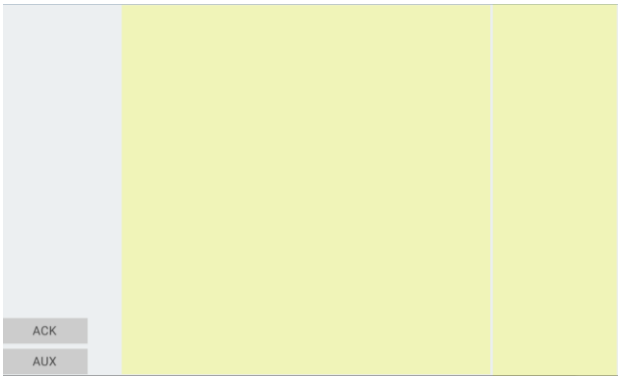
SmartBox®+ Troubleshooting:
Quick Answers to Common Questions

This document provides answers and reference information to the most common issues that arise when operating SmartBox+

SmartBox+ is not visible in the UT

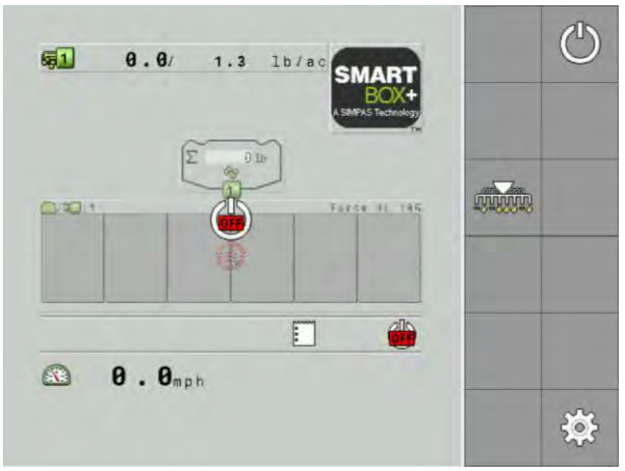
- It is likely the ECU is not powered. Investigate the power source to the ECU.
- See the document 'SmartBox+ ECU Power Troubleshooting' for guidance
- It is also possible that any relevant display unlocks have not been applied. Check with the display manufacturers guidance on how to confirm this.



SmartBox+ powers on, but does not operate

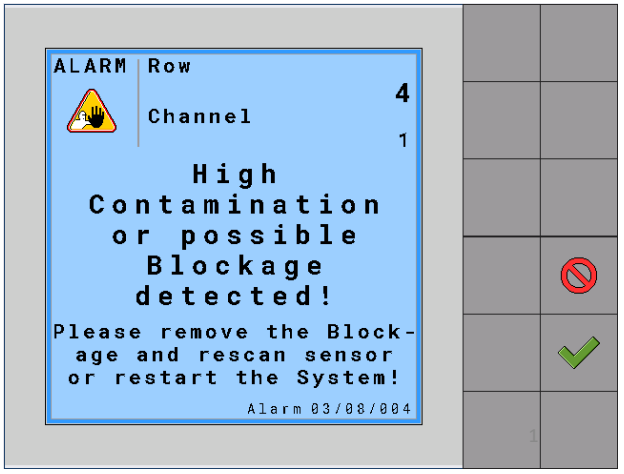
There are a number of factors required to be in place for the SmartBox+ system to operate:

- The tractor must be moving and the SmartBox+ software must be receiving a speed value
- The lift switch must be in the 'planting' position
- There must be a target application rate
- All Meters must have a calibration value
- The Master Switch must be on



SmartBox+ powers on, but the error 'High Contamination detected' appears

- The High Contamination warning is an indication that one or more meters are blocked with material at startup.
- Blockage detection will not function on any Meter started with blocked material.
- Remove the blocked material and restart the system to resolve this issue.
- For more details, see the document: 'Troubleshooting High Contamination'



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SmartBox+ powers on, the error message 'Configuration Mismatch' appears

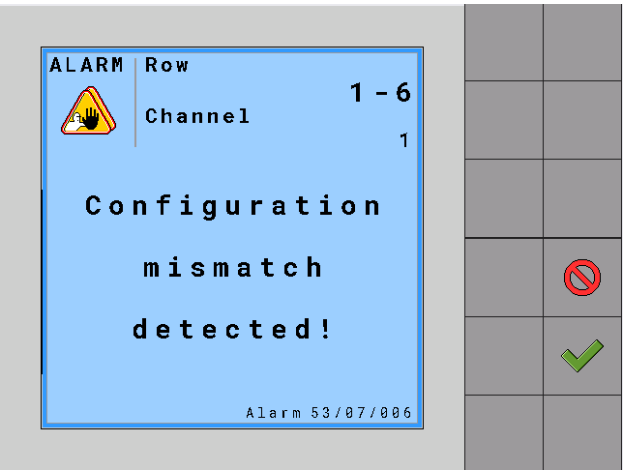
Shortly after power on the error message 'Configuration Mismatch Detected' appears.

This is an indication that one or more meters are not communicating with the ECU. In this state, the Meter will not operate.

It is likely that a harness issue is the cause, see below for more detail.

If you've determined the harnesses are functioning correctly, it may be necessary to replace the meter.

- Note: the Meter is not serviceable if it has failed



Error message indicating a loss of communication with one or more granular meters

Troubleshooting Harness and Power issues:

The most common harness and power problems result from excess wear or pinching of the harness cables. Such damage can cause loss of control communication with the meters.

When one (or more meters) loses control communication, the system error message **"Configuration mismatch detected"** will be displayed.

- **Before** beginning in-depth troubleshooting, carefully inspect **all** harnesses for signs of wear or damage.
- To troubleshoot the issue, **First, disconnect** the damaged harness from the system, **Then reboot** the system.
  - As a first attempt, disconnect the communication and power harnessing at the halfway point along the planter.
  - If the Configuration mismatch error does not appear at the next power up, this indicates the issue is somewhere on the part of the planter just disconnected.
  - Now, add row harnesses back to the system until the issue reoccurs. The point at which the issue reoccurs is likely to be the damaged harness.

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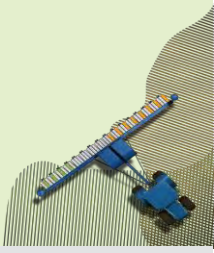

This document provides answers and reference information to the most common issues that arise when operating SmartBox+

The 'Configuration Mismatch' error message indicates that no meters are communicating

In some cases, an issue can occur with the system where no Meters will communicate with the ECU. If this occurs, it is likely due to a specific failure in the harness that makes it impossible for the Meters to obtain CAN addresses on the CAN Bus.

For details on how to resolve this issue, see the document titled: ***'SmartBox+ Harness Troubleshooting'***, specifically the section: 'Troubleshooting failures that have caused total loss of communication'

- Below is a short overview of the procedure:
  - The goal is to remove the damaged harness from the system, once this occurs the remaining connected meters will communicate again.
  - The general approach is to start by disconnecting a large set of meters from the system, rebooting, seeing the results and then narrowing down based on what is found.
  - For example, for a 24-row system, with a failed harness at row 16:
    1. Power the system with only Meters 1-11 connected, by disconnecting the harness at row 12. Reboot. Meters 1-11 communicate, this tells us the failed harness must be between row 12-24
    2. Power the system with Meters 1-18 connected, by reconnecting at row 12 and disconnecting at row 18. Reboot. Meters do not communicate; this tells us the failed harness is between row 12-18.
    3. Power the system with Meters 1-13 connected, Reboot. Repeat the process by connecting one additional row for each reboot until the meters stop communicating. The last row connected is the failed harness, remove and replace.

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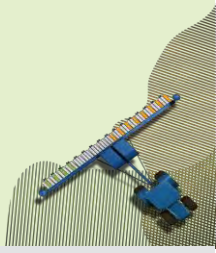

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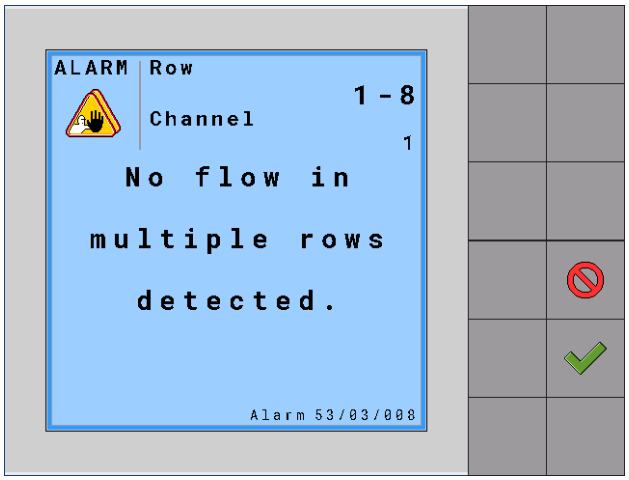
SmartBox+ powers on, operates, the 'No flow detected' error appears



The No Flow warning can appear to two reasons:

1. Product is blocked inside the meter and unable to flow
    - To resolve this issue; it is necessary to remove the blocked material from the meter.
    - Removing the blocked material could be done by:
        1. Running the meter manually at low and high speeds in both forward and reverse.
        2. If this does not work it may be necessary to physically remove the blockage. Ensure appropriate Personal Protective Equipment is worn.
2. The Meter is running but no product is flowing
    1. It is most likely that this is due to an empty SmartBox container, field experience has shown that bridging of product in the SmartBox container is not an issue.

Troubleshooting Blockage issues:

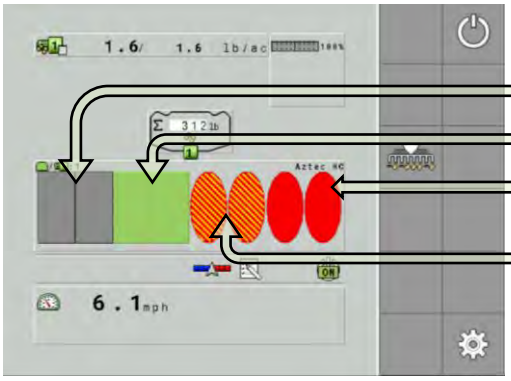
The most commonly encountered problem with SmartBox+ operations is a blocked outlet tube.

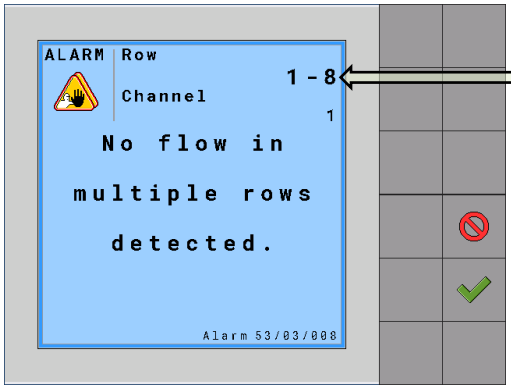
The system uses two ways to inform an operator of a blocked outlet tube:

1. Blockage indication on the Run screen
2. Full screen warning

A blocked outlet tube must be physically cleared .

1. <u>Before leaving the tractor cab,</u> check the Run Screen Indicators and Flow Warnings to determine which rows are blocked.
2. After the blocked rows have been identified, insert a suitable tool into the blocked outlet/furrow-tube and clear the blockage





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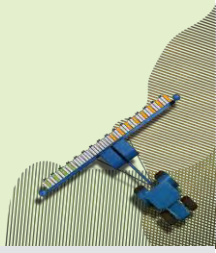

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During operation the SmartBoxes appear to be emptying too quickly

It is common for new operators to report that the SmartBoxes are emptying too quickly.

This is usually because the operator does not realize that there is 15 pounds of product in the base container, which represents almost 1/3rd of a full SmartBox. Hence the illusion that the SmartBox appears to be emptier than the operator is anticipating.

Commonly, once the operator is aware of this situation their concerns subside.

Issues during the first 100 acres of operation

For a new installation it is quite common for issues to appear with the system, during the first 100 hours of operation.

Most commonly, issues will be found with harnessing due to installation issues. Examples of common installation issues include:

- Not enough slack has been allowed around the fold points and a harness is stretched and damaged
- Not enough slack has been applied to allow for the full range of vertical movement of the row unit, causing stretching and damage to harnesses
- Not enough clearance has been allowed between the row unit and the SmartBox bae unit or Meter (due to risers being to small, or no risers being used). The depth adjustment handle will sometimes contact the meter or harness and cause damage
- Not enough protection has been allowed for moving parts, allowing press wheels or other parts to wear on a harness and cause damage
- Improper placement of the harness around fold or pinch points on the planter, causing damage to the harness. This is particularly an issue with the power extension harness as it's routed down the planter fold arms, where it can be pinched by the transport hooks when the planter is folded.

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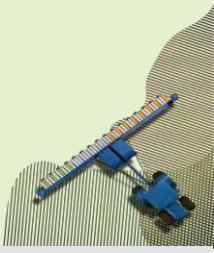

This document provides answers and reference information to the most common issues that arise when operating SmartBox+

Meter firmware mismatch

The system requires the firmware version on all granular meters to be identical, for correct function.

The impact of having different firmware version is variable, depending on the age of the various firmware versions loaded; the possible outcomes include:

- Only the meters with the older firmware do not communicate
- Meters with older firmware communicate but do not function
- No meters can communicate

The ECU software contains a function to upgrade all meters to the correct firmware version. To trigger the function the ECU must power up and communicate with all meters. For example; if the ECU is configured for 24 rows/24 meters the ECU must communicate with all 24 meters at startup, at this point the Meter firmware update process will be triggered, if necessary.

Identifying meters with incorrect firmware

The most common case for this to occur is if a user has recently replaced a non-functioning meter with a spare meter off the shelf.

Usually, in this case when the 'new' meter is installed, all meters will stop communicating.

To verify the firmware version on the suspected meter follow these steps:

1. Disconnect the suspected meter from the system, reboot, and view the firmware version for the connected meters, in the meter diagnostics screen
2. Connect the suspected meter at row 1
3. Disconnect all other meters in the system, by disconnecting the harness between rows 1 and 2
    - i.e. ensure only 1 meter is connected to the system
4. Reboot the system
5. View the firmware version in the meter diagnostics screen, note any difference between the suspected meter and the other meters in the system

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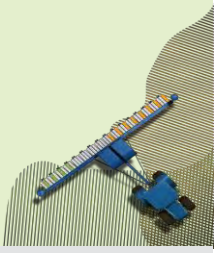

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Meter firmware compatibility matrix

The table below provides guidance on how to handle the Meter firmware versions that might be found out in the field.

For further assistance in obtaining firmware files contact your AMVAC representative.

Meter firmware version	Upgrade to…	Next step
02.00.00.00s	V01.01.00.00O2	Upgrade the Meter manually, using DownloadManager2 software *
02.00.00.00z	V01.01.00.00O2	Upgrade the Meter manually, using DownloadManager2 software *
02.00.00.01g	V01.01.00.00O2	Upgrade the Meter manually, using DownloadManager2 software *
02.00.00.01h	V01.01.00.00O2	Upgrade the Meter manually, using DownloadManager2 software *
02.02.01.00L	Use ECU loaded with package FD bootloader	Contact AMVAC
02.02.01.00N	Use ECU loaded with package FD bootloader	Contact AMVAC
02.02.01.00R	No module update needed	Upgrade will be handled by ECU
02.02.01.00T	No module update needed	Upgrade will be handled by ECU
02.02.01.00U	No module update needed	Upgrade will be handled by ECU
02.02.01.00W	No module update needed	Upgrade will be handled by ECU
02.02.01.00 and newer	No module update needed	Upgrade will be handled by ECU

* For these Meter firmware versions, it is necessary to complete a second firmware upgrade. The second upgrade will be completed with the automated ECU process.

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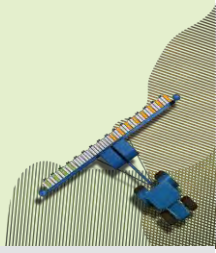

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The 'Configuration Mismatch' error message indicates that 1-5 meters has lost communication

In some cases, an issue can occur with the system where only a few Meters stop communicating with the ECU. It is likely that this is due to a failure on a CAN wire in the harness.

A failed CAN wire can cause the meter effected to be 'skipped' in the addressing process.

Often a single harness failure of this type can lead to instability in the CAN Bus, which causes other Meters to stop communicating.

For details on how to resolve this issue, see the document titled: ***'SmartBox+ Harness Troubleshooting'***, specifically the section: 'Troubleshooting failures that have caused 1-5 meters to stop communicating'

Below is s short overview of the procedure:

1. Manually run each meter in the system, one at a time. Physically assess which meter runs
    - For example, when manually commanding the meter at row 1 to run, it should be found that the meter on row 1 is running
2. The failed harness will be found when the command to run a meter causes the meter on the next row to run
    - For example, the Meter on row 5 is commanded to run, however, the Meter on row 6 is the Meter running.
    - This is the indication that the Meter on row 5 does not have the correct CAN address and therefore is not functioning correctly. The harness on row 5 is the failed harness.

Meters do not communicate when the tractor engine is not running

The SmartBox+ system requires a strong source of voltage for optimum operation.

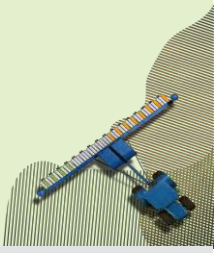
In cases where a tractor has been sitting for some time without running, or if it is very cold the SmartBox+ system may not function correctly with the engine not running.

The most common issues that arise when trying to operate the system with the engine off are:

- Loss of meter communication
- Erratic operation of meters

It is best practice to ensure that the engine is running before making assessments on system failures.

It is also recommended to make sure the tractor battery/batteries are in good working order. A failing battery can also cause similar issues



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ISO Task Controller (Automatic Rate and Section Control)

The ISO Task Controller ('Task Control') function provides automatic rate and section control for the SmartBox+ system.

The Task Control function is supplied by the Display (for example, the John Deere 4640, or Trimble GFX).

To operate the Task Control function, the following must be in place:

1. The display has the Task Control function available
    - Not all displays are capable of Task Control
2. The Task Control function is unlocked
    - In most displays, the Task Control function requires an additional fee
3. The Task Control function is enabled
    - The Task Control function must be switched on

Once the Task Control function is unlocked, and enabled the display will provide the following functions:

1. *Automatic rate control*
    - The display can send application rates to the ECU. For example if a prescription is being used, the Task Control function will send application rates to the ECU based upon the current location of the tractor in the field.
2. *Automatic section control*
    - The display will track the area of the field that has been covered so far and turn off any parts of the planter that move into already planted ground
    - SmartBox+ is capable of receiving section control commands for individual rows on the planter

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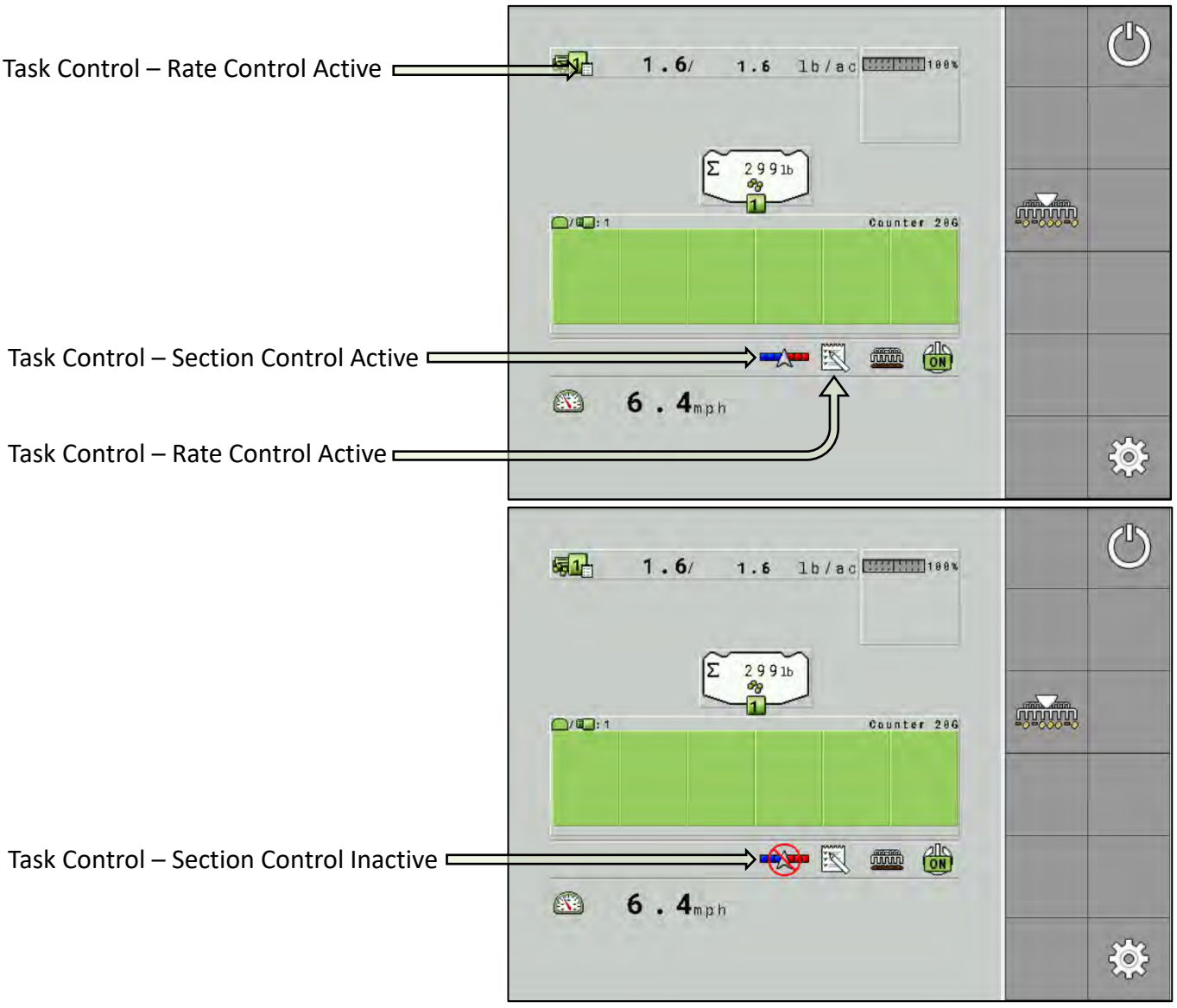
ISO Task Controller – Status Ions

The status of the Task Control function is shown in the SmartBox+ software in the following locations:



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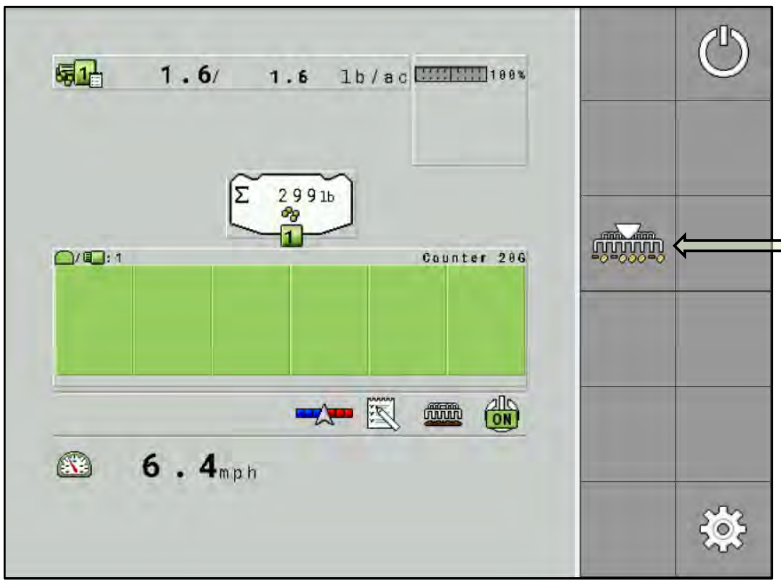
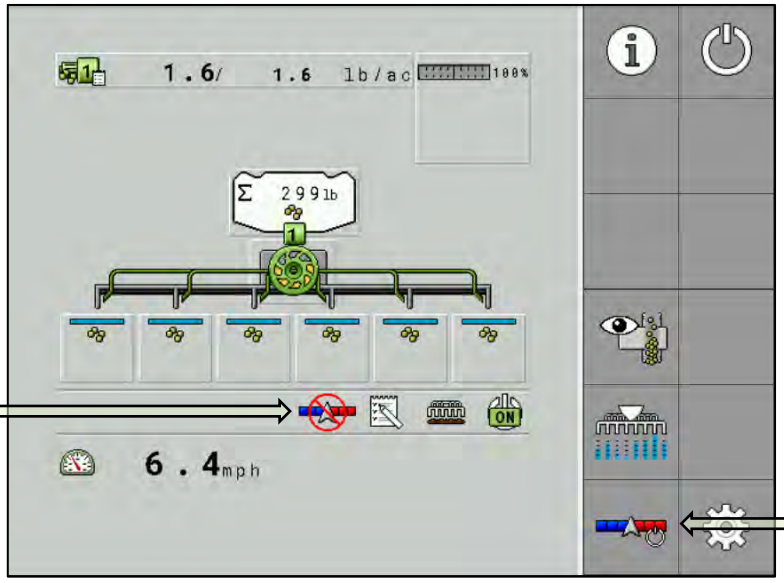
ISO Task Controller – Section Control Manual Shutdown

If necessary, the Section Control function of Task Control can be manually shut down.

1. Navigate to the Section Control run view



Touch the Section Control view icon



Section Control status icon updates to reflect On/Off state

Toggle Section Control on and off by touching the Section Control Icon