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JOHN DEERE - RC SINGLE PRODUCT

AgXcel Quick Start Setup



PLEASE NOTE: YOUR SETUP MAY VARY!

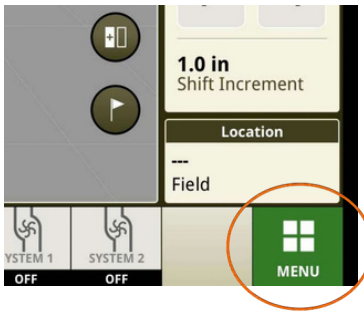
The screenshots in this guide represent a typical AgXcel Liquid Fertilizer System setup.
See your equipment operator's manual for safety information and additional setup and operating information.
Please ensure you have the latest firmware installed!

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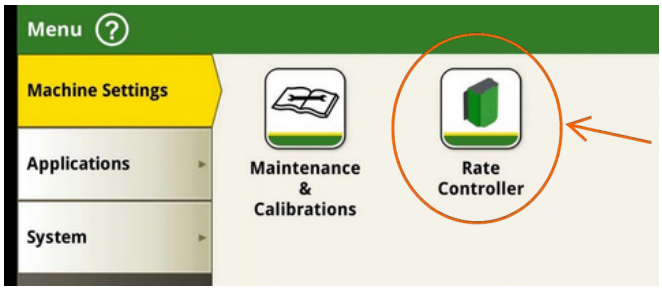
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MENU STRUCTURE FOR LIQUID RATE CONTROLLER

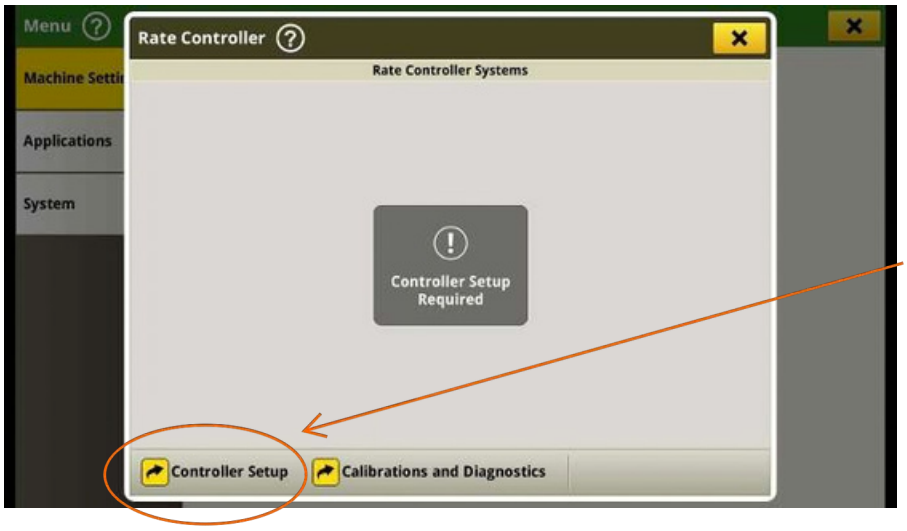
MENU STRUCTURE FOR LIQUID RATE CONTROLLER
SET UP: Implement



Press **Menu** to find your Rate Controller 3



Under **Machine Settings** press **Rate Controller** to start your profile setup



Press the **Controller Setup** on the bottom left of the **Rate Controller** tab

Then **add a name** for the Profile you are about to create and choose the **Single Solution** box for a single product application. Once done, press **OK**.

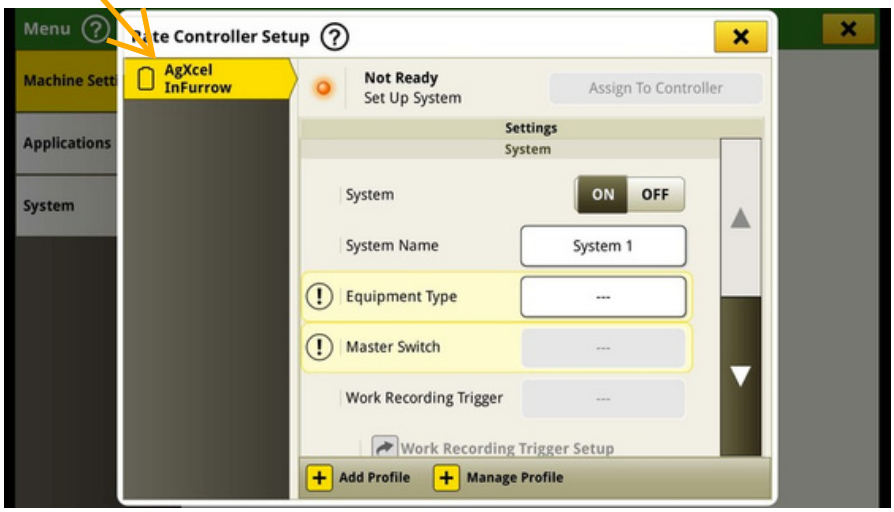


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Setup and Configuration

This is the Profile that you have created. From here, you can change the settings of the Profile.



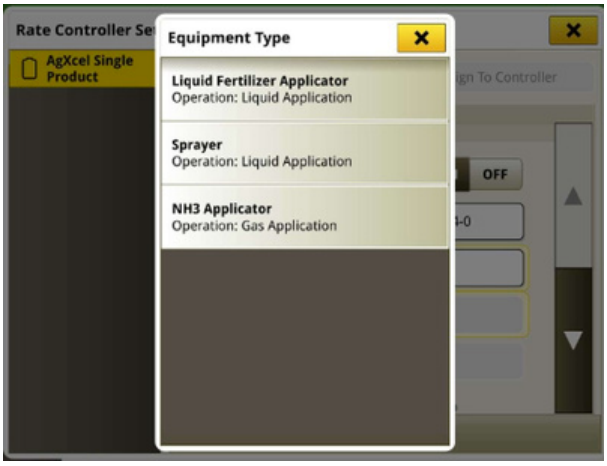
System: You can turn this off when you are not wanting to apply liquid on a certain field and not have to delete the profile.

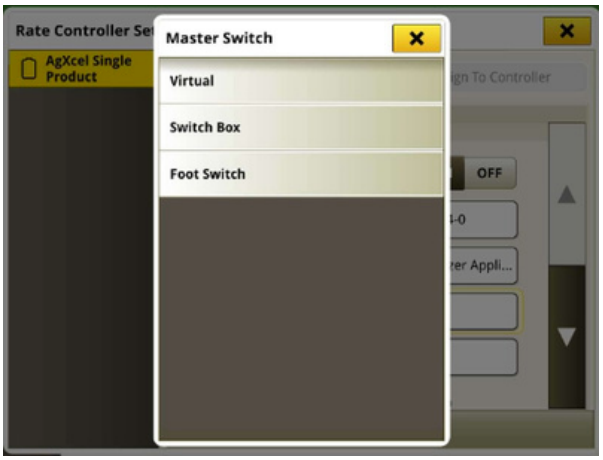
System Name: Enter the name of the system (such as the product name or application type).

Equipment Type: Select Liquid Fertilizer Applicator.

Master Switch: Select if you are using a soft Virtual switch, a Switch Box, or a Foot Switch as your system master switch.

Work Recording Trigger: If you are using an AgXcel provided lift switch, then select Height Switch. Or else you can select any other option you prefer as a height switch if you choose to use a height switch.







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Setup and Configuration



Transmit Work Trigger: This can be selected when using multiple Rate Controller 3 units to share the work recording trigger. Select this when using multiple Rate Controller 3 units with one implement switch.

Speed Source: Selecting Auto will first prioritize GPS, then Radar, then Wheel Speed. Radar Speed Only prioritizes Radar first, then Wheel Speed.

Constant Flow: If a three way valve were to be installed and the section valves were to shut off, then the three way valve would open to return flow back to the tank. Most applications do not check this box.



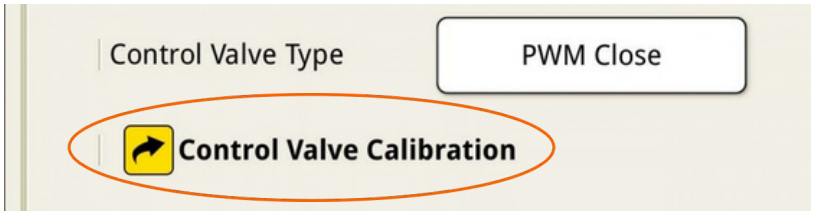
Control Valve Calibration: All AgXcel pump systems use a PWM driver, so you will select PWM Close.

Pump Speed Sensor: Do not enable. AgXcel GX2 or GX5 pumps do not use an RPM sensor when a flowmeter is in use. AgXcel GX5 RPM sensor motors read at 15 Pulses Per Revolution.

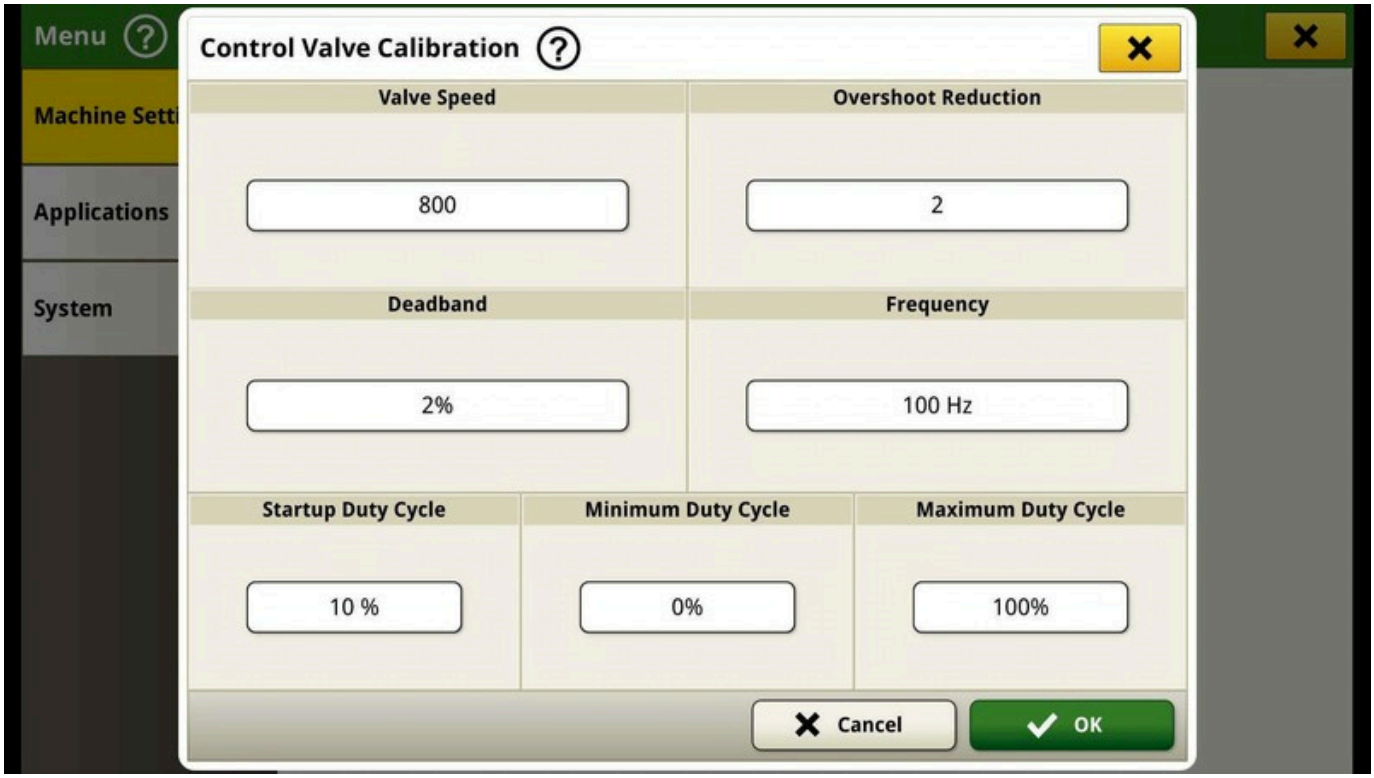
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Setup and Configuration



Once you have selected your Control Valve Type, **Press the Control Valve Calibration** to enter the calibration numbers.



Valve Speed (adjust as needed)
GX2: 800
GX5 Diaphragm: 100
GX5 Centrifugal: 100

Overshoot Reduction (adjust as needed)
GX2: 2
GX5 Diaphragm: 2
GX5 Centrifugal: 2

Deadband 2%

Frequency
GX2: 100
GX5 Diaphragm: 100
GX5 Centrifugal: 122

Startup Duty Cycle (adjust as needed)
GX2: 10%
GX5 Diaphragm: 20%
GX5 Centrifugal: 20%

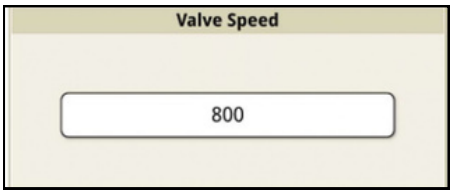
Minimum Duty Cycle (adjust as needed)
GX2: 0%
GX5 Diaphragm: 10%
GX5 Centrifugal: 10%

Maximum Duty Cycle
GX2: 100%
GX5 Diaphragm: 100%
GX5 Centrifugal: 100%

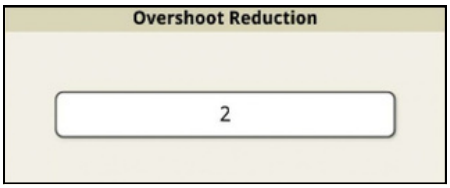
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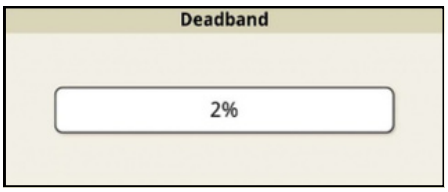
Setup and Configuration



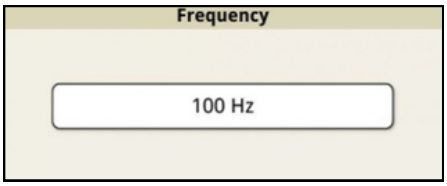
Valve Speed: Affects how quickly the PWM valve moves in response to the difference between the actual flow rate and the target flow rate. The higher the value, the more aggressive (meaning faster) the valve responds. If the pump surges around the target rate, lower this value. If the pump is too slow to reach the target rate, increase this value.



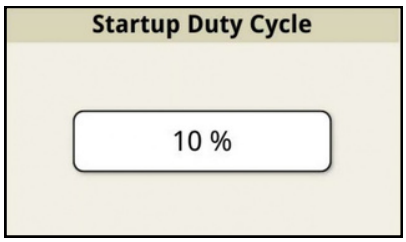
Overshoot Reduction: Affects how quickly the PWM valve moves in response due to speed, rate, or section changes. The higher the value, the more aggressive (meaning faster) the valve responds. If the pump surges around the target rate, lower this value. If the pump is too slow to reach the target rate, increase this value.



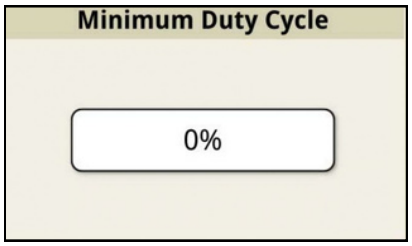
Deadband: The range around the target rate where the valve stops adjusting rate until the change in flow exceeds the entered limit.



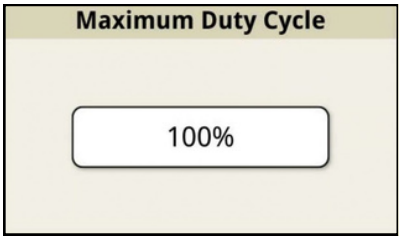
Frequency: The frequency of the control signal that is provided by the AgXcel pump.



Startup Duty Cycle: The initial duty cycle that the AgXcel pump will start at.



Minimum Duty Cycle: The lowest duty cycle that the AgXcel pump is allowed to operate at.



Maximum Duty Cycle: The jhighest duty cycle that the AgXcel pump is allowed to operate at.

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Setup and Configuration



Pump Pressure Sensor:
This is Pressure 2 on AgXcel harnessing.

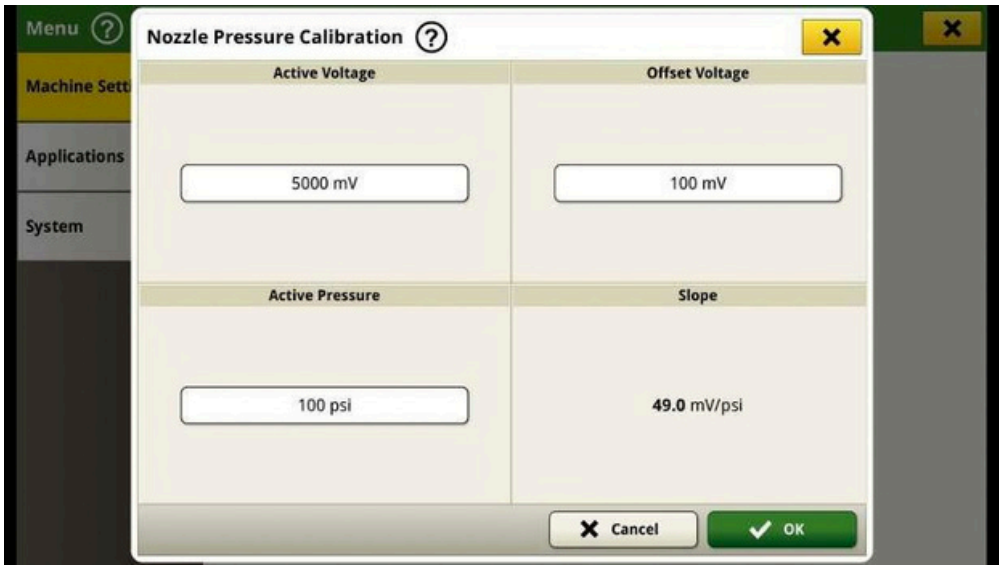
Nozzle Pressure Sensor:
Enable if you are using an AgXcel Pressure Transducer. Once enabled, select the Nozzle Pressure Calibration.

For AgXcel Pressure Transducers, enter the following settings

Active Voltage: 5000mV

Offset Voltage: 100mV

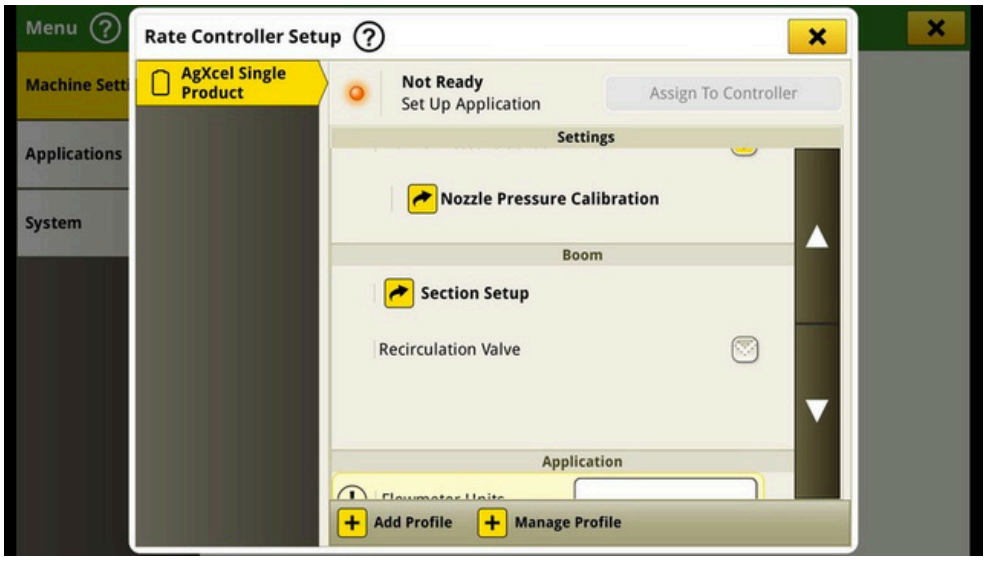
Active Pressure: 100PSI



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Setup and Configuration



Setup Sections:
Select this to set the number of sections and rows per section for the selected liquid product.

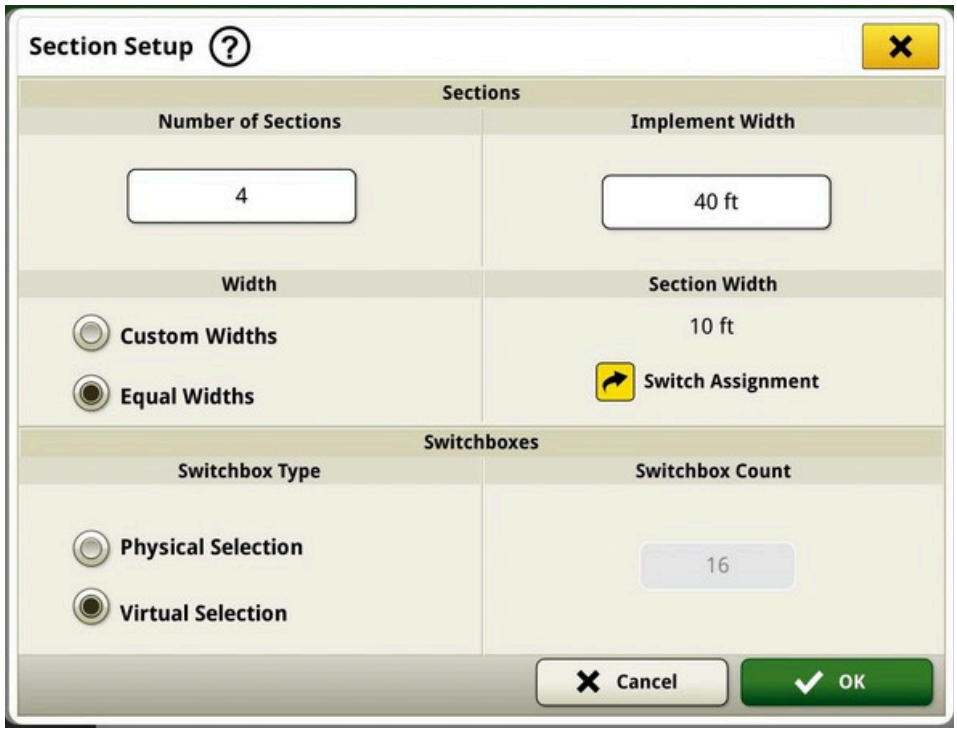
Recirculation Valve:
Select this if a recirculation valve is in use.

Number of Sections:
Set the number of sections for the currently selected pump system. If you do not have any sections valves, enter 1 section.

Implement Width:
Enter the width of your implement in feet.

Width:
This gives you the ability to set Custom Widths or Equal Widths. Select Custom Widths if you do not have an even number of rows between all sections. Select Equal Width if you have the same amount of rows for every section.

Section Width:
If you selected Custom Widths, enter the width of each section per width. If you selected Equal Widths, ensure the displayed width is correct.

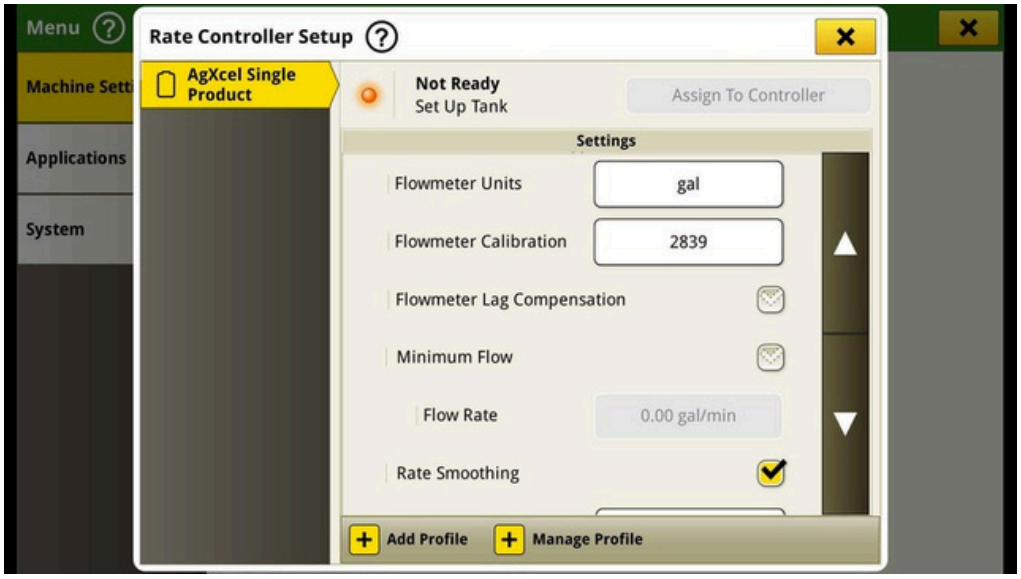


Switchbox Type:
If you are using a physical switch box, select Physical Selection. If you are not using a physical switch box, select Virtual Selection.

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Setup and Configuration



Flowmeter Units: gal

Flowmeter Calibration: See chart below

Flowmeter Lag Compensation: Select this to record the target flow

rate as the actual flow rate for three seconds, or until the flowmeter reads flow. Enable this to compensate for map gaps when flow is present.

Minimum Flow: Do ***not*** enable this setting. The Minimum Flow should always stay at 0 gal/min.



Orion 2+ Magnetic Flowmeter Models

FLOW RANGE (GPM)	PULSES PER GALLON	JOHN DEERE GS2/GS3 2K LRCM	
		DB8 CABLE	CAL#
0.053 - 5.3	11355	YES	2838
.53 - 53	1135	NO	1135
2.11 - 211	284		284

Orion 3 Magnetic Flowmeter Models

FLOW RANGE (GPM)	PULSES PER GALLON	JOHN DEERE GS2/GS3 2K LRCM	
		DB8 CABLE	CAL#
.04 - 1.6 (DN3)	75708	YES	9464
.08 - 3.17 (DN4)	37854		4731
.26 - 10.5 (DN7)	11356		1419
.52 - 21 (DN10)	4542	NO	4542
1.45 - 58 (DN	2063		2063



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Settings



Rate Smoothing: Enable

Rate Tolerance: Set at 10%

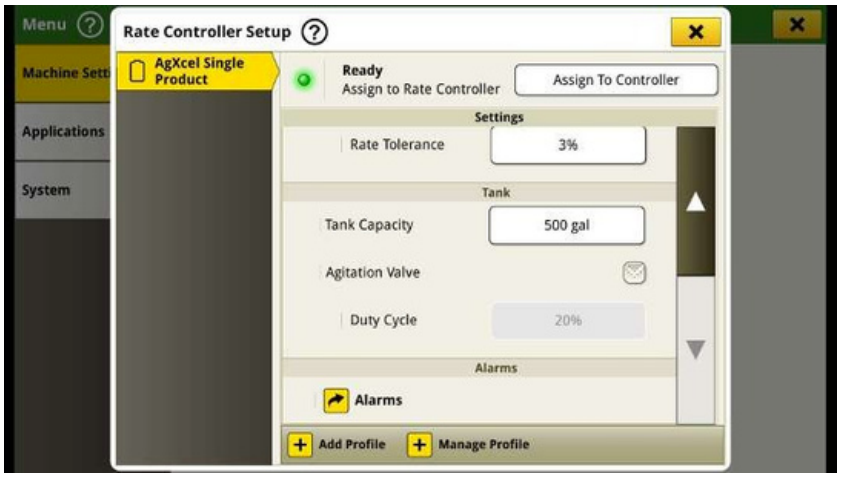
Tank Capacity: Set to your tank(s) capacity

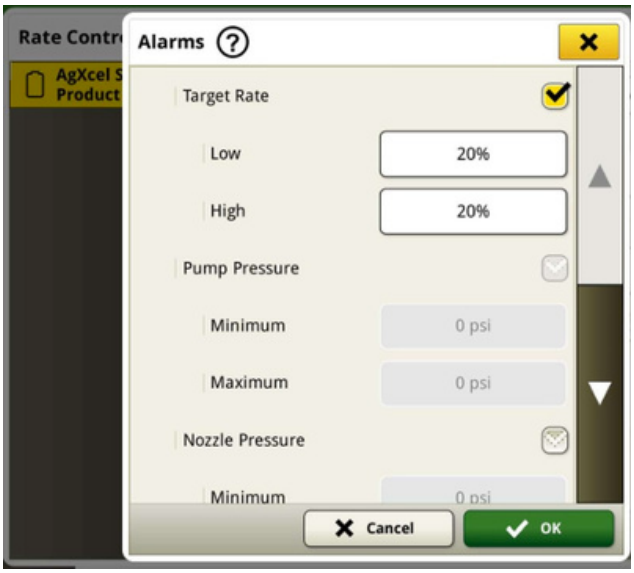
Agitation Valve: Do not enable

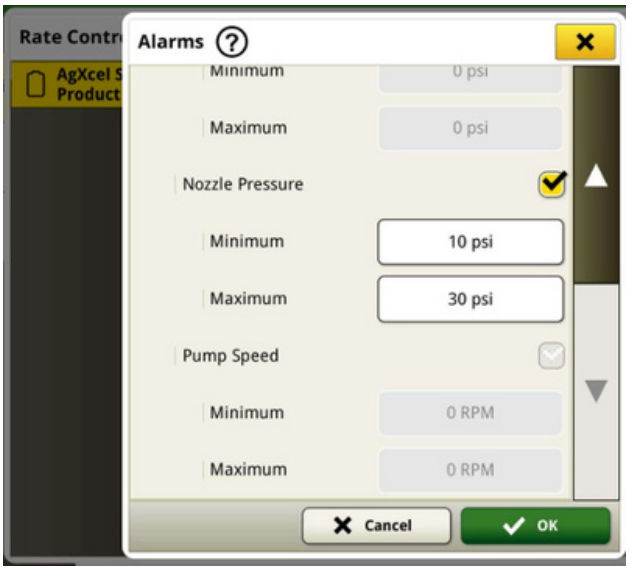
Alarms
Select Alarms to enable certain alarms and set thresholds.

Target Rate: If you choose to enable this, AgXcel recommends setting the Low & High limits at 20%.

Nozzle Pressure: If you choose to enable this, AgXcel recommends setting the Low to 10 PSI for GX2 or 20 PSI for GX5. Then the High for GX2 at 30 PSI or 60 PSI for GX5.







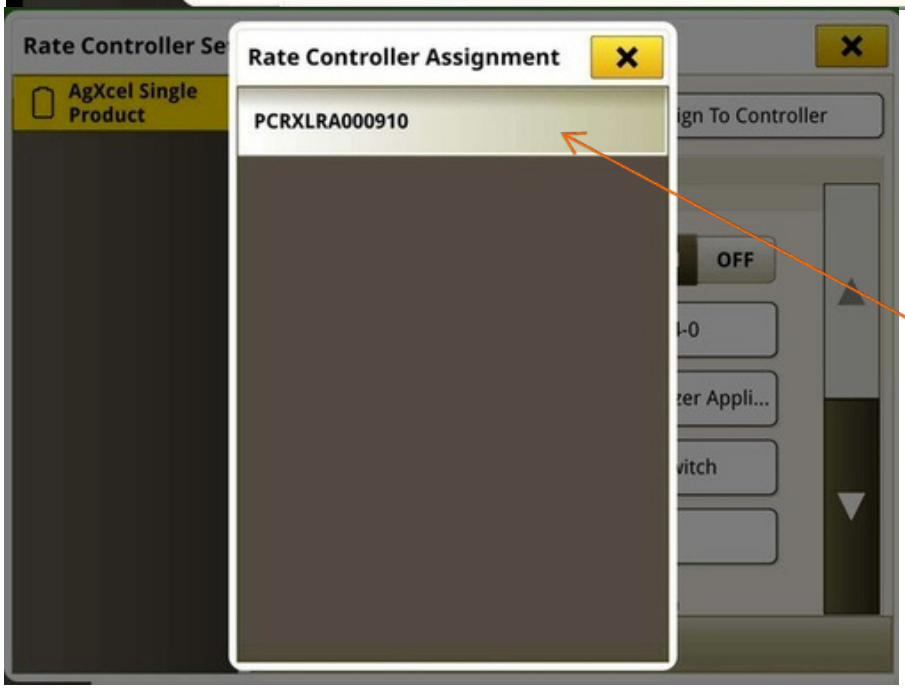
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Settings

Once you have entered all of the required settings, scroll back to the top and press the **Assign To Controller** option.





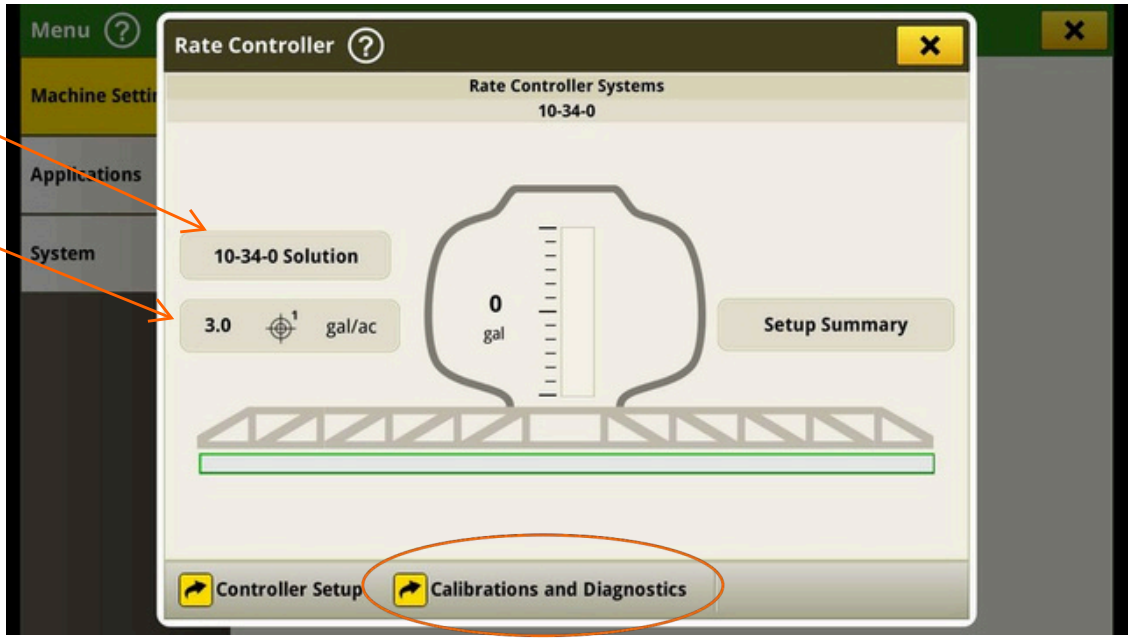
Then you will need to select which Rate Controller 3 you want to assign the product to (the option(s) displayed are the serial numbers of the Rate Controller 3 units).

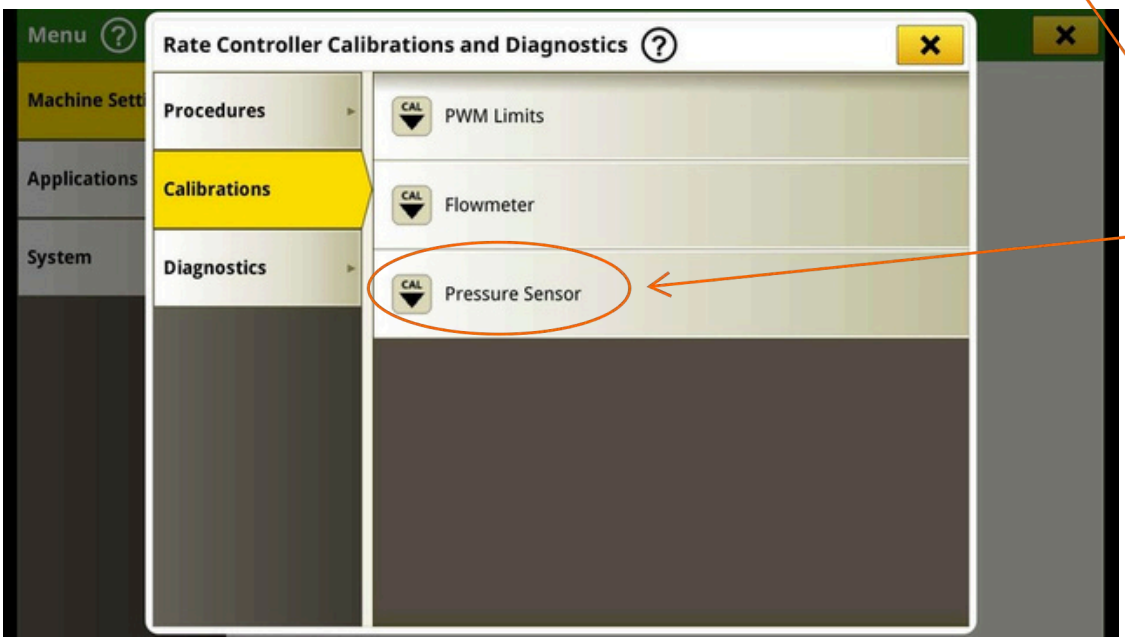
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Settings

Once assigned, enter your Work Setup & Preset Target Rates.





Then press the Calibrations and Diagnostics. Then select the Pressure Sensor option under Calibrations.

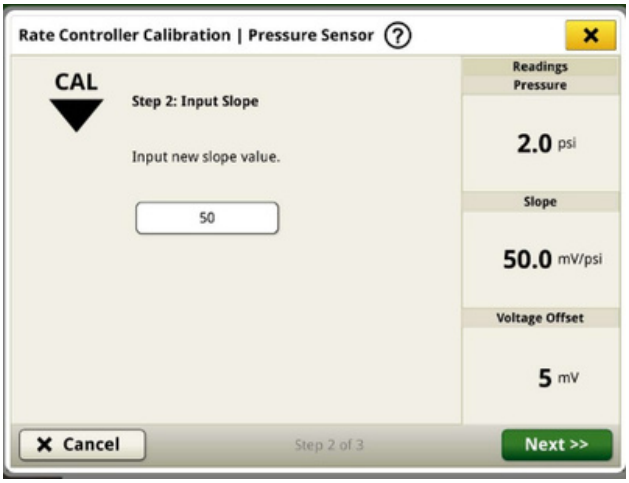
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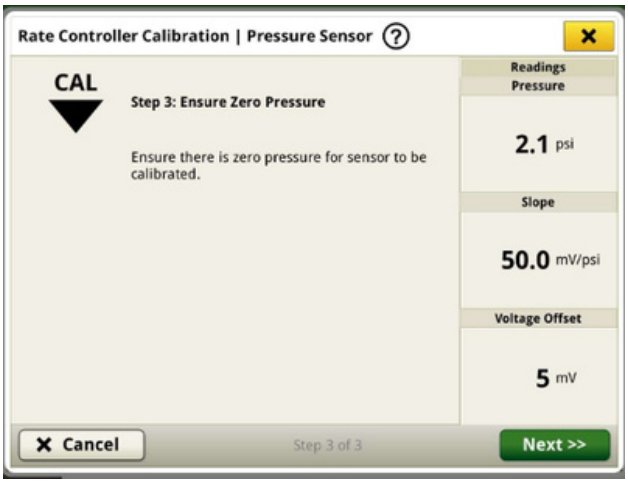
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Settings



Step 1. Select the pressure transducer that you want to calibrate under Select System, then Pressure Sensor, & Test Type will be set to Voltage Based Calibration.

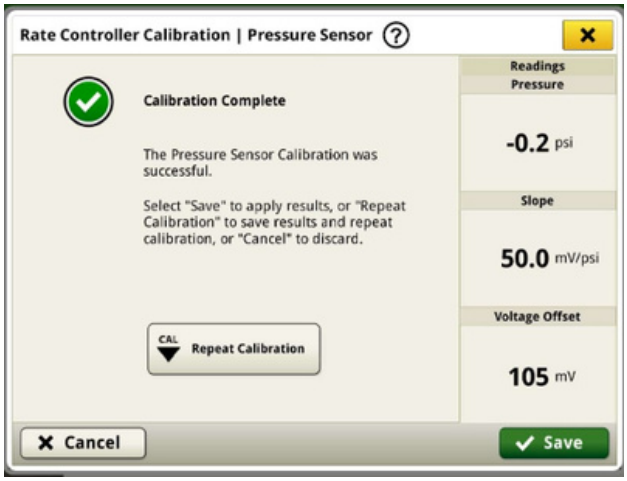




Step 2. Enter the slope as 50.

Step 3. Confirm that there is no pressure in the system.

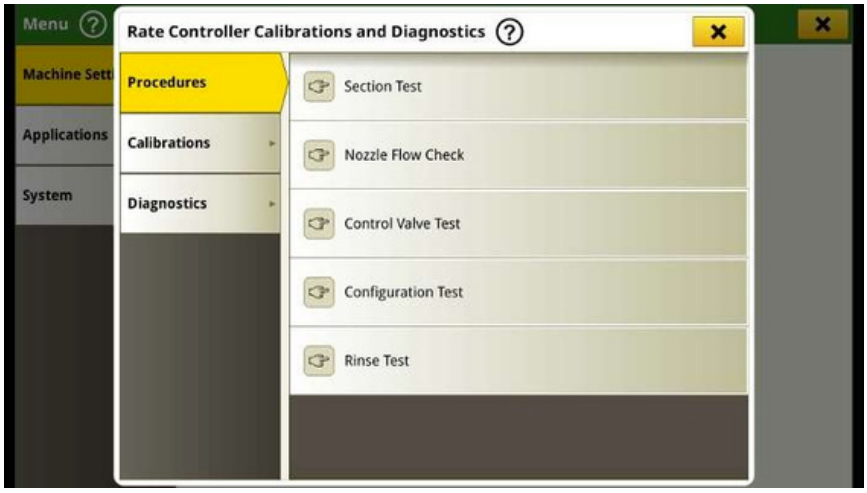
Then press **Save** to save results.



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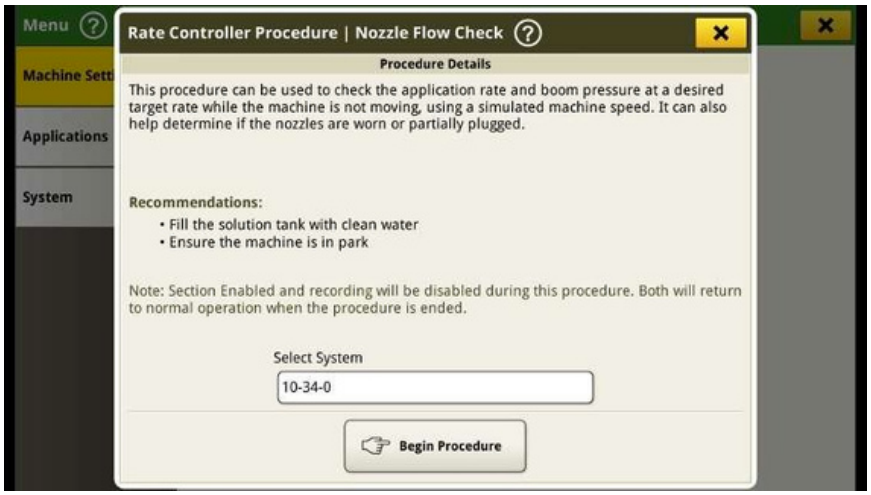
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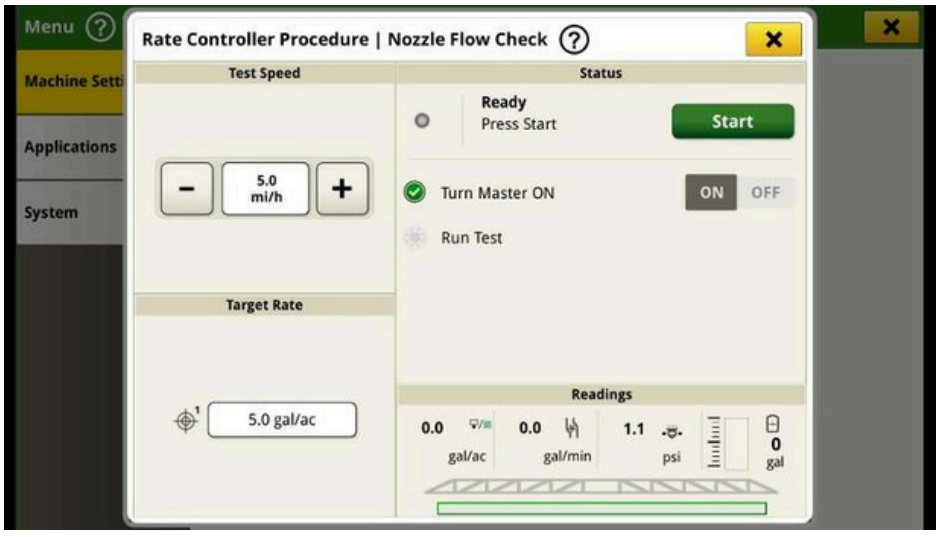
Settings



"Step 1. Select the pressure transducer that you want to calibrate under Select System, then Pressure Sensor, & Test Type will be set to Voltage Based Calibration."

Under Select System, **Select the product** that you want to do the wet test with. Then press **Begin Procedure**.

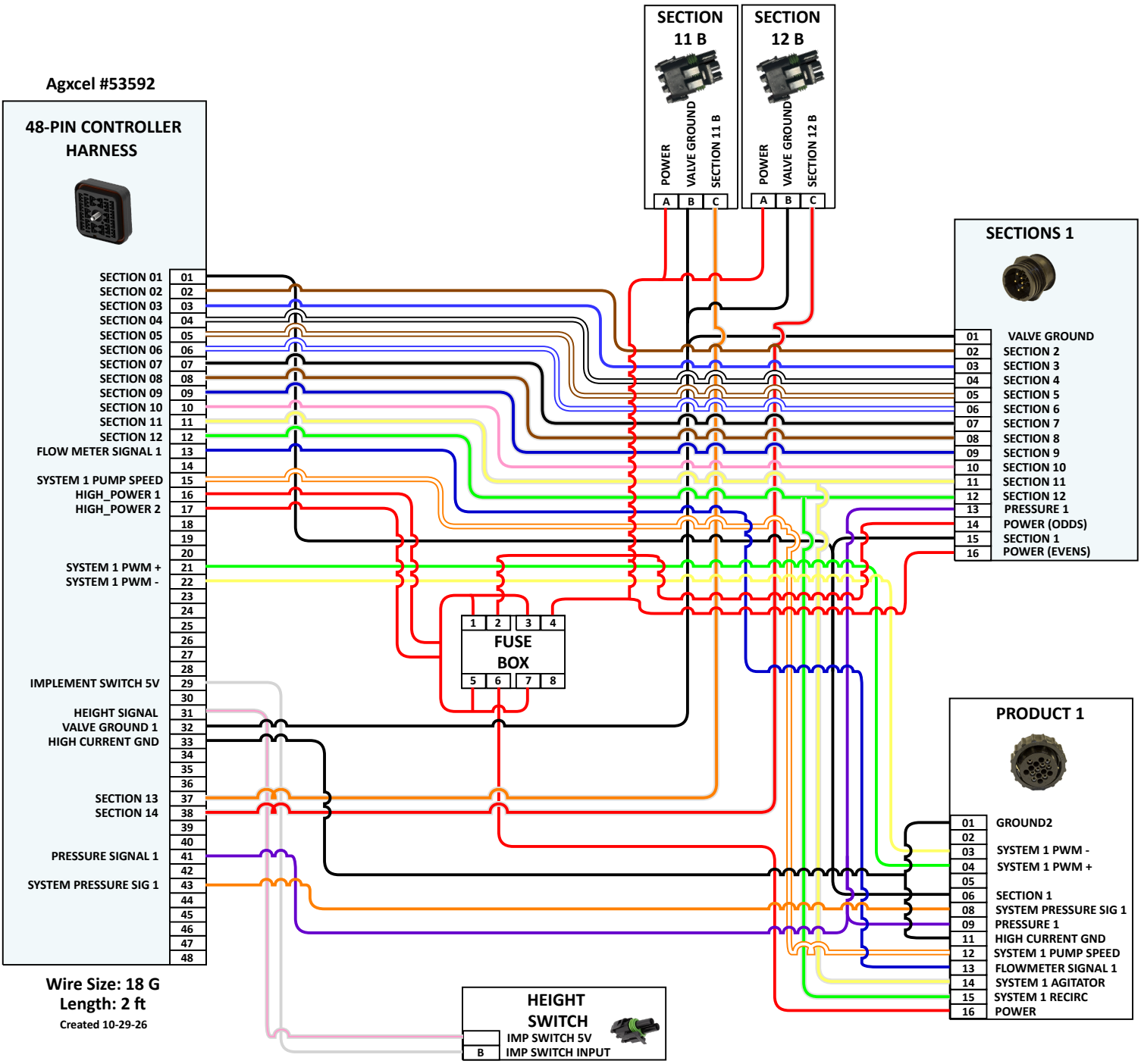




From here, enter your **Target Speed**, **Target Rate, turn your Master Switch ON, & press Start** to begin the nozzle flow check. On the bottom of the page under Readings, you can see what your actual GPA rate, actual GPM rate, & Pressure. Ensure the screen is saying that the correct rate is being applied. Once confirmed, do a catch test at a few rows to ensure you are catching the correct flow rate.

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TROUBLESHOOTING

Why am I Over-Applying?

- Ensure that your PWM Low Limit setting is lower than the current Duty Cycle. This setting can be found under Field IQ > Calibrate > Drive Calibration. If your PWM Low Limit is set too high, then the liquid controller will not allow the pump to apply at a lower Duty Cycle than the set low limit.
- Ensure that your Minimum Flow Rate is set to 0. This setting can be found under Field IQ > Setup > Rate Control Tab > Drive Setup.
- If you are using the GX5 Hydraulic Pump, ensure that the manual override valve is set in the close position. If the manual override is opened, then the GX5 pump will ignore the commands from your liquid controller and will only apply fluid based off of your hydraulic flow.

Why am I Under-Applying?

- Ensure that the pump system pressure is not too high, such as over 40 PSI. If your pump system pressure is too high, then you may have an obstruction in your pump or in your plumbing after the pump.
- Ensure that your disk orifice or microtube size is not too small. When the weather is colder, fertilizer can become more viscous, meaning that the pump is creating more pressure so the thicker liquid can be pushed through the same smaller size disk orifice or microtube.
- Ensure that your filter is not fully plugged or partially plugged.
- Ensure all ball valves from the tank to the pump are fully opened.
- Ensure you are not pulling in air from anywhere on the pump or before the pump. Ensure that all poly fittings have plumbers tape, all clamps are tight, all gaskets are in place, no poly fittings are cracked or damaged, all filter cups are screwed on tight and the oring is present and not damaged on the cup.
- If you are using a GX5 Hydraulic Pump, ensure you are providing enough hydraulic flow to the GX5 pump.
- Ensure that your PWM High Limit is set at 100. This setting can be found in your System Settings under Control Valve Setup. If your PWM High Limit is set too low, then the liquid controller will not allow the pump to apply at a higher Duty Cycle than the set high limit.
- If you are using the GX5 Hydraulic Pump, ensure that the manual override valve is set in the close position. If the manual override is opened, then the GX5 pump will ignore the commands from your liquid controller and will only apply fluid based off of your hydraulic flow.
- Ensure that your pressure is higher than at least 10 PSI (check valve size dependent). If you are using a 4LB check valve (blue top), then you will need a minimum of 10 PSI to open all of the check valve. If you are using a 10 PSI check valve (black top), then you will need a minimum of 20 PSI to open all of the check valves. Not creating enough pressure can cause uneven flow to each row and also potentially cause your pump system under apply.

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TROUBLESHOOTING

Why is my flow rate surging?

- Ensure that the Threshold set at 10%. This can be found under Configuration Setup > Controller Settings > Rate Error Alarm.
- Lower the PWM Gain. This setting can be found in Configuration Setup > Controller Settings > Control Valve Settings. The higher this value is, the more aggressive the pump system will be. The more aggressive the pump system is, the more the pump can surge, but having a higher valve response rate also means that the pump is able to respond faster to changes in your flow rate. But if the PWM Gain is too low, then the pump can become too slow and take too long to reach your target rate.
- Ensure that your pressure is higher than at least 10 PSI (check valve size dependent). If you are using a 4LB check valve (blue top), then you will need a minimum of 10 PSI to open all of the check valve. If you are using a 10 PSI check valve (black top), then you will need a minimum of 20 PSI to open all of the check valves. Not creating enough pressure can cause uneven flow to each row and also potentially cause your pump system under apply.

What should my system pressure be?

- AgXcel Pump Systems are not pressure based, especially when they are controlled with a Liquid Rate Controller. However, pressure can affect the performance of the pump system if the pressure is too low or too high. It is recommended to not apply under 10 PSI if you are applying fertilizer infurrow and not above 40 PSI. For a Nitrogen application, it is recommended not to apply below 20 PSI but no need to apply over 60 PSI.

Why is my controller tells me I am applying the correct amount, but I am actually applying more/ less at the rows?

- If your flowmeter calibration number is incorrect, your liquid controller can still tell you that you are applying the correct amount of fertilizer, even though you are actually applying an incorrect amount of fertilizer. Ensure that your flowmeter calibration number is the same as what was provided on your pump system manual. This number will be located on a sticker on the manual.
- If you have the correct flowmeter calibration number entered that was provided by AgXcel, then you will need to manually change the flow calibration number. You can either preform a Catch Test Calibration which can be found in your System Settings under Rate Sensor Setup, or you can manually adjust the flow calibration number yourself. If you raise the flowmeter calibration number, then you will apply more fertilizer. If you lower the flowmeter calibration number, then you will apply less fertilizer.
    - To quickly find what your flowmeter calibration number should be, take the amount of fluid you caught at the row and divide that by the amount of fluid that you should have caught at the row. So if you over applied by 20%, then you can reduce your flowmeter calibration number by 20%. Then do another catch test to ensure you are applying at the correct rate. Or if you under applied by 20%, then you can raise your flowmeter calibration number by 20% and do a catch test to ensure you are applying at the correct rate.

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QuickStart Setup Instructions for John Deere - Rate Controller 3 Single Product

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