



**SurePoint**<sup>TM</sup>  
Application Systems

## Rate Controller 3 Setup Guide

*For SurePoint Liquid & NH<sub>3</sub> Application Systems*

396-02-7730  
V1.2.0  
02Apr2026

### **Abstract**

This guide provides an overview of controller configuration considerations when using John Deere Rate Controller 3 with a SurePoint application system. It is intended to support proper system integration between the John Deere display and SurePoint control hardware by describing general setup concepts, controller relationships, and configuration context applicable to a wide range of application systems. This document assumes that the SurePoint application system has been mechanically installed and electrically connected in accordance with the applicable product documentation. It does not replace official operator manuals, installation instructions, or safety information provided by John Deere or SurePoint Ag Systems.

SurePoint Ag Systems

# 1. Introduction

## 1.1. Safety - General

Safety alert symbols found throughout this manual are used to call your attention to instructions involving your personal safety and the safety of others. Failure to follow these instructions can result in injury or death.

### 1.1.1. Recognize Safety Information



This is a safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.

### 1.1.2. Signal Words

Note the use of signal words, DANGER, WARNING, CAUTION, and NOTICE with safety messages. The appropriate signal word for each has been selected using the following guidelines:



#### **DANGER**

DANGER indicates imminently hazardous situation that, if not avoided, can result in death or serious injury. This signal word is to be limited to the most extreme situations typically for machine components which, for functional purposes, cannot be guarded.



#### **WARNING**

WARNING indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

**CAUTION**

CAUTION indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

**NOTICE**

NOTICE is used to address safety practices not related to personal safety.

### 1.1.3. Personal Protective Equipment (PPE)

Wear clothing and personal protective equipment appropriate for the job. Wear steel-toed shoes when operating. Wear hearing protection when exposed to loud noises. Do not wear additional hearing impairment devices such as radio headphones, etc.

### 1.1.4. A Word to the Operator



It is your responsibility to read and understand the safety messages in this manual. You are the key to safety. Safety is your responsibility.

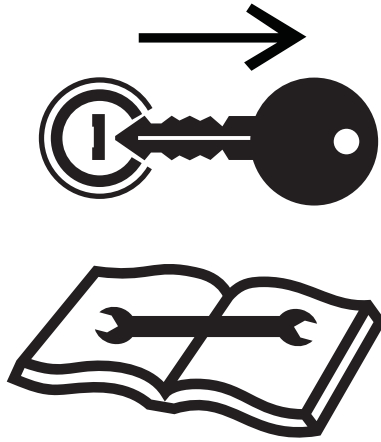
Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.

### 1.1.5. Chemical Safety

Chemicals used in agricultural applications can be harmful to personal health and/or the environment if not used correctly. Always follow all label directions for effective, safe, and legal use of any chemicals.

### 1.1.6. Park Machine Safely

Before working on the machine:



- Lower all equipment to the ground.
- Stop the engine and remove the key.
- Disconnect the battery ground strap
- Display a "DO NOT OPERATE" tag in the operator station.

### **1.1.7. Follow Safety Instructions**

Carefully read all safety messages in this instruction. Read the product operator's manual for operating instructions and safety messages. Do not let anyone operate without instruction.

### **1.1.8. Replace Safety Signs**

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.

## 2. Controller Setup

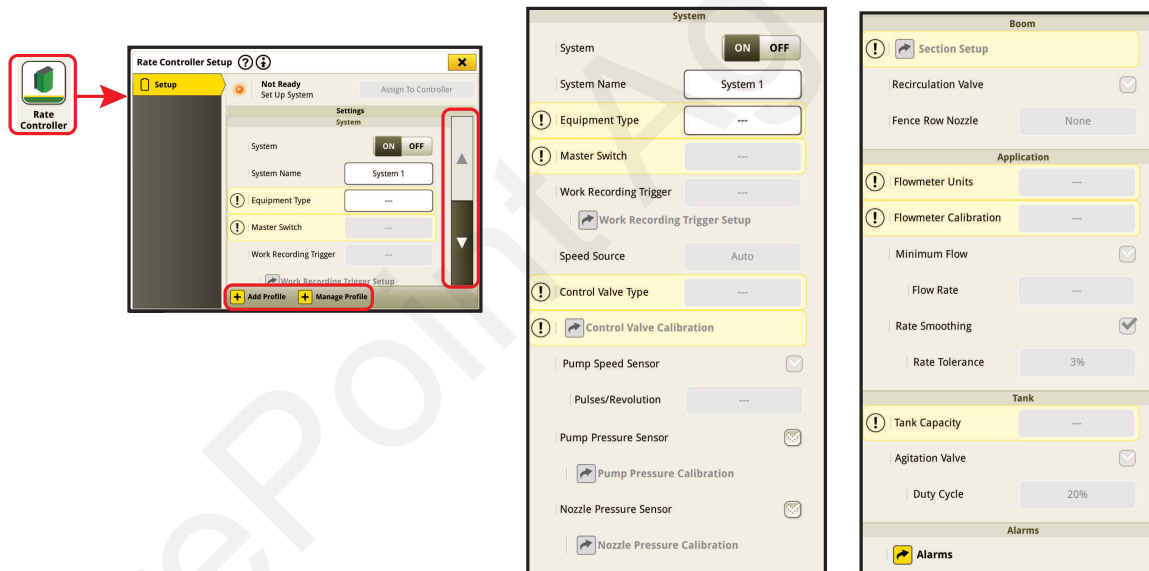
For additional information about Rate Controller 3, refer to the operator's manual at the link provided or scan the QR code below.

[RC3 Operator's Manual](#)



At initial startup, the controller needs to be setup entirely. This requires creating new profiles. Add a new profile, or manage an existing one, then proceed to the following steps for details when setting up Rate Controller 3 with a SurePoint Ag System.

**Figure 1. Profile Setup Screen**



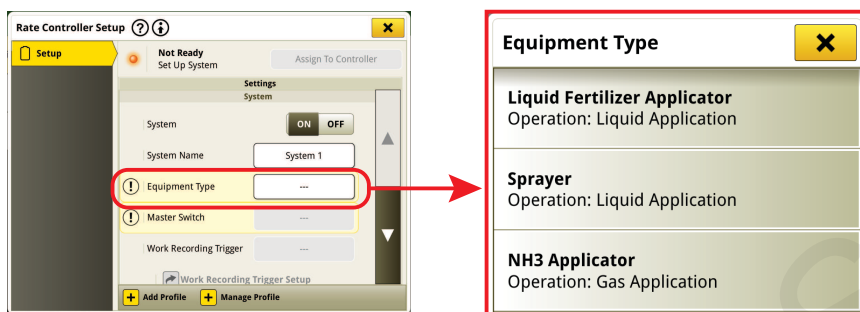
Use the arrow buttons on the right to scroll through all of these settings. Settings with (!) and highlighted yellow, need attention and must have settings entered before proceeding.

### 3. Profile Settings

Single Solution (Liquid or NH3)

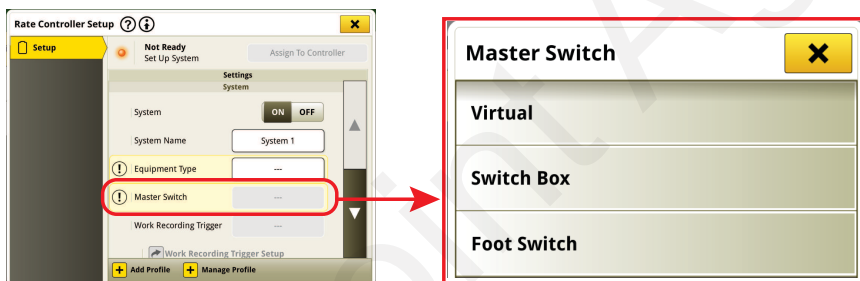
#### System

##### Equipment Type



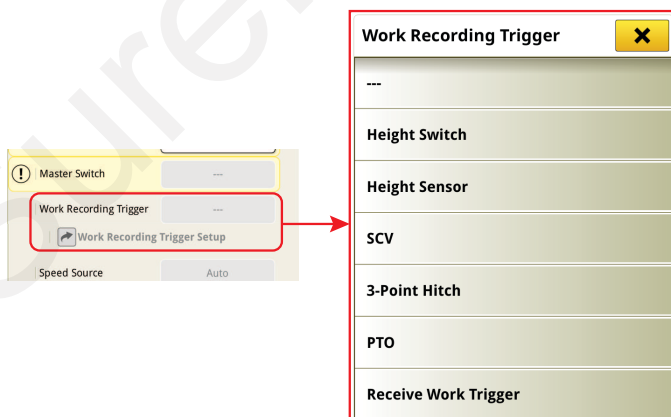
Select equipment type connected to RC3. If system is a PumpRight, Tower, or Spartan pump system, select Liquid Fertilizer Applicator. If system is a SurePoint Torpedo, select NH3 Applicator.

##### Master Switch



Select Master Switch type to control RC3. An external master switch is not required if Virtual is selected.

##### Work Recording Trigger



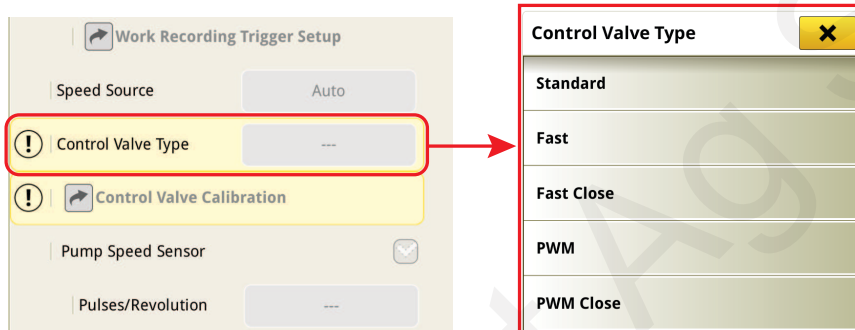
Select what triggers work recording

1. --- - No selection.

**NOTE**  
Work Trigger is **NOT** required in **Liquid Fertilizer** Applicator profile, but **IS** required for **NH3** Applicator.

2. Height Switch - typically provided by SurePoint, commonly the option selected.
3. Height Sensor - N/A
4. SCV - N/A
5. 3-Point Hitch - N/A
6. PTO - N/A
7. Receive Work Trigger - Select this if an existing GRC or GRD is connected with existing implement switch to share signal with RC3.

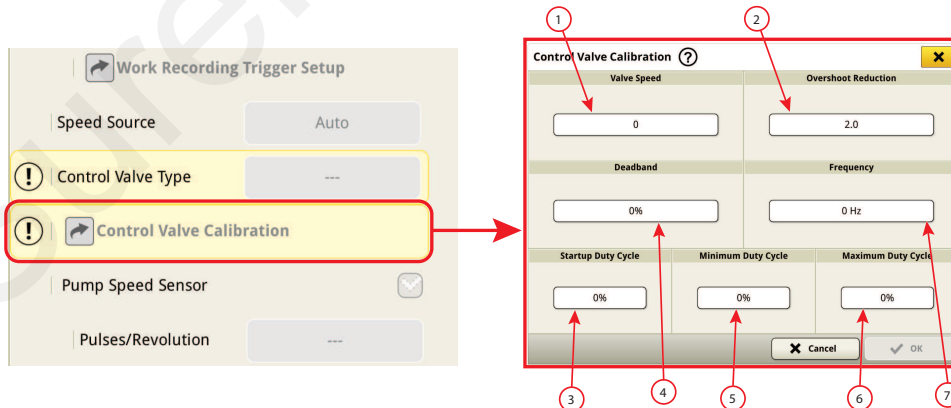
### Control Valve Type



Select which valve type is connected to control RC3

- **PWM Close** - Most common valve type for SurePoint Liquid systems. This option shuts the pump off when the master switch or implement switch is triggered.
- **PWM** - This option is used when constant agitation is used with a SurePoint liquid pump system.
- **Standard** - This option is selected when using a SurePoint Torpedo (NH3) system.

### Control Valve Calibration



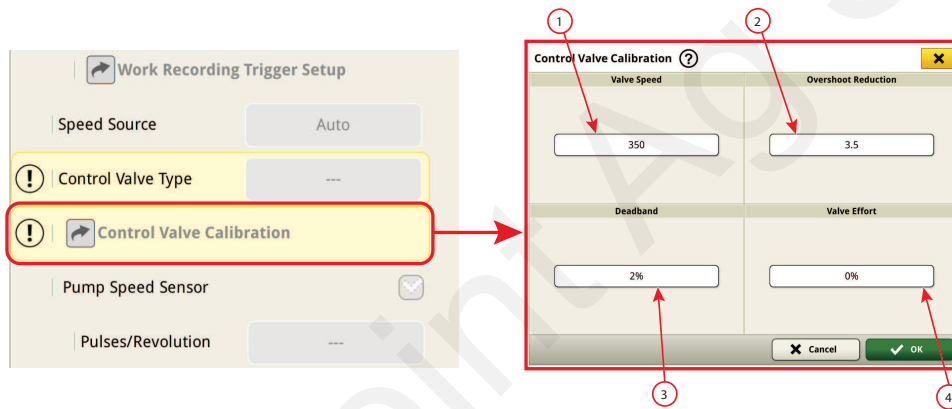
See chart below for Valve settings on varying SurePoint pump models.

**Table 1. SurePoint Control Valve Calibration Settings (Liquid)**

SPA Pump Model	Valve Speed	Over-shoot Reduction	Startup Duty Cycle	Dead-band	Min. Duty Cycle	Max Duty Cycle	Frequency
Tower	999	2	25	2%	10	100	100 Hz
PR17	100	2	25	2%	25	100	100 Hz
PR30, PR40, D250	75-100**	2	25	2%	25	100	100 Hz
PR80	50-75**	2	25	2%	25	100	100 Hz
Spartan	40	2	10	2%	10	100	100 Hz

**TIP**  
 \*\* Valve Speed operating ranges shown in table. If rate is fluctuating above and below target, decrease value by 5 units at a time to fine tune system. If rate is slow to reach target, increase value by 5 units at a time to fine tune the system. Optimal setting will lock on desired target rate.

**Control Valve Calibration**



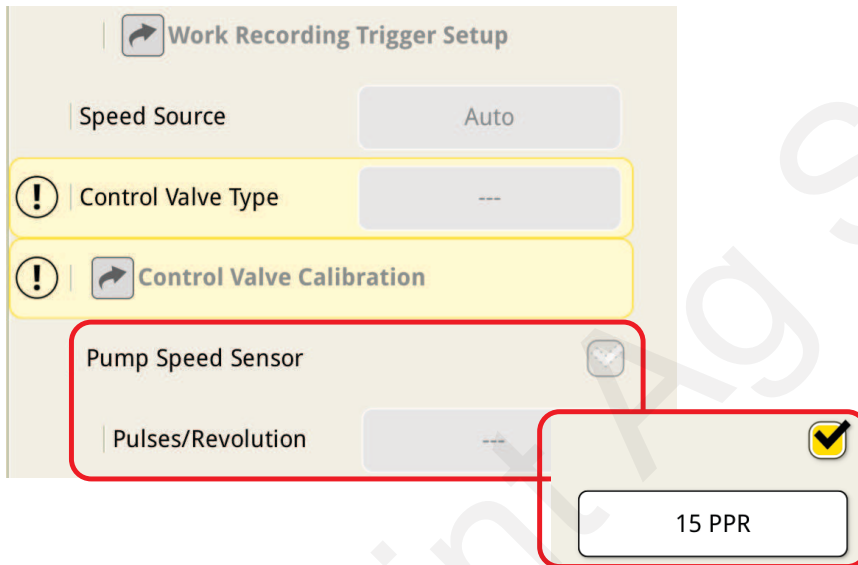
See chart below for SurePoint Torpedo settings.

**Table 2. SurePoint Control Valve Calibration Settings (NH3)**

	Valve Speed	Overshoot Reduction	Valve Effort	Deadband
Torpedo (NH3)	350	3.5	0%	2%

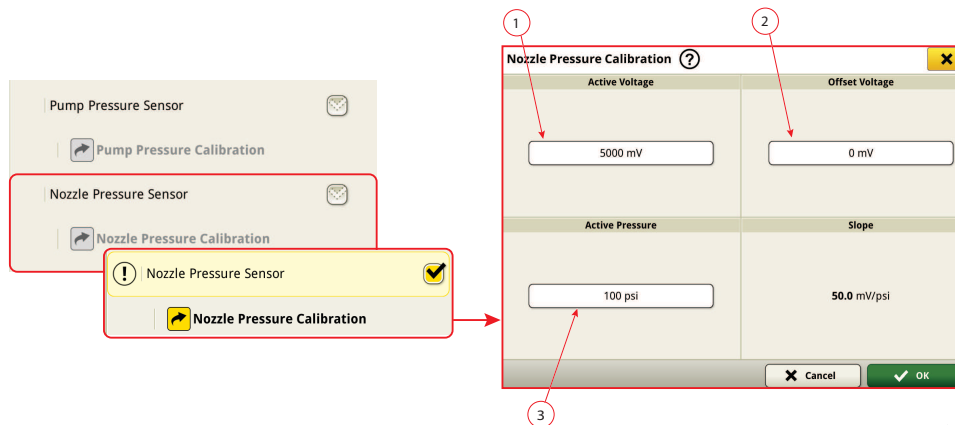
**TIP**  
 If rate is fluctuating above and below target, decrease valve speed by 10 units at a time to fine tune system. If rate is slow to reach target, increase valve speed by 10 units at a time to fine tune the system. Optimal setting will lock on desired target rate.

### Pump Speed Sensor



Only check Pump Speed Sensor when using a SurePoint **PumpRight** pump. Enter **15 PPR** Pulses/Revolution. Leave unchecked for all other pump models.

## Liquid Nozzle Pressure Calibration



This is present when setting up Liquid Fertilizer Applicator.

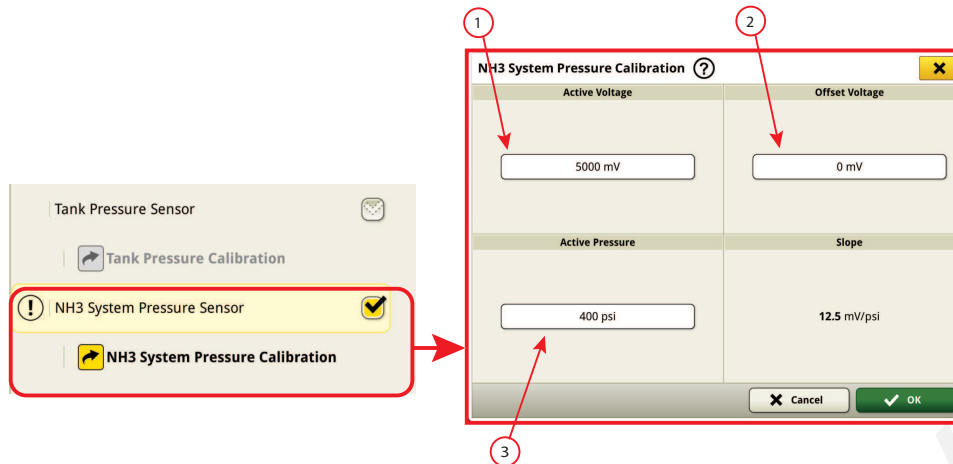


### NOTE

Ensure there is no system pressure present when entering these values.

1. Active Voltage - Set to 5000mV.
2. Offset Voltage - Set to 0mV.
3. Active Pressure - Set to 100 psi.

## NH3 System Pressure Calibration



This is present when setting up NH3 Applicator.



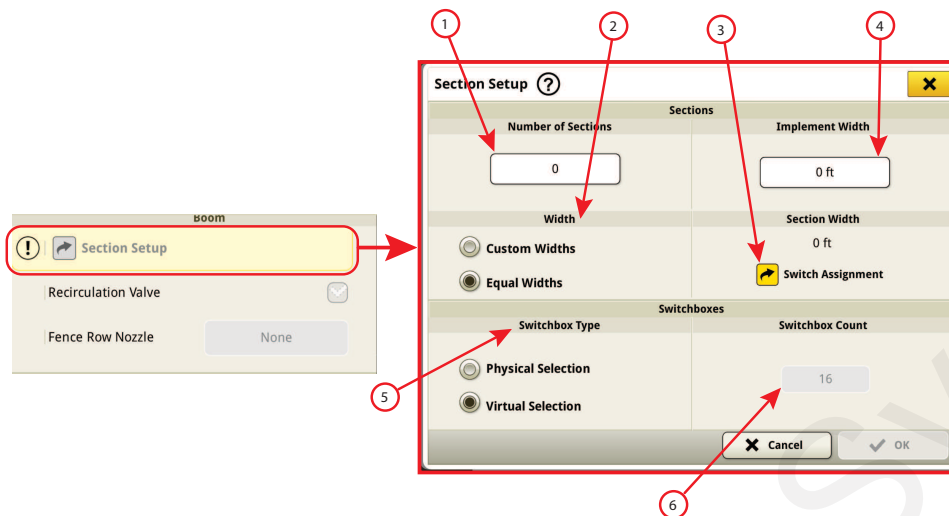
### NOTE

Ensure there is no system pressure present when entering these values.

1. Active Voltage - Set to 5000mV.
2. Offset Voltage - Set to 0mV.
3. Active Pressure - Set to 400 psi.

## Boom

### Section Setup



1. Number of Sections - Total count of section valves present on the implement.

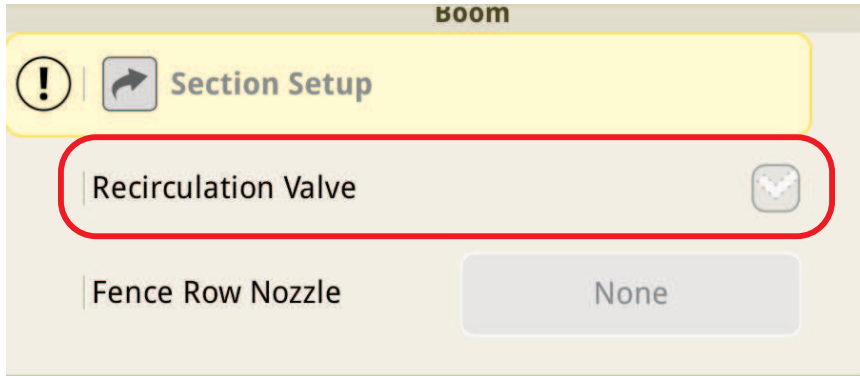


**NOTE**

Maximum of **16** Sections for **Liquid**, **12** Sections for **NH3**.

2. Width - Total implement width, to be assigned by sections.
  - Custom Width - Manually enter individual section widths.
  - Equal Width - Automatically calculate section widths based on total implement width and number of sections.
3. Section Width - Defines the width of each specified section.
  - Switch Assignment - Present when Equal Widths is selected. Assigns section valves on implement.
  - Custom Sections - Present when Custom Widths is selected. Assigns section valves and section widths of the implement.
4. Implement Width - Total implement width.
5. Switchbox Type - Select switch type present.
  - Physical Selection - Select this option to use physical switch box section switches.
  - Virtual Selection - Select this option to use sections switches on the screen.
6. Switchbox Count - Predetermined by section setup, not selectable.

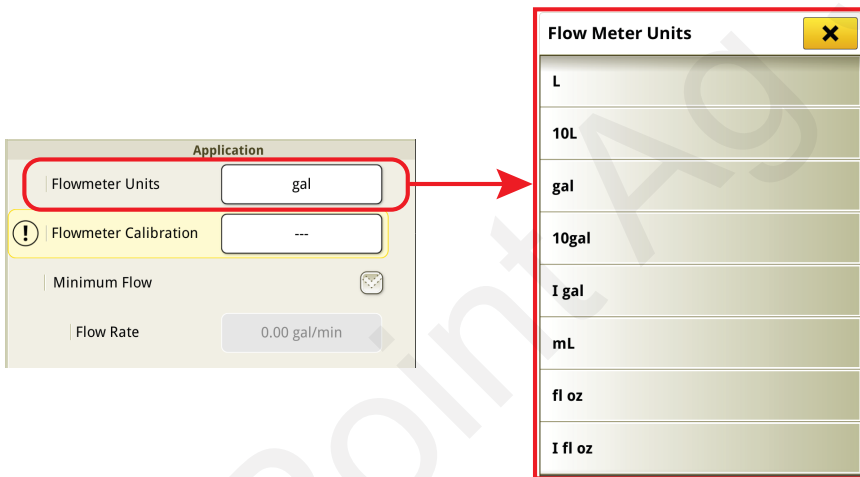
## Recirculation Valve



Select this check box if there is a valve present that diverts flow to the tank when all sections are off.

## Application

### Flowmeter Units



SurePoint Flowmeters use gal.

**Flowmeter Calibration**

**Application**

Flowmeter Units

Flowmeter Calibration

Minimum Flow

Flow Rate

Use the table below to enter flow cal numbers for SurePoint flowmeters.

**Table 3. SurePoint Flowmeter Calibration Values (PR & Tower)**

Flowmeter	Gal/Min	Flow Cal No
DN10	0.2 - 24	4542
DN17	1.4 - 58	2063
E Mag	5 - 106	568

**Table 4. SurePoint Spartan Flowmeter Calibration Values**

Spartan Model	Flow Range (oz/min)	Pulses/fl. oz.
115	1 - 10	1700
125	3 - 20	890
135	6 - 40	450
145	10 - 80	220

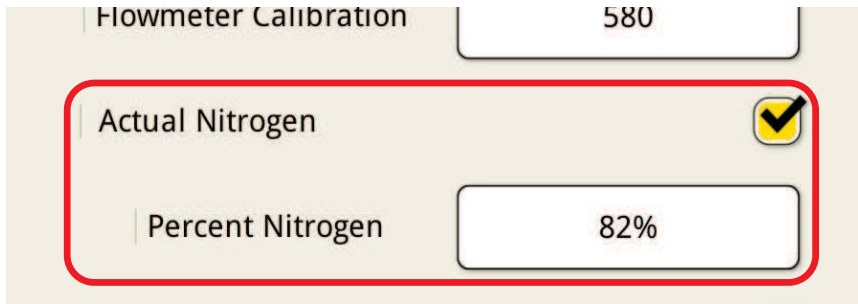
**IMPORTANT**  
 Spartan flowmeter cal values are pulses/oz, but need to be entered as pulses/gal. Set the rate using number of ounces per acre desired. For example, to apply 32oz/acre, set the rate to 32 gal/acre. Display will read gal/acre, but actually apply oz/acre.  
  
 Enter proper tank volume by multiplying by 128. If tank is 20 gal, tank size should be 256 gal to read accurately.

**Table 5. SurePoint NH3 Flowmeter Calibration Values**

Flowmeter	Pulses/Gal
204-02-A-C-150-FM-V	580

**NOTE**  
 If flowmeter not listed, reference the ID tag on flowmeter for Flow Cal Value.

## Actual Nitrogen



Flowmeter Calibration	580
Actual Nitrogen	<input checked="" type="checkbox"/>
Percent Nitrogen	82%

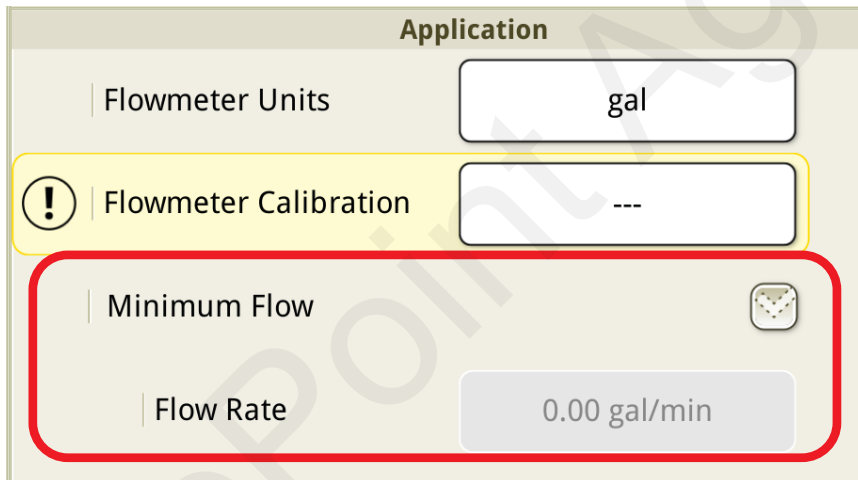
For NH3 Applicators, SurePoint recommends selecting Actual Nitrogen for units. NH3 is 82% Nitrogen.



### NOTE

When selecting Actual Nitrogen box, set your target rate as Units of N.

## Minimum Flow Rate



Application	
Flowmeter Units	gal
Flowmeter Calibration	---
Minimum Flow	<input checked="" type="checkbox"/>
Flow Rate	0.00 gal/min

SurePoint Recommends leaving Minimum flow unchecked, Flow Rate = 0.00

### Rate Smoothing

Rate Smoothing

Rate Tolerance

Tank

SurePoint recommends Rate Smoothing ON (checked) and Rate Tolerance at 3%.

## Tank

### Tank Capacity

Tank

Tank Capacity

Agitation Valve

Duty Cycle

Rate Tolerance

Tank

Tank Capacity

Total Volume of Tank. Liquid = Gallons, NH3 = LbN.

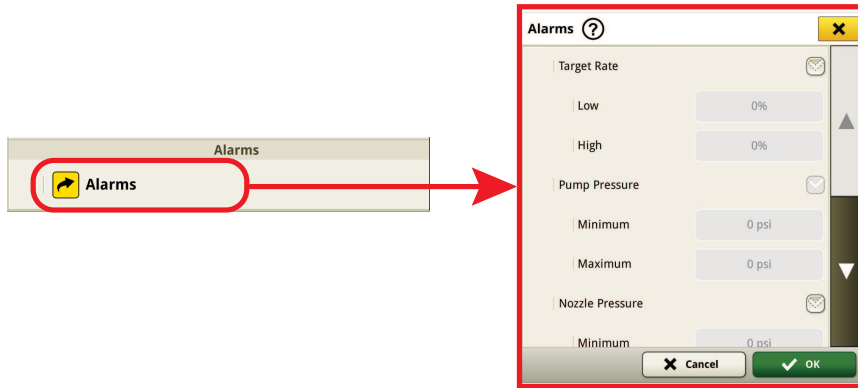


**NOTE**

SurePoint does NOT utilize Agitation Valve.

## Alarms

### Alarm Settings



See table below for SurePoint recommended Alarm values.

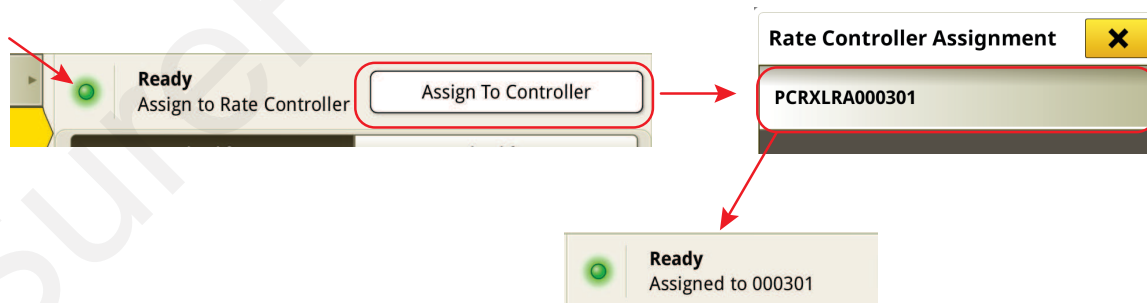
**Table 6. Alarm Settings**

	Target Rate Low	Target Rate High	Nozzle Pressure Min.	Nozzle Pressure Max.	Pump Speed Min.	Pump Speed Max.
Tower	20%	20%	10 psi	45 psi	N/A	N/A
PumpRight	20%	20%	10 psi	85 psi	1 RPM	500 RPM
Spartan	20%	20%	10 psi	85 psi	N/A	N/A
NH3	20%	20%	N/A	N/A	N/A	N/A

**NOTE**  
SurePoint does not use Pump Pressure.

## Assign Profile

When setup is complete, the profile status shows Ready with a green indicator. Select Assign to Controller and choose the controller serial number. The status will then show "Assigned to xxxx".



The system is now ready to test.

## 4. Dual Solution (Liquid/Liquid)

When setting up Rate Controller 3 (RC3) in a dual-solution configuration with two SurePoint systems, use the recommendations in this section where settings differ from the Profile Settings.

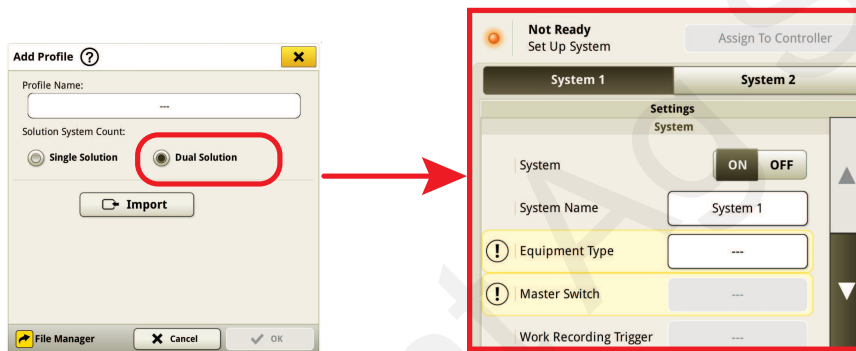


### NOTE

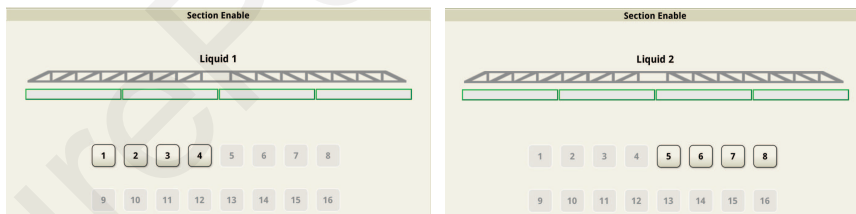
When using **Liquid** system in a dual solution configuration, a **maximum of 16 total sections** are available across both systems.

### Dual Solution non Shared Sections

1. Add or Manage Profile and select Dual Solution.



2. Complete setup for Solution 1 using [Profile Settings \[5\]](#).
3. Complete setup for **Solution 2** until reaching **Section Setup**.
4. Select **Section Setup** and choose whether sections are shared or not. If not shared, System 1 will begin with section 1, and System 2 will begin with the **next available section**.  
Ex. Solution 1 has 4 sections, (1-4) and Solution 2 has 4 sections (5-8).

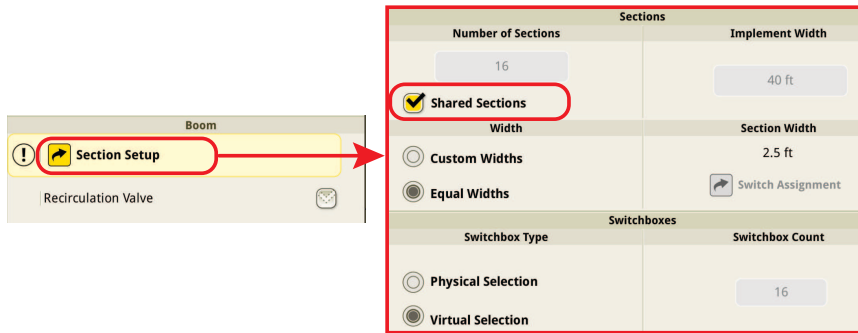


### Dual Solution Shared Sections

Shared Sections - This checkbox is used to indicate sections that are shared between systems. It is only available when configuring a second liquid system.

If Sections are Shared between systems, System 1 and System 2 will begin with section 1 and use the same section signals. Appropriate harnessing is needed to ensure proper connection when using Shared Sections.

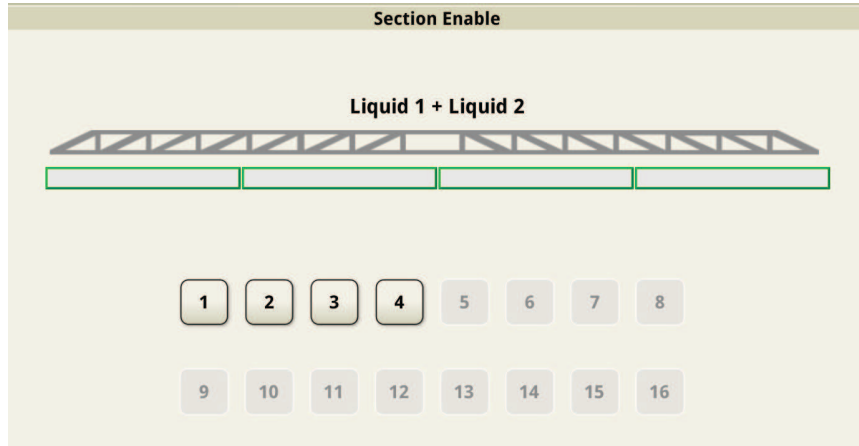
Complete Steps 1-3 above then Select the Shared Sections Checkbox.



## NOTE

Sections	
Number of Sections	Implement Width
4	40 ft
Width	Section Width
<input checked="" type="checkbox"/> Shared Sections <input type="checkbox"/> Custom Widths <input type="checkbox"/> Equal Widths	10 ft <input checked="" type="checkbox"/> Switch Assignment
Switchboxes	
Switchbox Type	Switchbox Count
<input type="checkbox"/> Physical Selection <input checked="" type="checkbox"/> Virtual Selection	16

If sections are shared, Solution 1 will show Shared Sections greyed out.  
 Solution 1 is where Number of Sections and Implement Width are defined.



Liquid 1 and Liquid 2 are sharing 4 sections. Solution 1 = 4 sections, Solution 2 = Shared Sections which also operate as Section 1-4.

## 5. Dual Solution (NH3/Liquid)

When setting up Rate Controller 3 (RC3) in a dual-solution configuration with two SurePoint systems, one NH3 and one liquid, use the recommendations in this section where settings differ from the Profile Settings. **NH3 must be System 1.**

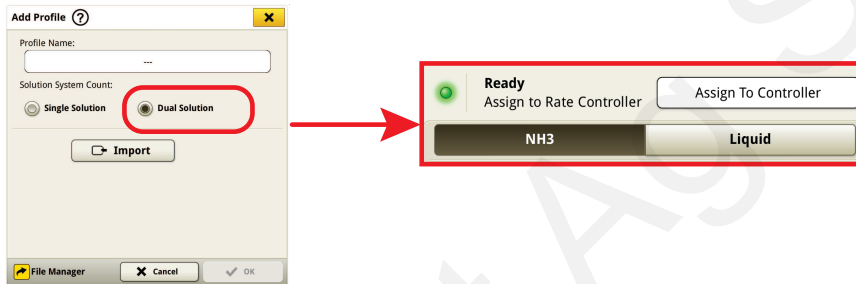


### NOTE

When using an **NH3** system in a dual solution configuration, a **maximum of 12 total sections** are available across both systems.

### Add or Manage Profile

1. Add or Manage Profile and select Dual Solution.



2. Complete setup for Solution 1 & 2 using [Profile Settings \[5\]](#) Ensure Solution 1 is NH3.



### NOTE

NH3 applicator does **NOT** allow shared sections.

## 6. Initial Startup - Liquid

Complete the following procedures once system(s) are installed and profile(s) are setup on RC3.

For NH3 startup, see [Initial Startup - NH3 \[27\]](#)

### Section Test



#### WARNING

**Running this test will discharge liquid from the nozzles.**

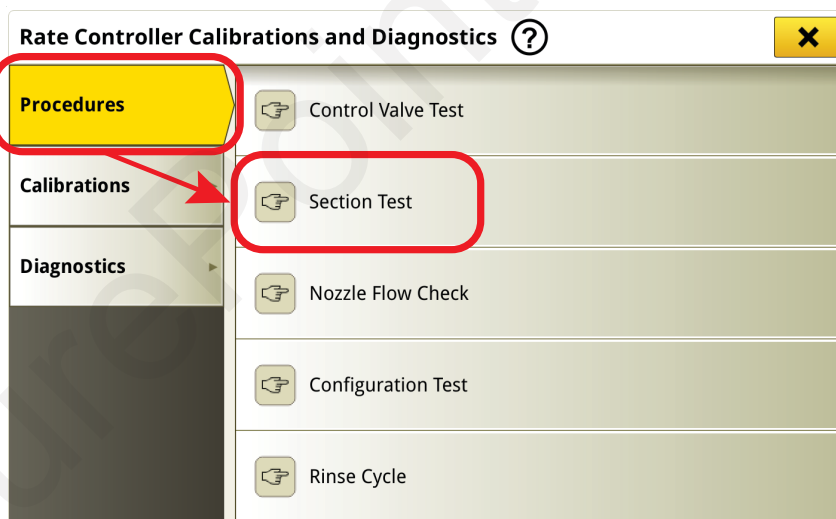
To avoid injury from exposure to chemicals, use clean water and appropriate personal protective equipment.

If necessary, use the master switch to stop application.

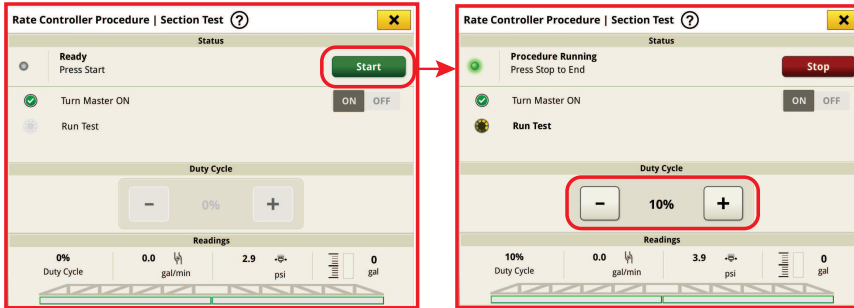
Use Section Test to prime your system, purge air, or check for leaks upon initial startup.

It is recommended to use water to perform the Section Test upon initial startup, or at the beginning of each season. Once water is tested, product can be used.

1. From the Calibrations and Diagnostics page, select **Procedures**, and then **Section Test**.



2. Select which system you want to test, then press **Begin Procedure**.
3. Ensure Master is **ON**, Press **Start**, and increase Duty Cycle slowly. An electric system should start to pump between 10-15% duty cycle. A hydraulic pump will start to pump close to 25% duty cycle. If system does not prime open the priming air bleed valve to exhaust air to allow pump to prime. Once pump is primed push on the boom if section valves are present and test that each section valve is operating correctly and in sequential order.



- Once pump is primed and system operation is verified press **Stop** continue to a Nozzle Flow Check.

## Nozzle Flow Check

It is recommended to use water to perform the Nozzle Flow Check upon initial startup, or at the beginning of each season. Once water is tested, product can be used.



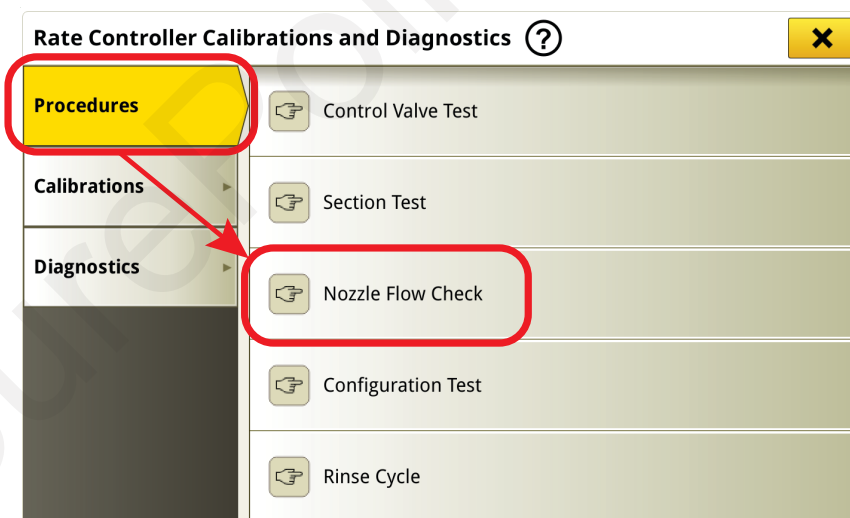
### WARNING

**Running this test will discharge liquid from the nozzles.**

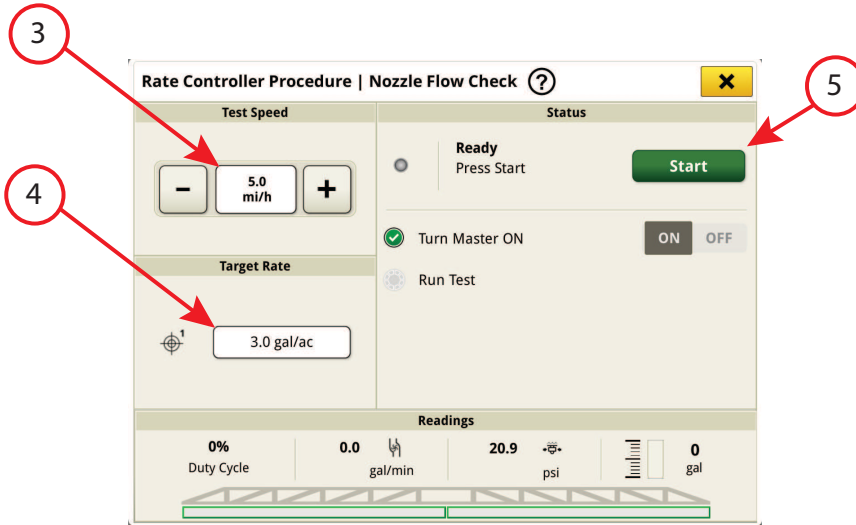
To avoid injury from exposure to chemicals, use clean water and appropriate personal protective equipment.

If necessary, use the master switch to stop application.

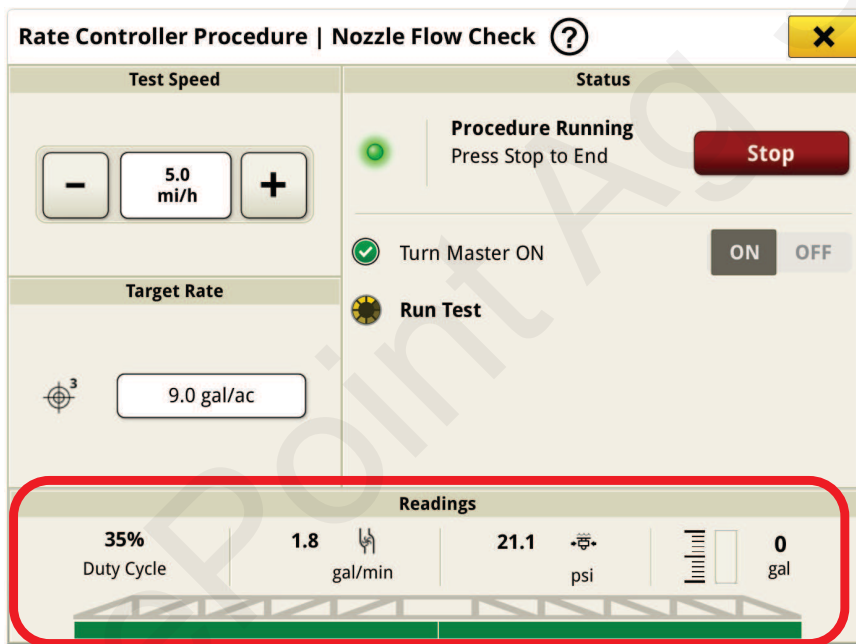
- From the Calibrations and Diagnostics page, select **Procedures**, then **Nozzle Flow Check**.



- Select which system you want to test, then press **Begin Procedure**.
- Enter a Test Speed
- Enter a Target Rate
- Ensure Master is **ON** and press **Start**.



6. Monitor the Readings to ensure Target Rate is achieved and duty cycle, gal/min, and psi are all steady and not making large fluctuations. If large fluctuations are observed further fine tuning of the system settings may be needed.



**TIP**  
 Select the green bars below the boom image to toggle sections on or off during the nozzle flow check.

7. Once flow check is verified, press **Stop** to end the nozzle flow check.

## Flowmeter Calibration



### WARNING

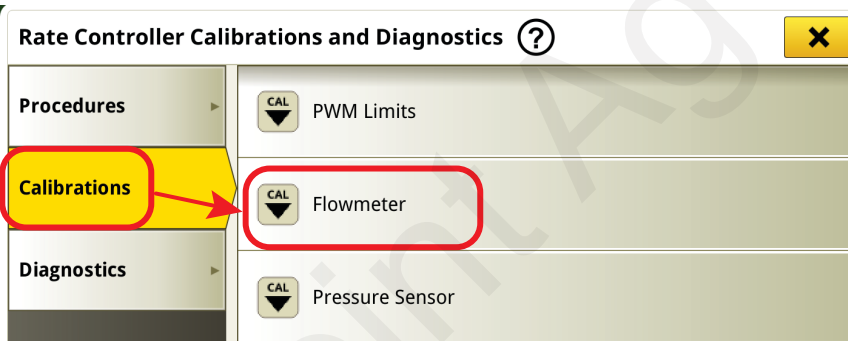
Running this test will discharge liquid from the nozzles.

To avoid injury from exposure to chemicals, use clean water and appropriate personal protective equipment.

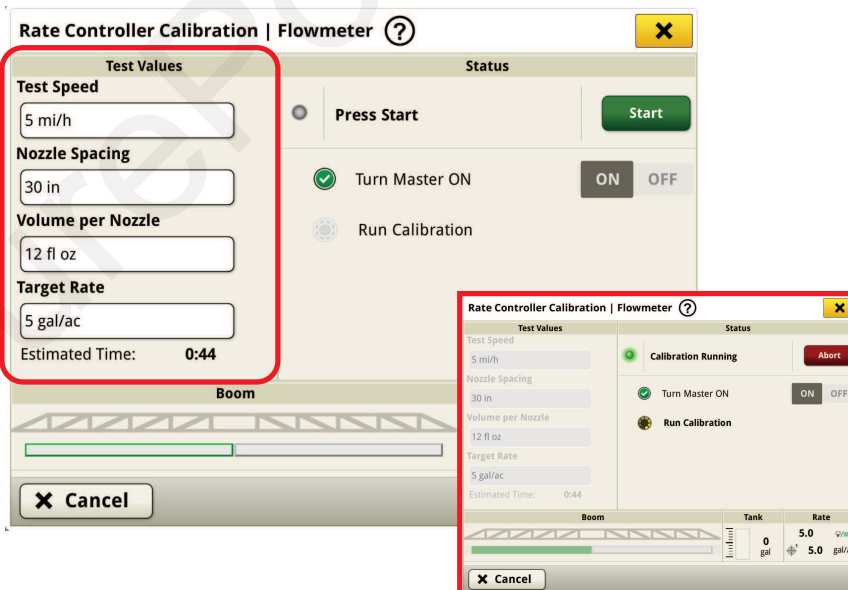
If necessary, use the master switch to stop application.

It is recommended that Flowmeter Calibration is performed with actual product to ensure accuracy of the flowmeter performance.

- From the Calibrations and Diagnostics page, select Calibrations, then Flowmeter. On the next page, select which system to test, and what Test Type. Choose Catch to perform a catch test, then select Begin Calibration.



- Next, enter Values to test when performing a catch test.



3.

**NOTICE**  
System will turn on and fluid will be dispensed.

Place a catch container under each nozzle of the section(s) ON for the catch test. Turn Master ON and press Start.

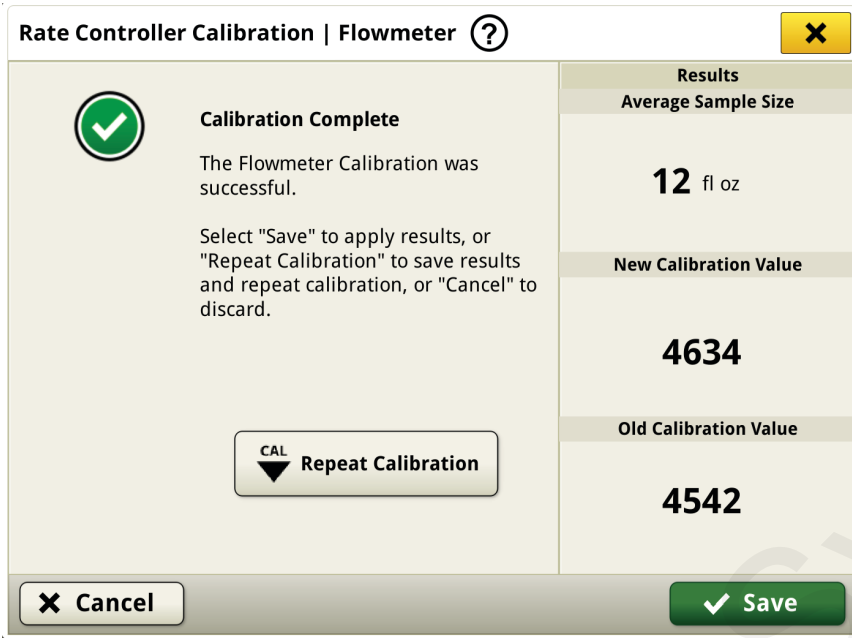
4. Collect all liquid until the estimated time reaches 0:00 and the system turns off.
5. Measure each nozzle container and enter the amount in the sample number boxes. Press OK.

Test Values			
Sample 1 12 fl oz	Sample 2 11 fl oz	Sample 3 11 fl oz	Sample 4 13 fl oz
Sample 5 0 fl oz	Sample 6 0 fl oz	Sample 7 0 fl oz	Sample 8 0 fl oz
Sample 9 0 fl oz	Sample 10 0 fl oz	Sample 11 0 fl oz	Sample 12 0 fl oz
Sample 13 0 fl oz	Sample 14 0 fl oz	Sample 15 0 fl oz	Sample 16 0 fl oz

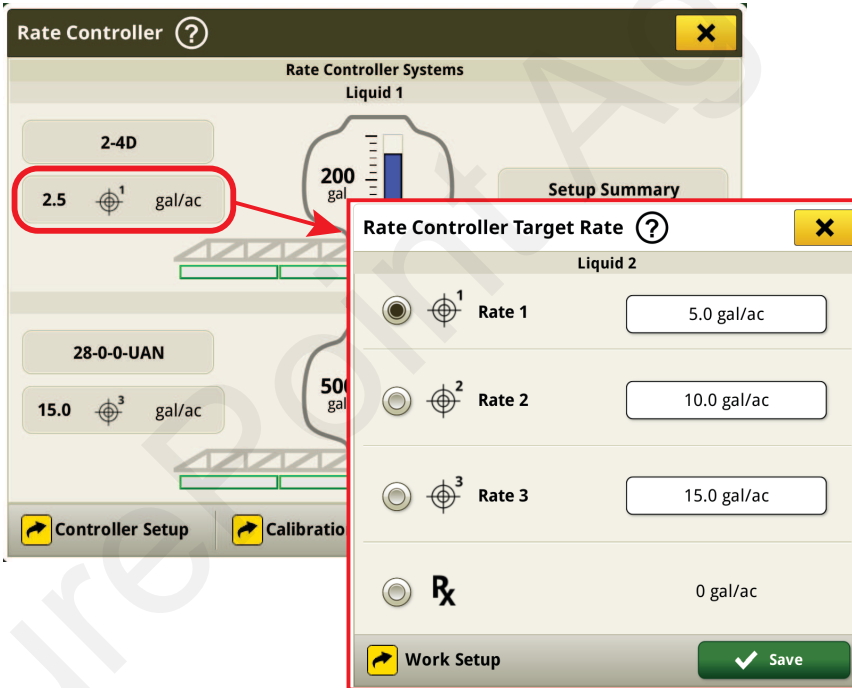
<< Retry      OK

**NOTE**  
Entering 0 will alter the calibration process.

6. The Results page will populate and show a new flowmeter calibration value if the samples collected were different from the entered volume per nozzle. If the flowmeter calibration value does change repeat the catch test to ensure system accuracy. When the flowmeter is calibrated correctly the flowmeter catch test should dispense the amount entered per nozzle in the test setup.



- Once tests are complete, the system is ready to operate. From the Main Run screen, enter user defined rates in one of the 3 presets, or choose Rx for prescription rates through work setup.



## 7. Initial Startup - NH3

Complete the following procedures once system(s) are installed and profile(s) are setup on RC3.

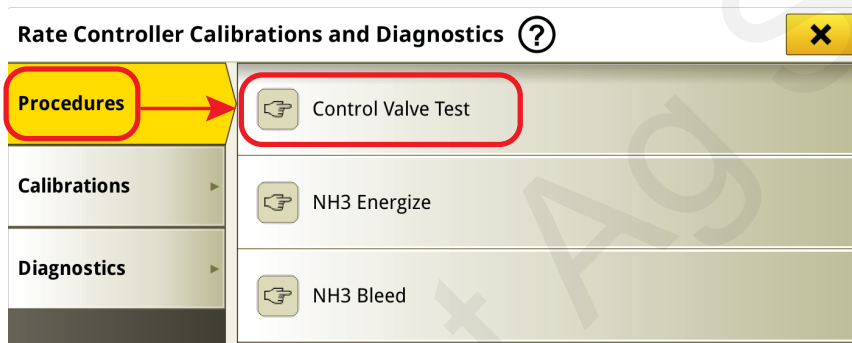
### Control Valve Test



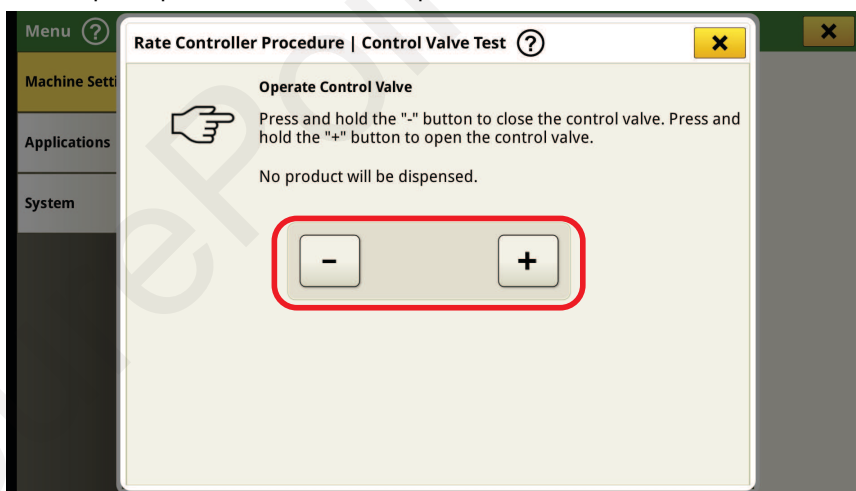
#### NOTE

Control Valve Test is used to ensure the control valve is functioning properly. Product will NOT be dispensed during this test. Complete this test before Energizing the system.

1. From **Calibrations and Diagnostics** page, select **Procedures**, then **Control Valve Test**.



2. Select the system you want to test, then press **Begin Procedure**.
3. Follow prompt on the screen to open and close the control valve using (-) and (+) buttons.



## NH3 Energize



### WARNING

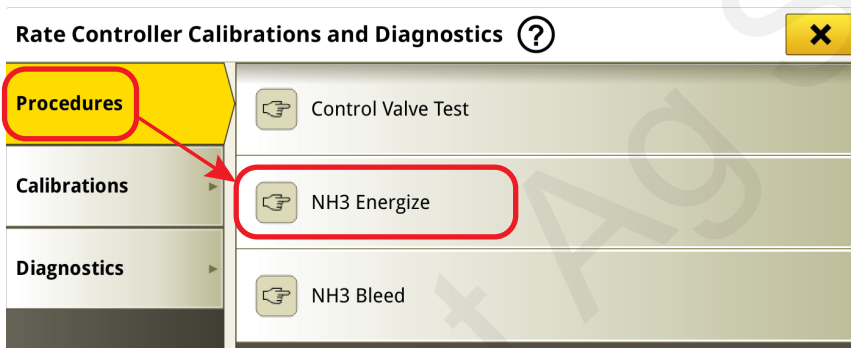
Running this test will discharge anhydrous ammonia.

To avoid serious injury or death from exposure to anhydrous ammonia, ensure there are no bystanders, and sound horn before pressing Start.

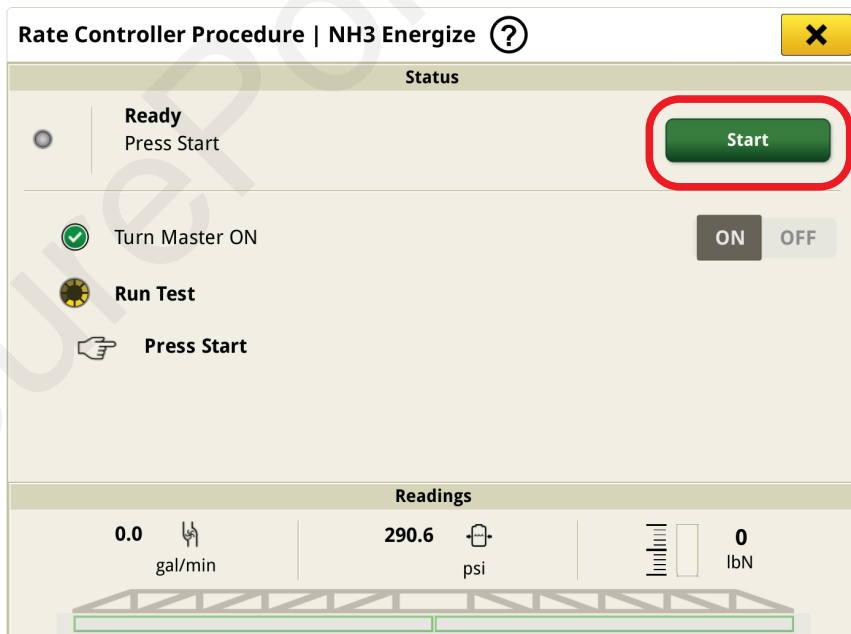
Work Trigger status will be ignored during this test.

If necessary, use the master switch to stop application.

1. From **Calibrations and Diagnostics** page, select **Procedures**, then **NH3 Energize**.



2. Select the system you want to test, then press **Begin Procedure**.
3. Once Master is ON, press **Start**. This will open the master and section valves to charge the system for a few seconds. Product will begin to flow through the entire system.



4. A prompt will appear once procedure is complete. You may want to replicate this process more than once to fully charge the system as needed.

## NH3 Bleed



### WARNING

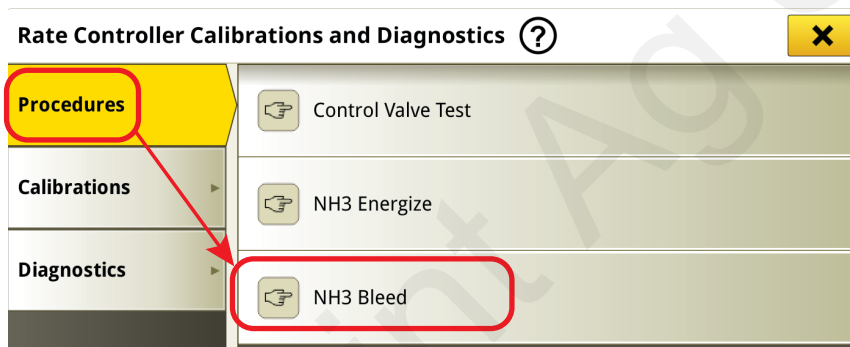
Running this test will discharge anhydrous ammonia.

To avoid serious injury or death from exposure to anhydrous ammonia, ensure there are no bystanders, and sound horn before pressing Start.

Work Trigger status will be ignored during this test.

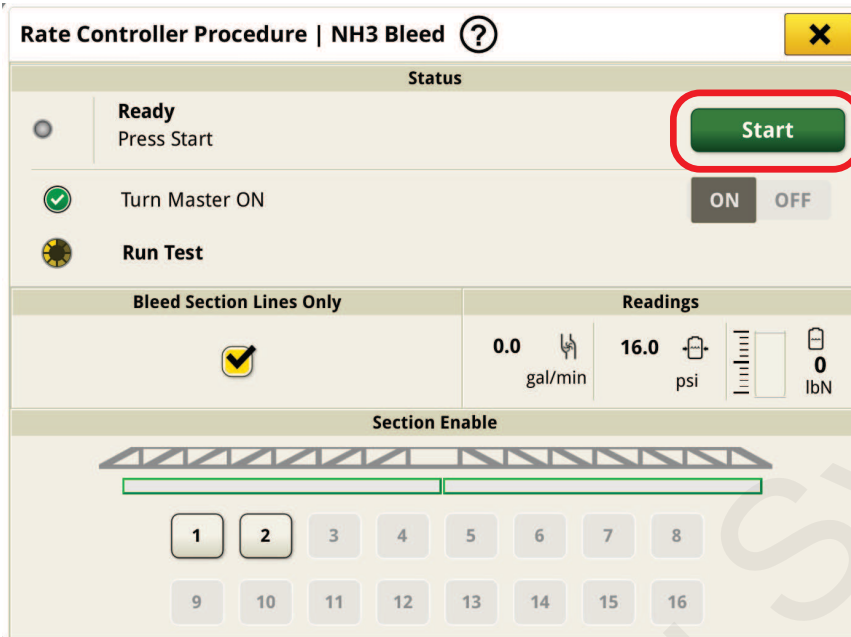
If necessary, use the master switch to stop application.

1. From **Calibrations and Diagnostics** page, select **Procedures**, then **NH3 Bleed**.



2. Select the system you want to test, then press **Begin Procedure**.

- Once Master Switch is ON, press **Start**. This will open section valves, but keep Master Valve Closed to relieve pressure from plumbing downstream from master valve.



- Once tests are complete, the system is ready to operate. From the Main Run screen, enter user defined rates in one of the 3 presets, or choose Rx for prescription rates through work setup.

