

Precision-IQ: Managing Implements

USER GUIDE

This document provides details for managing implements with/without application control in Precision-IQ™.

Change Log

Revision C: Added [ISO/CAN Speed Extensions](#) chapter.

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Taking Implement Measurements

- ▶ Pull-Type and Mounted Implements
- ▶ Self-Propelled Equipment

This chapter describes how to take measurements for your implement. This information is used to complete an implement's profile.

Before you take measurements:

- Park the vehicle on level ground.
- Ensure that the implement is oriented to the vehicle as it would be in the field.

The measurement sections show only the measurements required for the type of implement you selected.

Tap the button for each measurement.

Use the on-screen number pad to edit the measurements for:

- Pull-Type and Mounted Implements
- Self-Propelled Equipment

Pull-Type and Mounted Implements

Measurement	Instructions
Hitch Type	Select how the implement connects to the vehicle: <ul style="list-style-type: none"> • Drawbar • Fixed-mount (mounted)
Drawbar	<p>Hitch-to-Ground Contact Point</p> <p><i>With Application Control:</i></p> <ul style="list-style-type: none"> • 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. • ISO and TUVR controllers may provide this measurement to PIQ, if it is incorrect the value must first be corrected in the controller <p><i>Without Application Control:</i> Distance from the hitch to where coverage is to be logged.</p>
Fixed Mount	<p>Hitch-to-Application Point</p> <p><i>With Application Control:</i></p> <ul style="list-style-type: none"> • No offset will be entered at this stage. Application offsets will be managed by the application control channel offset. • ISO and TUVR controllers may provide this measurement to PIQ, if it is incorrect the value must first be corrected in the controller <p><i>Without Application Control:</i> Enter the distance from the hitch to the application point of the implement.</p>
Application Width	Measure the width of the area where the implement applies material (working width).
Rows	Enter the number of rows covered by the toolbar. This setting is used to define Row spacing for the “shift by row” function. (Note: <i>There must be at least 1 row per section if using application control</i>)
Center offset start and end row <i>(Center Offset planters only)</i>	Defines the rows that make up the center offset.
Swath Width	Defines the spacing of guidance patterns. The swath width is what the vehicle will guide to. The swath width will default to match the application width. It can be modified to generate a skip or overlap in application.
Overlap/Skip	Calculated based on the difference between the application width and swath width. <ul style="list-style-type: none"> • A positive value represents application overlap. • A negative value represents application skip.
Left/Right Offset	Measure from the center of the vehicle to the center of the implement. Select Left or Right to indicate the direction the implement is offset, when looking at the vehicle from behind. This measurement adjusts the tractor’s path so that the implement is centered on the line.
Physical Width and Length	Used for NextSwath to ensure boundary clearance.

Self-Propelled Equipment

Measurement	Instructions
Application Width	Measure the width of the area where the implement applies material. (Working width)
Rows	<p>Enter the number of rows covered by the toolbar. This setting is used to define Row spacing for the “shift by row” function.</p> <p>NOTE – There must be at least 1 row per section if using application control.</p>
Swath Width	Defines the spacing of guidance patterns. The swath width is what the vehicle will guide to. The swath width will default to match the application width. It can be modified to generate a skip or overlap in application.
Overlap/Skip	<p>Calculated based on the difference between the application width and swath width.</p> <ul style="list-style-type: none"> • A positive value represents application overlap. • A negative value represents application skip.
Left/Right Offset	<p>Measure from the center of the vehicle to the center of the implement. Select Left or Right to indicate the direction the implement is offset, when looking at the vehicle from behind.</p> <p>This measurement adjusts the tractor’s path so that the implement is centered on the line.</p>
Physical Width and Length	Used for NextSwath to ensure boundary clearance.

Implements: WITHOUT Application Control

- ▶ [Add and Configure an Implement WITHOUT Application Control](#)
- ▶ [Remote Logging Switch - WITHOUT Application Control](#)

This chapter describes how to add and configure an implement for Precision-IQ WITHOUT application control.

Add and Configure an Implement WITHOUT Application Control

Before you begin, take accurate measurements of your implement as described in [Taking Implement Measurements](#). If your implement does not use Application Control (that is, the Application Device is set to **None**) and you wish to activate a remote logging switch, then follow the steps outlined in Remote Logging Switch - Without Application Control.

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.

2. Tap the **New** button to launch the Implement Setup wizard.
3. On the Select Application or Device screen, tap the field and select **None**. Selecting **None** allows you to configure the implement without Application Control. Tap **Next**.
4. The next screen of the Implement Setup wizard prompts you to select a type of operation you expect your implement to perform:

Available operations for your implement are:

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

Tap the tile for the operation that applies for your implement. If you select an implement that would normally apply a product (such as Slurry, Spreading, Seeding), then tap **Next** and select **None** as the application control type from the pop-up window.

Tap the **Save** icon to continue with your implement configuration.

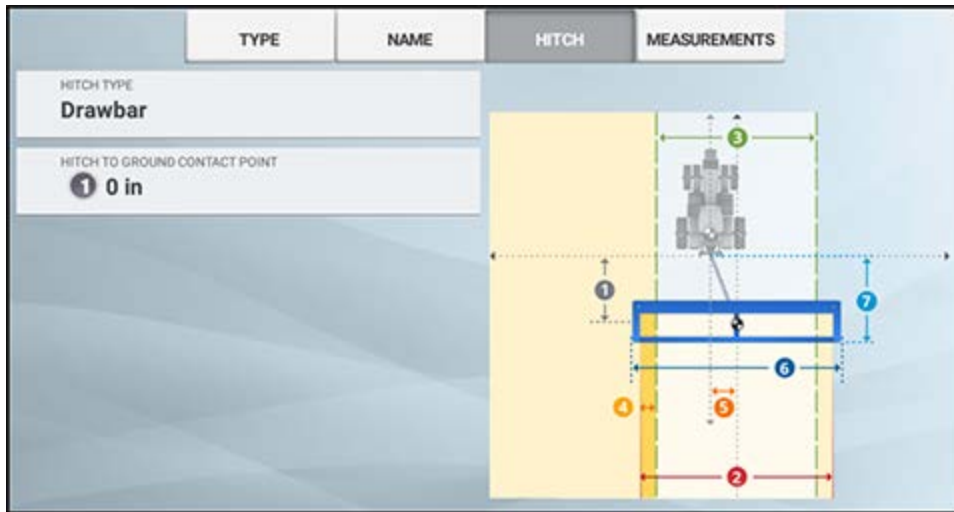
5. **Implement Type.** On this screen, the choices available are determined by operation type you selected earlier. For example, if you selected the Swather operation, then the implement types you can select are *Pull Type Swather* and *Self Propelled Swather - Header*.

Tap **Next** to continue.

6. **Implement Name.** Enter a name for your implement or use the name provided.

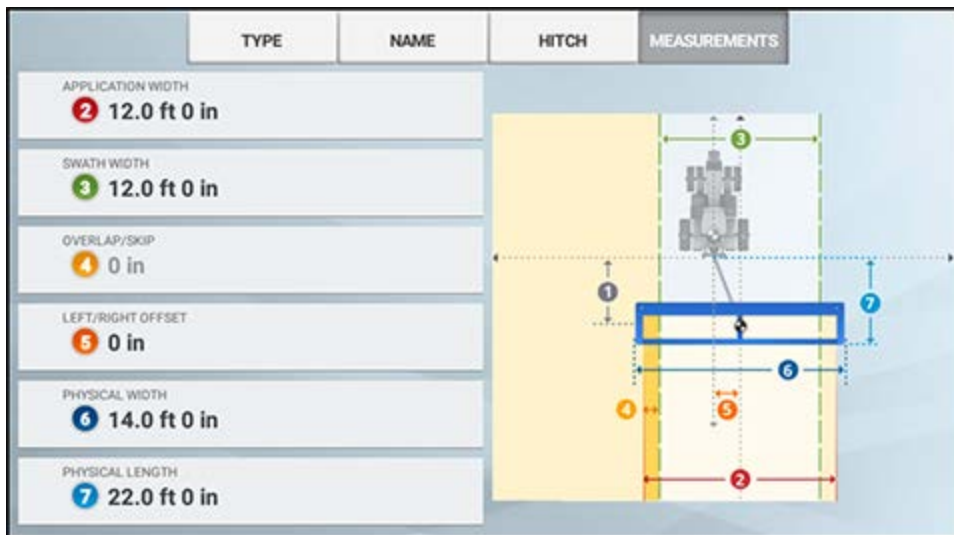
Tap **Next** to continue.

7. **Implement Hitch.** Tap the **Hitch Type** field and select either **Drawbar** or **Fixed**. If you select **Drawbar**, then specify the **Hitch To Ground Contact Point** value:



Tap **Next** to continue.

8. **Implement Measurements.** Enter the implement measurements. See [Taking Implement Measurements](#) for details about each data point.



Field	Description
Application Width	Working width of the implement.
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 application.
Physical Width and Length	Used for NextSwath to ensure boundary clearance. See <i>Implement Setup for NextSwath</i> in NextSwath for details.

Tap **Next** to continue.

- 9. **NextSwath** (optional). The NextSwath feature is used to automatically turn the vehicle at the end of a straight line guidance pattern to align with the next selected swath. See Implement Setup for NextSwath in NextSwath for details.

NOTE – If your implement does not support NextSwath, then this option will not appear.

- 10. **Summary**. The summary screen provides an overview of the implement that was just configured:



Tap the **Save** icon to save the implement configuration.

Once your implement is set up, you can return to the Implement Setup wizard to make any changes. See [Edit/Delete an Implement or Application Control Channel](#) for details.

Remote Logging Switch - WITHOUT Application Control

If your implement does not use Application Control (that is, the Application Device is set to **None**) and you wish to activate a remote logging switch, then follow the steps below:

- 1. On the Settings screen, tap **Mapping**. Then verify the **With Active Remote Switch** option is enabled as shown below:



NOTE – If you use the **With Active Remote Switch** option, then the **When Engaged** option cannot be enabled

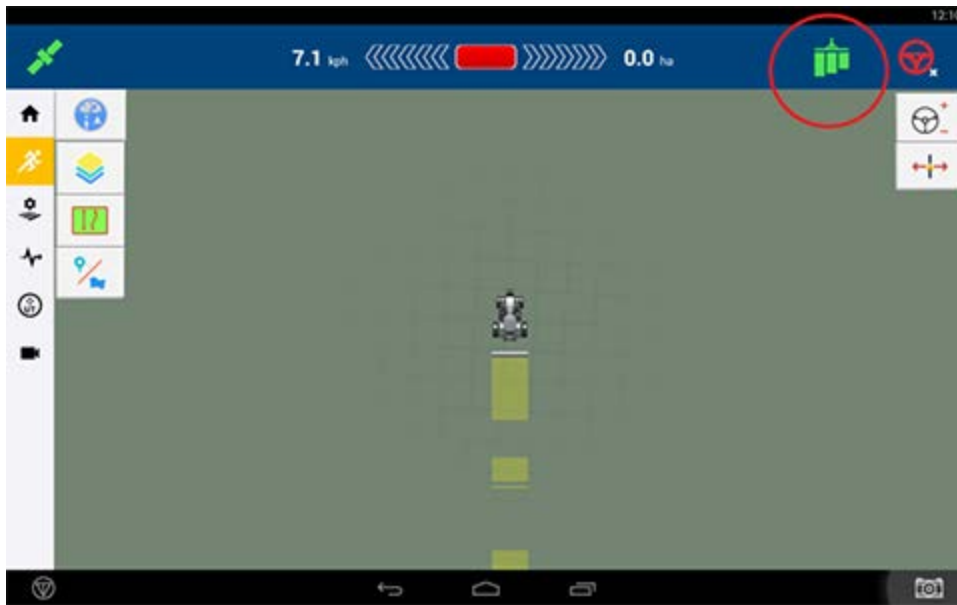
- Then tap the **Remote Switch Working State** and set to the state based on the switch being used. For example, set to Active Low when using a closed grounded circuit to trigger an active work state:



Active High: the circuit is open (The display is sensing that the reference signal voltage is not completing a circuit).

Active Low: the circuit is closed (The display is sensing that reference signal has been grounded).

On the Run screen, an arrow will display in the header to indicate whether the implement is lowered or lifted. If your implement does not use Application Control, then the Run screen will look like this:



Implements: WITH Application Control

- ▶ Verify Precision-IQ Preferences
- ▶ Select an Implement Application Type
- ▶ Add and Configure an Application Control Channel

This chapter describes how to add and configure an implement for Precision-IQ **WITH** application control.

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 Preferences](#)
- [ISOBUS Preferences](#)

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 Preferences	Setting Options
Implement Setup	Auto-Select New Implement. Enable to automatically select the new implement after it has been created.
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	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.
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	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.
Material Rates	Remember Material Rates. When enabled, material target rates are saved and recalled from a Task.

Safety and Alarms Preferences

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

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 Preferences	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. 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 TUVR 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 <i>(With Application Control)</i>	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 covered by the toolbar. This setting is used to define Row spacing for the “shift by row” function. NOTE – There must be at least 1 row per section if using application control.
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.

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.

Add and 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:
 - [ISOBUS Implements:Application Control Details](#)
 - [Serial VR or TUVB Implements: Application Control Details](#)
 - [Virtual Implements:Application Control Details](#)
 - [Field-IQ Implements:Application Control Details](#)

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.

ISOBUS Implements: Application Control Details

- ▶ [Application Control Details for an ISOBUS Implement](#)
- ▶ [Enter ISOBUS Implement Switches Details](#)
- ▶ [ISOBUS Implement Summary with Application Control](#)

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.
 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	For multi-ECU/multi-device support: <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 	For Multi-Rate point support: <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.	
Hardware	ISOBUS implements use an ECU.	

Supported ISOBUS Configurations	
GFX-350/XCN-750 display	Up to 2 channels: (Multi product license required to use channel 2) <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.

Supported ISOBUS Configurations	
	<ul style="list-style-type: none"> Multi Rate Point Support up to 24 rate points. <p><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></p>
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 TUVR 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"> 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". Devices with more than 48 rate points may work, but coverage logging performance may not be acceptable.

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	The ECU's identifier. Usually the ECU name or serial number. (This is not an editable field.)
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. This field can be edited if it is not correct.
Material (optional)	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.
Use as Primary display channel	(Only available when the channel isn't currently assigned as the primary channel) 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.
Use Signal Input Module/switch boxes	When enabled, the channel uses the inputs from the Signal Input module. This setting will only be shown when switch boxes are connected and the channel is not set as the primary channel.

Tap **Next** to continue.

2. **Offsets** screen: enter the Application offsets for the channel. These measurements are based off 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. (See table below for these options)
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.

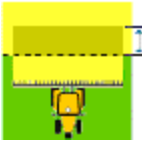




5. **Latencies** screen: tap each field to set latency details:




Latencies Value	Description
On	This specifies the number of seconds it takes for the system to reach the correct rate after the

Latencies Value	Description
Latency	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	<p>Tap to toggle on or off. When on, compensates for hardware delays.</p> <p>On = The system uses the On Latency to switch sections on so that application can begin as soon as the boundary is 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 = Sections turn off when you are not moving.</p> <p>Off = Sections stay on even when you are not moving.</p>

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	The percentage of s sections width that must cross a boundary before it is switched.. The higher

Overlaps Value	Description
Switching Overlap	<p>the number, the greater the overlapped area before the section is turned off.</p> <div><div><p>Favor skip</p><p>1%</p></div><div><p></p><p>50%</p></div><div><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.

Enter ISOBUS Implement Switches Details

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

Field-IQ

- Number of switches: Sets the number of switches the system will look for
- 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.

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



ISOBUS Implement Summary with Application Control

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



NOTE – The settings and configuration for your implement will not be saved until you tap the **Save** icon.

Serial VR or TUVR Implements: Application Control Details

- ▶ Application Control Detail for a Serial VR or TUVR Implement
- ▶ Enter Serial VR or TUVR Implement Switches Details
- ▶ Serial VR or TUVR Implement Summary with Application Control

Application Control Detail 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

Set up the controller, press:

1. Return
2. Return
3. Fertil-Distib

4. Select Type
5. Bogballe e/ex
6. Accept

Configuring the Raven controller

Data menu settings:

1. Baud-9600
2. GPS- Inac
3. DLOG- ON
4. TRIG-1
5. Unit- Sec

Configure the LH500 controller

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

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**.

Configure the Vaderstad controller

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 (TUVR) implement:

1. **Type & Material** 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. For example: 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 (not editable).
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.

3. 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)	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.

Settings Value	Description
options)	
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.

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. The section widths are provided by the TUVR ECU and are not editable.

Tap **Next** to continue.

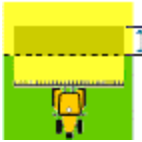




5. **Latencies** screen: tap each field to set latency details:




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.
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.

Latencies Value	Description
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.

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>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>

Overlaps Value	Description
	<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>50%</p> </div> <div style="text-align: center;"> <p>Favor overlap</p>  <p>99%</p> </div> </div>

Tap **Next** to continue.

7. **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.**

Adjustments 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>

8. **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.

9. **Summary.** Review the details about the application control channel.

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

10. Tap **Next** to continue and Enter Implement Switch Details.

Enter Serial VR or TUVR Implement Switches Details

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

Field-IQ

- Number of switches: Sets the number of switches the system will look for
- 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.

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



Serial VR or TUVR Implement Summary with Application Control

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

OPERATION	IMPLEMENT	APPLICATION CONTROL	INPUTS	SUMMARY						
<table border="1"> <thead> <tr> <th>Category</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Implement</td> <td> Name: Pull Type Sprayer Iq Type: Pull Type Sprayer Hitch Type: Drawbar Implement Width: 120.0 ft 0 in Swath Width: 120.0 ft 0 in Hitch to Ground Contact Point: 25.0 ft 0 in Left/Right Offset: 0 in 0 in </td> </tr> <tr> <td>Application Control</td> <td> Channel 1: Fiq Control Type: Field IQ Material Type: Liquid </td> </tr> </tbody> </table>					Category	Result	Implement	Name: Pull Type Sprayer Iq Type: Pull Type Sprayer Hitch Type: Drawbar Implement Width: 120.0 ft 0 in Swath Width: 120.0 ft 0 in Hitch to Ground Contact Point: 25.0 ft 0 in Left/Right Offset: 0 in 0 in	Application Control	Channel 1: Fiq Control Type: Field IQ Material Type: Liquid
Category	Result									
Implement	Name: Pull Type Sprayer Iq Type: Pull Type Sprayer Hitch Type: Drawbar Implement Width: 120.0 ft 0 in Swath Width: 120.0 ft 0 in Hitch to Ground Contact Point: 25.0 ft 0 in Left/Right Offset: 0 in 0 in									
Application Control	Channel 1: Fiq Control Type: Field IQ Material Type: Liquid									

NOTE – The settings and configuration for your implement will not be saved until you tap the **Save** icon.

Virtual Implements: Application Control Details

- ▶ [Application Control Details for a Virtual Implement](#)
- ▶ [Enter Virtual Implement Switches Details](#)
- ▶ [Virtual Implement Summary with Application Control](#)

Application Control Details for a Virtual Implement

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

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

Type & Material Value	Description
Name	Allows the entry of a custom name to identify the channel.
Control Type	Selected control type (not editable).
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:**

Offsets 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.

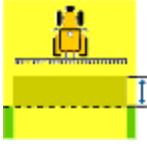



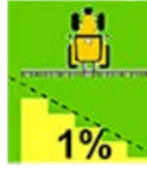


5. **Latencies** screen: tap each field to set latency details:

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 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	Tap to toggle on or off. When on, compensates for hardware delays. On = The system uses the on Latency determines when to switch sections on so that application can begin as soon as the boundary 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 = 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. 

Overlaps Value	Description
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>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>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.

Enter Virtual Implement Switches Details

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

Field-IQ

- Number of switches: Sets the number of switches the system will look for
- 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.

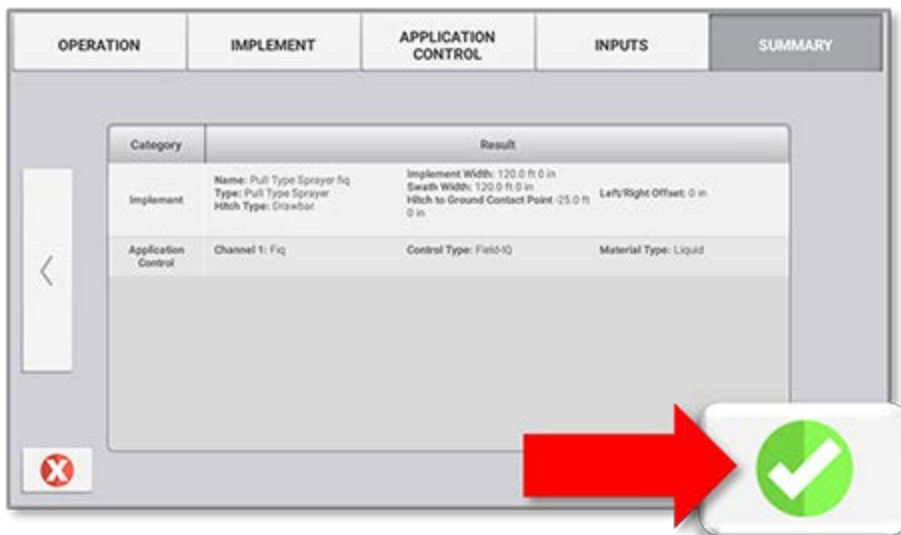
- **Work State Active Hi:** System is in work mode when the switch circuit is **open**.
- **Work State Active Low:** System is in work mode when the switch circuit is **closed**.

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



Virtual Implement Summary with Application Control

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



NOTE – The settings and configuration for your implement will not be saved until you tap the **Save** icon.

Field-IQ Implements: Application Control Details

- ▶ Configuration Details for a Field-IQ Implement
- ▶ Inputs - Field-IQ Sensors, Implement Switches, and Signal Input Module
- ▶ Field-IQ Implement Summary with Application Control

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 channel 2) GFX-750: Up to four channels (Multi-product license required for channel 2-4) TMX-2050: Up to six channels (Multi-channel license required for channel 2-6)
Section Control	<ul style="list-style-type: none"> GFX-350 up to 24 sections including up to two fence rows GFX-750, TMX-2050 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 (SIM)

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 Spinner Speed Settings \(Spreading operations only\)](#)
6. [Enter Row Monitoring Settings](#)
7. [Enter Virtual Tank Settings](#)
8. [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	Description
Name	Allows the entry of a custom name to identify the channel.
Control Type	Selected channel control type (not editable).
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.

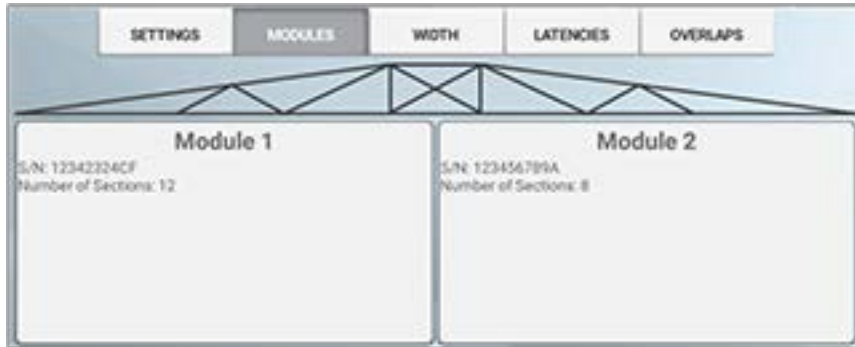
Tap **Next** to continue.

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:



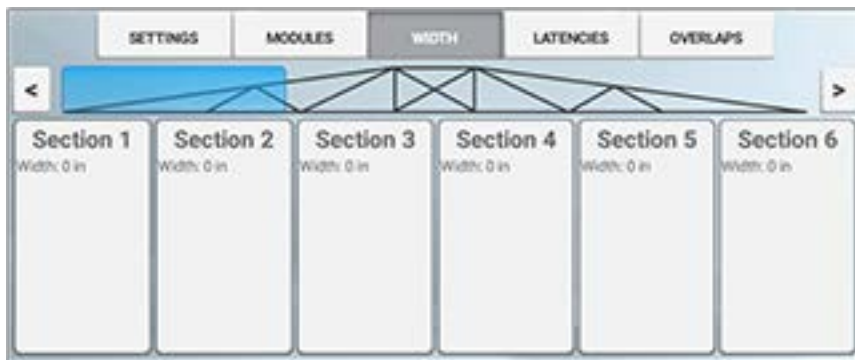
Tap a module to change the **Number of Sections** value:

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:

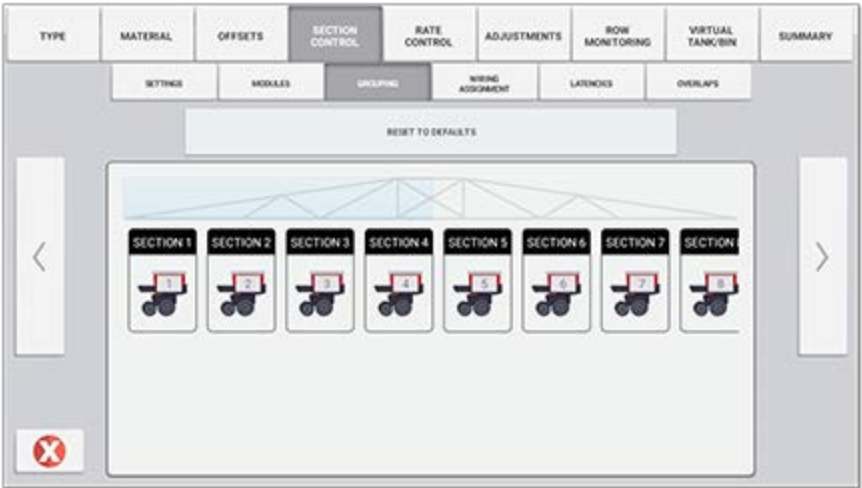
Tap the section to enter a width value, if needed:

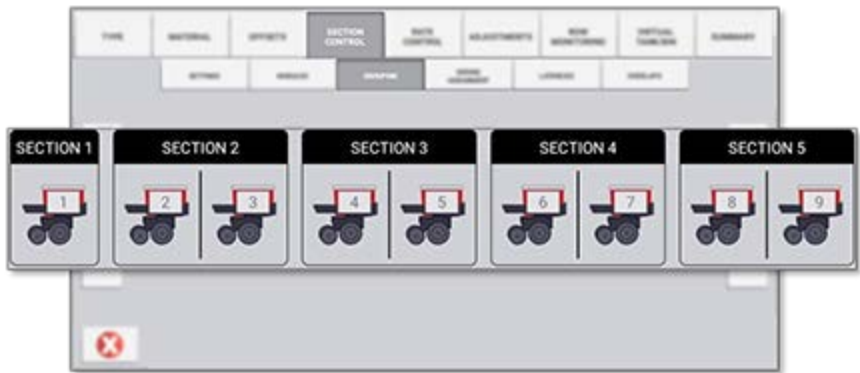


This screen will show the measured section width for each section on the boom. The widths of individual sections can be changed by pressing on the section button. Note that total boom width cannot be changed from here. Any changes made to individual sections will result in the altering of the width of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





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).



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 output.

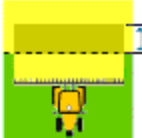







5. **Section Control - Latencies** screen: tap each field to set latency details:

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	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 outside the boundary. 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 = Section control components close/ turn off when you come to a stop. Off = Section control components stay on when you come to a stop. Application is stopped by the flow control valve or master/ dump valve.

Tap **Next** to continue.

6. **Section Control - 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.

Overlaps Value	Description
	
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><div><p>Favor skip</p><p>1%</p></div><div><p>50%</p></div><div><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><div><p>Favor skip</p><p>1%</p></div><div><p>50%</p></div><div><p>Favor overlap</p><p>99%</p></div></div>


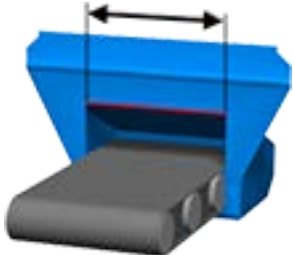
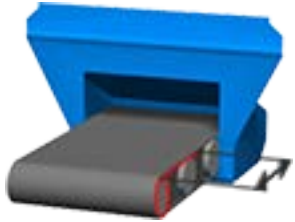
Tap **Next** to continue.

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	If On : Coverage is logged only when flow is present. 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.
Number of Drives	Defines the number of drives on the channel.
Number of Nozzles (Liquid only)	Number of nozzles or shanks used on the boom not including fence rows.

Spreading Operations only:

Gate Setup		
Gate Height Vertical gate opening 	Gate Width Horizontal gate opening 	Drag Chain Length Distance the belt travels per turn of the drag shaft 

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:</p> <ul style="list-style-type: none"> • 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>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: (PWM only) Sets valve to a predefined position when all sections are off. This position is set via the calibration menu.</p>
Liquid: Pump Disarm Switch	<p>Liquid Application:</p> <p>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>
Granular: Pump or Ground Drive Settings	<p>Granular Application:</p> <p>Armed when high: For ground clutches that engage when energized</p> <p>Armed when low: For ground clutches that disengage when energized.</p>
Reduce Drive Speed for Closed Sections <i>(Granular materials only)</i>	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	<p>Type:</p> <p>Raven (Enter the meter cal as it reads on the tag)</p> <p>Pulses per 10 gallon Pulses per 10 liter</p> <p>Trimble</p> <p>Pulses per gallon Pulses per liter</p> <p>Other</p> <p>Pulses per gallon Pulses per liter Pulses per in 3</p>
Liquid: Flowmeter Calibration Number	<p>Enter the meter cal from the flowmeter. This will be updated with the corrected value after a catch test is complete.</p> <p><i>For NH3 applications, enter the liquid calibration number.</i></p>
Granular and Row Crop application: Shaft Encoder Constant	Enter pulse count per revolution as identified by the encoder manufacturer.
Granular and Row Crop application only: Gear Ratio	<p>Enter the Gear Ratio from the Encoder to the meter/drag shaft.</p> <p>NOTE –</p> <p>If the encoder is mounted directly to the meter/drag shaft, enter a ratio of 1.</p> <p>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.</p>
Seeds per disk (row crop seed only)	<p>Enter the number of cells on the seed plate.</p> <p>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.</p>

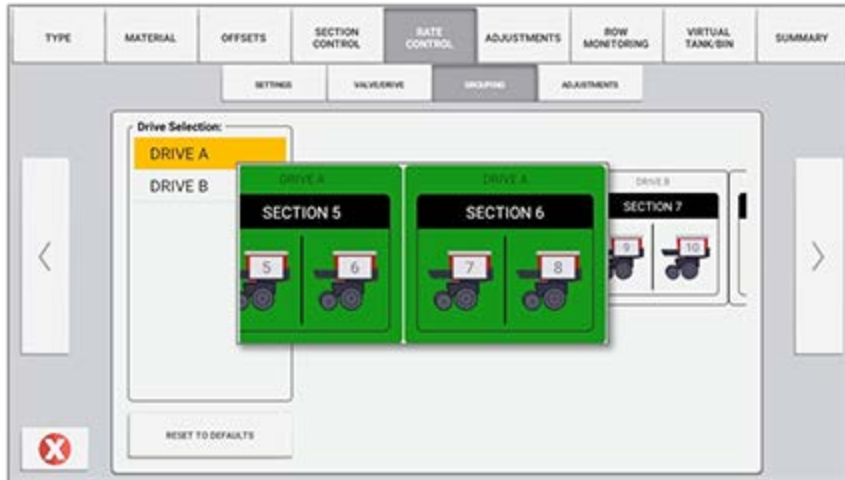
Tap **Save** to save the flow meter settings for the valve/drive.

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	Jump Start is a feature available both with and without a master switch box.

Field	Description
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.



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

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

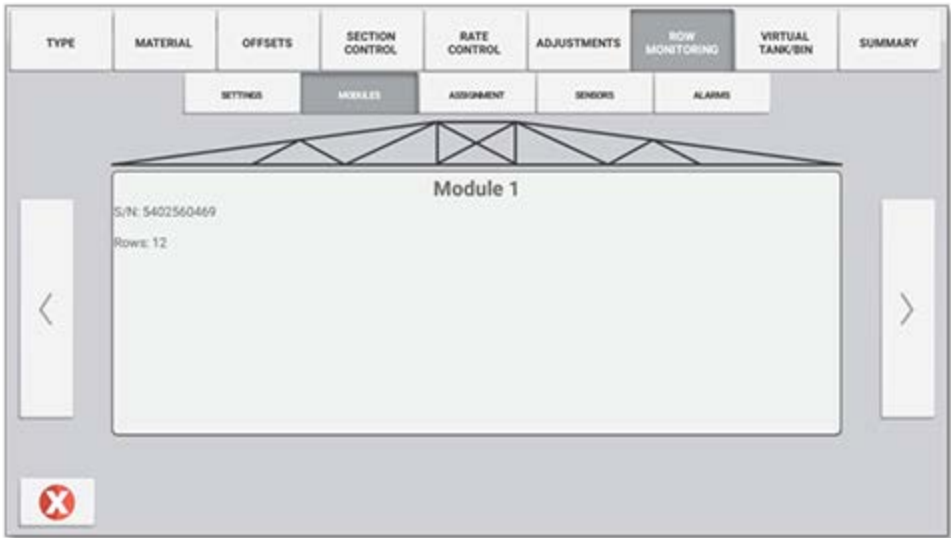
Field	Description
Serial Number	Assigns the Drive to a Field-IQ Rate control module
Valve Type	<p>Sets the control valve type:</p> <p>Servo Valves:</p> <ul style="list-style-type: none"> • Fast Servo - 4 wire servo valves • Hardi% bypass - Used with constant displacement pump and flowback boom valves. • Pump Servo - Servo used to control hydraulic flow to a motor or pump • Standard Servo - 2 wire servo valves <p>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	
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	
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	<p>Blockage: Used to monitor flow</p> <p>Population: Used to monitor singulated seed statistics such as population, singulation, skips, multiples and spacing</p>
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	When enabled, the Seed monitoring module will detect the configured rows for sensors. If a sensor is

Field	Description
Detection	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:



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	Increasing the threshold will decrease the sensitivity to	Decreasing the threshold will

Threshold	Behavior if increased	Behavior if lowered
Detection (default 35%)	multiples	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.

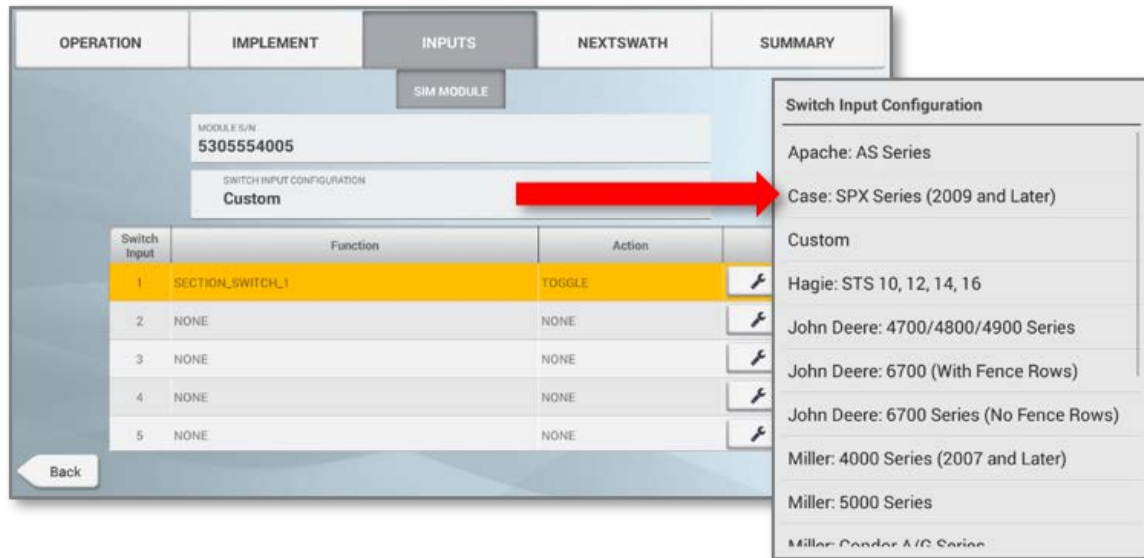
Inputs - Field-IQ Sensors, Implement Switches, and Signal Input Module

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

- Number of switches: Sets the number of switches the system will look for
- 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.

- **Work State Active Hi:** System is in work mode when the switch circuit is **open**.
- **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. When enabled, a 12v signal referenced by the Field IQ module will signal the system to turn on.

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

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

Field-IQ Implement Summary with Application Control

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



NOTE – The settings and configuration for your implement will not be saved until you tap the **Save** icon.

Working With Application Control on the Run Screen

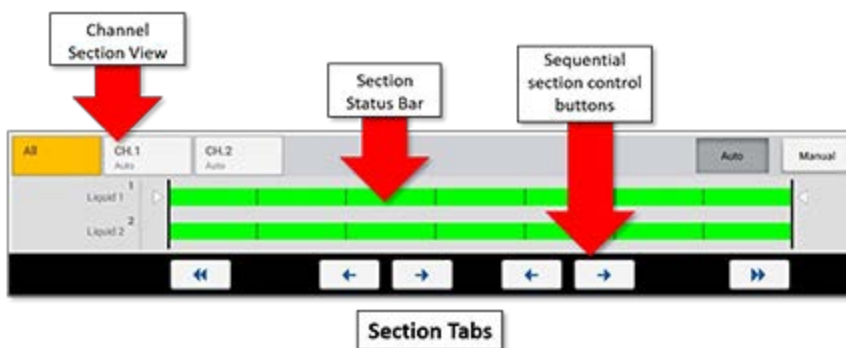
- ▶ Run Screen Example WITH Application Control
- ▶ Unlock or Upgrade a Field-IQ Module
- ▶ Calibrating Field-IQ Channels
- ▶ Section Master Status
- ▶ Rate Details
- ▶ Section Details
- ▶ Field-IQ and TUVI Implement Jump Start Details
- ▶ Section Control Widgets

Run Screen Example WITH Application Control

Single Channel Overview



Multi Channel Overview

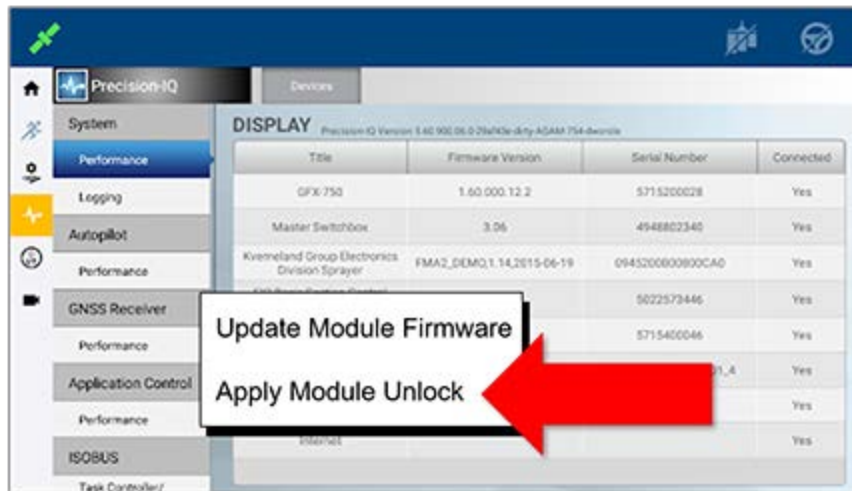


Unlock or Upgrade a Field-IQ Module

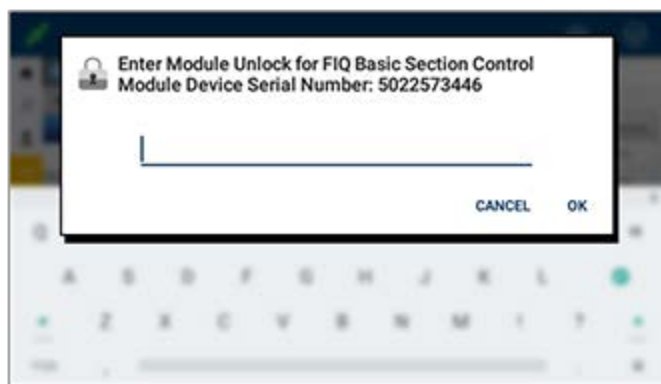
Field-IQ Rate/Section Control Module

Follow the steps below to unlock a 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:



- 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.

Module Firmware

Follow these steps to upgrade Module Firmware:

- On the Precision-IQ Home screen, tap the **Diagnostics** icon in the activity bar.
- 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.
- Tap the **Update Module Firmware** text to gain access to the module upgrade UI:
- Select the desired firmware and the upgrade will start automatically.
- 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](#)

Drive/Valve Calibration

- Select **Application Control**.
- 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	<p>Adjusts the speed response of the control valve. Increasing the value will increase the speed at which the valve adjusts.</p> <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	<p>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.</p> <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	Sets the “dead zone” for the valve. When the flow rate is within the allowable error, the Field-IQ

Value	Description
Error	<p>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.</p> <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](#)
- [Optional “hand” calculated flow calibration corrections.](#)
- [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

Example: 1000 gallons / 1085 gallons = .921

Formula: Correction factor x Current meter cal = Corrected meter cal.

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

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.

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

Section Master Status	Description	
	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:




The screenshot shows the 'Rate Details' screen. At the top, a summary bar for '1 Liquid 1 (P)' displays TARGET 5.0 gal/a, ACTUAL 3.4 gal/a, and 94%. A red arrow points from this bar to a detailed view for '1 (P) Korn'. The detailed view shows TARGET 35.0 kS/a, ACTUAL 0.0 kS/a, and a 'Korn' heading. Below this, there are controls for 'TARGET RATE' (35.0, 40.0) and 'OFFSET' (-, +, 0.0 kS/a). At the bottom, a status bar displays Swath 0, Vehicle Heading 0.0°, Area Total 0.00 ac, Productive Total 0.00 ac, Coverage 0.09 ac, and Coverage Total N/A.

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)

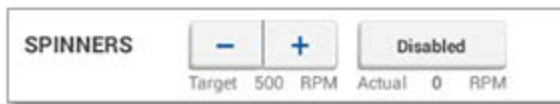
Use  to adjust the target rate by the manual rate increment value.


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 (by section switch)
Dark Gray	Section off (in coverage/boundary or master 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 (more than one channel is in use) will allow the user to perform the following tasks:



View the Section Status

“All” Sections Tab

1. View the status of all channels sections
2. Enable or disable sections using the manual boundary control arrows (Sequential section control)

Other icons that may be visible:

- **Lock icon (ISO only):** Used to indicate when a channel is set to manual section control mode:



- **Link icon:** Used to represent channels that have linked sections:

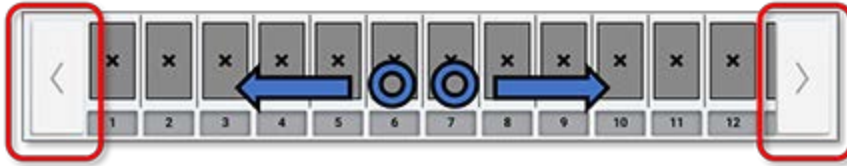


Channel specific Section Tabs

For 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

NOTE - 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.

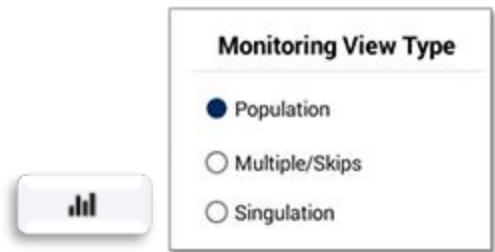
Section Details with Population or Blockage Monitoring

- **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



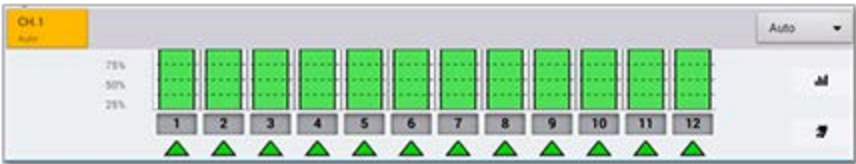
Changing View Type



Multiple/Skips View



Singulation View



Blockage Monitoring View

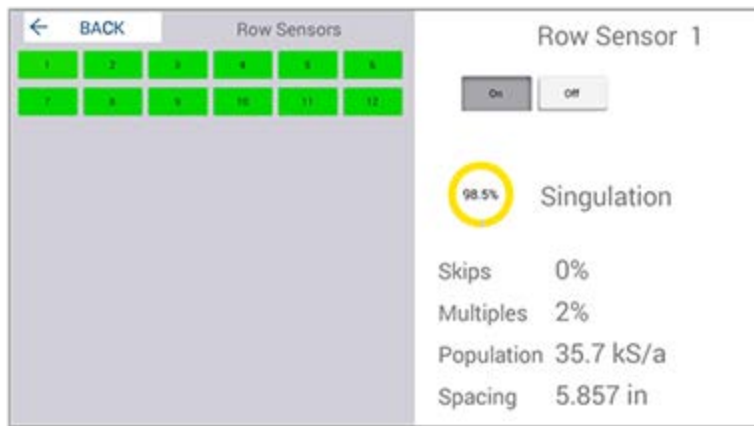


Row Details

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

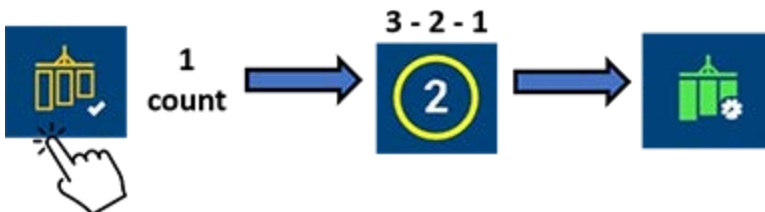


Field-IQ and TUVR Implement Jump Start Details

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 three-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:

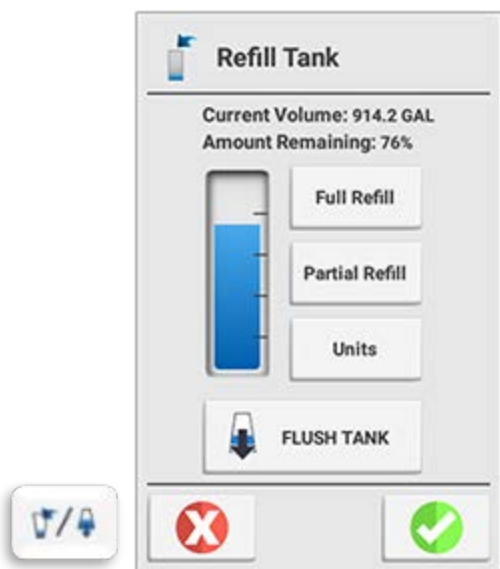
- Jump start timeout limit is reached.
- Jump start speed is exceeded (and system is traveling above the shut off speed).

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](#).

Section Control Widgets

Auto and Manual Section Control

Auto Section Control. Automatically switches sections based on Coverage, Boundary's, or Non-productive zones:

If either *off when stopped* is enabled or the implement is over covered ground the sections will remain closed and no application will occur.

If *off when stopped* is disabled and the implement is over clear ground, the section will open and application will occur. If jump start is enabled, application will occur at a rate corresponding to the jump start speed.

Manual Section Control:

Off: *(For ISOBUS implements only)* Disables Task Controller (TC) Section Control.

Virtual Tank

1. Virtual Tank and Flush *(for Field-IQ Basic implements only)*. To view details, tap the **Virtual Tank** button:



- To start the flush:

1. Tap the **Flush** button:



The stay clear notification will be displayed.

2. Press the **flush** button. The “stay clear” notification will be displayed.
3. Tap the screen to dismiss the notification.
4. Press the section master (and/or enable the remote master switch) to start the flush process.

- To stop the flush:

1. Press 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.

2. This feature can be tested with the BRASS module simulators.

3. Tap the **Collapse** icon to collapse the rate widget details:







Channel Work State

Heading Color	ISOBUS State	Field-IQ State
Gray	OFF: ECU work state is off . OR Channel is disabled. OR An error that would prevent application is present.	OFF: Ready for application
Yellow	Channel work-state is on, but no application is reported.	OFF: Ready for application/ No Flow
Green	ON:	ON: Master Switch on/ System is applying

Section Master Icon

At the Run screen, the on-screen master switch button is available for controlling sections.

Button	Explanation
	Coverage logging not available. Invalid task, application setup, controller connection issue or no communication with guidance controller.
	ISOBUS: (Yellow) The task controller is ready to control sections. All sections are off. Field-IQ Basic, TUVR, Virtual: Application control is off. System is ready for application to start.
	ISOBUS: (Green) The task controller is controlling sections. Field-IQ Basic, TUVR, Virtual: Master switch is on.
	Field IQ: Jump Start is active

Coverage Layers and Logging

- ▶ Coverage Layers and Logging
- ▶ Edit Coverage Layers
- ▶ Coverage Logging
- ▶ Automatic Logging with Engage

Coverage Layers and Logging

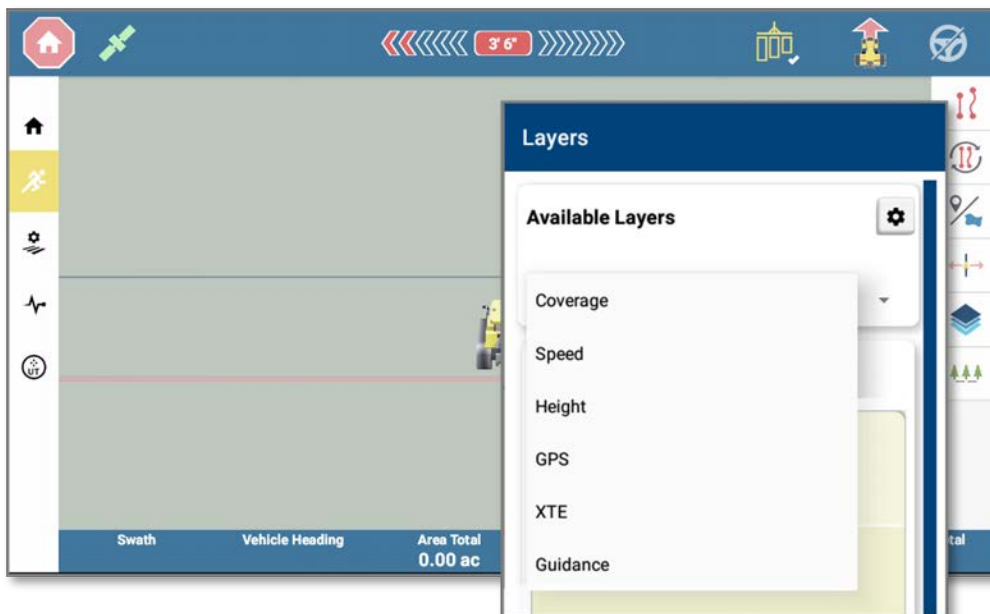
From the *Run* screen, you can view coverage themed by a variety of map features which are recorded with each task. To view the available coverage layers:

1. To change the visible coverage layer or edit the layer, tap the **Coverage Layer** button:



This will open the **Layers** drawer. With the drawer open the following options are available:

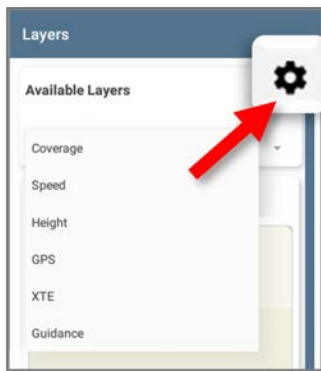
- List of available layers. By default, the Coverage Layers appear; though, the last layer you selected will display.
 - Legend or preview for the current layer.
2. To change the layer, select the drop-down from the *Available Layers* section. A list of selectable layers will be shown. The list of available layers will change depending on what features or functions are enabled.



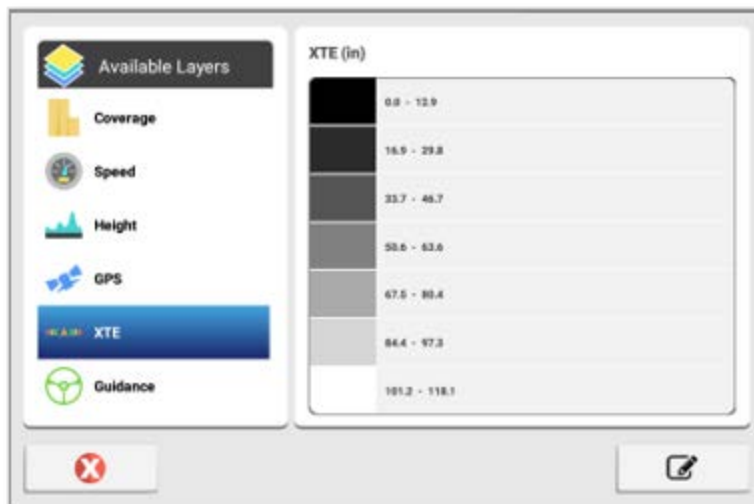
Edit Coverage Layers

Precision-IQ allows you to customize the coverage layer. To edit a coverage layer:

1. Tap the **Coverage Layer** button to open the Layers drawer.
2. Tap the **Settings** icon:



3. In the *Settings* pop-up window, tap the coverage layer you want to edit. In this example, tap the **XTE** layer (for *Cross Track Error*):

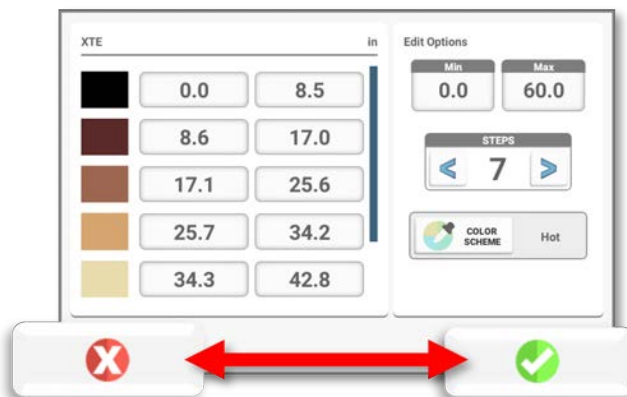


If the layer is editable, the **Edit** icon will appear in the lower-right corner of the layer editor.

4. Tap the **Edit** icon to modify the following options:



- **Minimum** and **Maximum** values - If a coverage layer does not require a minimum or maximum value, these buttons are grayed out.
 - **Steps** - Tap to adjust the number of ranges in the Coverage Layer widget.
 - **Color scheme** - Tap to change the color family of the Coverage Layer widget. Choose from **Cool**, **Hot**, **Grey Scale**, or **Rainbow**.
 - Modify the range of each step. (By default the ranges are divided equally across the steps.
 - When editing the ranges, Precision-IQ will automatically align the values partnering ranges to prevent a skip or overlap in the ranges.
 - If the high value for the maximum step or the low value for the lowest step is different from the entered maximum or minimum value, the min/ max values will automatically update to match.
5. When you have completed your selections, tap the green check mark to save your changes or tap the red X to discard any changes:



Coverage Logging

Precision-IQ application's *Coverage Logging* records the area that you have covered when you carry out an operation, for example, applying fertilizer to a field. It also allows you to view different map layers of your coverage as you are working in the field.

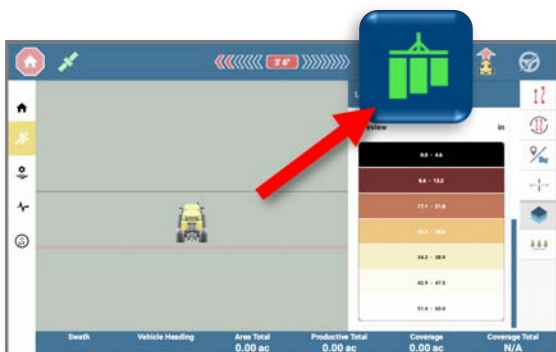
You can set up themes that make it easy to see the difference between different types of coverage. This enables you to:

- Change product part way through a field, so that you can later identify which parts of the field are covered by which product.
- Plant or apply two or more different products side-by-side and record the locations in your field. For example, you could put corn seed in the left side hoppers on your planter and clover seed in the right side hoppers and track where each set of seeds is planted. Varieties are assigned to rows on your implement. Specify the number of rows on your implement when you configure it.

Once you enter the *Run* screen, coverage logging is not engaged by default, which is indicated by the following icon:



Tap this icon to engage coverage logging. The icon changes to:



Automatic Logging with Engage

If your system has been configured to do so, coverage will start when your auto guidance system is engaged in the *Run* screen. Coverage will stop when auto guidance is disengaged.

If automatic logging is activated, you can still turn logging on or off when engaged or when disengaged by tapping the **Coverage Logging** icon.

See [Taking Implement Measurements](#) and [Add and Configure an Implement WITH Application Control Overview](#) for details about coverage logging and application control.

Master Switch Box (MSB)

- ▶ MSB and 12-Section Switch Box Support
- ▶ Master Switch Box (MSB)
- ▶ 12-Section Switch Box
- ▶ Fence Rows
- ▶ Multichannel Example with Fence Rows

MSB and 12-Section Switch Box Support

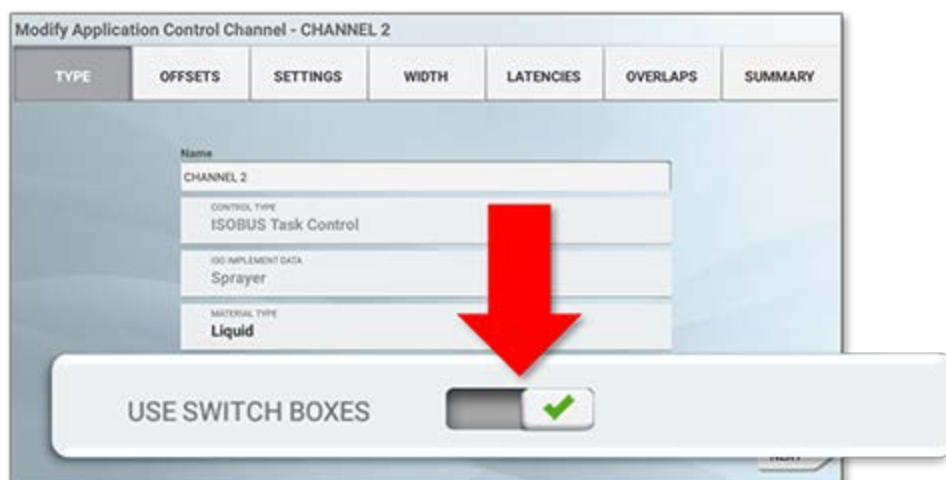
If you have a Field-IQ™ Basic, ISOBUS, TUV, or Virtual implement, then support of the Master Switch Box and 12-Section switch box is available.

NOTE –

Use of the switch boxes is optional, and when assigned to an application channel the physical switches and master switch, replaces the use and function of almost **all** on-screen virtual switches in Precision-IQ.

The exceptions are the application of Anhydrous (Field-IQ) and channels using linear actuator drives. A Master Switch box is required for these applications.

When Switch boxes are present, Channels 2 - 6 may “opt out” of switch box control. This setting can be specified on the *Application Control Type* page of the *Application Control Setup* wizard:



NOTES –

- This option will not appear if switch boxes are not detected by the system.
- This option will not appear for Channel 1, as Channel 1 cannot “opt out” if a switch box is present.

Master Switch Box (MSB)

Only one Master Switch box (MSB) can be used per display. When connected, the (MSB) master switch state is applied to all channels. The on-screen Section Master button becomes a status icon, and its state is slaved to the physical master switch.



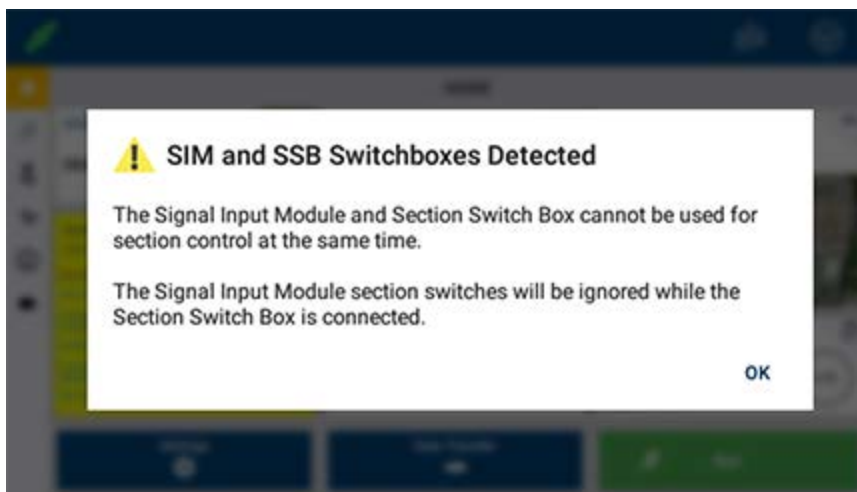
MSB Setting	Description
 <p>Jump Start ON OFF</p>	<p>Master Switch/Jump Start</p> <ul style="list-style-type: none"> • Off - All channels will be commanded to stop application • On - All channels will be commanded to apply (assuming the vehicle is not stopped) • Jump Start - is only applied to Field-IQ and TUVR channels. ISO channels will be set to On when the switch is in the Jump Start position. <p>If the master switch box and signal input module are connected, the signal input module is slaved to the master switch state.</p>
	<p>Increase/Decrease</p> <p>When using a preset rate (Rate 1 or 2) This will increment the target rate by the materials target rate increment.</p> <p>Field-IQ only - When the rate is in "Manual" mode. Pressing the switch up will slowly open the valve. Pressing the switch down will slowly close the valve.</p>
	<p>Section Control: Auto or Manual</p> <p>Sets section control mode for channels using the switch box.</p>
	<p>Target Rate Change</p> <p>Target rate change can be set between rate 1, 2, and Manual.</p> <p>The following options apply for Manual rate control:</p> <ul style="list-style-type: none"> • Field-IQ. Using the Increase or Decrease switch (+ or -), the valve can be opened and closed manually. The as-applied rate will read in as flow/minute. • ISO and TUVR Channels. These will lock to the last target rate if the switch is set to Manual rate control (M). They will not be affected by the increment/decrement rate events while in manual rate control mode.

12-Section Switch Box



NOTE – Only one 12-section switch box can be used per display.

If the signal input module (with section switches assigned) and 12-section switch box are connected at the same time, the SIM section inputs will be ignored. The 12-section switch box must be used. The following notification will appear when this situation occurs:



If there are more than 12 sections, then the 12-section switch box will begin to group sections to switches. The system will start to pair sections working from the middle of the implement out.

If multiple channels are in use, then the channel with the smallest section count will be used for switch assignments. Channels with higher section counts will have their sections grouped to match the channel with the lowest count. The number of switches assigned to regular sections will be based on the channel with the smallest section count.

Fence Rows

The **Left Hand** fence row will always be tied to switch 1. Section 1 and following sections will be offset by one switch.

The **Right Hand** fence row will be tied to the switch next to the last section.

For example, if the last section is on **switch 7**, then the right hand fence row will use **switch 8**.

Multichannel Example with Fence Rows

This example uses two (2) channels: one channel for ISO (with four (4) regular sections) and one channel for Field-IQ (with six (6) regular sections). The Field-IQ channel has both left and right fence sections enabled.

The Rate and Section switch mapping would be as follows:

- Switch 1 = Field-IQ left fence section
- Switch 2 = ISO regular section 1, Field-IQ regular section 1
- Switch 3 = ISO regular section 2, Field-IQ regular sections 2 and 3
- Switch 4 = ISO regular section 3, Field-IQ regular sections 4 and 5
- Switch 5 = ISO regular section 4, Field-IQ regular section 6
- Switch 6 = Field-IQ right fence section

Edit/Delete an Implement or Application Control Channel

- ▶ [Edit an Implement](#)
- ▶ [Edit an Application Control](#)
- ▶ [Delete an Implement or Application Control Channel](#)

Edit an Implement

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 an implement to select it. Then tap the **Edit** button. The Summary screen of the implement displays.
3. Tap the section where you want to make edits and enter the appropriate changes. For example, if you need to update an implements measurements (as described in [Taking Implement Measurements](#)), tap **Inputs** to enter the appropriate measurement values.
4. When you are finished, 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 the **Save** icon to save your changes to the implement. The Home screen displays.
To cancel/remove your edits and not change the existing profile, tap the Android **Back** button on the display. A message displays, asking if you want to save your changes. Tap **No**.

Edit an Application Control

To configure or 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.

Delete an Implement or Application Control Channel

You can delete an implement or application control channel. However, when you do so, all settings associated with that implement or application control channel will also be deleted.

To delete an implement or application control channel:

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

This screen shows a list of available implements.

2. Select an action:
 - [Delete an Implement](#)
 - [Delete an Application Control Channel](#)

Delete an Implement

1. Tap the implement you want to delete to select it.
2. Tap the **Delete** button.
3. On the confirmation pop-up window, tap the green check to confirm that you want to remove the implement and to complete the delete process.

Delete an Application Control Channel

1. Tap an implement to select it. Then tap the **Edit** button to display the implement's Summary screen.
2. Tap the **Application Control** tab to display all channels assigned.
3. For the application control channel that you want to remove, tap the **Settings** button.
4. On the confirmation message, tap **Yes** to confirm the removal. Otherwise, tap **No** to cancel the removal.
5. 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.
6. Tap **Save** to save the channel and return to the Application Control section. The application returns you to the Implement setup panel.

To exit channel setup without saving, tap the Android **Back** button. A message displays, asking if you want to cancel without saving your changes. Tap **Cancel**.

ISO/CAN Speed Extensions

- ▶ ISO Speed Extensions
- ▶ Enabling the Extensions
- ▶ Speed Monitor Extension
- ▶ Speed Generator Extension

ISO Speed Extensions

ISO Speed Monitor: When enabled, this extension monitors and displays any CAN speed message being broadcast on the CAN bus the display port is connected to. The ISO speed monitor is intended to be used as a diagnostics tool with two primary functions:

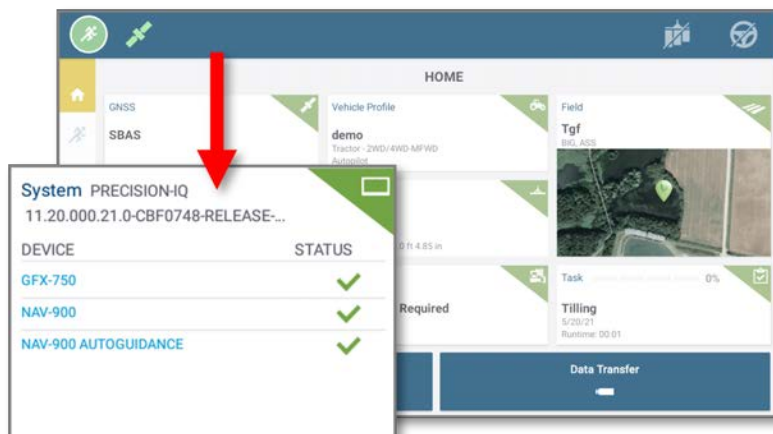
1. Display of any third-party speed message that is being broadcast to prevent duplicate messages from Precision-IQ being enabled.
2. Monitor data contained within the various speed messages to validate their accuracy and update rate.

ISO Speed Generator: When enabled, this extension allows the configuration and broadcast of the following messages from the display CAN port/s. This extension does not control messages being sent from the receiver. The ISO Speed generator is intended to be used to send CAN speed messages to third-party devices connected to the display. It will not function when Universal Terminal (UT) is enabled. If UT is enabled, the UT application will need to be used to manage and generate ISO speed/position messages.

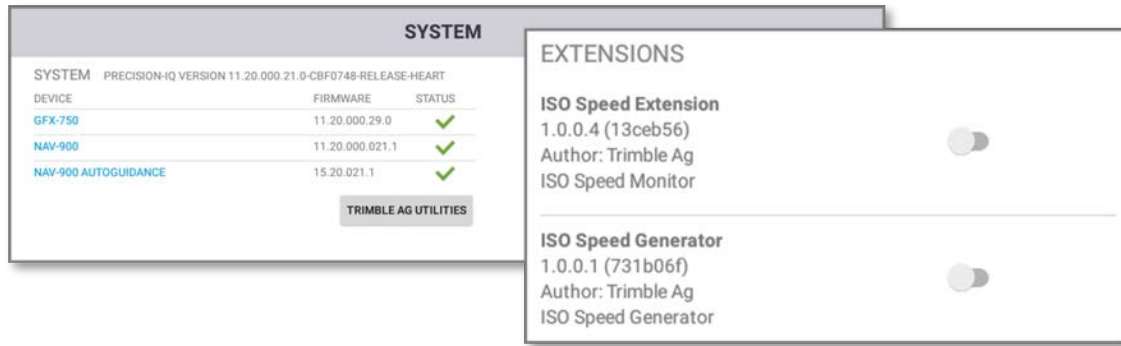
Enabling the Extensions

Both extensions can be activated from the Precision-IQ *Systems* tile.

- Tap the **Systems** tile to view the system details and available extensions:



- The ISO speed extensions will be displayed on the right side of the screen. Toggle the switch to enable or disable the extension:



- When enabled, the following icons will appear in the left-hand navigation bar:

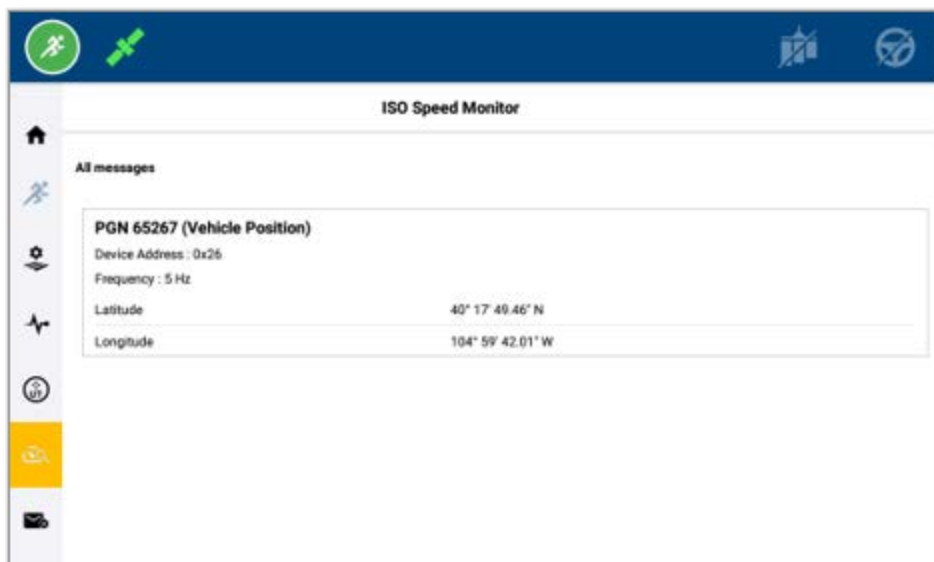
Speed Monitor icon:



Speed Generator icon:



Speed Monitor Extension



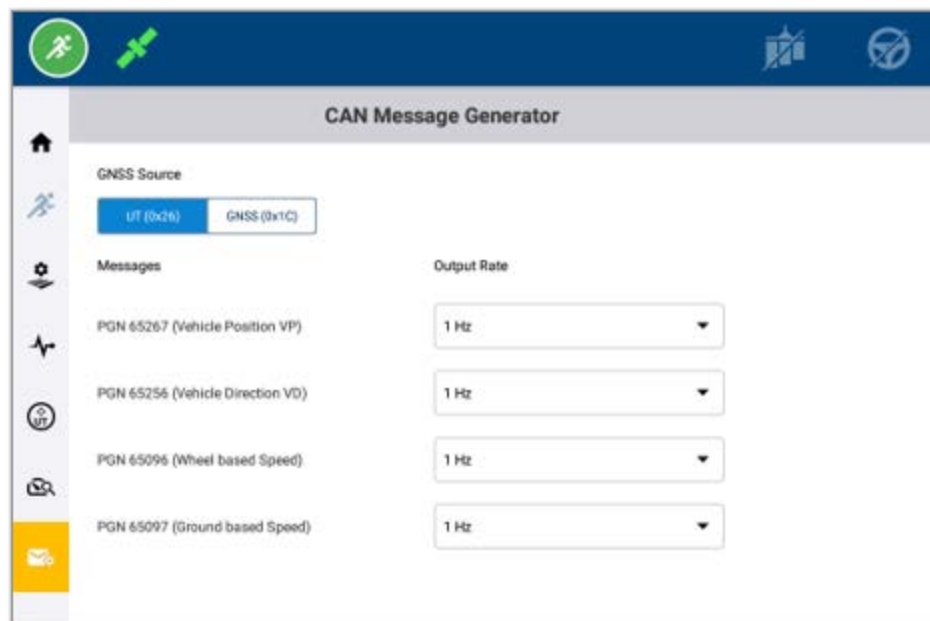
Each unique message (PGN) and its details will be contained within a message box. Duplicate messages will be highlighted and grouped together. The following details will be contained within the box:

Item	Description
Speed Message (PGN)	The message ID will be displayed as PGN #### (Message description) .
Device Address	Hexadecimal source address of the speed message. Multiple messages may be generated by the same device.
Frequency	Update rate of the message.
Message details	Values/data contained in the message. Values/data will vary by message type.

Speed Generator Extension

NOTES –

- The Speed Generator Extension and Universal Terminal will not function at the same time. If Enabled, Universal Terminal will take precedence over the speed generator extension
- Systems where the display and receiver are on the same CANBUS, It is advised not to use the Speed Generator in combination with receiver CAN messages.
 - The Speed Generator Extension does not monitor or control the CAN speed messages generated by the receiver. If the display and receiver are connected to the same CAN bus it is possible for duplicate messages to be broadcast.



GNSS Source Address

Sets the default source address for the speed messages being generated by the extension. If a source address conflict is identified, the extension will automatically resolve the conflict by choosing an unused source address.

- UT (0X26): Extension default source address.
- GNSS (0X1C): Alternative source address. Select this when the 3rd party devices are configured to receive messages from a receiver (Direct GPS source).

Messages

- PGN 65267 (Vehicle Position VP): Vehicle latitude and longitude.
- PGN 65256 (Vehicle Direction VD): Vehicle compass bearing (heading), navigation-based speed, pitch, and altitude.
- PGN 65096 (Wheel based Speed): Wheel-based speed.
- PGN 65097 (Ground based Speed): Ground-based speed.

Output Rate

Sets the update rate of the configured message. Messages set to **Off** are not broadcast.

