SIMPAS™

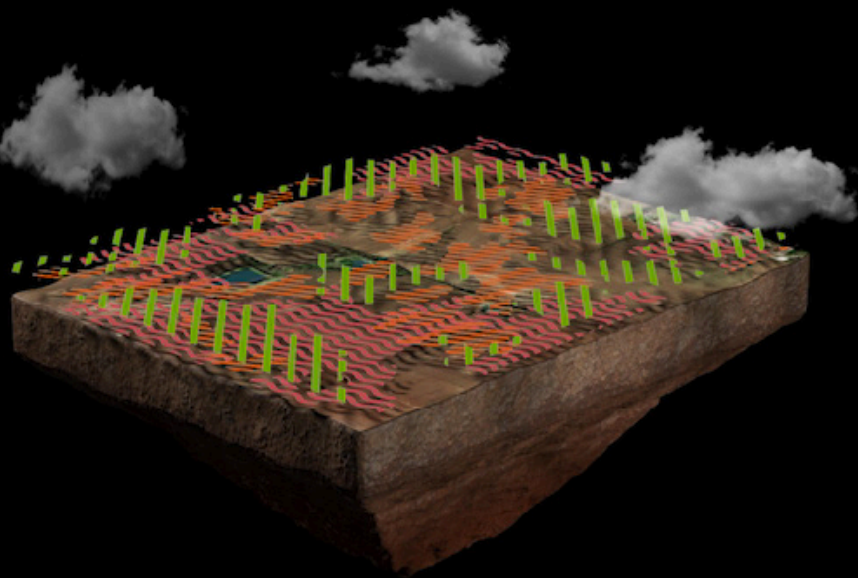## User Guide

This product use guide highlights the key features of the SIMPAS system.

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Introduction

Smart Integrated Multi-Product Prescription Application System

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Nematicide

Micronutrient

Fungicide

SIMPAS™ stands for Smart Integrated Multi-Product Prescription Application System. It is a multi-product variable rate system that is controlled by an ISO-based display to automate and variably apply multiple inputs across a field. SIMPAS equipment has been designed to be easily installed on most major commercial row crop planters, across all brands.

Based on prescriptions developed by trusted advisors, the SIMPAS software controls the application of each SIMPAS-applied Solutions™ (SaS) through a patented system to apply only what's prescribed, precisely where it is needed. These SaS product categories can include nematicides, fungicides, micronutrients, insecticides, plant/soil health products, inoculants, or other products that can be prescriptively applied at planting. SaS products can be applied in either a granular or ready-to-use liquid formulation.

SIMPAS-applied Solutions are delivered in a manner that is similar to an inkjet printer applying ink from multiple color cartridges.

SIMPAS technology makes it easy to prescriptively apply multiple, in-furrow dry, and/or liquid SaS while planting.

Closed System Approach

The SIMPAS system allows operators to address spatially-distinct, yield-limiting challenges at planting in a resource-efficient manner that reduces the overall chemical load and minimizes worker exposure due to the closed delivery system.

The system enables SIMPAS-applied Solutions (SaS) to be applied through SmartCartridge™ Containers (cartridges) that have safeguards to ensure cartridges cannot be removed when the product valve is open and eliminates the need for operators to handle contents of cartridges thus minimizing worker exposure.

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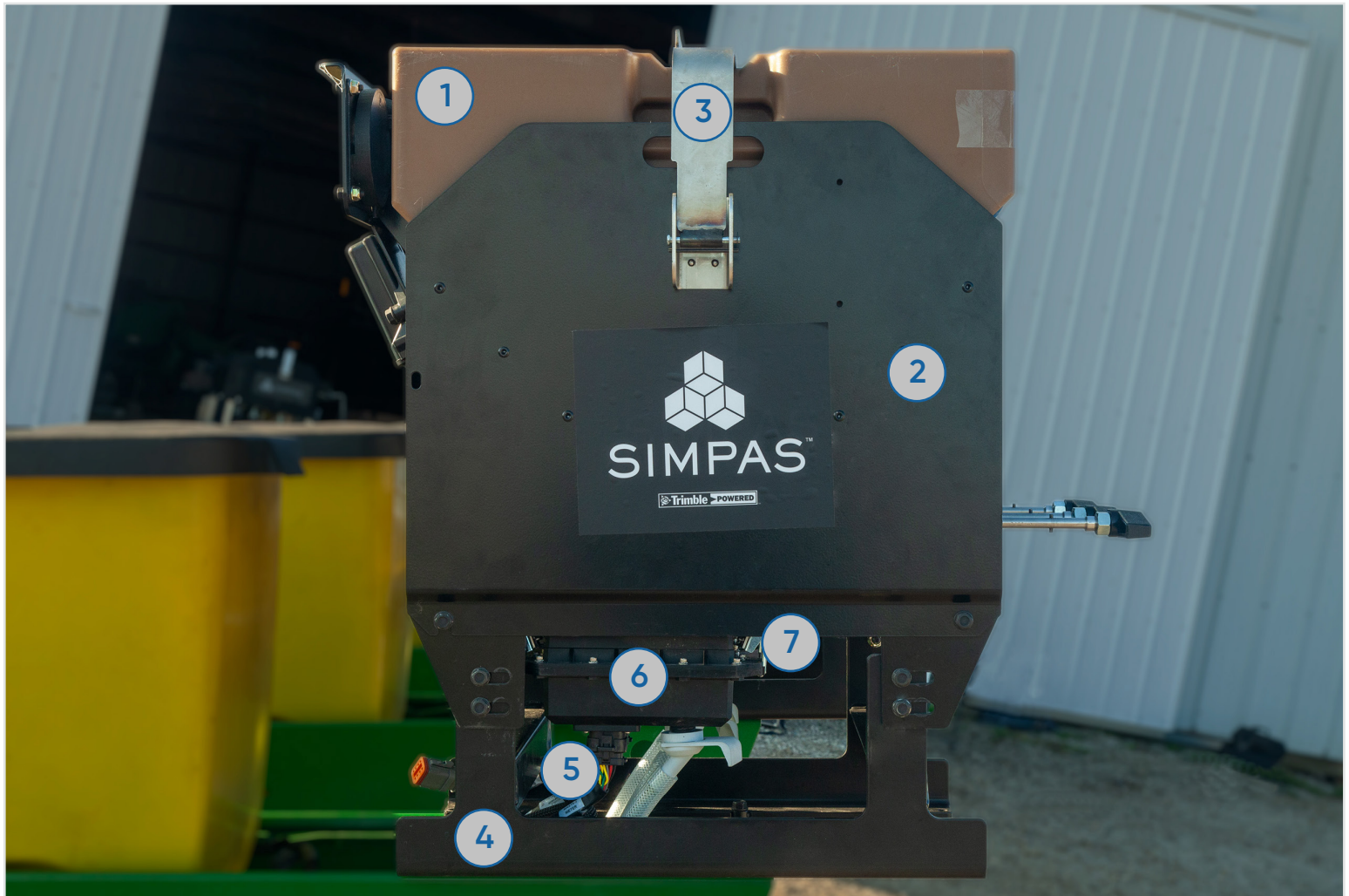
1 SmartCartridge™ Container

This holds SIMPAS-applied Solution. SaS products can be applied in a granular container, pictured here.

2 Partition Assembly

Attaches the SIMPAS unit to a planter's row unit.
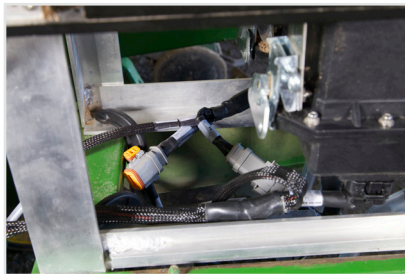
3 **Container Securing Lock**

This device holds down each container to ensure a tight connection with the valves.

4 **Planter Bracket**

This planter-specific component attaches the partition assembly to the existing planter's row unit.
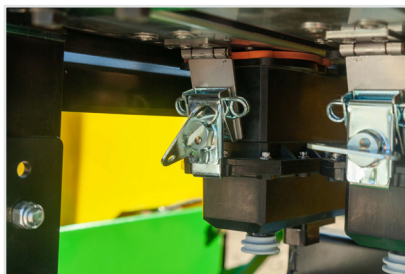

5 **Meter Wiring Harness**

This is the electrical communication connection from the electronic control unit to the meter.

6 **Granular Meter**

Located on the underside of the unit, the granular meter contains the electronics, patented inclined brush auger meter, and motor that collectively control dispensing of the product.

7 **Quick Latches**

These connect the granular meters to the SIMPAS™ partition assembly and allow for easy removal of the granular meter for inspection and/or replacement.

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1 Liquid Metering Slot

This is the location for bracketry to mount liquid metering devices at the front of each slot.

2 Valve Handle

This opens and closes the valve ensuring containers cannot be removed when the valve is open. It also closes the valve in order to remove or replace the cartridges. In the image above, the valve handle on the right is "open" and ready for application while the two handles on the left are "closed" and ready for the cartridge to be replaced.

Closed Valve

Open Valve
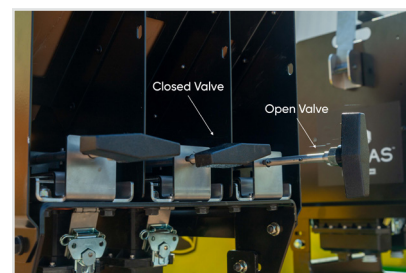
3 RFID Reader/Writer

The RFID Reader/Writer is mounted to read and write information (e.g., number of acres applied to ensure operators only pay for acres treated) on the container's RFID-based SmartTag. The RFID Reader/Writer will ensure that the correct cartridge is loaded into the correct channel and will communicate errors to the operator.

4 Granular Product Valve Connection

This connection is between the valve on the cartridge and the valve on the partition assembly to enable product flow into the granular meter.
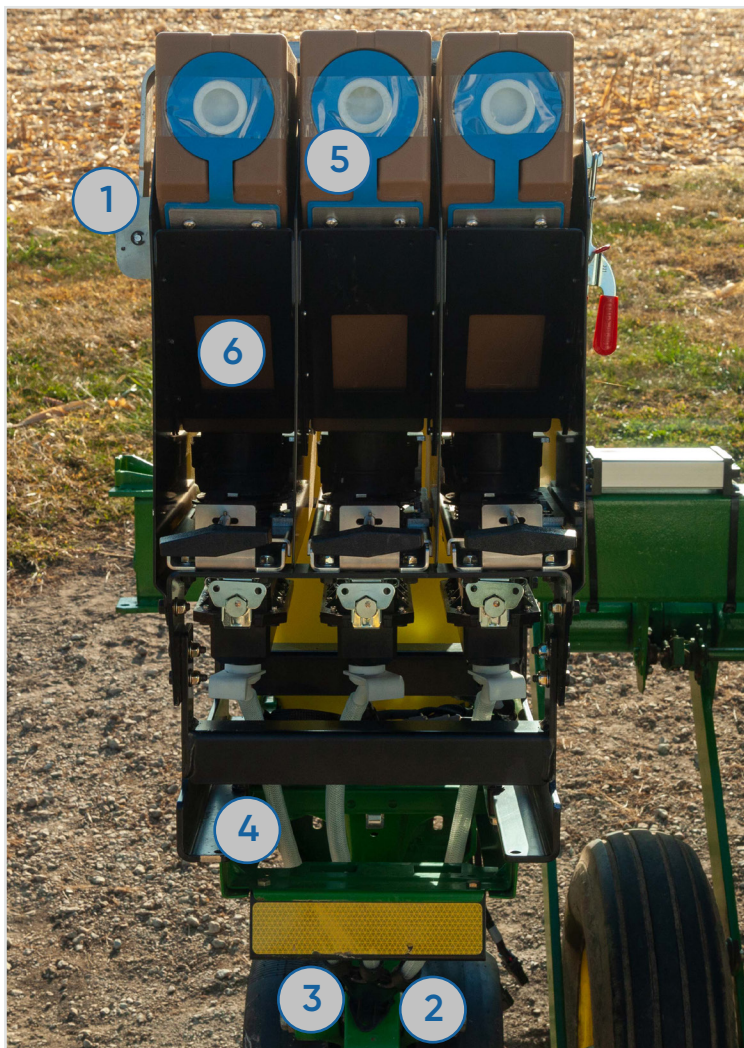

5 RFID Antenna

One antenna per channel will read/write to each individual RFID-based SmartTag and communicate with the RFID Reader/Writer.

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3 Manifold

The manifold combines three granular product tubes into one flexible hose for dispensing product in the furrow. The manifold keeps granular products separated from liquid products when delivered into the furrow. *Note: Make sure the correct hose is used in the correct place, as the outlet tube is a larger diameter than the inlet tubes.*

4 Product Tube with Discharge Elbow

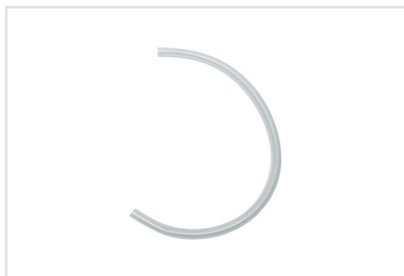These move product from the meter to the manifold.

1 Container Securing Lock

This device keeps all the cartridges tightly connected to ensure proper valve connections.

2 Outlet Tube

Product travels out of the manifold into the product tube into the furrow. The product tube stays close to the furrow to ensure accurate placement of granular products. To install the outlet tube, remove all bends so the tube is secured as vertical as possible. Ensure the tube does not get caught or pinched in any moving parts.

5 SmartCartridge™ Container

This holds the SIMPAS™-applied Solutions.

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6 Channels 1, 2, and 3

Areas on the partition assembly that receive the cartridges are labeled 1, 2, 3 from left to right while standing behind the unit.

1   2   3
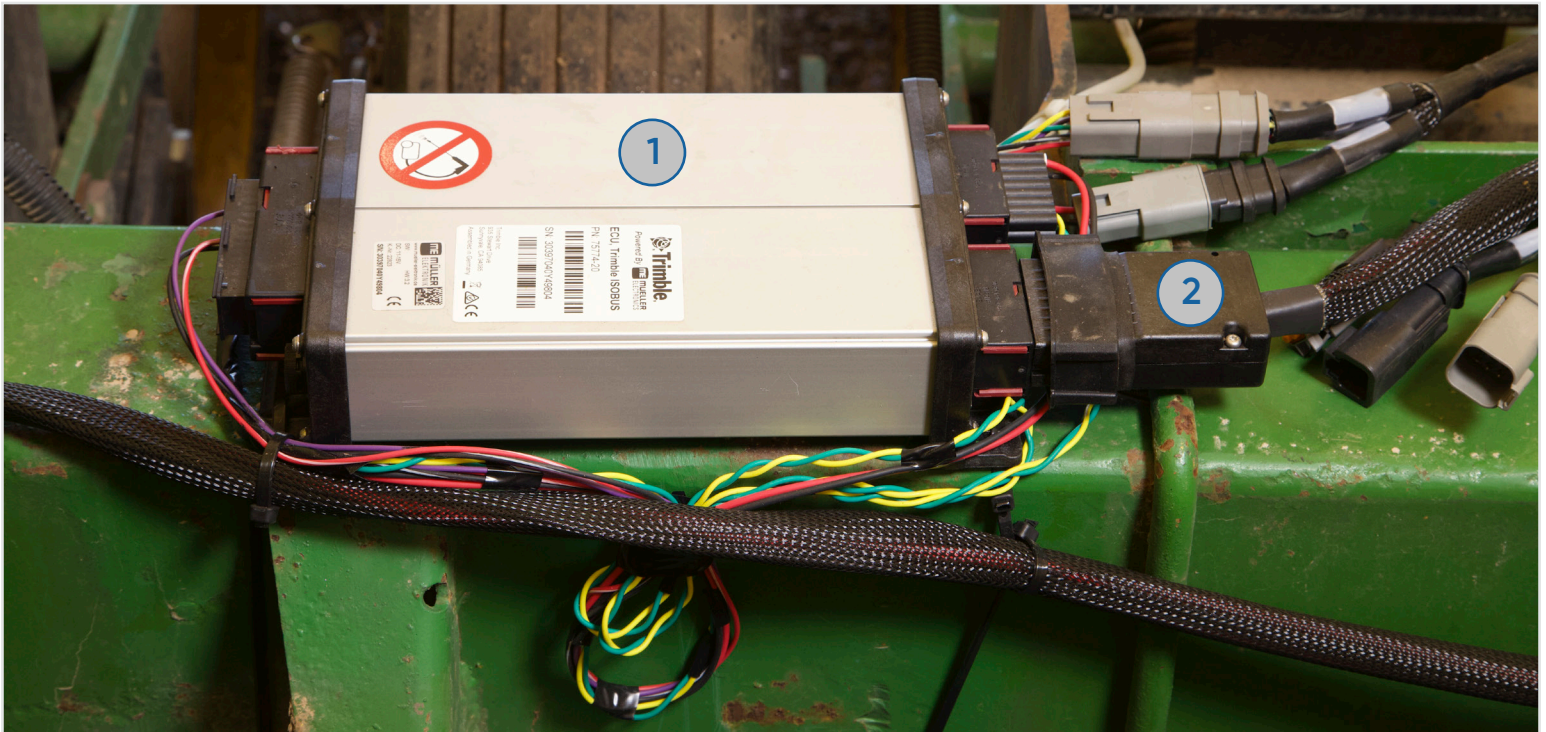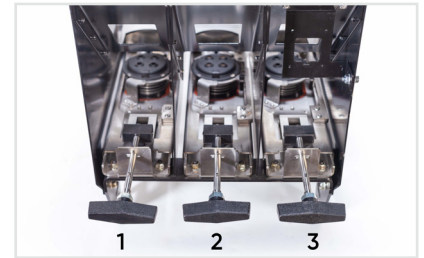
1 Electronic Control Unit (ECU)

Manages communications and data/information transfer between meters and display.

2 ISObus Connection

This connects the ECU to the tractor.

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Granular Metering Unit Components and Function

1 Meter Gasket and Square Gasket
These two gaskets seal the meter to the base of the partition assembly.

2 Product Hopper
Product moves through the product hopper into the metering unit.

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3 **Harness Connection**

This connects the wiring harness to the metering unit.

4 **Product Tube Coupler**

This connects the metering unit to the product tube.

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Slide Tube Assembly

The slide tube assembly is used in conjunction with SIMPAS™ and SmartBox™+ ladder brackets. The assembly allows connection to the granular meter down to the furrow, allowing for additional height between the two when the ladder bracket is used.

1 Hose clamps – qty 4		**4** Slide tube – inner slider (white plastic)	
2 Large diameter product tubing		**5** Slide tube – outer slider (dark colored plastic)	
3 Small diameter product tubing		**6** Retention spring	

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SmartCartridge™ Container Components and Functions

1 Dispensing Valve With Cap

Product is dispensed through this valve and flows into the granular meter.

2 Fill Port With Weather Cap

The cartridge is filled by the SmartFill System through the Fill Port with Weather Cap. The tamper-evident seal is affixed after the cartridge is full. Never attempt to remove the weather cap. Never break the tamper-evident tape. Contact the SIMPAS™-applied Solutions retail agent where cartridges were purchased if any cartridges have the tamper-evident tape broken prior to use.

3 Label Side

The product label is affixed to the recessed side. Label booklets will be affixed after the product labels have been approved for use by appropriate regulatory authorities. The image above is not representative of a SmartCartridge label.

4 Handle

Always carry the cartridge by the handle.

1 DOT Side

This side of the cartridge has a protruded side. This allows the cartridge to be stacked appropriately on the pallet. Labels are affixed to represent the DOT/UN certification of the cartridges and any additional details regarding the chemical properties of the products.

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RFID-based SmartTag

An RFID-based SmartTag is used to identify and track information about the cartridge. SmartTags ensure the cartridge is loaded into the correct channel and keeps real-time information on product usage to enable operators to receive a credit for the acres treated upon return to the SaS retail agent.

SIMPAS™+ Dos

When working with the SIMPAS system, there are a few key practices to remember:

1 Ensure the cartridge valves are fully seated when installed so they are correctly aligned on the base valve.

2 Inspect wiring harnesses to ensure full connection to provide proper electrical communication.

3 Check system components relative to other agronomic delivery mechanisms on the planter, being aware of other inputs being applied to ensure correct mechanical and agronomic operation.

4 Minimize exposure of cartridges to moisture to ensure granular products are not adversely affected.

5 Prior to opening the valve handle, ensure the Container Securing Lock is closed and secured to ensure a tight valve connection.

6 Always ensure the valve handle is in the closed position when switching the cartridge or removing a meter for any reason (e.g., troubleshooting, replacement, etc.).

Always wear Personal Protective Equipment (PPE) when changing containers or troubleshooting system components based on the label requirements for each of the SaS being used.
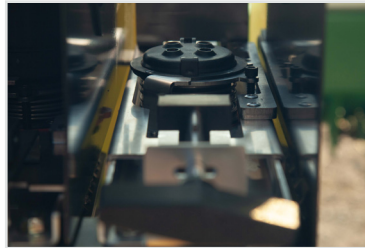
Check to ensure the base valves are properly oriented prior to the placement of the cartridge.

Inspect bolts and fasteners every season to ensure that the bracket and partition assembly are secured to the planter row unit.

Ensure wiring harnesses are secure and not in a place where it will pinch or rub.

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SIMPAS™+ Don'ts

When working with the SIMPAS system, remember to avoid the following practices:

1   Do not store cartridges outside prior to planting.

2   Do not operate the system without securing the container securing lock and ensuring each appropriate valve handle is open to enable product flow.

3   Do not lift the cartridge by the valve. Always pick up the cartridge using the handle.

4   Do not install cartridges with misaligned valves.

5   Do not wash any system components with pressurized water. Take every precaution to not expose water to the inside of a meter.

6   Do not remove the meter without appropriate PPE.

Safety

Even with a closed delivery system, always wear Personal Protective Equipment (PPE) when changing containers or troubleshooting system components based on the label requirements for each of the SaS being used.

Safety Precautions

Persons using a SIMPAS™ system to apply granular insecticides are responsible for obtaining, reading, and following all safety recommendations as stated on the manufacturer's SIMPAS-applied Solution product label. Read and follow all use directions and precautions specified on the product label(s), including but not limited to, the following sections:

→ Emergency Response Telephone Numbers

→ Personal Protective Equipment (PPE)

→ User Safety Requirements

→ User Safety Recommendations

→ Environmental Hazards

→ Directions for Use

→ Agricultural Use Requirements

→ Storage and Disposal

Warranty

→ AMVAC warrants that all components of the SIMPAS system shall be free from defects in materials and workmanship for a period of one year after the date of purchase.

→ This warranty only applies if the product is installed by a trained Trimble Dealer.

→ The warranty is applied if the SIMPAS system is correctly installed, configured, maintained, and stored as defined in the SIMPAS User Guide.

→ The warranty will not apply to any aspect of the supplied SIMPAS equipment if any portion of the equipment has been modified or misused.

→ Software for operation of the SIMPAS system shall not be charged or modified. All software associated with the SIMPAS system is subject to all Warranty, Exclusions and Disclaimers from published Trimble Software terms.

→ AMVAC is not responsible for damage caused by accident, lightning or electrical discharges, immersion in water, use of pressurized water, or normal wear and tear.

→ AMVAC is not liable for any damages including, bur not limited to, cost of yield lost or replanting as a result of off-label applications of an approved SIMPAS product.

→ These terms and conditions represent the complete agreement between the manufacturer and purchaser, and not collateral, oral, or other agreements are the responsibility of AMVAC.

Getting to Know the User Interface

Universal Terminal and Task Controller

SIMPAS™ Controls

The SIMPAS software to operate the system has been developed utilizing ISO-based standards to enable ISO-based displays with appropriate capabilities to control the system. The Trimble GFX-750 is the recommended display for use with the SIMPAS system and the balance of the training materials will be based off of the GFX-750 and Trimble Precision IQ platform. Different displays will have slightly different configurations.

Task Controller (TC)

The task controller (TC) communicates prescription data with the Electronic Control Unit (ECU).
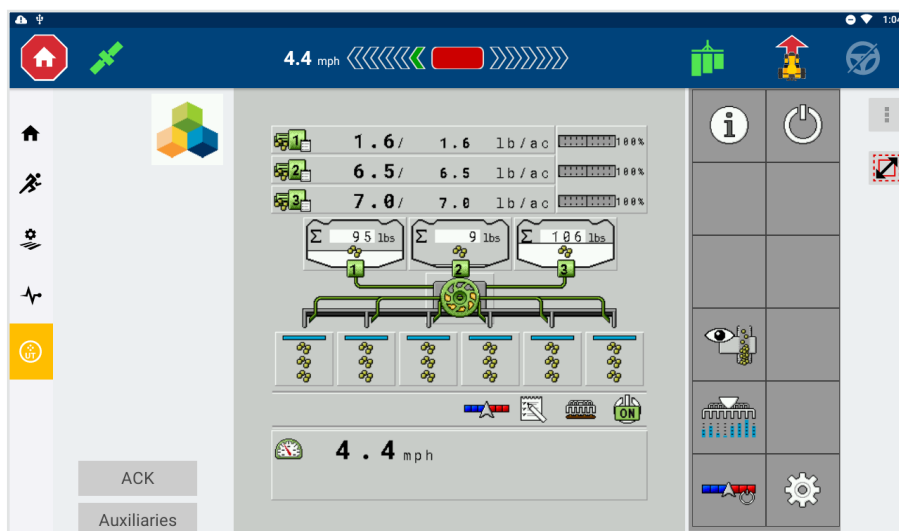
Example display image from Trimble GFX-750.
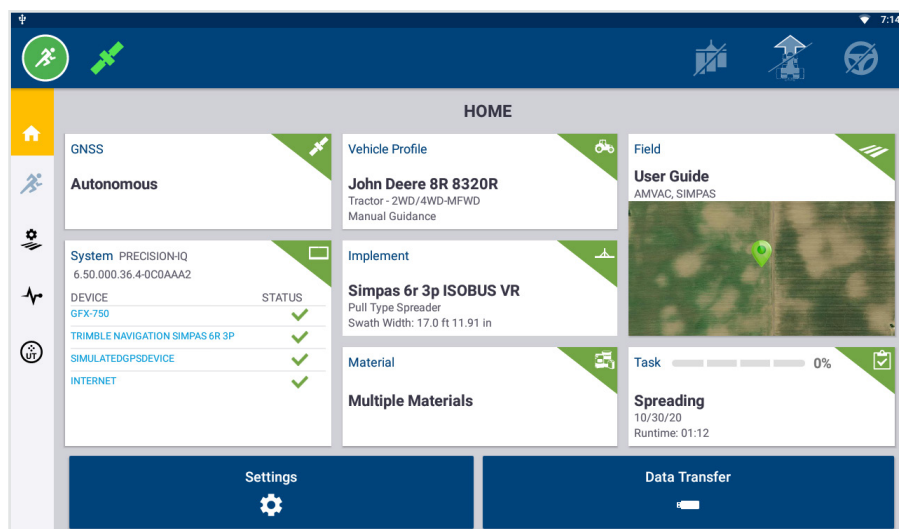
Universal Terminal (UT)

The universal terminal (UT) is the user interface from your ISO-based display provider. This is the SIMPAS user interface which was built by Trimble. Here is the run screen in the Trimble UT.
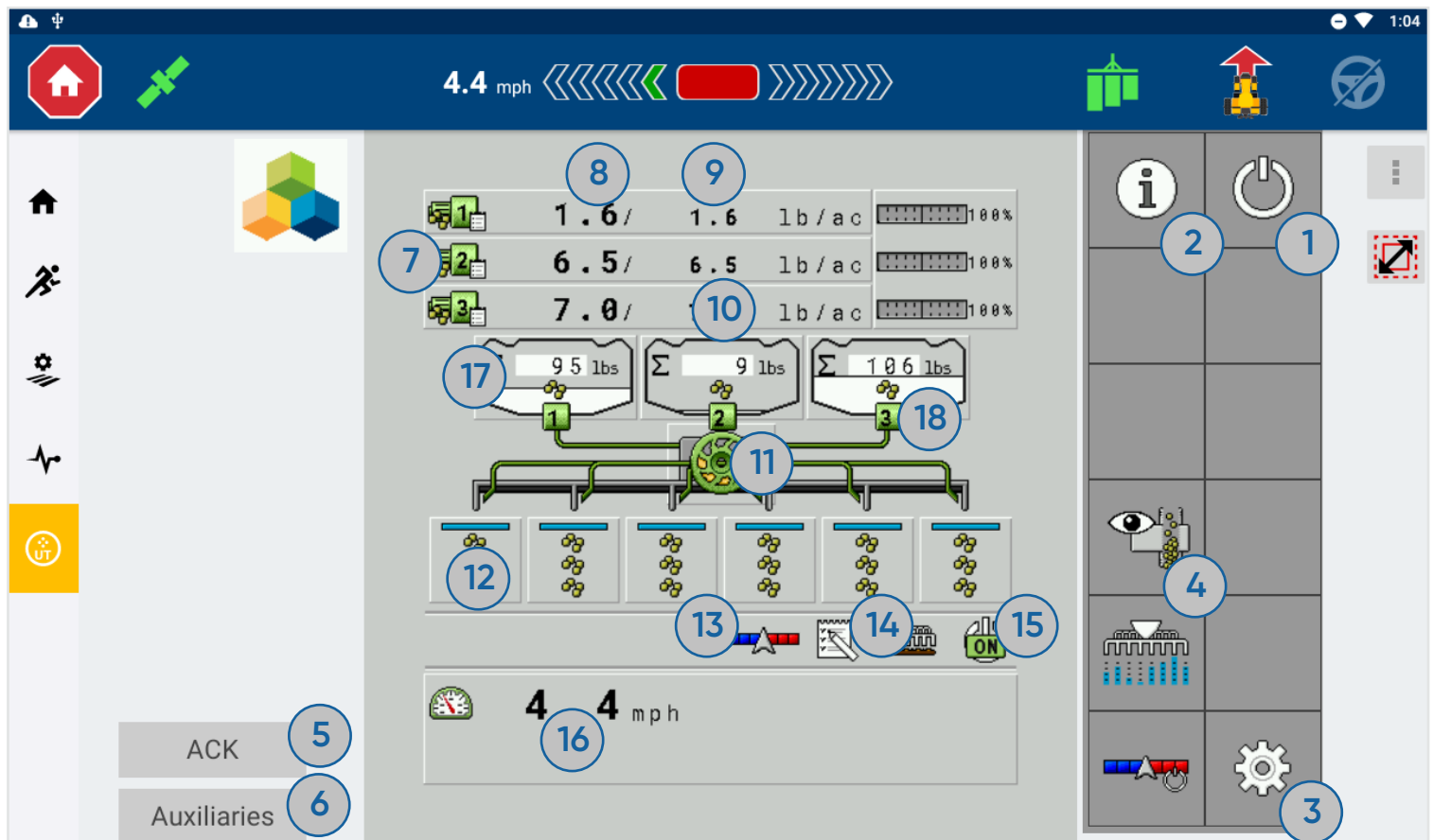
Example display image from Trimble GFX-750.

Navigating the Universal Terminal (UT)

There are three main screens the user will work with on the ISOBUS Universal Terminal: **Run Screen**, **Settings Screen**, and the **Diagnostics Screen**.
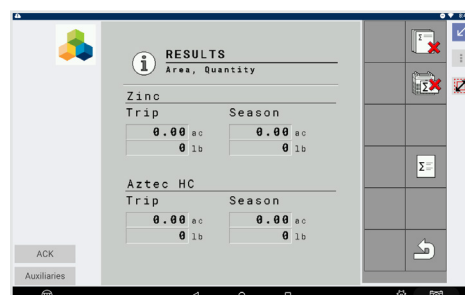
Run Screen

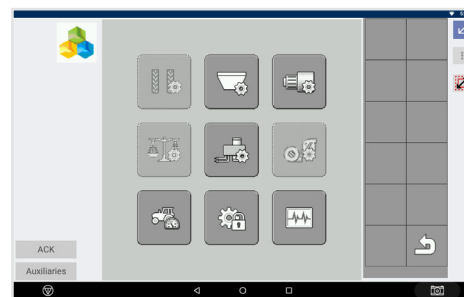## Run Screen: Section Control View

1 **SIMPAS™ Master Control**
This button is the master control for turning application of the SIMPAS system on or off within the display.

2 **Trip Counter**
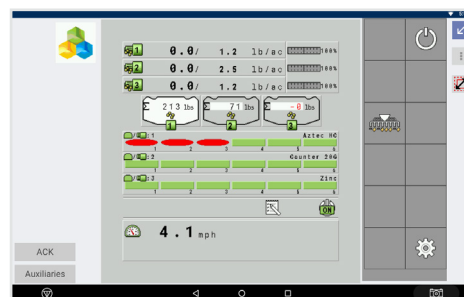This summarizes the area covered and the weight of product applied.

3 Settings Button

The main system settings can be accessed here.

4 Row Blockage View

Selecting this button changes the section control view to the row blockage view.


5 Acknowledge Warnings

The operator can acknowledge the alarms by pressing the "ACK" button on the home screen when alarms appear. Priority 1 alarms signify there is a risk of operator injury, these alarms must be acknowledged before operation can continue.

6 Auxiliaries

Working with an authorized Trimble dealer, the "Auxiliaries" button is used to set up an external switch box.

7 Product Bars

Make sure the chosen prescription is active. The Task Controller icon will display at the bottom right of the Product Bar icon, and a notepad graphic will show up next to the Product Bar icon when a prescription is loaded and activated properly. The three bars are touchable buttons, which allow the operator to enable and disable the prescription. To enable the prescription, touch the Product Bar icon and then touch the notepad icon at the bottom left of the grid of buttons on the right-hand side of the screen.
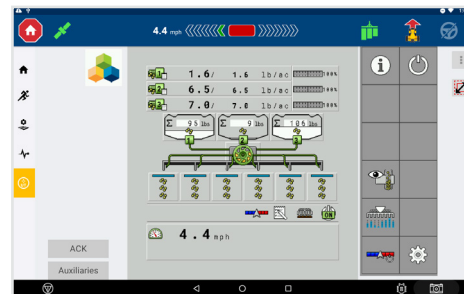
8 As Applied Rate

The numbers on the left indicate the rate currently being applied.

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9   Target Rate

The numbers on the right identify the target rate by product.

10   Hopper Illustrations

This hopper illustration allows the user to see the specified product and change the target rate. However, if Task Control is being used to control target rate, this screen will not allow you to edit target rate.
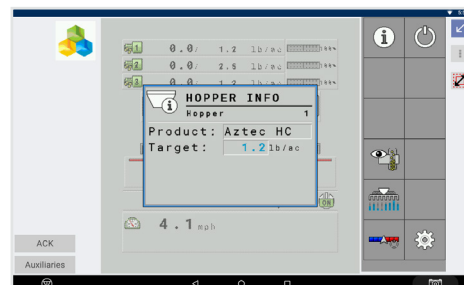
11   Prime the System

Prime the system to make sure all the meter hoppers are full and confirm that the system is set to apply the correct rate from the beginning. The operator can be stationary, and with the master switch in the "on" position you can press this button, which causes the meters to run for a set period. The time period can be configured in the settings.

12   Partition Assembly Illustrations

These boxes represent each partition assembly. Up to 12 rows, each partition assembly will have its own box. After that, rows will be grouped:

→ Blue = On and applying
→ Red = On but commanded off
→ Black = Master off
→ Grey = Forced off by operator either by physical switch on aux-N device or by touching the section on screen

13   Automatic Section Control

This indicates that section control is on.

14   Task Controller Indicator

This indicates communication with the task controller is occurring.

15   System Status

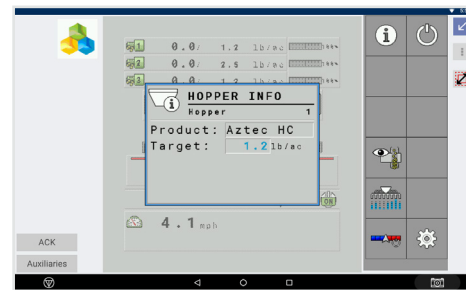This icon signifies whether the master switch is on or off.

16   Speed

The current speed is displayed by this speed meter. If a simulated speed is set, text will appear here that says "SIM."

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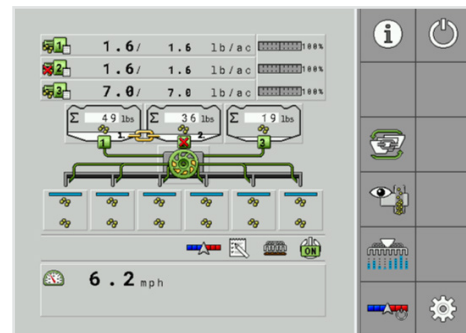
17 Hopper Illustrations

This hopper illustration allows the operator to see the specified product.
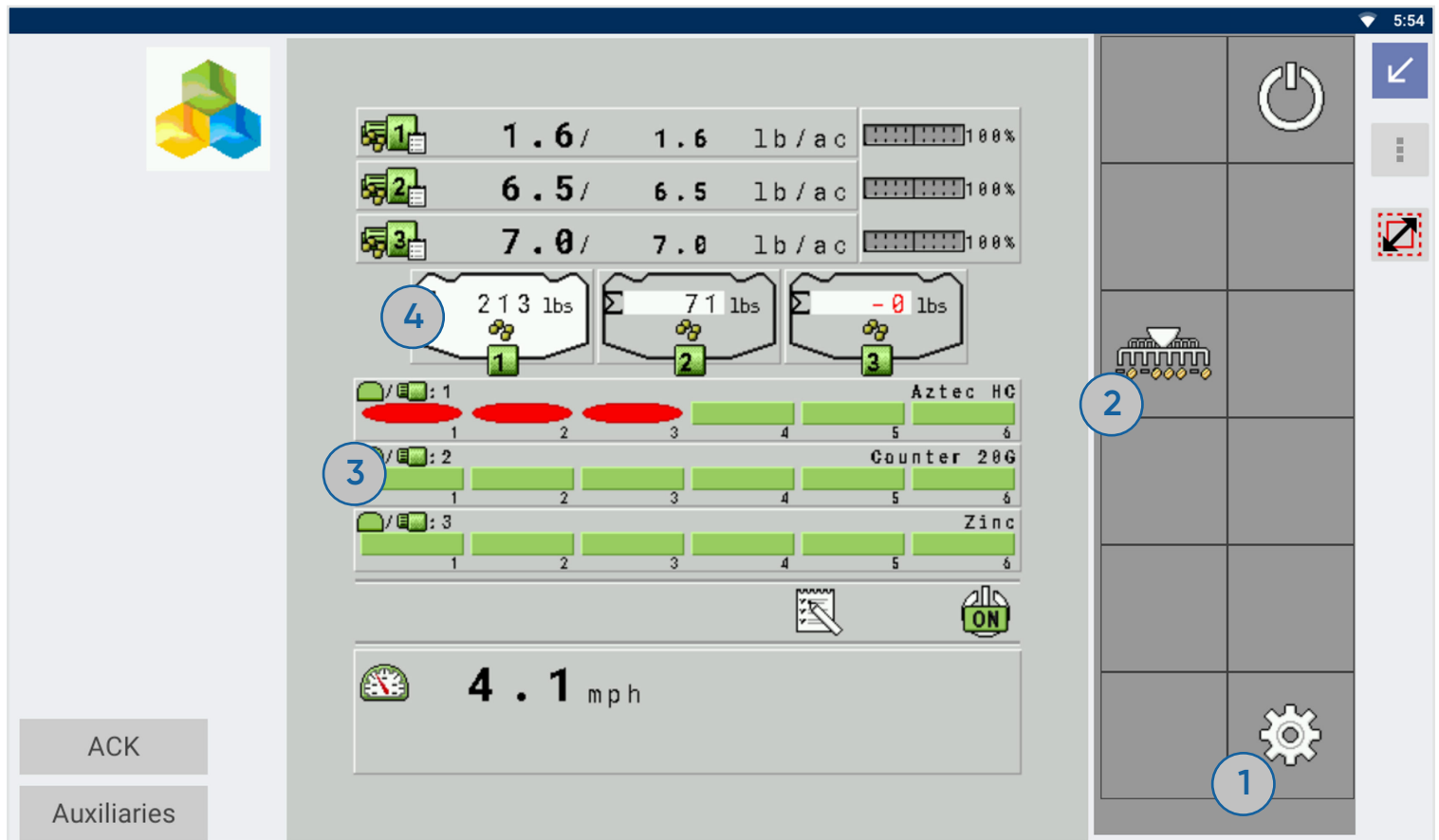

18 Bin Chaining

Bin chaining is used to "link" two channels of the same product, allowing the operator to use product from the first channel and simply switching to the second channel without having to replace SmartCartridges on the planter. Bin chaining is when operator is using two of the same products across two channels.
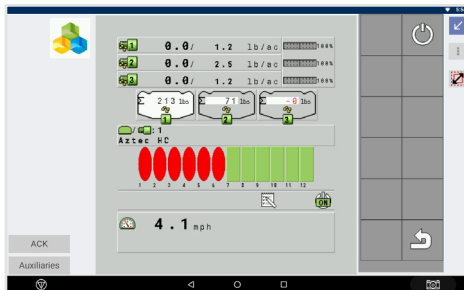
Run Screen: Row Blockage View
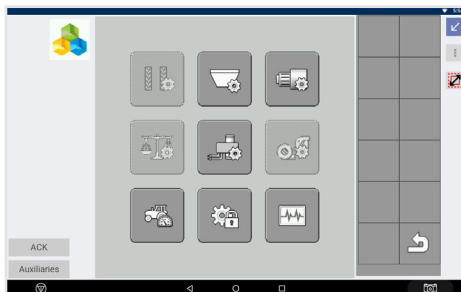
1 System Settings

This opens the Settings Screen.

2 Section Control View

This icon toggles the view back to section control.

3 Meter Illustrations

Each of these green bars represents the current blockage state of each meter. Green means it is functioning correctly. If a row is red, it indicates there is a blockage or no flow. Click on each product bar to see the details for one product at a time.
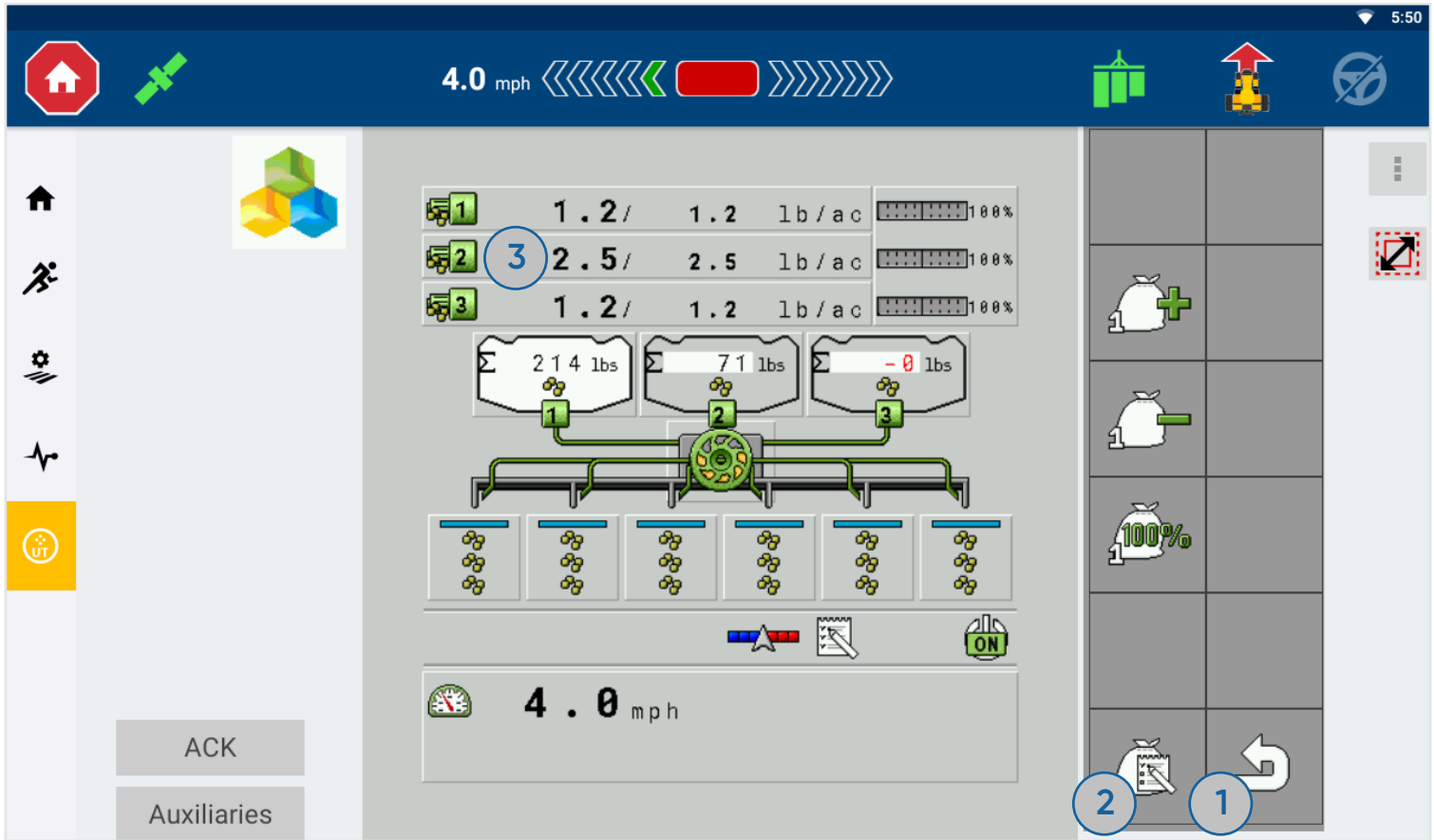

4 As Applied Rate View

The as-applied rate view shows the current rate being applied for all rows on the planter. The black horizontal line on the bar graph represents the current target rate for that row. The blue bar graph illustrates the current rate.

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Run Screen: Task Control Prescriptive Rates

1. Back Button

This returns you to the previous screen.

2. Task Control Rate

Selecting this button toggles from the set target rate in the UT to the set rate communicated from the task controller. Only active if getting a prescription rate from TC.

3. Product Bars

The Product Bars are touchable buttons. When one button is selected, the operator can adjust the target rate for that meter. The product that is selected is denoted by the numbers on the buttons on the right-hand side. A notepad graphic next to a Product Bar icon signifies that a prescription is active. To control each channel individually, press the three bars. To control all three channels at once, press the big square button to the right.

Settings Screen: Entire Panel

1

Back Button
Returns the operator to the previous screen.

2

### Hopper Settings
The Hopper Settings Screen displays the product weight across all channels. The buttons on the right will turn each product on or off – for example, when off, the product will not be applied. The Hopper buttons can be selected to view/edit sub-hopper parameters.
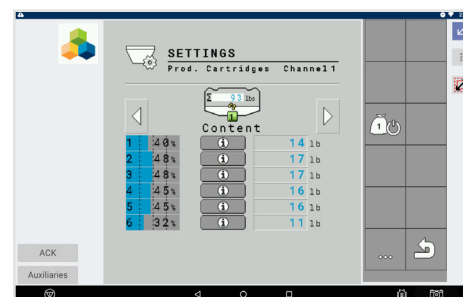
3 Metering Unit Settings

The metering unit settings screen can be used to set the target rate for all three products, set the target rate increment and also begin the calibration process for each product. Start the calibration process by clicking the icon on the right (highlighted in the red box).
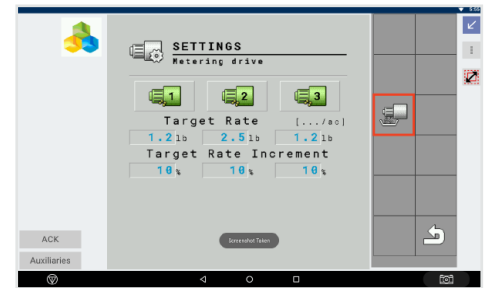
4 Blockage Settings

Note: There is a blockage settings page for each product, the operator uses the three button softkey at the bottom of the screen to scroll between products.

Disable sensors: This button allows you to disable just a few sensors in the system (for example you might have one sensor on row three that is failing, but you need to get planting finished so you just want to carry on anyway). The options are:

→ No (none disabled)
→ Odd (sensors on odd numbered rows are disabled)
→ Even (sensors on even numbered rows are disabled)
→ Custom (user chooses rows to disable)

Use the custom option if you need to disable something. These three products are applied to all rows for the selected product:

→ Sensor delay time: This is how long the sensor is in a blocked/open state before the alarm triggers.
→ Lower threshold: This is the percentage of blockage the sensor is seeing for the "is there flow?" alarm. Below this threshold the "no flow" warning will show.
→ Upper threshold: This is the percentage of blockage the sensor is seeing for the "product blocked" alarm. Above this threshold the product on that row is considered to be blocked.
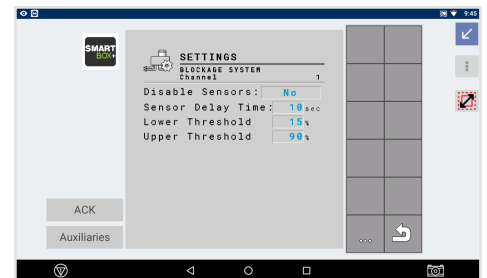
5 Speed Settings

You can select which speed source the system displays. Normally, you will select GPS. The simulated speed can be changed to test the system. Click the blue text to enter a value. The wheel speed is based on the transmission output. The ground speed is based on radar pointing at the ground.

6 **Advanced Settings (Configuration)**

This panel allows you to access the advanced settings for the hopper, product, implement configuration, and the metering unit. Consult with an authorized Trimble dealer about specific changes in the Advanced Settings.
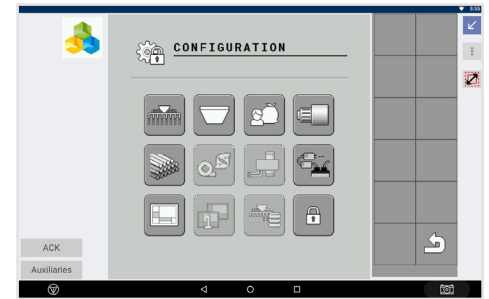
7 **Diagnostics**

This button accesses the Diagnostics Screen which houses many readouts of the current state along with targeted controls for specific actions (e.g., adjusting meter RPMs).
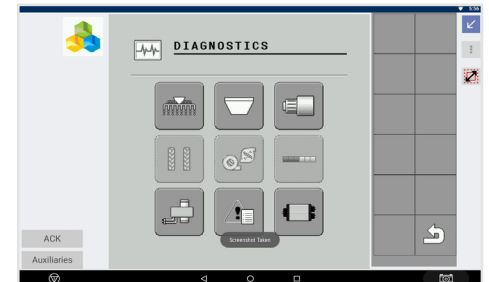
Configuration Screen

1

Back Button
Returns user to the previous screen.

② Implement Advanced Settings

This screen is used to set the machine name, the number of hoppers, the number of channels, and the number of metering units. Additionally, it is used to set the way in which the work position switch (lift switch) works (the switch Open is "on" or switch Closed is "off") and whether or not an external mas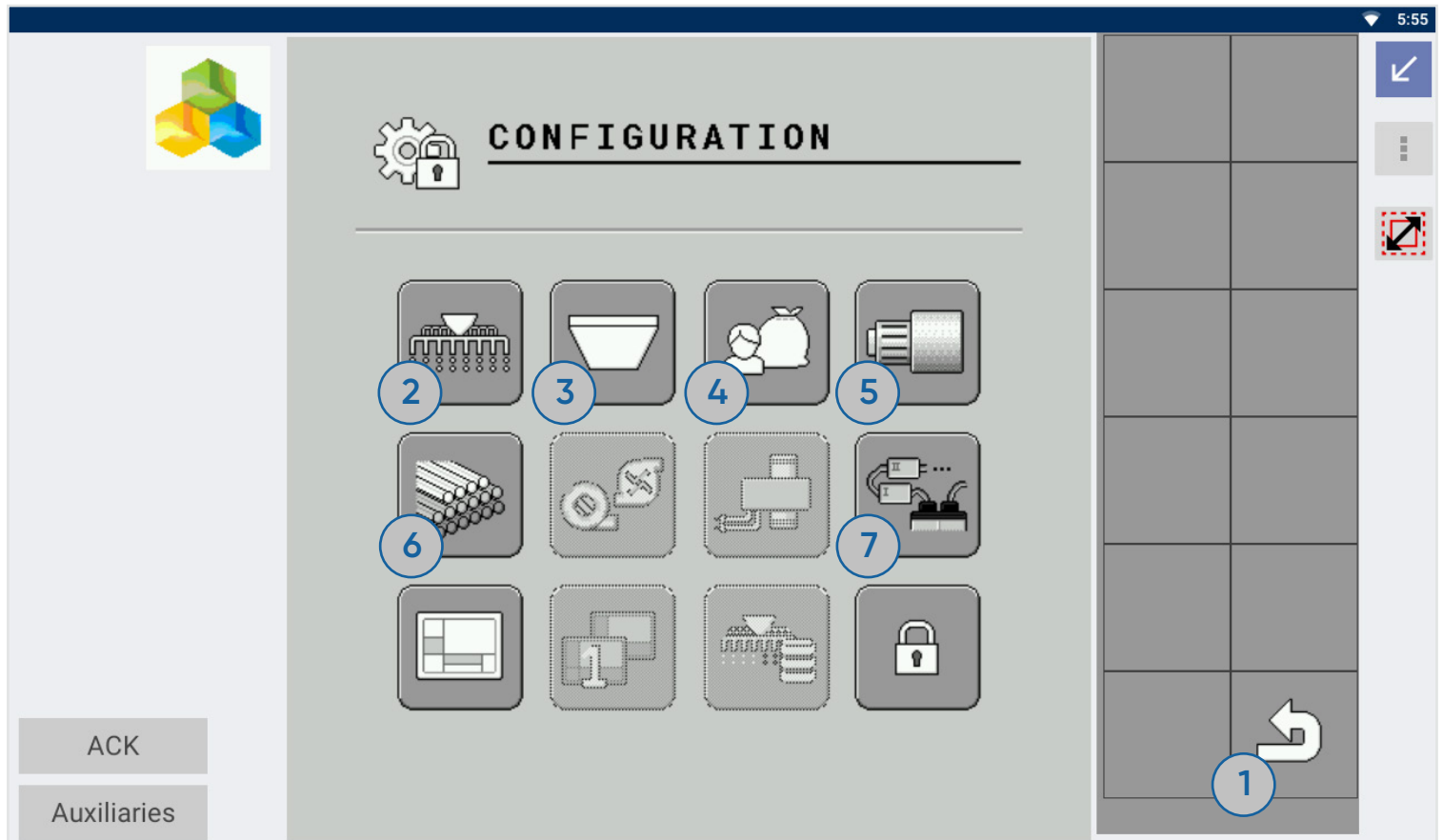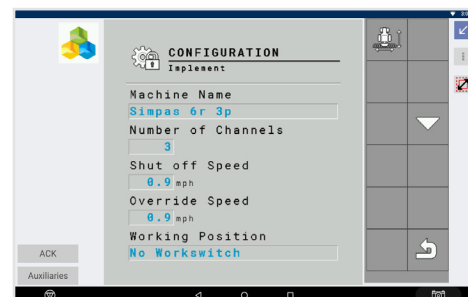ter switch is used. Additionally, hopper chaining is configured on this screen. This setting would be used if an operator is applying the same product across multiple cartridge channels either as a way of increasing the amount of product going down or not having to change out cartridges as often.

Work Position Switch

Use the Working Position option to configure the system to match your work position switch. Select from the following options:

→ 'No Workswitch' – if you are not using a work position switch
→ Workswitch OFF in work – if you have a work switch that is open when the planter is down and operating
→ Workswitch ON in work – if you have a work switch that is open when the planter is down and operating
→ ISOBUS tractor – (not used with the SIMPAS system)

Note: The John Deere work switch provided by AMVAC is the 'off in work' type.

Bin Chaining

Bin chaining is when the operator is using two of the same products across two channels.

There are two methods available for controlling bin chaining:

→ None – Bin chaining is not active.
→ Sequential – The sequential option allows the user to empty the first channel before switching to the second channel. With this setting, the second channel not in use does not apply any product. It is recommended to use this setting when applying products at low rates - for example, Aztec and 1.6 lbs/ac.
→ Parallel – The parallel option applies both linked channels at the same time, both at a reduced rate to meet the intended target. The parallel option will empty both channels at the same time. Use this option when applying higher rate products, or products at higher speeds - for example, Counter at 6.5 lbs/ac.

Once the bin chaining option has been set, you must visit the hopper settings screen to complete the setup. In the hopper settings screen:

→ When using sequential, set the 'linked bins:' Select the two channels that have been linked. For example, if linking channel 1 to channel 2, select channel 2 in the setting underneath channel 1.
→ When using parallel, set the 'linked bins:' Select the two channels that have been linked. For example, if linking channel 1 to channel 2, select channel 2 in the setting underneath channel 1. Once the link has been set, you must also set the how the target rate will be 'split' across the two channels. It is recommended to set this setting to 50% so that both channels will apply at the same rate and empty at the same time.
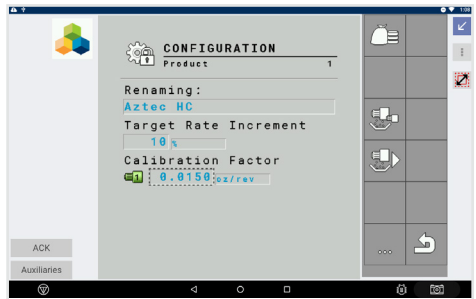
3 Hopper Advanced Settings

Use this screen to choose the product associated with the hopper and channel. The threshold for the low-level warning is also set here. It is recommended for the low-level threshold to be set at five pounds multiplied by the number of rows. The low-level warning and the max hopper settings are an aggregate of all rows. Each product needs to be configured by the three dot softkey.
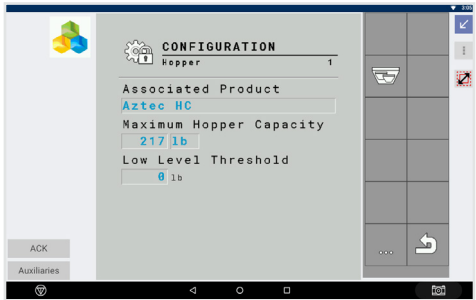
4 Product Advanced Settings

This screen lists the attributes of each product, but is non-configurable.

5 Metering Unit Advanced Settings

Use this screen during initial setup to define key implement parameters. The number of sub-meterings will match the number of rows in the planter. The calibration factor will automatically be set by the calibration procedures (more guidance is provided in that section). If calibration factors need to be adjusted, the user should consult an authorized Trimble dealer. Each meter needs to be configured by the three dot softkey.
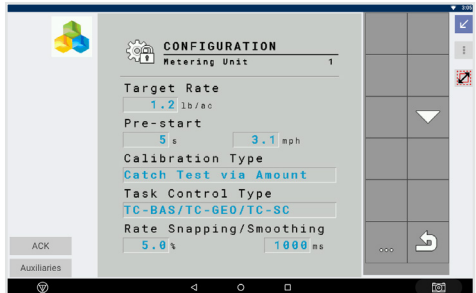
6 Channel Advanced Settings

Use this screen to set up each channel which will match the number of products. Set the number of sections, which will be the same as the number of rows, and the total working width of the planter. Use this screen to set up section control. Each channel needs to be configured using the three dot softkey.
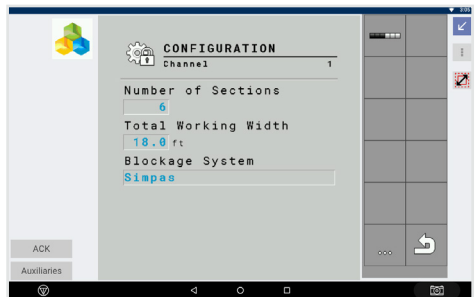
7 **Detected Modules**

Use this screen to confirm that the number of detected modules matches the number of meters connected to the planter. This screen is also used to force the system to readdress all modules connected to the bus. This is a troubleshooting function and can be used if a problem module was removed and a new one was added.
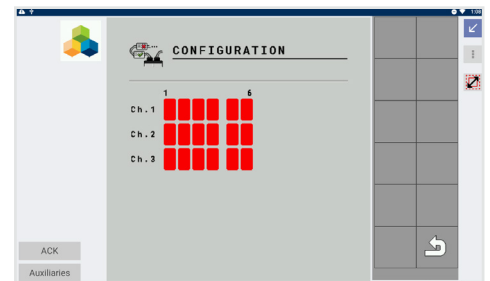
Missing Modules

The missing modules page provides a visual illustration of what modules are currently connected. This page shows a red or green square for every module on the planter. The green squares show modules that are communicating, and the red squares show modules that are not communicating.

Diagnostics Screen

Diagnostics Screen: Entire Panel

1 Back Button

This returns you to the previous screen.
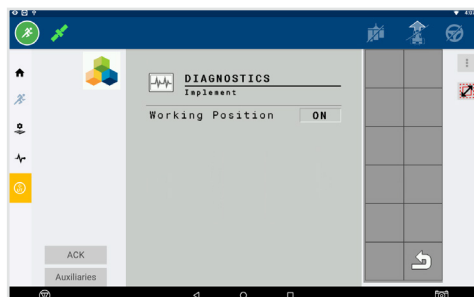
2 Work Position Switch (Lift Switch) Information

This tells you the state of the work position switch.
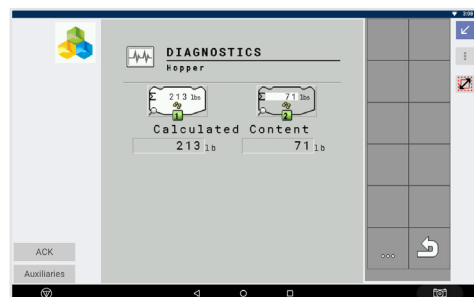
3 Hopper Information
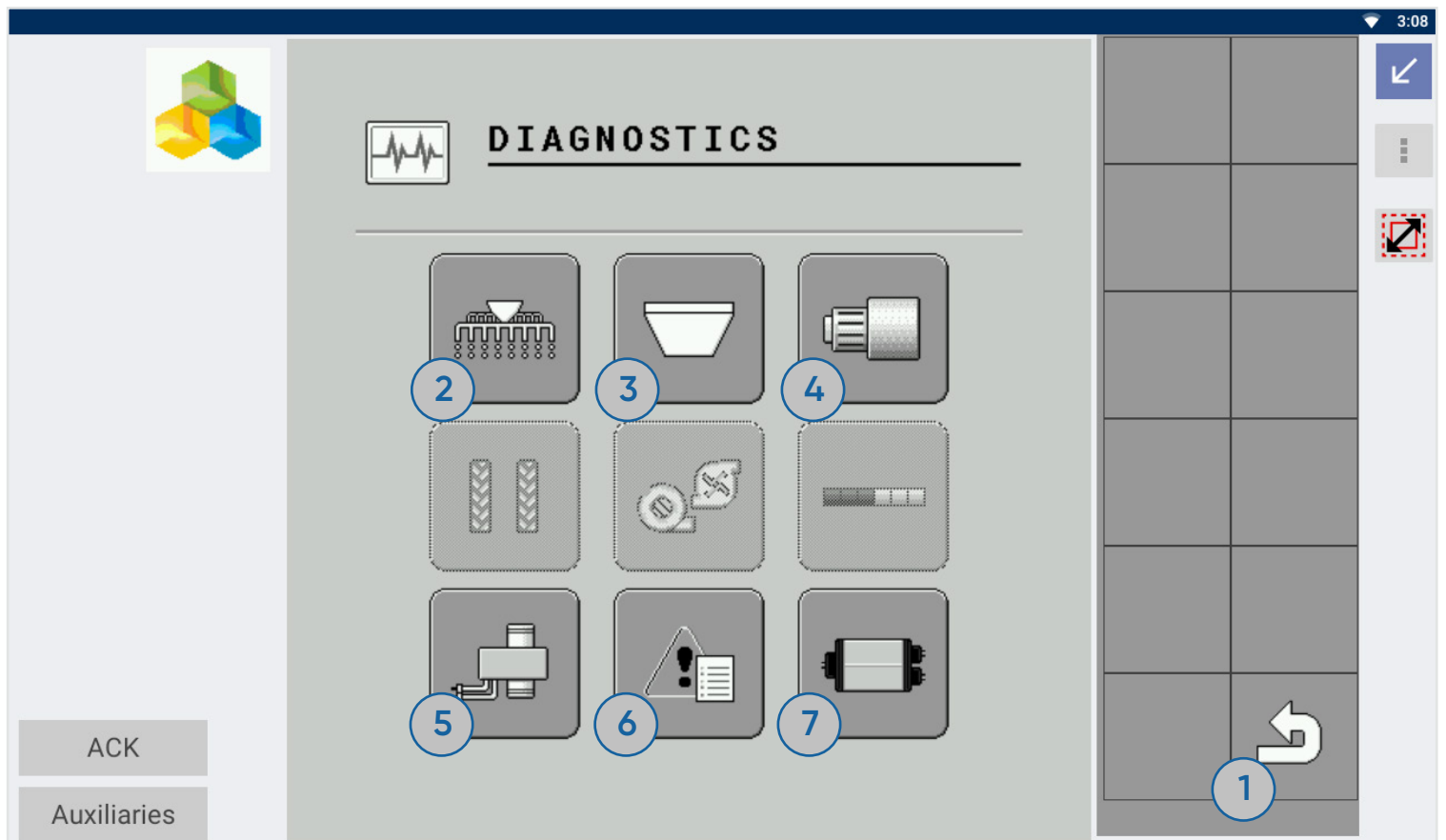
This tells you the current product amount in each hopper. Additionally, you can press the individual hopper buttons to bring up the current product amount for the sub-hoppers.
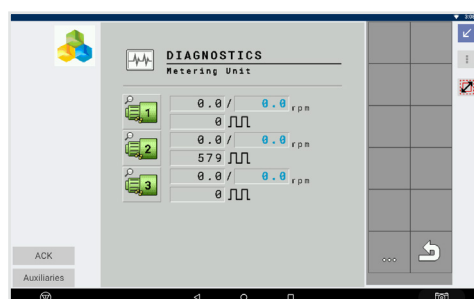
4 Metering Unit Information

This screen is used to monitor meter performance and RPM consistency between target and actual readings; to manually change the RPM of meters; and to prime the system, empty meters, and clear blockages. Enter a value by clicking the blue text. Run the meter backwards by entering a negative value. More guidance is provided in the next section.
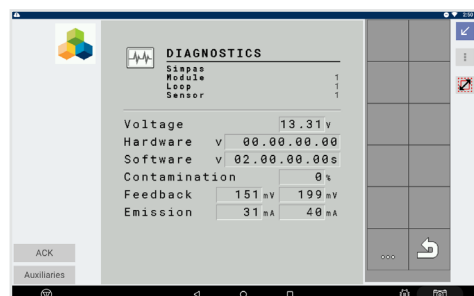
5 Blockages and Diagnostics

This screen shows: Operating voltage, feedback reading (in millivolts), and emission reading (in millivolts).

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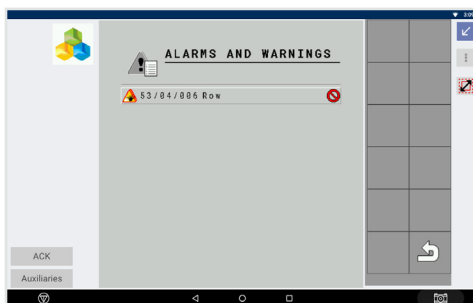
6 Alarm and Warning History

This shows the history of the alarms. When troubleshooting with an authorized Trimble dealer, it is important to have the alarm code. Additionally, alarms can be accepted and declined in this menu.
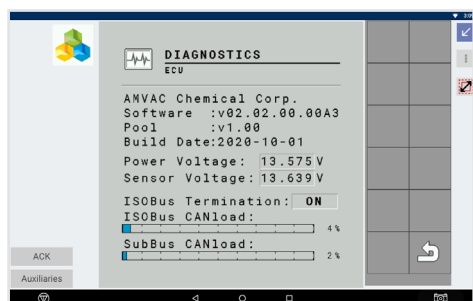
7 ECU Info

This page shows the software version, pool version, and the two system voltages and is to be used when troubleshooting.

Diagnostics Screen: Metering Unit
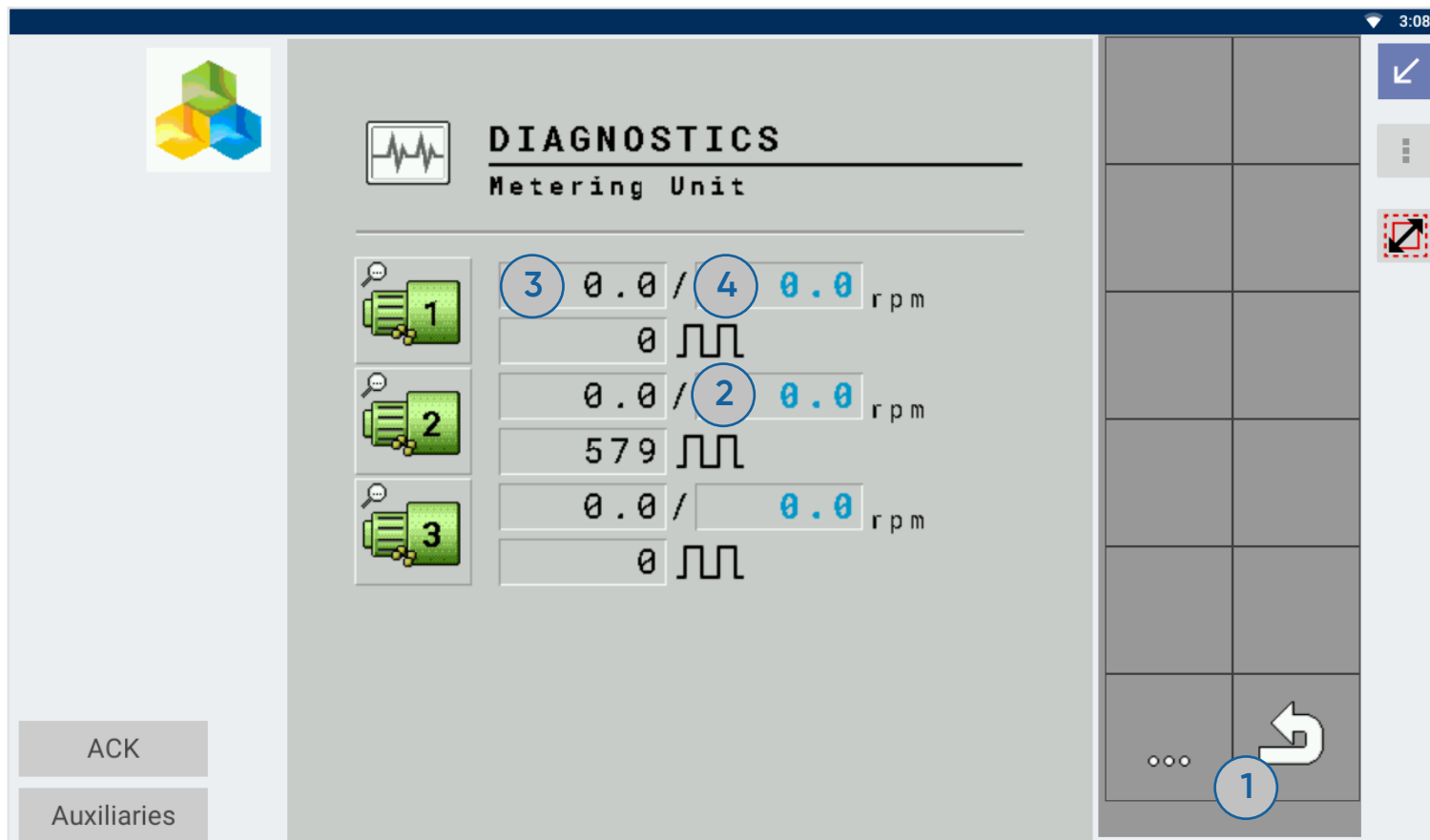
1. Back Button
This returns you to the previous screen.

2. Meter Info by Channel
To manually control the RPM of all the meters in the same channel, click the blue RPM. Then, enter the value. To view individual sub-meters, click the green meter icon.
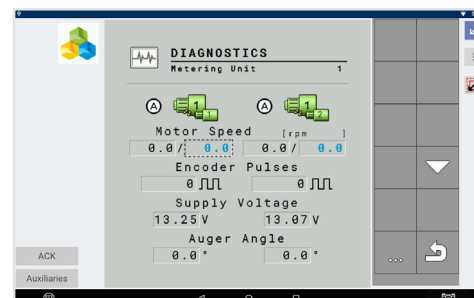
3. Current RPM
This displays the current RPM by channel.

4 Reported RPM

The values in blue text listed during system operation show the requested RPMs for each meter based on the rate of the product being delivered. You can then use this screen to manually change the RPM of meters. It will be used to prime the system, empty meters, and clear blockages. The black text shows the currently reported RPM. To enter a value, click the blue text. Run the meter backwards by entering a negative value.
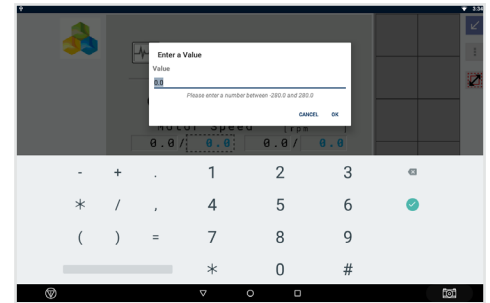
At Installation

Getting Started with SIMPAS™

Installing SIMPAS™

As you work with your authorized Trimble dealer to install your SIMPAS system, there are a few key things to remember:

→ Verify your tractor and ISOBUS connection have sufficient amperage capacity to run all electrical components simultaneously.
→ Verify harnessing is connected appropriately and securely.
→ Place the ECU at row 3, 4, 5, or 6, depending on the size of the planter.
→ Place the work position switch on a row unit near the ECU, to allow connection to the harness. Note: If needed, a 10-foot switch extension is available.
→ Verify that each meter is functioning by running each meter separately.

Your authorized Trimble dealer can verify the equipment is installed and functioning correctly.

Verifying Amperage Capacity

On some larger systems an external alternator may need to be installed to ensure there is enough power to reliably power the system.

Systems meeting the following specifications likely will require the installation of an external alternator:

→ Tractors with up to 120 amp alternators
→ More than 40 amps total system draw
→ SIMPAS rows 24 and above

For further assistance in determining the need for an external alternator, contact your Trimble dealer.

These steps outline the installation of the SIMPAS system.

Step 1:   **Line up holes and install bolts.**

→ Planter-specific brackets are currently in development to be installed with the partition assembly.
→ If a bracket is required for the planter, follow the instructions accompanying the specific bracket to install.
→ The number of bolts to secure depends on the planter. Ensure all bolts provided are secured based on planter row unit type.

Step 2: **Install the partition assembly.**

→ The partition assembly is universal and will connect to any of the different planter-specific brackets.

→ Pick up the partition assembly and place it on the outside of the bracket. The partition assembly slides on the outside of the bracket attachment points. Adjust the position of the partition assembly for the correct fit on the planter for proper placement. Use the four included bolts secured to the bracket to install. Once secured, torque the bolts.

Step 3: **Inspect RFID Reader/Writer installation and make sure connections are tight.**

→ Each item – the three antennae and the RFID Reader/Writer – is secured to the row unit with four bolts.
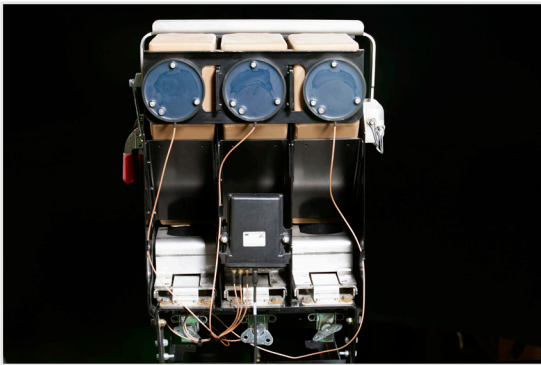
Step 4: **Prepare the meter.**

→ Prepare the meter to be installed onto the unit by attaching the gasket and QuickAttach components to it properly.

Step 5: **Install the granular meters.**

→ Use the gasket and the QuickAttach system on the partition assembly to secure each meter.

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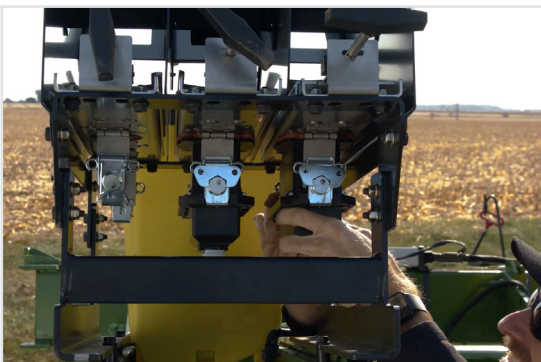
Step 6: **Place and secure the ECU unit on the planter.**

→ The location for the ECU installation depends on the size of the planter. Zip tie the ECU unit in place. The ECU can be installed at the following locations:

8 row planter: between rows 2 and 3

12 row planter: between rows 3 and 4

16 row planter: between rows 3 and 4

24 row planter: between rows 5 and 6

Step 7: **Install the work position switch (lift switch).**

→ The specific work position switch utilized will vary by planter manufacturer. Consult with your authorized Trimble dealer to order the correct switch. The ideal placement of the work position switch is near the connection point on the ECU cable. If this location is not practical, use the available extension harness to make the connection.

Step 8: **Install the harnessing.**

→ First, link the tractor to the ECU unit using the 16-pin cable (SMSE001). Make sure the pin connector is connected to the "In" port on the ECU. Install and zip tie the cable in place.

→ Next, link the ECU unit to the first row unit using the 16-pin and 42-pin cable cable (SMSE003). Install it, and make sure the 16-pin connector is connected to the ECU "Out" port. Then, coil and secure the remaining cable. Avoid coiling the remaining cable too tightly to ensure the wires do not break.

→ Then, use the primary meter cable (SMSE011) to connect to the first meter on the row unit; use two secondary meter cables (SMSE012) connected together to connect meters two and three on the row unit.

→ Continue the process, using cable links to harness the first row unit to the second row unit, and so on.

Step 9: **Install the manifold**

→ The purpose of the manifold will combine three product tubes into one flexible hose for dispensing product into the furrow. The point at which the manifold is installed on the planter row unit will depend on the specific planter.

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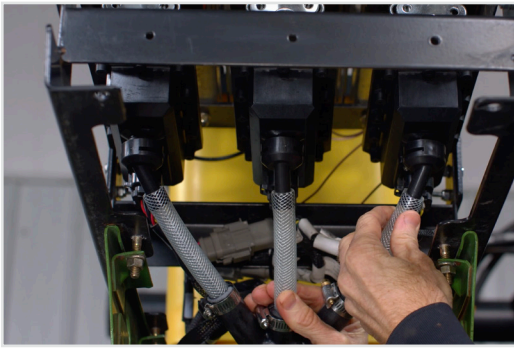
Step 10: **Ensure proper installation of product tubes.**

→ Install gaskets within each product tube to connect to each granular meter. After the product tubes and manifold is installed, clip the manifold into the retaining bracket (if a part of the system configuration). Ensure the angles of repose for product tubes from the discharge point of the meter into the manifold are at least 30 degrees. This ensures proper flow of granular products.

Step 11: **Install slide tube assembly (as necessary).**

To complete the slide tube assembly installation process, we will start at the highest point (the granular meter) and work our way down.

→ Attach the small diameter product tubing to the granular meter discharge elbow.

→ Insert the small diameter product tube into the large diameter product tube and secure with a hose clamp.

→ Cut the large diameter product tube to the appropriate length to allow the slide tube assembly to be located vertically, approximately 12 inches below the partition assembly/cradle.

→ Install the large diameter product tube onto the top end of the outer slider (the end with the largest diameter). Secure with a hose clamp.

→ Install the remaining large diameter product tube onto the white inner slider. Secure with a hose clamp.

→ Insert the inner slider into the outer slider.

→ Attach the retention spring and secure with a cable tie. To attach the retention spring, insert ends of the spring into the hose clamps attaching the product tubing.

→ Attach the completed assembly to the granular meter. Use the provided clip to attach the discharge elbow to the granular meter.

→ Route the remaining large diameter product tubing down to the furrow, through the row unit.

→ Assess the length of the large diameter product tube and trim.

→ Trim the product tube so that the end of the tube sits about 2/3 of the way up the closing wheel. Cut the end of the tube at a 45 degree angle. Orient the tube so that the "long" end of the angle faces the direction of travel, such that any debris that hits the tube won't travel up inside the tube.

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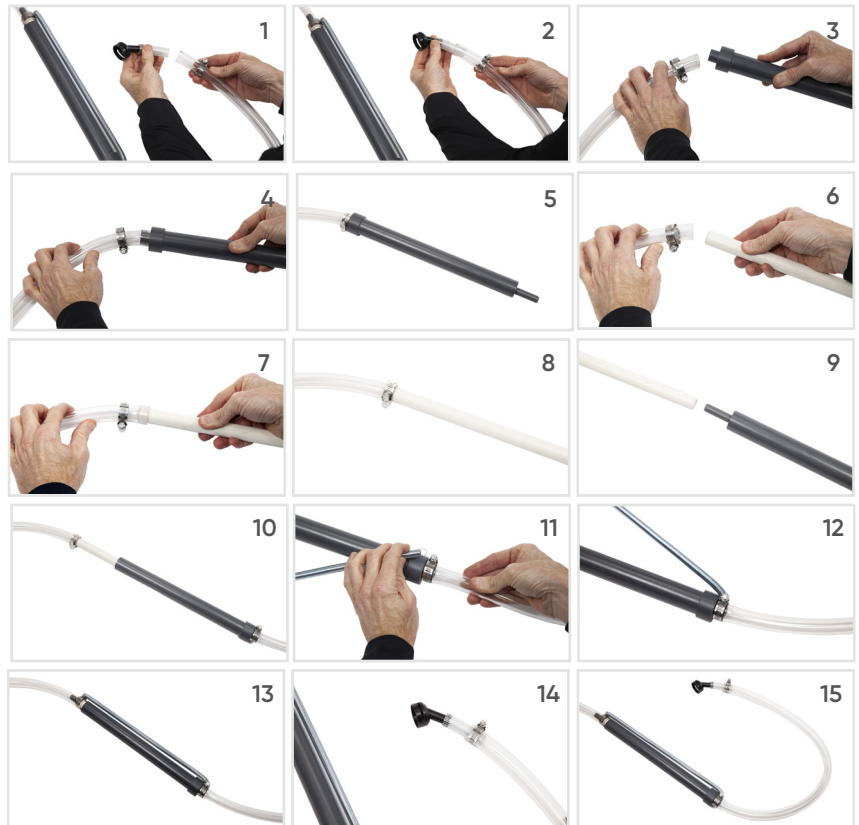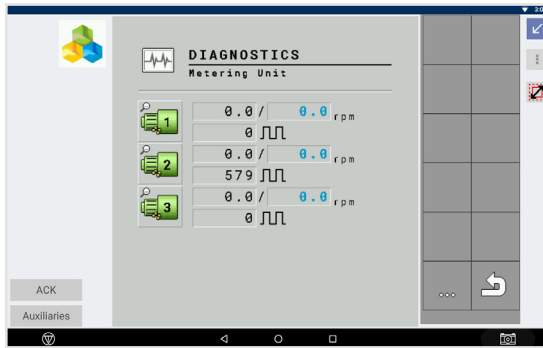
Validate system operability.

→ To verify each meter is functioning prior to calibration and/or use of the system with the product, navigate to the Metering Unit screen from the Diagnostics Screen and turn on the meters. To change the RPMs of all the meters in the same channel, click the blue text and enter appropriate values. Compare the black RPM values to the blue values set to validate meters are running appropriately.

Additional installation questions can be addressed within the order guide for the SIMPAS™ components.

Pre-Season

Prepare for First Use

Identify Agronomic Needs

Before using the SIMPAS™ system for the first time, operators should coordinate with trusted advisors to identify the field-specific agronomic needs to be addressed through SIMPAS-applied Solutions (SaS). A trusted advisor will use a variety of data sources such as sampling/sensing, historical yield data, soil type, elevation/topography data, and historical agronomic knowledge to create location-specific prescriptions for issues that SIMPAS can help operators address. The SaS-specific prescriptions are easily uploaded as shapefiles into the operator's display and applied through the SIMPAS controller.

Operators will work with a SIMPAS-applied Solutions retail agent to purchase other crop inputs and obtain the needed SaS for the season. Your retailer will have access to a SaS Data Portal & Agronomic Prescription Toolkit that provides guidance on developing and loading prescriptions.

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Setting Up the Task Controller

Every manufacturer display is a little different when it comes to setting up a field, SIMPAS™-applied Solutions (SaS) material, and task. This example walks through setting up a task controller through Trimble's Precision-IQ platform on a GFX-750 display.

Step 1: **Get started.**

Unlock the display.

→ To operate the SIMPAS system with the GFX-750 display you must purchase the following unlocks:

1) License, Display: Multi type implement, Prescriptions, No Expiry

2) Licence, Display: Multi type implement, ISOBUS Task Controller, No Expiry

3) License, ISOBUS: Universal Terminal

License, Display: Multi type implement, ISOBUS Multi-Product Control, No Expiry

→ Contact your Trimble dealer to apply these unlocks to the display.

Enable ISO

→ Once the unlocks have been applied you must enable ISO functionality within the PIQ software.

→ From the home screen go to "Settings" then "ISOBUS."

→ Ensure the "Enable Universal Terminal" setting is enabled.

→ Ensure the "Enable Task Controller Support" setting is enabled.

Note: The "Enable Automatic ISO Configuration Updates" is automatically enabled when the Task Control option is enabled. This setting will allow the system to automatically detect set up changes on the ISO ECU and update the PIQ software.

→ Configure the messaging rates.

→ Go to the "Universal Terminal" page within PIQ and touch the menu icon at the top right.

→ Touch the "Messaging" tab. Use the dropdown menus to set the following settings:

GNSS Vehicle position: 5 Hz

GNSS Vehicle Direction/Speed: 5 Hz

Wheel-based Speed: 5 Hz

Ground-based Speed: 5 Hz

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Step 2: **Create or select vehicle profile.**

→ Press the "Vehicle Profile" box to enter the Vehicle Profile screen.

→ Press an already created profile in the box on the left side of the screen to view the vehicle details on the right side of the screen. Press the "Select Vehicle Profile" button at the bottom of the screen to select that profile.

→ To create a new profile, press the "New" key and enter all vehicle settings by pressing the tab on the left side of the screen, entering the required information, and scrolling to the next tab with the arrow on the right side of the screen. Press the green checkmark when all necessary settings have been entered to save the vehicle profile.

→ Press the "Back" button to return to the home screen. The "Vehicle Profile" box should now be green in the top right corner.

Note: Refer to the appropriate Trimble documentation for additional setup information.

Step 3: Create an implement.

→ Press the "Implement" box. The Implement screen will appear. You can edit an existing implement or create a new implement.

→ To edit an existing implement:

To edit an existing implement, use the "Edit" key. The summary screen will appear. Press the tabs at the top of the screen to view and edit all available settings.

In the "Application Control" tab, use the wrench softkey to modify an existing current channel.


→ To create a new implement:

To create a new implement, use the "New" key on the Implement screen. In the "Application and Device" window, the ECU application type/ECU number should show up as a menu item. Ensure that this choice is selected.

Tap the "New" arrow. Choose the operation type "Spreading," then tap the "Next" arrow to select the Implement type "Pull Type Spreader," continue to tap the "Next" arrow to review the name and hitch measurements; these entries are set by the ECU.

On the "Measurements" tab verify the Application Width, Rows and Swath Width settings are correct, and enter the Physical Width and Physical Length settings. The Physical Width setting should match the overall width of the planter. The Physical Length setting should match the distance from the tractor hitch to the application point.

In the "Application Control" tab, use the wrench softkey to modify a current channel.

→ Under the "Type & Material" tab, the control type should be greyed out and read "ISOBUS Task Control," and the "ISU Implement Data" should match the machine name of the ECU. Set the material type to match the channel you are configuring.

→ Under the "Settings" tab, ensure that Rate Control and Section Control are ON if you wish to utilize those features. For the option "Record Coverage Using" select the choice "Command states + Work State." Note that the "Link to Channel" and "number of Sections" settings are not configurable, these are controlled by the SIMPAS™ ECU.

→ Tap the "Latencies" tab. Set the On and Off latencies to match the time of delay seen on your planter between the system turning on/off and product actually hitting the ground, or turning off.

→ Tap the "Overlaps" tab. Set the "Start" and "End" overlap distances if you wish to double apply at the start and end of the row to ensure good coverage.

→ Tap the "Summary" tab, then press the green checkmark to save the edited settings and return to the main implement configuration screen.

→ Finish entering settings for the application control. Under the "Inputs" tab do not select the "lift switch" option. The lift switch setup is controlled by the SIMPAS ECU. Under the "ISO Logging" tab set the logging option to "On" if you wish to record data to the ISO Task Data folder.

→ Tap the "Summary" tab. Again, press the green checkmark to save the edited settings.

→ Press the "Back" button to return to the home screen. The Implement box should now be green in the top right corner.
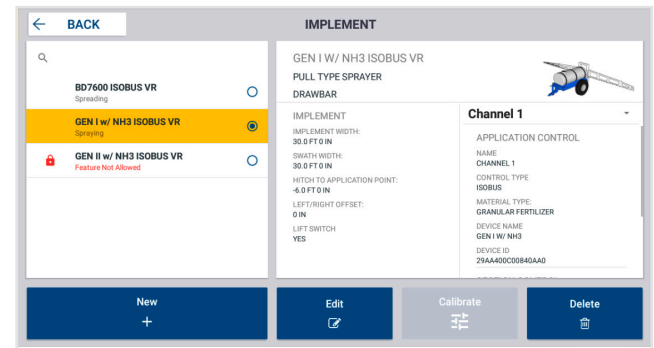

Step 4: **Add SIMPAS™ applied Solutions to the display.**

Watch the video to see SaS added in the GFX-750 display. Select the "Material" button from the GFX Home Screen.

→ Select "+ New" button.
→ Add material name (e.g., Aztec®HC).
→ Category (e.g., granular fertilizer). Currently, "Granular Fertilizer" is the category that represents all granular SaS.
→ Choose appropriate type (e.g., Insecticide).
→ Add units (e.g., lbs./ac).
→ The operator has the option to add material density (e.g., 50lbs/ft3), but this is not required. Appropriate product densities can be found in the SaS label if desired.
→ Consult the product label for target rates. Add target rates 1 and 2. These two rates would be used if the system was running in a manual setting rather than on a prescription.
→ The operator can change the rate increment (e.g., 5.00) based on guidance from their trusted advisor.
→ Add Min. Rate (e.g., 0) to minimize alarms for prescriptions that use a zero rate in unapplied areas and to help with as-applied recording.
→ Add Max. Rate (e.g., 1.63) This comes from SaS label.
→ Click "Save."

On the material assignment page, assign SaS to appropriate channels.

Note: Once a Target Rate has been entered you must enter the Rate Increment, Minimum Rate and Maximum Rate entries before you can Save the material.
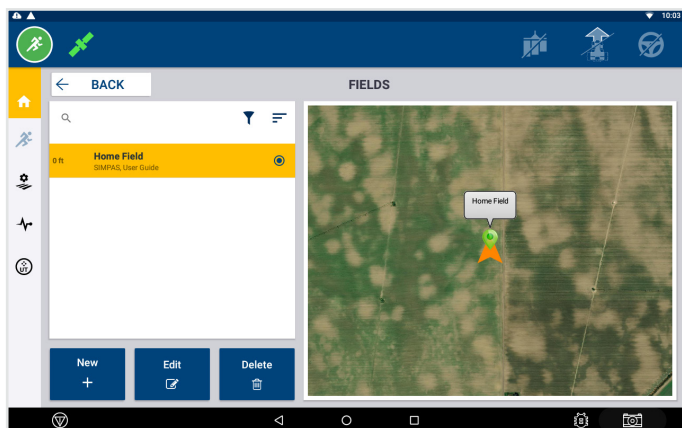
Step 5: **Set up a new field.**

Select "Field View" from the Home Screen. To add a new farm:
→ Click the "New" button.
→ Field Name: Enter name.
→ Client: Select "+" button then, enter client name.
→ Create Farm: Select "+" button, then enter name.
→ Click "Save" and the new farm will show up on the Field View.

NOTE: It is not necessary to Assign Rx during initial field setup, as this step can be completed later.

It is best practice to exactly match text inputs for products between the display's TC and the SIMPAS UT.

Step 6: **Set up a new task.**

→ A task refers to the job the operator is completing (e.g., spreading, planting, etc.). Spreading is the recommended task type for SaS.

Press the "Task" box from the PIQ home screen.

To create a new task, touch the "New" icon. Create a task each time you start a new field.

To resume a previously unfinished field, press a previously created task on the right side of the screen.

Press the "Back" button to return to the home screen. At this point, all boxes on the home screen should be green.
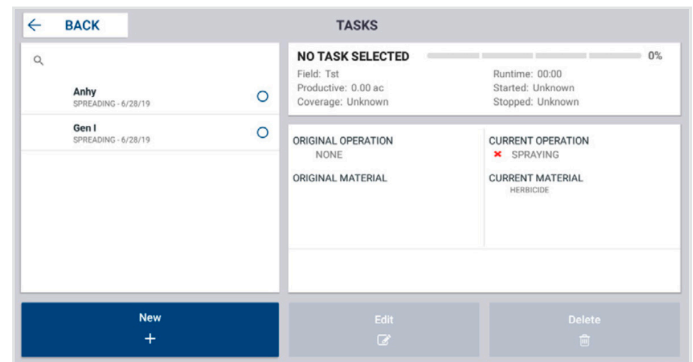
Step 7: **Copy prescription onto the display.**

→ Obtain the prescription file(s) from your trusted advisor.
→ Copy the prescriptions onto the display ensuring adherence to the folder and file format supported by your display's operating system. (E.g. For Trimble GFX-750 displays using Precision IQ, the folder format is AgData > Prescriptions > prescription_file.shp).
→ Insert the USB that was provided by your trusted advisor with appropriately formatted SIMPAS™-applied Solution (SaS) data portal prescriptions.
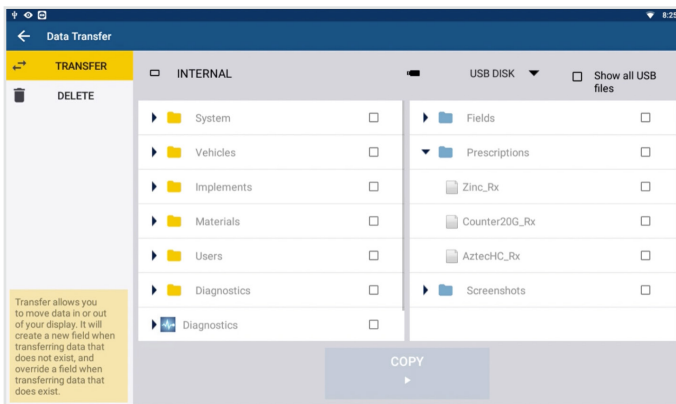
Step 8: **Load your prescription.**

→ Load the prescription once in the field.
→ The target rate is set by the prescription loaded into the Task Controller. Ensure the Task Control function is active before beginning operation.
→ Ensure the rate column is set to match the rate column in the shapefile. Failure to do this may result in incorrect rates being applied.
→ To confirm task control function, ensure the notepad icon appears alongside the metering icons on the product bars.
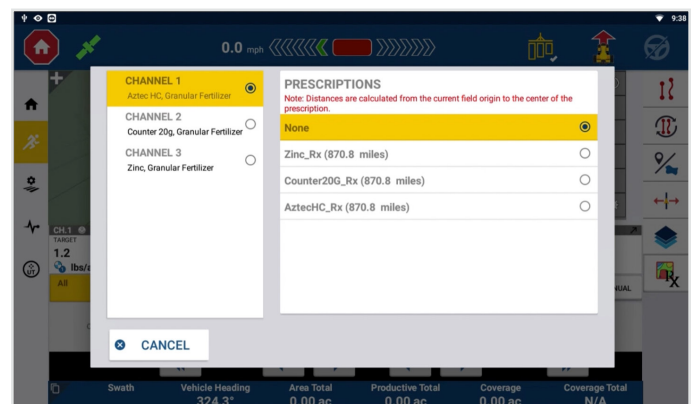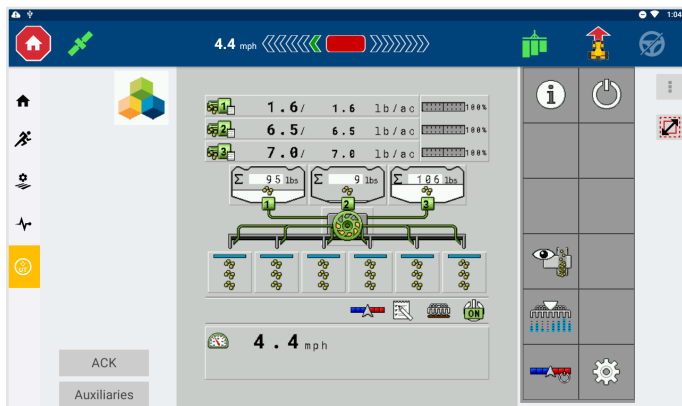
Step 9: Select the Product Bar icon.

→ Make sure the chosen prescription is active.

→ The Task Controller icon will display at the bottom right of the Product Bar icon, and a notepad graphic will show up next to the Product Bar icon when a prescription is loaded and activated properly. The three bars are touchable buttons, which allow the operator to enable and disable the prescription. To enable the prescription touch the Product Bar icon and then touch the notepad icon at the bottom left of the grid of buttons on the right hand side of the screen.

Pre-Use Checklist

☐ Boot up the system. The first time the system is booted up it may take up to 15 minutes. The UT will indicate that progress is happening. After the first time, the process will only take a few minutes. After the first time you boot up the system, the process will take less than a minute.

☐ Ensure the task control function is active. To do this, verify the Task Control icon is visible on the UT. Reference the Getting to Know the UI section for more information.

☐ Ensure you have a GPS position using your display diagnostics. GPS signal is often best when the vehicle is parked outside, and the GPS receiver has an unobstructed view to the sky, enabling successful satellite communication.

☐ Ensure the work position switch (lift switch) is properly functioning.

☐ Confirm the speed source is defined and functioning. In the UT, select "Settings" then "Speed Settings." To confirm the speed source is functioning, drive the vehicle and watch the speed numbers on this screen. Check the box of the appropriate speed setting. It is recommended to run on GPS speed, however the wheel speed (based on transmission output) or the ground speed (based on radar pointing to the ground) are also available.

☐ Check voltage readings across all meters for power, and then run all meters to ensure proper operation. Use the diagnostics interface to assess voltage across all meters – to ensure they have a minimum of 12+ volts. To check the voltage on each metering unit, touch the metering unit icon and review the voltage status item.

☐ Manually turn on the meters by manually entering RPMs by selecting the blue text and entering a value. Run each channel prior to placing products on channels to ensure each meter turns and is reporting the RPM.Use the diagnostics interface to assess voltage across all meters – to ensure they have a minimum of 12+ volts. To check the voltage on each metering unit, touch the metering unit icon and review the voltage status item.

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SIMPAS™-applied Solutions (SaS) Setup

Follow these steps to correctly set up the SaS in the SIMPAS system.

Step 1: **Place SmartCartridge™ Containers in channels.**

→ Make sure the base valves are properly oriented prior to the placement of the cartridge.
→ Remove valve cover from cartridges and place into each channel with the fill port facing away from the tractor.
→ Ensure valves are fully seated when installed so they are correctly aligned on base valve.
→ For more on SmartCartridge alignment, please see "If the cartridge is not aligned, what should I do?" in the FAQ Troubleshooting section.

Step 2: **Latch container securing lock.**

→ Lift the container securing lock over the cartridges and latch to hold the cartridges in place. It is critical to latch the container securing lock prior to opening the valves.
→ Ensure the lock is latched correctly, as shown in the picture.

Step 3: **Open the valve.**

→ Open the valve by pulling the valve handle out.
→ Open the valve by rotating the handle 90 degrees and pulling the handle toward you.
→ When the handle reaches the second "stop" location, the valve is fully opened. Only adjust the valve if there are issues while installing the cartridge. If the valves are not aligned, note the position of the valve handle; if the valve handle is in the closed position, the valves should appear aligned.

Step 4: **RFID-based SmartTag reads data.**

→ The SmartTag on the cartridge will be read, and the data will be sent to the user interface to ensure each SaS is in the correct channel.

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Step 5: **Inspect SmartCartridge™ Containers.**

→ The SmartTag will validate that the SaS is in the correct channel, but it is always a best practice to visually inspect the cartridges to ensure that the same SaS are in the same channels across each row of the planter. Always ensure proper alignment of SmartCartridge containers to ensure the product is in the proper channel and the containers are appropriately aligned.

Tip: Place the products in alphabetical order across the partition assembly for consistency and ease of use. For example, if the three products being used are Aztec, Counter, and Zinc; then, Channel 1 would be Aztec, Channel 2 Counter, and Channel 3 Zinc.

Step 6: **Check harnessing.**

→ Ensure harnessing is secure and not in a place it will pinch or rub.

Step 7: **Prescribe target rate.**

→ The target rate is set by the prescription loaded into the Task Controller. Ensure the task control function is active before beginning operation.
→ The Task Controller icon will display at the bottom right of the Product Bar icon, and a notepad graphic will show up next to the Product Bar icon when a prescription is loaded and activated properly.
→ To confirm task control function, ensure the notepad icon appears alongside the metering icons on the product bars.
→ For further information on how to activate the task control function, see the Pre-Season section.

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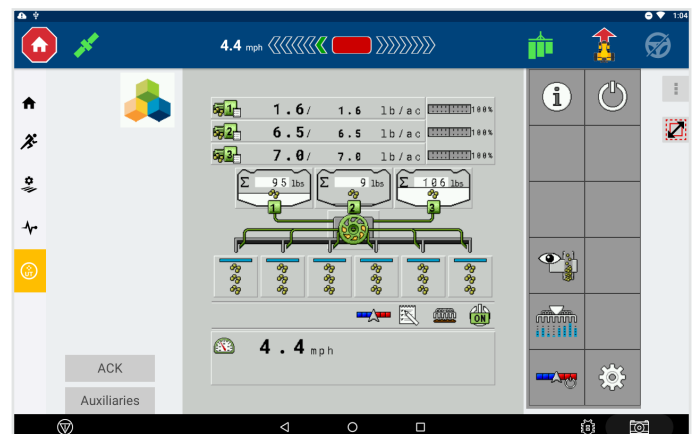
Calibrate the System

This section provides an overview of the calibration process. Work with an authorized Trimble dealer to calibrate the SIMPAS™ system before use. Calibration should occur at the beginning of the season or when switching SIMPAS-applied Solution (SaS) products being applied through the same meters to ensure that the meters are calibrated appropriately to deliver the labeled rate. Before calibration, consult the label for each SaS product to ensure appropriate PPE is worn by the operator during calibration procedures.

Step 1: **Gather needed materials.**

→ Gather the needed materials:

Live SaS product to be applied

Catch bottles

Gram scale

Calibration sheets

All required PPE listed on SaS product labels

Step 2: **Wear personal protective equipment.**

→ Wear PPE according to SaS product label requirements. Dispose of calibration SaS product materials properly according to label requirements.

Step 3: **Install the catch bottle.**

→ Detach the manifold from the meter and install catch bottles with product tubes on each meter.

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Step 4: **Run the calibration sequence in UT.**

Calibrate with the tractor running so as to not run down the tractor batteries.

In calibration mode, test each meter. It is recommended to calibrate each SaS product set individually (channel 1, 2, or 3). However, the system is set up so the operator can calibrate the entire system, one channel, or one meter. To calibrate one metering unit at a time, select the SaS product, then select the row unit to test.

→ In the UT, click on "Settings," then click on "Metering Unit Settings," then click on the "Calibration Screen" icon.

→ To calibrate one metering unit at a time, select the SaS product, then select the row unit to test.

→ Click each "Metering System" button to make active.

→ Set target amount for each by clicking the blue text below. Enter the number of pounds and the speed, validating the pounds to be caught with appropriate calibration sheet(s). It is recommended to calibrate with a catch amount of 4 oz. and at your intended planting speed.

→ Select SaS products to calibrate by clicking the checkbox.

→ Select the "Prefill" icon to fill all meters with SaS product. After hitting "Prefill" any SaS product collected in the catch bottles should be removed prior to the actual calibration start to ensure that the measurements are as accurate as possible. When "Start" is selected, SaS products are being dispensed right away to make calibration accurate.

→ Click the "Start" button.

Note: Ensure target rate, calibration factor (should be set automatically), calibration speed, and calibration catch quantity are set before beginning, as calibration cannot progress without these settings. Ensure all meters are functioning before beginning calibration, this can be done using the diagnostic screens to operate each meter manually.

After calibration, record all factors per row. It is optimal to run calibration a minimum of two times. If any rows are off target by more than 1/10 oz., run calibration again for that row.

Note: The units entered during calibration will be ounces, as prompted in the User Interface.
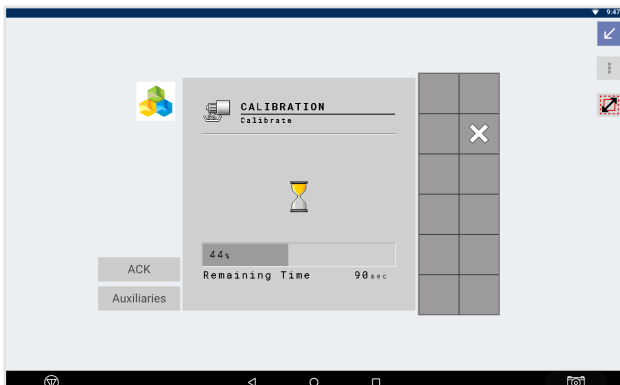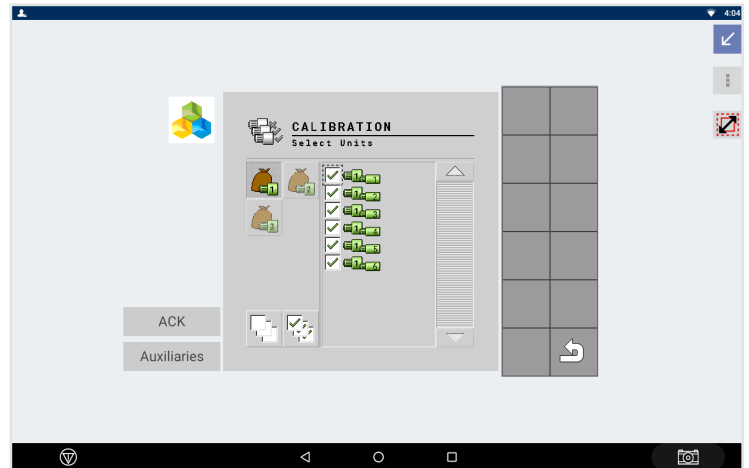
Step 5: **Wait for product to be dispensed.**

→ This is the screen when the calibration is running. If the percent is not increasing during the calibration, a meter in the system is not functioning.

→ A white arrow appears when it is done. Select that icon to continue to the enter weights screen.

Note: In case a meter is not functioning, consult the Troubleshooting section to determine a resolution.

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Step 6: **Weigh the catch bottles.**

→ Use the gram scale to establish a tare weight of an empty calibration bottle.

→ Next weigh each catch bottle after collecting SaS product, using caution to keep track of the row and channel being weighed. Calibration Sheets with specific catch weights for SaS products can be obtained from an authorized Trimble dealer.
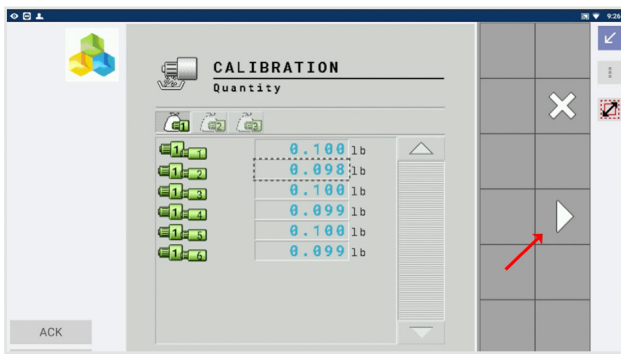

Step 7: **Enter weights in UT.**

→ Enter weights in the "Calibration Quantity" screen in the UT. Click the blue text to enter weight. Make sure the units from the scale used to capture weights and units on the display match.

→ The "Calibrations Results" screen automatically adjusts the system to apply the correct rate.

→ Click the "Continue" arrow button to see all the target rates with calibration factors and target rate increments.

Step 8: **Complete calibration.**

→ This screen demonstrates calibration was completed successfully. Review the calibration factor values to ensure they look reasonable.

→ If they are appropriate, click the "checkmark" icon on the screen. The new calibration values are not saved unless this happens.
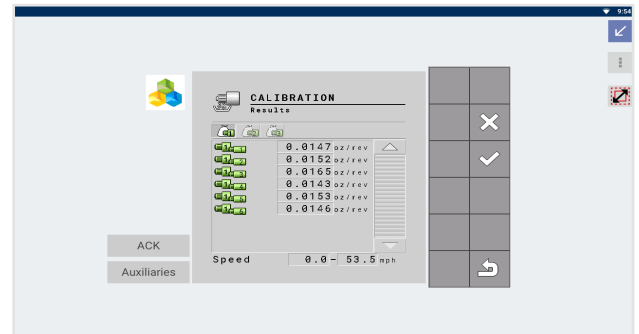
Step 9: **Dispose of product and reattach the product tubes.**

→ After weighing each catch bottle, transfer SaS product to the provided collection bottles.

→ At the end of calibration, consult the SaS product labels for proper disposal options.

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Verify system function.

Before operating in the field, it is important to verify the system is operating as it should.

→ Leave calibration catch bottles in place to ensure product is not dropped in one place.
→ Set the simulated speed to operating speed.
→ Close the partition assembly valves to stop product from applying.
→ Engage the master switch, allowing the system to run briefly.
→ In the "Diagnostics/Metering Unit" screen, verify the requested RPM closely matches the RPM currently being achieved by the meters.
→ Set the simulated speed to something different.
→ Repeat.

Secure the System Before Travel

Before transporting the SIMPAS™ system to the field, complete a walk around inspection, checking the following items:

1 Ensure valves are closed with valve handles locked and inspect all dispensing valves to ensure proper alignment.

2 Inspect all wiring harnesses to ensure all are secured appropriately and that installation has occurred to enable planter folding (as required).

3 Make sure all product tubes are correctly connected and installed.

4 Check to see that the product tubes are installed in a manner that ensures they are connected within the manifold effectively.

5 Ensure each meter is securely connected with the gasket with the quick latches.

6 Lock all SmartCartridge™ Containers with the container securing lock.

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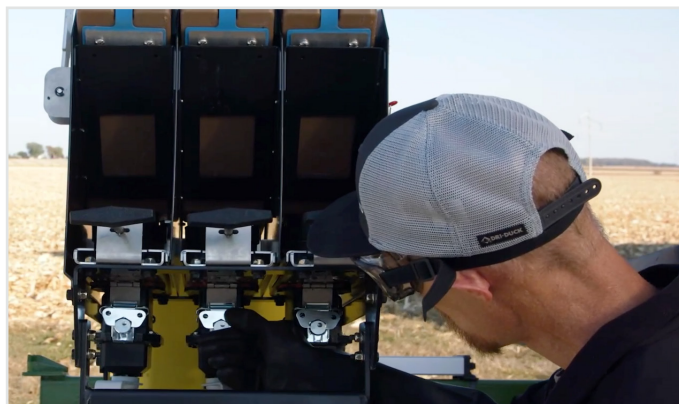
Follow these steps to secure the system before travel.
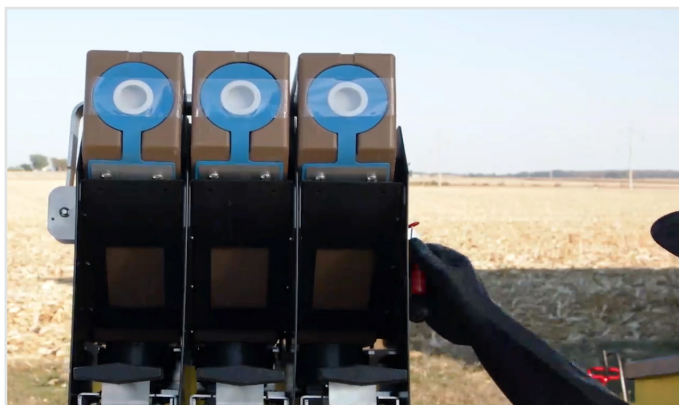
1 Ensure container securing lock is locked.

2 Ensure valves are closed with valve handles locked.

3 Ensure meters are securely connected with quick latches.

4 Ensure product tubes are properly secured.

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# At-Planting

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During Operation

Before operation:

→ Power on the SIMPAS™ system and the display.

→ Confirm the work position switch (lift switch) is correctly operational.

Once in the field, before operation:

→ Confirm that the desired field is specified and visible on the display.

→ Ensure all container securing locks are fully locked across all rows and then validate that all valve handles are engaged to open valves.

→ Confirm that all products, desired rates and applicable prescriptions have been defined on the display's operating system.

→ Note any warnings pertaining to the RFID system and correct any issues before beginning operation. Examples include "wrong product" or "low product" warnings.
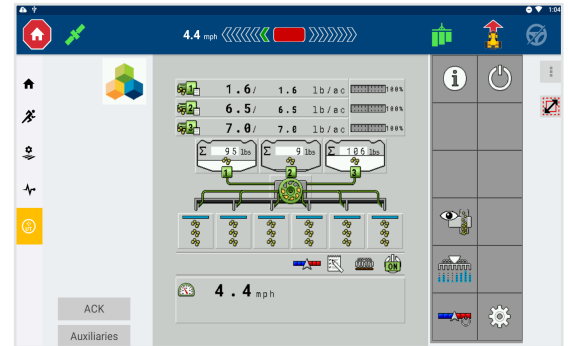
Product Bars

→ Make sure the chosen perspective is active. The Task Controller icon will display at the bottom right of the Product Bar icon, and a notepad graphic will show up next to the Product Bar icon when a prescription is loaded and activated properly. The three bars are touchable buttons, which allow the operator to enable and disable the prescription. To enable the prescription touch the Product Bar icon and then touch the notepad icon at the bottom left of the grid of buttons on the right hand side of the screen.
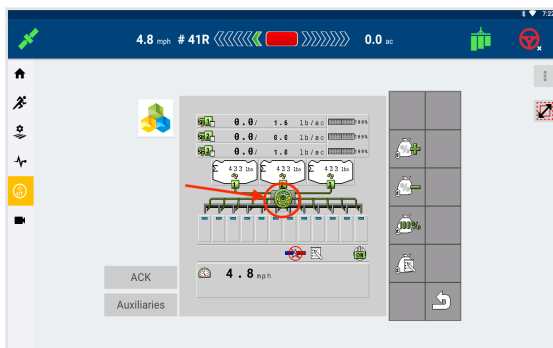
Run Screen – Prime
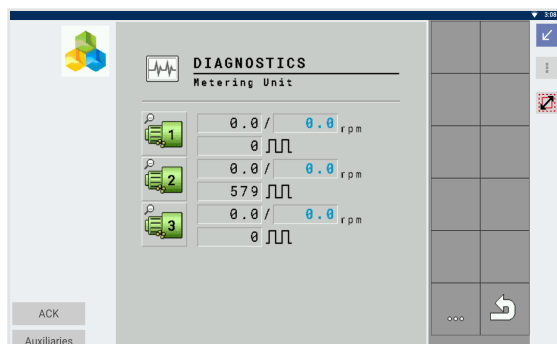
Diagnostics Screen – Metering Unit

Prime the System

→ Prime the system to make sure all the meter hoppers are full and confirm that the system is set to apply the correct rate from the beginning.

→ There are two ways to prime the meters.

→ First, the wheel button in the center of the boom graphic on the run screen can be used to prime the meters. The user can be stationary, and with the master switch in the "on" position you can press this button, which causes the meters to run for a set period. The time period can be configured in the settings.

→ Alternatively, in the UT, select the "Settings" icon, then select the "Diagnostics" icon, and then select the "Metering Unit Info" icon. Manually run the meters by adjusting the RPM on each. Change the RPM by selecting the blue text and entering a value. Verify the meters are successfully primed by visually inspecting each row to ensure product was dispensed.

→ Before using either method to prime the meters, ensure container securing locks are fully locked and then engage the valve handles to open the valves across all rows.

Begin Operation

→ To begin system operation, touch the SIMPAS™ master switch icon.
→ In the PIQ Software, ensure the master coverage icon is set to 'On.' The icon will be green when it is in the 'On' state.
→ When the vehicle's speed climbs above the minimum, override speed, and when the implement lift switch is in the 'work' position, the system will apply product.
→ Look for any blockage warnings and take steps to remove any blockage from those rows.

Bin Chaining

The SIMPAS system can be configured to allow the same product to be applied from multiple channels (for example, Aztec HC could be applied in both channel 1 and channel 2).

There are two options available when configuring bin chaining, sequential and parallel.
The sequential option will empty channel 1 and then automatically move on to channel 2.

The parallel option will empty both channel 1 and channel 2 at the same time. Ensure the correct rate is being applied across both channels by conducting a targeted catch-test in collaboration with your authorized Trimple dealer.
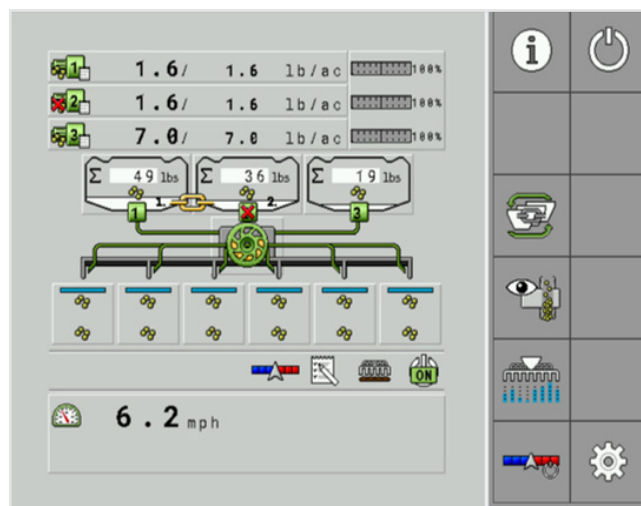
Operating the Master Switch

Enable the master switch to begin applying product.

Once the SIMPAS system is successfully calibrated and primed, the system will be delivering SIMPAS-applied Solutions (SaS) at the prescribed rate for the current management zone. This allows the operator to focus on other aspects of planting. The system will notify the operator if anything needs their attention.

Alarms & Warnings

The system is constantly monitoring itself to ensure that the requested operation is being achieved. If the requested application rate cannot be achieved, a warning will be shown.

Step 1: **Operational Alarm: Meter Drive Stationary**

When this alarm occurs, the granular meter is not turning. This could be due to the following:

→ The meter has no calibration factor.
→ The meter RPM sensor is faulty and not returning the correct RPM report.
→ The system has a blockage which has caused the meter to stop turning completely.
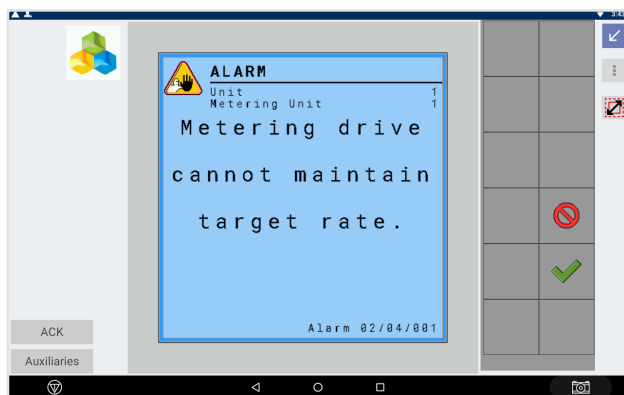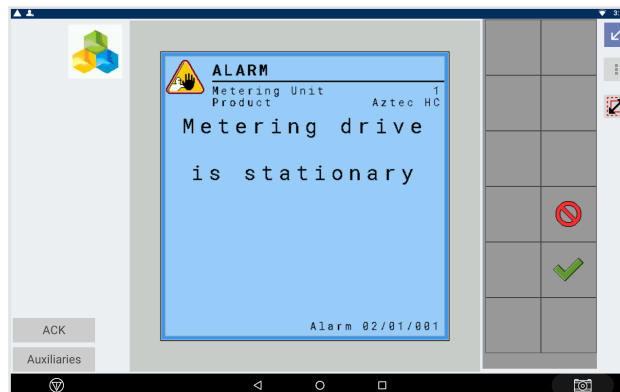
Step 2: **Operational Alarm: Cannot Maintain Target Rate**

When this alarm occurs, the granular meter cannot turn at the rate being requested by the system. This could be due to the following:

→ The meter is stalled (due to a blockage).
→ The meter RPM sensor is faulty and not returning the correct RPM report.
→ The system is asking for more RPM than the meter can deliver because of an incorrect meter calibration or ground speed is too high.
→ The system has a blockage which has caused the meter to slow down.

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Step 3: Operational Alarm: Flow Warning

When this alarm occurs, product flow has been detected in the meter, in a situation where no flow should be occurring. This could be due to the following:

→ Vibration has caused a small quantity of product to move past the blockage sensor during transport.

→ The blockage sensor settings need to be adjusted.

GROUP ALARM
Row   1-6
Channel   1
Flow in
multiple rows
detected.
Alarm 53/04/006
ACK
Auxiliaries

GROUP ALARM
Row   1-6
Channel   2
No flow in
multiple rows
detected.
Alarm 53/03/006
ACK
Auxiliaries
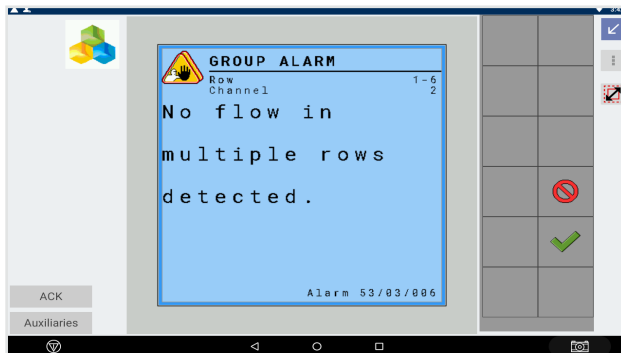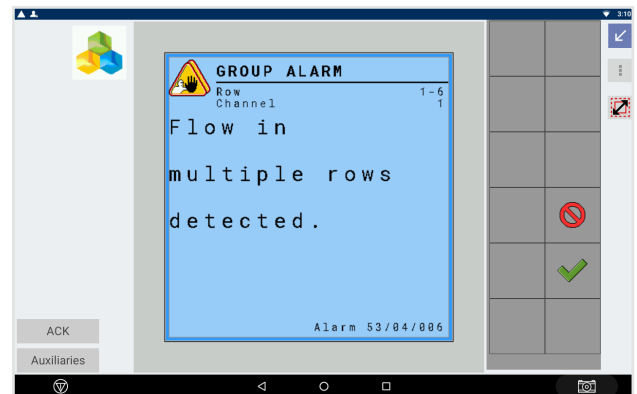
Step 4: Operational Alarm: No Flow Warning

When this alarm occurs, product is not flowing when it should. This could be due to the following:

→ The system has run out of SIMPAS™-applied Solutions (i.e. chemical product).

→ The system has a blockage which has stopped the meter from applying product.

Step 5: Addressing Alarms

→ When an alarm appears, assess the planter to determine the cause of the alarm. Once the condition that caused the alarm has been resolved, click the green check mark to clear the alarm. If the condition persists, the alarm screen will return.

→ If it has been determined that it is safe and necessary to continue operating while the alarm condition persists, the alarm can be ignored. To ignore the alarm, click the red circle. This action will need to be confirmed. Confirm that you ignore this alarm by pressing the red circle, followed by the white check mark on the following screen. This will suppress the alarm until the system is shut off.

→ Additionally, the operator can acknowledge the alarms from the "ACK" button on the Home Screen.

→ Priority 1 alarms signify there is a risk of operator injury, these alarms must be acknowledged before operation can continue.

→ When troubleshooting a problem with an authorized Trimble dealer, the operator should reference the row and channel code on the top right of the error warning window. Additionally, the operator may need to view the alarm history. This is found in the Diagnostics screen under "Alarms and Warnings".

ALARMS AND WARNINGS
53/04/006 Row
02/20/001 Metering Unit   1
02/04/001 Unit   1
53/03/006 Row
53/03/006 Row
ACK
Auxiliaries

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Clearing a Blockage

If one meter is not working, put on required PPE for the SIMPAS™-applied Solutions (SaS) being applied and walk through this protocol.

Step 1: **Check for physical blockages.**

→ If the system has indicated one or more meters are blocked, put on Personal Protective Equipment (PPE) and check both the product tube (above the manifold) and the delivery/ flexible hose (below the manifold) for physical blockages.

Step 2: **Close product valve.**

→ Push in the valve handle to ensure the valve on the SmartCartridge™ Container is fully closed to stop SaS product flow. Be prepared to catch the material in a container provided by a SIMPAS-applied Solutions retail agent to minimize exposure and enable disposal after troubleshooting. For further clarity, review the video below.

Step 3: **Run the meter with the blockage forward and backward at 200RPM.**

→ In the UT, select the "Settings" icon, then select the "Diagnostics" icon, and then select the "Metering Unit Info" icon.

→ Manually turn on the meters by adjusting the RPM on each. Change the RPM by selecting the blue text and entering "200RPM" to try and push SaS product through to clear it. Set the value to a negative number ("-200RPM") to reverse the meter, if necessary.

→ Run the meter for two minutes at 200RPM to empty the meter.

→ Please consult SaS product label for proper disposal options for each SaS product.
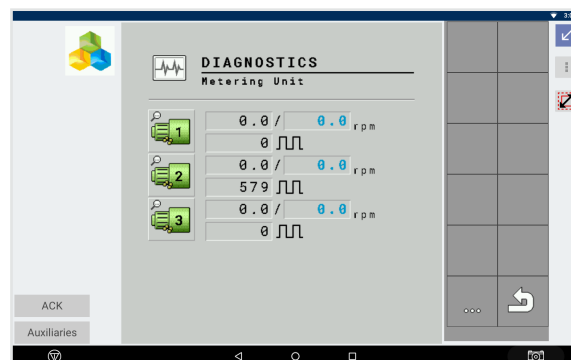
Step 4: Detach the meter and inspect the product hopper.

→ Once the cartridge valves are closed, remove the cartridge. Detach the meter. Confirm there are no blockages in the product hopper.

→ In case of blockages, if running the meter manually, do not clear the blockage. Ensure the cartridge valves are closed and remove the cartridge.

Step 5: Inspect the valve for blockages.

→ Inspect the valve of the cartridge and granular product valve connection for blockages.

Step 6: Call Your Authorized Trimble Dealer.

→ If the problem cannot be solved, replace the meter and/or call your authorized Trimble dealer.

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SmartCartridge™ Container Replacement

Replace the cartridges while stopped to refill other inputs when you've determined there is not enough remaining SIMPAS™-applied Solutions (SaS) product to last until your next planned stop.

Step 1: **Verify acreage covered is expected.**

→ At first cartridge replacement, ensure the application rate is appropriate. Verify the number of acres applied matches what was expected. Do this by using the acre tracker in the SIMPAS software.

→ You can find the acre tracker through the main run screen by touching the 'I' icon to access the acre counter screen. The following information can be found in this screen:

Acres covered for each channel for the current field and entire season

Product applied per channel for the current field and entire season

→ The "field" and "season" totals must be reset manually using the "delete trips" and "delete seasons" icons.

Step 2: **Place cartridges in channels.**

→ Make sure the base valves are properly oriented prior to the placement of the cartridge.

→ Remove valve cover from cartridges and place into each channel with fill port facing the rear of the planter.

→ Ensure valves are fully seated when installed so they are correctly aligned on base valve.

Step 3: **RFID-based SmartTag™ reads data.**

→ After switching a cartridge, the SmartTag on the new cartridge will be read to ensure it is installed in the appropriate channel – but you should take care to pay attention to the SIMPAS-applied Solutions (SaS) label and ensure that the correct cartridge is in the correct channel when installing as well.

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Step 4:   **Close container securing lock.**

→   Always close and secure the container securing lock before opening valves handles.

Step 5:   **Pull and lock the valve handle.**

→   Pull and lock the valve handle to open the cartridge valve.

Step 6:   **Double check SIMPAS™-applied Solutions (SaS).**

→   Double check the correct cartridge is in the correct channel.

Step 7:   **Palletize partially filled & empty cartridges.**

→   Replace the cartridges while stopped to refill other inputs when you've determined there is not enough remaining SIMPAS-applied Solutions (SaS) product to last until your next planned stop.

→   Replace the cap on each of the valves and put the used cartridges back on the pallet. Used cartridges of different SaS types can be mixed on one pallet.

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When planting is complete for the day:

1 Ensure valves are closed.

2 If moving the SIMPAS™ system, verify valves are closed with valve handles locked for transport.

3 To the extent possible, try to store the SIMPAS system in a covered location, particularly when cartridges are loaded onto the system.

1 Ensure container securing lock is locked.

2 Ensure valves are closed with valve handles locked.

3 Ensure meters are securely connected with quick latches.
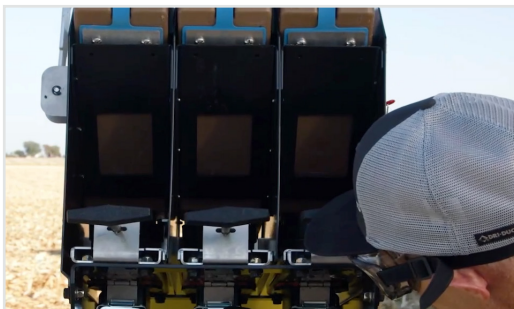
4 Ensure product tubes are properly secured.

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Subsequent Days of Operation

When using the same SIMPAS™-applied Solutions (SaS), prime the system following these steps.

Prime the system.

→ Remember to always use PPE and catch bottles if running the meters, and then dispose of the contents. Priming the meters ensures that SaS has filled the meter and is ready to dispense at the appropriate rate when the planter enters the desired application area.

There are two ways to prime the meters.

→ First, the wheel button in the center of the boom graphic on the run screen (circled in the image) can be used to prime the meters. The user can be stationary, and with the master switch in the "on" position you can press this button, which causes the meters to run for a set period. The time period can be configured in the settings.
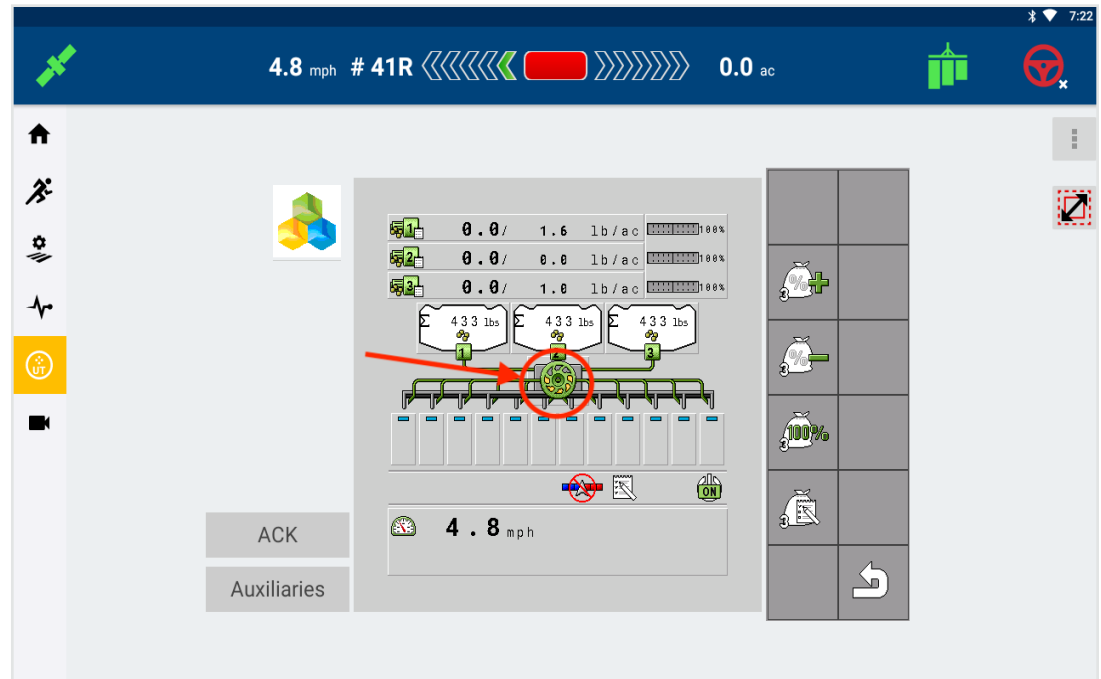

Run Screen – Prime
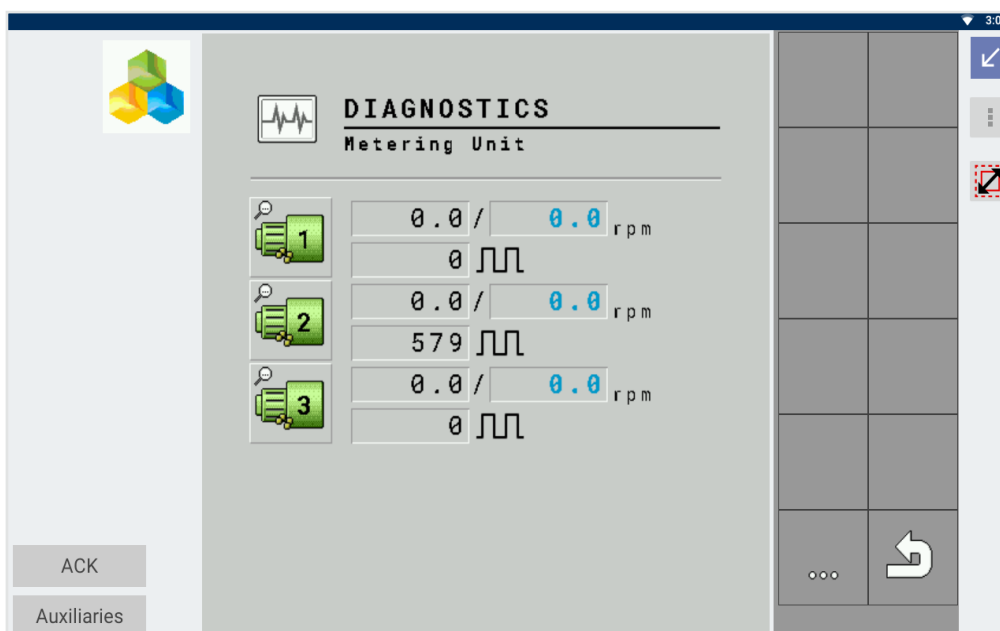
Diagnostics Screen – Metering Unit

→ Alternatively, in the UT, select the "Settings" icon, then select the "Diagnostics" icon, and then select the "Metering Unit Info" icon. Manually run the meters by adjusting the RPM on each. Change the RPM by selecting the blue text and entering a value.

→ Ensure valves are open and ready for application.

When using a different SaS:

→ Make sure the meter is ***completely empty*** before installing new cartridges. The amount of time it takes to empty the meter will depend on the rate the system is running at and the size of the granules. Below the cartridge and above the auger the meter will hold four ounces of SaS product. Run the meter at 200 RPM for two minutes to empty the meter and appropriately dispose of contents according to the SaS product label.
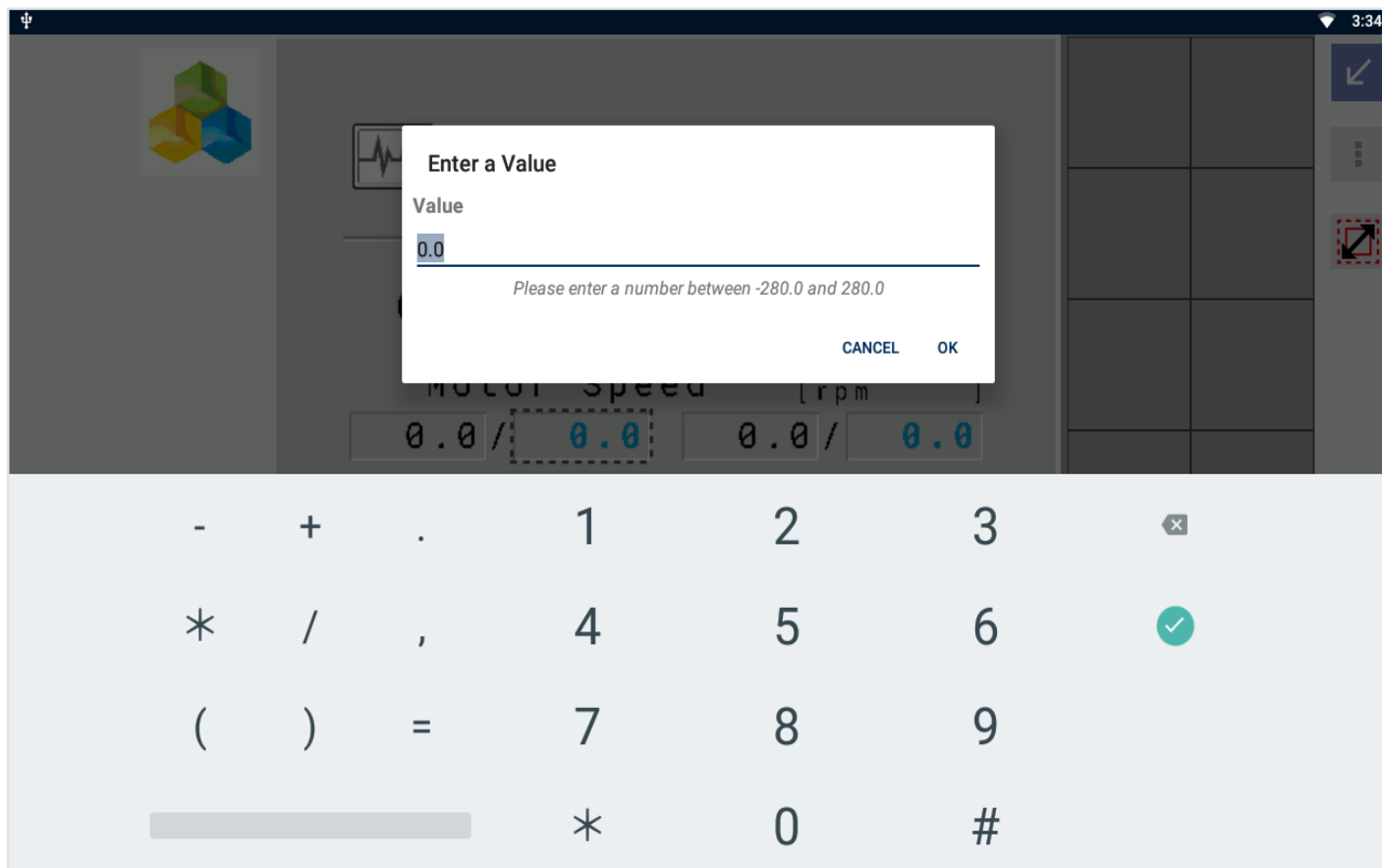
Install the SmartCartridge™ Containers:

→ The RFID-based SmartTag on each cartridge will be read, and the data will be sent to the user interface to ensure each SaS product is in the correct channel.

→ Recalibrate the system.

Post-Season

Post-Planting Steps

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End of Season Protocol

At the end of the season, follow this protocol to properly care for the SIMPAS™ system.
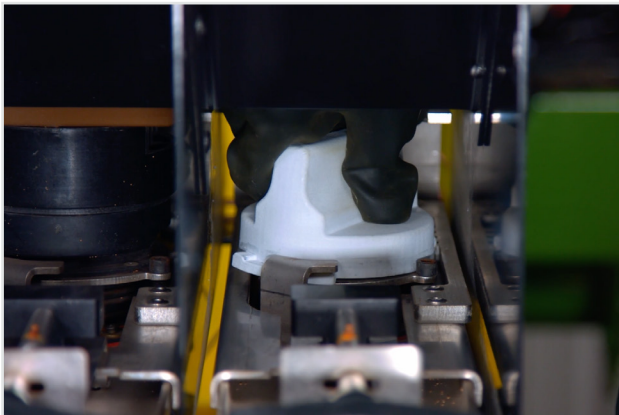
Step 1: **Remove SmartCartridge™ Containers.**

→ Make sure the cartridges are removed, palletized, and returned to the SIMPAS-applied Solutions retail agent they were received from.

Step 2: **Check valve system.**

→ Check valve system to make sure it is free from blockages and test each valve. Apply a dry lubricant and make sure the valves are free moving.

Step 3: **Add valve caps.**

→ Place one valve cap over each valve opening. Ensure the cap is secured.

Step 4: **Remove meters.**

→ Make sure valves on system are closed.

→ Run meters until they are empty to make sure they are completely free of SIMPAS™-applied Solutions (SaS) product. Run the meter at 200 rpm for two minutes to empty the meter.

→ Capture the SaS product and dispose of properly (according to label instructions) while wearing appropriate PPE. Never wash meters with water!

→ Take meters completely off, while wearing appropriate PPE, and store in a box that will protect them from any moisture.

→ Replace ISOBUS connector dust cap on wiring harness.

→ It is critical to protect meters from accidental exposure to water.
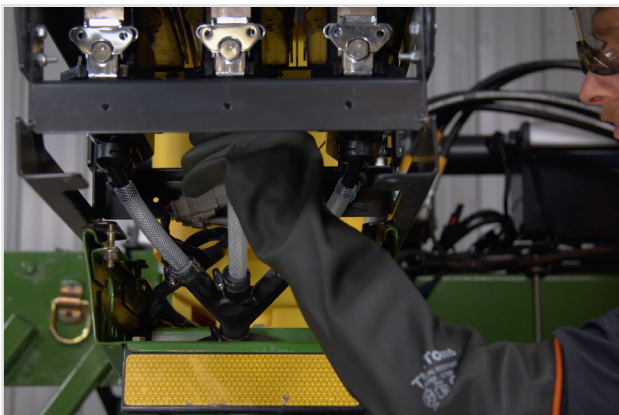
Step 5: **Remove product tubes.**

→ Remove product tubes and manifolds while wearing appropriate PPE that is specified on the label of each SaS product utilized. Store these in a box that will protect them and keep them clean.

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Step 6: **Clean channels.**

- → Clean and remove excess dirt while wearing appropriate PPE.
- → Avoid using pressurized water on the system, but a light application of a dry lubricant can be used to ensure smooth valve function.
- → Consult the label and wear appropriate PPE for each SaS product utilized.
- → If using forced air, wear a respirator and goggles.
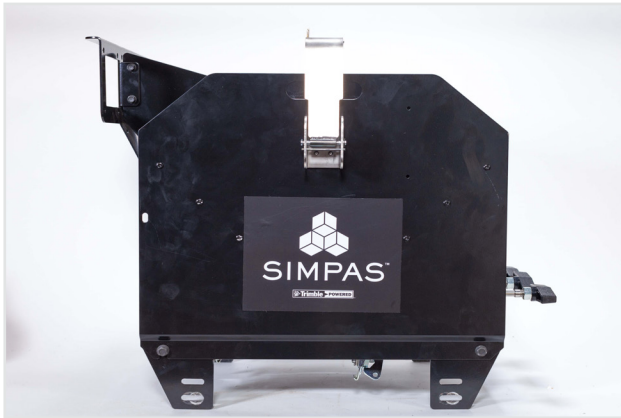
Step 7: **Store SIMPAS™ system inside.**

- → Store the SIMPAS system inside for the off season.

Beginning of Next Season Steps

At the beginning of the next season, follow this protocol.

Step 1: **Reinstall meters and product tubes.**

→ Make sure meters and product tubes are free of debris before reinstalling.

→ Reinstall meters and product tubes.

→ If a component needs to be replaced, contact your authorized Trimble dealer for replacement parts.

Step 2: **Check valve system.**

→ Check valve system to make sure it is free from blockages and test each valve.
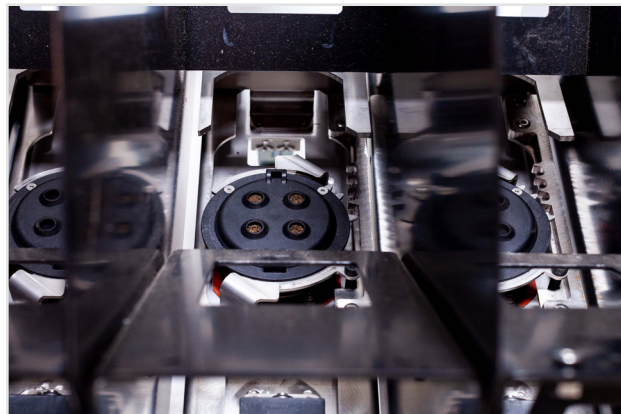
Step 3: **Clean ISOBUS connector.**

→ Spray electric contact cleaner on ISOBUS connectors on all harnesses to ensure good electric connection.

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Step 4: **Inspect components.**

→ Inspect all structural components and brackets for wear, cracks, or malfunctions. Determine if any component needs servicing or replacement.

→ If a component needs to be replaced, contact your authorized Trimble dealer for replacement parts.

→ Inspect that all fastening components on brackets and the partition assembly to ensure they are tight and secure.

→ Inspect all the electric wiring components for potential servicing and replacement.

→ Confirm that all wiring and harnesses are secured and fastened.

→ Make sure there are no visible blockages in the product tubes.

Step 5: **Calibrate system.**

→ Now, it is time to load the SmartCartridge™ Containers and calibrate the system.

Calibration

For step-by-step instructions for calibrating the system, return to the "Pre-Season" section of this guide.

Liquid System

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Liquid System Components

Liquid SmartCartridge™ Container with Quick Connects on the Cap
(Not connected)

Liquid SmartCartridge Container with Quick Connects on the Cap
(Connected)

Liquid SmartCartridge Container with Quick Connects on the Cap
(Side profile)

Liquid Pump Housing with Product Tube

Pump and Flow Sensor

Meter Cable

Product Tube to Furrow

Product Tube to Pump

Pump Controller Housing with Gaskets

Pump Controller
(Side profile)

Manifold with Blocking for Liquid Usage

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Liquid System Installation

We'll assume the installation is being done on a fresh unit that hasn't been installed or used anywhere previously.
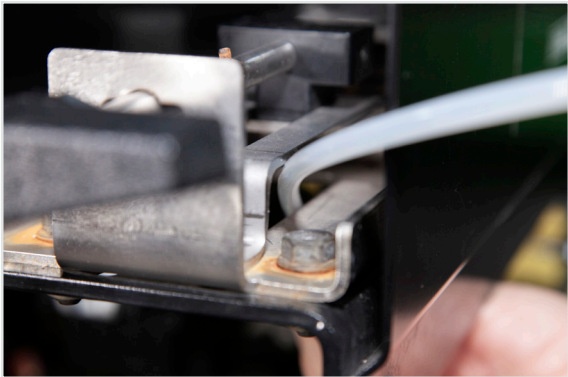
Step 1: **Install the pump housing.**

→ Install the pump housing onto the front of the cartridge slot using provided bolts.

Step 2: **Place the product tubing.**

→ Place the product tubing as seen in the video.

Note: It is important to route the tubing through the Partition Assembly (instead of to the outside) to avoid the tubing being cut or damaged.

Step 3: **Run the product tube down to the furrow.**

→ Use a marker to mark the point at which to cut the tubing and make the cut using pliers or a similar tool. Place the product tube so that the product will flow into the furrow.
→ It is important to cut the end of the tube on a 45-degree angle to provide protection against foreign material entering the tube during operation.
→ When placing the tube, ensure the "long" side of the cut faces the direction of travel of the planter.

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Step 4: **Remove the appropriate number of product tubes.**

→ When installing the granular material manifold, remove the appropriate number of product tubes from the top side of the manifold.

→ Place a manifold cap over the now opened stem or stems of the manifold.

Step 5: **Attach the manifold.**

→ Attach the manifold onto the Granular SmartCartridge™(s) using the provided clips.

Step 6: **Attach the pump controller.**

→ Attach the pump controller as you would for a Granular Meter.

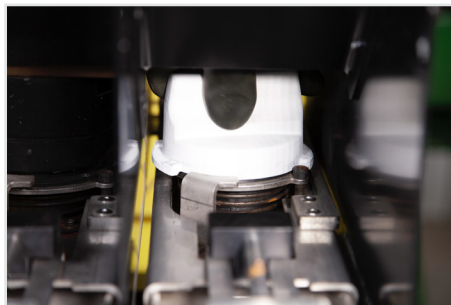*Note: The photos in the video show proper alignment for the pump controller.*

Step 7: **Connect the harness.**

→ Connect the harness to the Liquid Meter. The harness is fully seated when an audible click is heard.

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**Step 8:** **Place cap over the unused valve(s).**

→ Place cap over the unused valve(s) on the partition assembly.
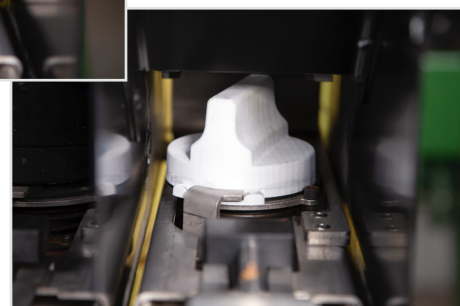
Installing the Liquid SmartCartridge™ Container

Step 1: **Install the liquid SmartCartridge.**

→ Ensure that the product tube is not in the way of the empty cartridge slot. Place the liquid SmartCartridge into the cartridge slot. Be sure that it is aligned properly as you would with a granular cartridge.
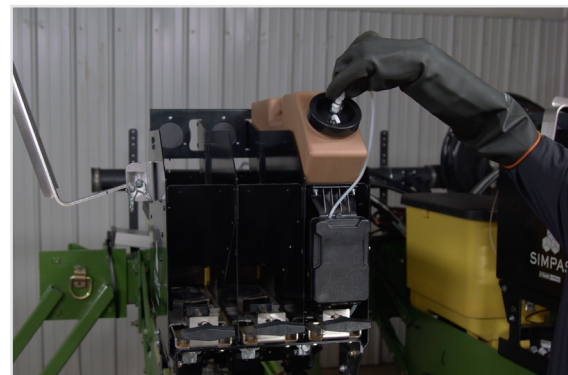
Step 2: **Attach the product tube.**

→ Attach the top of the product tube onto the Quick Connects on the liquid SmartCartridge and ensure that it latches securely.
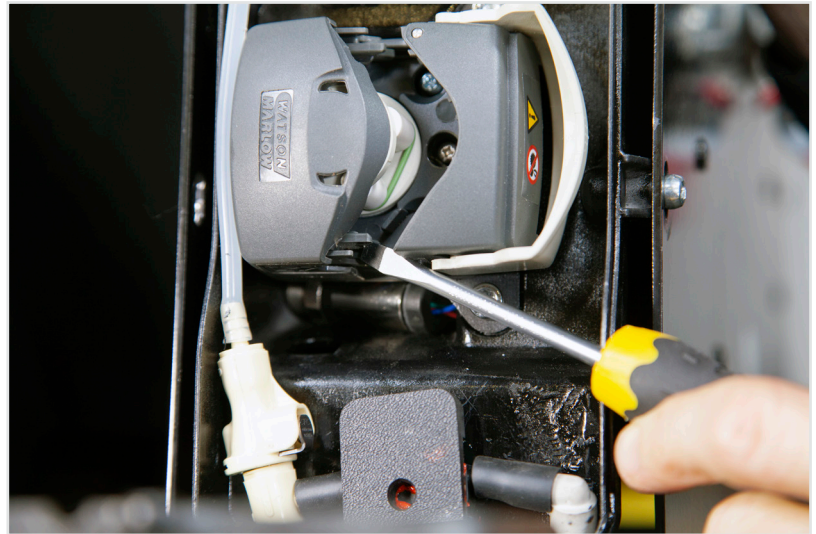
→ Replace and lock the arm that secures the SmartCartridges.

Verify the pump tube holders are set to the correct location.

→ The pump tube holders, located inside the pump housing to the left and right sides. To ensure correct pump operation, it is important to set the tube holders to the position that matches the tube size being used.

Review the table to select the correct tube holder location:

Tubing Size	Tube Holder Location
1/16" ID	Higher position
1/8" ID	Higher position
3/16" ID	Lower position

To change the position of the tube holders, do the following:

→ To change from the higher to the lower position, carefully press down and then slide the holder across to lock it into the lower position.

→ To change from the lower to the higher position carefully press down and across to release the holder and allow it to come up to the higher position.

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Liquid SmartCartridge™ Container Removal

Step 1: Unlock and lift the arm that secures the cartridges.
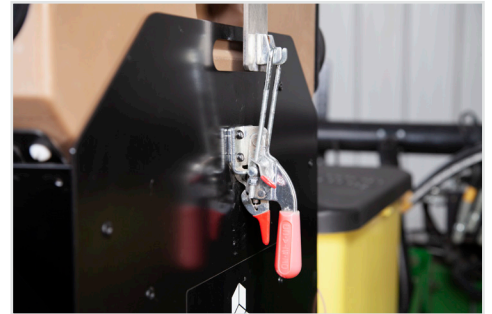
Step 2: Detach the product tube from Quick Connect on the cartridge.

Step 3: Install the liquid SmartCartridge.

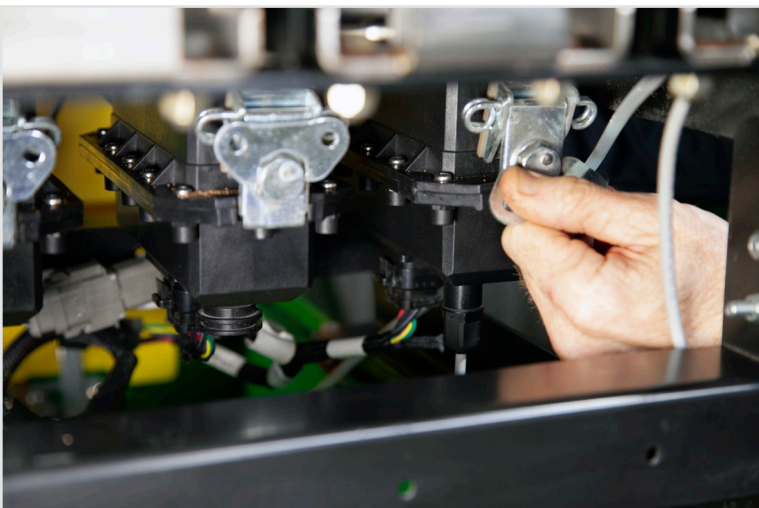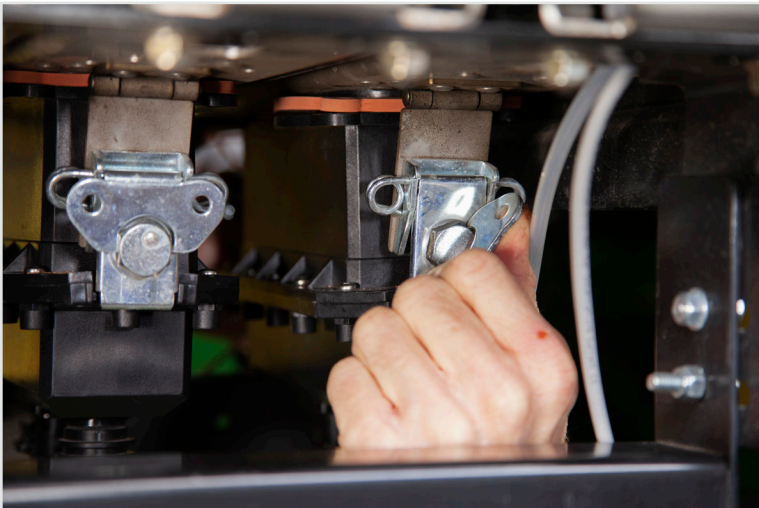**Step 4:** Unclip the harness from the bottom of the metering unit.
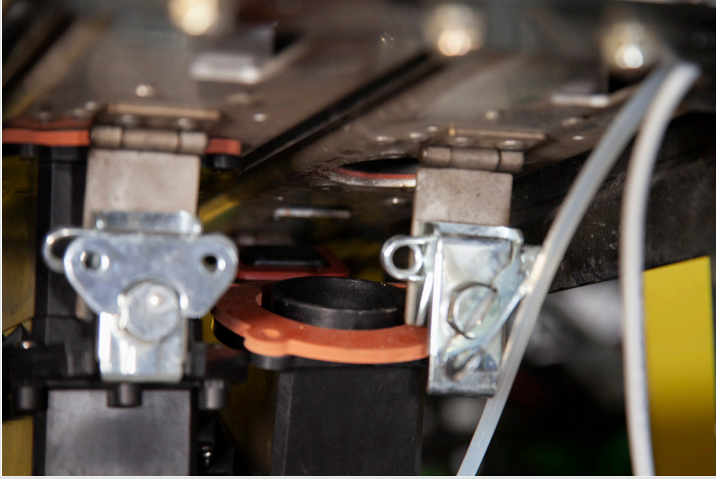

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Step 1: To remove the pump controller, unclip the harness.

Step 2: Unlatch the QuickAttach component holding the pump controller to the base unit.

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Step 3: Lower the pump controller away from the base unit.

Step 4: Detach the pump housing and carefully pull out the product tubing.

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FAQs

How many acres per fill can I cover with my planter?

The user interface will allow you to have an estimate of acres remaining. The cartridges hold a specified amount of SIMPAS™-applied Solution (SaS) product. Use the SaS product rate, planter width, row spacing, and proportion of fields in management zones where the SaS product will be applied to determine how many acres per fill can be covered with your specific system.

What types of products will be available to operators?

Granular and liquid SIMPAS-applied Solutions (SaS) of synthetic or biologic manufacture, consisting of nematicides, fungicides, insecticides, micronutrients, plant health/biostimulants, inoculants, and other potential SaS categories of crop inputs that can be prescriptively applied at planting. Please contact your SaS retailer to discuss specific SaS products available for use in the SIMPAS system.

How does the system apply liquid and granular products?

There are two types of SmartCartridge™ Containers available — one for liquid SIMPAS-applied Solutions (SaS) products and one for dry SaS products. Both are interchangeable within the same channels on the partition assembly, taking less than 30 seconds to reconfigure an individual cartridge receptacle from dry to liquid or from liquid to dry.

Does the SIMPAS system require a Trimble display?

The system has been successfully tested and run with multiple operators utilizing Trimble's GFX-750 display. While the user interface was developed according to ISO-based standards, please consult with your SIMPAS-applied Solutions (SaS) retailer to better understand the capabilities of other ISO-based displays to run the system.

### How are prescriptions created for products?

Trusted advisors will use a variety of inputs such as sampling/sensing, historical yield data, soil type, elevation/ topography, and historical knowledge of previous issues to create a location-specific prescription for issues SIMPAS can help operators address. The issue-specific prescriptions for each of the three SIMPAS-applied Solutions (SaS) are uploaded easily to the SIMPAS controller.

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How do I load a prescription?

Check the information from the manufacturer of the display being used to control the SIMPAS™ system for specific information and/or coordinate with the trusted advisor who developed your prescriptions to provide the associated formatted files needed in the display for each of the SIMPAS-applied Solutions.

How do I confirm my prescription has been sent to the ISOBUS system?

On the Run screen of the UT, a white notepad graphic will appear by each meter icon when a prescription is successfully loaded and active. Additionally, there is a notepad on the diagnostics bar that indicates the prescription is active (highlighted below). Remember, the task controller needs to be in operation for the prescription and notepad to work.
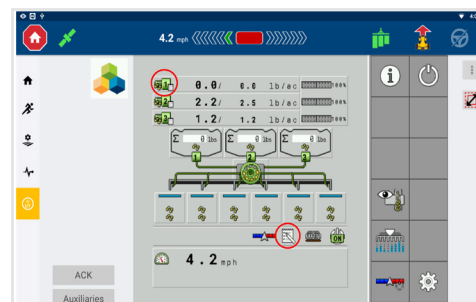
How do I get charged for the product I use?

SmartCartridge™ Containers are returnable, refillable, and reusable. At the time of purchase, operators will be invoiced for the acres that are planned for application based on the per-acre price for each individual SIMPAS-applied Solution (SaS) product. When cartridges are returned to the SaS retail agent, RFID-based SmartTags will be read to validate application information to ensure that the operators only pay for the acres treated.

During Operation

Why is it important to prime the meters?

Priming the meters ensures that SIMPAS-applied Solutions (SaS) has filled the meter and is ready to dispense at the appropriate rate when the planter enters the desired application area. This makes sure there are no skips in application when operation begins.

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How do I prime the meters?

There are two ways to prime the meters.

First, the wheel button in the center of the boom graphic on the Run screen (highlighted) can be used to prime the meters. The operator can be stationary, and with the master switch in the "on" position, you can press this button which causes the meters to run for a set period. The time period can be configured in the settings.
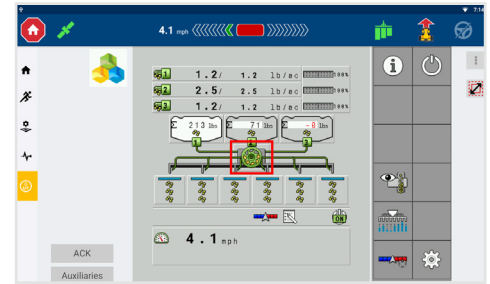
Alternatively, in the UT, select the "Settings" icon, then select the "Diagnostics" icon, and then select the "Metering Unit Info" icon. Manually run the meters by adjusting the RPM on each. Change the RPM by selecting the blue text and entering a value.

Why it is important to empty the meter before troubleshooting or changing?

To ensure that no one is exposed to any of the SIMPAS™-applied Solutions (SaS) product, it is important to first close the valve, and then run the existing SaS product through the meter to eliminate the potential to be exposed to any residual chemical when detaching the meter. Always remove the SmartCartridge™ Container before detaching the meter.
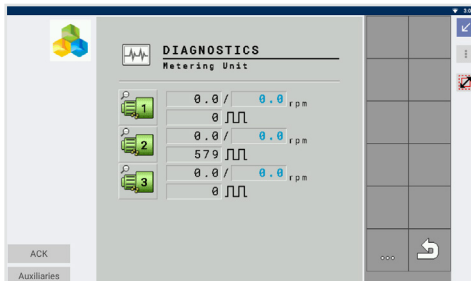
How do I empty the meters?

Below the SmartCartridge Container and above the auger, the meter will hold four ounces of SIMPAS-applied Solutions (SaS) product. Run the meter at 200rpm for two minutes to empty the meter. Dispose of SaS product according to label specifications wearing required PPE. Ensure the cartridge valve is closed and that the cartridges are removed prior to running the meter.

When a meter becomes stalled, does it damage the meter if the system continues operation?

The meter is designed to prevent any damage due to stalled operation.

Who do I call and where do I go for in-season support?

For equipment support, please contact the authorized Trimble dealer you purchased your system from. For support related to the SIMPAS-applied Solutions (SaS) products in the SmartCartridge Containers, please contact the SaS retailer where they were purchased.

How do the RFID-based SmartTags work during operation?

Each row contains a single RFID Receiver and three RFID Antennas. Periodically, as the system operates, these items read and write information to the RFID-based SmartTags that are on each individual SmartCartridge™ Container. You will receive alarms and information from the RFID SmartTags during operation, follow the text on these alarms to correct any errors.

Why is it important to set up the Task Controller?

To ensure that as applied data is being recorded and the prescription is running properly, the first step is to set up the Task Controller. The SIMPAS™ system will not operate at the prescribed rate if the Task Controller is not functioning correctly. Also, the correct functioning of the Task Controller ensures that as-applied data is recorded and the prescription is being applied correctly.

In the User Interface

How do I view blockage information for individual rows?

From the Run screen, select the "Row View" icon. Each of these green bars represents the current blockage state of each meter. Green means it is functioning correctly. If a row is red, it indicates there is a blockage or no flow. Click on each product bar to see the details for one SIMPAS-applied Solutions (SaS) product at a time.
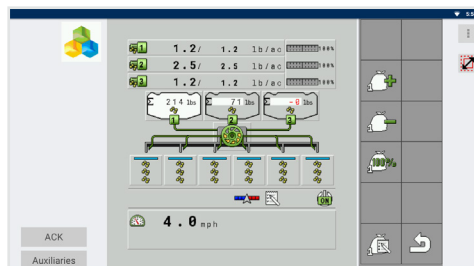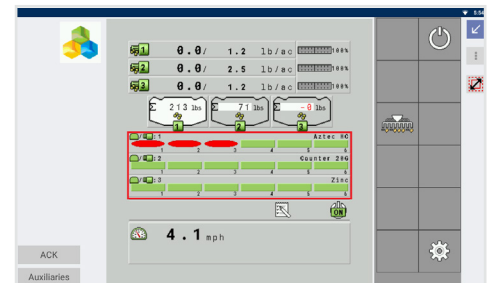

How do I adjust my rate?

When using task control, target rates are set up in the product or materials section of the operating system performing task control, such as Trimble's Precision IQ software when using a GFX-750 display. Target rates are controlled by the associated prescription. The target rates will automatically be set if a prescription is loaded and activated on the SIMPAS Run Screen.

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How do I calibrate a single meter versus an entire channel?

To calibrate one metering unit at a time, select the SIMPAS™-applied Solutions (SaS), then select the row unit to test.
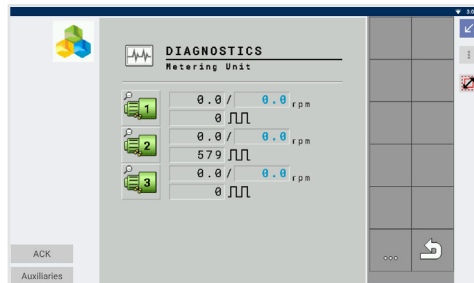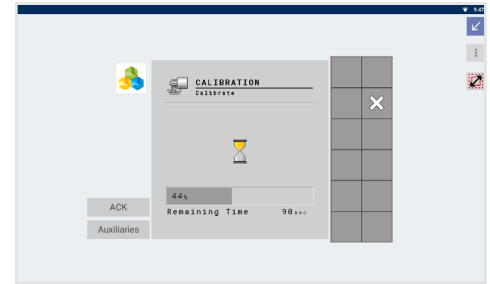
How do I test or run the meters when not in the field?

Ensure the cartridge valve is closed and the cartridge is removed prior to running the meter. Additionally, make sure meters are empty or calibration bottles are on the meter.

In the UT, select the "Settings" icon, then select the "Diagnostics" icon, and then select the "Metering Unit Info" icon. Manually run the meters by adjusting the RPM on each. Change the RPM by selecting the blue text and entering a value. If you leave the diagnostics screen while the meter is running, the system automatically shuts the meter off.

How do I enable Task Controller for all three products at once?

There are two buttons you can use to enable the Task Controller target rates. One enables task control for all SIMPAS-applied Solutions (SaS) products at the same time (if they are properly defined in the task controller's operating system); the other allows you to toggle the task controller for individual SaS products.

The button to the right of the product bars highlighted below will allow you to turn Task Control on or off for all 3 products. Touch the notepad icon at the bottom of the icon grid. Note the status icon next to the metering unit icon to determine the current state.

NOTE: The SIMPAS icon changes to a bar graph when the SIMPAS master switch has been powered on.
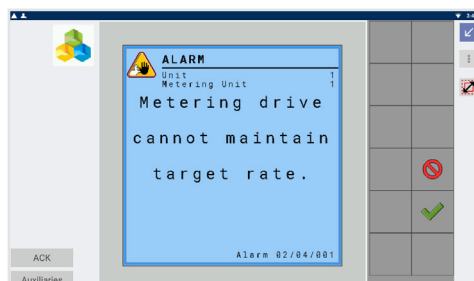

How do I clear alarms?

Click the green check mark on the alarm screen to acknowledge the alarm. Then, address the specific alarm. If there is a reason to continue operation, click the red circle to ignore the alarm. The operator will have to confirm that action. This will suppress the alarm until the system is shut off then on again.

How do I check my software/firmware version?

From the Settings Screen, select "Diagnostics," and then select the "ECU Settings" icon.
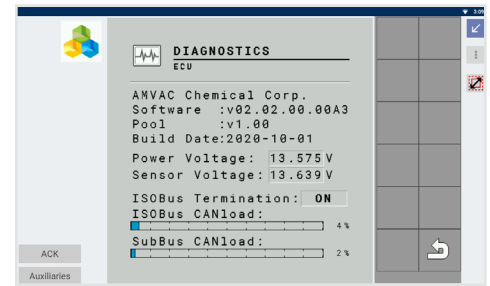
Troubleshooting

Who do I call and where do I go for in-season support?

Contact an authorized Trimble dealer.

What do I do if one meter is not working?

Check voltage and complete a physical inspection as outlined:

→ If one meter is not working, check the voltage to ensure the meter has required power, voltage should be a minimum of 12 volts.

→ Next, run the blockage sequence on the user interface to run meters forwards and backwards at 200 RPM.

→ In the UT, select the "Settings icon", then select the "Diagnostics" icon, and then select the "Metering Unit Info" icon. Manually turn on the meters by adjusting the RPM on each. Change the RPM by selecting the blue text and entering a value. Set it at a higher RPM than normal, and try to push SaS product out to clear it. It can also be set at a negative number to have it run in reverse.

→ Run the meter at 200 RPM for two minutes to empty the meter.

→ If there is power, but no functionality, put on required PPE for the SIMPAS™-applied Solutions (SaS) product being applied, and first check the product tube for physical blockages.

→ Next, close the valve and detach the meter. Confirm there are no blockages in the hopper.

→ Inspect valve for blockages.

→ If the problem cannot be solved, replace the meter and/or call your authorized Trimble dealer.
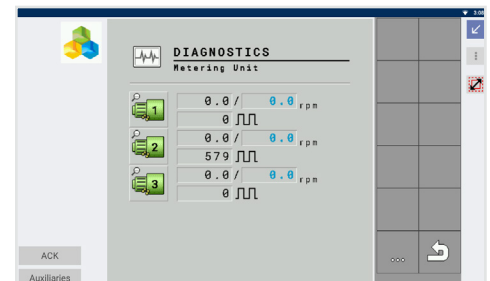
What do I do if all the meters are not working?

If all meters are not working, there is likely an electrical issue or the work position switch (lift switch) is not functioning properly. Check the wiring harness and work position switch.

Check the voltage to ensure the meter has required power – a minimum of 12 volts. Then, check that the appropriate number of meters are addressed. From "Diagnostics" screen, select "Meters," and then readdress the meters. If meters are still not working, check the cabling between rows to ensure continuity. If you can not find resolution, call your authorized Trimble dealer.
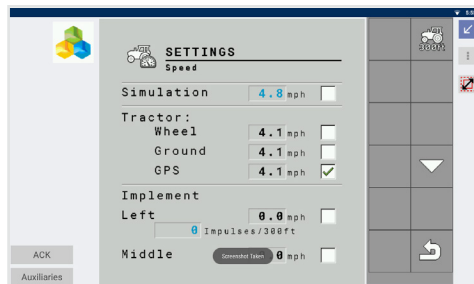
## What do I do if my cartridges are not emptying as fast as I think they should?

There are a variety of factors that could prevent the cartridge from emptying as quickly as expected. Ensure your settings are correct for row spacing, implement width, number of sections, calibration coefficients, and speed.

Consider recalibrating in consultation with your authorized Trimble dealer.

If the valve is not aligned, what should I do?

Only adjust the valve if there are issues while installing the cartridge. Note the position of the valve handle; if the valve handle is in the closed position, the valves should appear aligned.

The granular SmartCartridge™ valve should align with the metering unit valve perfectly, and they should nearly touch but not be flush with each other.

Incorrect Alignment
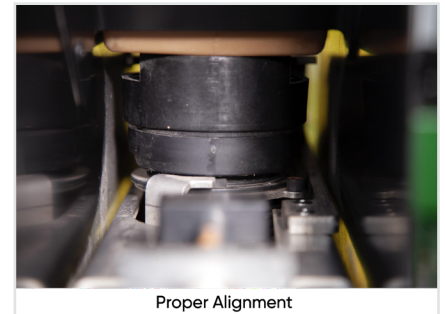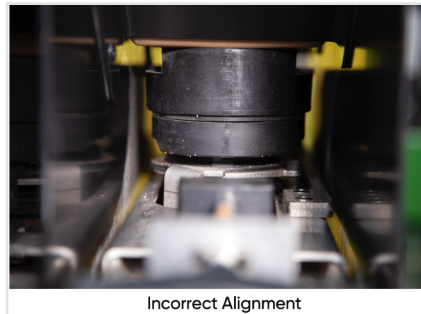
Proper Alignment

If the cartridge is not aligned, what should I do?

If the granular SmartCartridge is not properly aligned, the securing arm will not be able to close properly. You can check for proper alignment by looking at the top line of all three cartridges and by looking at the valve alignment underneath the cartridge.

The cartridge is properly aligned when the tops of all three cartridges are even and when the valves are aligned in proper proximity. You will then be able to properly latch the securing arm. For more on valve alignment, see the section "Troubleshooting: If valves are not aligned, what should I do?"

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Pump is turning but product won't flow.

Symptom: The pump is turning, the tubing has been confirmed in the correct location, but product won't flow.

Cause: If the tubing is left clamped onto the pump for a number of days or weeks, the tubing can collapse or become crushed. If this happens, the tubing loses elasticity and is unable to provide the correct motion to allow product to flow.

Solution: Open the pump housing and move the tubing along, so that a 'fresh' section of tubing is now routed inside the pump. (i.e., a section of tube that hasn't been used inside the pump, previously).
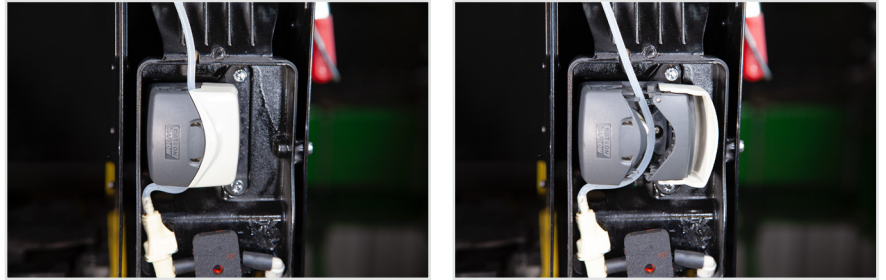
Pump won't prime.

Symptom: At initial start, up the pump won't draw liquid from the liquid SmartCartridge™ container.

Cause: The tube holders on the side of the pump are not set correctly.

Solution: Ensure both tube holders are set to the same position and that the position is correct for the size of tube in use.

→ For 1/8th Internal Diameter tubing, the tube holders can be placed in either the lower or higher positions. Ensure that both holders are set to the same setting.
→ For 1/16th Internal Diameter tubing, the tube holders can be placed in the higher position. Ensure that both holders are set to the same setting.
→ For 3/16th Internal Diameter tubing, the tube holders can be placed in the lower position. Ensure that both holders are set to the same setting.
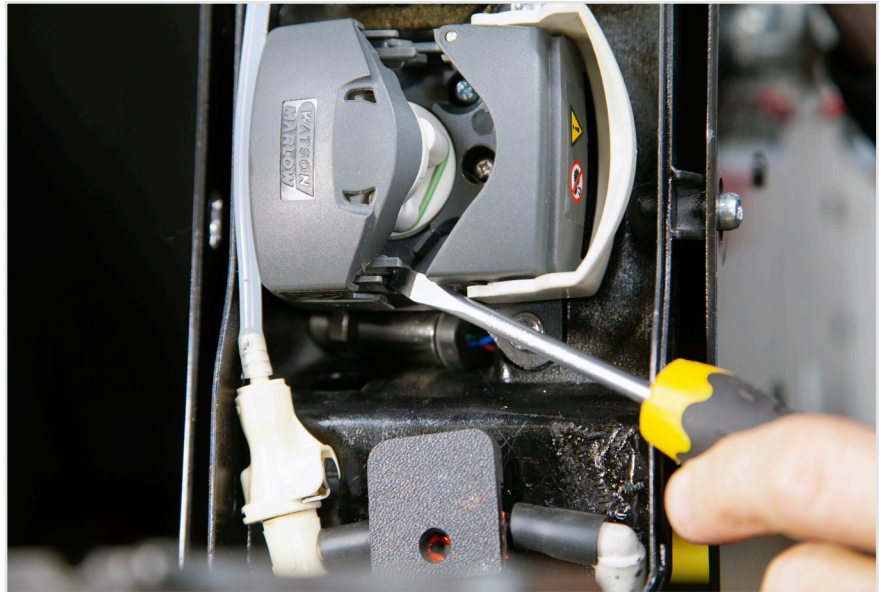
To change from the higher to the lower position, carefully press down and then slide the holder across to lock it into the lower position.

To change from the lower to the higher position carefully press down and across to release the holder and allow it to come up to the higher position.
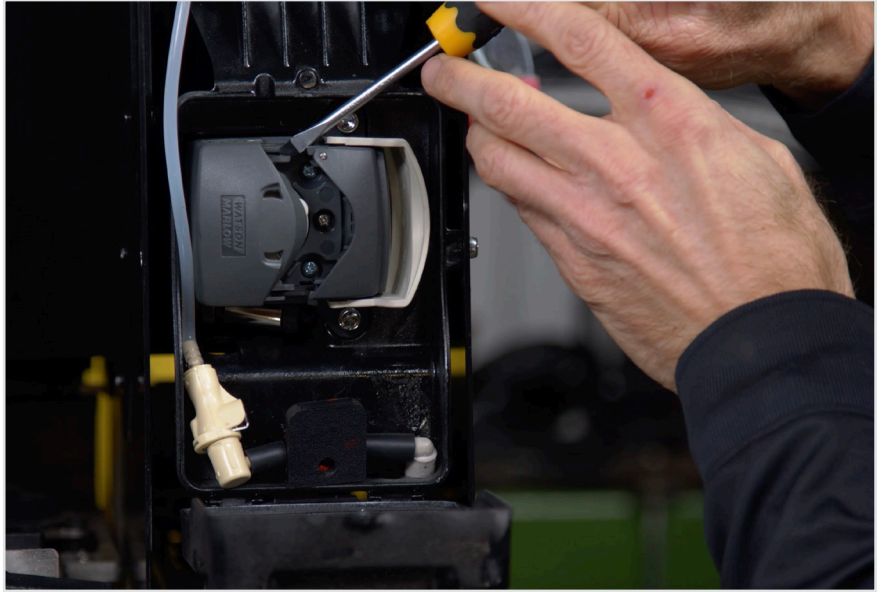
Product won't flow.

Symptom: The pump is turning, but product is not flowing.

Cause: Tubing is not routed correctly.

Solution:
1. Open the housing. Ensure that the product tube is properly placed through the pump.
2. Ensure the tubing is properly connected on both sides of the flow sensing unit.

Product is not flowing from the liquid SmartCartridge™.

**Symptom:** Product not flowing from the liquid SmartCartridge.

Cause: Liquid SmartCartridge quick disconnect fitting not seated correctly.

Solution: If the product tubing attachment does not smoothly attach to the liquid SmartCartridge attachment, ensure that there is nothing blocking the inside of the attachment or the sliding piece that allows the attachment to lock in. Press it a few times to loosen it if it appears to be stuck.
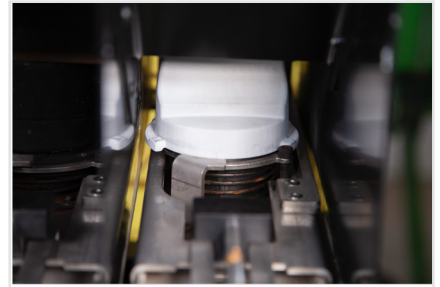
The metering unit cover is rattling or not secure.

Ensure the metering unit cover is secure over the metering unit.
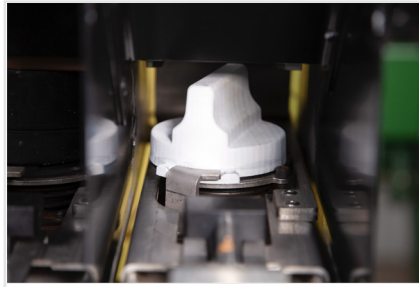
Proper Alignment

Improper Alignment

Glossary

Electronic Control Unit (ECU)

Manages communications and data/information transfer between meters and display.

ISO-based displays

ISO stands for International Organization for Standardization. The ISO works with standards institutes from over 150 countries to develop technology and product standards.

Management zone

Spatially defined area of a field that has specific agronomic needs to be addressed by SIMPAS™-applied Solutions (SaS).

Prescription

Trusted advisor's recommended agronomic solution to address zone-specific needs.

Rate control

Electronic communication controlling each meter's rotation speed based on the prescribed rate and label requirements for application of the SIMPAS-applied Solutions (SaS) product according to the physical properties of the planter, including implement width, row spacing and the speed of operation.

Section control

This is the automatic start, stop, and rate control for meters on a defined number of rows in the section. It is controlled by the system's GPS location and spatial data regarding areas that have already been applied, management zone boundaries, and field boundaries.
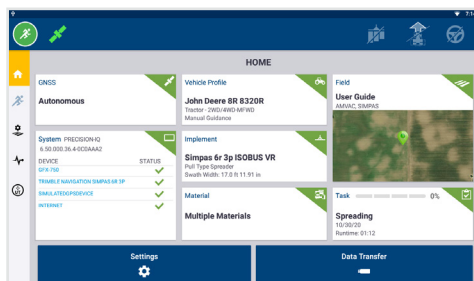
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Shapefiles

A specific management zone file type used to control product application in prescribed scenarios that are loaded into the SIMPAS™ system for prescriptive application of each individual SaS.

SIM

SIM refers to simulated speed used for calibration and troubleshooting to ensure product flow.

SIMPAS-applied Solutions (SaS)

SIMPAS-applied Solutions (SaS) are the products packaged in SmartCartridge™ Containers purchased from a SaS retail agent to meet specific agronomic needs. If you have questions about specific categories of products available or concerns about the SaS products you purchased for use in the system, please contact your retailer.
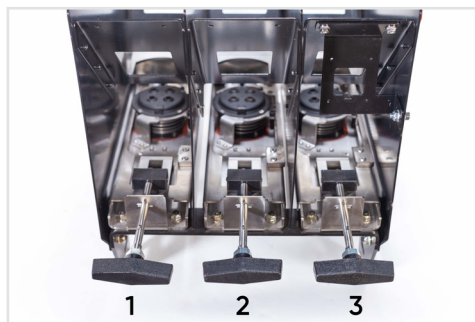

TC

The task controller sends prescription data back and forth to ECU. This is the mechanism that records as-applied data.

UT

Universal terminal or user interface display.

SIMPAS™ System Components

Channels 1, 2, 3

Areas on the partition assembly that receive SmartCartridge™ Containers are labeled 1, 2, 3 from left to right while standing behind the unit. (e.g., Row 1, Channel 1-2-3; Row 12, Channel 1-2-3).

Container securing lock

Device to hold all cartridges tightly connected to ensure proper valve connections.
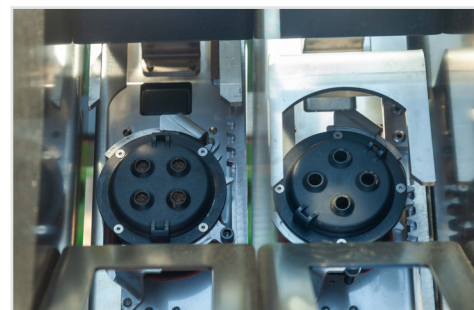

Granular meter

Located on the underside of the partition assembly, the granular meter contains the electronics, inclined auger, and motor that collectively control dispensing of SIMPAS-applied Solutions (SaS) products.

Granular product valve connection

Connection between valve on cartridge and valve on the partition assembly to enable SIMPAS-applied Solutions (SaS) product to flow into the granular meter.

Liquid meter slot

Location for bracket to mount liquid metering devices at the front of each slot.
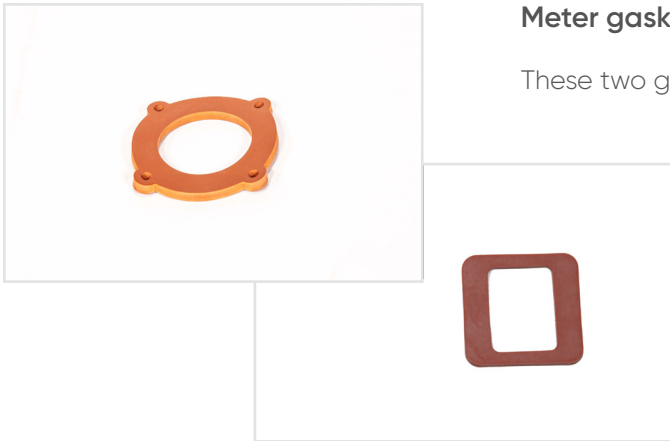
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Manifold

The manifold combines three granular product tubes into one flexible hose for dispensing product in the furrow.
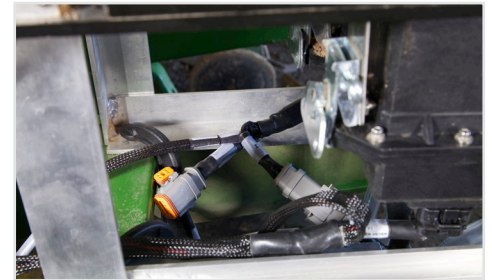

Meter gasket and square gasket

These two gaskets seal the meter to the partition assembly.

Meter wiring harness

Electrical communication connection from the electronic control unit to the meter.

Outlet Tube

Product travels out of the manifold into the flexible hose into the furrow. The flexible hose stays close to the furrow to ensure accurate placement of granular products. Flexible hoses vary based on planter make and model.
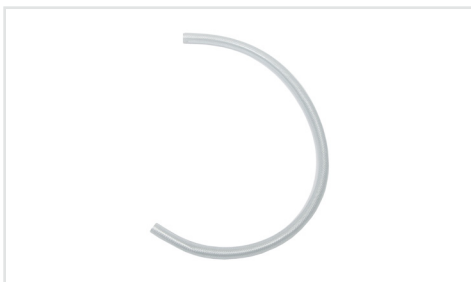
Partition Assembly

Attaches the SIMPAS™ unit to a planter's row unit.

Planter bracket

Planter-specific component to attach partition assembly to the planter.

Product Tube with Discharge Elbow

These move SaS products from the meter to the manifold.

Quick latches

These connect the granular meters to the partition assembly and allow for easy removal of the granular meter for inspection and/or replacement.

RFID Antennas

One antenna per channel will read/write to each individual RFID-based SmartTag and communicate with the RFID Reader/Writer. There is one per channel (three per row) provided with the RFID kit.

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RFID Reader/Writer

The RFID Reader/Writer will ensure that the correct SmartCartridge™ Container is loaded into the correct channel and will communicate errors to the operator. The RFID Reader/Writer writes the amount of product used/remaining to the RFID-based SmartTag to enable operators to receive a credit for unused contents upon return to the SIMPAS™-applied Solutions (SaS) retail agent.

SmartCartridge Containers (i.e., cartridges)

This holds SIMPAS™-applied Solutions (SaS) product. Pictured is a granular SaS cartridge. These cartridges come fully loaded with an RFID-based SmartTag to ensure safe and easy installation into the channel.

Valve handle

This opens and closes the valve. A cartridge cannot be removed when the valve is open. In order to remove/replace a cartridge, the valve must be closed. Pull out to open the flow, push in to close the flow.

Liquid System Components

Liquid Pump Housing with Product Tube

Not Connected   Connected   Side Profile

Liquid SmartCartridge Container with Quick Connects on the Cap

Manifold with Blocking for Liquid Usage

Meter Cable

SIMPAS™

Trimble POWERED

Product Tube

Product Tube to Furrow   Product Tube to Pump

Pump and Flow Sensor

Pump Controller Housing with Gaskets

Pump Controller (Side profile)