SETUP GUIDE

CNHi RAVEN RATE CONTROL MODULE

SINGLE LIQUID – SINGLE SWATH

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APPROVED BY	J. NAISMITH

Overview

This document provides instructions for setting up a Liquid Systems (SA) Rate Control Module with a Raven ISOBUS controller. These instructions were developed and tested with a Raven Rate Control Module (RCM) connected to an ISOBUS compatible display. The scenario covers set up of single liquid system being controlled by the Raven RCM without section control.

This document should be read in conjunction with Raven RCM Operator's Manual.

Configuration Prerequisites

Before the system can be configured in an ISOBUS compatible display following steps need to be completed.

- Physical installation of a Liquid Systems (SA) Rate Control Module including tank plumbing.
- Physical installation of a Stacker distribution system on the tool bar or planter.
- Installation and connection of a Raven RCM to the display unit.
- Verify ISOBUS connection of in cab display to Raven RCM. An Icon representing the Raven Controller should appear on screen.
- If required, install Height Switch on planting implement.
- Fill product tanks with enough water to conduct testing.

FLOW METER Identification & Settings----------

All Liquid Systems (SA) Pump and Rate Control Modules are available with multiple flow meter configurations to suit specific applications and flow rates. Each flow meter has a 'Calibration Factor' which needs to be input to the rate controller by the operator. If the incorrect calibration factor is used, the system will not operate correctly, and the applied rate will be incorrect. The below images and tables show the different flow meter and calibration factors.

TeeJet 801 Flow Meter (STD)

ARAG Flow Meters

IDENTIFICATION LABEL

ARAG Flow Meters all appear visually the same, although can be identified by the label on the side. This label shows the range and calibration factor in pulses per litre.

Flow Meter Variations & Calibration Setting	**TeeJet 801 Flow Meter** (Standard)	**ARAG Electromagnetic Flow Meter**		
Flowmeter Range	7.5-250L/Min	2.5-50L/Min	1.0-20L/Min	0.5-10L/Min
Pulses Per Litre	82	1200	3000	6000
Pulses Per US Gallon	310	4542	11355	22710
Pulses Per Imperial Gallon	373	5455	13638	27277

SHUTOFF VALVE Identification & Settings----------

LQS Modules are built with 3 different Fast-Shutoff Valves, the images below show the difference between the two KZ Valves and Teejet Valve.

KZ Valve- L03067

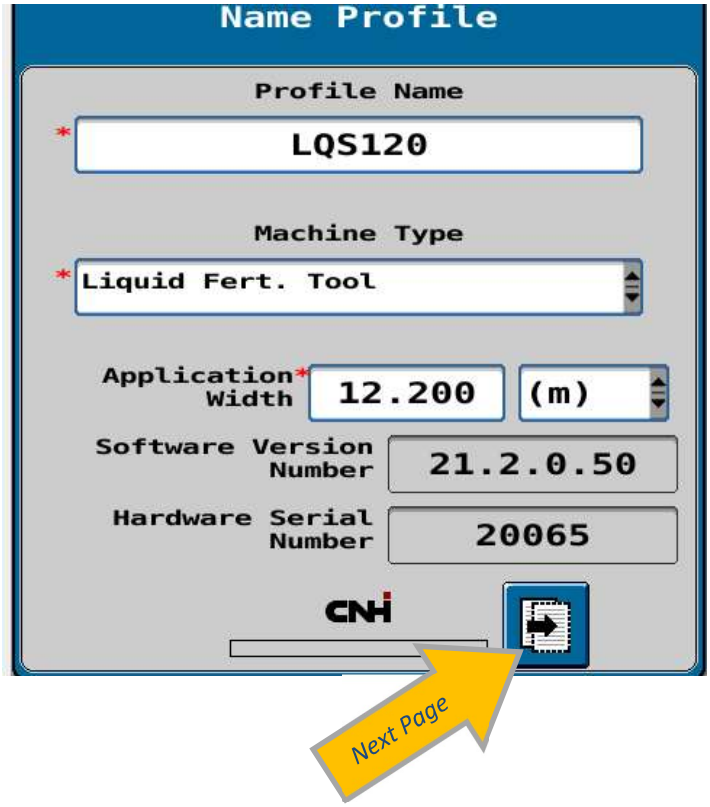
KZ Valve- L03085 (STD)

TeeJet Valve

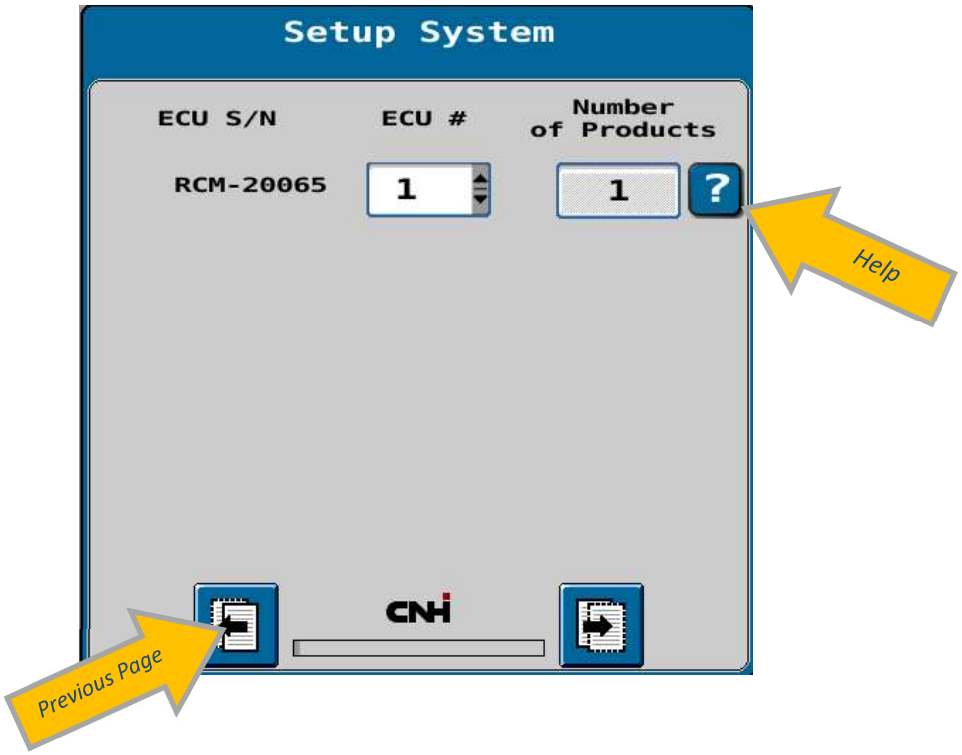
Shut off VALVE TYPE	**Modules Pre 2025**			**Modules 2025 – BPOD** Note: BPOD – Back Pressure Orifice Diffuser		
	Valve Response Rate	**Control Deadband**	**Control Effort**	**Valve Response Rate**	**Control Deadband**	**Control Effort**
L03067	50	2	3	100	4	17
L03085 (Standard)	50	2	3	100	3	36
TeeJet	50	2	3	100	3	30

Raven Liquid Control Setup

1. Create an appropriate **Profile Name**. Select **Liquid Fert Tool** from Machine Type drop down menu. Enter **Application Width** and press **Next Page** (right arrow) button.



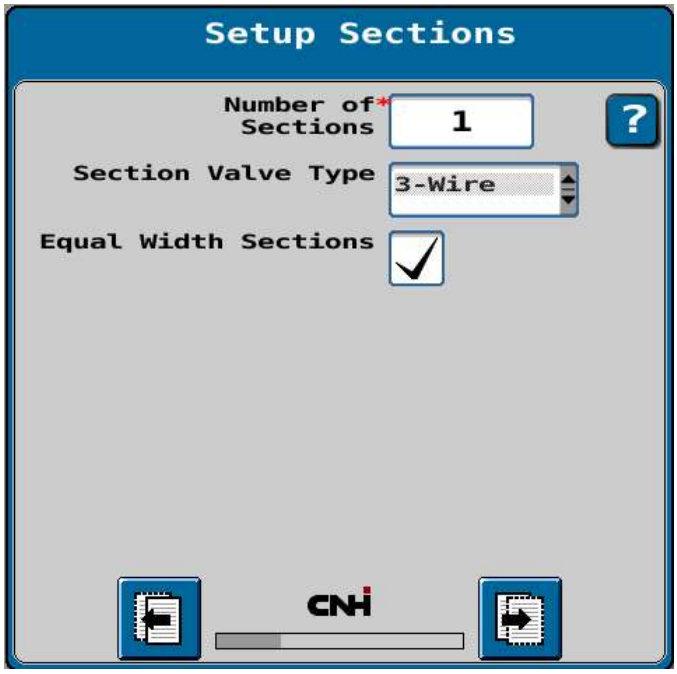
2. Enter **1** for Number of Products and press **Next Page** button. Press **Previous Page** (left arrow) button to go back & re-enter data any time if required. Press **Help** button If any clarification is needed with set up.



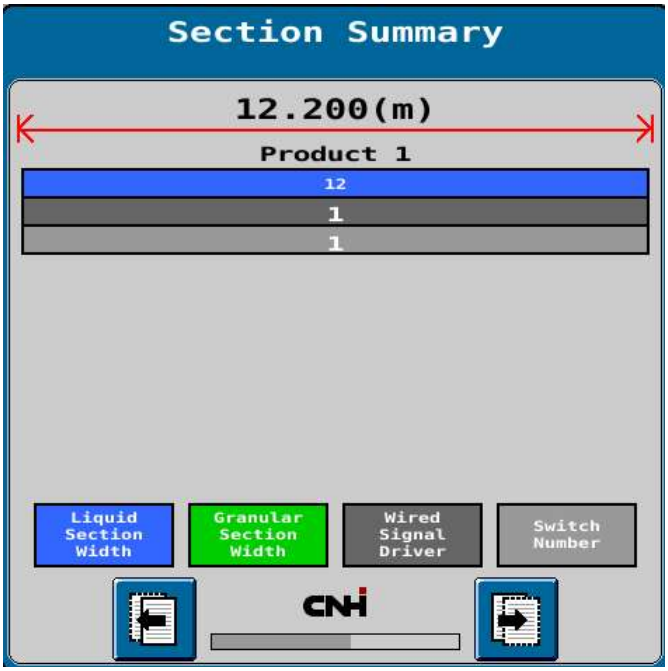
3. Select **Liquid (L)** from Application Type drop down menu and press **Next Page** button.

4. Confirm Application Mode for Product 1 and press **Next Page** button.

5. Enter **1** for Number of Section and press **Next Page** button.

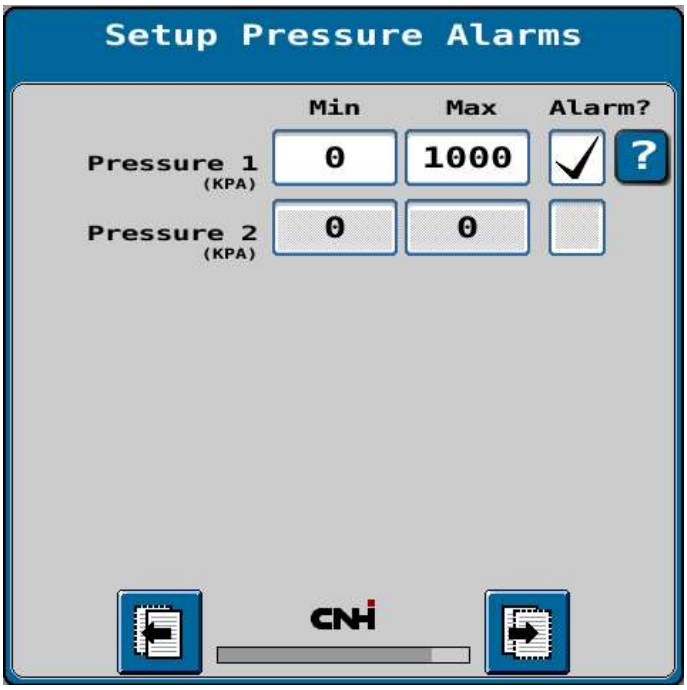


6. Review **Section Summary** data and press **Next Page** button.

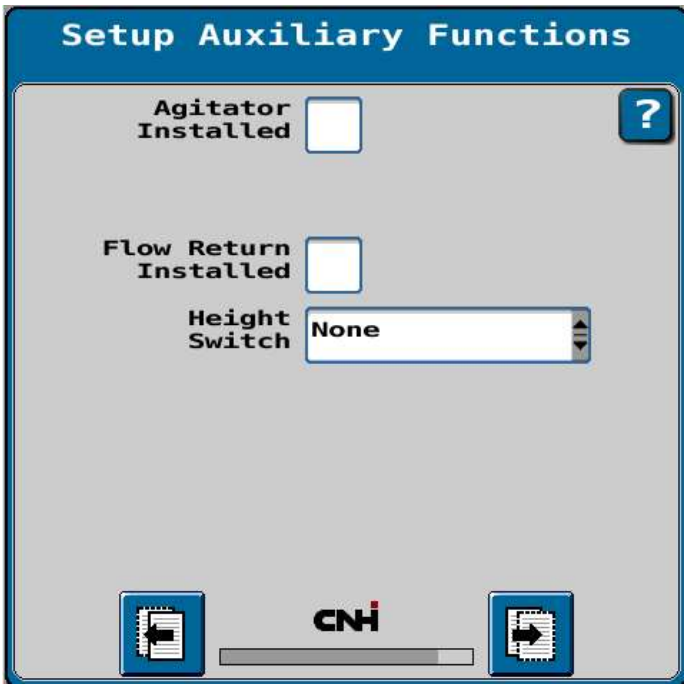


7. Select **Custom** for Pressure Sensor Type from drop down menu for Product 1 and press **Next Page** button.

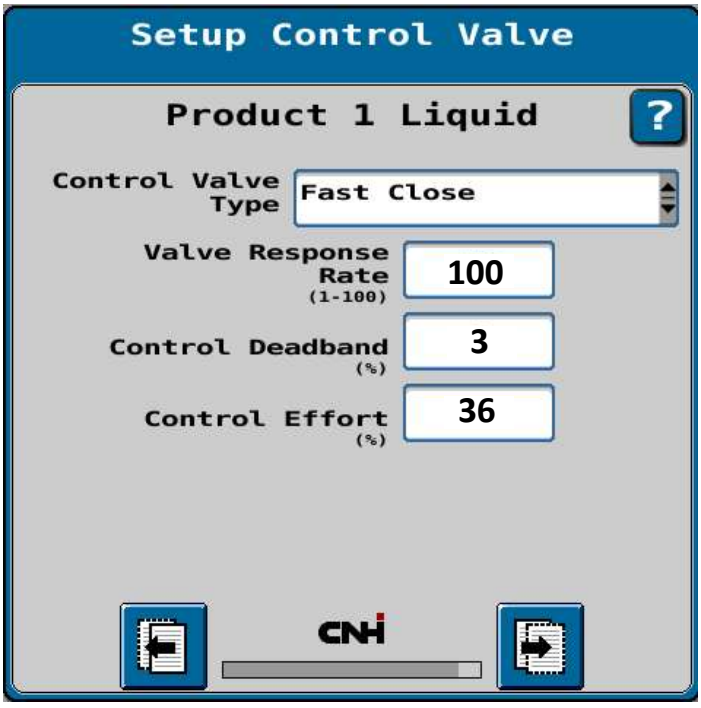
8. Enter **0 kPa** for Minimum & **1000** kPa for Maximum pressure alarm settings. Tick the Alarm box to trigger an audible alarm for system pressure readings outside the set limits. Press **Next Page** button.



9. Leave Agitator and Flow return unselected, if a height switch is used, select and setup accordingly.

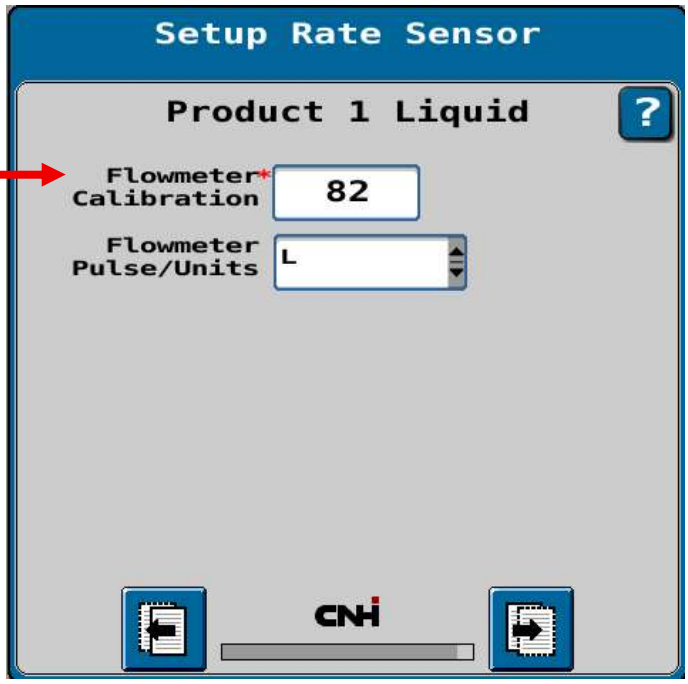


10. Enter following Control Valve settings for Product 1 as a starting point. Settings can be adjusted later if rate control is erratic. Press **Next Page** button. Refer to Help button for each parameter and their impact on rate control.



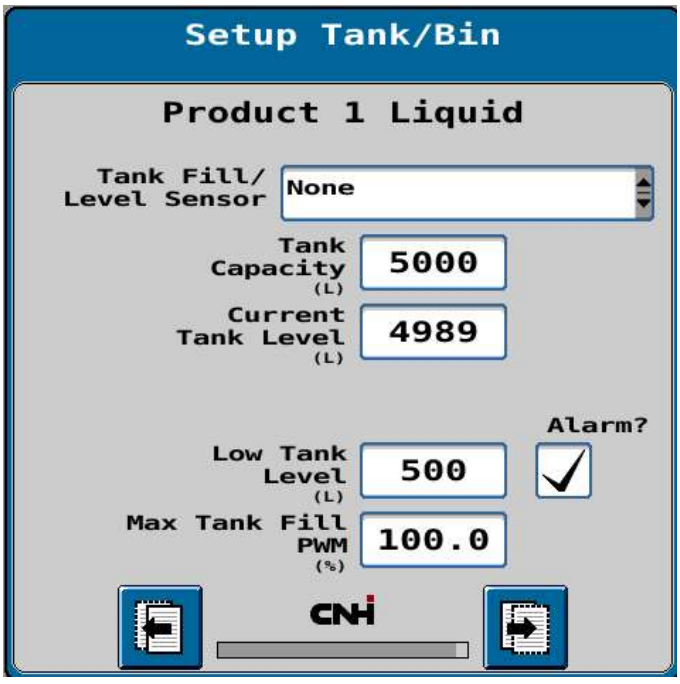
NOTE: This Control Valve Calibration settings are for the **Standard KZ L03085.** For Modules with other Control Valves **SEE Calibration settings on Page 3 at the start of this guide**.

11. Enter Flowmeter Calibration factor for Product 1 and press **Next Page** button. Refer to table below for applicable factor for various types of flowmeters.

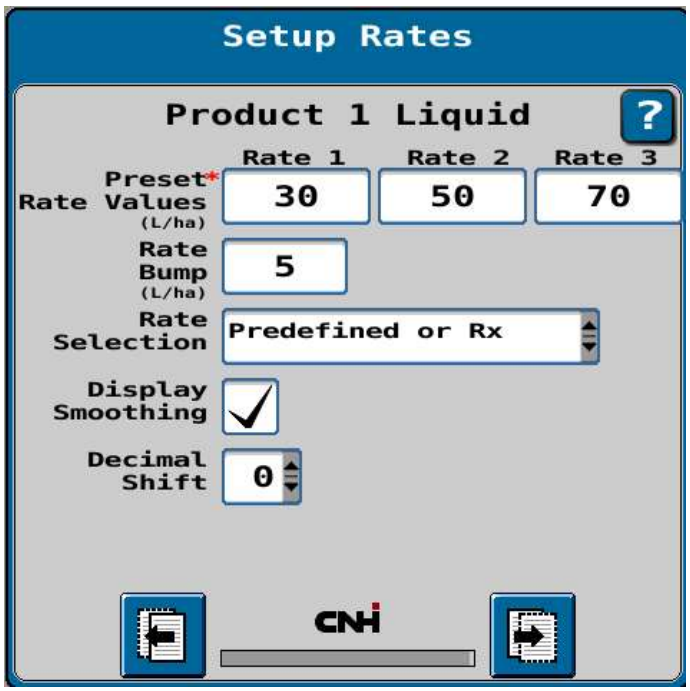


NOTE: This Flow Meter Calibration setting is for a **Standard TeeJet 801 Flowmeter** in Litres. For modules with **ARAG Electromagnetic** Flowmeter, check label for calibration setting.
SEE Calibration settings on Page 3 at the start of this guide.

12. Enter tank parameters for Product 1 and press **Next Page** button.

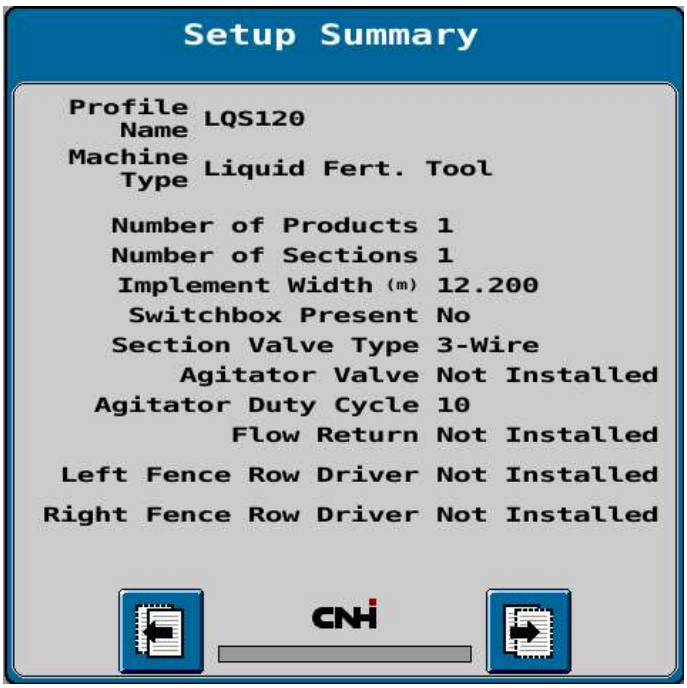


13. Enter target application rates for Product 1. Refer to Help button for guidance with set up. Press **Next Page** button when data entry is complete.

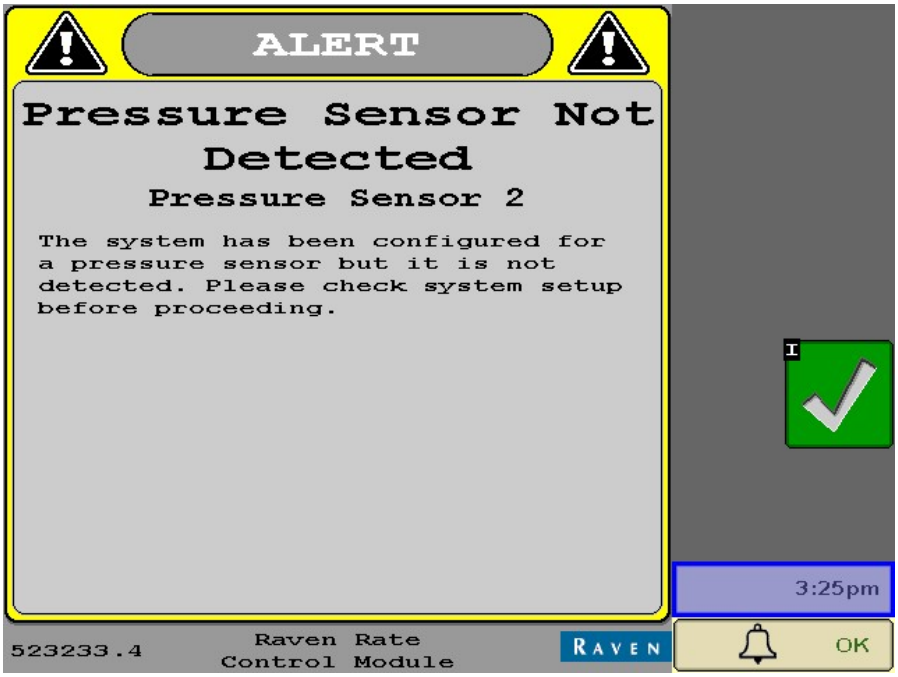


14. Enter Alarm parameters for off target rate % and press **Next Page** button.

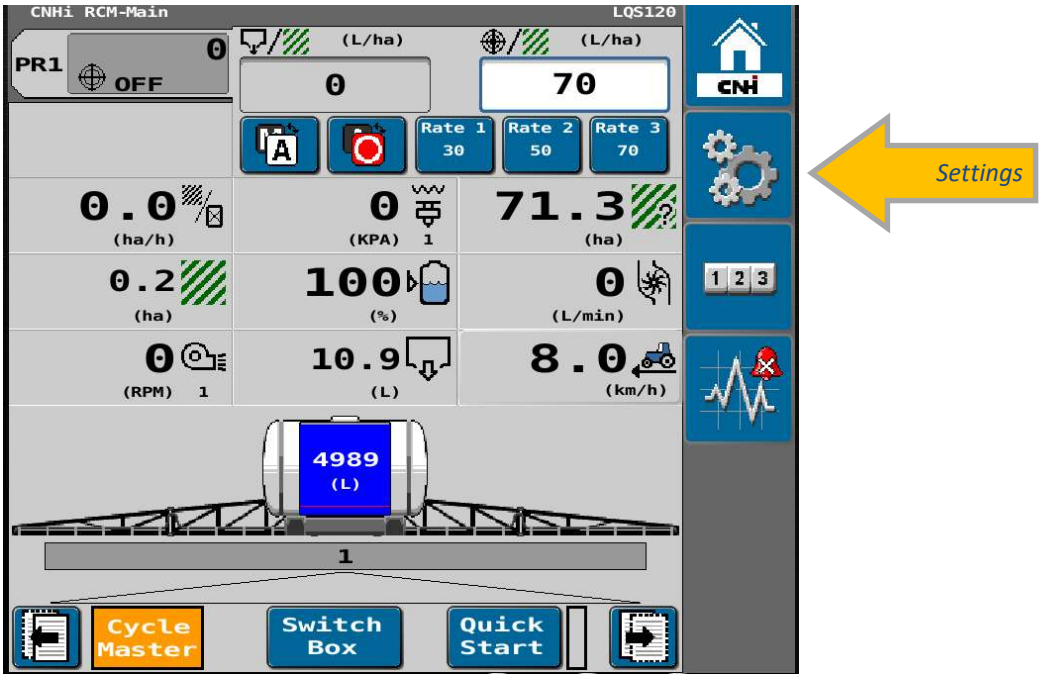
15. Review Setup summary. Press **Next Page** button to continue or press Previous Page button to go back and edit data.



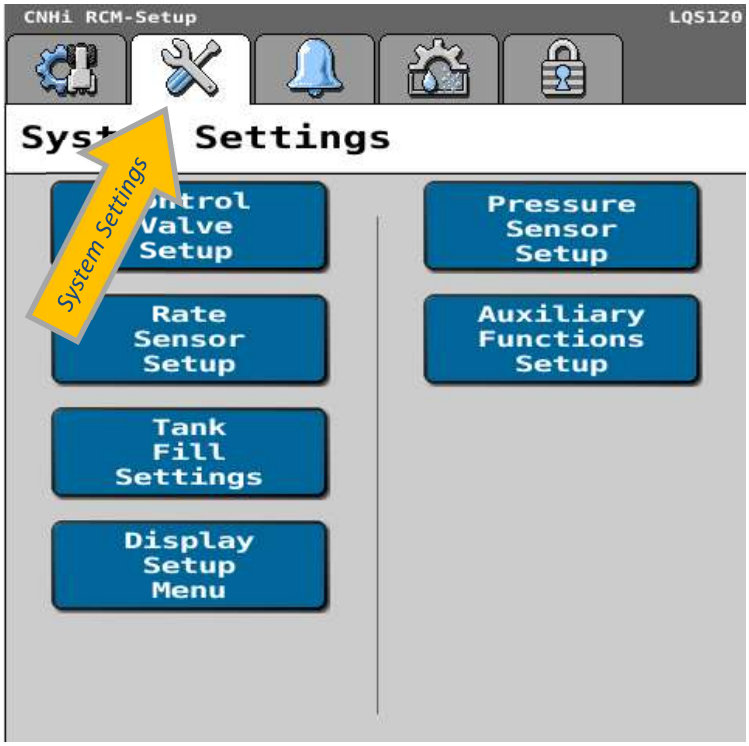
16. Ignore this alert and press **Green Tick** button to proceed to pressure sensor set up.



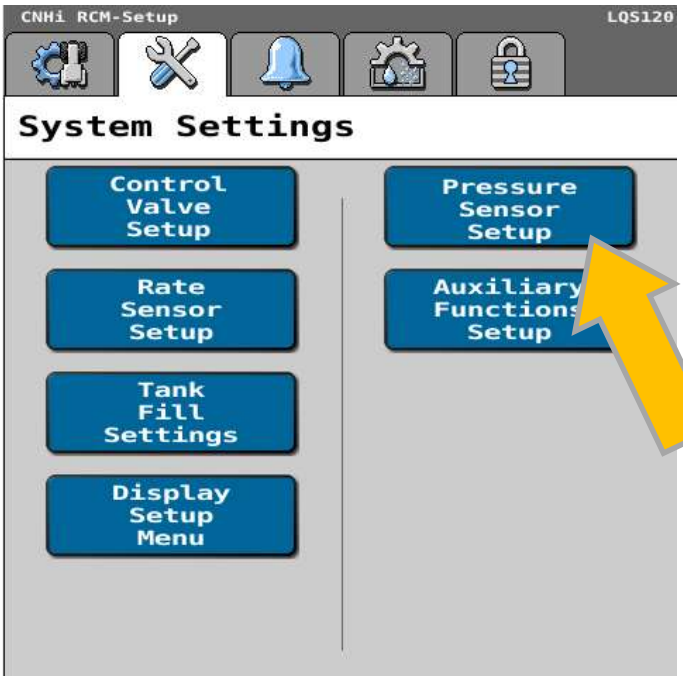
17. Select **Settings** from the setup screen.



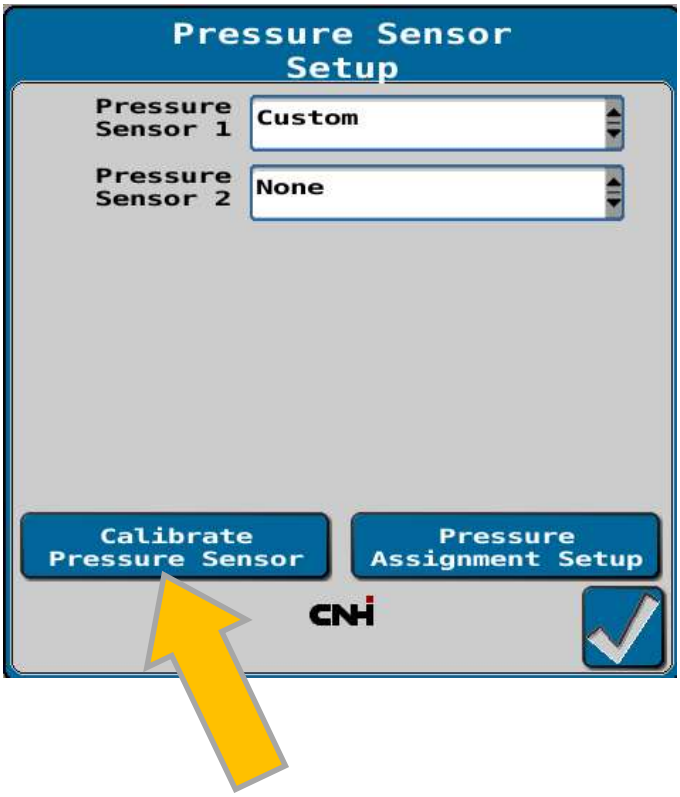
18. Select **System Settings** tab.



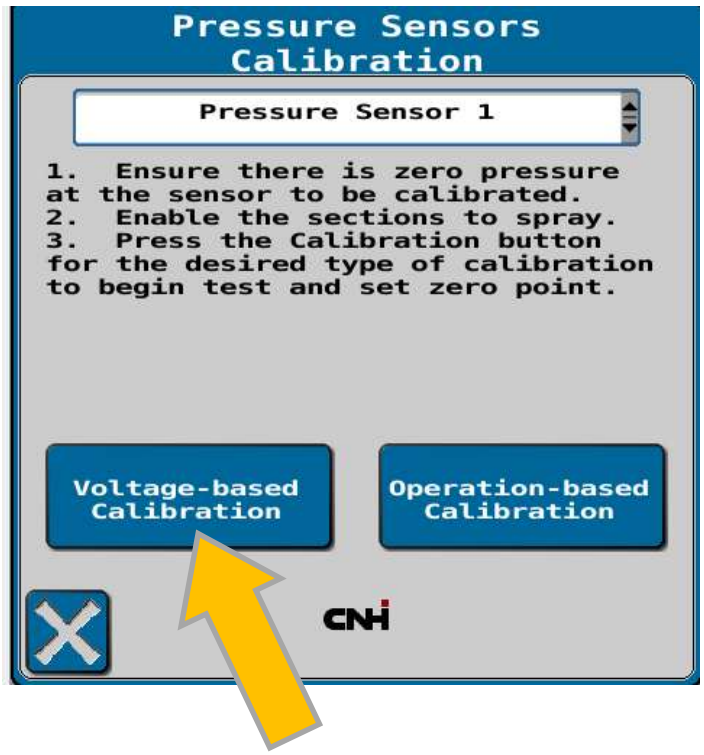
19. Select **Pressure Sensor Setup.**



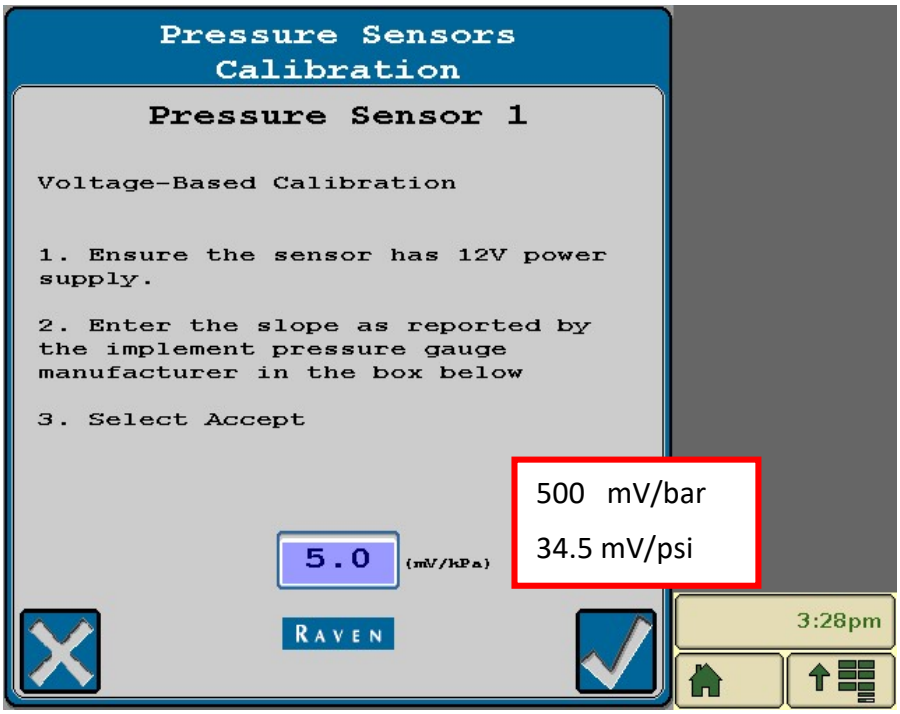
20. Select **Calibrate Pressure Sensor** option and press **Blue Tick** button.



21. Ensure pump is **NOT** running. select **Pressure Sensor 1** from the drop-down menu and select **Voltage-based Calibration**.



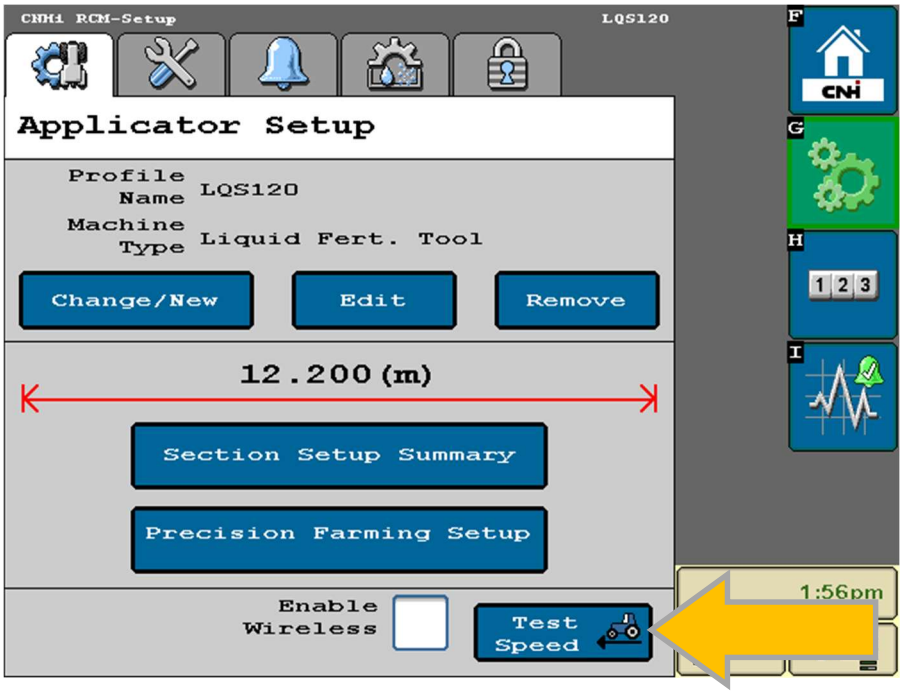
22. Enter Pressure Sensor Calibration factor 5mV/kPa : 500mV/bar : 34.5mV/psi
Press **Blue Tick** button to save settings.



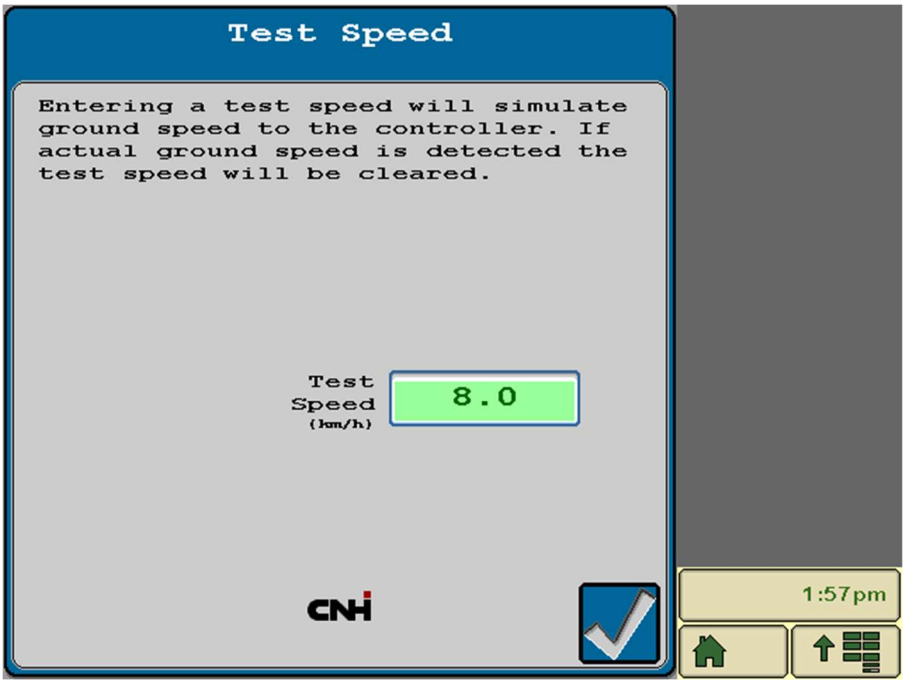
System Set Up Verification Tests

Start the pump and perform a stationary test to verify control settings.

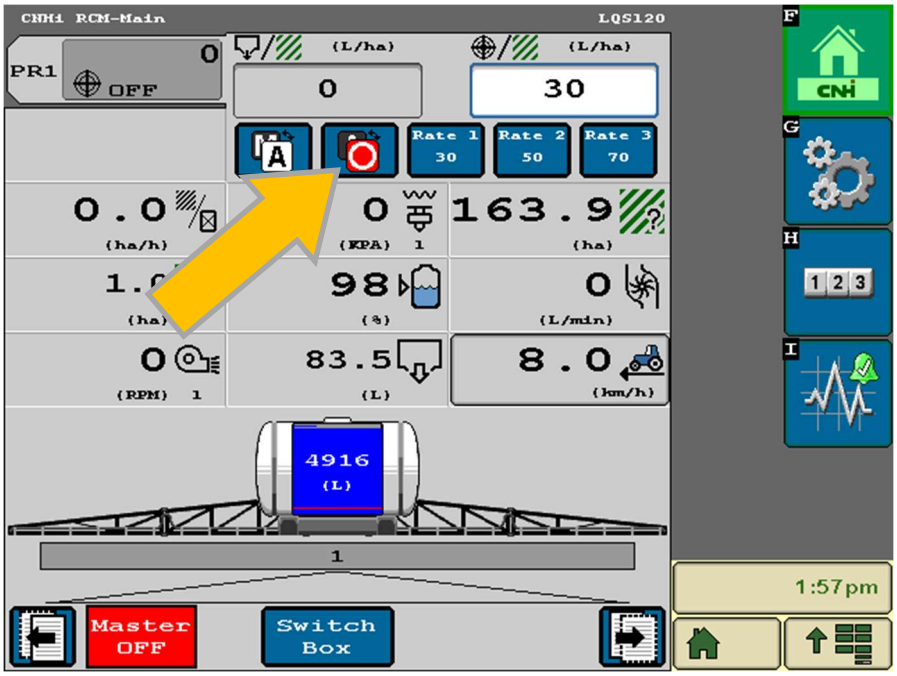
1. Enter the settings menu, and select **Test Speed**



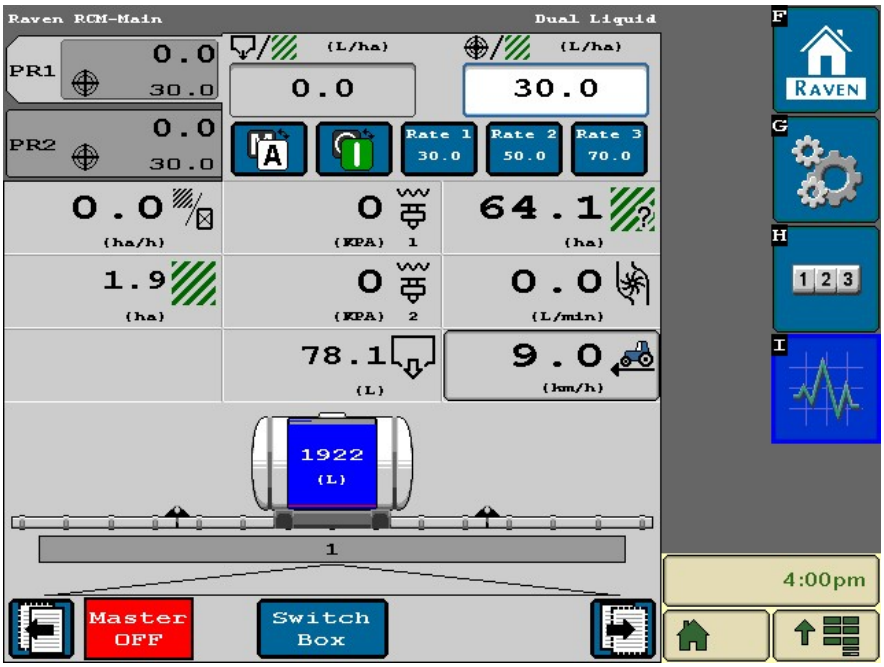
2. Enter a test speed and press **Accept** button to return to home screen



3. Actual system pressure, flow and application readings should be displayed on the screen. Turn the master switch on and activate the liquid product.



4. Vary the application rates to test the control system is performing correctly across the entire set up range. Turn the master switch (foot switch) off to terminate the test.



System Stability and Application Consistency

Regulator-Valve control parameters can be specific depending on the individual system set-up and flow/pressure dynamics.

If the system is unstable or is unable to maintain a consistent application rate, set up parameters can be adjusted to improve performance. Return to Control Valve set up page and adjust control parameters. Refer to help for further guidance

Valve Response Rate:

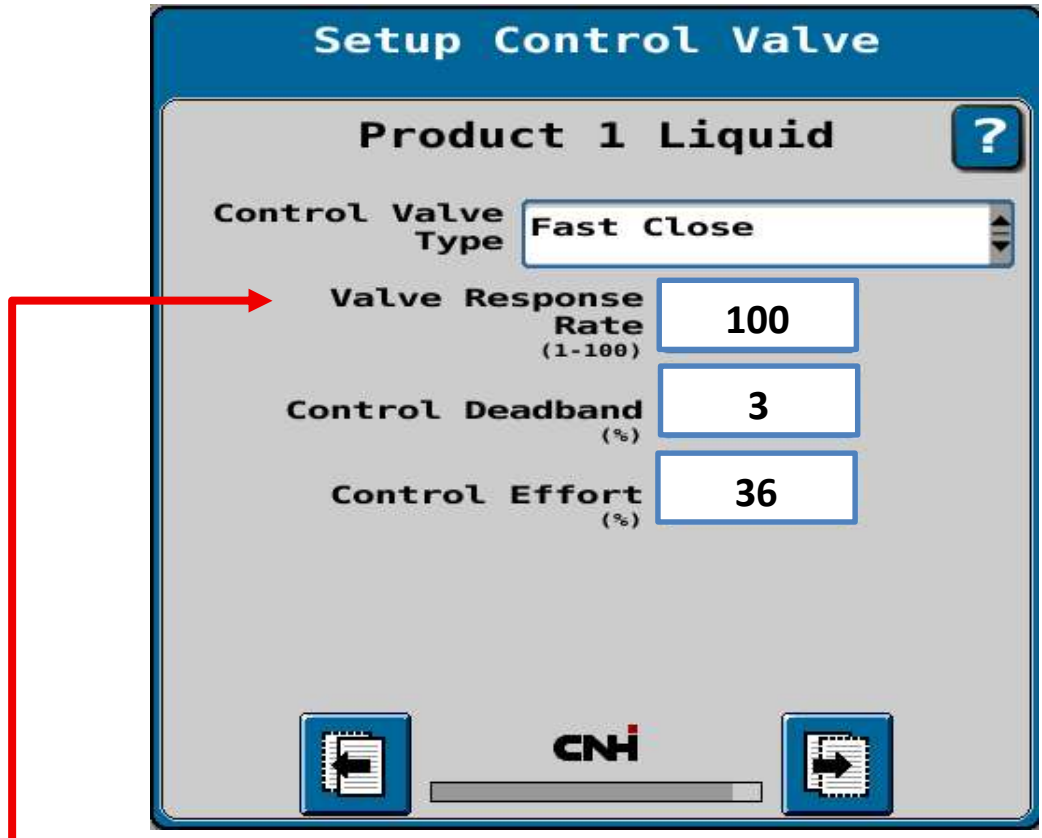
How fast the actuator will respond to being off-rate. How fast the valve will move, this can generally be left at 100 but if fluctuation is persistent, reduce to 85.

Control Deadband:

A range of being off-rate (higher and lower) that the actuator will tolerate before adjusting. A lower value will keep it tighter on rate, but can result in “chatter” or unnecessary small adjustments that can lead to “hunting” around the target rate.

Control Effort:

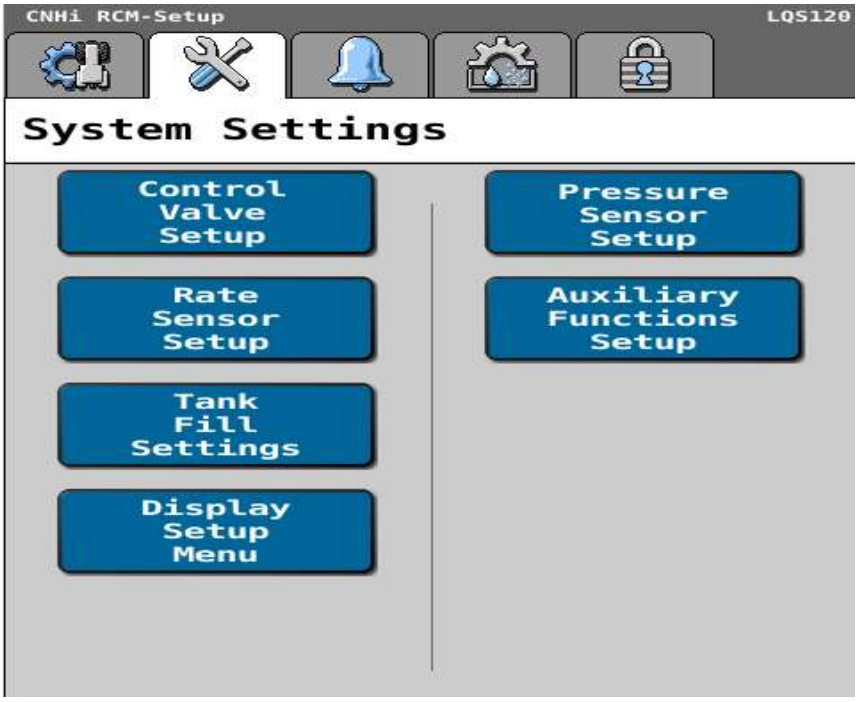
How far the actuator will move with each adjustment step. **This is crucial for performance**. A lower value can result in slower times getting to rate, while too high a value will lead to “hunting” around the target rate. Start low when tuning and bring up in small steps until hunting is observed, then drop down to a previous steady value.



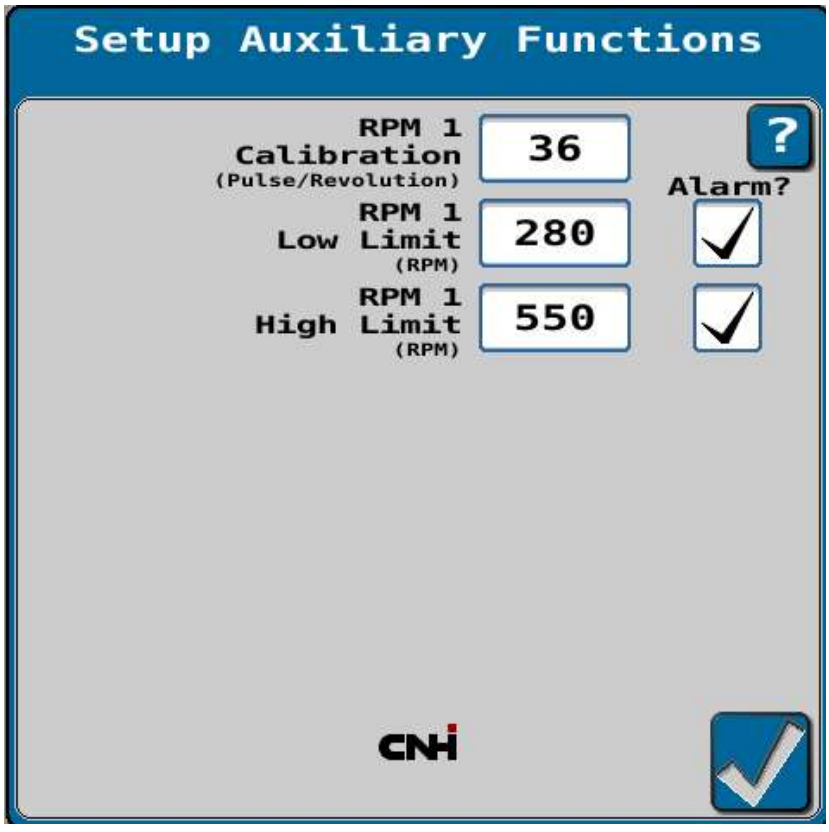
NOTE: This Control Valve Calibration setting is for a Standard KZ L03085. For Modules with other Control Valves **SEE Calibration settings on Page 3 at the start of this guide**.

RPM Sensor Integration

1. Return to **System Settings** Screen and select **Auxiliary Functions Setup**.



2. Enter RPM calibration of **36** and **Low and High RPM** alarm limits. Tick the Alarm box to trigger an audible alarm for RPM readings outside the set limits. Press **Next Page** button to save settings.



Run Screen Setup & Operation

Raven RCM can be configured to display a variety of operational information. Selecting various fields and parameters as shown in the following screen image provides a useful set of information for monitoring of liquid application in real time.