amount through all components. At the beginning of the next season, begin with water to verify the system is in working order with no leaks.

## Inspect Electric Pumps

The electric pump and motor is a completely sealed component. Over time the electric motor will lose efficiency. The entire pump and motor will need replaced when it won't efficiently produce the flow required.

## Pre-season Service

1. Fill system with water and run in Manual mode to verify components and system are in working order.
2. Tighten all clamps. Loose clamps may be evident by leaks on the output side of the system. Loose clamps from the tank to the pump are not always apparent, but can be sources of air getting into the system which can create issues.
3. Be sure all rows are flowing and that all metering tubes are open. (Note: It will take a higher flow rate with water to create enough pressure to open all the check valves.)
4. Run the system in Auto Mode with a manual speed to verify that system will lock on to a Target Rate.



## Torpedo™ NH3 Precision Anhydrous Ammonia Application

SurePoint's Torpedo™ NH3 Systems are a "one-stop-shop" for all components needed to get Anhydrous Ammonia from the tank to the soil. SurePoint will work with you to ensure all necessary components are supplied as part of the complete kit.

SurePoint Ag Systems

9904 Hwy 25  
67730

Atwood, KS

