



SmartBox™ +

User Guide

This product use guide highlights the key features of the SmartBox+ system.





SMARTBOX⁺
A SIMPAS Technology

Introduction

SmartBoxTM +

SmartBox+ accurately and prescriptively delivers a variety of products in SmartBox containers. The system contains both metering and flow-sensing functions that ensure accurate application at a wide range of rates and speeds. It uses as-applied mapping to improve record-keeping in real time, displaying application rates and the number of acres on a full-color, touchscreen display with industry-standard ISO connections and a USB port for easy data transfer.

SmartBox+ is versatile, with a bracket to fit most planters.

Closed System Approach

SmartBox+ uses a closed-application system to minimize operator exposure while ensuring the system accurately delivers labeled rates. No more opening, pouring from, handling, or disposing of bags. This closed delivery system protects farmers and the environment.



SmartBox™ System Components and Functions



1

Transfer Container

The transfer container holds the SmartBox labeled product.

2

Valve Handles

When the valve handles are turned to the open position, not in the horizontal position, product will flow from the transfer container to the base unit.

3

Base Unit

The base unit mounts to the cradle or bracket, depending on the planter model. The QuickAttach system and meter attaches to the bottom of the base unit, and the SmartBox product transfer container sits on top of the base unit. When field-packed with product, the base unit can hold 15 pounds of product.



4

Tractor Power Harness

The tractor power harness connects the battery of the tractor to the ECU.



5

ECU to Meter Harness

This harness is a cable attaching the ECU to the first row of the SmartBox™+ system.



6

Meter Wiring Harness

The meter wiring harness serves as the electrical communication connection from the electric control unit to the meter.

7

QuickAttach System

The QuickAttach system allows for service and repairs of a meter without removing any bolts. Always use the required PPE based on the product label when removing a SmartBox+ meter.

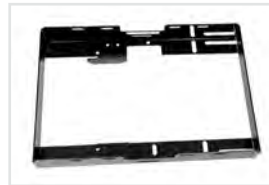
The QuickAttach system includes latches that connect the meter to the QuickAttach system, allowing for easy removal of the meter for inspection or replacement.



8

Cradle

The cradle is used to mount to the planter row unit or bracket. It holds the base unit assembly. However, not all brackets require a cradle. Your SmartBox+ dealer has the ordering and quoting guide detailing when the cradle is required.



9

Meter

Located on the underside of the QuickAttach system, the meter contains the electronics, inclined auger, and motor that collectively control dispensing of SmartBox products.



10

Drop Tube

Mounted on the planter row unit, the drop tube, if used, allows precise application of the SmartBox product into the furrow. Additionally, a flexible hose can be used in place of the steel drop tube to get the product to the furrow. The drop tube is no longer a part of the system for high speed planters, so in those instances, it will not be included.





Display

The display is mounted in the cab of the planter tractor and serves as the controller for the SmartBox™+ system. Pictured here is a GFX-350. GFX-1060 and GFX-1260 can also be used. There are also other compatible ISO-based displays available that can control the system.



Display Cables

The display cables allow for the Trimble GFX to connect to the ISO connection.



Harnessing

Multiple cables are part of the harnessing for the SmartBox+ system. They include the following harnesses: tractor battery, power extension, power tee, power injection, ECU to tractor, ECU to first row unit, row unit, and CAN extension.



Meter Gasket

The meter gasket allows for a seal between the meter and the QuickAttach system.



Nav 500

Nav 500 provides speed input, swath control, and as-applied mapping of the SmartBox+ system. Nav 900 can also be used.



Product Tube

The product tube moves the SmartBox™ product to the drop tube and into the furrow. It's important to make sure the angle of repose is not less than 30 degrees, and no bends are in the product tube.



Work Position Switch (Lift Switch) and Bracket

The switch lets the SmartBox+ controller know when the planter is in the plant position. Different planter models and brands require different styles of work position switches.

The work position switch bracket allows for the mounting of the work position switch. It is recommended to install close to the ECU.



Riser

The riser raises the base unit to allow clearance of the meter and the planter row unit. It also allows for the proper angle of repose for proper product flow.

The size or overall necessity of risers is based on the needs of each individual planter.



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.

- Hose clamps – qty 4
- Retention spring
- Small Diameter product tubing
- Large diameter product tubing
- Slide tube – inner slider (white plastic)
- Slide tube – outer slider (dark colored plastic)

SmartBox™ + Dos

When working with the SmartBox+ system, there are a few key practices to always remember:

- 1 When servicing the equipment, always wear Personal Protective Equipment (PPE) based on the label requirements for the SmartBox product being used.
- 2 Ensure SmartBox transfer container valves are turned to the open position after placing the transfer container on the base unit.
- 3 Inspect wiring harnesses to confirm everything is fully connected to provide proper electrical communication.
- 4 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.
- 5 Minimize exposure of transfer containers to moisture to ensure granular products are not adversely affected.
- 6 Ensure the SmartBox transfer container is latched to the base unit.
- 7 Ensure the hose connected to the meter is not bent at less than a 30-degree angle to enable the product to flow properly.



Always wear Personal Protective Equipment (PPE) when changing transfer containers or troubleshooting system components based on the label requirements for each of the products being used.



Inspect bolts and fasteners every season to ensure that the base unit is secure on the cradle, and the cradle is secure on the planter row unit.



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

SmartBox™+ Don'ts

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

- 1 Do not apply a product not available in a SmartBox transfer container. Do not modify the SmartBox transfer container to apply a product which is not available through SmartBox.
- 2 Do not apply a product above the target rate on the product label.
- 3 Do not refill a SmartBox transfer container.
- 4 Do not wash any SmartBox+ components with pressurized water and take every precaution to not expose water to the inside of a SmartBox+ meter.
- 5 Do not remove the meter without appropriate PPE.

Safety



Even with a closed delivery system, always wear PPE when changing SmartBox transfer containers or troubleshooting system components based on the label requirements for each of the SmartBox products. Do not remove the meter without appropriate PPE based on the product label.

Safety Precautions

Persons using a SmartBox™+ system to apply granular insecticides are responsible for obtaining, reading, and following all safety recommendations as stated on the manufacturer's SmartBox 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 SmartBox+ 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 SmartBox+ system is correctly installed, configured, maintained, and stored as defined in the SmartBox+ User Guide.
- The warranty will not apply to any aspect of the supplied SmartBox+ equipment if any portion of the equipment has been modified or misused.
- Software for operation of the SmartBox+ system shall not be changed or modified. All software associated with the SmartBox+ 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, but not limited to, cost of yield lost or replanting as a result of off-label applications of an approved SmartBox product.
- These terms and conditions represent the complete agreement between the manufacturer and purchaser, and no collateral, oral, or other agreements are the responsibility of AMVAC.





Getting to Know the User Interface

Universal Terminal and
Task Controller

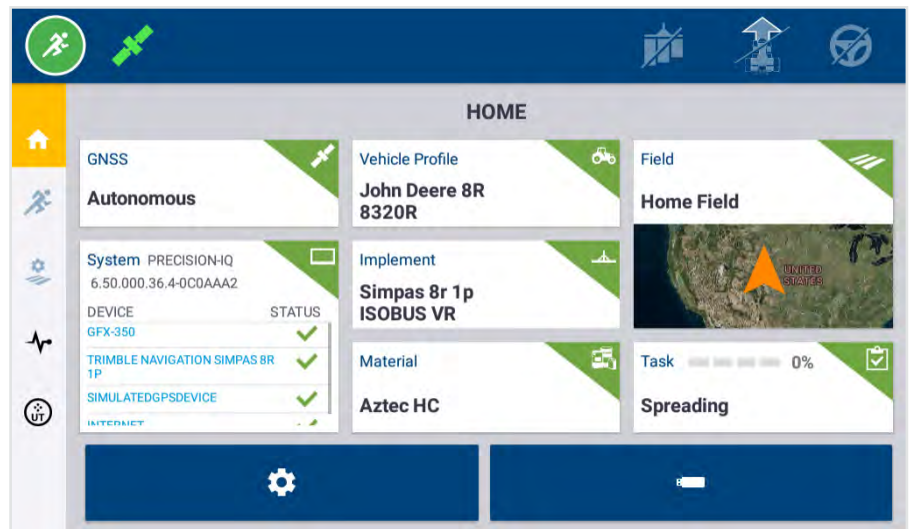
SmartBox™+ Controls

The SmartBox software to operate the system has been developed utilizing ISO-based standards to enable ISO-based displays with appropriate capabilities to control the system. Trimble's GFX displays and the AgLeader InCommand 1200 have been successfully utilized in commercially operating SmartBox+ systems. The balance of the training materials will be based off of Trimble's GFX suite of displays and Trimble's Precision IQ platform. Different displays will have slightly different configurations. To ensure data is captured successfully ensure that PIQ is running alongside UT for correct acre and billing information.

Task Controller (TC)

The task controller (TC) communicates prescription data with the Electronic Control Unit (ECU). It is important to set the TC up to receive as-applied mapping and prescription application data. Otherwise, application data will not be stored.

Example display image from Trimble GFX-350.



Universal Terminal (UT)

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

Example display image from Trimble GFX-350.

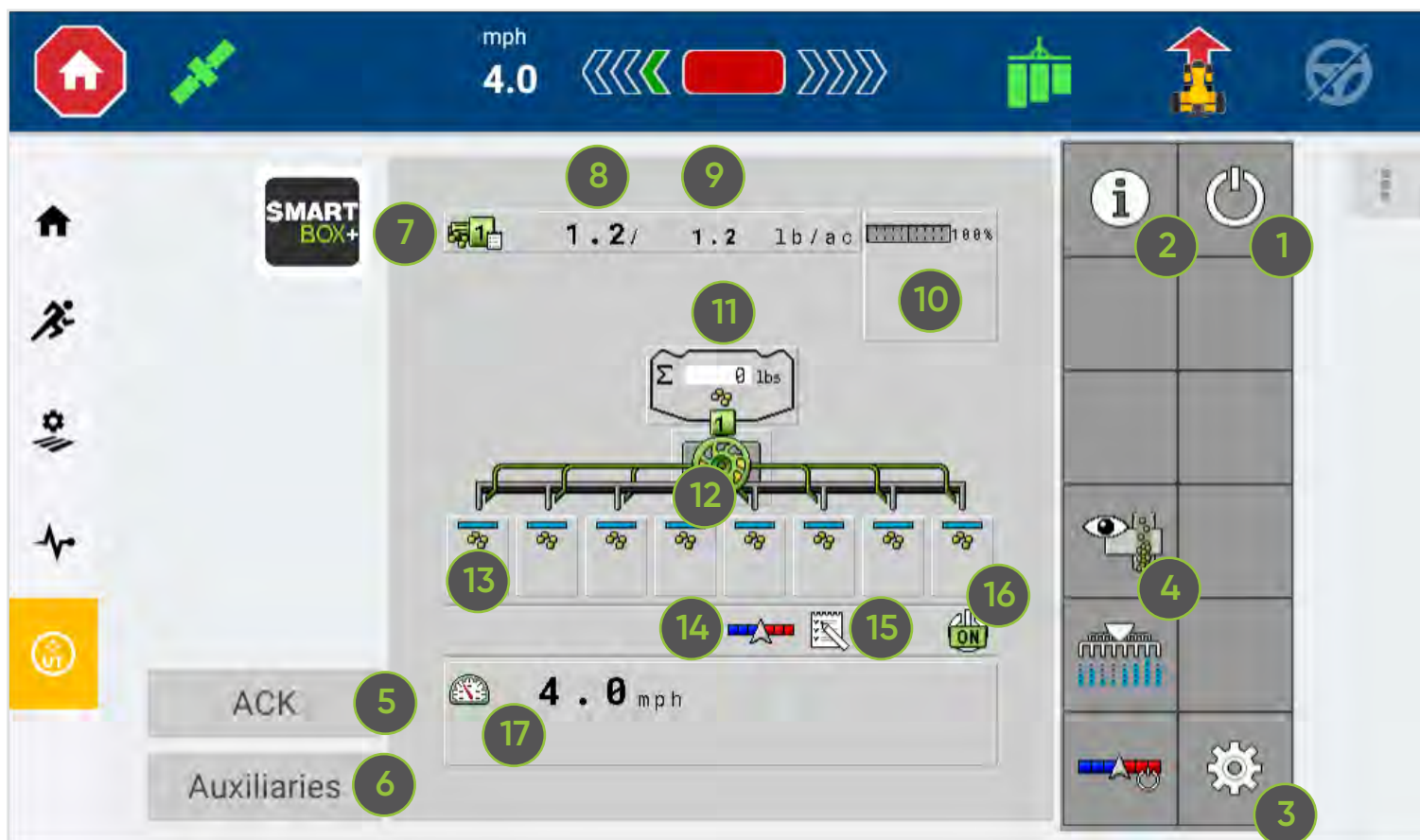


Navigating the Universal Terminal (UT)

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

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



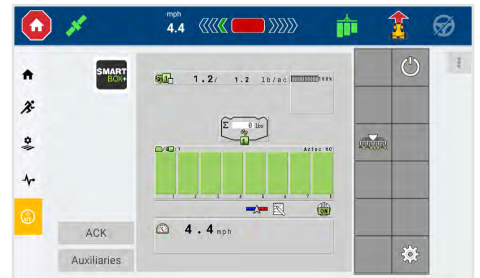
3 Settings Button

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

7 Product Bar

This bar is a touchable button. Selecting it allows the user to manually change the target rate of the product. It also allows the operator to switch between manual target rate change and Task Control rate change. When a product is loaded and activated properly, the Task Controller icon will display at the bottom right of the Product Bar icon. A notepad graphic next to a Product Bar icon signifies the product rate is being controlled by the Task Controller.



8 As Applied Rate

The number on the left indicates the rate currently being applied.

9 Target Rate

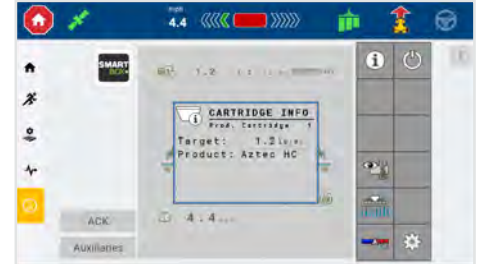
The number on the right identifies the target rate for the product.

10 Adjust Rates

This allows the user to adjust the product target rate or reset it to 100%.

11 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.



12 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 planter 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.

13 SmartBox™+ Row Unit Illustrations

These boxes represent each row unit. Up to 12 rows, each row unit 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 user either by physical switch on aux-N device or by touching the section on screen

14 Automatic Section Control

This indicates that section control is on.

15 Task Controller Indicator

This indicates communication with the task controller is occurring.

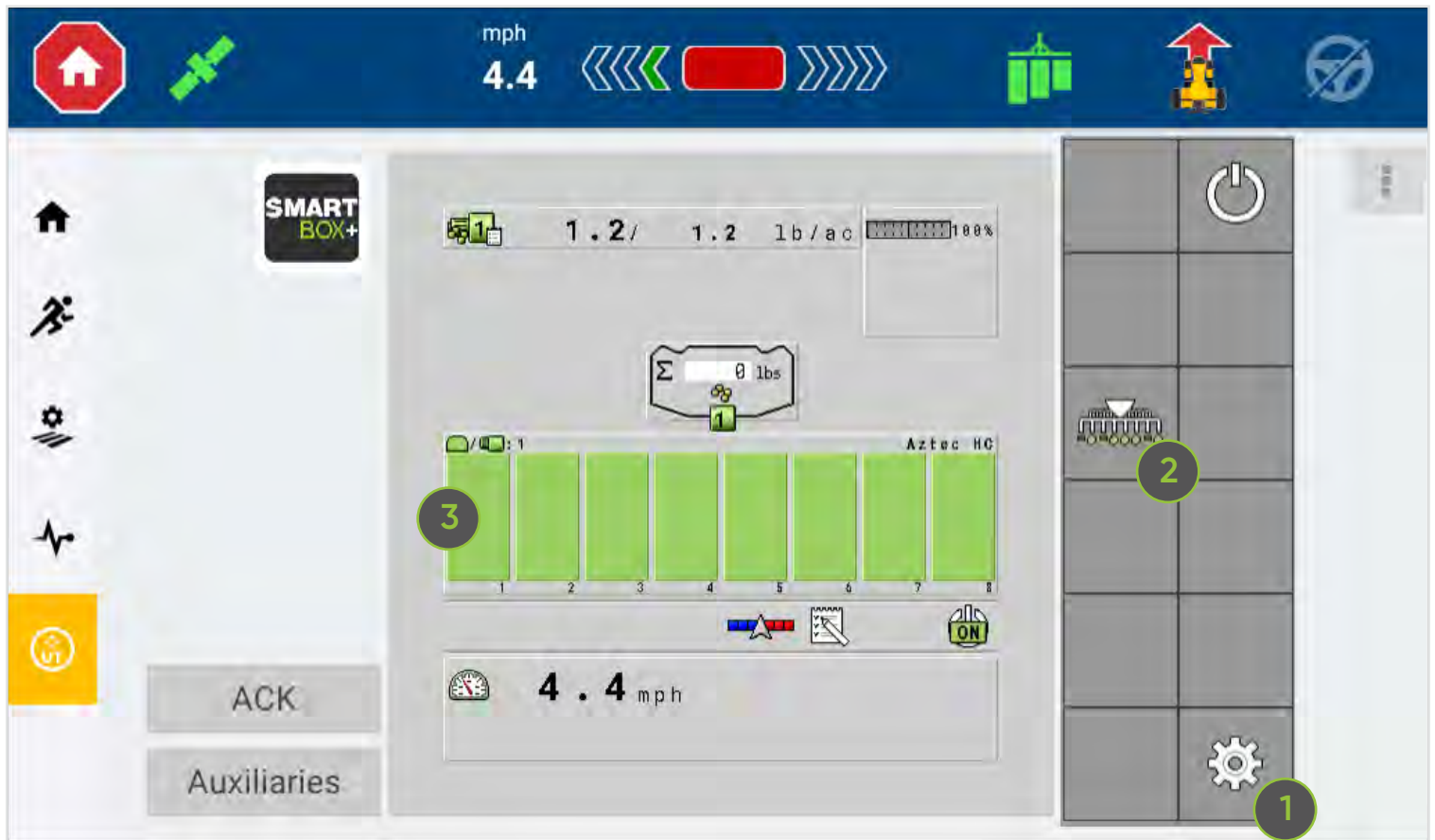
16 System Status

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

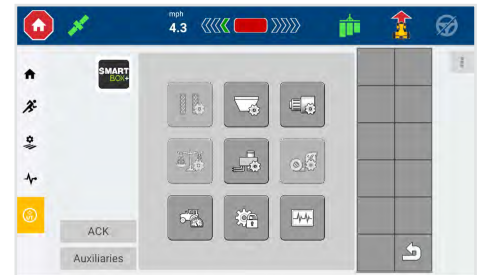
17 Speed

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

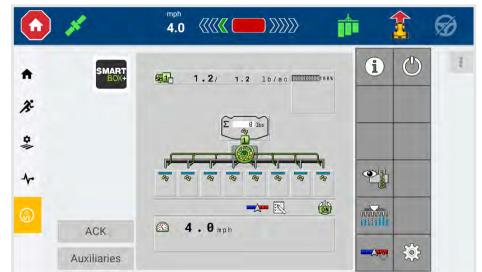
Run Screen: Row Blockage View



- 1** System Settings
This opens the Settings Screen.

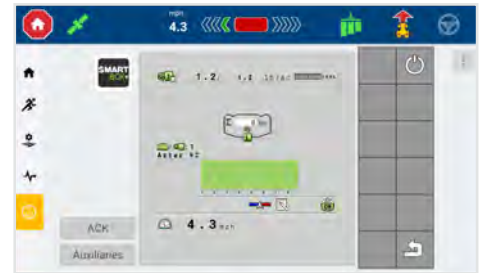


- 2** Section Control View
This icon toggles the view back to section control.



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.



Run Screen: Adjust Target Rate View



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

Target Rate Increase

Increases the target rate by the set target rate increment. The user defines the target rate increment.

4

Target Rate Decrease

Decreases the target rate by the set target rate increment. The user defines the target rate increment.

5

Reset Target Rate

Resets target rate to original value.

6

Product Bar

The Product Bar is a touchable button. When selected, the user can adjust the target rate for that product. A notepad graphic next to a Product Bar icon signifies a product's target rate is being actively controlled by the Task Control function.

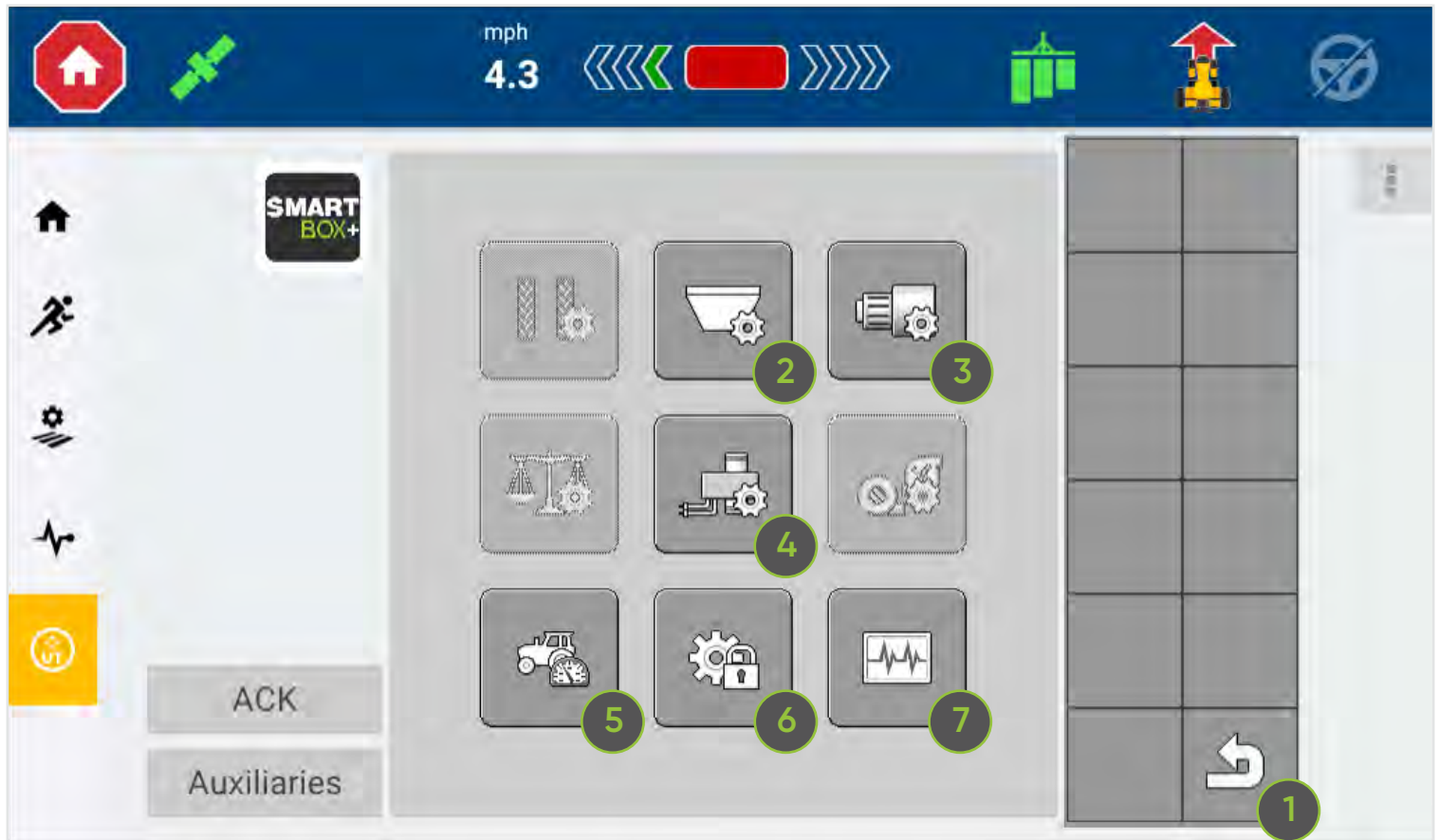
7

Percent of Rate Indicator Bar

Touching the SmartBox™+ button allows the user to adjust the target rate.

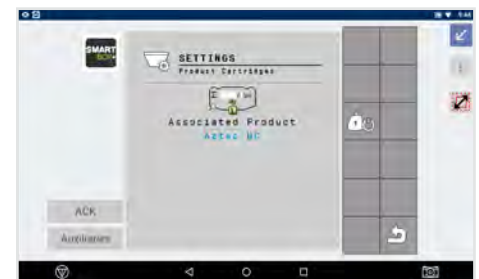


Settings Screen: Entire Panel



1 Back Button
Returns user to the previous screen.

2 Hopper Settings
The Hopper Settings Screen displays the product weight. The button on the right will turn the product on or off - for example, when off, the product will not be applied. The Hopper button can be selected to view/edit sub-hopper parameters.

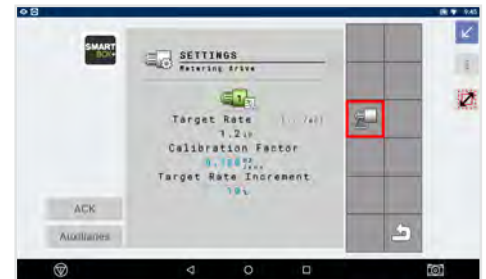


3

Metering Unit Settings

Start calibration by clicking the icon on the right (highlighted in the red box).

After calibration occurs, a clickable box appears around the meter icon. A user can manually override the calibration settings by changing the blue text.



4

Blockage Settings

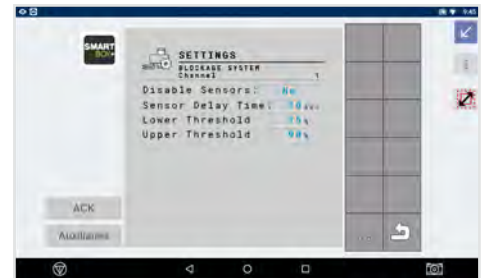
Disable sensors: This button allows you to disable just a few sensors in the system (for example you might have one sensor on row three that is failing, but you need to get planting finished so you just want to carry on anyway). The options are:

- 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 a row.

These three settings are applied to all rows for the select 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 utilizes. Normally, you will select GPS. The simulated speed can be used to test the system. Click the blue text to enter a value. The wheel speed is based on the tractor transmission output (if connected). The ground speed is based on the output from a speed radar, mounted on the tractor.



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 your 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 of the system, along with targeted controls for specific actions (e.g. adjusting meter RPMs).



Configuration Screen



1

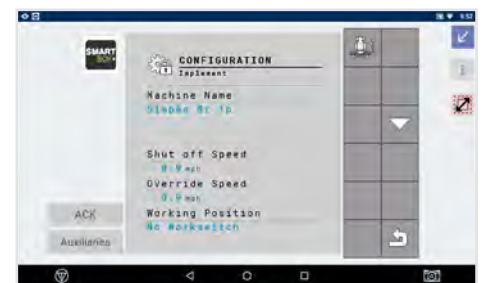
Back Button

Returns user to the previous screen.

2

Implement Advanced Settings

This screen is used to set the machine name. 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 master switch is used.



3 Hopper Advanced Settings

Use this screen to choose the product being applied. The threshold for the low-level warning is also set here. Each container holds approximately 50 pounds of material when full, so set the maximum hopper capacity by multiplying the total number of rows by 50.



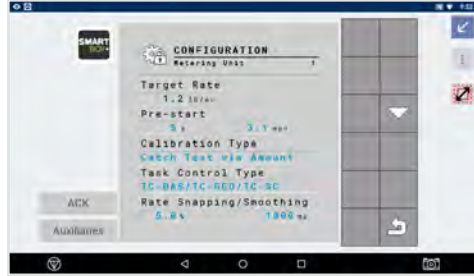
4 Product Advanced Settings

This screen lists the product attribute.



5 Metering Unit Advanced Settings

Use this screen during initial setup to define the pre-start time and speed. You will also define the range on the as-applied bar graph y-axis on the main run screen.



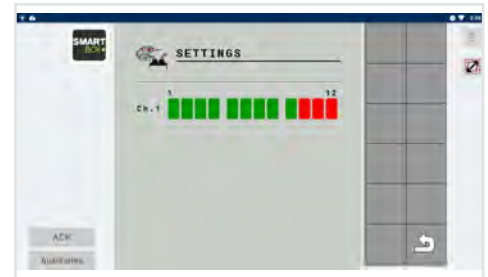
6 Channel Advanced Settings

Use this screen to set up the channel. Set the number of sections, which will be the same as the number of rows, and the total working width of the planter.



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. This screen will show 'detected' modules in green and 'missing' modules in red.



Diagnostics Screen

Diagnostics Screen: Entire Panel



1 Back Button

Returns user to the previous screen.

2

Work Position Switch Info

This tells you the state of the work position switch.



3

Hopper Info

This tells you the current product amount in the hopper. This amount needs to be manually refilled when the planter is refilled with full SmartBox product containers.



4

Metering Unit Info

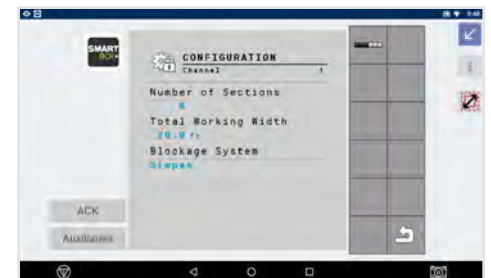
This screen is used to manually change the RPM of meters. It can be used to prime the system, empty meters, and clear blockages. Enter a value by clicking the blue text. Run the meter backwards by entering a negative value. More guidance is provided in the next section.



5

Blockages and Diagnostics

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



6

Alarm and Warning History

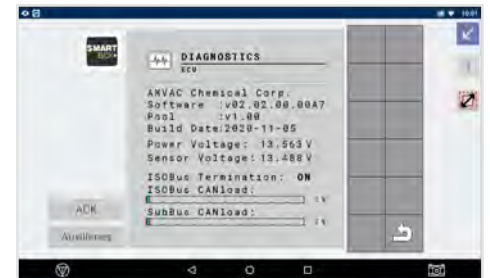
This shows the history of the alarms. When troubleshooting with your authorized Trimble dealer, it is important to have the alarm code. Additionally, alarms can be accepted and declined in this menu.



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

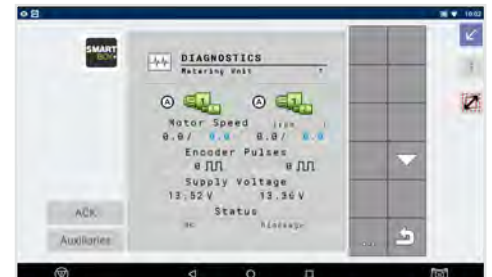
Back Button

Returns user to the previous screen.

2

Meter Info by Row

To change the RPM of all the meters across rows, click the blue 'RPM' text entry. Then, enter the value. To view individual sub-meters, click the green meter icon.



3

Current RPM

The RPM value shown here is an average value of all rows across the planter.

4

Programmable RPM

This screen is used to manually change the RPM of meters. It will be used 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.





At Installation

Getting Started with
SmartBox™+

Installing SmartBox™+

For installation of the SmartBox+ 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.
- Coordinate with your authorized Trimble dealer if you would like to have support for installation of the SmartBox+ system.
- Verify harnessing is connected appropriately and securely.
- Place the ECU near to the first row unit for simplest installation.
- 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.

These steps outline the installation of the SmartBox+ system.

Step 1: Install the cradle.

- Line up the cradle with the holes on the planter.
- Using the provided bolts, secure the cradle to the planter. The number of bolts to secure depends on the planter. Ensure all bolts are secured based on the planter row unit type.



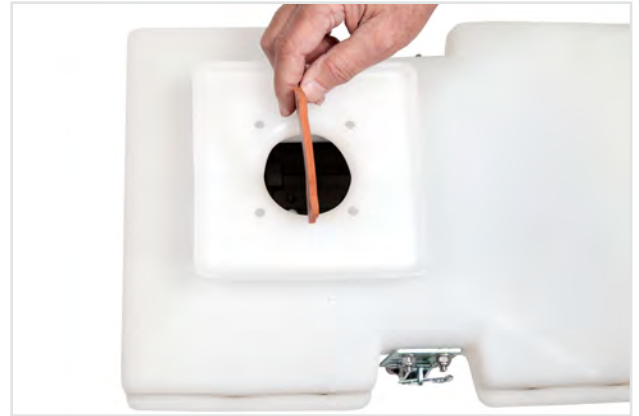
Step 2: Install risers.

- Line up the bottom slats of the risers with those of the cradle and secure them using the provided bolts. Complete this for both sides of the cradle. Ensure all bolts are secured.

Step 3: Install QuickAttach.

Components needed for this step include the gasket, QuickAttach plate, blue funnel gasket, QuickAttach, and base unit. Follow these steps:

- Turn the base unit over so that the circular opening is facing upward.
- Check to ensure the gasket you have is the correct size and that it will not go into the opening of the base unit or the meter.
- Place the gasket, black piece, blue piece, and QuickAttach over the opening.
- Attach with included bolts.



Step 4: Install the base unit.

- Pick up the base unit and place it in the cradle. Use the eight included bolts to secure the base unit to the cradle. Once secured, torque the bolts.
- Different size risers are needed for different planters. Your Trimble dealer will supply the correct risers for your planter.
- Ensure the angle of the outlet hose dropping product into the furrow is no less than 30 degrees.

Step 5: Prepare the meter.

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



Step 6: Install the meter.

- Use the gasket and the QuickAttach system to attach the meter to the underside of the SmartBox™ base unit.

Step 7: Place and secure the ECU unit on the planter.

- It is recommended to place the ECU near the first row of the SmartBox™+ system. Zip tie the ECU unit in place.
- Recommended ECU locations based on planter size:
 - 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 8: Install the work position switch (lift switch).

- Zip tie the remaining cable to secure the work position switch close to the placement of the ECU. The work position switches will vary by planter manufacturer. Your Trimble dealer will verify and supply the correct switch for your planter.

Step 9: Install the harnessing.

- First, link the tractor to the 'In' port of the ECU unit using the 16-pin cable. Install and zip tie the cable in place.
- Next, link the ECU unit to the first row unit using the 16-pin cable and 42-pin cable. Make sure the 16-pin connects to the 'Out' port of the ECU. Install it, and then coil and secure the remaining cable. Avoid coiling the remaining cable too tightly to ensure the wires do not break.
- Then, use the meter cable, which consists of two plugs to connect the meter to the row unit. Install and zip tie the meter cable in place.
- Continue the process, using cable links to harness the first row unit to the second row unit, and so on. CAN extension cables can be added for fold points on the planter as needed.

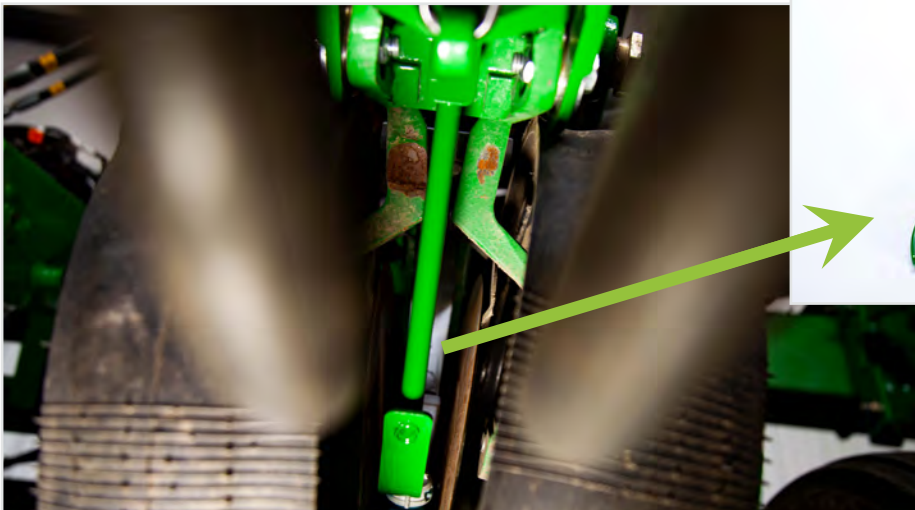


Step 10: Install the product tube.

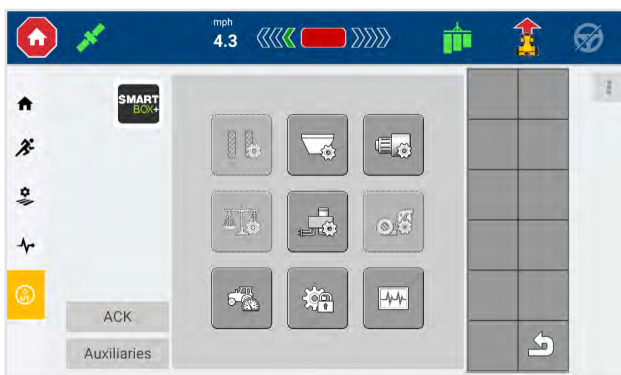
- Install the product tube, which runs from the meter to the furrow for the specific planter make/model. Drop tubes are optional, but if needed, order the proper drop tube and install those to each row unit following the instructions included with the drop tube.

Step 11: Ensure proper installation of the product tube.

- Ensure the angle of repose from the discharge point of the meter into the product tube is at least 30 degrees. This helps ensure proper flow of granular products.
- As a reminder, this step is not relevant for high speed planters.
- If not using a drop tube, make sure to cut the product tube at ground level.



Note: Drop tube use is optional. This photo shows proper drop tube installment.



**Step 12: Validate system operability.
(Ensure system is unlocked.)**

- 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 a meter, click the blue text and enter appropriate values.
- Compare the black RPM values to the blue values set to validate the meter is running appropriately.

Step 13: 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.



Additional installation questions can be addressed within the order guide for the SmartBox+ components.



Pre-Season

Prepare for First Use

Loading the SmartBox™+ Transfer Container

First, load the SmartBox transfer container onto the system. This example walks through the process.

Step 1: Treat seals on the base unit.

- Treat all seals on the base unit with talc powder. This will make the removal of the transfer container easier.



Step 2: Load the transfer container.

- Set the SmartBox transfer container on the base unit, and secure the latches on the side of the base unit.

Step 3: Open the transfer container.

- Turn the handles of the transfer container to the open position.

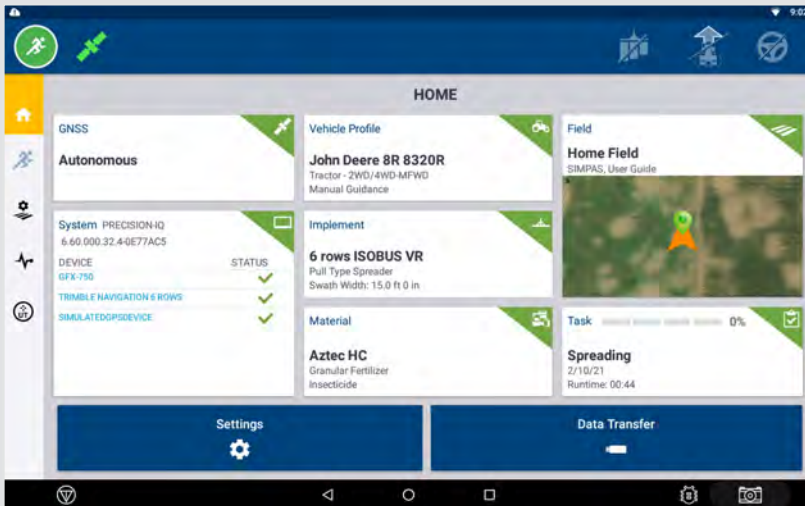
Note: When the handles are in the open position, they remain at a 45-degree angle.



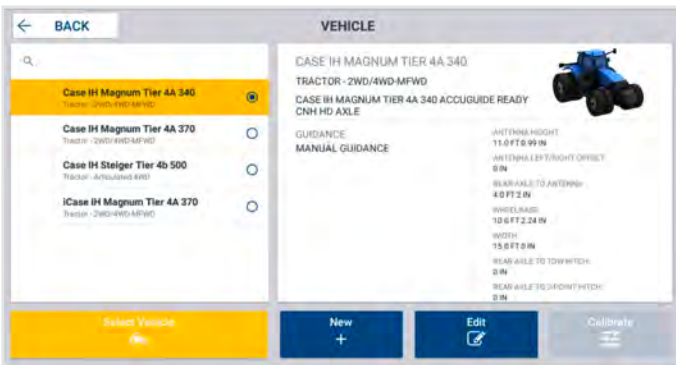
Step 4: Fill the base unit.

- Fill the base unit with product from the SmartBox transfer container.

Setting Up the Task Controller



Every manufacturer display is a little different when it comes to setting up a field, SmartBox™ product, and task. This example walks through setting up a task controller through Trimble's Precision-IQ platform on a GFX-350 display.



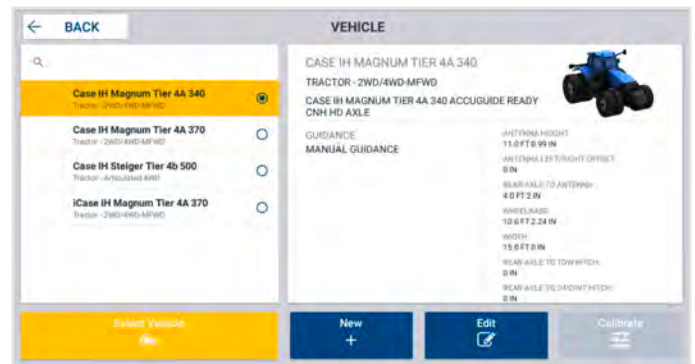
Step 1: Unlock the system.

- Unlock and configure the display for use with ISOBUS.
- Unlock, turn on ISOBUS, configure communication (messaging).

Note: You will only need to complete this step once each season.

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 or select 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:
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:

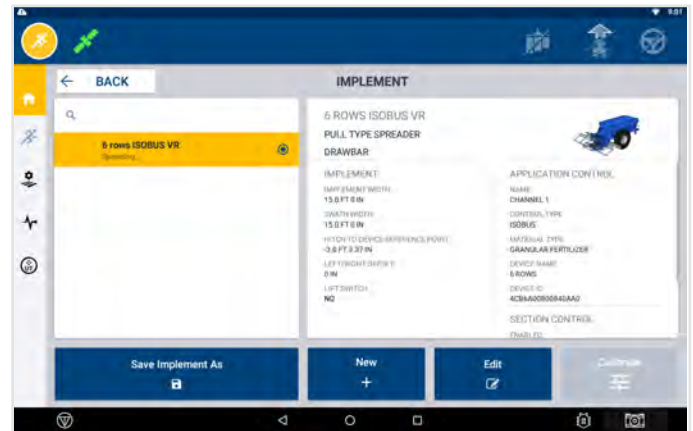
To create a new implement, use the "New" key on the Implement screen. In the "Application and Device" window, the ECU application type/ECU number should show up as a menu item. Ensure that this choice is selected.

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, follow the directions on the display screen to determine what measurements need to be taken. The instructions will detail how to 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 "ISO 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 SmartBox™+ 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 SmartBox+ 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 SmartBox™+ to the display.

- Watch the video to see SmartBox product added in the GFX-350 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 product 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.

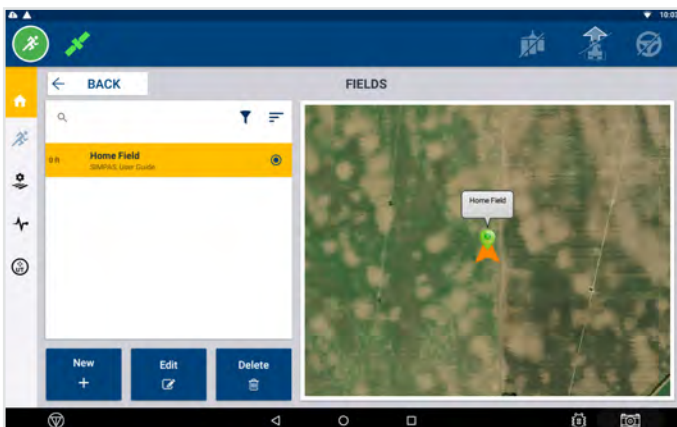
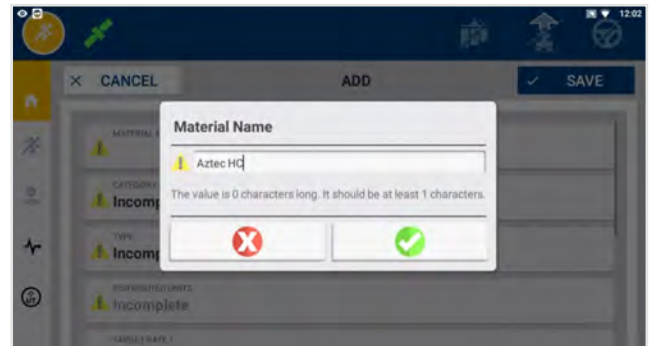
The operator can change the rate increment (e.g., 5.00) based on guidance from their trusted advisor.

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). The maximum rate must match the rate printed on the product label.

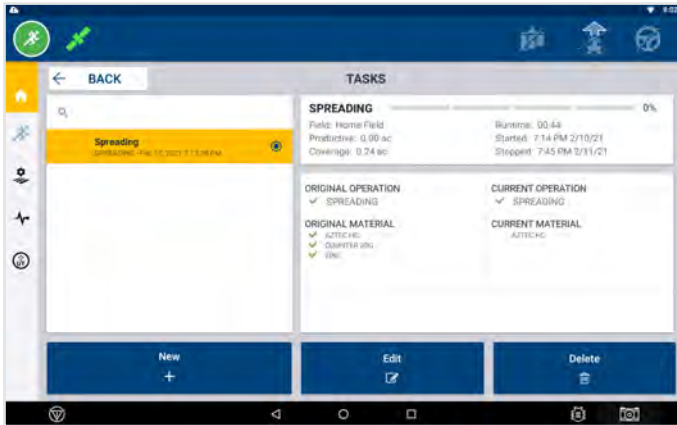
Click "Save."

- On the material assignment page, assign the SmartBox product.
- 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 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 SmartBox™ product.

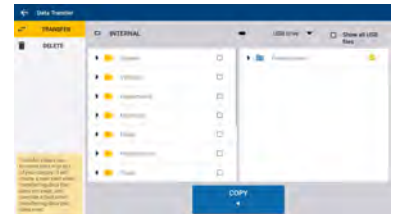
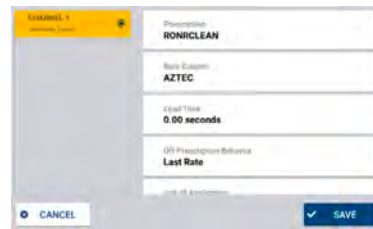
Press the “Task” box from the PIQ home screen.

Press a previously completed task on the left side of the screen to select it and bring up the task details on the right side of the screen. Edit this task by pressing the “Edit” key and updating the task name, or press the “New” key to enter a new Task Name. Ensure that the task matches the application type of the ECU.

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-350 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 data portal prescriptions.



Step 8: Load your prescription.

- Load the prescription once in the field.
- Please ensure that Task Control is active as indicated by the notepad to enable prescriptive application.

Pre-Use Checklist

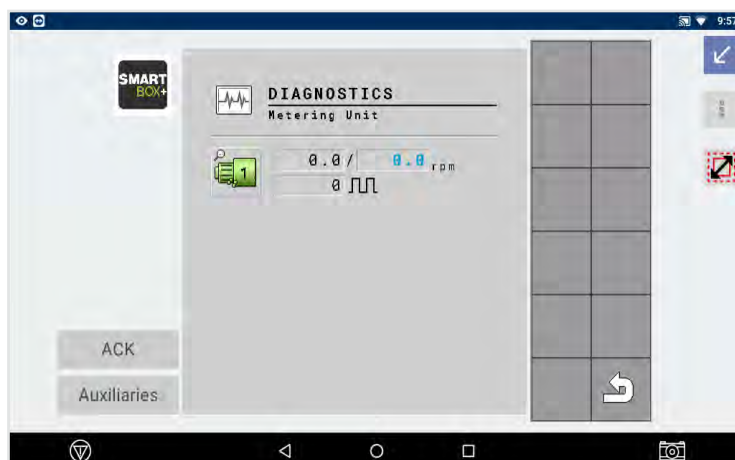
- Boot up the system. The first time the system is booted up it may take up to 15 minutes. The UT will indicate that progress is happening. After the first time, the process will only take a few minutes.
- Ensure the system is unlocked.
- Ensure you have a GPS position using your display diagnostics. 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.
- Check voltage readings across all meters for power, and then run all meters to ensure proper operation.

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 in 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.



Settings > Speed Setting



Settings > Diagnostics > Metering Unit Info

Check voltage readings across all metering units for power, 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. Manually turn on the meters by adjusting the RPM on each. Change the RPM by selecting the blue text and entering a value.

Calibrate the System

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



Step 1: Gather needed materials.

- Gather the needed materials:
 - Live SmartBox product to be applied
 - Catch bottle
 - Gram scale
 - Calibration sheets
 - All required PPE listed on SmartBox product label

Step 2: Wear personal protective equipment.

- Wear PPE according to SmartBox product label requirements. Dispose of calibration SmartBox product materials properly according to label requirements.



Step 3: Fill the base unit.

- Fill the base unit with product from the SmartBox transfer container.





Step 4: Install the catch bottle.

- Remove the product tube and install the catch bottle on the end of the product tube.

Step 5: Run the calibration sequence in UT.

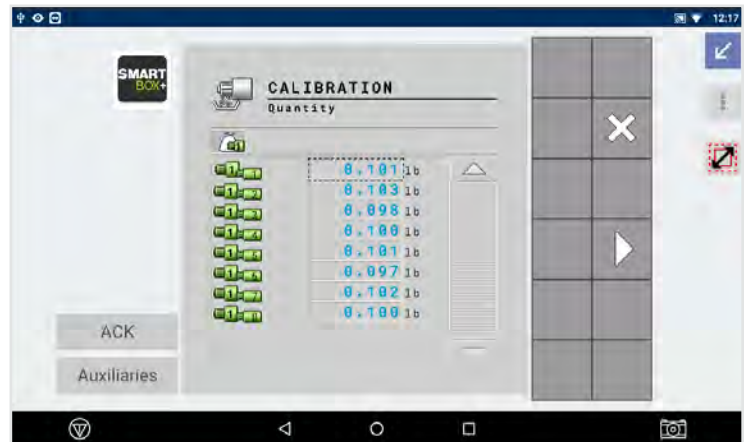
Calibrate with the tractor running so as to not run down the tractor batteries. When calibrating, test each meter. To calibrate one metering unit at a time, select the product, then select the row unit to test.

- Before beginning the calibration:

Make sure the target rate is set to the rate you intend to use for application.

Make sure the calibration factor has a non-zero value.

- 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 SmartBox™ 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 amount to be caught with appropriate calibration sheet(s). It is recommended to calibrate with a catch amount of 4 oz.
- Make sure the target speed matches the intended speed during application.
- Select the SmartBox product to calibrate by clicking the checkbox.
- Select the "Prefill" icon to fill the meter with product. After hitting "Prefill" any product collected in the catch bottle should be removed prior to the actual calibration start to ensure that the measurement is as accurate as possible. When "Start" is selected, SmartBox product is being dispensed right away to make calibration accurate.
- Click the "Start" button.
- If the calibration bar isn't moving during the calibration procedure, there is a meter not running or not reporting a valid RPM. Inspect all meters and use the diagnostic functions to ensure all meters are functioning.
- The calibration process should not take longer than five minutes to complete. If it does, there is a potential problem with the system.
- When finished, it is recommended to record the calibration factors for every row.



Step 6: Wait for product to be dispensed.

- This is the screen when the calibration is running. If the progress bar isn't moving, there is a problem with the system. It is likely a meter has stopped functioning, and you should contact your Trimble dealer for assistance.
- A white arrow appears when it is done. Select that icon to continue to the enter weights screen.

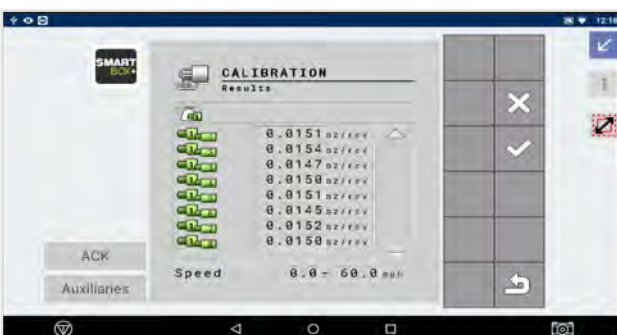
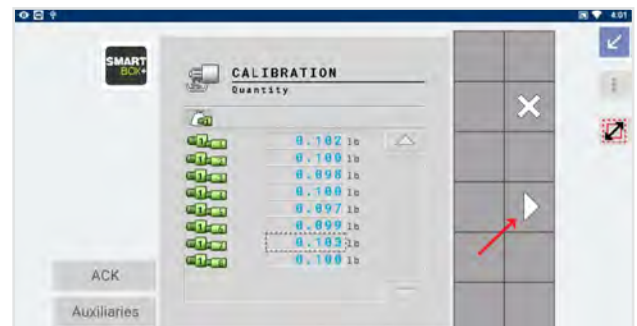


Step 7: Weigh the catch bottle.

- Use the gram scale to establish a tare weight of an empty calibration bottle.
- Next weigh the catch bottle after collecting SmartBox™ product, using caution to keep track of the row being weighed. Calibration Sheets with specific catch weights for SmartBox products can be obtained from an authorized Trimble dealer.

Step 8: Enter weight 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 the weight 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 the target rate with calibration factors and target rate increments. This demonstrates calibration was complete, and you can proceed after validating results compared to calibration sheet(s) for the product.



Step 9: Complete calibration.

- Review the calibration factor value to ensure it matches the value shown previously during the calibration procedure. This screen demonstrates calibration was completed successfully.
- It is important to click the 'check' icon on this screen; otherwise, the new calibration values are not saved.

Step 10: Dispose of the product and reattach the product tube.

- After weighing the catch bottle, transfer SmartBox™ product to the provided collection bottle.
- At the end of calibration, consult the SmartBox product label for proper disposal options.



Secure the System Before Travel

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

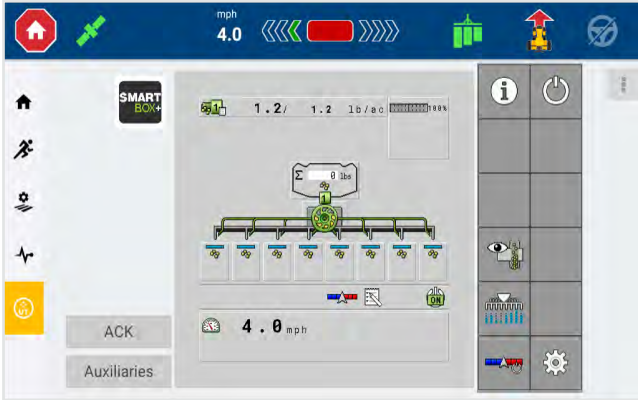
- 1 Inspect all wiring harnesses to ensure all are secured appropriately and that installation has occurred to enable planter folding (as required).
- 2 Make sure the product tube is correctly connected and installed.
- 3 Ensure each meter is securely connected with the quick latches.
- 4 Ensure the SmartBox transfer containers are turned to the open position and the latches are secured.



At-Planting

During Operation

Note the product containers may look emptier than you would expect, especially early in the field. However, do not be alarmed. The transfer container holds 50 lbs. of SmartBox™ product, but approximately 15 lbs. of the product drains into the base unit when you open the valves on the product container.



Run Screen

Once in the field, before operation:

- Power on the SmartBox™+ system and the display.
- Ensure the SmartBox transfer container handles are in the open position and the latches are secured.
- Ensure that all appropriate master switches that control implement operation are on and functional.
- Confirm the work position switch (lift switch) is correctly operational.
- Confirm that the desired field is specified and visible on the display.
- Confirm that the product, desired rates, and applicable prescriptions have been defined on the display's operating system.

Prime the System

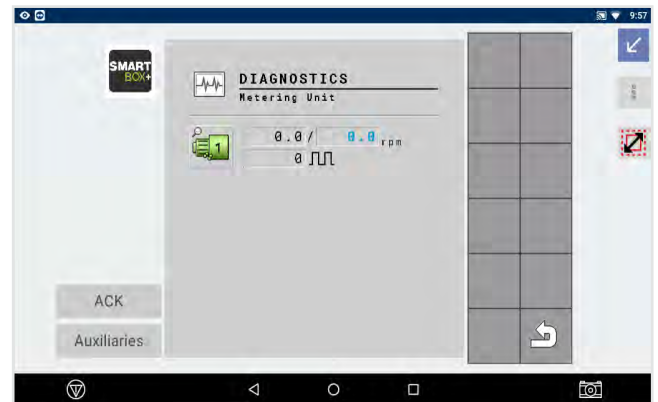
Prime the system to make sure the meter hopper is full and confirm that the system is set to apply the correct rate from the beginning. Remember to always use PPE and catch bottles if running the meters, and then dispose of the contents.

There are two ways to prime the meter. 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.

First, the wheel button in the center of the boom graphic on the run screen can be used to prime the meter. The user can be stationary, and with the master switch in the "on" position you can press this button, which causes the meter 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 meter by adjusting the RPM on each. Change the RPM by selecting the blue text and entering a value.

Verify the system was successfully primed by visually inspecting each row to ensure product was dispensed.



Run Screen - Prime

Once the SmartBox+ system is successfully calibrated and primed, the system will be delivering SmartBox product at the targeted rate throughout the field. This allows the operator to focus on other aspects of planting. The system will notify the operator if anything needs their attention.

Alarms & Warnings

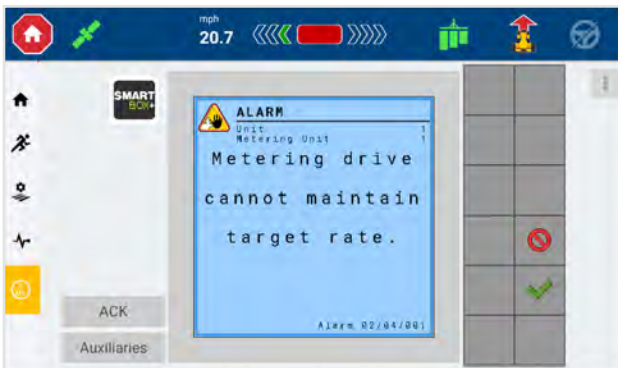


The system is constantly monitoring itself to ensure that the requested operation is being achieved. If the requested application rate cannot be achieved, a warning will be shown.

Alarm 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.



Alarm 2: Operational Alarm: Cannot Maintain Target Rate

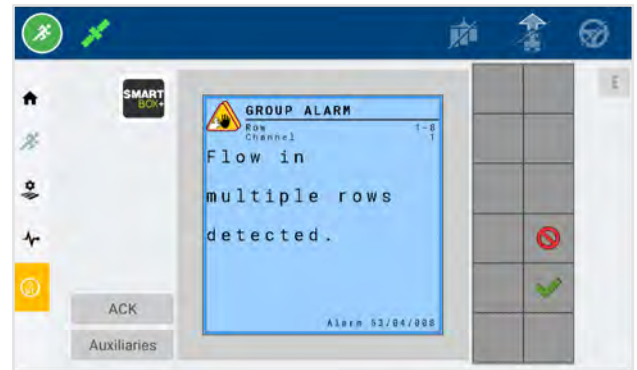
When this alarm occurs, the granular meter cannot turn at the rate being requested by the system. This could be due to the following:

- 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.

Alarm 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.



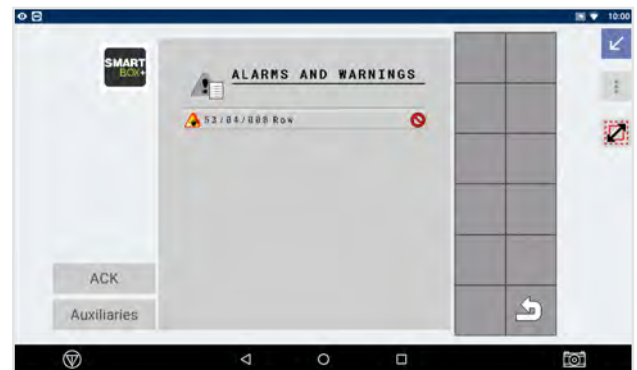
Alarm 4: Operational Alarm: No Flow Warning

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

- The system has run out of SmartBox product (i.e., chemical product).
- The system has a blockage which has stopped the meter from applying product.

Process: 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 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".



Clearing a Blockage

If the meter is not working, put on required PPE for the SmartBox™ product being applied and walk through this protocol.



Step 1: Check for physical blockages.

- Check the product tube for physical blockages.

Step 2: Run the meter with the blockage forward and backward at 200RPM.

- Be prepared to catch the material in a container provided by your authorized Trimble dealer to minimize exposure and enable disposal after troubleshooting.
- In the UT, select the "Settings" icon, then select the "Diagnostics" icon, and then select the "Metering Unit Info" icon.
- Manually turn on the meter by adjusting the RPM. Change the RPM by selecting the blue text and entering "200RPM" to try and push 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 the SmartBox product label for proper disposal options for the specified product.



Diagnostics Screen - Metering Unit



Step 3: Remove the meter from the QuickAttach system.

- Remove the meter from the QuickAttach system and confirm there are no blockages in the product hopper.

Step 4: Call your authorized Trimble dealer.

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



SmartBox™ Transfer Container Replacement

To replace the transfer container, visit the "Load the SmartBox Transfer Container" instructions in the "Pre-Season" section of this user guide.



Post-Season

Post-Planting Steps

End of Season Protocol



At the end of the season, follow this protocol to properly care for the SmartBox™+ system.

Step 1: Store product.

- It is recommended the product is stored in the base units, with the caps in place, over the winter.



Step 2: Remove the SmartBox transfer containers.

- Return empty SmartBox transfer containers to the SmartBox product retailer where they were purchased.

Step 3: Install the rain cap.

- Install the rain cap.



Step 4: Clean the system.

- Clean and remove excess dirt while wearing appropriate PPE and avoid using pressurized water on the system.
- Consult the label and wear appropriate PPE for each SmartBox™ product. If using forced air, wear a respirator and goggles.



Step 5: Store the SmartBox+ system inside.

- Store the SmartBox+ system inside for the off season if possible.



Beginning of Next Season Protocol



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

Step 1: Remove the rain cap.

→ Remove the rain cap.



Step 2: Treat seals on the base unit.

→ Treat the seals on the base unit with talc to make removal of the transfer container easier.



Step 3: Clean the ISOBUS connector.

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



Step 4: Inspect components.

- Inspect all structural components and brackets on SmartBox™+ system for wear, cracks, or malfunctions. Determine if any component needs servicing or replacement.
- Contact your authorized Trimble dealer for replacement parts.
- Inspect all fastening components on brackets and sled to ensure they are tight and secure.
- Inspect all the electrical 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 tube.

Next Steps

- Now, it is time to load the SmartBox transfer container and calibrate the system.



Calibration



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

FAQs

Before Operation

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

The user interface will allow you to have an estimate of acres remaining. Each transfer container holds 50 pounds of SmartBox™ product. When field-packed with product, the base unit can hold an additional 15 pounds of product. Consider the planter width, row spacing, and product application rate to determine the number of acres.

Does the SmartBox+ system require a Trimble display?

An operator will be able to use an ISO-based display from Trimble or other manufacturers, providing flexibility and enabling SmartBox+ to easily plug-and-play with other brands of ISO-based equipment and precision/prescriptive software. Some supported displays include:

- GFX-350
- GFX-750
- TMX-2050
- AgLeader InCommand 1200

Can I prescriptively apply a product with SmartBox+?

Yes, if you would like to prescriptively apply a SmartBox product, work with your trusted advisor to develop the prescriptions based on your field-specific needs.

How do I load a prescription?

Check the information from the manufacturer of the display being used to control the SmartBox+ 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 the product.



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.

During Operation

Why is it important to set up the Task Controller?

To ensure as-applied data is being recorded, the prescription is running properly, and swath control is active, the first step is to set up the Task Controller.

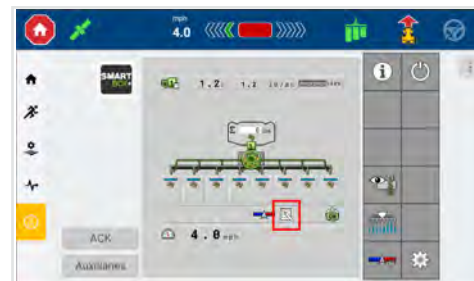
Why is it important to prime the meters?

Priming the meters ensures that the SmartBox™ product 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.

How do I prime the meters?

Ensure the transfer container valve is closed and the transfer container is removed prior to running the meter. Then, 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.

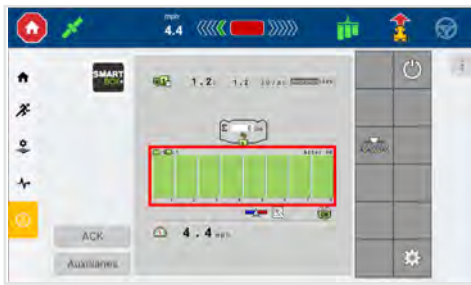
When a meter becomes stalled, does it damage the meter if the system continues operation?

The meter is designed to prevent any damage due to stalled operation. The meter will not suffer any long term damage if it is operated in a stalled condition.

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

For equipment support, contact your authorized Trimble dealer.

In the User Interface



How do I view my individual rows?

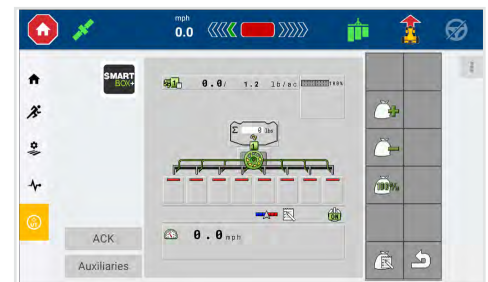
From the Run screen, select the “Row View” icon. The green bar represents the current blockage state of the meter. Green means it is functioning correctly. If the row is red, it indicates there is a blockage or no flow. Click on the product bar to see the details for the SmartBox™ product.

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-350 display. Target rates can either be a constant rate or utilize prescription mode. The target rates will automatically be set if a prescription is loaded and activated on the SmartBox+ Run Screen.

If the rate needs adjusted manually during operation, adjust the product rate while continuing to operate on prescription mode by utilizing the following steps:

- From the Run screen, select the appropriate product bar to adjust the target rate.
- Use the buttons on the right side to adjust the target rate up or down.



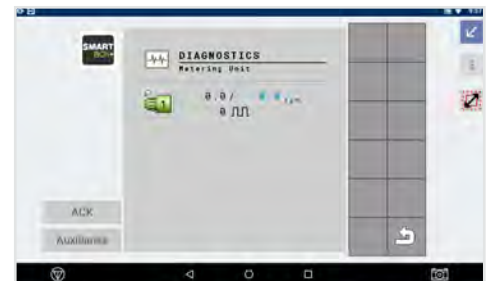
How do I calibrate a single meter versus a bank of meters?

To calibrate one metering unit at a time, select the SmartBox+ logo, then select the row unit to test.

How do I test or run the meters when not in the field?

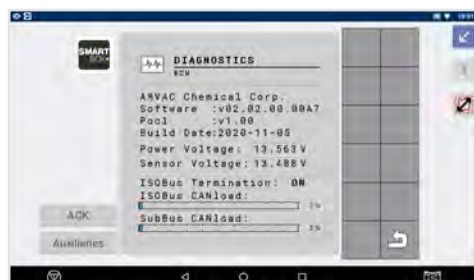
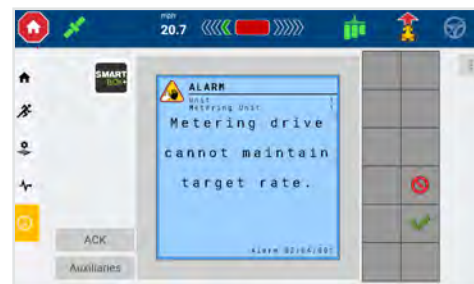
Ensure the transfer container valve is closed and the transfer container is removed prior to running the meter. Additionally, make sure meters are empty or calibration bottles are on the meter.

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 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 user 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?

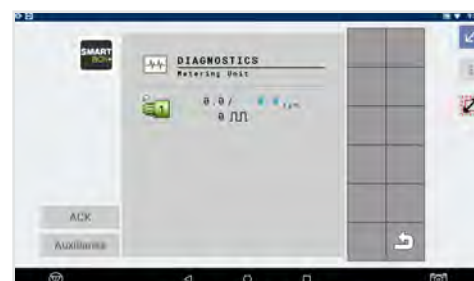
From the Settings Screen, select "Diagnostics," and then select the "ECU Settings" icon.

Troubleshooting

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 - a minimum of 12 volts.
- Inspect product tube for blockages.
- If there is power, but no functionality, put on required PPE for the SmartBox™ products being applied, and first check the product and delivery tube for physical blockages.
- Detach the meter. Confirm there are no blockages in the product hopper.
- 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 SmartBox 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 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 is not functioning properly.

- Check the wiring harness and work position switch (lift 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 the "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 transfer container is not emptying as fast as I think it should?

- First, note that the base unit will hold 15 pounds of product.
 - There are a variety of factors that could prevent the transfer container 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.
-

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

Contact your authorized Trimble dealer the system was purchased from.

Glossary

Terms and Definitions

Electronic Control Unit (ECU)

The 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.

Prescription

This is the trusted advisor's recommended agronomic solution to address zone-specific needs.

Section control

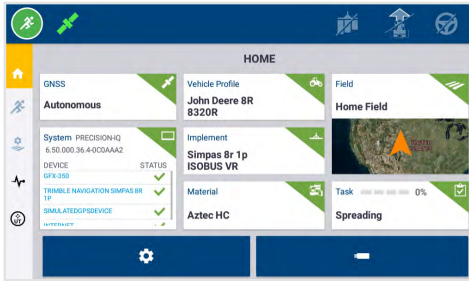
This is the automatic start, stop, and rate control for meters on a defined number of rows in the section. It is controlled by the system's GPS location and spatial data regarding areas that have already been applied, management zone boundaries, and field boundaries.

Shapefiles

This is a specific management zone file type used to control product application in prescribed scenarios that are loaded into the SmartBox™+ system for prescriptive application of each individual SmartBox product.

SIM

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

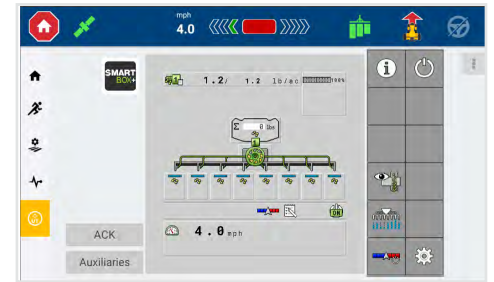


TC

The task controller sends prescription data back and forth to the ECU.

UT

The UT is the universal terminal or user interface display.



SmartBox+™ System Components

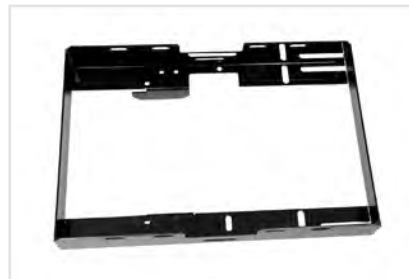


Base Unit

The base unit mounts to the cradle or bracket, depending on the planter model. The QuickAttach system and meter attaches to the bottom of the base unit, and the SmartBox™ product transfer container sits on top of the base unit. When field-packed with product, the base unit can hold 15 pounds of product.

Cradle

The cradle is used to mount to the planter row unit or bracket. It holds the base unit assembly.





Display

The display is mounted in the cab of the planter tractor and serves as the controller for the SmartBox™+ system. Pictured here is a GFX-350. GFX-1060 and GFX-1260 can also be used. There are also other compatible ISO-based displays available that can control the system.

Display Cables

The display cables allow for the Trimble GFX to connect to the ISO connection.



Drop Tube

Mounted on the planter row unit, the drop tube allows precise application of the SmartBox product into the furrow. The drop tube is no longer a part of the system for high speed planters, so in those instances, it will not be included.

ECU to Meter Harness

This harness is a cable attaching the ECU to the first row of the SmartBox+ system.



Meter

Located on the underside of the QuickAttach system, the meter contains the electronics, inclined auger, and motor that collectively control dispensing of SmartBox products.

Meter Gasket

The meter gasket allows for a seal between the meter and the QuickAttach system.



Meter Wiring Harness

The meter wiring harness serves as the electrical communication connection from the electronic control unit to the meter.



Nav 500

Nav 500 provides speed input, swath control, and as-applied mapping of the SmartBox™+ system. Nav 900 can also be used.

Power Harness Ext.

If the system is larger than 12 rows, an extra harness will attach to the battery, and meter wiring harness between two rows.

Power Tee

The power tee allows for connection of the Power Harness Ext. to the meter harness.

Product Tubes

The product tubes move the SmartBox product to the drop tube and into the furrow. It's important to make sure the angle of repose is not less than 30 degrees, and no bends are in the product tubes.





Quick Attach System

The QuickAttach system allows for service and repairs of a meter without removing any bolts. Always use the required PPE when removing a SmartBox™+ meter.

The QuickAttach system includes latches that connect the meter to the QuickAttach system, allowing for easy removal of the meter for inspection or replacement.



Riser

The riser raises the base unit to allow clearance of the meter and the planter row unit. It also allows for the proper angle of repose for proper product flow.

The size or overall necessity of risers is based on the needs of each individual planter.



Tractor Power Harness

The tractor power harness connects the battery of the tractor to the ECU.

Transfer Container

The transfer container holds the SmartBox labeled product.

Valve Handles

When the valve handles are turned and not in the horizontal position, product will flow from the transfer container to the base unit.

Work Position Switch (Lift Switch) and Bracket

The switch lets the SmartBox™+ controller know when the planter is in the plant position. Different planter models and brands require different styles of work position switches.

The work position switch bracket allows for the mounting of the work position switch. It is recommended to install close to the ECU.



