

Add and Configure an Implement WITH Application Control

AGRICULTURE

November 2020

TRIMBLE RESELLER CONFIDENTIAL

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Follow the steps below to add an implement in **Precision-IQ** that uses application control:

1. **Before you begin**, take accurate measurements of your implement as described in [Taking Implement Measurements](#).
2. [Verify Precision-IQ Preferences](#)
3. [Select an Implement Application Type](#)
4. [Add an Application Control Channel](#). You can also [Edit an Application Control Channel](#).
5. Enter details for a specific implement:
 - [Application Control Details for an ISOBUS Implement](#)
 - [Application Control Details for a Serial VR or TUVR Implement](#)
6. [Enter Implement Switch Details](#)
7. [Enter Signal Input Module Details](#)
8. Review the [Implement Summary](#) and save the details.

Note: To set up and use a TUVR or Serial VR implement, you must have purchased and installed the Serial Rate and TUVR license for the feature. See [App Central: Installing Licenses from a USB Drive](#).

- [Application Control Details for a Virtual Implement](#)
- [Configuration Details for a Field-IQ Implement](#)

See also:

- [Master Switch Box and 12-Section Switch Box Support](#)
- [Edit/Delete an Implement or Application Control Channel](#)

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Verify Precision-IQ Preferences

For implements that use Application Control, there are some common preferences that should be verified regardless of the implement type. To access the Settings screen, tap the **Settings** button on the Precision-IQ Home screen. Verify the following preferences:

- [Application Control Preferences](#)
- [Safety and Alarms for Application Control](#)
- [ISOBUS Preferences](#)

Note: Even though the ISOBUS preferences apply to ISOBUS implements, other implement types may also support ISOBUS functionality. These preferences should be verified.

Tap **Home** to return to the Home screen.

Application Control Preferences

On the Settings screen, tap **Application Control** and verify the following preferences:

Application Control Preference	Setting Options
Implement Setup	<p>Enable Access to Installer Setup. Enable this option to allow access to advanced implement setup and calibration. When disabled, the implement setup will limit access to many of the implement configuration parameters.</p> <p>Note: This setting only needs to be enabled when editing a previously configured implement. Installer level access is always enabled when performing setup on a newly created implement configuration.</p> <p>For Field-IQ, this setting must be enabled before you can unlock or update an RSCM. If it is off, the module update will not be presented to the user.</p> <p>Auto-Select New Implement. Enable to automatically select the new implement after it has been created.</p>
Coverage Mapping	<p>Adjust Rate Themes for Material. When enabled, the as-applied coverage layer is automatically scaled to the application.</p> <p>Adjust Applied Rate Theme for Prescription. When enabled, the as-applied coverage layer is automatically scaled to the prescription target rates.</p>
Prescriptions	<p>Enable Prescription Usage Automatically. When enabled, the system will automatically set the target rate to the prescription. When off, the user will need to manually tap the RX rate icon.</p>

Application Control Preference	Setting Options
Manual Boundary Control <i>(Sequential Section Switching)</i>	<p>Enable Auto Manual Boundary Increment. When enabled, sections on all booms can be shut off or turned on sequentially. This feature is useful when section widths of a boom are not uniform.</p> <p>Manual Boundary Increment. If the Enable Auto Manual Boundary Increment setting is not enabled, then each tap of the Manual Boundary left/right arrow buttons will cause the boundary to snap to the user-defined width.</p>
Section Control	<p>Turn Off All Sections on Zero Target Rate. When enabled, all sections will close if the target rate is set to 0. This option is useful when running prescriptions with rate zones that contain a rate of 0 as the target rate.</p> <p>Allow Negative On/Off latencies. When enabled, this allows negative latencies to be entered (common with ISO ECUs).</p>
Rate Control	<p>Rate Snapping Level. When the as-applied rate is within the defined percentage of the target rate, the system will snap the as-applied rate to match the target.</p> <p>Remember Material Rates. When enabled, material target rates are saved and recalled from a Task.</p>

Safety and Alarms for Application Control

Precision-IQ provides a safety feature where you can set a timeout for when you want Precision-IQ to automatically disengage application control operations. On the Settings screen, tap **Safety and Alarms** to set the timeout option:

Safety and Alarms Preference	Setting Options
Operator Timeout	<p>The amount of time before Precision-IQ disengages automatic application control and any auto guidance after the last user interaction with the system.</p> <p>By default, 15 minutes is entered.</p>

Tap **OK** to save your changes.

If the application timer is not reset, then application control shuts off.

ISOBUS Preferences

From the Home screen, tap the **Settings** button. Then on the Settings screen, tap **ISOBUS** to configure the following settings:

ISOBUS Preference	Setting Options
Enable Universal Terminal	To use Universal Terminal when using ISO-certified equipment, tap OFF to ON to activate this feature.
Enable Task Data Logging <i>(Only available if no Task Controller (TC) license is present.)</i>	To enable logging of an ISO ECU's default data set. Note: If a TC license is present, then Task Data logging will be enabled and disabled with the "Enable Task Controller Support" preference.
Enable Task Controller Support <i>(If a TC license is not present, then this setting will enable or disable Task Data Logging.)</i>	To use Task Controller (TC) for automatic section control when using ISO-certified equipment, tap OFF to ON to activate this feature. Note: This feature is optional and requires a license. See App Central: Installing Licenses from a USB Drive . Without a TC license, this setting will remain off. This preference must be enabled for Precision-IQ to detect and communicate with the ISOBUS ECU for automatic rate and section control.
Enable Automatic ISO Configuration Updates	Enable this setting to automatically update the implement configuration when changes are made to the ISOBUS ECU.

Select an Implement Application Type

This section describes how to select an application controller for your implement that uses application control. Before you begin, take accurate measurements of your implement as described in [Taking Implement Measurements](#).

As you complete each step, tap **Next** to continue to the next one. Tap the **Save** icon to save unique implement details.

1. From the Home screen, tap the **Implement** tile to display the Implement screen.

This screen shows a list of available implements. Tap an implement to view details about the selected implement.

2. Tap the **New** button to launch the Implement Setup wizard.

The first screen of the Implement Setup wizard prompts you to select an application device. If you are using multiple application devices, choose the controller that will be assigned to the primary application channel. The Primary Channel is used to define the base implement dimensions. Secondary controllers will be added to the configuration in a later step.

- An **ISOBUS implement** is represented as the ECU descriptor, which is usually the ECU manufacturer and/ or ECU serial number (SN).
- A **TUVR implement or Serial VR** is represented:
 - GFX-350/XCN-750, GFX-750/XCN-1050 displays: as the **GFX or XCN serial port (Serial VR)**.
 - TMX-2050/XCN-2050 displays: as the available **EXP-100 serial port (Serial VR)**.

Once the serial port is defined, select the serial control type. Options are:

Serial VR type	Notes
Amatron/ Amazone ASD/ AMABUS	
Amatron/ Amazone ASD/ ISOBUS	
Bogballe	Old protocol
Hardi 5500 / 6500	
LH5000	
Raven	
Trimble	For TUVR Controllers
Vaderstad	

- A **virtual implement** shows simulated rate and section control. For example, if you want to log application attributes even though Precision-IQ does not have direct control of said application.
- A **Field-IQ implement** is represented as “Field-IQ” When creating an implement, a list of connected Field-IQ devices is automatically generated. Enter the number of Field-IQ channels to be configured.

Tap **Next** to continue.

3. Review the controller summary screen to confirm that the correct application controller has been selected. Tap **Save** to save the application type option.
4. Select the implement operation type:

Note: For ISOBUS and TUVR implements, the operation type may be pre-selected, and this selection can be overwritten.

Available operations for your implement are:

Harvesting	Seeding	Spraying	Subsurface Drainage	Swathing
Planting	Slurry	Spreading	Surface Leveling/Drainage	Tilling

Tap the tile for the operation that applies for your implement.

Tap **Next** to continue.

5. Enter/edit the implement name.

Tap **Next** to continue.

6. Set an **Implement Hitch** value. Tap the Hitch field and select either **Drawbar** or **Fixed**. If you select **Drawbar**, then specify the **Hitch to Ground Contact Point** value.

Note: If you are configuring an ISOBUS, Serial VR, or TUVB implements, then some of these fields may be provided by the ECU and may not be editable. If the measurements are incorrect, check the measurements on the ECU or controller.

Tap **Next** to continue.

7. Enter the Hitch details

- Pull-Type Implements

Measurement	Instructions
Hitch Type	Select how the implement connects to the vehicle: <ul style="list-style-type: none"> • Drawbar • Fixed mount
Hitch to Ground Contact Point (With Application Control)	Measure the distance from the hitch to the point where the implement makes contact with the ground. This is the point that the implement rotates about.

- Self-Propelled Equipment: The application offset will be defined at the channel level

8. Enter **Implement Measurements** values:

Measurement	Description
Application Width	Working width of the implement.
Rows	Enter the number of rows managed by the toolbar. This setting is used to define Row spacing for the “shift by row” function. Note- in later steps, you will not be able enter more sections than rows.
Swath Width	Sets the distance between swaths. Overlap or Skip field will be adjusted by altering the swath width. A positive value will indicate an overlap, and a negative value will indicate a skip.
Left/Right Offset	This value represents the offset of the vehicle drawbar to the center of the Implement.
Physical Width and Length	Width: Physical width of the implement. Length: Physical length from hitch to the rear of the implement Used for NextSwath to ensure boundary clearance. See <i>Implement Setup for NextSwath</i> in NextSwath for details.

Note: If you are configuring an ISOBUS, Serial VR, or TUVB implements, then some of these fields may be provided by the ECU and may not be editable. If the measurements are incorrect, check the measurements on the ECU or controller.

9. Tap **Next** to continue.

Add/Configure an Application Control Channel

1. On the Application Control screen, tap the **on/off** slider to enable Application Control. If a control type was selected in the initial implement setup process, application control will be enabled and a channel/ channels will be pre populated. Skip to step 6 to see configuration details for these channels.
2. Tap the **Add** button to add an additional channel.
3. Select the controller type for the new channel.

Note: For an ISOBUS ECU with multiple products, Precision-IQ will add more than one channel.

4. Tap **Next**.
5. Review the controller summary. If the controller details are correct, tap the **Save** icon. Repeat this process until all application controllers have been selected.
6. Once you have selected the application controllers, continue to the next step to enter the details for:
 - [Application Control Details for an ISOBUS Implement](#)
 - [Application Control Details for a Serial VR or TUVS Implement](#)
 - [Application Control Details for a Virtual Implement](#)
 - [Configuration Details for a Field-IQ Implement](#)

Edit an Application Control Channel

To edit an application control channel for an existing implement:

1. From the Home screen, tap the **Implement** tile to display the Implement screen.
2. Tap the **Edit** button to display the Summary screen of the implement.
3. Tap the **Application Control** tab. For the control channel you want to modify, tap the **Settings** button, then select **Modify**.
4. When you finish making changes, tap **Summary** at the top right corner of the screen.

If any part of the setup is not complete, you can save the changes but you cannot use the implement on the Run screen.
5. Tap **Save** to save the channel and return to the Application Control section.

Application Control Details for an ISOBUS Implement

ISOBUS is a set of software and hardware standards that makes possible the communication between equipment made by different manufacturers. With ISOBUS, you can use the Precision-IQ application to control an ISO-certified implement without an additional display.

- With Precision-IQ, using task controller (TC) functionality (an optional feature). Enabling task controller allows you to perform automatic section and rate control with the ISOBUS implement.
 - With Universal Terminal (UT), an on-screen window opens in the Precision-IQ application to access directly the functions provided by the electronic control units (ECUs).
1. Unlock Task Controller. See [App Central: Installing Licenses from a USB Drive](#) for details.
 2. Turn on the Task Controller feature.
 3. Ensure that ISO UT and/or ISO TC are enabled. These settings are found in the Precision-IQ settings.
 4. ECU Settings should be verified via the UT **before** creating an implement in Precision-IQ.
 5. Connect the display to the ISO-certified implement with ISO cabling.
 6. Set up the GNSS receiver to send the required speed messages to the implement. (Refer to the ECU ISO manual for the required speed messages.)

ISOBUS Requirements	
Precision-IQ	<p>For multi-ECU/multi-device support:</p> <ul style="list-style-type: none"> • GFX-350: version 1.30 or later • GFX-750: version 1.50 or later • TMX-2050: version 5.50 or later <p>For Multi-Rate point support</p> <ul style="list-style-type: none"> • GFX-350: version 1.30 or later • GFX-750: Version 2.20 or later • TMX-2050: Version 6.20 or later
License	A license is required to use Task Controller (TC) with an ISOBUS implement. You can purchase the appropriate license from the Trimble Store and download the license from the Reseller Admin Site. See App Central: Installing Licenses from a USB Drive for details on how to install the license.
Hardware	ISOBUS implements use an ECU.
Supported ISOBUS Configurations	
GFX-350/XCN-750	<p>Up to 2 channels: (Multi product license required to use channel 2)</p> <ul style="list-style-type: none"> • Single ECU with multiple channels up to 2 channels. • Two (2) ECUs with one channel each. • Single channel ECU + Field IQ, serial/TUVR or Virtual • 24 sections per channel. • Multi Rate Point Support up to 24 rate points. <ul style="list-style-type: none"> ◦ <i>Multi rate point support is dependent on the ISO ECU capabilities. This may be represented as "row by row", "nozzle by nozzle" or "rate per section".</i>
GFX-750/XCN-1050 display	<p>Up to 4 channels: (Multi product license required to use channel 2-4)</p> <ul style="list-style-type: none"> • Single ECU with multiple channels up to 4 channels total. • Multiple ECU's with multiple or single channels up to 4 channels total. • Multiple ECU's or Channels + Field-IQ, serial/TUVR channels or Multiple virtual channels (up to 4 channels max • 255 sections per channel. • Multi Rate Point Support up to 48 rate points. <ul style="list-style-type: none"> ◦ <i>Multi rate point support is dependent on the ISO ECU capabilities. This may be represented as "row by row", "nozzle by nozzle" or "rate per section".</i> ◦ <i>Devices with more than 48 rate points may work, but coverage logging performance may not be acceptable</i>

TMX-2050/XCN-2050 display	<p>Up to 6 channels: (Multi product license required to use channel 2-6)</p> <ul style="list-style-type: none"> • Single ECU with multiple channels up to 6 channels total. • Multiple ECU's with multiple or single channels up to 6 channels total. • Multiple ECU's or Channels + a single Field-IQ or TUV channels or Multiple virtual channels (up to 6 channels max) • 255 sections per channel. • Multi Rate Point Support up to 48 rate points. <ul style="list-style-type: none"> ○ <i>Multi rate point support is dependent on the ISO ECU capabilities. This may be represented as "row by row", "nozzle by nozzle" or "rate per section".</i> ○ <i>Devices with more than 48 rate points may work, but coverage logging performance may not be acceptable</i>
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Follow the steps below to enter the application control details that are specific to an ISOBUS implement:

1. **Type & Material** screen: enter a name, if needed, and material type:

Type Value	Description
Name	Allows the entry of a custom name to identify the channel.
Control Type and Implement data	Selected control type (not editable).
ISO Implement Data	
Material Type	The material type will determine what types of materials can be assigned to the channel. For ISO this will generally be determined by the ECU.
Material (optional)	<p>Allows the assignment of a material to the channel. This is an optional step but may limit virtual tank unit selection.</p> <p><i>Ex- A virtual bin can not be configured in Bushels without a material containing a bushel weight being assigned to the channel.</i></p>
Use as Primary display channel	<p>(Only available when the channel isn't currently assigned as the primary channel)</p> <p>When enabled, the coverage layer for this channel will be shown by default on the Precision-IQ Run screen. Only one channel may be selected as the primary.</p>
Use Signal Input Module	When enabled, the channel uses the inputs from the Signal Input module.

Tap **Next** to continue.

2. **Offsets** screen: enter the Application offsets for the channel. These measurements are based off of the device reference point.

Tap **Next** to continue.

3. **Settings** screen: tap the active fields to update the values:

Settings Value	Description
Rate Control	Enable this to allow rate control. For ISO this will default to the functionality reported by the ECU. The user can overwrite the selection.
Record Coverage Using	Sets the requirements for coverage logging to occur. <i>(See table below for these options)</i>
Section Control	Enable to allow section control. For ISO this will default to the functionality reported by the ECU. The user can overwrite the selection.
Link to Channel	For use with multi-channel ECU's only. Used when the ECU is sharing section outputs between channels. Linked sections will be represented by a link icon on the run screen.
Number of Sections	Number of boom sections controlled by this channel. For ISO, this will be set to the reported sections from the ECU and will not be editable.

For ISOBUS implements, the following selections are available for the **Record Coverage Using** option:

Type Value	Description	"Record Coverage Using" Use Case
Commanded States	Logging based off of section states as commanded by Precision-IQ (PIQ).	ECUs that are slow to report their work state, Section state, or as-applied rate back to PIQ. In this mode, coverage may be logged even though no application is actually occurring. Use this mode only if none of the other modes result in a satisfactory coverage logging performance. Best to avoid using this mode if possible.
Commanded States + Work State	Logging based on the ECU Work state + the commanded section state by Precision IQ.	ECU's that are slow to report their Sections States and As applied rate. In this mode, coverage may be logged even though no application is actually occurring.
Reported States	Logging based on reported section state of application device.	ECUs that are slow to report their work state or as applied rate back to PIQ. In this mode, coverage may be logged even though no application is actually occurring.
Reported State + Work State	Logging based on the reported section state and overall work state of the application device.	ECUs that are slow to report their as applied rate back to PIQ. In this mode, coverage may be logged even though no application is actually occurring.
Applied Flow State	Logging based on reported section states and as-applied rate from application device.	ECUs that are slow to update the overall workstate.
Applied Flow + Workstate	Logging based on reported section states, as-applied rate and overall work state from application device.	ECUs that report all their states in a timely manner. In this mode, coverage logging will most closely reflect the state of application.

Tap **Next** to continue.

4. **Width** screen: tap the section to enter a width value, if needed.

This screen will show the measured section width for each section on the boom. For ISOBUS implements, these values are reported by the ECU and are not editable.

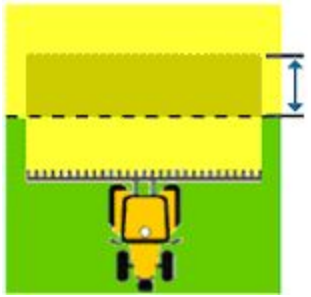
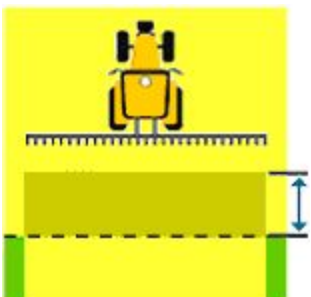
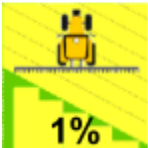


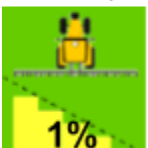


Tap **Next** to continue.

5. **Latencies** screen: tap each field to set latency details:

Latencies Value	Description
On Latency	This specifies the number of seconds it takes for the system to reach the correct rate after the boom sections have been commanded to turn on. For ISOBUS, this value may be determined by the ECU and not be editable.
Off Latency	This specifies the number of seconds it takes for the system to turn off after the boom sections have commanded to turn off. For ISOBUS, this value may be determined by the ECU and not be editable.
Apply On Latency to Boundary	Tap to toggle on or off. When on, compensates for hardware delays. On = The system uses the On Latency to switch sections on so that application can begin as soon as the boundary is entered Off = The system switches on when the boundary is reached. Any mechanical delay could leave a gap between the boundary and where the product is applied. When GPS accuracy is low, this option is recommended to prevent application outside of the boundary.
Sections off when stopped	On = Sections turn off when you are not moving. Off = Sections stay on even when you are not moving.

Tap **Next** to continue.

6. **Overlaps** screen: tap each field to set overlap details:

Overlaps Value	Description
Start Overlap	<p>The distance of intentional application overlap when you exit a previously applied area.</p> 
End Overlap	<p>The distance of intentional application overlap when you enter a previously applied area.</p> 
Coverage Switching Overlap	<p>The percentage of sections width that must cross coverage before it is switched. The higher the number, the greater the overlapped area before the section is turned off.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Favor skip</p>  <p>1%</p> </div> <div style="text-align: center;"> <p>Favor overlap</p>  <p>50%</p> </div> <div style="text-align: center;"> <p>Favor overlap</p>  <p>99%</p> </div> </div>
Boundary Switching Overlap	<p>The percentage of s sections width that must cross a boundary before it is switched.. The higher the number, the greater the overlapped area before the section is turned off.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Favor skip</p>  <p>1%</p> </div> <div style="text-align: center;"> <p>Favor overlap</p>  <p>50%</p> </div> <div style="text-align: center;"> <p>Favor overlap</p>  <p>99%</p> </div> </div>

Tap **Next** to continue.

7. **Summary**. Review the details about the application control channel. Tap **Save** to save the application control channel details.

Repeat these steps for Channel 2, if needed.

8. Tap **Next** to continue and [Enter Implement Switch Details](#).

Application Control Details for a Serial VR or TUVR Implement

Precision-IQ supports these rate controllers for automatic rate and section control using serial communication. For specific capabilities on each model, please see its respective documentation.

Manufacturer	Supported Models
TUVR	
Berthoud	EC Tronic
Hardi/Evrard	Regulor 6
Kuhn/Blanchard	REB
Rauch/Kuhn	Quantron A, Quantron E2
Sulky	Vision
Vaderstad	Control Station (with and without remote control)
Serial VR	
Amatron/ Amazone ASD	AMABUS and ISOBUS
Bobballe	Old protocol
Hardi	5500 and 6500
LH5000	
Raven	
Vaderstad	

Prior to setting up the implement and Precision-IQ:

1. In App Central, verify that the **Serial Rate and TUVR** license is present. Without this license, this application type will not be a selectable option.
2. Connect the display using the serial connection on the back of the display.

3. Ensure that the controller is configured to accept commands from Precision-IQ. To set the Serial Variable Rate settings:

Configure the Bogballe Controller	Configuring the Raven controller	Configure the LH500 controller
Set up the controller, press: 1. Return 2. Return 3. Fertil-Distrib 4. Select Type 5. Bogballe e/ex 6. Accept	Data menu settings: 1. Baud-9600 2. GPS- Inac 3. DLOG- ON 4. TRIG-1 5. Unit- Sec	Set up the controller, press: 1. Return 2. Return 3. Fertil.-Distrib 4. Select Type 5. LH5000 6. Accept
Configure the Hardi 5500 and 6500		Configure the Vaderstad controller
1. Turn on the controller while holding the ESC button. 2. In the extended menu, use the arrow keys to select the E.4 Data Exchange menu. 3. Enter the COM 1 setup and complete the settings. a. Equipment type set to VRA/remote b. Protocol set to Hardi VRA c. Baud Rate set to 9600	4. Turn off the controller and turn it on again. 5. Go to Menu 2.3 and select VRA/Remote ControlEnable.	1. Press the ? button and hold it down while turning on the controller. Pressing ? and selecting Info will not work if the unit is communicating with the display. 2. In the Setup screen, scroll to GPS and then select No .

4. Set up the GNSS receiver to send messages to the implement. Generally, radar is sent to these controllers.

Once your implement is set up, you can return to the Implement Setup wizard to make any changes.

Follow the steps below to enter the application control details for a Trimble Universal Variable Rate/Trimble Universal Serial Rate (TUVSR) implement:

1. **Type** screen: enter a name, if needed, and offset measurements: Allows the assignment of a material to the channel. This is an optional step but may limit virtual tank unit selection. Ex- A virtual bin can not be configured in Bushels without a material containing a bushel weight being assigned to the channel.
- 2.

The screenshot shows the 'TYPE & MATERIAL' screen of the Trimble Implement Setup wizard. The screen has a top navigation bar with tabs: TYPE & MATERIAL, OFFSETS, SETTINGS, WIDTH, LATENCIES, OVERLAPS, ADJUSTMENTS, SPEEDS, and SUMMARY. The main content area contains the following fields:

- Name:** CHANNEL 1
- CONTROL TYPE:** Trimble TUVSR Protocol
- SERIAL PORT DEVICE:** 5715200105
- MATERIAL TYPE:** Liquid
- MATERIAL (OPTIONAL):** 1 Copy

A red X icon is visible in the bottom left corner of the screen.

Type Value	Description
Name	Allows the entry of a custom name to identify the channel.
Control Type	Selected control type <i>(not editable)</i> .
Material Type	The material type will determine what types of materials can be assigned to the channel.
Material name (optional)	Select the material to be assigned to the channel.
Use as Primary Display Channel (If implement contains <1 channel)	When enabled, this becomes the primary application channel.

Tap **Next** to continue.

3. **Offsets:**

Type Value	Description
Application Forward/Back Offset	This is the offset from the toolbar.
Application Left/Right Offset	This is the left/right offset from the center of the toolbar.

4. **Settings** screen: tap the active fields to update the values:

Settings Value	Description
Rate Control	Enable this to allow rate control.
Record Coverage Using (See table below for TUVR options)	When enabled, coverage logging will not start until the ECU has reported a section open and flow is present. When disabled, coverage logging will be based off of the reported section state.
Section Control	Enable to allow section control.
Number of Sections	Number of boom sections controlled by this channel. For TUVR implements: Sections may be populated by controller.
Fence Rows	Fence row configuration as reported by the controller.

For TUVR implements, the following selections are available for the **Record Coverage Using** option:

Coverage Option	Description	"Record Coverage Using" Use Case
Commanded States	Logging based off of section states as commanded by Precision-IQ (PIQ).	Controllers that are slow to report their Section state or as applied rate back to PIQ. In this mode, coverage may be logged even though no application is actually occurring. Use this mode only if none of the other modes result in a satisfactory coverage logging performance. Best to avoid using this mode if possible.
Reported States	Logging based on reported section state of application device.	Controllers that are slow to report their applied rate back to PIQ. In this mode, coverage may be logged even though no application is actually occurring.
Applied Flow State (If rate control is on)	Logging based on reported applied rate and Section state	Controllers that report the as-applied and section state in a timely manner.

Tap **Next** to continue.

5. **Width** screen: tap the section to enter a width value, if needed.

This screen will show the measured section width for each section on the boom. The section widths are provided by the TUVR ECU and are not editable.

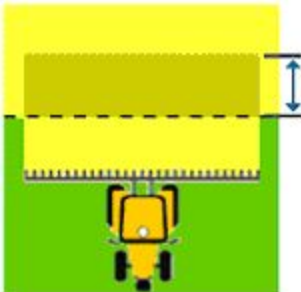
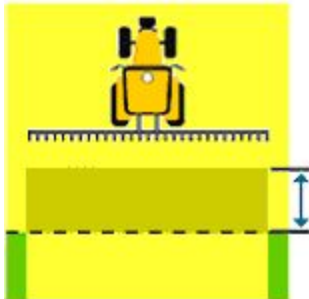
Tap **Next** to continue.

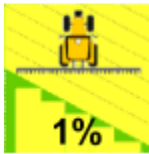





6. **Latencies** screen: tap each field to set latency details:

Latencies Value	Description
On Latency	This specifies the number of seconds it takes for the system to reach the correct rate after the boom sections have been commanded to turn on.
Off Latency	This specifies the number of seconds it takes for the system to turn off after the boom sections have commanded to turn off.
Apply On Latency to Boundary	<p>Tap to toggle on or off. When on, compensates for hardware delays.</p> <p>On = The system uses the on Latency determines when to switch sections on so that application can begin as soon as the boundary entered</p> <p>Off = The system switches on when the boundary is reached. Any mechanical delay could leave a gap between the boundary and where the product is applied. When GPS accuracy is low, this option is recommended to prevent application outside of the boundary.</p>
Sections off when stopped	<p>On = Application stops when you are not moving.</p> <p>Off = Application continues, even when you are not moving.</p>

Tap **Next** to continue.

7. **Overlaps** screen: tap each field to set overlap details:

Overlaps Value	Description
Start Overlap	<p>The distance of intentional application overlap when you exit a previously applied area.</p> 
End Overlap	<p>The distance of intentional application overlap when you enter a previously applied area.</p> 

Coverage Switching Overlap	<p>The percentage of sections width that must cross coverage before it is switched. The higher the number, the greater the overlapped area before the section is turned off.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Favor skip</p>  <p>1%</p> </div> <div style="text-align: center;"> <p></p>  <p>50%</p> </div> <div style="text-align: center;"> <p>Favor overlap</p>  <p>99%</p> </div> </div>
Boundary Switching Overlap	<p>The percentage of s sections width that must cross a boundary before it is switched.. The higher the number, the greater the overlapped area before the section is turned off.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Favor skip</p>  <p>1%</p> </div> <div style="text-align: center;"> <p></p>  <p>50%</p> </div> <div style="text-align: center;"> <p>Favor overlap</p>  <p>99%</p> </div> </div>

Tap **Next** to continue.

8. **Adjustments:** Set jump start parameters (TUVR only) ***Note: For Jump Start to work, the TUVR controller MUST use the speed messages provided by precision IQ. External speed sources will not permit the operation of Jump Start.***

Value	Description
Jump Start speed	<p>The speed at which the system will apply at when Jump Start is on, Jump Start speed will be used for application control when the vehicle's speed is below the Jump Start speed threshold.</p> <p>Setting this speed to 0 will disable jump start for the channel.</p>
Jump Start timeout	<p>Sets the amount of time the system will hold the Jump Start speed. Jump Start speed will be used for application control when the vehicle's speed is below the Jump Start speed threshold.</p>

9. **Speeds:** Used to enable a fallback speed if GNSS is degraded. When enabled PIQ will send speed at the defined value when GNSS is degraded.
Note: For fallback speed to work, the TUVR controller MUST use the speed messages provided by precision IQ
10. **Summary.** Review the details about the application control channel.
Tap **Save** to save the application control channel details.
11. Tap **Next** to continue and [Enter Implement Switch Details](#).

Application Control Details for a Virtual Implement

Follow the steps below to enter the application control details for a Virtual implement:

1. **Type** screen: enter a name, if needed, and offset measurements: Allows the assignment of a material to the channel. This is an optional step but may limit virtual tank unit selection. Ex- A virtual bin can not be configured in Bushels without a material containing a bushel weight being assigned to the channel.

Type Value	Description
Name	Allows the entry of a custom name to identify the channel.
Control Type	Selected control type <i>(not editable)</i> .
Material Type	The material type will determine what types of materials can be assigned to the channel.
Material name (optional)	Select the material to be assigned to the channel.
Use as Primary Display Channel (If implement contains <1 channel)	When enabled, this becomes the primary application channel.

Tap **Next** to continue.

2. **Offsets:**

Type Value	Description
Application Forward/Back Offset	This is the offset from the toolbar.
Application Left/Right Offset	This is the left/right offset from the center of the toolbar.

Tap **Next** to continue.

3. **Settings** screen: tap the active fields to update the values:

Settings Value	Description
Rate Control	Enable this to allow rate control.
Section Control	Enable to allow section control.
Number of Sections	Number of boom sections controlled by this channel. For TUVR implements: Sections may be populated by controller.
Fence Rows	Allows the configuration of virtual fence rows.

Tap **Next** to continue.

4. **Width** screen: tap the section to enter a width value, if needed.

This screen will show the measured section width for each section on the boom. You may edit the Section widths by tapping on the corresponding section.

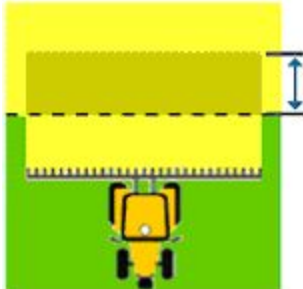
Tap **Next** to continue.

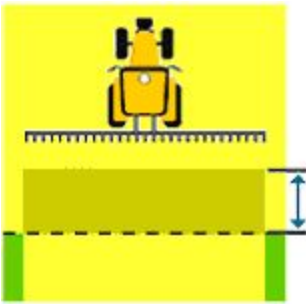
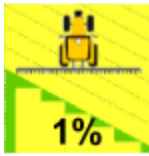





5. **Latencies** screen: tap each field to set latency details:

Latencies Value	Description
On Latency	This specifies the number of seconds it takes for the system to reach the correct rate after the boom sections have switched on.
Off Latency	This specifies the number of seconds it takes for the system to turn off after the boom sections have switched off.
Apply On Latency to Boundary	Tap to toggle on or off. When on, compensates for hardware delays. On = The system determines when to switch on so that application can begin as soon as the boundary is crossed when entering from the outside. Off = The system switches on when the boundary is reached. Any mechanical delay could leave a gap between the boundary and where the product is applied. When GPS accuracy is low, this option is recommended to prevent application outside of the boundary.
Sections off when stopped	On = Application stops when you are not moving. Off = Application continues, even when you are not moving.

Tap **Next** to continue.

6. **Overlaps** screen: tap each field to set overlap details:

Overlaps Value	Description
Start Overlap	The distance of intentional application overlap when you exit a previously applied area. 

<p>End Overlap</p>	<p>The distance of intentional application overlap when you enter a previously applied area.</p> 
<p>Coverage Switching Overlap</p>	<p>The percentage of sections width that must cross coverage before it is switched. The higher the number, the greater the overlapped area before the section is turned off.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Favor skip</p>  <p>1%</p> </div> <div style="text-align: center;">  <p>50%</p> </div> <div style="text-align: center;"> <p>Favor overlap</p>  <p>99%</p> </div> </div>
<p>Boundary Switching Overlap</p>	<p>The percentage of sections width that must cross a boundary before it is switched.. The higher the number, the greater the overlapped area before the section is turned off.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Favor skip</p>  <p>1%</p> </div> <div style="text-align: center;">  <p>50%</p> </div> <div style="text-align: center;"> <p>Favor overlap</p>  <p>99%</p> </div> </div>

Tap **Next** to continue.

7. **Summary.** Review the details about the application control channel:

Tap **Save** to save the application control channel details.

8. Tap **Next** to continue and [Enter Implement Switch Details](#).

Configuration Details for a Field-IQ Implement

Field-IQ Supported Features	Description
Number of application channels	<ul style="list-style-type: none"> GFX-350: Up to two channels (Field-IQ license required. Multi product license required for channel2) GFX-750: Up to four channels (Multi product license required for channel2-4) TMX-2050: Up to six channels (Multi phannel license required for channel2-6)
Section Control	<ul style="list-style-type: none"> GFX-350 up to 24 sections including up to two fence rows GFX-750, TMX2050 up to 48 sections including up to two fence rows
Rate Control	<ul style="list-style-type: none"> GFX-350 Up to 2 drives per channel GFX-750 and TMX-2050, Up to 4 drives per channel, 6 drives system max Liquid anhydrous, granular fertilizer, granular seed and row crop seed materials Prescriptions supported with 96553-07 license
Spinner Speed control	<ul style="list-style-type: none"> All Displays 2 spinner speed drives (Same channel). PWM or Servo control
Population / Blockage Monitoring	<ul style="list-style-type: none"> GFX-350: Up to 24 sensors GFX-750 and TMX-2050: Up to 96 sensors
Sensors	<ul style="list-style-type: none"> Two pressure sensors (Air, Liquid, Vacuum) per RSCM One bin level, gate height, and RMP input per RSCM
Switches and other modules	<ul style="list-style-type: none"> External Master Switch input One lift switch per RSCM, SMM, SIM One Master Switch Box- Required for NH3 application or Linear Actuator Control channels One 12 Section Switch Box One Signal Input Module

Note: With the exception of Anhydrous application and Linear Actuator control channels, no switch boxes are required for Field-IQ operation.

Follow the steps below to enter the configuration details for a Field-IQ Basic implement:

1. [Enter Field-IQ Implement Application Control Details](#)
2. [Enter Section Control Settings](#)
3. [Enter Rate Control Settings](#)
4. [Enter Adjustments Settings](#)
5. [Enter Row Monitoring Settings](#)
6. [Enter Virtual Tank Settings](#)
7. [Review Configuration Summary Details](#)

Enter Field-IQ Implement Application Control Details

After you have selected the Field-IQ application type and added the available application control channels, follow the steps below to configure a Field-IQ channel for Precision-IQ. Once your implement is set up, you can return to the Implement Setup wizard to make any changes.

Follow the steps below to configure a Field-IQ channel:

1. **Type** screen: enter or verify the following fields:

Type Value	Description
Name	Allows the entry of a custom name to identify the channel.
Control Type	Selected channel control type (<i>not editable</i>).
Material Type	Defines the material type that can be assigned to the channel (granular seed and granular fertilizer are seen as one material type by the display)
Material	Allows the assignment of a material to the channel. This is an optional step but may limit virtual tank unit selection. <i>For example, a virtual bin cannot be configured in Bushels without a material containing a bushel weight being assigned to the channel.</i>
Use as Primary Display Channel (If implement contains >1 channel)	When enabled, this becomes the primary application channel.

Tap **Next** to continue.

2. **Offsets** screen: enter the channel application offsets.

Settings Value	Description
Application Left/Right Offset	Defines the center of application if offset from the hitch
Number of offsets (Center offset, Interplant planter layouts only)	Defines the number of row offsets. If more than one offset is defined, the option to define multiple application forward/ back offsets will become available.
Application forward/back offset	Drawbar Implements: Defines the application offset from the measured ground contact point. This may be left at 0 if the application offset is the same as the ground contact Mounted Implements: Defines the application offset from the defined vehicle hitch point. This may be left at 0 if the application offset is the same as the hitch.

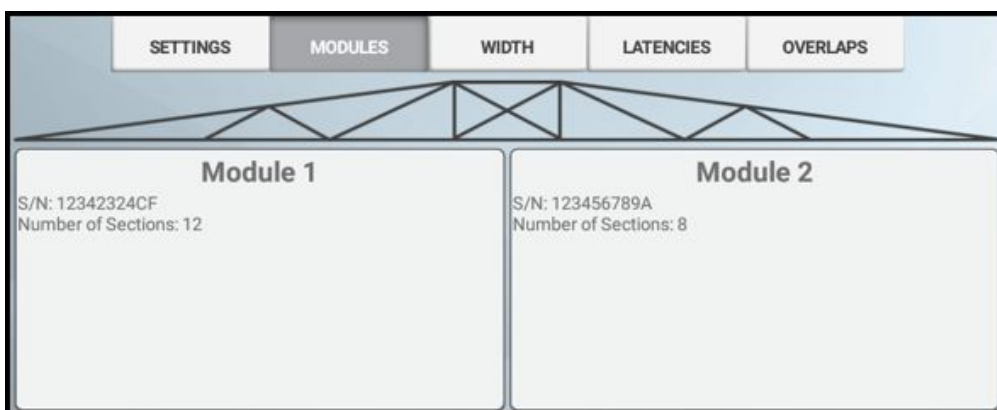
Tap **Next** to continue.

Enter Section Control Settings

Tap the active fields to update the values:

Settings Value	Description
Section Control	Toggle section control on or off .
Control Type	Field-IQ implements, for individual section switching. Rate as Section - Treats the Drive or Flow control valve as a section. Section widths will be defined by the drive widths
Number of Modules	Sets the number of section control modules assigned to the channel. Module assignment is done in a future step.
Section Control Type	Active Hi (12V= On) - For use with standard boom valves. (Section is on when 12V is applied.) Active low (12V=Off) - Inverts the section signal for use with TruCount products. (Section is off when 12V is applied.)
Fence Row Nozzles (liquid channels only)	Used to define what fence rows are being used. Settings are: left only , right only , or both .
Fence Row Wiring (liquid channels only)	This option sets the output used for the right hand fence row. <ul style="list-style-type: none"> • Raven/EZboom +1 (Adds the output 1 section after the last section.) • +12 sets the output to the 12th section wire.

1. **Section Control - Modules** screen: Verify the section control module details:



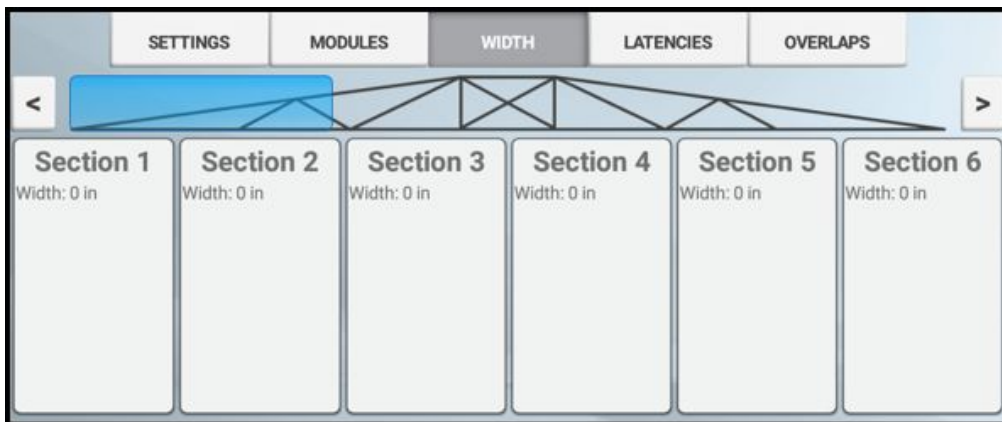
Tap a module to change the **Number of Sections** value:

Tap **Save** to save the new number of sections for the module.

Tap **Next** to continue.

2. **Section Control - Width (Non Planting/Seeding operation types)** screen:

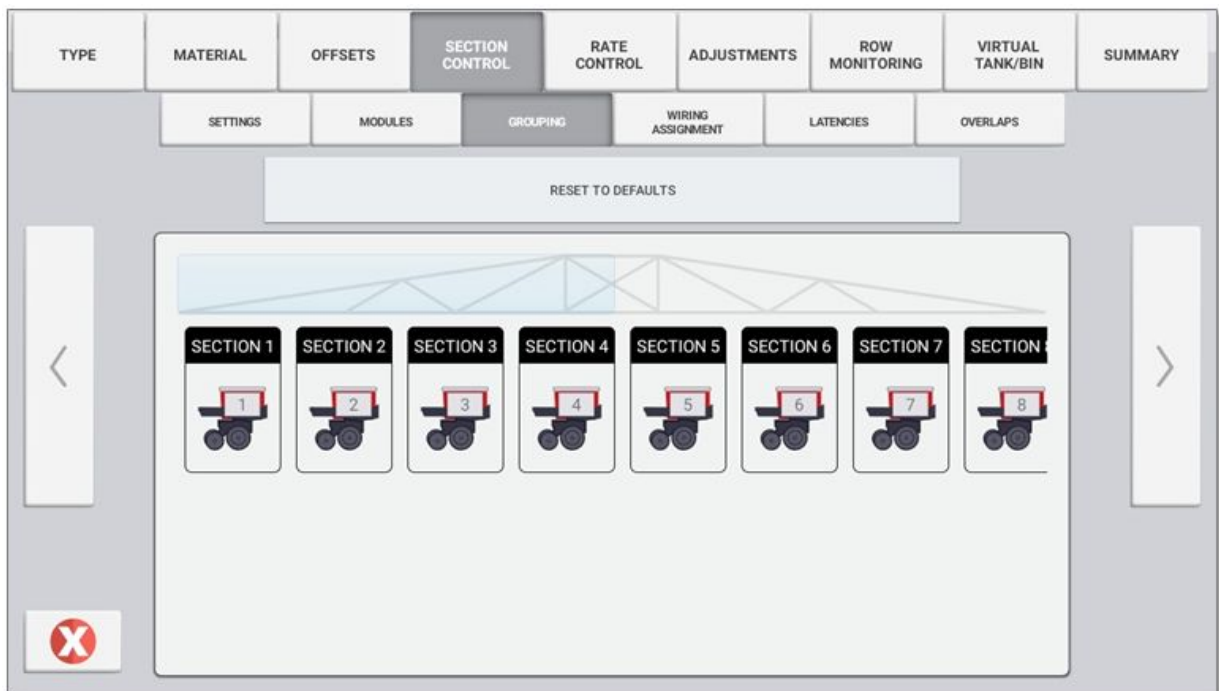
Tap the section to enter a width value, if needed:



This screen will show the measured section width for each section on the boom. The widths of individual sections can be changed by pressing on the section button. Note that total boom width cannot be changed from here. Any changes made to individual sections will result in the altering of the width of the **last** section in order to maintain a constant boom width.

3. Section Control - Grouping for Planting/Seeding Operation Types

Section grouping is used to define row-to-section assignments. Tap the section to modify its assignment. Best practice is to modify the row assignments from left to right. *Precision-IQ will force each section to contain at least one row.*



Section 2 Grouping

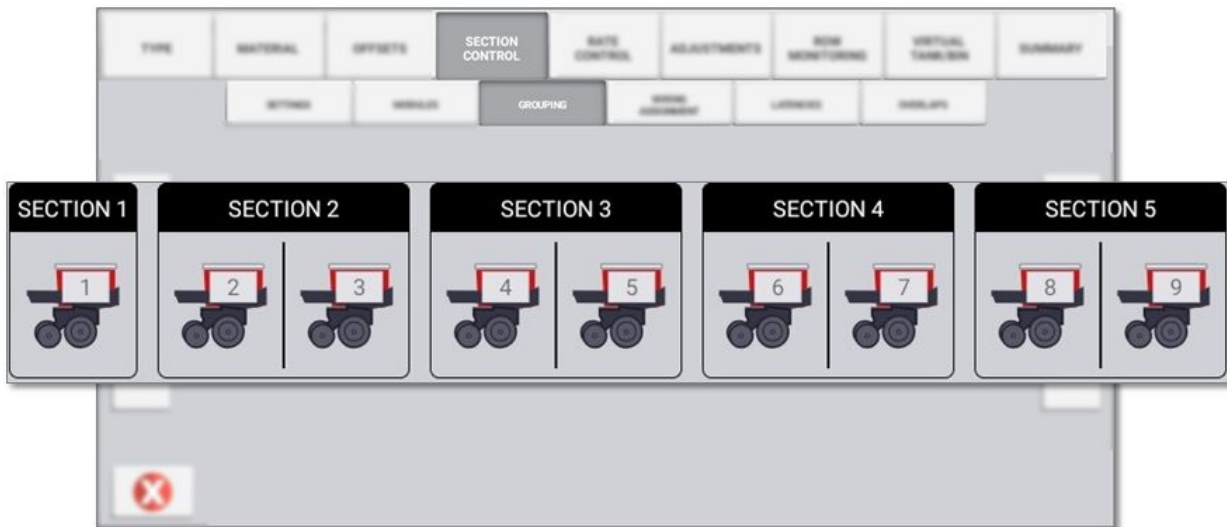
Define the Rows for this section by selecting from the available rows below.



Section 2 Grouping

Define the Rows for this section by selecting from the available rows below.





Note: Sections are modified by adding new rows to sections (A row can't be removed from a section, only added to another). For example, if Section 1 contains rows 1 and 2, to move row 2 to section 2 the user would tap on section 2 and add that row to the section.

Tap **Next** to continue.

4. **Section Control - Wiring Assignment**

Wire assignment is used to map Field-IQ Rate and Section control module outputs to a section. This is primarily used to align section outputs to the appropriate row/section on an interplant planter.

To modify an output to section assignment, tap the wrench icon next to the section. A list will show indicating the section control modules current output assignment. To change the assignment, select the new output pin (outputs that are already assigned will be overwritten).

TYPE	MATERIAL	OFFSETS	SECTION CONTROL	RATE CONTROL	ADJUSTMENTS	ROW MONITORING	VIRTUAL TANK/BIN	SUMMARY
SETTINGS		MODULES	GROUPING	WIRING ASSIGNMENT	LATENCIES	OVERLAPS		
RESET TO DEFAULTS								
		Section ID	SCM Output Pin					
		1	A 1					
		2	A 2					
		3	A 3					
		4	A 4					
		5	A 5					
		6	A 6					

Section 1 - output assignment	
A 1	Assigned to section 1
A 2	Assigned to section 2
A 3	Assigned to section 3
A 4	Assigned to section 4
A 5	Assigned to section 5
A 6	Assigned to section 6
A 7	Assigned to section 7
A 8	Assigned to section 8
A 9	Assigned to section 9
A 10	Assigned to section 10
A 11	Assigned to section 11
A 12	Assigned to section 12

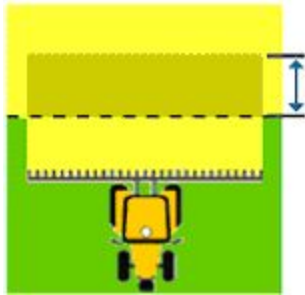
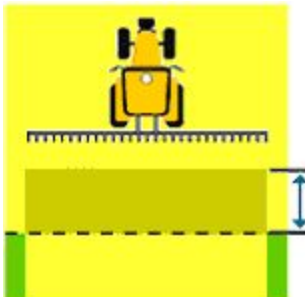
If a section does not have a control module output assigned, a warning indicator will appear next to the list and on the specific missing input.

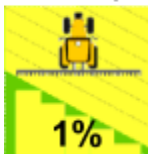


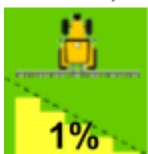


5. **Section Control - Latencies** screen: tap each field to set latency details:

Latencies Value	Description
On Latency	This specifies the number of seconds it takes for the system to reach the correct rate after the boom sections have switched on.
Off Latency	This specifies the number of seconds it takes for the system to turn off after the boom sections have switched off.
Apply On Latency to Boundary	<p>Tap to toggle on or off. When on, compensates for hardware delays.</p> <p>On = The system determines when to switch on so that application can begin as soon as the boundary is crossed when entering from outside the boundary.</p> <p>Off = The system switches on when the boundary is reached. Any mechanical delay could leave a gap between the boundary and where the product is applied. When GPS accuracy is low, this option is recommended to prevent application outside of the boundary.</p>
Sections Off When stopped	<p>On = Section control components close/ turn off when you come to a stop.</p> <p>Off = Section control components stay on when you come to a stop. Application is stopped by the flow control valve or master/ dump valve.</p>

Tap **Next** to continue.

6. **Section Control - Overlaps** screen: tap each field to set overlap details:

Overlaps Value	Description
Start Overlap	<p>The distance of intentional application overlap when you exit a previously applied area.</p> 
End Overlap	<p>The distance of intentional application overlap when you enter a previously applied area.</p> 

Coverage Switching Overlap	<p>The percentage of a section's width that must cross coverage before it is switched. The higher the number, the greater the overlapped area before the section is turned on or off.</p> <div> <div>Favor skip</div> <div>  </div> <div> <div>Favor overlap</div> <div>  </div> <div>  </div> </div> </div>
Boundary Switching Overlap	<p>The percentage of a section's width that must cross a boundary before it is switched.. The higher the number, the greater the overlapped area before the section is turned on or off.</p> <div> <div>Favor skip</div> <div>  </div> <div> <div>Favor overlap</div> <div>  </div> <div>  </div> </div> </div>

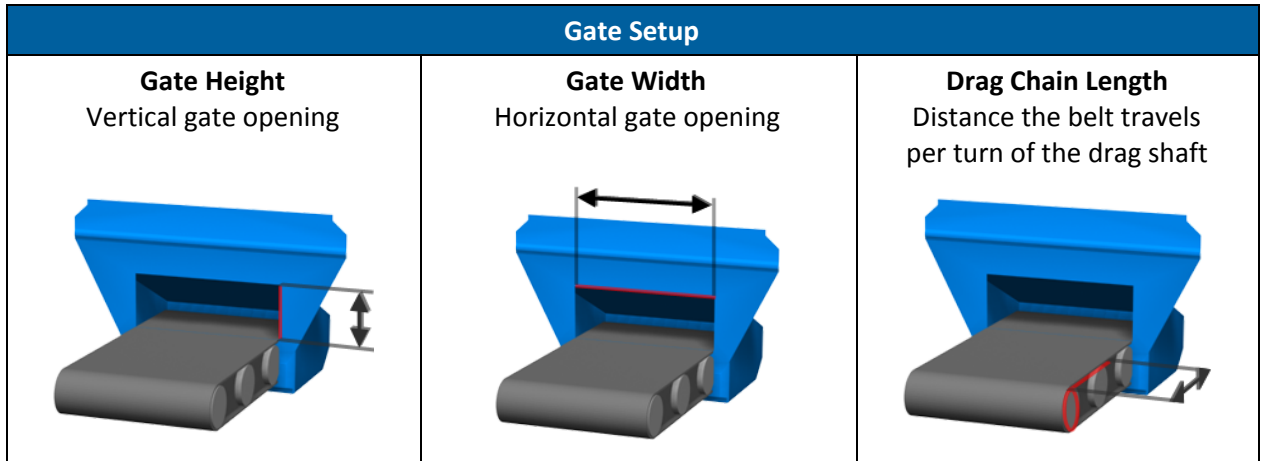
Tap **Next** to continue.

Enter Rate Control Settings

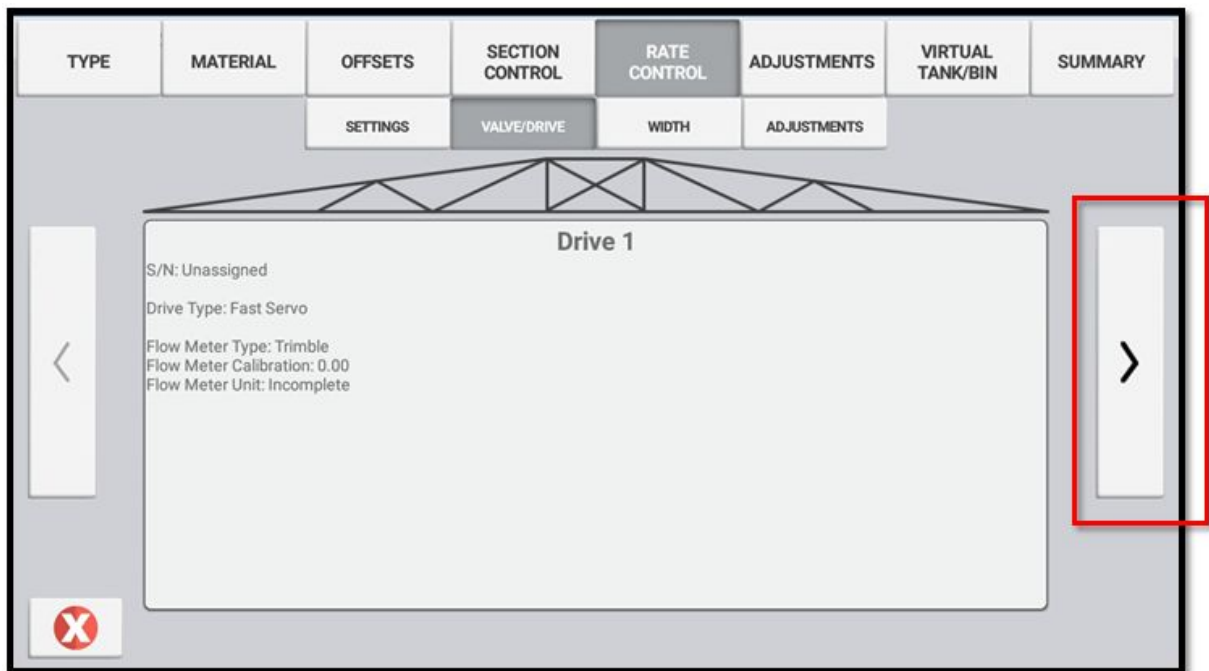
1. Tap each field to adjust settings details:

Field	Description
Rate Control	Toggle rate control on or off .
Record Coverage on Applied Flow Rate	<p>If On: Coverage is logged only when flow is present.</p> <p>If Off: coverage is logged when a section is on regardless of product flow. In this mode, coverage may be logged even though no product is being dispensed.</p>
Number of Drives	Defines the number of drives on the channel.
Number of Nozzles (<i>Liquid only</i>)	Number of nozzles or shanks used on the boom not including fence rows.

Spreading Operations only:



2. Tap **next** to review the valve/drive settings:



- a. Tap **Drive** to change the flow meter setup for the valve/drive:

Field	Description
Serial Number	Assigns the Drive to a Field-IQ Rate control module
Drive Type	<p>Sets the control valve type:</p> <p>Servo Valves: Fast Servo - 4 wire servo valves Hardi% bypass - Used with constant displacement pump and flowback boom valves. Pump Servo - Servo used to control hydraulic flow to a motor or pump Standard Servo - 2 wire servo valves</p> <p>Inline vs Bypass: Sets the plumbing type of the servo. Inline systems directly control flow to the boom valves. Bypass systems meter the flow going back to the tank.</p> <p>PWM: Electronic solenoid used to control hydraulic flow to a motor.</p> <p>Linear Actuator: Electric motor used to control the linear position of a shaft/lever</p> <p>Electric over Hydraulic: A valve that uses electric current (PWM signal) to control the hydraulic valve output</p>
Auxiliary Valves	<p>Master: Valve opens to allow application</p> <p>Dump: Valve opens when application stops</p> <p>Material Clutch +: 12V signal for clutches that engage when energized</p> <p>Material Clutch-: 12V signal for clutches that disengage when energized</p>
Control Valve Behavior When Sections Close	<p>Close: Valve closes when all sections are off</p> <p>Lock in last position: Valve locks in last position when all sections are off</p> <p>Lock in minimum position: (<i>PWM only</i>) Sets valve to a predefined position when all sections are off.</p>
Liquid: Pump Disarm Switch Granular: Pump or Ground Drive Settings	<p>Liquid Application: -Used with self-propelled sprayer platforms to trigger a relay that allows Field-IQ to take control of the pump away from the OEM harness. The pump disarm switch does not turn the pump on or off.</p> <p>Granular Application: -Armed when high: For ground clutches that engage when energized -Armed when low: For ground clutches that disengage when energized.</p>
Reduce Drive Speed for Closed Sections (Granular materials only)	When enabled, the meter will slow down as sections are closed.

- b. Tap **Next** to continue with valve settings:

Field	Description
Liquid only Flowmeter Type	Sets the meter type. The meter type defines the units that can be selected.
Liquid only Units	<div> <div>Type:</div> <div> Raven (Enter the meter cal as it reads on the tag) Pulses per 10 gallon Pulses per 10 liter Trimble Pulses per gallon Pulses per liter </div> <div> Other Pulses per gallon Pulses per liter Pulses per in 3 </div> </div>
Liquid: Flowmeter Calibration Number Granular and Row Crop application: Shaft Encoder Constant	Enter the meter cal from the flowmeter. This will be updated with the corrected value after a catch test is complete. <i>For NH3 applications, enter the liquid calibration number.</i> Enter pulse count per revolution as identified by the encoder manufacturer.
Granular and Row Crop application only: Gear Ratio	Enter the Gear Ratio from the Encoder to the meter/drag shaft <div> Notes: If the encoder is mounted directly to the meter/drag shaft, enter a ratio of 1. Belt type Spreaders: If the encoder is mounted on the front roller, calculate the ratio from the front roller to the rear (drag shaft). These are often the same size= a ratio of 1. </div>
Seeds per disk (row crop seed only)	Enter the number of cells on the seed plate. <div> Note: It is suggested to save one implement profile for each set of seed plates that are used. Ex. "12 row planter- Corn" and "12 row planter- Beans". This will prevent the need to modify this setting each time the seed plates are changed. </div>

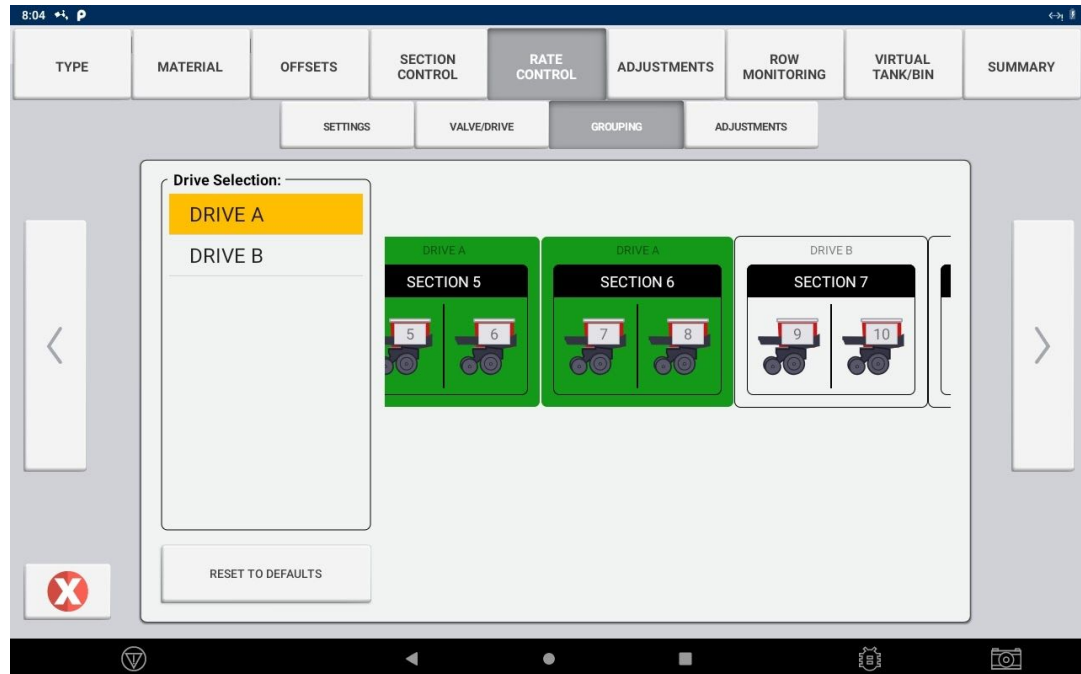
Tap **Save** to save the flow meter settings for the valve/driver.

Tap **Next** to continue.

3. Rate Control

- Width** (For all operation types other than planting /seeding **or** Rate as Section implements) Verify the rate control width value. This value is used to confirm the application width for the control valve. This setting is important when using rate as a section. The sum of all drive widths can not be greater than the application width.
- Grouping** (for all planting/seeding operations that are **not** using rate as section) Used to define the Section to Drive grouping. To add a section to a drive select the appropriate drive, then select the section to add to it. Sections that can be added will have a white background. Sections

already assigned to the selected drive will have a green background



Tap **Next** to continue.

4. **Rate Control - Adjustments.** Tap each field to configure the rate control adjustment settings:

Field	Description
Minimum Override Speed	When applying below the set speed, the drive will lock to that speed (until the shut off speed is reached) Note: If the shut off speed is greater than the override speed, then the override speed will effectively be disabled.
Manual Rate Switch Aggressiveness (When master switch box is connected)	Sets the aggressiveness of the valve increment and decrement commands when in manual rate.
No/Low Flow Timeout	When applying, this is the time limit in which no flow can be reported by the flowmeter before the system will automatically shut off.

Tap **Next** to continue.

Enter Adjustments Settings

Tap to define the Jump Start speed and time out

Field	Description
Jump Start	Jump Start is a feature available both with and without a master switch box. See xxx for the use of jump start
Jump Start speed	The speed at which the system will apply at when Jump Start is on, Jump Start speed will be used for application control when the vehicle's speed is below the Jump Start speed threshold.
Jump Start timeout	Sets the amount of time the system will hold the Jump Start speed. Jump Start speed will be used for application control when the vehicle's speed is below the Jump Start speed threshold.
Shut-Off Speed	When the system is at or below this speed, the application is stopped.

See [Enter Field-IQ Implement Auto Jump Start Details](#) for more details about this feature.

Tap **Next** to continue.

Enter Spinner Speed Settings (Spreading operations only)

Spinner Speed Settings:

Enable or disable spinner speed and define the number of spinner speed drives.

TYPE & MATERIAL	OFFSETS	SECTION CONTROL	RATE CONTROL	ADJUSTMENTS	SPINNER SPEED	ROW MONITORING	VIRTUAL TANK/BIN	SUMMARY
		SETTINGS	RPM	VALVE/DRIVE	ADVANCED			
<div>SPINNER SPEED CONTROL <input checked="" type="checkbox"/></div> <div>NUMBER OF DRIVES 1</div>								

<

>

RPM

Field	Description
Target RPM	Enter the target spinner RPM
RPM Increment	Sets the RPM change when incrementing or decrementing the target rpm
Minimum RPM	Minimum target rpm (Sets the floor for the target rpm)
Maximum RPM	Maximum target rpm (Sets the ceiling for the target rpm)

Valve/ Drive

- a. Tap **Drive** to change the flow meter setup for the valve/drive:

Field	Description
Serial Number	Assigns the Drive to a Field-IQ Rate control module
Valve Type	<p>Sets the control valve type:</p> <p>Servo Valves:</p> <p>Fast Servo - 4 wire servo valves</p> <p>Hardi% bypass - Used with constant displacement pump and flowback boom valves.</p> <p>Pump Servo - Servo used to control hydraulic flow to a motor or pump</p> <p>Standard Servo - 2 wire servo valves</p> <p>Inline vs Bypass: Sets the plumbing type of the servo. Inline systems directly control flow to the boom valves. Bypass systems meter the flow going back to the tank.</p> <p>PWM: Electronic solenoid used to control hydraulic flow to a motor.</p>

Feedback

Field	Description
Feedback Constant	Enter pulse count per spinner revolution.
Gear Ratio	Enter the Gear Ratio from the Encoder to the spinner (This is usually 1:1)

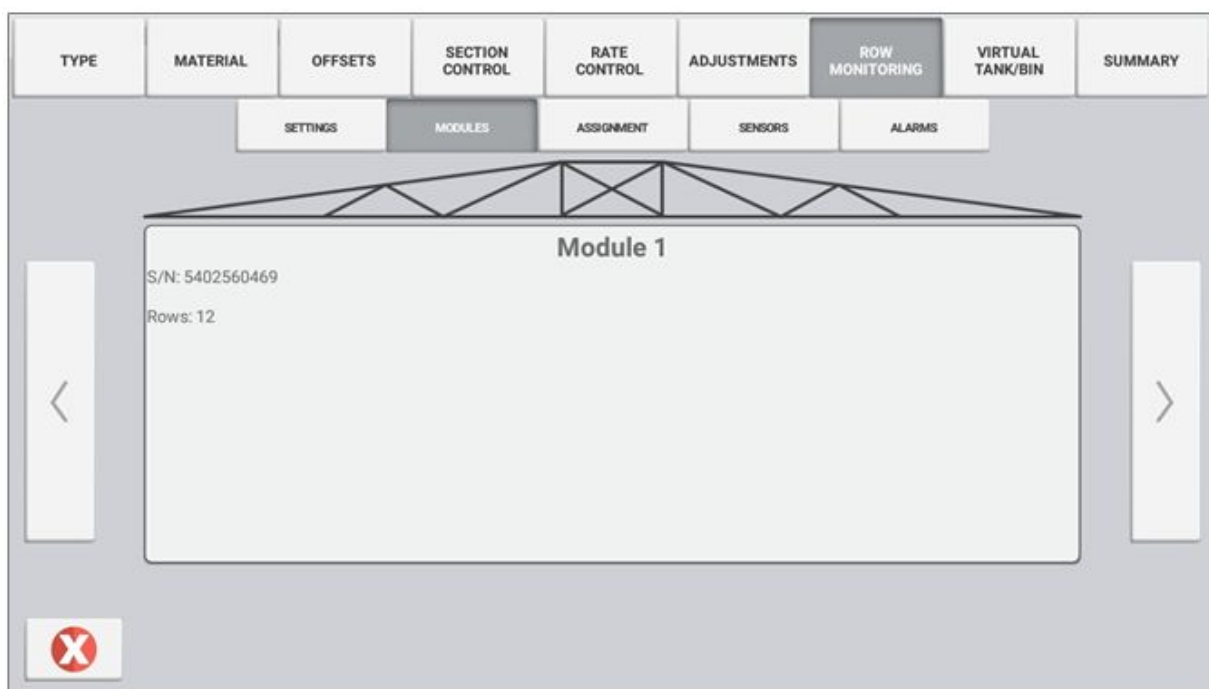
Advanced:

Field	Description
Spinner Drive behavior when Sections closed/ Belt stopped	<p>Lock in Last position: Valve command is held in its last position when the sections close or the belt stops.</p> <p>Lock in minimum (PWM only): Valve is driven to a defined position when the sections close or the belt stops. The minimum position is represented as the PWM duty cycle. The minimum position is changed via the drive calibration screens.</p>

Enter Row Monitoring Settings

Field	Description
Row Monitoring	Toggle to enable or disable Row Monitoring
Monitoring Type	Blockage: Used to monitor flow Population: Used to monitor singulated seed statistics such as population, singulation, skips, multiples and spacing
Number of modules	Enter the number of seed monitoring modules used
Non-Population Alarms(population monitoring only)	When enabled, alarms for non population details will be shown. Seeds when off is an example of a non population alarm
Sensor Detection	When enabled, the Seed monitoring module will detect the configured rows for sensors. If a sensor is not detected a warning will be shown identifying the sensor that is not connected. Note: Some muxbus compatible sensors are not compatible with sensor detection.

1. Tap **Next** to view the module assignment:



Tap **the module** to change the flow meter setup for the valve/drive:

Field	Description
Serial Number	Assignees the Seed Monitoring Module
Rows	Sets the number of rows (seed sensors) connected to the module)

2. Tap **Next** to manage the sensor to module input:

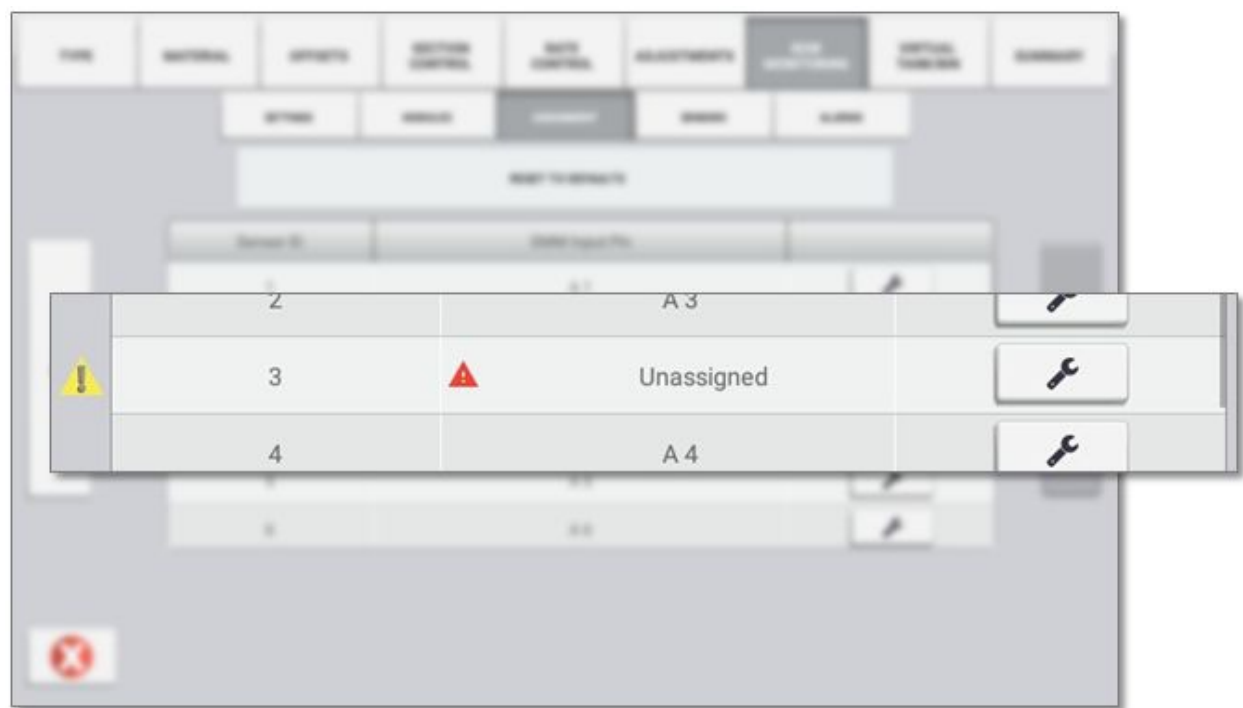
Sensor ID	SMM Input Pin	
1	A 1	
2	A 2	
3	A 3	
4	A 4	
5	A 5	
6	A 6	

To modify an input, tap the wrench icon next to that input. A list will show indicating the inputs current sensor assignment. To change the assignment, select the new input (inputs that are already assigned will be overwritten)

Sensor 1 - input assignment	
A 1	Assigned to sensor 1
A 2	Assigned to sensor 2
A 3	Assigned to sensor 3
A 4	Assigned to sensor 4
A 5	Assigned to sensor 5
A 6	Assigned to sensor 6
A 7	Assigned to sensor 7
A 8	Assigned to sensor 8
A 9	Assigned to sensor 9
A 10	Assigned to sensor 10
A 11	Assigned to sensor 11
A 12	Assigned to sensor 12
A 13	Unassigned

Sensor 1 - input assignment	
A 1	Unassigned
A 2	Assigned to sensor 1
A 3	Assigned to sensor 3
A 4	Assigned to sensor 4
A 5	Assigned to sensor 5
A 6	Assigned to sensor 6
A 7	Unassigned
A 8	Unassigned
A 9	Unassigned
A 10	Unassigned
A 11	Unassigned
A 12	Unassigned

If a sensor is left unassigned, a warning indicator will appear next to the list and on the specific missing input.



Tap **Next** to continue

3. **Row Monitoring: Sensors.** The sensors tab is used to review the current sensor to row assignment and disable a row sensor.



Tap **Next** to continue.

4. Row Monitoring: Alarms

Field	Description
Population High Alarm	Used to define the conditions required to trigger a High population alarm. Precision-IQ will alarm when the population is above this threshold.
Population Low Alarm	Used to define the conditions required to trigger a Low population alarm. Precision-IQ will alarm when the population is below this threshold.
Singulation low Alarms	Used to define the conditions required for singulation warnings. Precision-IQ will alarm when singulation is below the defined threshold.
Seeds When off	Used to define the conditions to alarm when seed flow is present of a row/rows that are commanded off.
No Seeds when on alarm	Used to define the conditions to alarm when no seed flow is present for a row/rows that are commanded on.

Tap **Next** to continue.

5. **Row Monitoring: Detection.** Detection values are used to adjust the **parameters** defining skips, multiples and misplaced seeds. The sample size can also be adjusted. Threshold percentages are in relation to the calculated seed spacing (target rate and row width).

NOTE: Adjust these values in small increments. Adjusting these values can lead to a system that is tolerant of poor performing rows.

Threshold	Behavior if increased	Behavior if lowered
Skip Detection (default 66%)	Increasing the threshold will decrease the sensitivity to skips	Decreasing the threshold will increase the sensitivity to skips
Multiples Detection (default 35%)	Increasing the threshold will decrease the sensitivity to multiples	Decreasing the threshold will increase the sensitivity to multiples
Misplaced Seeds (default 10%)	Increasing the threshold will decrease the sensitivity to misplaced seeds	Decreasing the threshold will increase the sensitivity to misplaced seeds
Average sample size (default 125)	Increasing the sample size will smooth out intermittent seed flow changes. Population monitoring overall will be more tolerant to variations	Decreasing the sample size will increase the systems responsiveness to flow changes.

Tap **Next** to continue

Enter Virtual Tank Settings

Tap to enable Virtual Tank and enter values as needed:

Field	Description
Virtual Tank	Toggle to enable or disable .
Show Units As	Sets the displayed tank units.
Full Capacity Volume	Set to match the capacity of the system.
Warning Type	Set to Volume or % remaining .
Warning Level	Sets the level at which a low tank warning will be displayed.

Tap **Next** to continue.

Review Configuration Summary Details

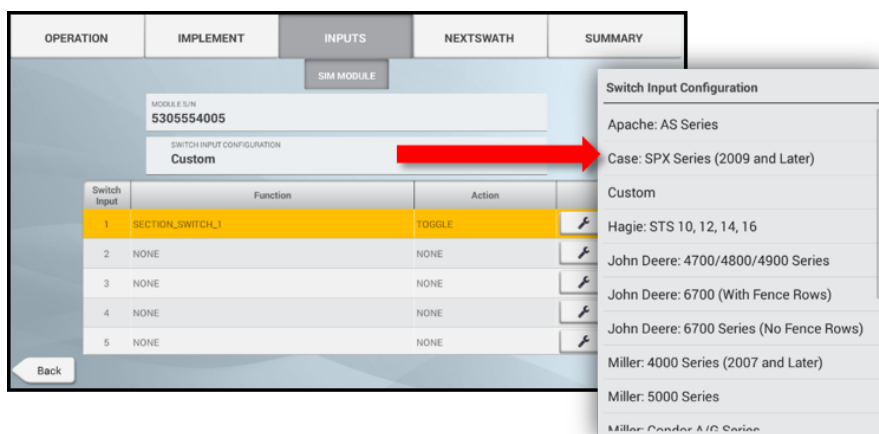
Review the details about the application control channel. Tap **Save** to save the application control channel details.

Inputs - Field-IQ Sensors, Implement Switches, and Signal Input Module

Enter Signal Input Module Details

This section describes the signal input module options:

1. **Module S/N.** The serial number of the connected signal input module.
2. **Switch Input Configuration.** Select a field to change from Custom inputs to predefined inputs:
 - *Predefined platforms* - to be used with Field-IQ self-propelled sprayer platform kits.
 - *Custom* - inputs are manually assigned.



3. Switch Assignments to:
 - *Assign an input:*
 - Tap the **Settings** button on the input to assign its function.
 - Toggle a switch that is connected to the signal input module. This will highlight the input it is connected to. Tap the **Settings** icon to assign the inputs.
 - *Clear inputs* - Select or reselect the **Custom** switch input configuration.

Category	Function	Input Type
Guidance	Engage/Disengage	Momentary
	Nudge Right	Momentary
	Nudge Left	Momentary
Field-IQ	Increment Rate	Momentary
	Decrement Rate	Momentary
All Application Control	Left Fence Row	Toggle (On/Off)
	Right Fence Row	Toggle (On/Off)
	OEM Master	Toggle (On/Off)
	Section Switches 1 - 24	Toggle (On/Off)

Enter Implement Switches Details

1. Lift switch: **enable** or **disable** an **Input Location**:

Field-IQ

- a. Number of switches: Sets the number of switches the system will look for
- b. Minimum number of switch changes: Defined the amount of switches that need to be tripped for engagement

Remote Logging Switch

For switches connected directly to the display. This input is enabled or disabled via the Display Setup screen in the Settings menu.

- a. **Work State Active Hi**: System is *in work* mode when the switch circuit is **open**.
- b. **Work State Active Low**: System is *in work* mode when the switch circuit is **closed**.

On the Run Screen, an arrow will display next to the section master indicating the state of the switch.



2. Auxiliary Master Switch (Field-IQ only): Remote master input connected to the Field-IQ module.

Enter Sensors Details (Field-IQ only)

To enable sensors to configure Field-IQ sensor inputs:

1. Select **Add** to add a sensor
2. Type: Select the sensor type:

Signal type	Sensor Type
Pressure 0 to 5V signal	Air Pressure Liquid Pressure Vacuum pressure
Level (Active hi or low)	Bin Level
RPM	RPM
Gate Height 0-5v signal	Gate height sensor

3. Name: used to define a custom sensor name
4. Location
 - a. Select module: defines the module the sensor is connected to
 - b. Input location: (for PSI sensors only) defines what input connector is being used
 - c. Units: defines the sensor units
 - d. Pulses per revolution (rpm only)
5. Alarm: When enabled, Alarms can be configured to user requirements:

Sensor type	Alarm types
RPM and PSI	Warn if below "x" value Warn if above "x" value
Bin Level	Alarm when changed to (low or hi) Alarm Text: User entered text that will accompany an alarm

4. Tap **Next** to review a summary and save implement details.

Implement Summary

Once you have entered the appropriate details for your implement that uses application control, the final step is to review the Summary screen. If the details are correct, then tap the **Save** icon:

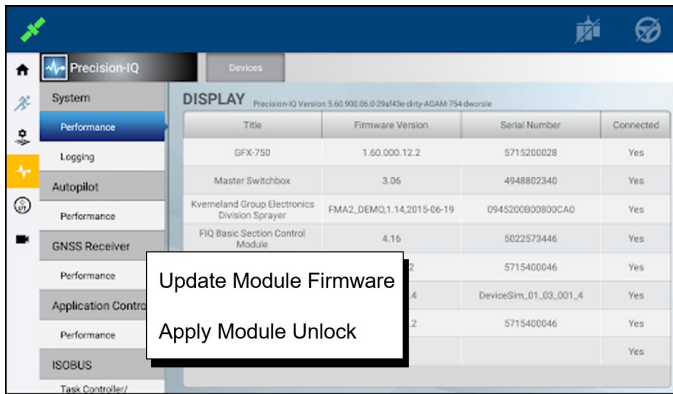
Category	Result
Implement	Name: Sprayer ISOBUS VR Type: Pull Type Sprayer Hitch Type: Drawbar Implement Width: 120.0 ft 0 in Swath Width: 120.0 ft 0 in Hitch to Application Point: -6.0 ft 0.01 in Left/Right Offset: 0 in
Application Control	Channel 1: CHANNEL 1 Control Type: ISOBUS Task Control Material Type: Liquid

BACK Save

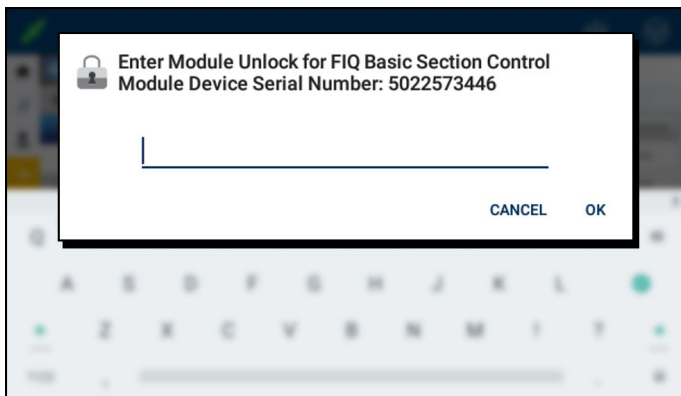
Unlock or Upgrade a Field-IQ Module

Follow the steps below to unlock an Field-IQ Rate/Section Control Module:

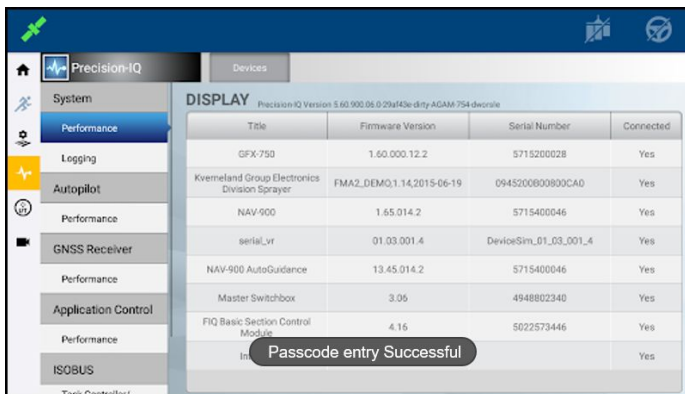
1. Purchase the required license from the Partners Store and assign it to your Field-IQ Rate/Section Control Module. A module unlock code will be sent that you will need to apply to the display.
2. On the Precision-IQ Home screen, tap the **Diagnostics** icon in the Activity bar.
3. On the Diagnostics screen, the System Performance menu displays by default. Locate the Field-IQ Rate/Section Control Module that you wish to unlock. Then, tap and hold the Title of the module for 2 seconds to be presented with the module upgrade UI.
4. Tap the **Apply Module Unlock** text to gain access to the module unlock UI:



5. Enter the **Module Unlock** code for the Field-IQ Rate/Section Control Module and tap **OK**:



The Diagnostics screen will update to show that the Passcode entry was successful:



6. Once the unlock is applied, it is recommended to cycle power to the module by disconnecting power from the module for at least 10 seconds.

Follow these steps to upgrade Module Firmware:

1. On the Precision-IQ Home screen, tap the **Diagnostics** icon in the Activity bar.
2. On the Diagnostics screen, the System Performance menu displays by default. Locate the Field-IQ Rate/Section Control Module that you wish to unlock. Then, tap and hold the Title of the module for 2 seconds to be presented with the module upgrade UI.

3. Tap the **Update Module Firmware** text to gain access to the module upgrade UI:
4. Select the desired firmware and the upgrade will start automatically.
5. Once the firmware is applied, it is recommended to cycle power to the module by disconnecting power from the module for at least 10 seconds.

Calibrating Field-IQ Channels

Access to the calibration for an implement requires that the installer UI be enabled in the application system settings. When opening the calibration screen you will be presented with the calibration summary status. Follow the calibration instructions in the following sections:

- [Drive/Valve Calibration](#)
- [Pressure Sensors](#)
- [Flow Calibration](#)
- [Run Screen](#)
- [Rate Widget](#)

Drive/Valve Calibration

1. Select **Application Control**.
2. Select the channel that you want to calibrate. Follow the steps on the screen to set the following values:

Drive limits

- a. Liquid/NH3: Maximum Flow. This should be calculated with one of the following:
 - Nozzles/Orifice. Multiply the maximum rate flow of the nozzles by the number of nozzles on the sprayer. If using multiple tips, install the largest tip that will be used.
 - Maximum Flow rating of the pump or flow meter, whichever is lowest.
- b. Granular: Minimum and Maximum RPM rating of the drive or meter
- c. Row Crop Seed: Minimum and Maximum seed disk / seed meter RPM.

Auto Tuning - The system will automatically tune the valve based on the minimum and maximum values in the first step.

Auto tuning is not available for the following scenarios: NH3 channels, Spinner Speed Drives, Linear Actuators

Drive Settings - Editable calibration values. Most valves can be tuned with the settings described in the table. The system can also be turned on in this screen to check the valve performance once an auto tune has completed.

Value	Description
Target speed	Use to enter a simulated speed value
Target rate	Target Rate (based on selected material). If a master switch box is connected, rate can be changed from the switchbox.
Master Switch	Status of the master switch (on/off)
Applied Rate	Applied Rate of material
Gain	Adjusts the speed response of the control valve. Increasing the value will increase the speed at which the valve adjusts. <ul style="list-style-type: none"> • If the gain is too high, the valve overshoots the target rate, resulting in a fluctuation in flow. • If the gain is too low, the system takes too long to respond to rate and speed changes.
Minimum Response	On a servo valve, this value sets the minimum rate the valve will move at when a command is sent. When a PWM valve is selected, it is the minimum command required for the valve to make a change in flow. <ul style="list-style-type: none"> • If this setting is too high, it can cause the flow rate to overshoot the target rate and then oscillate. • If the setting is too low, the valve may not respond, allowing the flow to stay above or below the target rate.
Allowable Error	Sets the “dead zone” for the valve. When the flow rate is within the allowable error, the Field-IQ system will not send an open/close command. Once the flow rate is outside the allowable error, the system will send a command to open or close the valve to correct the flow rate. <ul style="list-style-type: none"> • If you set this too low, the valve may be overly active around the target rate. • If you set this too high, the system will not maintain an acceptable flow rate.

Pressure Sensors

Note: RPM and Bin Level sensors do not require calibration. If these sensors are reading incorrectly, check the sensor settings in the implement setup

Select **Sensors** and select the module to calibrate.

Type	Description
Point/Slope	Uses the slope value of the sensor and a set point. The set point must be known, it can be 0. The slope value will be provided by the sensor manufacturer.
High/Low	Also known as two-point calibration. The sensor must reference two separate known pressures. The display will calculate the slope between these two values (0 is acceptable as the low pressure). This method is generally considered more accurate as it is tuned to the specific sensor.

Flow Calibration

The flow calibration is linked to the material. To access the calibration screens, open the **Material Setup** screen, a material must be assigned to a channel. Once assigned, select **Flow Calibration**:

Follow the steps in the Calibration menus and enter the following information:

- [Liquid Channels](#)
- [NH3 Channels](#)
- [Granular Channels](#)
- [Planter \(Row Crop Seed\) Channels](#)

Liquid Channels

1. Enter or Modify the meter calibration.
2. Calculate the system minimum flow.
 - Nozzle/orifices - Multiply the minimum flow of the tip by the number of tips on the smallest section of the sprayer.
 - Minimum flow rating of flow meter or pump, whatever is higher.
3. Enter a target rate and speed appropriate for the applicator.
4. To start the calibration, select **start flow**, then turn on the master switch.
5. Using a measuring container, catch 1-minute samples from at least 3 sections across the boom. Average the results.
6. Enter the results. If the corrected cal number is acceptable, tap **OK**.

NH3 Channels

To complete the NH3 calibration, you must apply product (a minimum of 1000 lbs will yield best results). You must enter the amount applied as indicated by Precision-IQ (See total volume applied status item) and the actual amount applied (based on tank starting and end weight). Once these values are entered, tap **Calculate** to update the calibration constant.

Optional “hand” calculated flow calibration corrections.

The following formulas can be used to calculate and correct the meter cal value. This is applicable to Liquid and NH3 channels.

Field Run Calibration:

The following data points are required.

- Actual applied amount (based on tank level/ area covered)
- Display calculated amount
- Current meter cal

Formula:

Display calculated amount / Actual amount = correction factor

1000 gallons / 1085 gallons= .921

Correction factor x Current meter cal= Corrected meter cal.

.921 x 710 pulses per gallon = 654 pulses per gallon

Catch Test Calibration:

Granular Channels

1. Enter or modify the Gate height (belt spreaders only), and shaft encoder constant as needed.
2. For the initial calibration, make sure that the calibration constant is set to **1**.
3. Tap next, enter or modify the minimum and maximum meter rpm.
 - a. Prepare to catch the material from the meter.
 - b. If the meter is not already primed, then turn the master switch on and select **Prime**. This will turn the meter one revolution.
4. Run Calibration.
 - a. Enter the target amount of material to be dispensed, target application rate and speed.
 - b. Tap **Next** to start the calibration.
 - c. Follow the onscreen instructions to start the calibration.
5. Calibration results.
 - a. The estimated amount of material dispensed will be displayed.
 - b. Enter the actual amount of material dispensed.
 - c. The updated calibration constant will be displayed. If needed, the calibration can be restarted.
 - d. Select the green check box to accept the calibration.

Planter (Row Crop Seed) Channels

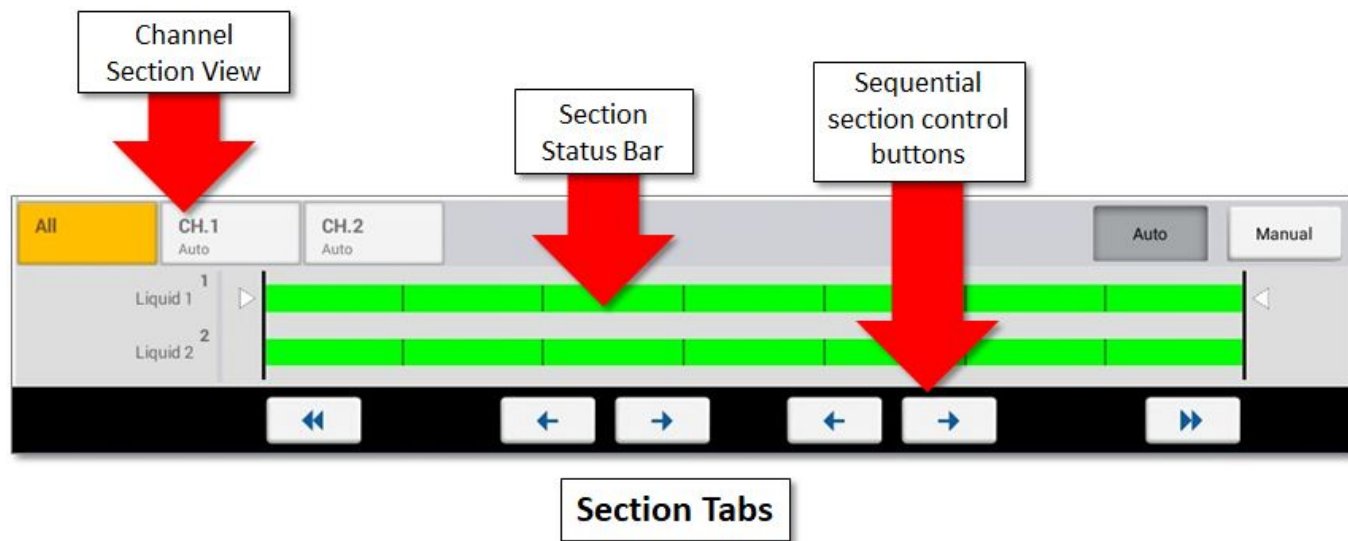
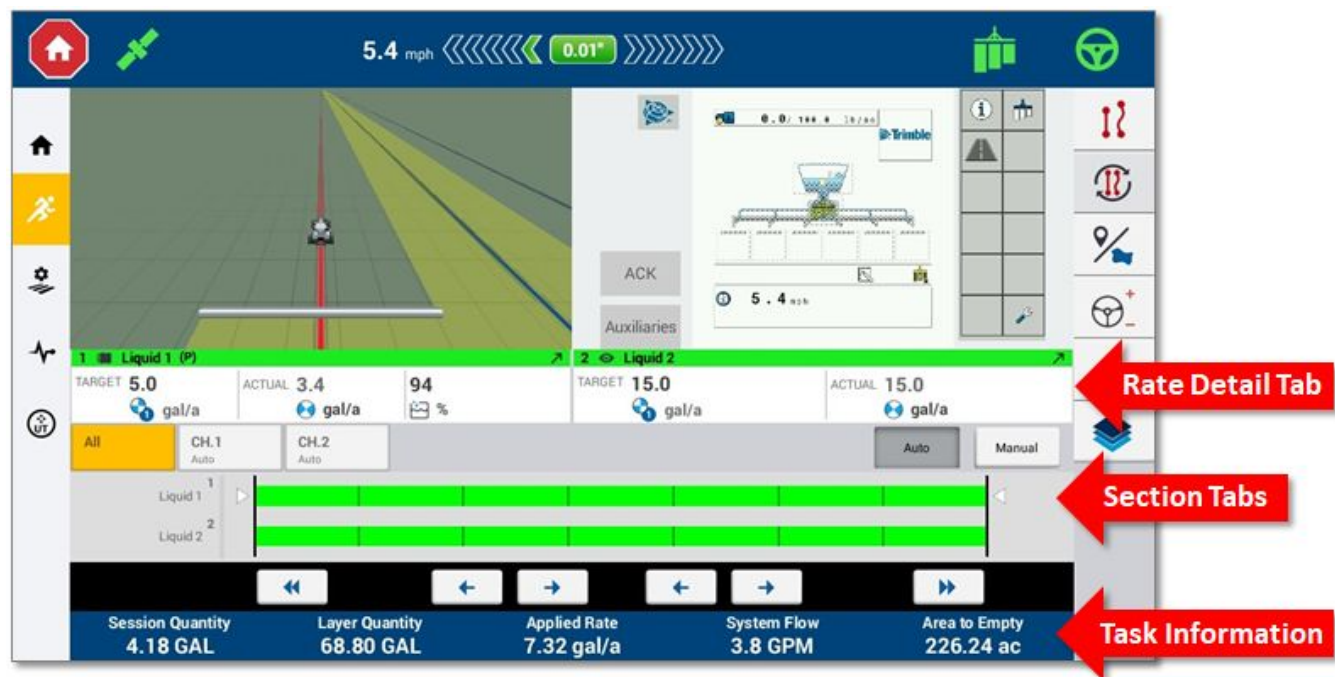
1. Enter or modify the **Seeds per Disk** value as needed.
2. Enter or modify the shaft encoder constant as needed.
3. For the initial calibration, make sure that the calibration constant is set to **1**.
4. Tap **Next**, enter or modify the minimum and maximum seed disk rpm.
 - a. Prepare to catch seeds from at least 2 meters.
 - b. If the meters are not already primed with seed, turn the master switch on and select **Prime**. This will turn the meter one revolution.
5. Run Calibration
 - a. Enter the target number of seed meter revolutions, Target application rate and speed. Tap **Next** to start the calibration.
 - b. Follow the onscreen instructions to start the calibration.
6. Calibration results
 - a. The Actual meter revolutions will be displayed along with the expected amount of seed dispensed.
 - b. Enter the actual number of seeds dispensed and select **Next**.
 - c. The updated calibration constant will be displayed. If needed, the calibration can be restarted.
 - d. Select the green check box to accept the calibration.

Run Screen with Application Control





Single Channel Overview



Multi Channel Overview



Section Master Status

Section Master Status	Description	
	Application control not available <ul style="list-style-type: none"> • Invalid task or channel configuration • No controller communications • No positions 	
	ISO: Task Controller is Ready to control sections, all sections are off.	All other: Application control is off, System is ready for application to start.
	ISO: Task Controller is controlling sections. System can apply product	All other: Master is on, System can apply product
	Field IQ and TUVR: System is operating in Jump Start mode	

Rate Details

Rate Heading Bar Color	Details	
	ISO	All Other
Gray	ECU overall work state reported as off	Off: Ready for application
Yellow	Work State on, No flow	On, No Flow detected
Green	Work State on, Flow reported	On, Flow reported


Tapping on a rate tab will allow the user to view the rate details and perform the following tasks:



1. Change the Target Rate:

- a. Two predefined rates (when a master switch box is present, the current master switch box rate will be highlighted)

- i. Use  to adjust the target rate by the manual rate increment value.


- ii. Reset the rate offset using the reset button 

- b. When a prescription is available, follow the prescription rate. Target rate must be set to rate 1.

2. Spinner Speed (when enabled) controls

- a. Enable or disable the spinners. (Once running, the spinners cannot be shut off until the master switch is turned off)



- b. Use  to change the target spinner speed setting.

3. For Field IQ channels (**Layout will vary depending on the channel operation type**)

- a. If enabled, View the virtual tank and flush (liquid only) controls.



- b. Access purge or prime functions.



- c. If enabled, Access Pump arm.



- d. For granular materials, Access material density controls.



- e. Gate height input for spreaders



Section Details

Rate/Section Status

Section Icon Color	Details
White	Section disabled
Gray	Section off (in coverage/boundary or by switch)
Blue	Section on, in Manual control (coverage/ boundary switching is ignored)
Yellow	Section on- No flow reported
Green	Section on- Flow present

Tapping on a Section Tab (when more than one channel is in use) will allow the user to perform the following tasks:



View the Section Status

- Section status colors (see table above).
- If a 12-section switch box is connected, then all sections will be shown.
- If no 12-section switch box is connected, then only 12 sections at a time will be in view. You can use the left and right scroll arrows or swipe left/right to scroll through the sections



Manually Turn Sections ON or OFF

(If a 12 section switch box is connected, only the section state will be shown)

- Section **ON**
- Section **OFF**



Enable Auto/Manual Section Mode

- **Auto mode** - If the section is turned on, the Section switching will occur automatically when the implement passes over coverage, boundaries or non productive zones.
- **Manual mode** - The sections will ignore coverage, boundaries and non productive zones. Only the section on/off state will be adhered to.

Section Details with Population or Blockage Monitoring

- **With** a 12-section switchbox: Up to 24 rows of sensor information will be shown at a time.
- **Without** a 12-section switchbox: 12 rows of sensor information will be shown at a time.

Population View



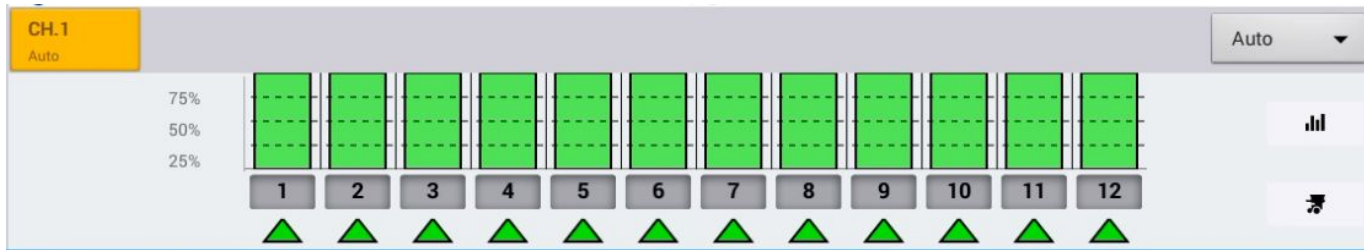
Changing View Type

The 'Monitoring View Type' selection interface shows three radio button options: 'Population' (selected), 'Multiple/Skips', and 'Singulation'. To the left of the options is a small icon of a bar chart.

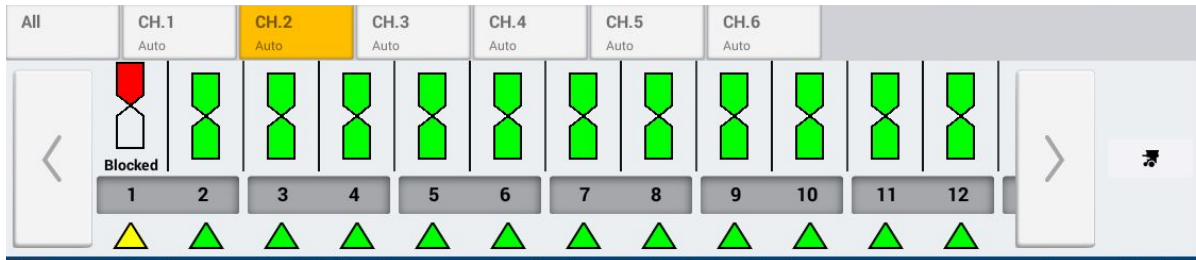
Multiple/Skips View



Singulation View



Blockage Monitoring View

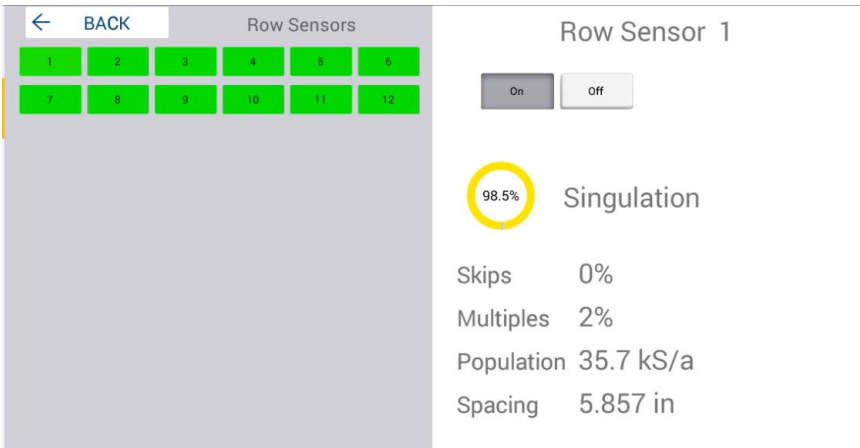


Row Details

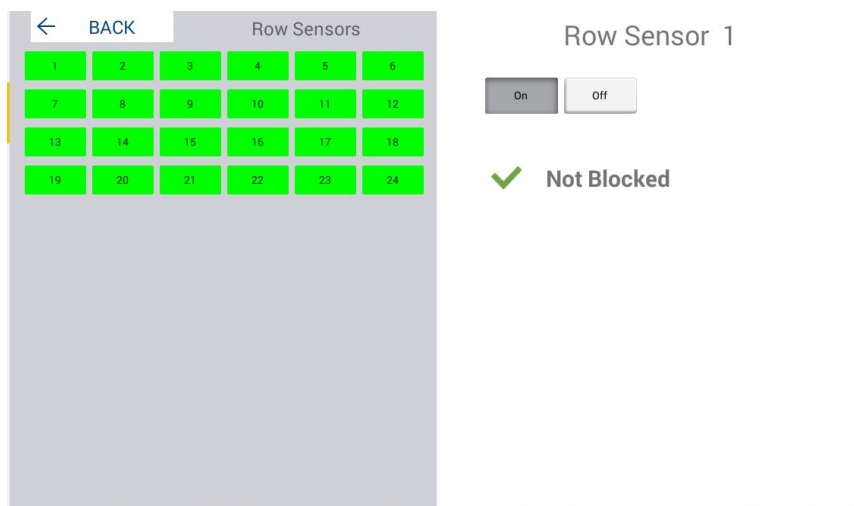
In the Row details screen, seed statistic information for each row is available. The sensor can also be disabled in this view.



Seed Statistics Details



Blockage Details

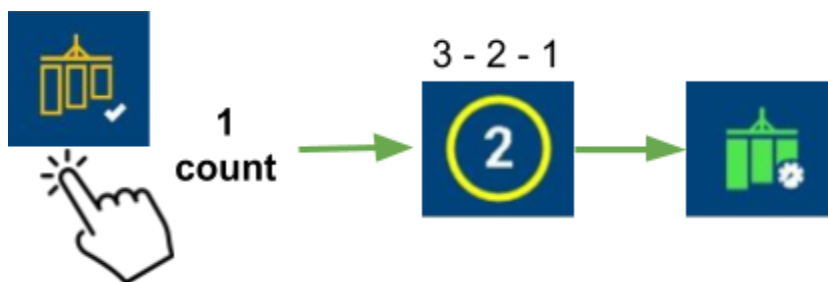


Field-IQ and TUVR Implement Jump Start Details

Jump start speed is used when the vehicle is stopped or not at nominal operating speed. When enabled, the system will use the predetermined jump start speed

Without a Master Switch Box

- Jump Start can be initiated by a **long press** of the section master icon.
- Once initiated, a 3 second counter will be shown. At the end of the countdown, Jump start will be initiated



- Jump start will remain active until one of the following conditions are met.
 - Jump start timeout limit is reached
 - Jump start speed is exceeded (and system is traveling above the shut off speed)
 - Note: If the conditions are not met, the system will shut off

With a Master Switch box.

- Jump Start can be initiated by toggling the master switch into the jump start position.
 - Jump start will remain active until one of the following conditions are met.
 - Jump start timeout limit is reached
 - Jump start speed is exceeded (and system is traveling above the shut off speed)



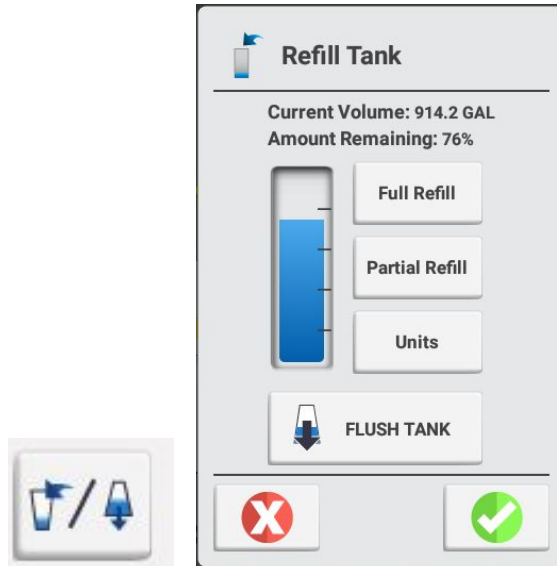
- Note: If the conditions are not met, the system will shut off.

Enter Field-IQ Implement Flush/Purge Details

To start the flush:

1. Expand the rate widget to reveal the Flush or Purge button at the bottom right.

If a virtual tank is present, then the tank refill and flush will be combined:

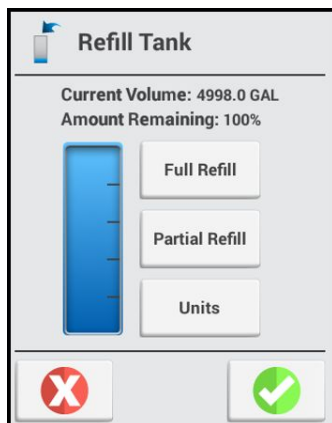


2. Tap the **Flush Tank** button. The *stay clear* notification will be displayed.
 3. Tap the screen to dismiss the notification.
 4. Tap the section master (and/or enable the remote master switch) to start the flush process.
- For Purge (NH3 materials), the purge will timeout after 7 seconds.

To stop the flush/purge:

1. Tap the section master and/or disable the remote master switch.
2. Note that the system flow will show non-zero on the rate widget while flush is in progress.

Enter Field-IQ Implement Virtual Tank Details



Expand the rate widget to reveal the virtual button at the bottom right. Enter the appropriate detail for the following options:

- Full Refill - Sets the Volume to the “full volume” of the tank
- Partial Refill - Allows the user to enter the volume of the tank.

Under Virtual Tank, enter the following details:

1. Select to enable or disable **Virtual Tank**. A green check indicates that the virtual tank is enabled.
2. **Show units as**. This option sets the displayed tank units.
3. **Full Capacity Volume**. You can use this option to set to match the capacity of the system
4. **Warning type**.
 - Volume
5. **Warning Level**. This option sets the level at which a low tank warning will be displayed.
6. Tap **Next** to continue and [Enter Signal Input Module Details](#).

For More Information

Contact your local Trimble Regional Sales Manager.