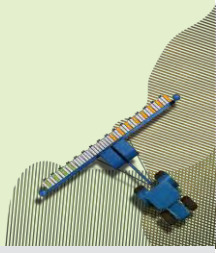
SmartBox®+ Harness Troubleshooting



This document provides detailed guidance on troubleshooting harness issues with SmartBox+

Common failure points:

The most commonly encountered problem with SmartBox+ harnessing occurs when the harness is damaged by movement of the planter row unit.

When troubleshooting harness issues, check these areas first for signs of wear and damage:

- Wear due to movement of the parallel arms
- Wear due to rubbing on the press wheels
- Damage to the harness connectors by parts of the row unit, such as the depth adjustment handle

Commonly, when wear or damage has occurred, a short is created in the harness, usually when a bare wire touches the row unit or planter frame.

Checking fuses:

Commonly, when wear or damage has occurred, a short is created in the harness, usually when a bare wire touches the row unit or planter frame. When a short is present in the system one of two fuses will open, depending upon its location.

Check these two harnesses for fuse failures:

- SMSE017 Row unit Harness
    - The fuse holder is part way along harness and can usually be found near the parallel arms of the row unit
- SMSE004 Battery Harness
    - The fuse is located at the start of the harness, near the ring terminals

Before replacing either of these fuses it is critical to locate the cause of issue.

- The most common cause for fuses to open is a short circuit, created when a bare wire touches the row unit or planter frame.

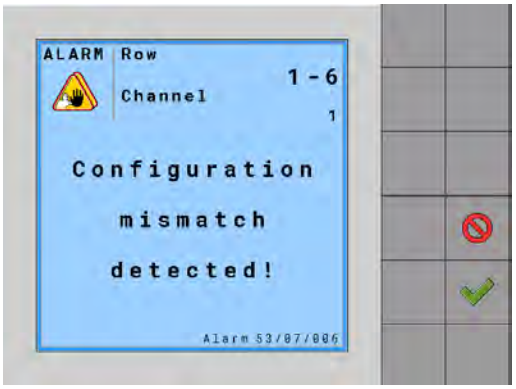
System Indications and Error message:

When a harness has failed the most common indication is a loss of communication with one or more Granular Meters.

When a Meter has stopped communicating, the ‘Configuration mismatch detected!’ error message is displayed. The top right portion of the error shows the rows effected.

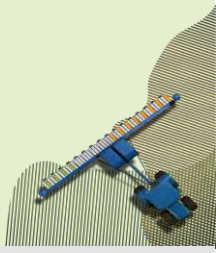
- If multiple meters have stopped communication the error message will indicate the range of rows with the issue.

Use the error message as a guide for locating the failed harness or meter.



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

SmartBox®+ Harness Troubleshooting



Troubleshooting failures that have caused total loss of communication:

Procedure for troubleshooting total loss of communication:

In some cases, the harness failure can cause all meters to stop communicating. The result is that we cannot use the error message for guidance on where the failure has occurred.

- Before beginning in-depth troubleshooting, carefully inspect all harnesses for signs of wear or damage.
- If the damaged harness cannot be identified visually, the damaged harness must be removed from the system to allow meter communication to begin again.

If the damaged harness cannot be located with visual inspection, the damaged harness must be removed, followed by a full reboot of the system. Once the damaged harness has been removed, communication to the meters will be restored.

- As a first attempt, disconnect the communication and power harnessing at the halfway point along the planter.
    - Disconnect the 'CAN OUT' and 'PWR OUT' connectors of the SMSE017 Row unit harness
- 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.

Example 1: Harness failure at row 21

For a 24-row planter with a harness failure at row 21, the troubleshooting process may follow this path:

Note: Ensure the tractor engine is running while completing this process.

1. Power the system with 12 rows connected
    - Disconnect 'CAN OUT' and 'PWR OUT' connectors at row 12
    - Reboot the system

    Result: Configuration Mismatch error reappears, showing rows 13-24 are not communicating

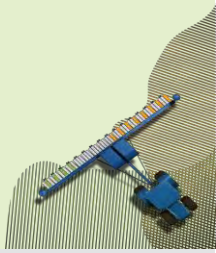
    Conclusion: Rows 1-12 are communicating, so the failure must be somewhere between rows 13-24

2. Power the system with 18 rows connected
    - Connect the 'CAN OUT' and 'PWR OUT' connectors at row 12
    - Disconnect the 'CAN OUT' and 'PWR OUT' at row 18
    - Reboot the system

    Result: Configuration Mismatch error reappears, showing rows 18-24 are not communicating

    Conclusion: Rows 1-18 are communicating, so the failure must be somewhere between rows 18-24

SmartBox®+ Harness Troubleshooting



Troubleshooting failures that have caused total loss of communication:

Example 1: Harness failure at row 21 continued…

After step 2 has been completed, we've learned that the failure is somewhere between rows 18-24. Starting with step 3 we will start adding one row at a time, until we find the failure point.

3. Power the system with 19 rows connected
    - Connect the 'CAN OUT' and 'PWR OUT' connectors at row 18
    - Disconnect the 'CAN OUT' and 'PWR OUT' at row 19
    - Reboot the system

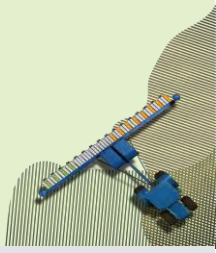
    Result: Configuration Mismatch error reappears, showing rows 19-24 are not communicating
    Conclusion: Rows 1-18 are communicating, so the failure must be somewhere between rows 19-24

4. Repeat the process, adding one additional row for each reboot until the issue is found
    - Connect the next row 'CAN OUT' and 'PWR OUT'
    - Disconnect the following row 'CAN OUT' and 'PWR OUT'

Once the failed harness has been added back into the system the 'Configuration Mismatch' error message will return to showing Rows 1-24 are not communicating. This is the indication that the last row added to the system is the one causing the failure.

5. Completing the process
    - Once the failed harness has been identified (indicated by the return of the 'Configuration Mismatch 1-24 message), remove the harness from the row exhibiting the issue (i.e. the last row added during troubleshooting)
    - Replace the failed harness
    - Reboot the system
    - Test all meters to ensure the system is functioning correctly
        - This can be done by running the meters manually using the diagnostics function

SmartBox®+ Harness Troubleshooting



Troubleshooting failures that have caused total loss of communication:

Example 2: Harness failure at row 10

For a 24-row planter with a harness failure at row 10, the troubleshooting process may follow this path:

1. Power the system with 12 rows connected
    - Disconnect 'CAN OUT' and 'PWR OUT' connectors at row 12
    - Reboot the system

    Result: Configuration Mismatch error reappears, showing all rows 1-24 are not communicating
    Conclusion: No rows are communicating, so the failure must be somewhere between rows 1-12

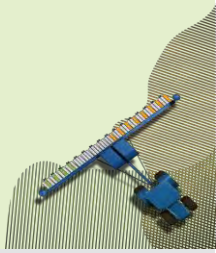
2. Power the system with 6 rows connected
    - Disconnect the 'CAN OUT' and 'PWR OUT' at row 6
    - Reboot the system

    Result: Configuration Mismatch error reappears, showing rows 1-6 are communicating
    Conclusion: Rows 1-6 are communicating, so the failure must be somewhere between rows 1-12

3. Power the system with 7 rows connected
    - Connect the 'CAN OUT' and 'PWR OUT' connectors at row 6
    - Disconnect the 'CAN OUT' and 'PWR OUT' at row 7
    - Reboot the system

    Result: Configuration Mismatch error reappears, showing rows 1-7 are communicating
    Conclusion: Rows 1-7 are communicating, so the failure must be somewhere between rows 7-12

SmartBox®+ Harness Troubleshooting



Troubleshooting failures that have caused total loss of communication:

Example 2: Harness failure at row 10 continued…

After step 3 has been completed, we've learned that the failure is somewhere between rows 7-12. Starting with step 4 we will start adding one row at a time, until we find the failure point.

4. Repeat the process, adding one additional row for each reboot until the issue is found
    - Connect the next row 'CAN OUT' and 'PWR OUT'
    - Disconnect the following row 'CAN OUT' and 'PWR OUT'

    Once the failed harness has been added back into the system the 'Configuration Mismatch' error message will return to showing Rows 1-24 are not communicating. This is the indication that the last row added to the system is the one causing the failure.

5. Completing the process
    - Once the failed harness has been identified (indicated by the return of the 'Configuration Mismatch 1-24 message), remove the harness from the row exhibiting the issue (i.e. the last row added during troubleshooting)
    - Replace the failed harness
    - Reboot the system
    - Test all meters to ensure the system is functioning correctly
        - This can be done by running the meters manually using the diagnostics function

SmartBox®+ Harness Troubleshooting

Troubleshooting failures that have caused 1-5 meters to stop communicating:

Procedure for partial loss of meter communication:

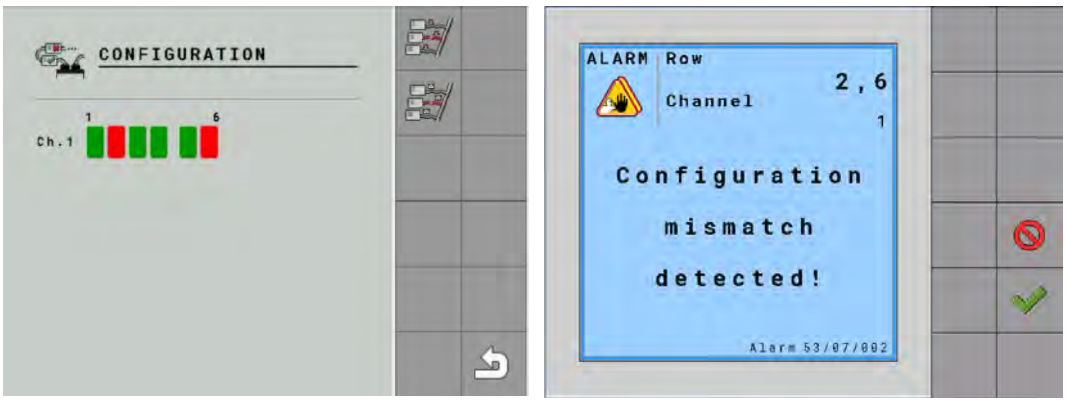
In some cases, the harness failure will cause just a few meters to stop communicating. In this case, it is likely that there is an issue with the CAN wires, somewhere in the harness

The goal is to identify the damaged harness and remove it from the system to restore system function. Before beginning in-depth troubleshooting, carefully inspect all harnesses for signs of wear or damage.

- If the damaged harness cannot be identified visually, we will use the procedure outlined below to assist in identifying the problem.

In the case where just one or a few meters are not communicating, we can use the 'Configuration Mismatch Error' message for guidance, however a loss of CAN communication can provide misleading results.

For example, when a single CAN wire is damaged, it may result in the meter on that row stopping communication. However, it may also stop other meters in the system from communicating. For example, meter 2 has a failed CAN wire, but meters 2 and 6 stop communicating, as in the example image below:



Example 1: Diagnosing a CAN wire harness failure at row 5

For a 24-row planter with a harness failure at row 5, the troubleshooting process may follow this path:

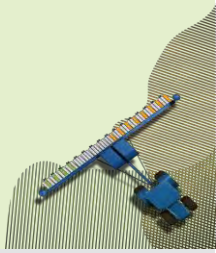
Note: Ensure the tractor engine is running during this process

1. Power the system with all rows connected, run meter 1/row 1 manually, observe the meter
   - Wait for the system to fully power up, and observe the Configuration Mismatch Error
   - Command the meter to run manually, go to meter diagnostics: Settings / Diagnostics / Meter Diagnostics / Channel 1 / Row 1 Manual RPM Entry
     - It is recommended to run the meter at high RPM (300-400) to allow the meter to be audible when it is running
   - Go to Row 1 on the planter, observe the meter.

   Result: The Meter at row 1 can be heard and is confirmed running.

   Conclusion: The harness at row 1 is functioning

SmartBox®+ Harness Troubleshooting



Troubleshooting failures that have caused 1-5 meters to stop communicating:

Procedure for partial loss of meter communication:

Example 1: Diagnosing a CAN wire harness failure at row 5

2. Return to the display, repeat the process completed at Row 1 for Rows 2, 3 and 4

   Run meters 2, 3 and 4 manually and observe

   - Note: it is recommended to run only 1 meter at a time, to ensure that it is easy to identify which meter is currently running. The previous meter can be stopped by entering a 0 RPM value.
   - To command the meter to run manually, go to meter diagnostics: Settings / Diagnostics / Meter Diagnostics / Channel 1 / Row 2 Manual RPM Entry
     - It is recommended to run the meter at high RPM (300-400) to allow the meter to be audible when it is running
   - Go to each row on the planter and observe each meter.

   Result: The Meters at rows 2, 3 and 4 can be heard and are confirmed running.

   Conclusion: The harnesses at rows 2, 3 and 4 are functioning

3. Command the meter on Row 5 to run manually, observe the meter
   - Go to meter diagnostics: Settings / Diagnostics / Meter Diagnostics / Channel 1 / Row 5 Manual RPM Entry
     - It is recommended to run the meter at high RPM (300-400) to allow the meter to be audible when it is running
   - Go to Row 5 on the planter, observe the meter.

   Result: The Meter at row 6 (i.e. not row 5 as expected) can be heard and is confirmed running.

   Conclusion: We commanded row 5 to run, but the meter at row 6 ran. Therefore, the harness at row 5 must be malfunctioning and needs to be replaced.

4. Complete the process
   - Replace the failed harness at row 5
   - Power down the system and reboot
   - Test all meters to ensure correct system function

SmartBox®+ Harness Troubleshooting

How to reboot the system:

Option 1: Full power down reboot (recommended)

The preferred option for rebooting the system is to completely remove power from the ECU and meters.

This can be done by disconnecting the battery and ISO harnesses at the planter hitch.

1. Shut down the controlling Display
    - Depending on the display this will be done by either keying the tractor off, or pressing the power button on the display
2. Locate and Disconnect the ISO Harness at planter hitch and disconnect it from the tractor
    - Part number: ME0502001-36 / SMSE001
3. Locate and Disconnect the Power Harness at the planter hitch
    - Part number: ME051407 / SMSE004
4. Reconnect both harnesses
5. Power on the display

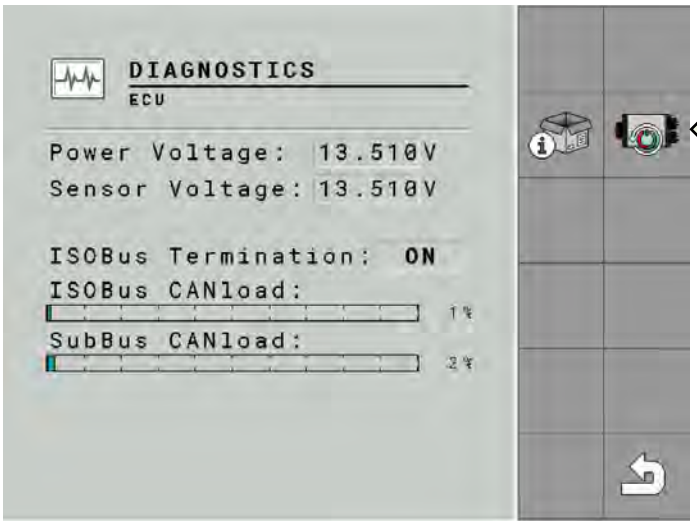
Option 2: Software reset

The second option for rebooting the system is to use the software reset function.

This option carries some risk in that occasionally the meter won't retrieve new CAN addresses, which can lead to misleading results when following this troubleshooting process.

1. From the Run screen, touch the following icons to enter the ECU diagnostics screen:

2. Once you've reached the ECU diagnostics screen, touch the Reset icon to Reboot the ECU and meters:



Reset icon