

# SOIL WARRIOR ISOBUS CONTROL MODULE

*powered by Raven*

## QUICK START GUIDE

*for ETS SoilWarrior®*



ENVIRONMENTAL  
TILLAGE SYSTEMS



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**For additional SoilWarrior service help:**



(507) 332-2231



[soilwarrior.com/support](http://soilwarrior.com/support)



Service & Maintenance Playlist



[service@soilwarrior.com](mailto:service@soilwarrior.com)

# 1 INTRODUCTION

The SoilWarrior® is a complete system that provides deep and shallow tillage, fertilizer placement, seedbed preparation, and residue management in a wide variety of soil types. This system is equipped with the latest technology for precision nutrient placement and monitoring technology. Each system allows the user to setup the machine to their personal preference based on the machine type, capacities, and uses. This is a step-by-step reference guide on how to set up a dry, liquid, or NH3-equipped SoilWarrior.

The SWICM (SoilWarrior ISOBUS Control Module) runs on the Universal Terminal (UT) menu on most ISOBUS ready displays. Select the UT icon to see available ISOBUS controllers currently connected to your display.

The screen shot to the right is an example of the main UT run screen for the SWICM. The main screen will show the number of products/channels set up. Information such as target rate, applied rate, ac/hr, and tank product level are displayed on the main run screen. To see more specific data, select one of the PR(x) icons. Once the selected PR(x) is highlighted, the information will be displayed specifically for that product.

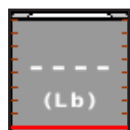
## Icon Key



The Manual/Automatic Rate control icon.  
A = Automatic/Predefined/Rx  
M = Manual rate



The icon with the red and white circle is to turn the product on or off.  
Red = Off, Green = On



Selecting the tank icon on the run screen opens the **Tank Refill** menu, which includes **Tank Refill**, **Product Density**, and **CFR Value**.



These icons are used to navigate to the **previous** or **next** pages.



Return to the main home screen

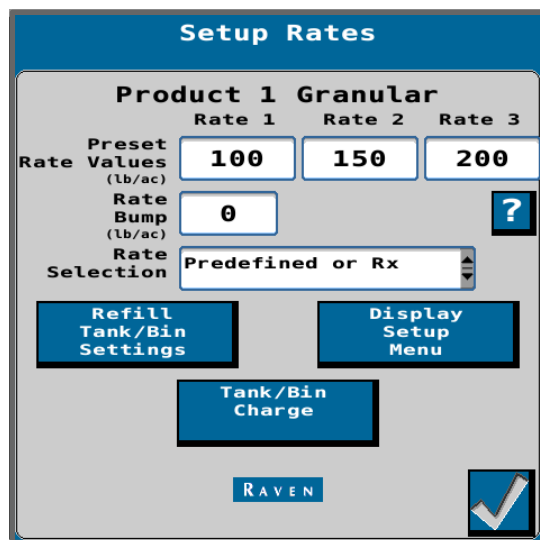
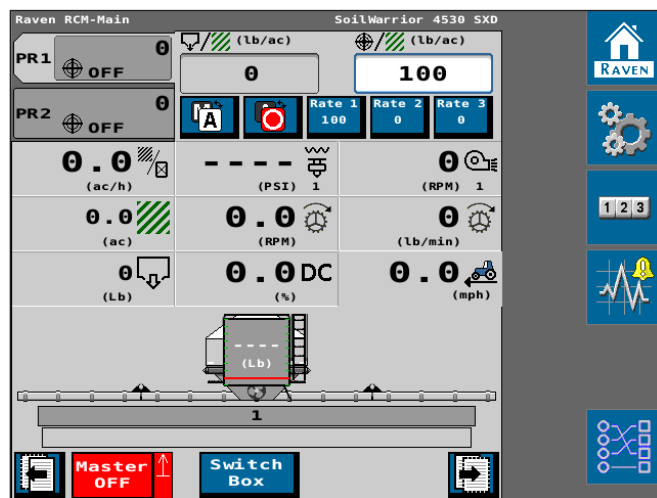
Enter the Setup menu

Totals

Diagnostics

Auxiliary Drivers

## SWICM Main Run Screen

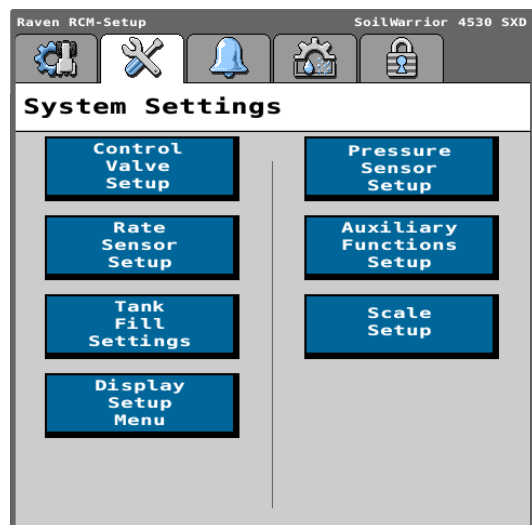


NOTE: Each screen contains a ? icon. Select to view the definition of each value on the screen.

# 1 INTRODUCTION

## System Settings

The System Settings tab shows all the implement settings by categories. Each box will allow you to change some settings without going back into the setup wizard.



## Alarm Settings

Under this tab, Product Alarms can be configured. The **Off Rate Alarm** is the allowable error set before the SWICM initiates an alarm.

Select the PR(x) icon. The highlighted icon is the PR(x) channel to be configured.



## Rates Setup

Options under the Rates Setup tab allow for editing rates for each product. There are multiple options for configuring the rate. There are three preset rate values that can be entered.

Rate Bump is the amount of rate increase or decrease when the selection is Rate Bump or Rx.

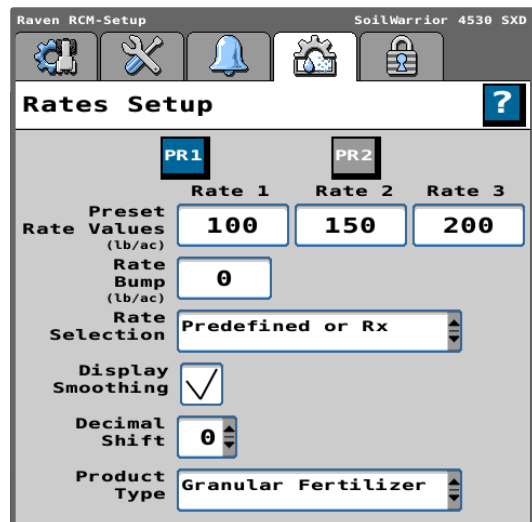
**Rate selection has 3 options:**

**Predefined or Rx:** Uses preset rate values as your target rate or uses a prescription map.

**Rate Bump or Rx:** Increases and decreases the target rate by the previously entered Rate Bump value from the Rate Setup page or uses a prescription map.

**VT Rate Entry:** Uses an entered rate on the Virtual Terminal screen.

**Display Smoothing** will smooth the rate displayed.



## 2 DRY PRODUCT SETUP

### Applicator Setup

This section will walk through the steps to set up dry product channel(s).

To begin, from the run screen, select the **Settings** icon, then select **Change/New**.

If you need to edit the current profile, select **Edit**.

*NOTE: Once you enter the Setup Wizard, you must complete the setup to exit.*

### Select Profile

Select **New Profile**, then select the checkmark to proceed.

Raven RCM-Setup SoilWarrior 4530 SXI

**Applicator Setup**

Profile Name SoilWarrior 4530 SXD  
Machine Type Generic

Change/New Edit Remove

30.000 (ft)

Section Setup Summary  
Precision Farming Setup

Height Switch ☒ Test Speed

**Select Profile**

Select the Profile that you would like to load. If "New" is selected the Setup Wizard will begin and a new Profile will be created.

New Profile

RAVEN

## 2 DRY PRODUCT SETUP

### Name Profile

Input your profile name in the first box. We recommend using the machine model as the **Profile Name**.

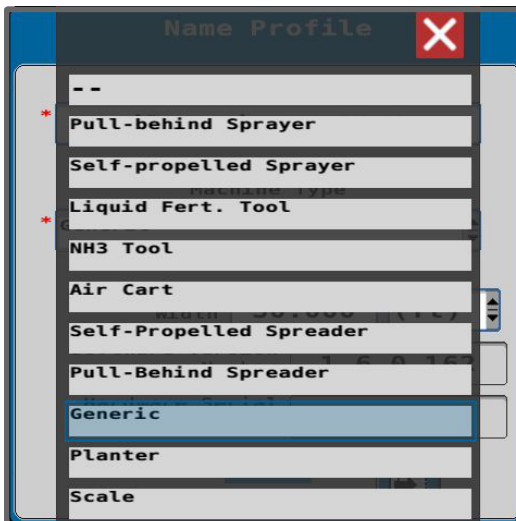
***NOTE:** If there is a red asterisk \* you must fill in the box or you will not be able to proceed.*

Under **Machine Type**, open the dropdown menu.

When setting up a dry only machine, select **Generic** for machine type. For a Dry and NH3 machine, go to section 4 of this manual.

Enter the application width of your SoilWarrior. Verify that the units are in feet.

After all information has been entered, select the **Next Page** icon.



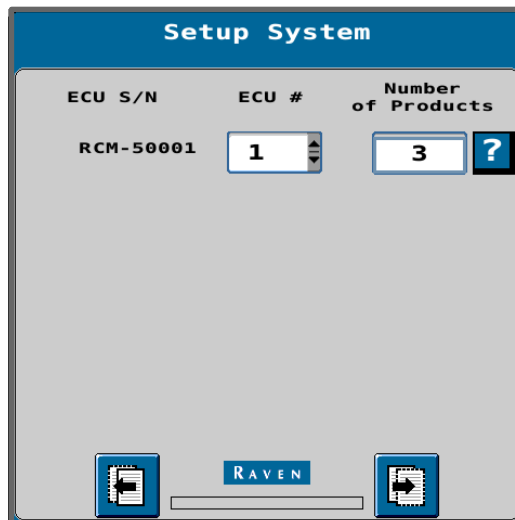
### Setup System

The **Setup System** screen will list the connected external control unit's (ECU) and their serial numbers.

Visually confirm that the correct number of ECU's is showing and enter 3 products to enable all of the features of the SWICM.

***NOTE:** The cabling on the machine is a 3-product harness. Entering in 3 products enables all of the features of the SWICM.*

Select the **Next Page** icon.



## 2 DRY PRODUCT SETUP

### Setup Fan/Spinner RPM

The number of RPM sensors are dependent on the number of fans on the machine. Leave the **Enable Fan/Spinner RPM Control** box unchecked. Fan RPM is controlled by the flow setting on the SCV.

Select the **Next Page** icon.

### Setup Application Type

This screen will list the number of products you selected and have a dropdown menu for each one.

Select the dropdown menu and select **Granular Fertilizer**.

Repeat for each product. If your machine does not use all 3 products, select **Not Installed** for each product this applies.

Select **Next Page** icon.

On the next screen, select from the **Application Mode** dropdown, **Granular Full Width Section**.

Select the **Next Page** icon and repeat for each dry product.

## 2 DRY PRODUCT SETUP

### Setup Section

The number of sections will be prepopulated based on the number of products being setup. Make sure that the **Master Clutch** and **Granular Product Sections Power to Apply** boxes are unchecked.

Select the **Next Page** icon.



*NOTE: Each screen contains a ? icon. Select to view the definition of each value on the screen.*

### Setup Auxiliary Drivers

Use the dropdown menu to select the proper **Aux Driver**. The chart below lists the driver number for each function.

**Some functions are optional and may not be equipped on your machine. Only select the functions available on your machine.**

Function	Aux Driver Number
Tilt	9
Fold	10
Air Compressor	13
Scale Heads (Optional)	14
Row Cleaner Lift (Optional)	15
Spare	16

Once the proper **Aux Drivers** have been selected continue to the **Next Page**.

### Auxiliary Drivers Assignment

Check the box next to each Aux Output. “Latched” means that when selected the function will stay active until it is selected again.

Once checked, proceed to the **Next Page**.

*NOTE: Functions will need to be reactivated in the event of a power cycle.*



## 2 DRY PRODUCT SETUP

### Section Summary

On the **Section Summary** screen, you will see each product you configured and the section width for each.

Select the **Next Page** icon to proceed.

The **Section Summary** screen displays a total section width of 30.000 (ft) with a red double-headed arrow. Below this, it lists two products:

Product	Section Width	1	2
Product 1	30	1	1
Product 2	30	2	2

At the bottom, there are four buttons: **Liquid Section Width** (blue), **Granular Section Width** (green), **Wired Signal Driver** (grey), and **Switch Number** (grey). Below these is a **RAVEN** label and a progress bar. Navigation icons for back and forward are also present.

### Scale Setup

If your machine has scale heads select the **Next Page** icon.

#### Single and Dual 160 Bushel Machines.

From the dropdown select **Product Scale**.  
Then check the box next to each Product Scale.

#### Dual 135 Bushel and Triple Bins

From the dropdown select **Gen. Purpose Scale**.  
Then check the box next to Scale 1 and Scale 3.

Select the **Next Page** icon.

The **Scale Setup** screen shows a dropdown menu currently set to **None**. A modal window is open, displaying the following options:

- None
- Product Scale
- Gen. Purpose Scale

At the bottom, there is a **RAVEN** label and a progress bar. Navigation icons for back and forward are also present.

The **Scale Setup** screen shows the dropdown menu set to **Product Scale**. Below it, there are two checkboxes:

- Product Scale 1 ☒
- Product Scale 2 ☒

At the bottom, there is a **RAVEN** label and a progress bar. Navigation icons for back and forward are also present.

The **Scale Setup** screen shows the dropdown menu set to **Gen. Purpose Scale**. Below it, there are four checkboxes:

- Scale 1 ☒
- Scale 2 ☐
- Scale 3 ☒
- Scale 4 ☐

At the bottom, there is a **RAVEN** label and a progress bar. Navigation icons for back and forward are also present.

# 2 DRY PRODUCT SETUP

## Setup Pressure Sensors

If the machine is not equipped with pressure sensors skip this step and continue to page 11.

If the pressure sensor package is installed select the following sensors listed to the right.

### Pressure Assignments

Monitored Pressure	Sensor Number
A/C Tank/Manifold	1
Toolbar Pressure	2
Row Unit Pressure (Black)	3
Tramline Pressure (Blue)	4
Row Cleaner Pressure (Red)	5

Select the **Next Page** icon.

## Setup Pressure Assignment

Check the box next to each product to assign the sensor to the product page.

Repeat for each sensor 1-5.

Select the **Next Page** icon.

## Setup Pressure Alarms

Reference the images below for the max pressure value for your row unit set up. Once the sensor detects a value larger than the Max pressure it will sound an alarm on the display.

Select the **Next Page** icon.

**Pressure Sensor Setup**

Pressure Sensor 1: 0-250psi (1-5V)

Pressure Sensor 2: 0-3000psi (1-5V)

Pressure Sensor 3: 0-250psi (1-5V)

Pressure Sensor 4: 0-250psi (1-5V)

Pressure Sensor 5: 0-250psi (1-5V)

Pressure Sensor 6: None

Buttons: Calibrate Pressure Sensor, Pressure Assignment Setup, RAVEN

**Setup Pressure Assignment**

**Pressure Sensor 1**

Product 1: ☒

Product 2: ☐

Buttons: ? (help), RAVEN

### N Row Unit

**Setup Pressure Alarms**

	Min	Max	Alarm?
Pressure 1 (PSI)	0	145	<input checked="" type="checkbox"/>
Pressure 2 (PSI)	0	1200	<input checked="" type="checkbox"/>
Pressure 3 (PSI)	0	80	<input checked="" type="checkbox"/>
Pressure 4 (PSI)	0	80	<input checked="" type="checkbox"/>
Pressure 5 (PSI)	0	80	<input checked="" type="checkbox"/>
Pressure 6 (PSI)	0	0	<input type="checkbox"/>

Buttons: RAVEN, Checkmark

### X Row Unit

**Setup Pressure Alarms**

	Min	Max	Alarm?
Pressure 1 (PSI)	0	145	<input checked="" type="checkbox"/>
Pressure 2 (PSI)	0	1200	<input checked="" type="checkbox"/>
Pressure 3 (PSI)	0	45	<input checked="" type="checkbox"/>
Pressure 4 (PSI)	0	45	<input checked="" type="checkbox"/>
Pressure 5 (PSI)	0	45	<input checked="" type="checkbox"/>
Pressure 6 (PSI)	0	0	<input type="checkbox"/>

Buttons: RAVEN, Checkmark

## 2 DRY PRODUCT SETUP

### Setup Auxiliary Functions

In the dropdown menu select **Default**.

Select the **Next Page** icon.



### Setup Fan/Spinner RPM Calibration

Enter the following:

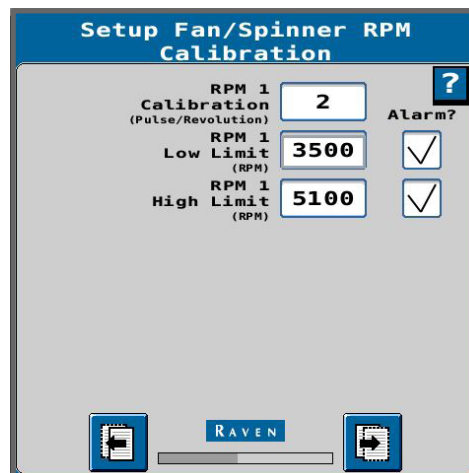
RPM 1 Calibration Pulses/Rev: 2

RPM 1 Low Limit: 3500

RPM 1 High Limit: 5100

Select the box under **Alarm?** when you want the display to alert you if the fan speed is too high or too low.

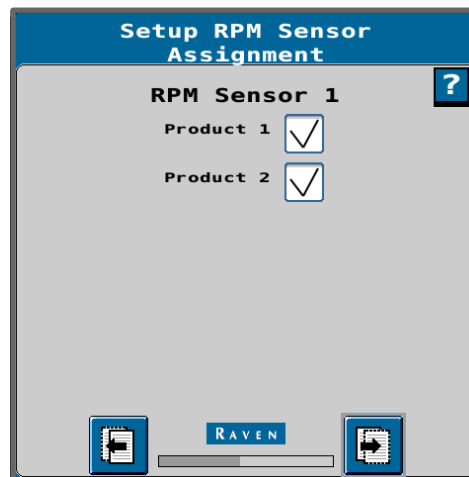
Select the **Next Page** icon.



### Setup RPM Sensor Assignment

Setup RPM Sensor Assignment allows you to assign the fan to a product or tank. If multiple products are configured, you can assign the fan to both products.

Select the **Next Page** icon.



## 2 DRY PRODUCT SETUP

### Setup Control Valve

From the dropdown menu next to Control Valve Type, select **PWM Close**.

Valve Response Rate: 50

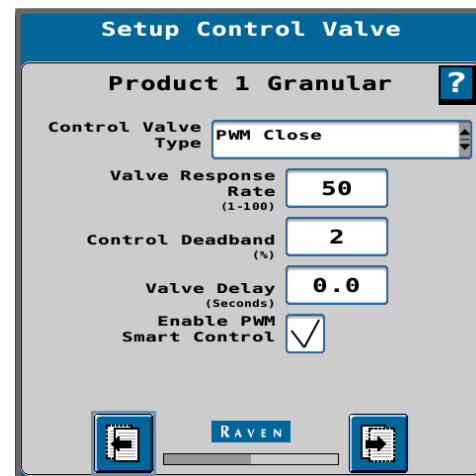
Control Deadband %: 2

Valve Delay: 0

Check the box to **Enable PWM Smart Control**.

Smart Control enables the SWICM to learn what percentage the PWM needs to be at for certain rates. This makes for faster rate changes.

Select the **Next Page** icon.



### Setup PWM

Enter the following:

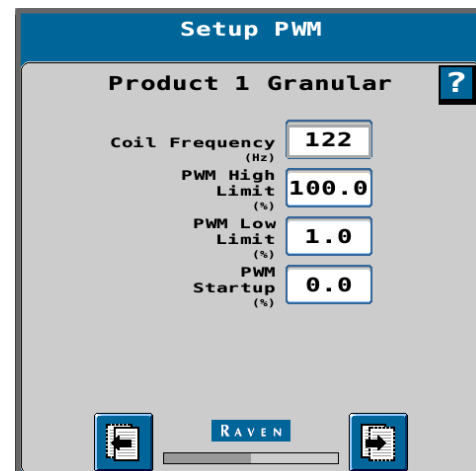
Coil Frequency: 122

PWM High Limit %: 100.0

PWM Low Limit %: 1.0

PWM Startup %: 0

Select the **Next Page** icon.



## 2 DRY PRODUCT SETUP

### Setup Rate Sensor

Enter the known **Product Density** of the product you are applying.

Refer to this equation to enter the **Calibration Weight**:

$$\text{CFR Value} \times \text{Product Density} = \text{lbs/rev}$$

Use the table below for the CFR value.

Number of Meter Rolls	Roll Size 7	Roll Size 10
4	0.018	0.026
6	0.028	0.039
8	0.037	0.051
12	0.055	0.077

Ex. 16 row machine with #10 rolls and a product density of 60. Calibration weight = 0.051 x 60 = 3.06 lbs/rev

**Pulses/Revolution:** 360

Select the **Next Page** icon.

**Setup Rate Sensor**

**Product 1 Granular** ?

Product Density (lb/cubic feet) **60.0**

Calibration Weight (lb/revolution) **3.072**

Pulses/Revolution **360.00**

RAVEN

### Setup Tank/Bin

Configure the tank specification for Product 1.

**Tank Capacity:** The SoilWarrior can be configured with three different tank sizes.

160 bushel - approx. 9,000 lbs.

130 bushel - approx. 7,500 lbs.

75 bushel - approx. 2,000 lbs.

Enter the tank capacity of the dry tank in lbs. For additional resources on tank sizes, refer to the SoilWarrior Operator's Manual.

**Current Level:** Amount you currently have in the tank.

**Low Tank Level:** Enter the amount at which the system will alert you. Check the **Alarm?** box to activate the alarm.

Check the **Low Bin Level Sensor** and leave the Bin Level Sensor Type as **Default**.

Select the **Next Page** icon.

**Setup Tank/Bin**

**Product 1 Granular**

Tank Capacity (Lb) **9000**

Current Tank Level (Lb) **0**

Low Tank Level (Lb) **800** Alarm? ☒

Low Bin Level Sensor ☒

Bin Level Sensor Type **Default** ?

RAVEN

## 2 DRY PRODUCT SETUP

### Setup Rates

On the **Setup Rates** screen, enter at least one **Preset Rate Value**. Three preset rates can be entered. The preset rates will be displayed on the run screen to serve as a shortcut.

Enter the **Rate Bump** increment.

Rate bump is when you manually increase/decrease the rate of fertilizer by the number entered into the rate bump box.

In the **Rate Selection** dropdown, select one of three:

**Predefined or Rx:** This option is most common. Controls rate via user entered rate value or receives rate from a prescription map.

**Rate Bump or Rx:** Manual rate increase or decrease. You can also use a prescription map.

**UT Rate Entry:** Uses a rate entered in the UT screen.

Check the **Display Smoothing** box.

If you will be applying rates with decimals (0.5), input 1 in the **Decimal Shift** box.

Select the **Next Page** icon.

**Setup Rates**

**Product 1 Granular** ?

	Rate 1	Rate 2	Rate 3
Preset* Rate Values (lb/ac)	100	0	0
Rate Bump (lb/ac)	0		
Rate Selection	Predefined or Rx		
Display Smoothing	<input checked="" type="checkbox"/>		
Decimal Shift	0		

Navigation icons: Previous, RAVEN, Next

### Setup Alarms

Enter the **Off Rate Alarm**.

This value will be the allowable error off target rate before the SWICM presents a warning.

Leave the **Shaft Sensor Alarm** box unchecked.

Select the **Next Page** icon.

**Setup Alarms**

**Product 1 Granular** ?

Off Rate Alarm (% off target rate) 10

Shaft Sensor Alarm ☐

Alarm? ☒

Navigation icons: Previous, RAVEN, Next

**Repeat Control Valve, PWM, Rate Sensor, Tank, Rates, and Alarms steps for each dry product/tank.**

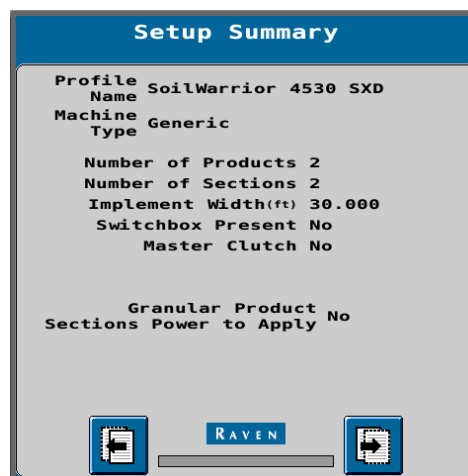
## 2 DRY PRODUCT SETUP

### Setup Summary

After completing the setup for all products/tanks, a **Setup Summary** screen will be shown that lists the number of products, sections, application width, and other details about the configuration.

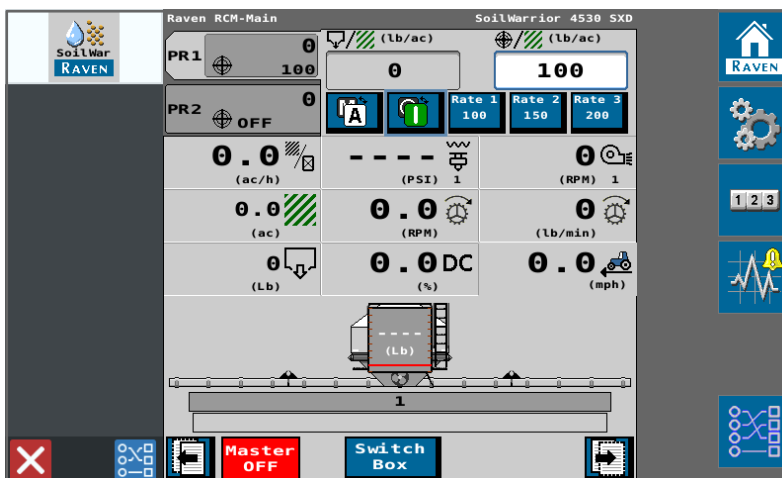
Verify the information is accurate and click the **Next Page** icon.

Next, select the **Home** page. Your machine has been successfully set up!



Once the setup is complete you will need to perform a **PWM Calibration** as well as a **Catch Test Calibration**.

Instructions can be found in the PWM Calibration, and Catch Test sections, starting on page 35.



# 3 LIQUID PRODUCT SETUP

## Applicator Setup

This section will walk through the steps to set up liquid product channel(s).

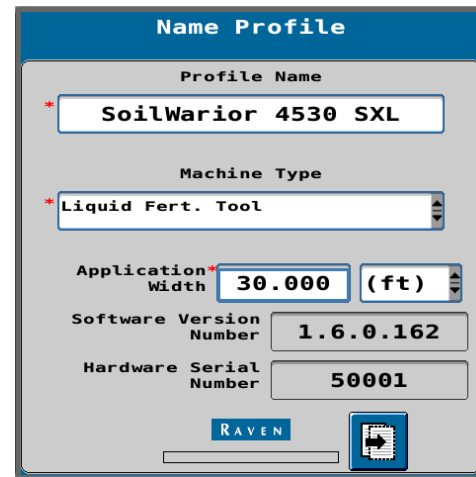
To begin, from the run screen, select the **Settings** icon, then select **Change/New**.

Under **Machine Type**, open the dropdown menu.

When only using one liquid product, select the **Liquid Fert. Tool**. For multiple products, or if a pressure package is installed, select **Generic**.

Enter the application width of your SoilWarrior. Verify that the units are in feet.

After all information has been entered, select the **Next Page** icon.



The 'Name Profile' screen contains the following fields and controls:

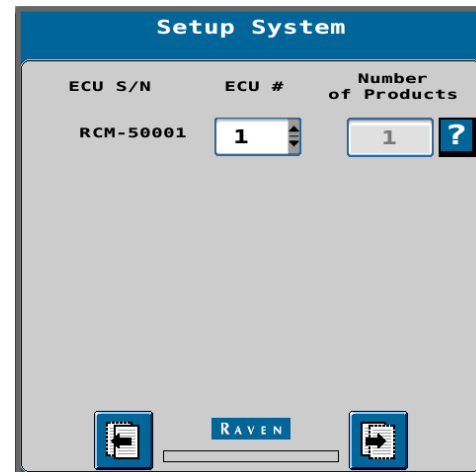
- Profile Name:** A text box containing 'SoilWarrior 4530 SXL'.
- Machine Type:** A dropdown menu showing 'Liquid Fert. Tool'.
- Application Width:** A text box with '30.000' and a unit selector '(ft)'.
- Software Version Number:** A text box with '1.6.0.162'.
- Hardware Serial Number:** A text box with '50001'.
- Navigation:** A 'RAVEN' button and a 'Next Page' icon (a square with a right-pointing arrow).

## Setup System

Check to make sure the right SWICM serial number is listed.

*The number of products is greyed out since there can be only one product with a Liquid Fert. Tool Machine Type.*

Select the **Next Page** icon.



The 'Setup System' screen contains the following fields and controls:

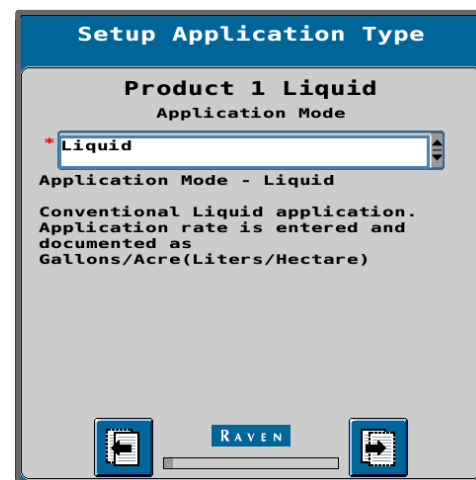
ECU S/N	ECU #	Number of Products
RCM-50001	1	1 ?

At the bottom, there is a 'RAVEN' button and a 'Next Page' icon.

## Setup Application Type

On the next screen, select **Liquid** from the **Application Mode** dropdown.

Select the **Next Page** icon.



The 'Setup Application Type' screen contains the following fields and controls:

- Product 1 Liquid Application Mode:** A dropdown menu showing 'Liquid'.
- Application Mode - Liquid:** A text box with the description: 'Conventional Liquid application. Application rate is entered and documented as Gallons/Acre(Liters/Hectare)'.
- Navigation:** A 'RAVEN' button and a 'Next Page' icon.



# 3 LIQUID PRODUCT SETUP

## Setup Sections

On the **Setup Sections** screen, you will need to enter the number of sections on the machine. The number of sections is the number of valves on your machine.

Check the **Equal Width Sections** box.

Select the **Next Page** icon.



**NOTE:** Each configuration screen contains a ? icon. Select to view the definition of each configuration value.

## Setup Section Width

The next screen will show how the sections are divided.

Select the **Next Page** icon.

# 3 LIQUID PRODUCT SETUP

## Setup Auxiliary Drivers

Use the dropdown menu to select the proper **Aux Driver**. The chart below lists the driver number for each function.

**Some functions are optional and may not be equipped on your machine. Only select the functions available on your machine.**

Function	Aux Driver Number
Tilt	9
Fold	10
Air Compressor	13
Scale Heads (Optional)	14
Row Cleaner Lift (Optional)	15
Spare	16

Once the proper **Aux Drivers** have been selected continue to the **Next Page**.

## Auxiliary Drivers Assignment

Check the box next to each Aux Output. “Latched” means that when selected the function will stay active until it is selected again.

Once checked, proceed to the **Next Page**.

## Section Summary

Review the **Section Summary** screen to ensure the sections cover the full width of the implement.

Select the **Next Page** icon.

Product 1		
10	10	10
1	2	3
1	2	3

# 3 LIQUID PRODUCT SETUP

## Setup Pressure Sensors

Select the dropdown to configure the pressure sensor.

The number of pressure sensors varies based on SoilWarrior configuration. If a pressure package is installed view the table below.

If there is no pressure package use the dropdown to select the **0-250 PSI (1-5V) Pressure Sensor**.

Select the **Next Page** icon.

### Pressure Assignments

Monitored Pressure	Sensor Type	Sensor Number
A/C Tank/Manifold	0-250 PSI	1
Toolbar Pressure	0-3,000 PSI	2
Row Unit Pressure (Black)	0-250 PSI	3
Tramline Pressure (Blue)	0-250 PSI	4
Row Cleaner Pressure (Red)	0-250 PSI	5

## Setup Pressure Alarms

Enter values to set the minimum and maximum pressures of your system.

If the **Alarm?** box is checked, an alarm will sound when the system pressure drops or exceeds these values.

If the pressure package is installed reference the image below for your row unit.

Select the **Next Page** icon.

### N Row Unit

### X Row Unit

# 3 LIQUID PRODUCT SETUP

## Setup Auxiliary Functions

Leave the boxes unchecked.

Use the dropdown to select **Default** for the height switch.

Select the **Next Page** icon.

## Setup Control Valve

From the dropdown menu next to **Control Valve Type**, select **Standard**.

Valve Response Rate: 50

Control Deadband %: 3

Valve Delay: 0

Valve Advance: 0

Control Effort %: 35

Select the **Next Page** icon.

## Setup Rate Sensor

Enter the **Flowmeter Calibration** number. Make sure to pay attention to the units found on the tag (i.e. 10 gal)

**NOTE:** This number can be found on the tag of the flow meter. If the tag is missing, refer to [Ravenhelp.com](http://Ravenhelp.com) to formulate a calibration number.

# 3 LIQUID PRODUCT SETUP

## Setup Tank/Bin

Configure the tank specification for Product 1.

**Tank Capacity:** The SoilWarrior can be configured with three liquid tank sizes.

1,250 gal.

1,600 gal.

2,200 gal.

Enter the tank capacity of the liquid tank in gal. installed on the SoilWarrior. For additional resources on tank sizes, refer to the SoilWarrior Operator's Manual.

**Current Level:** Amount you have in the tank currently.

**Low Tank Level:** Enter the amount at which the system will alert you. Check the **Alarm?** box to activate the alarm.

Select the **Next Page** icon.

## Setup Rates

On the **Setup Rates** screen, enter at least one **Preset Rate Value**. Three preset rates can be entered. The preset rates will be displayed on the run screen to serve as a shortcut.

Enter the **Rate Bump** increment.

Rate bump is when you manually increase/decrease the rate of fertilizer by the number entered into the rate bump box.

In the **Rate Selection** dropdown, select one of three:

**Predefined or Rx:** This option is most common. Controls rate via user entered rate value or receives rate from a prescription map.

**Rate Bump or Rx:** Manual rate increase or decrease. You can also use a prescription map.

**UT Rate Entry:** Uses a rate entered in the UT screen.

Check the **Display Smoothing** box.

If you will be applying rates with decimals (0.5), input 1 in the **Decimal Shift** box.

Select the **Next Page** icon.

# 3 LIQUID PRODUCT SETUP

## Setup Alarms

Enter the **Off Rate Alarm**.

This value will be the allowable error off target rate before the SWICM presents a warning.

Select the **Next Page** icon.

**Setup Alarms**

**Product 1 Liquid** ?

Off Rate Alarm (% off target rate) **10** Alarm? ☒

If Pressure Sensor 1 has a minimum pressure alarm enabled the system will not drop below that pressure to maintain spray pattern.

Navigation icons: Previous, RAVEN, Next

## Setup Summary

After completing the setup for all products/tanks, a **Setup Summary** screen will be shown that lists the number of products, sections, application width, and other details about the configuration.

Verify the information is accurate and click the **Next Page** icon.

Next, select the **Home** page. Your machine has been successfully set up.

**Setup Summary**

Profile Name SoilWarrior 4530 SXL

Machine Type Liquid Fert. Tool

Number of Products 1

Number of Sections 3

Implement Width(ft) 30.000

Switchbox Present No

Section Valve Type 3-Wire

Agitator Valve Not Installed

Agitator Duty Cycle 10

Flow Return Not Installed

Left Fence Row Driver Not Installed

Right Fence Row Driver Not Installed

Navigation icons: Previous, RAVEN, Next

# 4 NH3 PRODUCT SETUP

## Applicator Setup

This section will walk through the steps to set up an NH3 machine with two dry products.

To begin, from the run screen, select the settings icon, then select **Change/New**.

Under **Profile Name**, enter a name for the implement.

*NOTE: If your SoilWarrior is equipped with either dry+NH3 or liquid+NH3, select NH3 tool.*

Under **Machine Type**, open the dropdown menu.

Select **NH3 Tool**.

Enter the application width of your SoilWarrior. Verify that the units are in feet.

Once complete, select the **Next Page** icon.

## Setup System

The **Setup System** screen will list the number of External Control Units (ECU) and their serial numbers.

Enter the number of products to be controlled by that ECU.

This will also include the dry bins.

Once complete, select the **Next Page** icon.

# 4 NH3 PRODUCT SETUP

## Setup Fan/Spinner RPM

The number of RPM sensors are dependent on the number of fans on the machine. Either 1 or 2.

Leave the **Enable Fan/Spinner RPM Control** box un-checked. Fan RPM is controlled by the flow setting on the SCV.

Select the **Next Page** icon.

## Setup Application Type

This screen will list the number of products you selected and have a dropdown menu for each one.

NH3 is always product one.

Select the dropdown menu and select the appropriate product type you are applying.

Repeat for each product.

Up to two additional products can be added with NH3 and N-Serve if installed on a machine with a single SWICM.

Select the **Next Page** icon.

The next screen has two options for NH3. Select the correct option for your machine.

**NH3:** Standard NH3 with no HP pump.

**NH3 HP+:** NH3 with HP Pump

Select the **Next Page** icon.



# 4 NH3 PRODUCT SETUP

For the next two dry products select **Granular Full Width**.

Select the **Next Page** icon.

## Setup Section Groups

On the **Setup Section Groups** screen, enter the number of products in the **Number of Section Groups** field. Leave the **Granular Product Sections Power to Apply** box unchecked.

Select the **Next Page** icon.

## Setup Section Harnessing

Enter the number of section valves on the machine for product 1.

For the remaining products, reference the image to the right.



**NOTE:** Each configuration screen contains a ? icon. Select to view the definition of each configuration value.

# 4 NH3 PRODUCT SETUP

## Setup Section Group Assignment

Assign each **Section Group** to a product. (1 to 1, 2 to 2, etc.)

Select the **Next Page** icon.

## Setup Section Width

Review the page to confirm proper widths.

Once complete, select the **Next Page** icon.

## Setup Auxiliary Drivers

Use the dropdown menu to select the proper **Aux Driver**. The chart below lists the driver number for each function.

**Some functions are optional and may not be equipped on your machine. Only select the functions available on your machine.**

Function	Aux Driver Number
Tilt	9
Fold	10
Air Compressor	13
Scale Heads (Optional)	14
Row Cleaner Lift (Optional)	15
Spare	16

Once the proper **Aux Drivers** have been selected continue to the **Next Page**.

# 4 NH3 PRODUCT SETUP

## Auxiliary Drivers Assignment

Check the box next to each Aux Output. “Latched” means that when selected the function will stay active until it is selected again.

Once checked, proceed to the **Next Page**.

**Auxiliary Drivers Assignment**

Latched ☒  
Aux Output 1

Latched ☒  
Aux Output 2

Latched ☒  
Aux Output 3

Latched ☒  
Aux Output 4

Navigation icons and RAVEN label at the bottom.

## Section Summary

Select the **Next Page** icon if the sections are correct.

**Section Summary**

40.000 (ft)

Product 1	
20	20
1	2
1	2

Product 2

40
7
7

Product 3

40
8
8

Liquid Section Width Granular Section Width Wired Signal Driver Switch Number

Navigation icons and RAVEN label at the bottom.

# 4 NH3 PRODUCT SETUP

## Scale Setup

If your machine has scale heads select the **Next Page** icon.

### Single and Dual 160 Machines.

From the dropdown select **Product Scale**.  
Then check the box next to each Product Scale.

### Dual 135 and Triple Bins.

From the dropdown select **Gen. Purpose Scale**.  
Then check the box next to Scale 1 and Scale 3.

Select the **Next Page** icon.

The screenshot shows the 'Scale Setup' window with a dropdown menu set to 'Product Scale'. Below the dropdown, there are two checkboxes: 'Product Scale 1' and 'Product Scale 2', both of which are checked. At the bottom of the window, there are navigation icons for 'Previous', 'RAVEN', and 'Next'.

The screenshot shows the 'Scale Setup' window with a dropdown menu set to 'None'. A red 'X' icon is visible in the center. Below the dropdown, there are three checkboxes: 'None', 'Product Scale', and 'Gen. Purpose Scale'. The 'Gen. Purpose Scale' checkbox is checked. At the bottom of the window, there are navigation icons for 'Previous', 'RAVEN', and 'Next'.

The screenshot shows the 'Scale Setup' window with a dropdown menu set to 'Gen. Purpose Scale'. Below the dropdown, there are four checkboxes: 'Scale 1', 'Scale 2', 'Scale 3', and 'Scale 4'. The 'Scale 1' and 'Scale 3' checkboxes are checked. At the bottom of the window, there are navigation icons for 'Previous', 'RAVEN', and 'Next'.

## Setup Pressure Sensors

If the machine is not equipped with pressure sensors skip this step and select the **Next Page** icon to begin *Setup Fan* on the next page.

If the pressure sensor package is installed select the following sensors listed to the right.

### Pressure Assignments

Monitored Pressure	Sensor Number
Cooler Pressure	1
Tramline Pressure (Blue)	2
Row Cleaner Pressure (Red)	3
Row Unit Pressure (Black)	4

**NOTE:** If your machine is equipped with a boost pump, one of the pressure sensors will be consumed.

The screenshot shows the 'Setup Pressure Sensors' window. It contains four rows, each with a label and a dropdown menu: 'Pressure Sensor 1', 'Pressure Sensor 2', 'Pressure Sensor 3', and 'Pressure Sensor 4'. All four dropdown menus are set to '0-250psi (1-5V)'. At the bottom of the window, there are navigation icons for 'Previous', 'RAVEN', and 'Next'.

Select the **Next Page** icon.

# 4 NH3 PRODUCT SETUP

## Setup Pressure Assignment

Check the box next to each product to assign the sensor.

Repeat for each sensor 1-4.

Select the **Next Page** icon.

Setup Pressure Assignment

Pressure Sensor 1 ?

Product 1 ☒

Product 2 ☐

RAVEN

## Setup Pressure Alarms

Set the values to the Max pressure. For X row units enter 45 psi and for N row units enter 80 psi. Once the sensor detects a value larger than the Max pressure it will sound an alarm on the display.

Select the **Next Page** icon.

Setup Pressure Alarms

	Min	Max	Alarm?	
Pressure 1 (PSI)	0	200	<input checked="" type="checkbox"/>	?
Pressure 2 (PSI)	0	60	<input checked="" type="checkbox"/>	
Pressure 3 (PSI)	0	60	<input checked="" type="checkbox"/>	
Pressure 4 (PSI)	0	60	<input checked="" type="checkbox"/>	

RAVEN

## Setup Fan/Spinner RPM Calibration

Enter the following:

RPM 1 Calibration Pulses/Rev: 2

RPM 1 Low Limit: 3500

RPM 1 High Limit: 5100

Select the box under **Alarm?** when you want the display to alert you if the fan speed is too high or too low.

Select the **Next Page** icon.

Setup Fan/Spinner RPM Calibration

RPM 1 Calibration (Pulse/Revolution)	2		?
RPM 1 Low Limit (RPM)	3500	<input checked="" type="checkbox"/>	
RPM 1 High Limit (RPM)	5100	<input checked="" type="checkbox"/>	

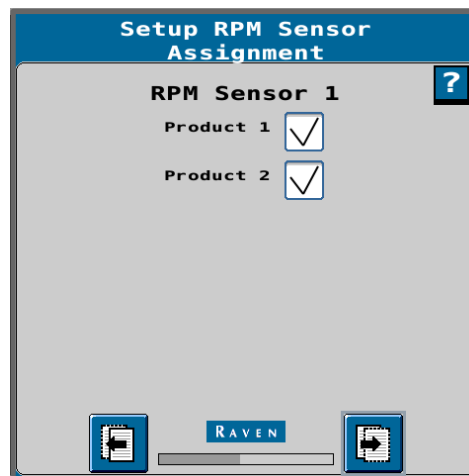
RAVEN

## 4 NH3 PRODUCT SETUP

### Setup RPM Sensor Assignment

Setup RPM Sensor Assignment allows you to assign the fan to a product or tank. If multiple products are configured, you can assign the fan to both products.

Select the **Next Page** icon.



### Setup Control Valve

From the dropdown menu under Control Valve Type, select **Accuflow Dual Valve** if the cooler is outfitted with a master on/off as well as a control valve. If the machine has a single valve select **Accuflow Single Valve**.

Enter the following values:

Valve Response Rate: 50

Control Deadband %: 3

Valve Delay: 0.0

Valve Advance: 0.0

Control Effort %: 35

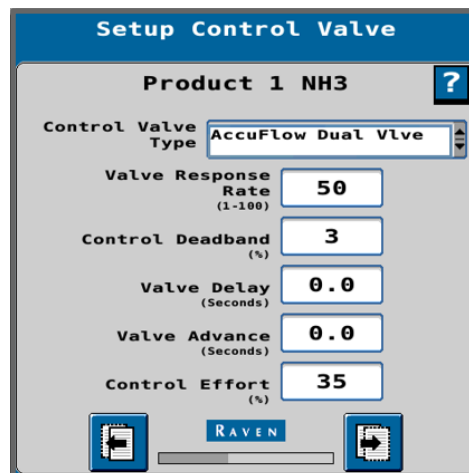
For Single Valve:

Valve Response Rate: 50

Control Deadband %: 3

Control Effort %: 3

Select the **Next Page** icon.



**NOTE:** These are default values and may be changed to fine-tune performance.

## 4 NH3 PRODUCT SETUP

### Setup Rate Sensor

Enter the **Flowmeter Calibration** number. This value can be found on the tag of the meter.

A standard 60S flowmeter has a beginning calibration value of 170.

Select the **Next Page** icon.

**Setup Rate Sensor**

**Product 1 NH3** ?

Flowmeter\* Calibration **170**

Flowmeter calibration units are (Pulses/10lbs of Actual N) for NH3 applications.

Navigation icons and RAVEN label at the bottom.

### Setup Tank/Bin

Enter the tank capacity of the NH3 tanks.

If the value is known, enter the current value.  
*This can also be entered later.*

Enter a low tank alert value, and check the **Alarm?** box to set up an alert when the tank reaches a predetermined low level.

Once complete, select the **Next Page** icon.

**Setup Tank/Bin**

**Product 1 NH3**

Tank Capacity (lb N) **2800**

Current Tank Level (%) **0**

Low Tank Level (%) **15** Alarm? ☒

Navigation icons and RAVEN label at the bottom.

### Setup Rates

**Predefined or Rx:** Uses preset rate values as your target rate or uses a prescription map.

**Rate Bump or Rx:** Increases and decreases the target rate by the previously entered Rate Bump value from the Rate Setup page or uses a prescription map.

**VT Rate Entry:** Uses an entered rate on the Virtual Terminal screen.

**Display Smoothing** will smooth the rate displayed.

Select the **Next Page** icon.

**Setup Rates**

**Product 1 NH3** ?

	Rate 1	Rate 2	Rate 3
Preset* Rate Values (Lbs N/Ac)	<b>100</b>	<b>0</b>	<b>0</b>
Rate Bump (Lbs N/Ac)	<b>0</b>		
Rate Selection	Predefined or Rx		
Display Smoothing	<input checked="" type="checkbox"/>		

Navigation icons and RAVEN label at the bottom.

## 4 NH3 PRODUCT SETUP

### Setup Alarms

**Off Rate Alarm** is the % off target rate before the system will trigger an alert.

Enter a value and select the checkbox.

Leave **Section Valve Status** unchecked.

Once complete, select the **Next Page** icon.

**Setup Alarms**

**Product 1 NH3** ?

Off Rate Alarm (% off target rate)  ☒ Alarm?

Section Valve Status Feedback Alarm ☐

Navigation icons and RAVEN logo at the bottom.

### Setup Control Valve

From the dropdown menu next to Control Valve Type, select **PWM Close**

Valve Response Rate: 50

Control Deadband %: 2

Check the box to **Enable PWM Smart Control**.

Select the **Next Page** icon.

**Setup Control Valve**

**Product 2 Granular** ?

Control Valve Type **PWM Close**

Valve Response Rate (1-100)

Control Deadband (%)

Enable PWM Smart Control ☒

Navigation icons and RAVEN logo at the bottom.

### Setup PWM

Enter the following:

Coil Frequency: 122

PWM High Limit %: 100.0

PWM Low Limit %: 1.0

PWM Startup %: 0

Select the **Next Page** icon.

**Setup PWM**

**Product 2 Granular** ?

Coil Frequency (Hz)

PWM High Limit (%)

PWM Low Limit (%)

PWM Startup (%)

Navigation icons and RAVEN logo at the bottom.



# 4 NH3 PRODUCT SETUP

## Setup Rate Sensor

Enter the known **Product Density** of the product you are applying.

Refer to this equation to enter the **Calibration Weight**:

$$\text{CFR Value} \times \text{Product Density} = \text{lbs/rev}$$

Use the table below for the CFR value.

Number of Meter Rolls	Roll Size 7	Roll Size 10
4	0.018	0.026
6	0.028	0.039
8	0.037	0.051
12	0.055	0.077

Ex. 16 row machine with #10 rolls and a product density of 60. Calibration weight = 0.051 x 60 = 3.06 lbs/rev

**Pulses/Revolution:** 360

Select the **Next Page** icon.

## Setup Tank/Bin

Configure the tank specification for Product 1.

**Tank Capacity:** The SoilWarrior can be configured with three different tank sizes.

160 bushel - approx. 9,000 lbs.

130 bushel - approx. 7,500 lbs.

75 bushel - approx. 2,000 lbs.

Enter the tank capacity of the dry tank in lbs. installed on the SoilWarrior. For additional resources on tank sizes, refer to the SoilWarrior Operator's Manual.

**Current Level:** Amount you currently have in the tank.

**Low Tank Level:** Enter the amount at which the system will alert you. Check the **Alarm?** box to activate the alarm.

Check the **Low Bin Level Sensor** and leave the Bin Level Sensor Type as **Default**.

Select the **Next Page** icon.

# 4 NH3 PRODUCT SETUP

## Setup Rates

On the **Setup Rates** screen, enter at least one **Preset Rate Value**. Three preset rates can be entered. The preset rates will be displayed on the run screen to serve as a shortcut.

Enter the **Rate Bump** increment.

Rate bump is when you manually increase/decrease the rate of fertilizer by the number entered into the rate bump box.

In the **Rate Selection** dropdown, select one of three:

**Predefined or Rx:** This option is most common. Controls rate via user entered rate value or receives rate from a prescription map.

**Rate Bump or Rx:** Manual rate increase or decrease. You can also use a prescription map.

**UT Rate Entry:** Uses a rate entered in the UT screen.

Check the **Display Smoothing** box.

If you will be applying rates with decimals (0.5), input 1 in the **Decimal Shift** box.

Select the **Next Page** icon.

**Setup Rates**

**Product 2 Granular** ?

	Rate 1	Rate 2	Rate 3
Preset Rate Values (lb/ac)	150	0	0
Rate Bump (lb/ac)	0		
Rate Selection	Predefined or Rx		
Display Smoothing	<input checked="" type="checkbox"/>		
Decimal Shift	0		

Navigation icons: Previous, RAVEN, Next

## Setup Alarms

Enter the **Off Rate Alarm**.

This value will be the allowable error off target rate before the SWICM presents a warning.

Leave the **Shaft Sensor Alarm** box unchecked.

Select **Next Page** icon.

**Setup Alarms**

**Product 2 Granular** ?

Off Rate Alarm (% off target rate) 10

Shaft Sensor Alarm ☐

Alarm? ☒

Navigation icons: Previous, RAVEN, Next

**Repeat Control Valve, PWM, Rate Sensor, Tank, Rates, and Alarms steps for each dry product/tank.**

## 4 NH3 PRODUCT SETUP

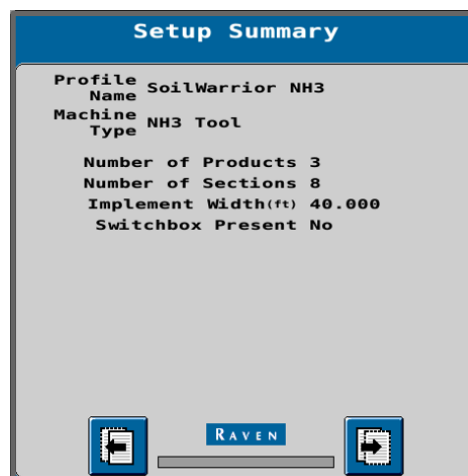
### *Setup Summary*

After completing the setup for all products/tanks, a **Setup Summary** screen will be shown that lists the number of products, sections, application width, and other details about the configuration.

Verify the information is accurate and click the **Next Page** icon.

Next, select the **Home** page. Your machine has been successfully set up.

Perform a Catch Test and PWM calibration found on page 35.



**Setup Summary**

Profile Name	SoilWarrior NH3
Machine Type	NH3 Tool
Number of Products	3
Number of Sections	8
Implement Width(ft)	40.000
Switchbox Present	No

Navigation icons: Home (left), RAVEN (center), Next Page (right)

# 5 PWM CALIBRATION

## PWM Calibration

1. Navigate to the **Tests** page.

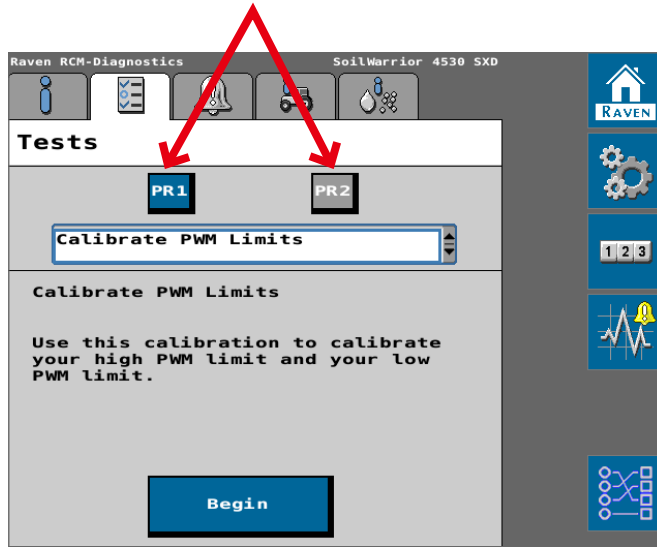
a. Select the **Diagnostics** icon



b. Select the **Tests** tab



2. Select the tank to calibrate by selecting **PR(X)**.



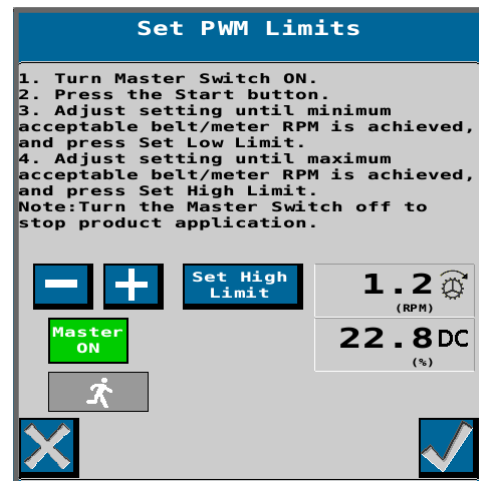
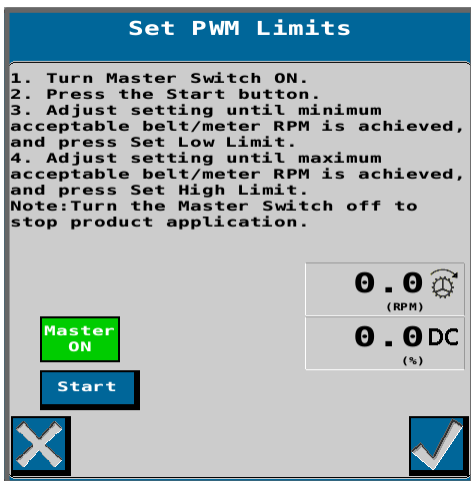
3. From the dropdown select **Calibrate PWM Limits**. If the box is greyed out, press the footswitch.

4. Once **Calibrate PWM Limits** is displayed and the correct tank is selected, press **Begin**.

5. Follow the directions on the screen to set PWM limits. For best results have the tractor RPM's at 1700 and the air compressor running. Also, before setting high or low make sure the meter RPM holds constant.

a. Set the Low Limit around 1.5 to 4 RPM.

b. Set the High Limit around 65 to 70 RPM.



6. Once complete repeat for each additional tank.

# 6 CATCH TEST

## SWICM Dry Catch Test

This is a step by step guide for the in-cab portion of a catch test after following the Preparing to Calibrate section in the Operators Manual.

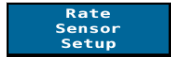
1. From the **Main Run Screen**, select the **Settings** icon.



2. Navigate to the second tab from the left.



3. Select the **Rate Sensor Setup** box.



4. On the upper part of the screen, select the product to be calibrated.

**NOTE:** You will need to calibrate each product.

The 'Setup Rate Sensor' screen displays fields for PR1 and PR2. PR1 is set to 360.00 Pulses/Revolution, and PR2 is marked with a question mark. Product Density is set to 60.0 (lb/cubic feet). Calibration Weight is set to 3.072 (lb/revolution). At the bottom, there are two buttons: 'Catch Test Calibration' and 'Applied Product Calibration'. A 'RAVEN' logo and a checkmark icon are also present.

5. Select the **Catch Test Calibration** box. If the box is greyed out, make sure all the boxes are populated or press the footswitch.

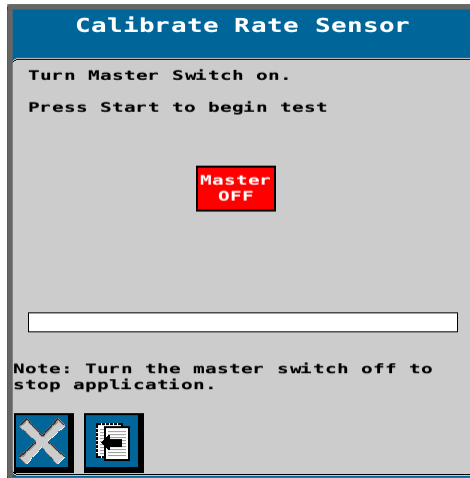
**NOTE:** If the system is not yet primed, charge the tank or bin before performing calibration. From the home screen select the PR(X) tab. Then select the Tank/Bin Charge icon.

6. Enter your fertilizer rate and travel speed in which you will be running your SoilWarrior. For the desired weight, we recommend using 25 lbs.

The 'Calibrate Rate Sensor' screen prompts the user to enter values. It includes fields for Product Density (60.0 lb/cubic feet), Calibration Weight (3.072 lb/revolution), Test Speed (5.0 mph), Rate (100 lb/ac), Desired Weight (30.303 Lb), and Estimated Test Time (01:00). At the bottom, there are three icons: a close button (X), a home button (house), and a footswitch button.

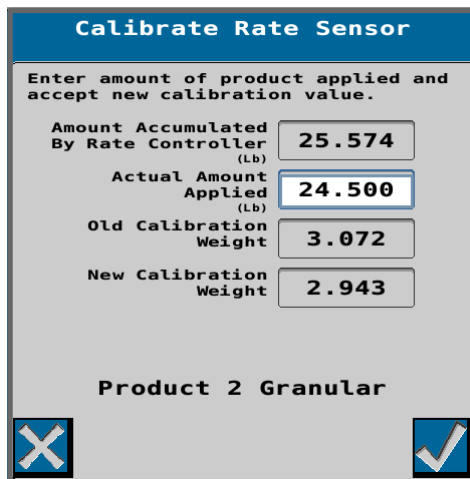
## 6 CATCH TEST

7. Before starting the test, ensure that the bottom is removed from the meter body and the catch test bag is secured to the meter bottom.
8. Increase the tractor engine RPM's to 1700 and follow the directions displayed on the screen.



The screen displays the title "Calibrate Rate Sensor" in a blue header. Below the header, the text reads "Turn Master Switch on. Press Start to begin test". A red button labeled "Master OFF" is centered on the screen. Below the button is a white rectangular input field. At the bottom, a note states "Note: Turn the master switch off to stop application." and there are two icons: a blue square with a white 'X' and a blue square with a white document icon.

9. Once completed, exit the cab and weigh the dispensed product in the catch bag.
10. Record the amount from the scale and enter it into the box labeled **Actual Amount Applied**, then select the checkmark in the bottom right to complete calibration.
  - a. Repeat for each product/tank until the weight of the product dispensed is within a half-pound of the desired amount (25lbs).



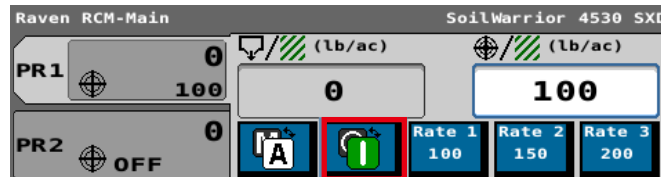
The screen displays the title "Calibrate Rate Sensor" in a blue header. Below the header, the text reads "Enter amount of product applied and accept new calibration value." The screen shows four rows of data with input fields: "Amount Accumulated By Rate Controller (Lb)" with the value "25.574", "Actual Amount Applied (Lb)" with the value "24.500", "Old Calibration Weight" with the value "3.072", and "New Calibration Weight" with the value "2.943". Below the data, the text "Product 2 Granular" is displayed. At the bottom, there are two icons: a blue square with a white 'X' on the left and a blue square with a white checkmark on the right.

# 7 TROUBLESHOOTING

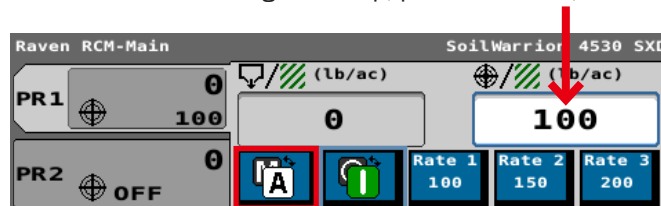
## Meters Will Not Engage Checklist:

### In-Cab Checklist:

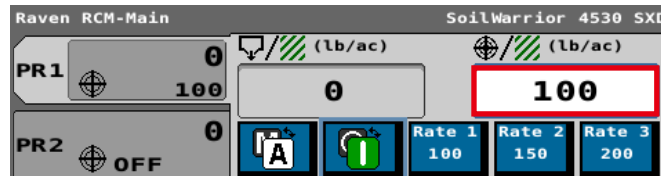
1. Are the SCVs engaged for meters and fan circuits?
2. Are the products turned on?
  - a. Check the boxes on the center of the run screen. The image below shows when the product is turned on.



3. Is the product in manual or automatic mode?
  - a. A= Automatic M= Manual
  - b. Automatic mode is used when using a Rx map, predefined rate, or Rate Bump.



4. Is the rate input for each product correct?
  - a. Rate input is found in the upper right-hand corner.



5. Is the master switch turned on?
  - a. Check that the master switch symbol is green. It is in the bottom left corner of the main run screen.



- b. If it is not on, press the footswitch to cycle the master switch.

6. Is the implement lift switch functioning?

- a. The implement switch status is in the bottom left corner of the run screen next to the master switch. Lift and lower the machine to check if it is cycling properly.



# 7 TROUBLESHOOTING

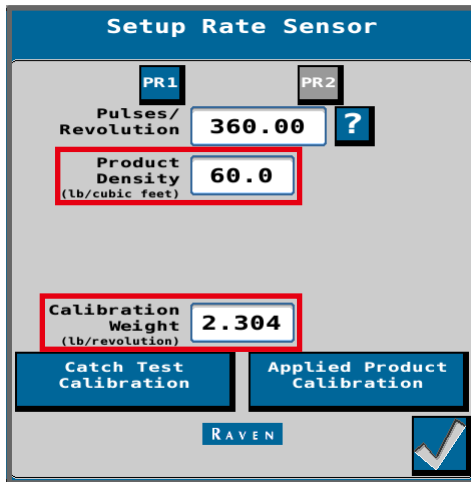
7. Is the travel speed registering on run page?

- On the main run screen check if your travel speed is being read through the rate controller.



8. Are the **Calibration Weight** and **Product Density** correct in the display?

- Within the settings tab, select **Rate Sensor Setup**.
- Double check that the density is correct for each product and that the **Calibration Weight** value is correct. *The Calibration Weight value on the screenshot may differ from your machine.*



Once you have checked the in-cab checklist exit the cab and go to the PWM block on the SoilWarrior.

## Machine Checklist:

- Visually inspect the chain and sprockets.
  - Is the chain too loose or broken?
  - Are the shear bolts still intact?
- Inspect the cabling running to the coils.
  - Did they get disconnected?
  - Are there any broken or exposed wires?
- With the bins empty or with the fan running, turn the manual override screw clockwise on the PWM block until the meter begins to turn.
  - Does the meter turn? If not call ETS Service.
  - Does the meter turn smoothly with no jumping, grinding, or chattering?
  - In the cab, are you getting RPM readings on the monitor? If not, this would indicate an issue with the encoder.
    - On the opposite side of the machine inspect the cabling and if the encoder is secured to the shaft.
  - Once you have inspected meter operation, turn the screw counterclockwise until the meter stops turning.

If you are still having issues after completing these steps, call an ETS Service technician.





# 7 TROUBLESHOOTING

## *Inconsistent Rate: Dry Fertilizer Application*

If you have any questions, please call an ETS Service technician.

### **1. Are the Product Density and Calibration Weight settings correct?**

a. Check Product Density lb/ft<sup>3</sup> settings in software to make sure they match what was on the ticket from the supplier.

i. If the lb/ft<sup>3</sup> is not on the ticket you will have to use the product density scale from the toolbox to get the correct reading.

1. Enter this in the correct software location. If using more than one tank, check each tank.

ii. Check Calibration Weight values. Use the table below for the CFR value, then multiply by the density of the product. The Calibration Weight should be close to this number.

Ex. 16 row machine with #10 rolls and a product density of 60.

Calibration weight = 0.051 x 60 = 3.60 lbs/rev

Number of Rolls	Roll Size 7	Roll Size 10
4	0.018	0.026
6	0.028	0.039
8	0.037	0.051
12	0.055	0.077

### **2. Is the meter speed constant?**

a. Check for fluctuation of more than 2 digits while running at a constant speed.

IE: Desired 32.3 RPM's 30-35 is OK.

1. If the fluctuation is greater than +/- 3 RPMs check for properly tightened connection of encoder to shaft coupler.

a. Tighten encoder coupling with set screws.

2. Is the direct drive or chain drive coupling on the motor slipping?

a. Check to make sure sheer bolt is intact.

b. Tighten chain at bracket.

c. Tighten set screws for direct drive.

3. Ensure you have proper ground speed to achieve rates.

a. Cannot achieve high rates, decrease speed.

b. Cannot achieve low rates, increase speed.

### **3. Is there an air leak in the system?**

a. Is the Crary Blower/Fan turning at 4,000 RPMs or more?

i. This can be monitored on the Rate Control software.

1. Make sure the tractor engine is at 1,700 RPM or more.

2. Listen for the fan.

3. Increase hydraulic flow to fan until it reaches desired speed.

b. Are the hydraulics for the meters in the constant position/detent and above 35% (3.5) not exceeding 50% (5.0) flow?

*continued on next page*



# 7 TROUBLESHOOTING

- c. Check to make sure the tank lid latch is secured, centered and providing pressure on the seal when locked.
  - i. Ensure that the screen is set in first before installing the seal.
  - ii. Make sure seal is clean and does not have fertilizer sitting on it.
  - iii. When latching the tank lid, make sure when the handle comes over. There is some resistance, and it will snap shut.
    - 1. If the J bolt does not have enough travel to snap shut, you can remove the lower jamnut to increase the resistance.
- d. Check all the cleanout and inspection doors on the meter body for tightness and that the foam seals are intact.
- e. Ensure doors are on the correct meter body if there is more than one dry hopper. Look for the number stamp on the doors and meter and match them up. The stamp is located on the far-left side of each component.
- f. Check that the delivery tubes are in place and secured from the blower to the row units.
- g. Ensure that the tubes are not plugged, run block monitoring will help.
- h. Check caps on unused runs for cracks, loose clamps or missing caps.
  - i. Order replacement caps as soon as possible. They are special made for ETS meters.

## 4. Meter rolls are plugged.

- a. Remove rear meter housing door (held in with small wing bolts and bar).
  - 1. Visually inspect each roll for blockage or packed in product.
  - 2. Inspect each roll for damage or foreign material.
  - 3. Try to spin rolls by hand; they should not spin.
    - a. If a meter roll spins, the key is sheared and the roll will need to be replaced.
- b. Remove T bar and install block off door.
- c. Remove large meter roll access door.
- d. Remove collector bottoms.
- e. Thoroughly clean entire meter body and each meter roll.
  - 4. To manually rotate the meters, turn on the hydraulic circuit that operates the meters.
    - a. Use the manual override screw on the PWM valve body.
      - i. Turn screw clockwise to activate the meter.
      - ii. Turn the screw all the way out counterclockwise until the meters stop rotating.
  - 5. Check the foam seals and mating surfaces of all doors.
  - 6. Reinstall all doors.
  - 7. Remove block off plate and reinstall T bar.
- f. Restart all systems.
- g. Recheck product rates, CFR, and density.

If you are still having issues after completing these steps, call an ETS Service technician.

# 7 TROUBLESHOOTING

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## *Liquid Troubleshooting*

If you have any questions, please call an ETS Service technician.

### **1. No product coming out of any of the sections.**

- a. Pump hydraulics are not on, yellow colored hoses typically in SCV 4.
- b. Hydraulic hoses plumbed backwards; solid color in cylinder retract port/SCV switch in forward position and detent for constant flow.
- c. Master Switch is Off.
- d. Implement switch has not been activated.
  - i. Lower machine or cycle machine up and down monitoring **Implement Switch**.
- e. Implement Switch can be turned off in most software.
  - i. If you disable **Implement Switch**, system must be turned on and off with **Master Switch** when turning around.
- f. Main filter may be plugged.

### **2. Product is not applying at desired rate.**

- a. Check hydraulic flow to pump; should be producing up to 50 PSI.
- b. Check to make sure that minimum flow rate is set to 0 or 1, too high of a minimum flow rate will cause system to over apply.
  - i. If you want to change this number to be closer to application rate, monitor flow for a few passes and change accordingly.
- c. Check the Flowmeter Calibration.
  - i. Calibration number can be found on the flowmeter tag.
  - ii. Make sure the units in the rate controller match the units on the tag. i.e. Standard 60P flowmeter calibration is 720 pules per 10 gallons.
    - 1. Lowering the Meter Cal will decrease output.
    - 2. Raising the Meter Cal will increase output.
- d. Check the Control Valve Calibration number.
  - i. The calibration number for the control valve can be found on the valve tag.
  - ii. A standard valve has a calibration of 2123.

**Caution, speed changes may still cause rate issues.**

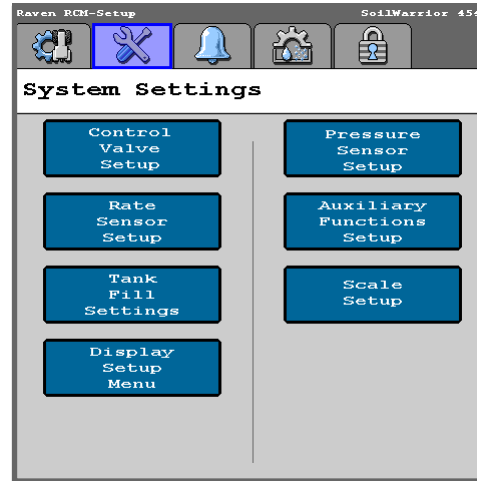
If you are still having issues after completing these steps, call an ETS Service technician.

# 7 TROUBLESHOOTING

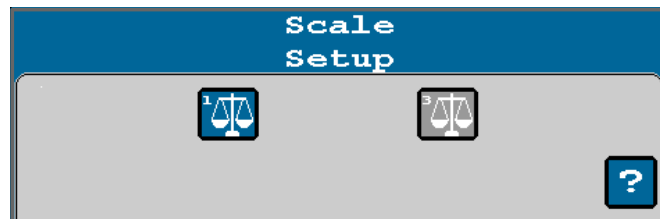
## SWICM Scale Calibration

If you are experiencing inaccurate scale readings follow the steps below. Before recalibrating the scale system, inspect the load cells for obstructions or signs of a faulty load cell. Simulate a load by applying light pressure on each cell, positive and negative. If each cell is clear of obstructions and you get a response from each one, proceed with the calibration.

1. Get a known weight of product. For example, a load of fertilizer from a co-op with a scale ticket.
  - a. Make sure the load can fit into the tank, 4,000 - 5,000 lbs. for a large tank and 3,000 lbs. for the center bin on a triple bin configuration.
2. Navigate to the **Scale Setup** screen.
  - a. From the home screen, Select the gears icon.
  - b. Select the **Systems Settings** tab.
  - c. Select the **Scale Setup** box.



3. Select which scale you need to calibrate on the top of the screen.



4. Select **Scale Calibration** box.



# 7 TROUBLESHOOTING

5. Make sure there is not any product in the tank, then zero out the scale by selecting the **Zero** box.
6. Load the product into the tank that is being calibrated.

**NOTE:** While loading, the number in the *Differential Voltage* box will change.

**Scale Calibration**

1. To modify the zero point, remove all weight from the scale, and press the Zero button.  
2. To modify the scale calibration, enter the Actual and Scale weights, then press the Calibrate button.

Current Scale Weight (Lb) **2**

Current Voltage Differential (mV) **0.28**

\* Actual \* Prev.

Calibration Weight (Lb) **0** **0**

**Zero** **Calibrate** **Clear Calibration**

**RAVEN**

7. Once loaded, in the box labeled **Actual**, enter the amount listed on the scale ticket.
8. Then enter the amount shown in the **Current Scale Weight** box into the box labeled **Prev.**

**Scale Calibration**

1. To modify the zero point, remove all weight from the scale, and press the Zero button.  
2. To modify the scale calibration, enter the Actual and Scale weights, then press the Calibrate button.

Current Scale Weight (Lb) **7521**

Current Voltage Differential (mV) **0.58**

\* Actual \* Prev.

Calibration Weight (Lb) **8000** **7521**

**Zero** **Calibrate** **Clear Calibration**

**RAVEN**

*Weight from scale ticket* → (points to Actual box)

*Current scale reading* → (points to Prev. box)

9. Once both boxes have been populated, select the **Calibrate** icon on the bottom of the screen.

**Zero** **Calibrate** **Clear Calibration**

**RAVEN**

10. Check the **Scale Weight** to ensure it is reading the correct amount, then select the checkmark to complete the calibration.