20|20

Operator's Guide – Planters
For Gen 3 20|20 Displays

Precision Planting®

955709_11 3/26/2021

Contents

20|20 Monitor Overiew

The Precision Planting 20|20 display is a high-definition, easy-to-use monitoring and control system for planting, seeding, harvesting, and liquid application. Its high definition mapping features and metrics on single and dual displays allow you to see exactly what is going on in your fields. Navigate the easy-to-use touch screen for implement and system setup, health checks, diagnostics, and other helpful information. The 20|20 display provides complete monitoring, control, and diagnostics for all of Precision Planting's SRM-based control products for seed and liquid application, down force control, and in-field sensing in addition to basic planter and combine monitoring.

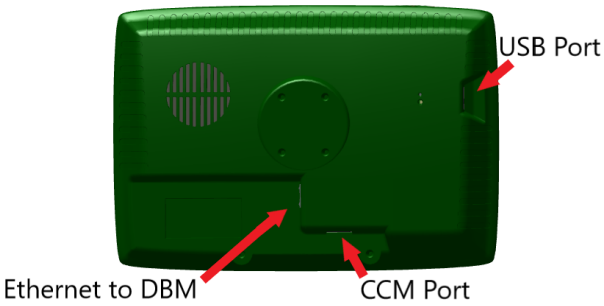
The 20|20 has complete control, monitoring, and diagnostics for: vDrive, DeltaForce, SpeedTube, SmartFirmer, vDrive Insecticide, vApplyHD, FlowSense, vSet Select, mSet, SeederForce, Smart Connector, and YieldSense.

Software Updates

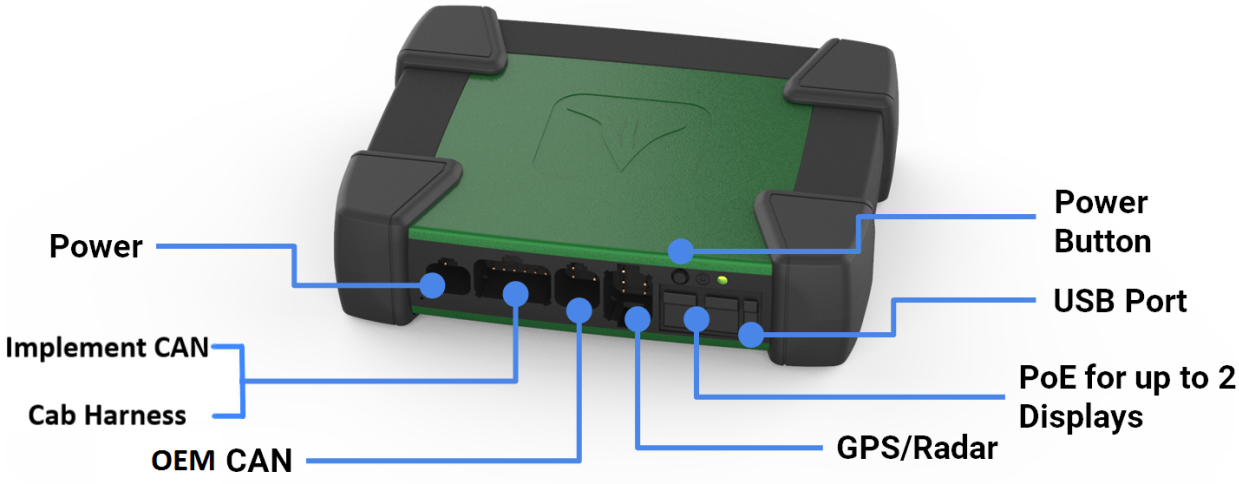
Precision Planting will continue to update and improve the 20|20. Software updates are free of charge and can be downloaded from www.precisionplanting.com/support and installed on the display with a USB drive.

20|20 Hardware Overview

Two different screen sizes are available with the 20|20, 10” and 16”. Either one or two displays can be connected to the Display Base Module at any time. If two displays from Precision Planting are used, any combination of the two different sizes is acceptable. One of these two displays can be an iPad running the Climate Corporation FieldView Cab app. Displays can be mounted in any location within the cab.



Display Base Module [DBM]



The Power over Ethernet [PoE] ports requires a Shielded Twisted Pair [STP] Ethernet Cable to connect to a display. If only one display is being used, use either port. Both ports will be used if connecting to two displays or one display and a FieldView Module [FVM]. The order by which two displays or a single display and FVM are plugged in does not matter.

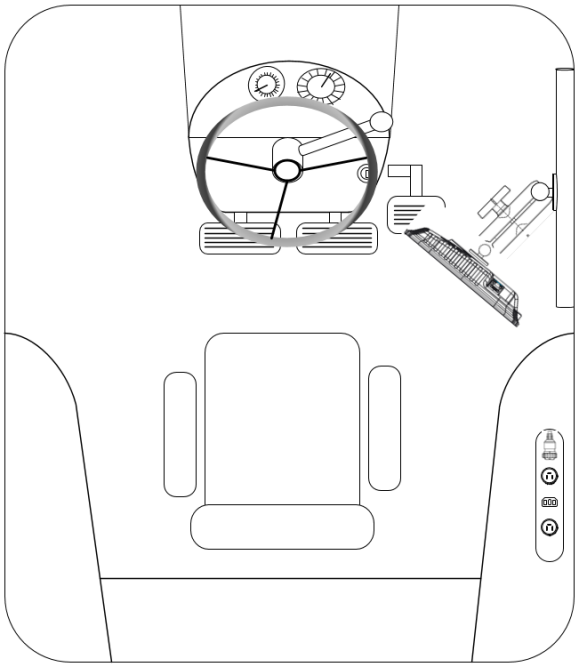
Indicator Light Overview

Color	Display Base Module	Display	FieldView Module
Green	Good Connectivity	Good Connectivity	Good Connectivity
White	Initializing	N/A	Downloading Software
Blinking White	Firmware Update in Process	N/A	N/A
Yellow	No Connection between Display and DBM	Initializing	Initializing
Blinking Yellow	Software Update in Process	Software Update in Process	Software Update In Progress
Blue	CCM Connectivity is Missing	N/A	Nothing Connected
Purple	Need to Power Cycle System	N/A	FieldView Not Connected
Red	N/A	Powering On	Powering Up
Blinking Red	Failure - Call Precision Support	N/A	N/A

Cab Installation

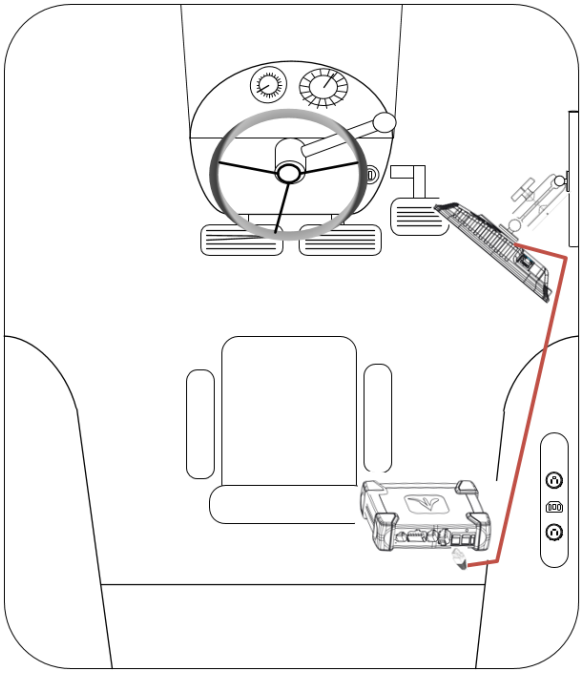
Step 1:

Mounting locations will vary from tractor to tractor. Mount the display or both displays for optimal visibility and interaction for the operator. There are several mounting options offered by Precision Planting available for the display. The diagram depicts the display with a RAM mount.



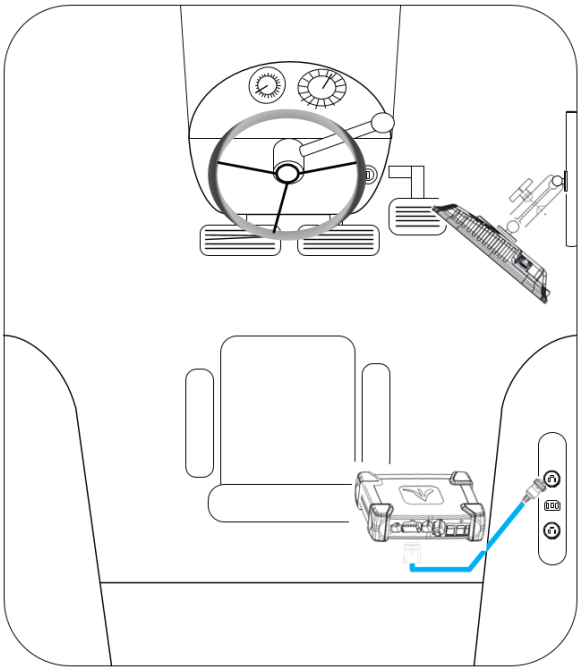
Step 2:

The Display Base Module [DBM] can be located in any convenient area of the cab. Ensure the DBM will not move around when operating the tractor. Plug one end of the provided Ethernet cord into either port on the front of the DBM and the other end into the back of the display. If using two displays connect the second display with the provided Ethernet cable to the other open port on the DBM.



Step 3:

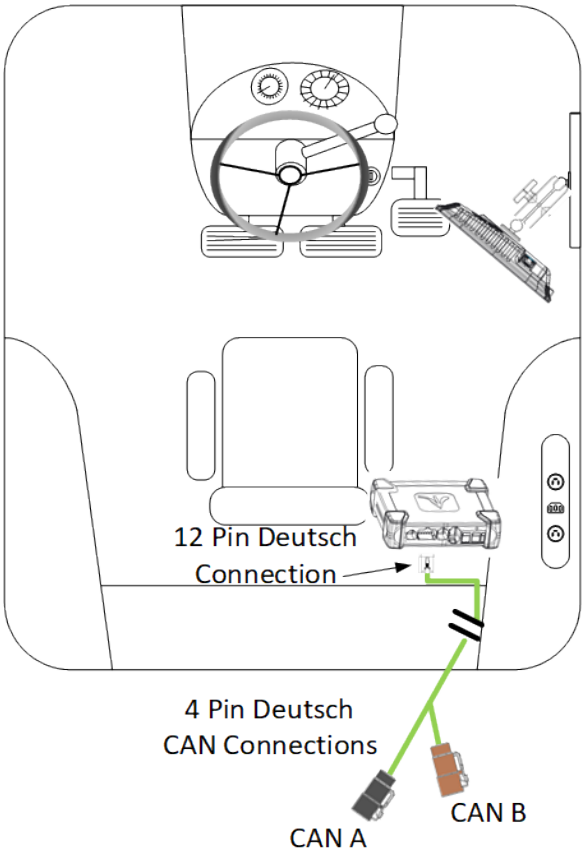
Connect the 725150 Power Harness to the DBM into the 4-pin Deutsch Connector on the DBM and then to the power source in the tractor cab. A three pin round convenience port connector is provided to plug directly into a standard convenience port. Various adapters are available to connect to different types of power ports.



Step 4:

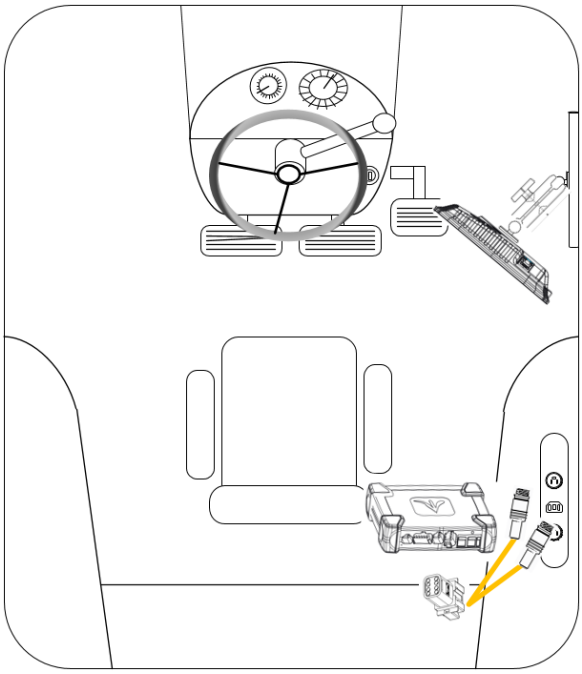
Connect an Implement CAN Harness into the 12-pin Deutsch Connector on the DBM. Route the remaining length of the cable through the cab harness port in the back window. There will be two CAN connections on the harness, CAN A (black connector) and CAN B (brown connector). If a PDM is installed, CAN A must be used and routed to the PDM. If no PDM is installed, (i.e. Smart Connector only system) then CAN B must be used.

Note: The 725935 Sensor CAN harness will only have a CAN B connection present.



Step 5:
Connect the 725155 Speed Harness to the 8-pin Deutsch connector on the DBM. This will provide you with two 4-pin round connections. The male pin connector will connect to the GPS adapter, while the female pin connector will connect to the Radar adapter.

Note: If this system is being used for Sensing only with a 725939 5Hz GPS Hockey Puck, the 725155 adapter is not necessary. The 725939 harness will plug directly into the 8–pin Deutsch connector on the DBM.



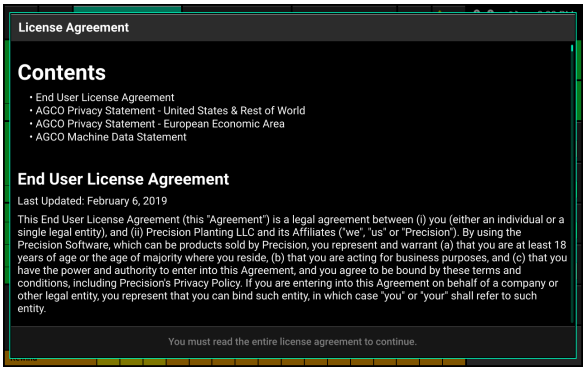
Powering the 20|20 On and Off

The monitor must have 12 volts of both switched and constant power. With the power harness connected to the DBM and power supply, turn the key on the tractor to the On or Run position. Switch the power button on the DBM to the On position.

To power the system off, either switch the power button on the DBM to the Off position or key the tractor/combine off.

User License Agreement

Once the 20|20 has booted up, read and agree to the User License Agreement to use the display. This will occur on first boot up and when updates are required for the agreement.

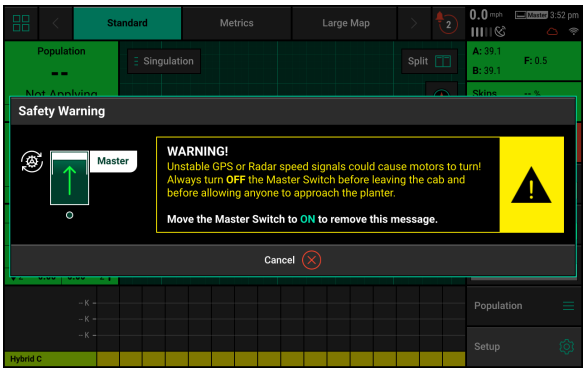


Note: If this system is being set up for a third party, the agreement should be reset to appear on next power up for the end user to agree to the document. This can be done under Advanced Display settings. Refer to the Display section of this manual for more details.

Note: This will only appear on 2019.1 and newer software.

Safety Warning

Once any control product is configured on the 20|20 display, the system will require a Cab Control Module (CCM) and will prompt the user to toggle the Master Plant switch on the CCM before any control products can be used. This warning is triggered any time the system is booted up, and when the system has traveled for more than half a mile.

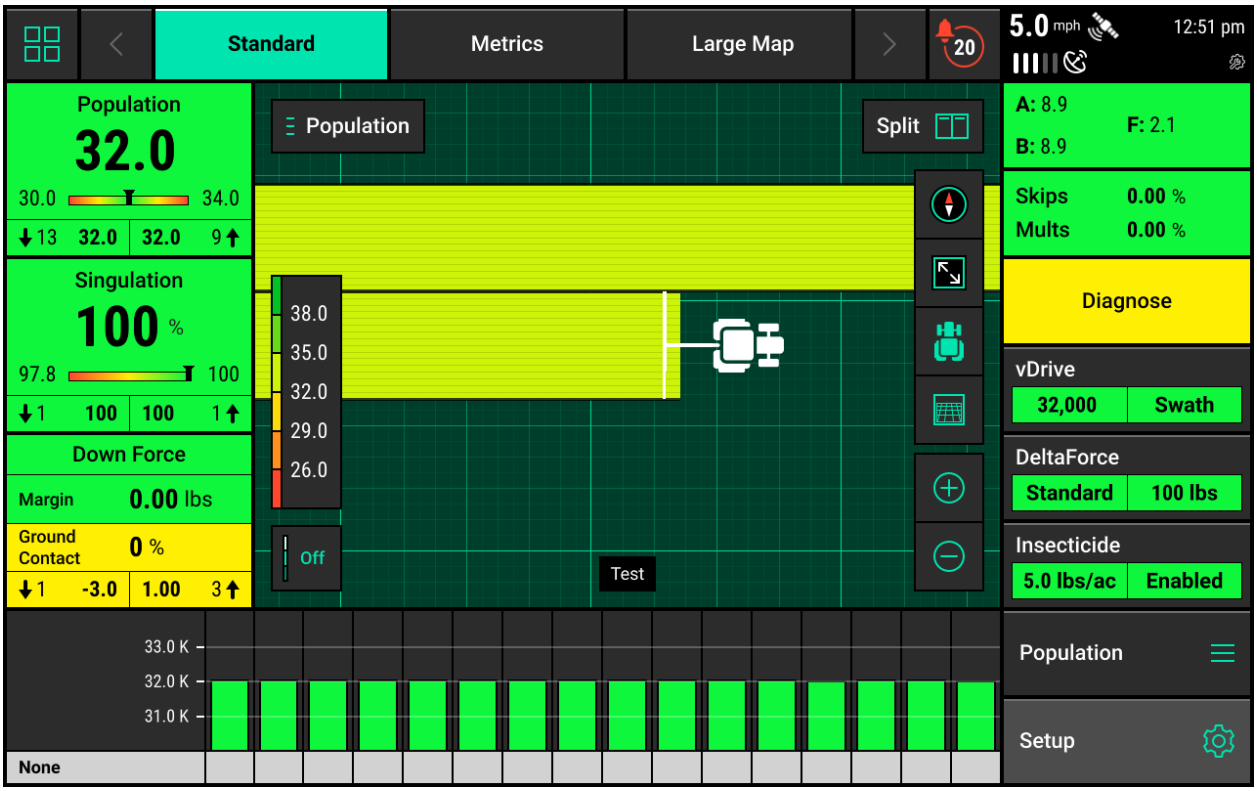


Note: This Safety Warning will only appear in 2020.1.x and newer software.

If a CCM is not installed, the cancel button can be used to bypass this warning. No control systems will operate until the Master Plant switch is toggled. This icon will be present in the status button in the top right if the Safety Warning was bypassed using the cancel button.

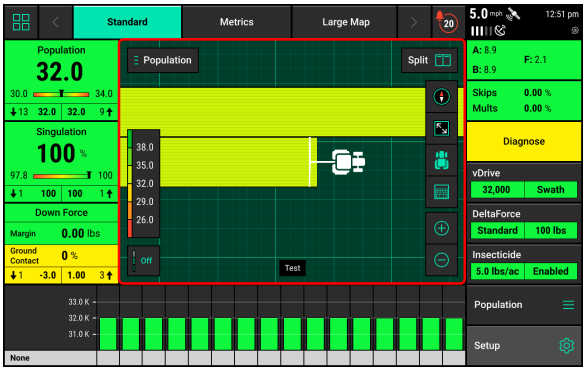
Home Screen Overview

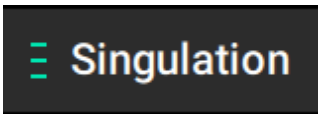
The Home Screen displays planting information in an easy to read, easy to navigate format. This information is presented as both metrics and high definition maps. There are three different home screen configurations that can be quickly selected to change the layout of the home screen. All three screens are completely customizable with different types of measurements, button sizes, map sizes, control buttons, and a minichart.



Maps

The 20|20 displays high definition maps while operating. Different map types can be selected and viewed during the planting process.

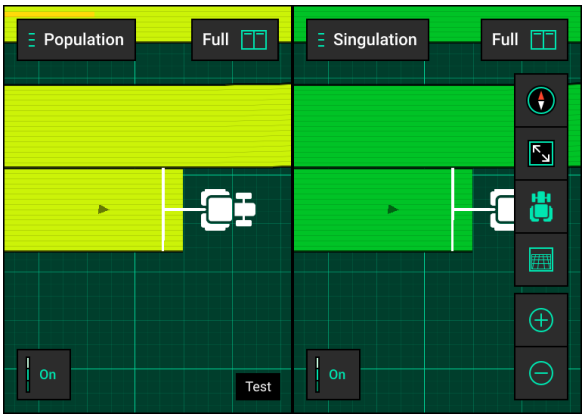


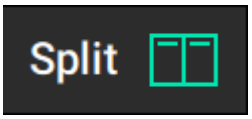


Selecting the Map Type name (e.g. Singulation) at the top of the map will display the Map Layer Selection screen. All map types are listed on this page (the systems installed and configured will determine which map types will build a map). Map types are categorized by Product Application and Prescription. For more information on what each map type is mapping see Appendix B.

Controlling the Map

The map will default to displaying the tractor/planter in the center of the screen at a preset zoom level. There are control buttons located around the map to adjust settings. The map will default to displaying the tractor/planter in the center of the screen at a preset zoom level. There are control buttons located around the map to adjust settings.





To split the map viewing area into two maps at the same time press “Split” in the top right hand corner of the map screen. When viewing two maps simultaneous, any adjustments done to one map (other than adjusting the legend) are also applied to the other map. For example, zooming in on one map will apply the same zoom to the other map.

To exit the split map view, press “Full” on either map type to view only that map.

Change the map orientation by pressing the compass button. Switch between two orientation modes:

- North Facing – The top of the map is always pointed towards north. The tractor icon will move around the screen in different directions. This is the default orientation mode. Indicated by the red compass arrow always pointing towards the top of the screen.
- Implement Facing – The implement icon is always pointed towards the top of the screen and the map itself moves around the implement. This is indicated by the red compass arrow moving to always show which direction north is.

- A third way to change the map orientation is to place two fingers on the map and rotate the map. Rotating the map in this style will lock the map into the orientation that it was rotated to. To switch back to North Facing press the compass button. Press it a second time to switch to Implement Facing.

Zooms to a view where the entire field is displayed.

Pressing this button will cause the tractor/planter icon to stay centered in the screen. Additionally, the zoom level will be reset and zoomed in on the tractor icon.

The Perspective View button will toggle the map view angle from 0, 65, and 75 degrees.

Note: The Perspective View button can only be used once WiFi and background imagery have been enabled. Refer to the Connectivity and Display sections of this manual for further details.

There are two ways to adjust the zoom level of the map.

1. Use the Zoom In (+) and Out (-) buttons to change the zoom level of the map.
2. Use the standard two finger pinch-in & pinch-out gestures.

Legends for each map can be toggled on by pressing the “On” button in the lower left hand corner of the map screen.

Toggle Legends off by pressing the “Off” button.

Most legends can be edited. There are two ways to edit legends:

1. Hold a finger on the legend and slide it up and down to adjust the high and low ends of the legend.
2. Tap on the legend to adjust the High & Low values, number of steps, and use the auto adjust feature.

Note: If a small map has been added to the home screen, none of the control buttons as described above will be available.

General Mapping Principles

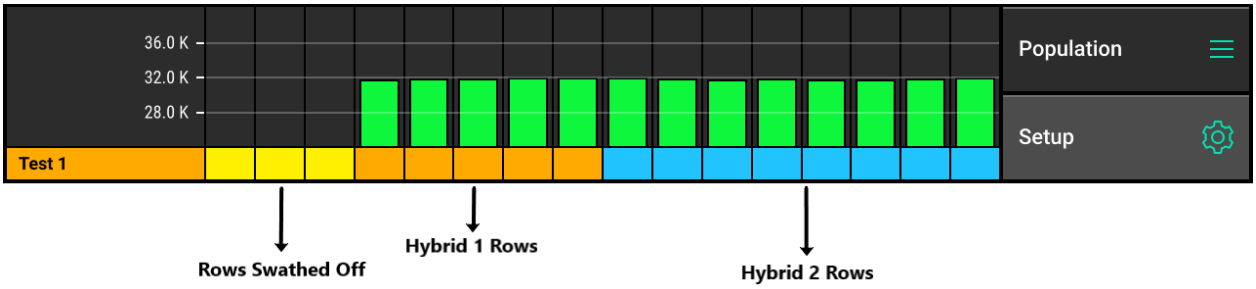
- All maps except for SRI (2 Hz) are mapped at 5Hz, meaning there are 5 data points mapped for each second of time.
- Maps are mapped on a row by row basis.
- A dark line will be mapped on either side of the planter to distinguish planter passes.
- If the planter appears to be mapping incorrectly, ensure that the planter setup is correct.
- Rows that are inactive or are not collecting information on a row (for example, a row does not have load cell installed) will not map.
- Map types can be changed at any time by selecting a different type.
- Some map types require specific Precision Planting products to be installed on the planter to generate the information necessary to create a map.
- If the map has moved away from the tractor/planter location, a white arrow will appear on the edge of the map pointing to the direction the tractor/planter is in.

Dashboard Mini Chart

The DashBoard Mini Chart is located at the bottom of the Standard and Metric Home Screens by default. The Mini Chart shows a bar chart for one of the measurements of the 20|20 for each row. Rows that exceed alarm values will turn yellow while rows that exceed alert values will turn red.

Note: Alarm and Alert values can be set in the Crops menu as described in the Crops Menu section below.

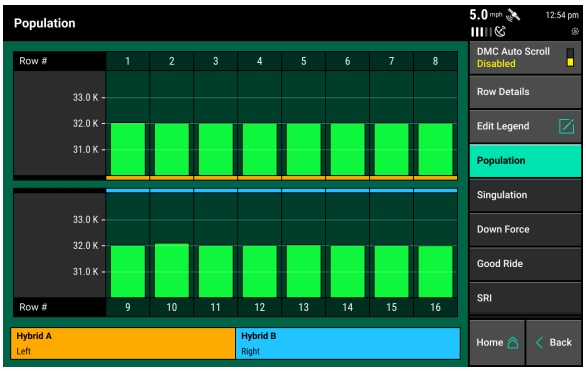
Below the bar chart, the active hybrids are displayed. If multiple hybrids are active, the hybrid name and associated color will alternate among the active hybrids every five seconds. Any row marked in yellow instead of a hybrid color indicates a row that is currently Swathed Off.



The metric type being displayed on the Mini Chart is located over the “Setup” button. The default metric type is Population. To change the type of metric, select “Population” (or the metric type

displayed) above the Setup button. The same screen can also be accessed by selecting any of the metric boxes on the home screen or touching directly on the DashBoard Mini Chart itself.

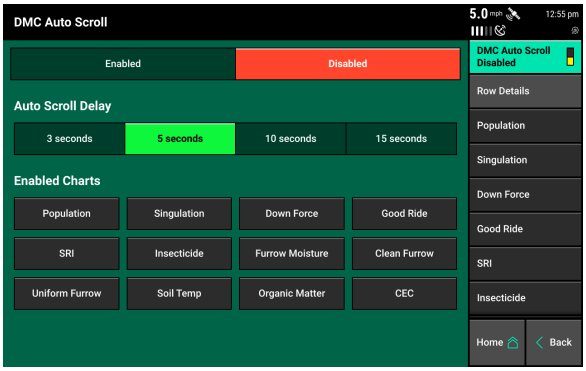
On the selection page a larger Row by Row chart will be displayed. On the Navigation Pane on the right hand side of the screen, select a different metric type to be displayed. Additional metrics are available if you use a finger to scroll the Navigation Pane downward. Once a different metric has been selected, press “Home” to go back to the home page. The Mini Chart will now display the new metric.



Additionally, the Mini Chart can be set to auto scroll through different metrics. On the selection page at the top of the Navigation Pane select the “DMC Auto Scroll” button.

When Auto Scroll is “Enabled”, select the speed at which the Mini Chart will scroll through different metrics. Finally, select the metrics/ charts that will be displayed on the home screen via the Auto Scroll.

Field Summary can also be enabled to show either a Last Pass or Entire Field Summary. When enabled, this will show summary metrics in the Display Mini Chart at the bottom of the home screen.

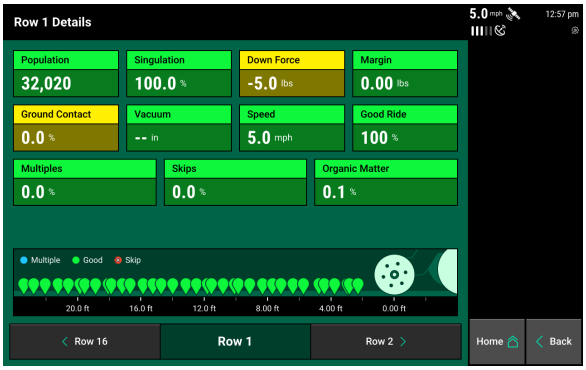


Individual Row Details

Detailed information for each planter row can also be viewed. Access the Row Details screen by either selecting a metric box on the home screen, touching the Dashboard Mini Chart, or selecting the metric type that is being displayed on the mini chart. Select “Row Details” on the right side of the screen.

Select the row number to view. To view additional rows, use your finger to scroll down the list of rows.

The Row Details screen displays all measurements available for that particular row including Population, Singulation, Skips & Multiples, Speed, and the Live Seeds Display. Other metrics such as down force or vacuum will not be displayed depending on if the appropriate sensor is installed on that row.



This view gives the operator all available information for a given row to help maximize the performance of each row on the planter.

Below the measurement metrics is a live seed display showing seeds that have been planted. Different color pins represent different singulation issues. The legend is displayed above the seed display. Pressing on the Live Seed Display will pause the screen so patterns can be evaluated. Press again to restart it.

The buttons showing row numbers at the bottom of the screen allow the operator to navigate to other rows.

Manual Swath Control

There are three different screens that the operator can manually swath of individual rows when the 20|20 is controlling seeding. When using manual swath control, ALL control products on rows that are swathed off will no longer output.

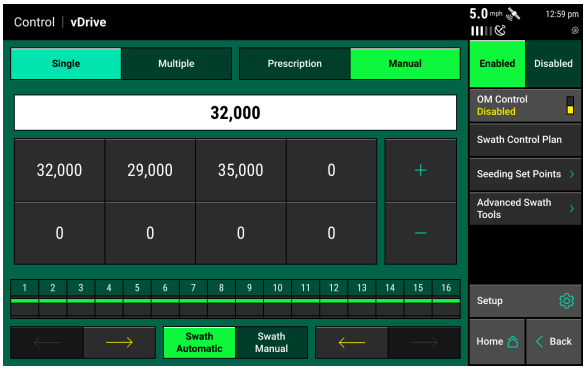
Note: The swath control switch on the Cab Control Module must be in the up position for manual swath control to work.

Option 1:

A swath control bar can be added to the home screen in place of the DashBoard Mini Chart. The Swath Control bar is a default setting in the “Large Map” tab at the top of the home screen.

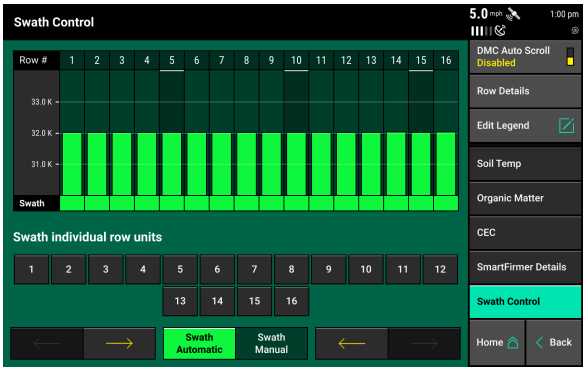
The Swath Control bar allows the operator to manually swath off rows on the planter from the home screen. To use the Swath Control bar press and hold the box representing the row you want to swath off. Some boxes have numbers to identify their location on the planter. When the box turns yellow, that row has swathed off. Multiple rows can be swathed off by dragging a finger across multiple rows once the first row has turned yellow. Once rows have been manually swathed off, swath control is now in Manual mode and rows will NOT swath off to boundaries or coverage. To switch back to automatic mode press the “Reset” button on the left side of the Swath Control bar. When in automatic mode this button will display “Swath”.

Option 2:



The control pages for vDrive, vSet Select, or mSet has an option at the bottom of the screen for manual swath control. Press and hold on individual rows to swath them off or use the arrow buttons below the rows to swath rows on and off from either side of the planter. To switch back to automatic swath control, press the Swath Automatic button.

Option 3:

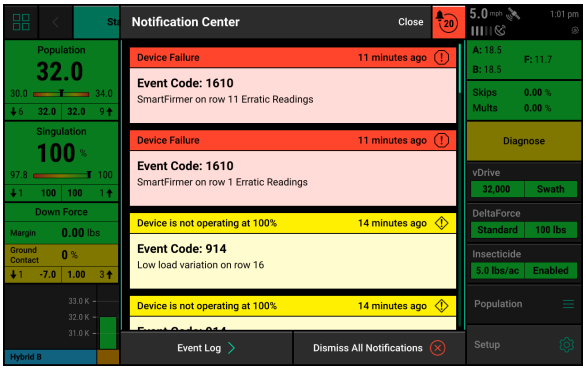


If the current home screen layout has a Dashboard Mini Chart at the bottom of the screen, select the name of the chart that located directly above the Setup button. Then on the right hand of the screen scroll the Navigation Pane to the bottom of the list and select “Swath Control”.

Select individual rows to swath off and on or use the Clutch arrow buttons at the bottom of the screen to swath rows on and off from the left or right hand side.

Note: A control button can also be added to the home screen which links directly to this Swath Control page.

Notification Center

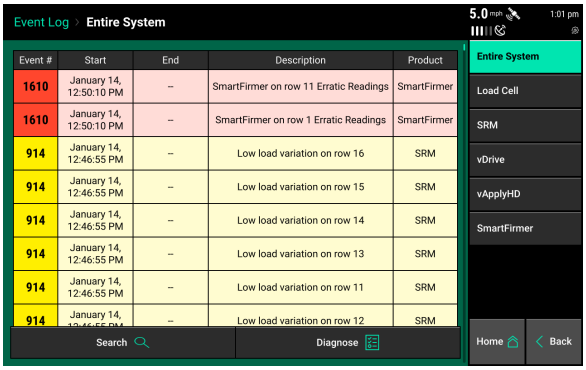


The Notification Center is designed to alert the operator of issues. The Notification Center button on the home page will give a number indicating the number of Event Codes that have taken place since the last reset. Press the button to display all event codes and a description of the issue.

Select an event code to view additional details about the event code and recommendations for fixing the issue.

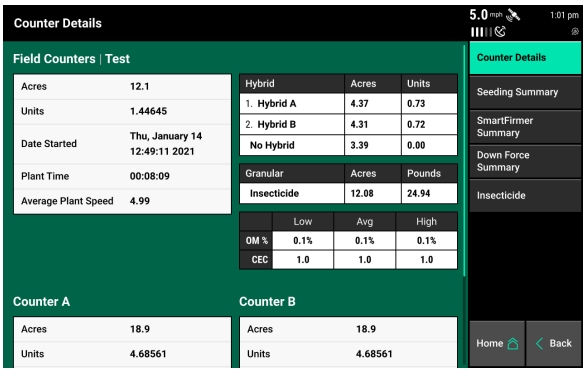
Press “Dismiss All Notifications” to clear out all event codes in the Notification Center. Events will still be stored in the Event Log.

The “Event Log” button will display a list of all notifications from the entire system with the newest at the top. This list is permanent so that event codes can be referenced when needed. Event codes from just SRMs can be viewed by selecting SRM on the navigation pane. Select individual event codes to view additional details and recommendations for fixing the issue.



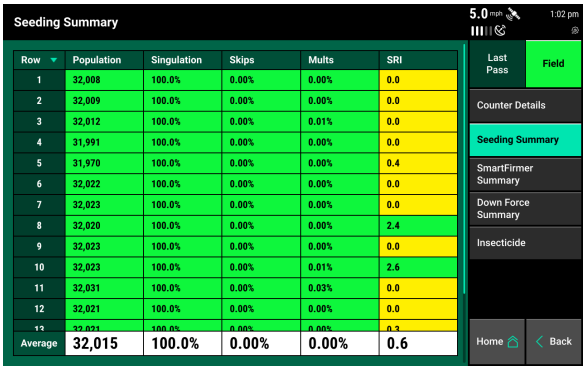
Summary Information

Summary information for the active field can be found by pressing any of the different acre counters on the home screen or the Field Summary button under Field Setup (Setup — Fields). When an acre counter is selected, the "Counter Details" page will be selected. On this page summary information will be provided for acres and seeds planted. Additionally, Hybrids, Liquids, and Insecticides will be displayed with the number of acres planted and amount used for each type. At the bottom of the page there are two acre counters (A & B). These acre counters do not reset when a different field is made active. The operator has to press the reset button for these to reset back to 0.



On the navigation menu on the right side of the screen there are two additional summary pages: Seeding Summary and Down Force Summary. Both the Seeding and Down Force summary pages can be displayed for the entire field or for the last pass through the field. Toggle between these modes at the right side of the page.

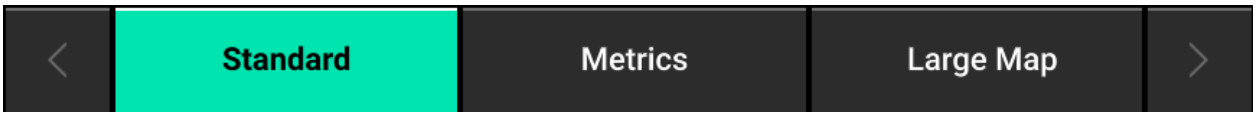
Seeding Summary displays row by row information for Population, Singulation, Skips, and Multiples. These values are averages for the entire field or the last pass through the field for each individual row. Planter wide averages are available at the bottom of the screen. Colors for each metric will change according to the limit adjustments configured in the Crops menu (Setup – Crops – Limit Adjustments).



Down Force Summary displays row by row information for average Down Force value (as determined by the load cell), Margin, Ground Contact, and Ride Quality for each individual row. These values are averages for the entire field or the last pass through the field for each individual row. Planter wide averages are available at the bottom of the screen.

Home Screen Tabs

At the very top of the Home Screen are three tabs that change the layout of the Home Screen. Each tab can be configured. Pressing on a tab (active tab is highlighted) will change the layout of the home screen. This allows different home screen looks to be saved and accessed very quickly. Up to eight total layouts can be configured and named. The arrows or swiping left/right can be used to access more screen layouts.



Default settings:

- Standard – Includes a large map with metrics on both sides. At the bottom the Population Mini Chart is displayed. All control buttons default to the right hand side of the screen.
- Metrics – A small map is displayed with the majority of the screen displaying different planting metrics. The Population Mini Chart is displayed at the bottom of the screen.
- Large Map – A full screen map is displayed with a manual swath control bar at the bottom of the screen.

Each of these three tabs can be renamed and the home screen fully customized for three different home screen looks that can be toggled between very quickly. Refer to Customizing the Home Screen below for information on how to do this.

Connectivity

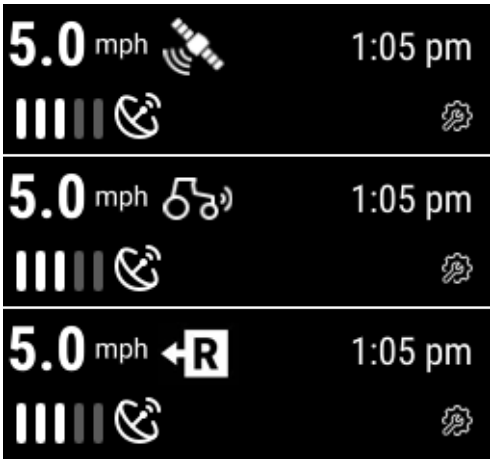
Speed & GPS

Speed

The top right hand corner of the home screen displays the current speed of the tractor. The bars under the speed source icon indicate signal strength. The icon itself will be white if the speed source state is good. It will turn yellow if communication is lost momentarily, there are errors in the signal, or the GPS fix is lost. The icon will turn red if the speed source becomes unusable.

There are three different icons that can be displayed:

1. GPS Receiver icon – indicates the speed source is coming from the GPS system.
2. Tractor/Radar icon – indicates the speed source is coming from the Radar system.
3. A capital R inside of a box – indicates the tractor is moving in Reverse.

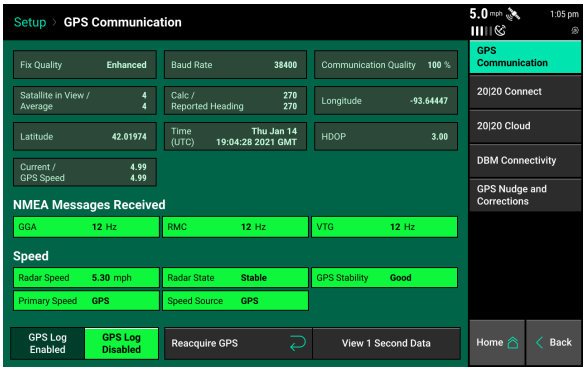


Pressing on the Speed button in the top right hand corner will direct the operator to the GPS Communication page. This page displays information about the GPS information that the 20|20 is receiving. For best GPS results:

- Set the Baud Rate to 19200 or 38400 in the system ouputting the GPS.
- The communication Quality should be as close to 100% as possible.
- There should be at least three satellites within view
- The HDOP should be between 0 – 2.
- Set NMEA messages GGA, RMC (or ZDA), and VTG at 5 Hz in the system outputting the GPS.. (Additional NMEA messages may degrade the GPS information due to too much information being received).

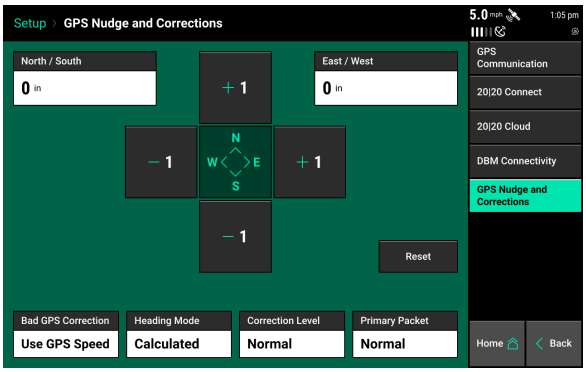
GPS Communication

GPS logs may be Enabled at the bottom of this page if requested by Precision Planting Support. Additionally, a “Reacquire GPS” button is located in the bottom center of the screen. Press this button to force the system to try to reacquire the GPS signal.



GPS Nudge and Corrections

GPS nudge can be used to move the map data in situations where GPS shift has occurred. Use the '+1' buttons to nudge the map in that direction.



The GPS Correction page can be used to configure how the system handles the GPS signal.

Bad GPS Correction — This can be changed between Calculated and GPS speed. Use Calculated for lower grade GPS systems.

Heading Mode — This can be changed between Calculated and GPS. Use Calculated for lower grade GPS systems.

Correction Level — This setting can be changed from Normal to High. High correction level will raise the minimum GPS quality percentage for mapping to occur.

Primary Packet — This setting will allow for the user to switch between GGA and RMC for the primary NMEA packet.

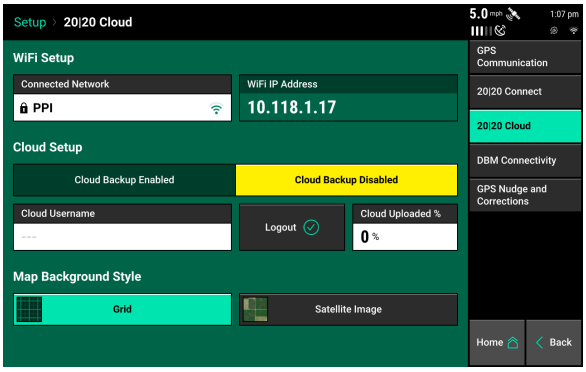
Note: Do not change any of the GPS correction settings unless instructed to do so by a Dealer or Product Support.

Cloud Connectivity

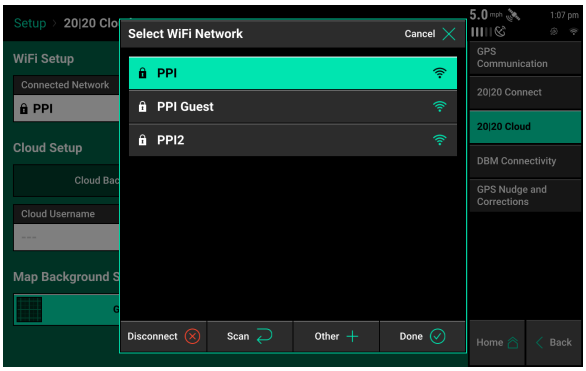
The 20|20 system can join a local WiFi network to back up data to the 20|20 Cloud. These features include Data Backup, Background maps, Software Updates, and sending support data to our Product Support Team.

Wifi Setup

To connect to WiFi, press the Speed button from any page and select Cloud Connection. Select the Connected Network button to begin the process of connecting to WiFi.

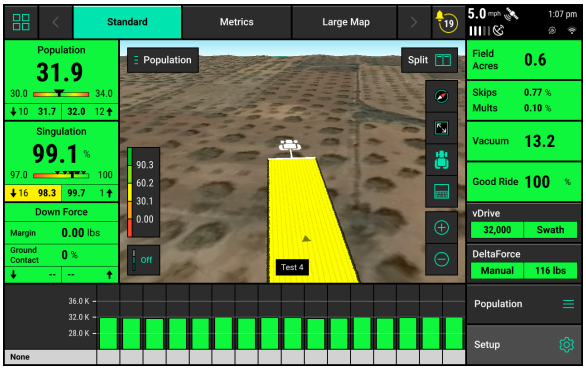


Select the WiFi network you would like to join, and enter the password. The scan button at the bottom of the page can be used to refresh the available networks. Use the Disconnect button at the bottom of the page to leave the active network.



Once the network has been joined, a WiFi symbol will appear in the GPS button. This symbol will also indicate the strength of the network signal.

While WiFi is connected, background imagery can be viewed on the home screen. The background map style can be changed at the bottom of the Cloud Connection Page. Once this setting has been changed, a background image will display on the map, and perspective mode can be used to change the angle of view.

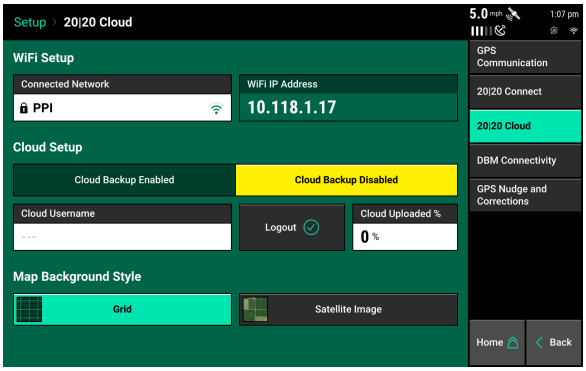


Cloud Setup

The 20|20 Cloud can be used to backup field map data and send support data to our Product Support team. Before logging into the 20|20 Cloud on the display, sign up for the Cloud at 2020.ag.

Select the Cloud Username box, and enter your cloud Username and Password.

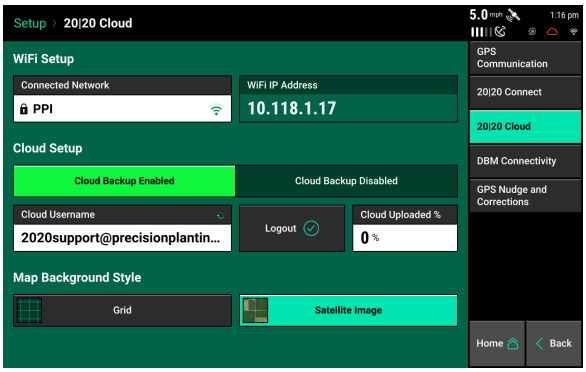
Note: WiFi must be connected prior to logging in to properly authenticate your login information.



Once the system has authenticated your cloud login information, a white cloud symbol will appear in the GPS button. A red cloud indicates that the cloud is not currently connected.

Cloud Backup

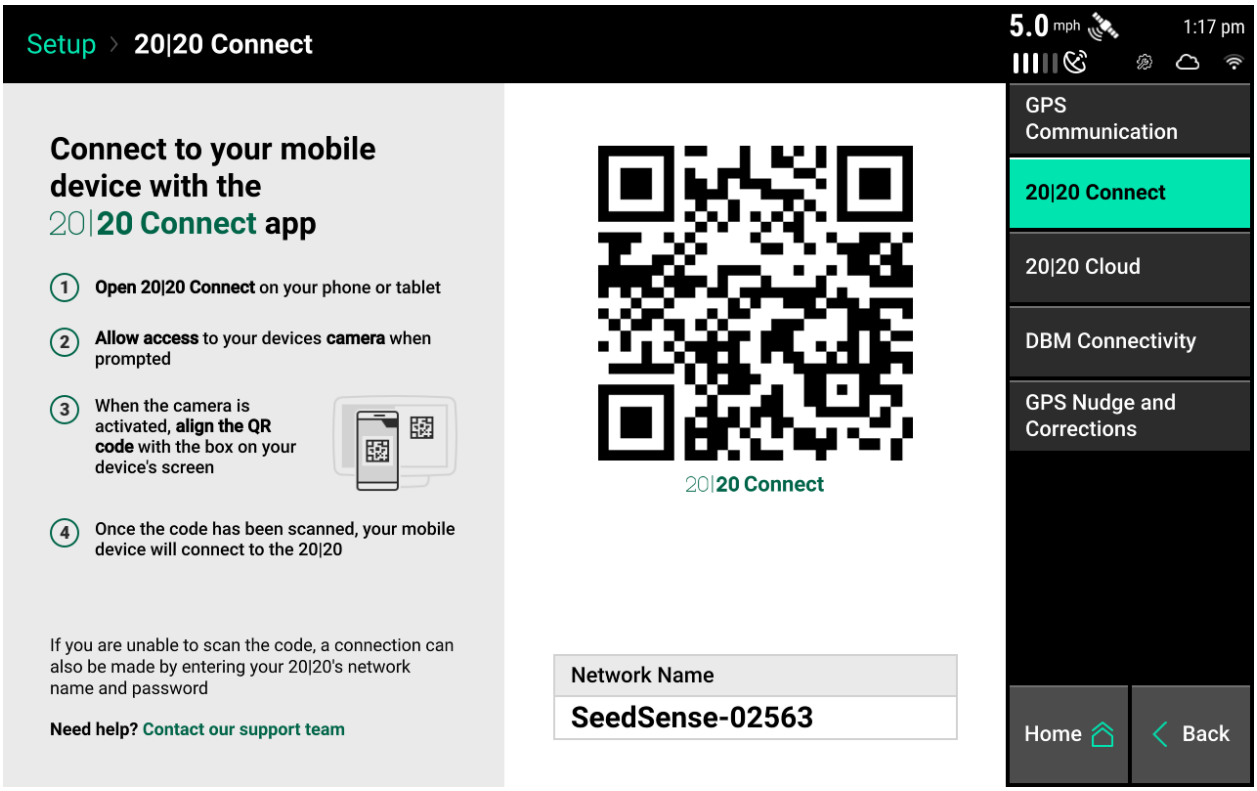
Once the 20|20 Cloud is connected, change the Cloud Backup toggle to Enabled. The Cloud Uploaded percentage will display a progress for the percentage of data that has been backed up to the cloud.



20|20 Connect

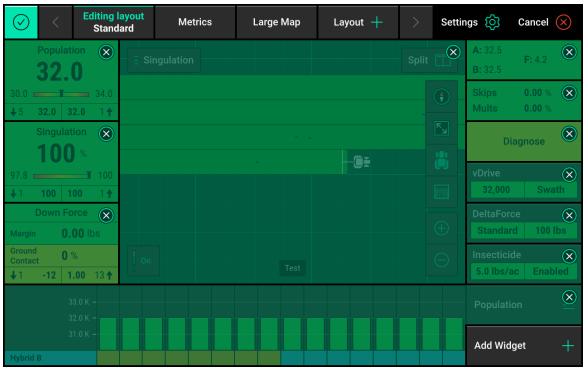
20|20 Connect is a mobile app available through the App Store and Google Play that connects locally to the on-board DBM WiFi. This app can be used for Calibrations, Health Checks and other system controls. Once the app has been downloaded, follow the on-screen instructions to pair it to your device.

For more information on 20|20 Connect and how to use it, refer to the 20|20 Connect Operator's Guide.



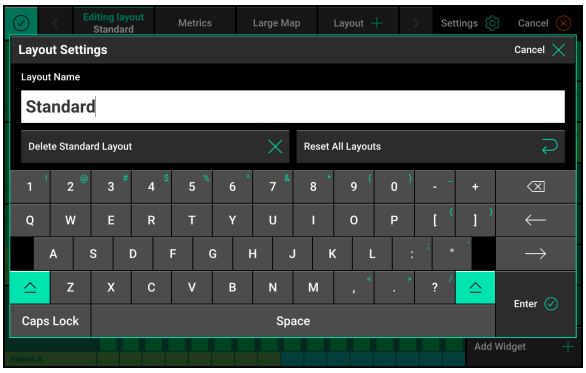
Customizing the Home Screen

Customizing the Home Screen

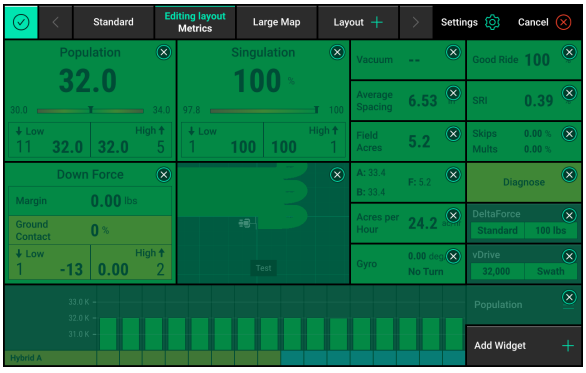


To begin the process of customizing the home screen, select the button in the top left hand corner of the screen. When pressing this button the home screen will be dimmed with a grid pattern laid on top. Each screen will be divided into grids, that the buttons will fit into.

The grids overlaying the home screen are used to place buttons such as, Metrics, Maps, and the Dashboard Mini Chart (these are all referred to as widgets). Every widget takes up a certain about of grid spaces. For example a 2 x 2 metric takes up four grid spaces (two columns and two rows). To remove a widget, press the ‘X’ at the top right corner. Press and drag a widget to move it to a new location.



At the top of the page is a “Settings” button that can be used to rename the layout and reset all screen layouts back to the factory default.



New Layouts can be added by pressing the ‘Layout +’ button at the top of the screen. Up to eight home screen layouts can be created for each implement type. Layout options can be moved by pressing and dragging them to the desired position.

To begin editing the home screen, select “Add Widget” from the bottom right corner.

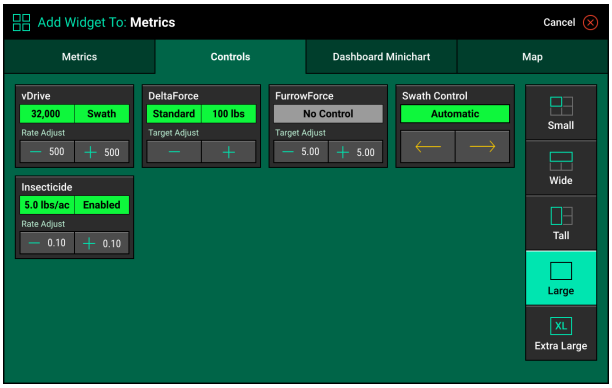
There are four different types of widgets that can be added to the home screen:

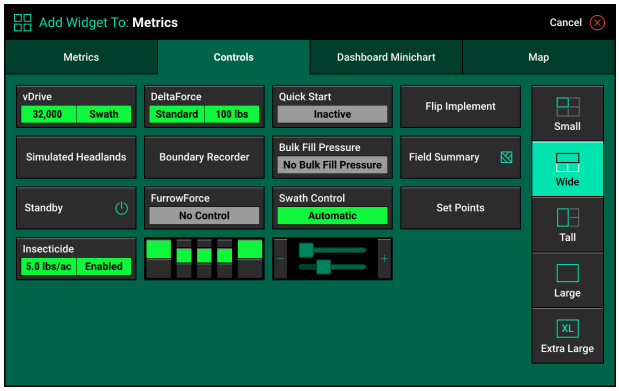
Metrics: The metrics are all of the buttons that display planter information on the home screen. Metrics can be displayed in five different sizes: Small (1x1), Wide (2x1), Tall (1x2), Large (2x2), and Extra Large (3x3). Not all metrics are available in Large and Extra Large. Press the size buttons on the right hand side of the screen to view the metrics available in each size.

Note: Definitions for the Metric and Control buttons can be found in Appendix A – Understanding the Home Screen Buttons.

Controls: The control buttons are used to control the different systems that can be installed on the planter. Control buttons can be displayed in three different sizes: Wide (2x1), Tall (1x2), and Large (2x2). The vDrive/vSet Select and DeltaForce control buttons are set by default on the Standard and Metrics screens. Other control buttons must be added manually. (i.e. vApplyHD).

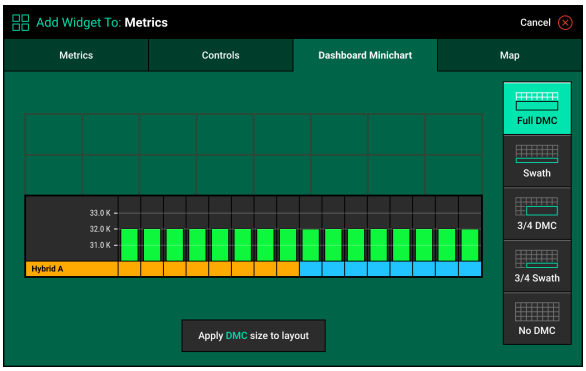
Note: The Large control buttons also add quick adjustment features for the control system. These quick control features can also be accessed by pressing and holding on the smaller control buttons.



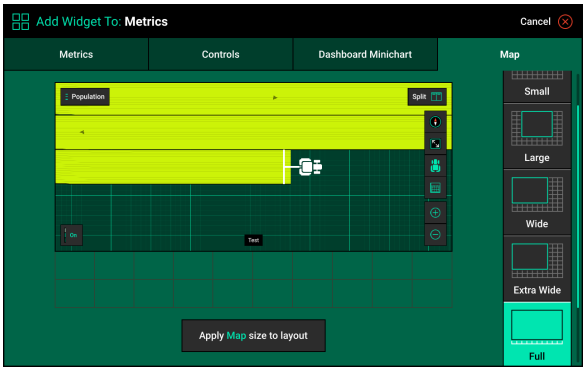


The same control button controls both vDrive and vSet Select. The button itself will switch modes depending on the drive system configured in the Equipment menu. The vApplyHD and FlowSense control buttons are the same and will switch according to which system(s) are configured. Additionally, the name of the vApplyHD and FlowSense control buttons will be Product 1 and Product 2 by default. Once the liquid system(s) are configured on the monitor, the name of these control buttons will change to reflect the product Nickname(s) that are set. The Product 2 control button will only be used if there are two liquid systems installed on the planter.

Dashboard Minichart: Add either a Dashboard Minichart to the home screen or a Swath Control bar. This page offers both in two different sizes: full and ¾. The Full size will stretch across the entire bottom of the display while the ¾ size, will leave a space on the left side where additional buttons can be added. The Dashboard Minichart can be removed by selecting "No DMC". Once a selection has been made, press "Apply DMC Size to Layout".

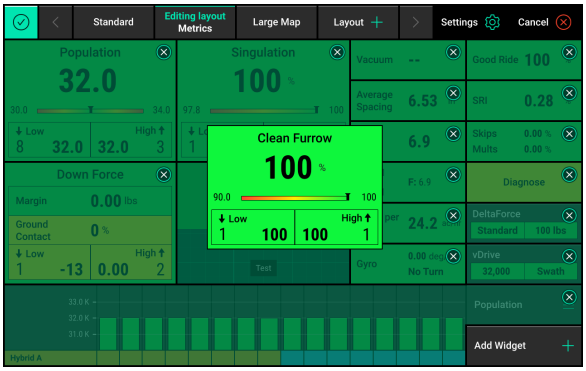


Map: Select the size of map to display on the home screen. There are four sizes of maps available: Large (6x6), Small (3x3), Wide (6x7), or Full (7x10). Additionally, there is a No Map option. Once the map type is selected press "Apply Map Size to Layout".



Placing a Widget on the Home Screen

Once a widget has been selected from any of the four categories, it can be placed anywhere on the home screen. After selecting a widget, that widget will be placed directly in the center of the screen. To move the widget press – hold – drag the widget to the area of the screen for it to be placed at. Once the finger is removed from the screen the widget will be placed in that position.



Note: If the widget is placed on top or on top of part of another widget (e.g. the map) the entire widget that it was placed on top of will be removed and a blank green area will be left.

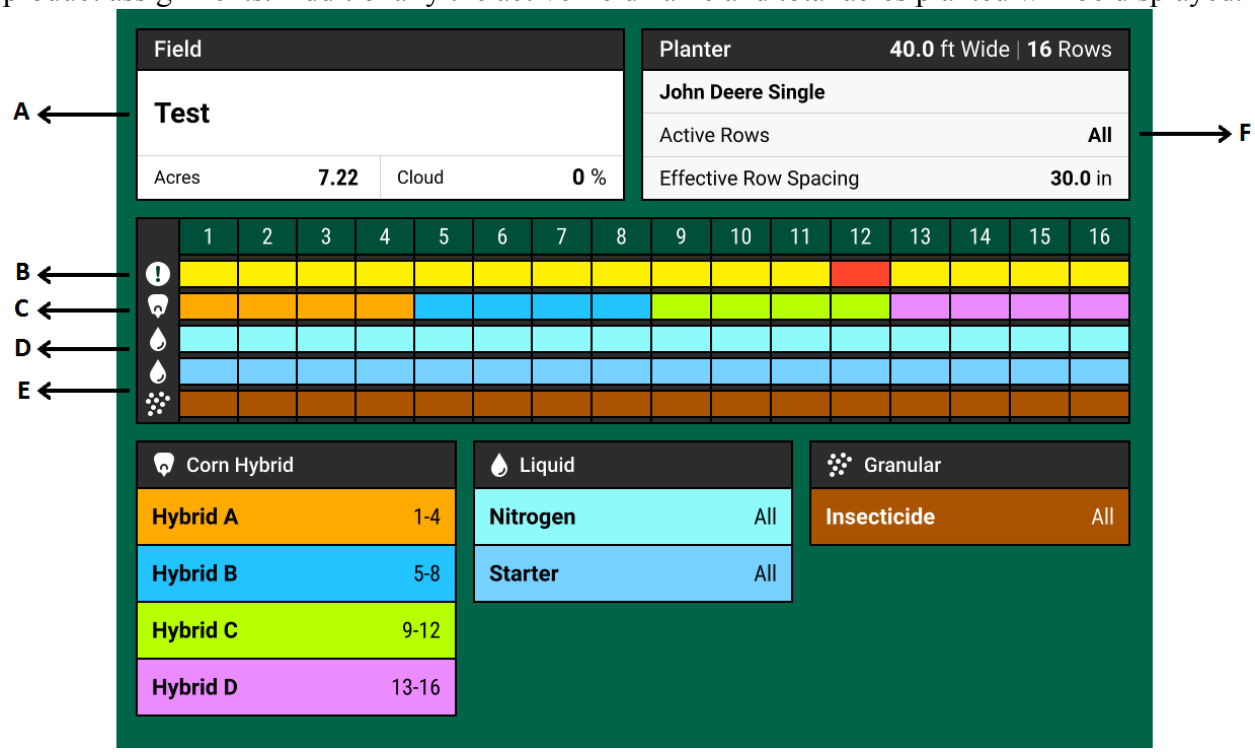
After the widget has been set, select "Add Widget" to continue customizing the home screen. Once finished press the check mark in the top left corner to save the current layout.

Note: When customizing the home screen, only the home screen for the selected tab at the top of the home screen will be changed.

Setup Button

Press the Setup button on the home screen to access the main navigation screen for equipment and control systems' setup, diagnostic, and data pages. This page is divided into information about the system including diagnostics, information about products being applied, and the main navigation pane.

The implement portion of the main setup page displays basic implement setup, diagnostic, and product assignments. Additionally the active field name and total acres planted will be displayed.



A - Displays the active field name as well as the total acres planted for the field in the current season. Press on the field name to select a different field name.

B - Row Diagnostic Information. Displays each rows diagnostic color from the diagnose page. Quickly see if all rows are green, or if there is an issue with a row or rows.

C - Row by Row Hybrid Information. A color will be assigned to each row indicating the hybrid name that is assigned. Colors correspond to the hybrids listed underneath the row information. Up to four different hybrids can be assigned at one time.

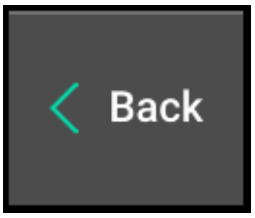
D - Row by Row Insecticide Information. A color will be assigned to each row indicating the type of insecticide product that is assigned. Colors correspond to the product names listed in the Insecticide Column underneath the row information. Up to four different insecticides can be assigned at one time.

E - Row by Row Liquid Information. A color will be assigned to each row indicating the type of liquid product that is assigned. Colors correspond to the product names listed in the Liquid Column underneath the row information.

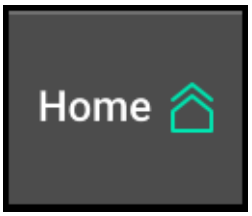
F - Implement setup information. Displays the width, number rows, implement make, frame type, active rows, and effective row spacing that have been setup for the implement.

Note: Insecticide and Liquid information will only be displayed on this page if an Insecticide and/or Liquid control system has been configured on the display.

On the right hand side of the Setup screen is the Navigation Pane. The Navigation Pane is used to access all other menus in the system.



When navigating through different screens, there will always be a “Back” button that will navigate the user to the previously viewed page.



The “Home” button will navigate the user to the main home screen.

Basic Overview of the Main Navigation Menu

Fields: Change the active field name, assign prescription/boundary to a field, and create or edit Client, Farm, & Field names.

Products: Assign Seeding, Insecticide, and Liquid products being applied.

Equipment: Configure the implement profile, implement measurements, and tractor measurements.

Systems: Setup and configure all products installed on the implement as well as the monitor.

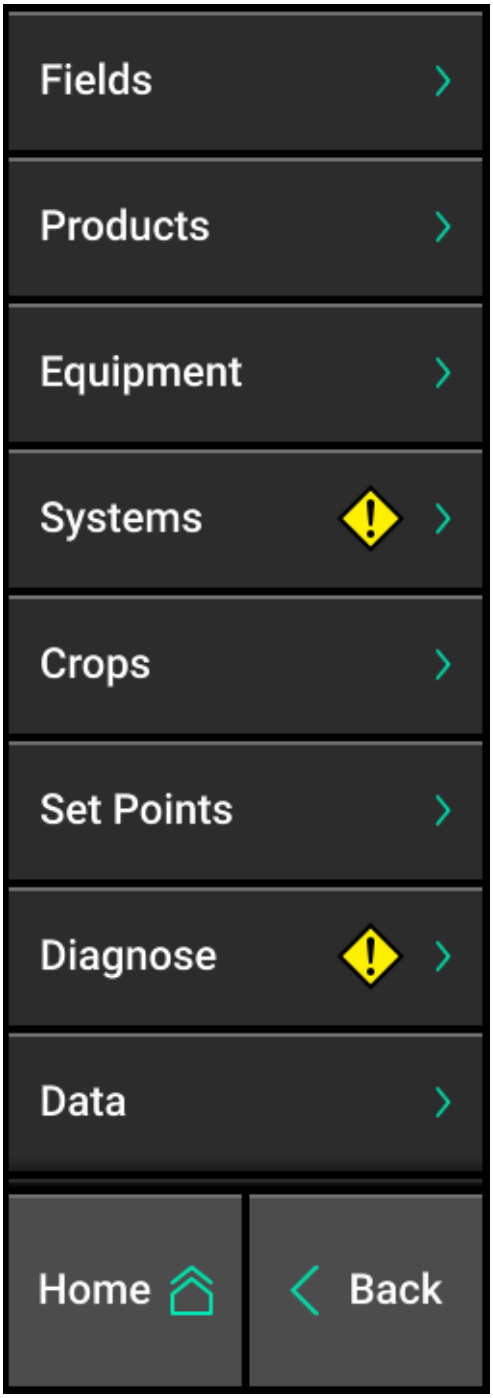
Crops: Edit the active crop as well as adjusting settings that are saved for each crop type including alerts and alarms.

Set Points: Enter preset rates for controlling vDrive seeding rates and vDrive Insecticide application rates.

Diagnose: The primary location for troubleshooting issues related to the operation of the display and products being controlled/ monitored on the implement.

Data: Export, Import, and delete data into the monitor as well as updating software.

Note: More information for each of these menus can be found below.



If a button on the Navigation Pane has a warning icon on it, the system has recognized an issue with the setup and configuration that must be addressed.

When navigating through the 20|20 there will be a “bread crumb” trail at the top left hand side of the screen showing the navigation path that has been taken. Select any part of the bread-crumb to navigate directly to that screen.

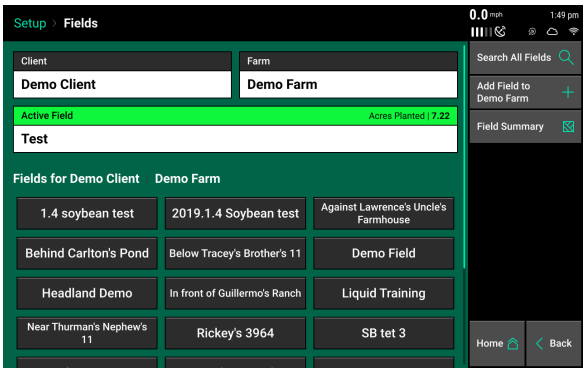
Example of a bread crumb trail:

Fields

Precision Planting uses a three tiered naming structure for field names: Client, Farm, & Field. Each tier of the naming architecture becomes more specific. At all times there will be an active field. The active field (a field consists of a Client, Farm, and Field name) is the field in which all data and map is being created for and stored under.

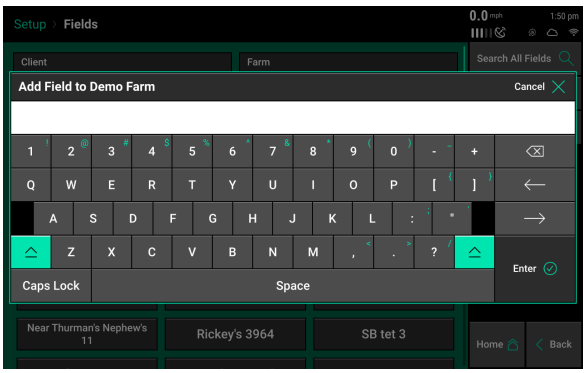
The Fields Menu is where the Client – Farm – Field structure can be created and edited. Select the Fields Menu from the Navigation Pane after pressing Setup on the home screen. (Selecting the active field name on the setup page will direct to the same page).

When the Fields menu is selected, the Active Field name will be displayed with a green heading. Also, the Client and Farm name of the Active field will be shown. At the bottom of the screen other fields for the same Client and Farm name will be shown. To access the Field Setup screen for the active field, press on the field name. To access the field setup screen for a different field or to make a different field active, select the field name from the bottom of the screen. If too many field names exist to fit on the page, either scroll down by using a single finger or use the “Search All Fields” function.

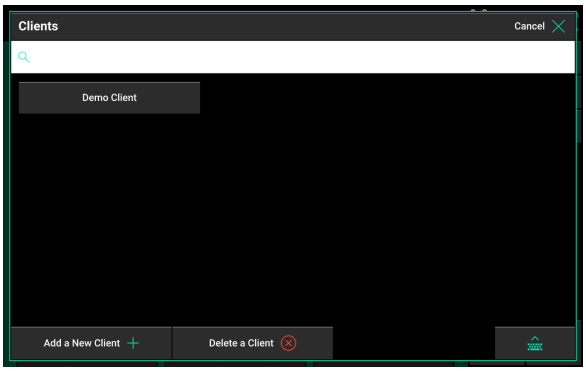


Additional field names can be added under the same Client and Farm name by selecting “Add Field to *current Farm name*”.

Use the keyboard on the screen to type in a new Field name. When finished, press the check mark on the bottom right side of the keyboard.



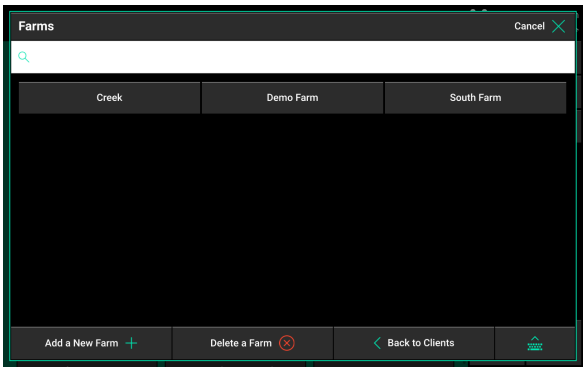
To view different field names, select a different Client or Farm name. Select either the Client or Farm name displayed towards the top of the page to select a different Client or Farm.



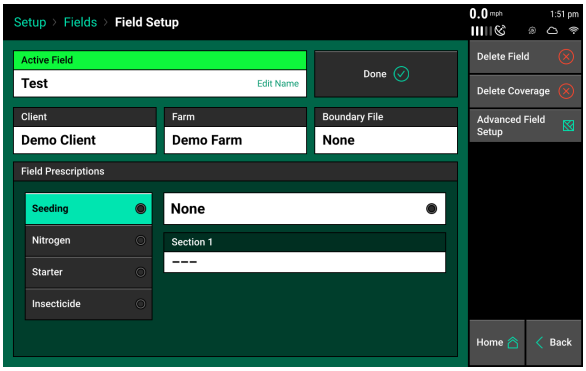
When the Client box is selected, a list of all Client names is displayed. Client names can be Added or Deleted by using the options at the bottom of the screen.

Select the keyboard icon in the bottom right to search for an existing Client name. Select a Client name listed on the screen to view the Farm names under the selected Client name.

Once a Client name is selected a Farm name must be selected. All Farm names under the selected Client name will be displayed. Farm names can be created and deleted. Select the appropriate Farm name to view all Field names under the selected Client & Farm name.



The Field Setup screen will appear when a Field name has been selected (including the active field name). Select “Make Active” to make the selected field active; so data and maps are stored under the field name. (If the large button says “Done” then the selected field is already the active field.



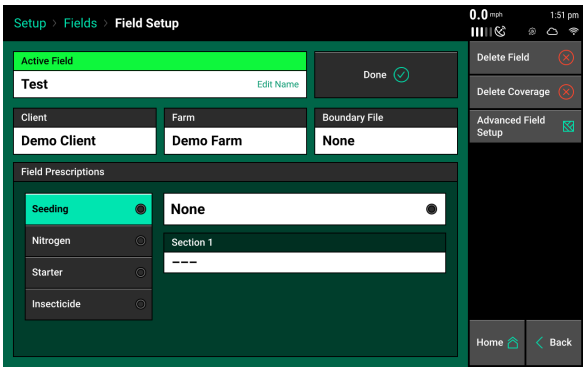
A field name can be deleted by selecting the Delete Field button. Data for the field will not be deleted and can still be exported off the display.

If coverage already exists for a field; so products such as vDrive remained swathed off, select “Delete Coverage” to clear all coverage from the selected field.

Boundary and Prescription files can also be assigned to fields on this page. Boundary and Prescription files must be in a Shape File format and include the .dbf, .shx, and .shp file extensions. (Shape files are imported in the Data menu.)

Select the Boundary File button to view a list of all imported shape files. Choose the appropriate boundary file for the selected field.

The 20|20 can use prescription files for Seeding (vDrive), Liquid application (vApplyHD), and Insecticide (vDrive Insecticide). The Field Setup page will change with the type of products configured. See following information in this document for importing and assigning prescriptions.

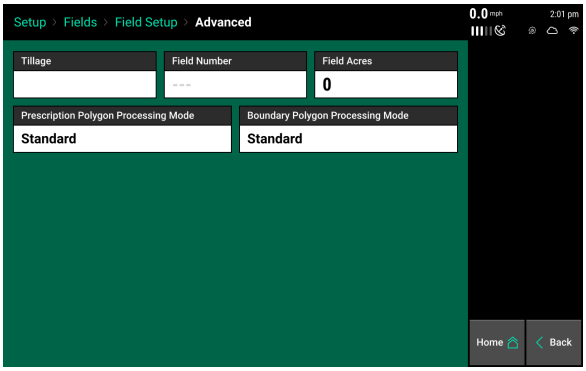


Note: The option to assign a prescription will not be available unless a Seeding/Liquid/ Insecticide system is setup on the display. Refer to the Product specific Operators Guide for how to configure each system.

Advanced Field Setup

On the right side of the Field Setup page is the Advanced Field Setup. This includes entries for Tillage, Field Number, and Field Acres. This is optional information that can be entered for record keeping.

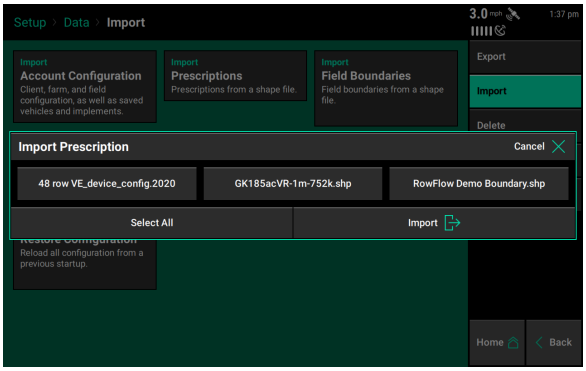
Prescription & Boundary Polygon Processing Modes can be adjusted to make the display read imported shape files differently.



The standard mode works for the majority of shape files. Selecting “All Exterior” will cause the display to read all polygons within the shape file as an external boundary of the field. This mode can help the system read shape files that were not saved in the typical ESRI file format.

Importing Prescription Files

To begin using the prescriptions, they must be imported. Follow the below steps to import the prescription(s).



1. Navigate to Setup - Data
2. Insert the USB Drive into the display containing the prescription files
3. Tap on the 'Import Prescriptions' button.

Note: The 20|20 supports the import of .2020 file prescriptions or .shp file based prescriptions (.shp, .dbf, .shx)

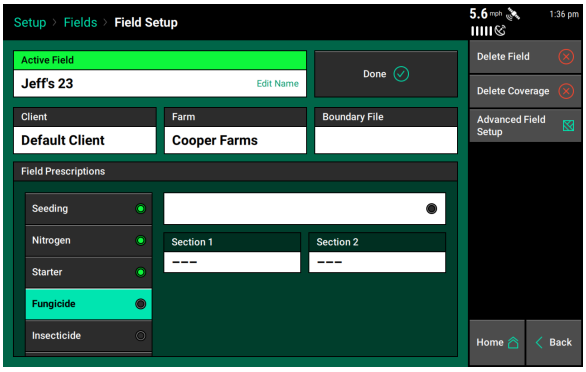
Next, select what system type the Prescription file(s) will be used for. Options include

- Seeding
- Liquid
- Granular
- Depth

Finally, Select what prescription files need imported. If prescription files are being used for multiple systems, complete the above process for each system type.

Assigning Prescription Files

Once Prescription files have been imported into the 20|20, each file will need to be assigned to its intended field. This can be done on the Field Setup page.



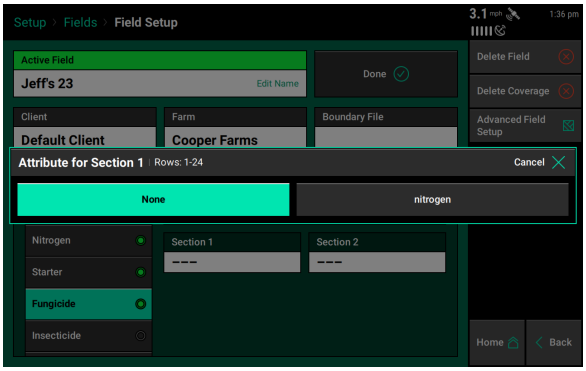
1. Navigate to Setup - Fields
2. Select the Client, Farm, and Field that will be using a prescription

Next, select what system type the Prescription file(s) will be used for. Options may include

- Seeding
- Liquid
- Granular
- Depth

Once the system is selected, tap on the prescription file box to look through existing prescription files and select the one that will be used for this field. After the prescription is selected, confirm that this is the desired prescription file, and if necessary, adjust the target zones before making it active on this field.

An attribute selection box can be used on the top right corner of the screen, and either individual zones or the whole file can be adjusted by either a percent or number bump. Press 'Save' once you are ready to assign the prescription. Finally, select what attribute will be used for each drive section. Complete the above process for each field that will be using a prescription file.



Controlling to Prescription Files

After the active field has a prescription file assigned to it, the system can use a prescription file for control. This applies to the following systems:

- Seeding
- Liquid
- Granular
- Depth

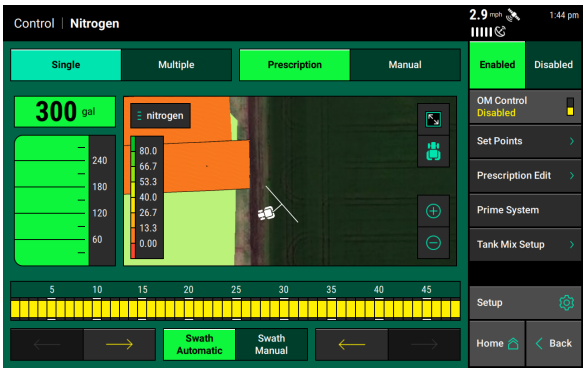
To switch to prescription control, follow the below steps:

1. From the Home screen, tap on the control button for the system. Some examples may include vDrive, mSet, Nitrogen, Depth, and Granular.
2. Toggle the system from 'Manual' to 'Prescription' control at the top of the screen.

The system will now control to the assigned prescription file.

Editing Prescription Files

The Prescription file can be edited either during the assignment process to the field, or from the system control screen. To edit a prescription already assigned to the field:

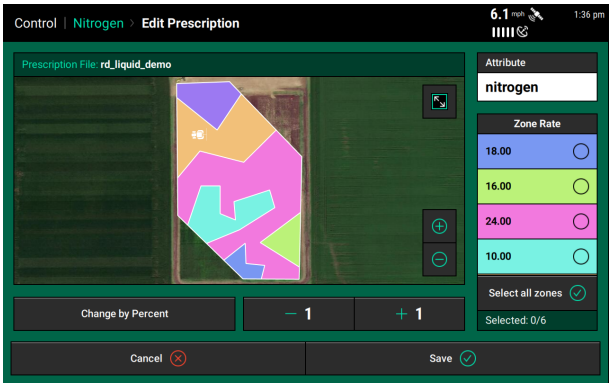


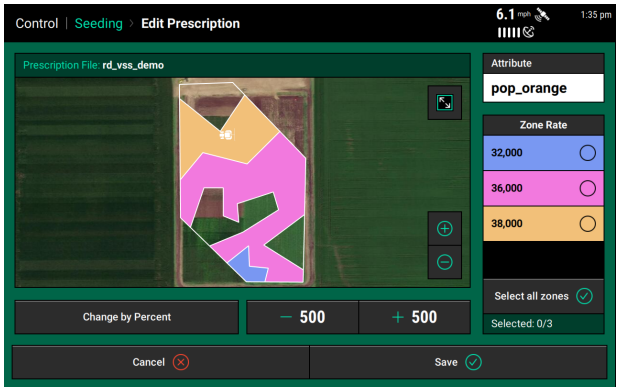
1. From the Home screen, tap on the control button for the system. Some examples may include vDrive, mSet, Nitrogen, Depth, and Granular.
2. Tap on the 'Prescription Edit' button on the right side of the screen.

Once within the Prescription edit page, The below options are available

- Switch between attributes on the top right corner of the screen.
- Select any combination of zones on the right side of the page, ranging from individual, multiple, to all.

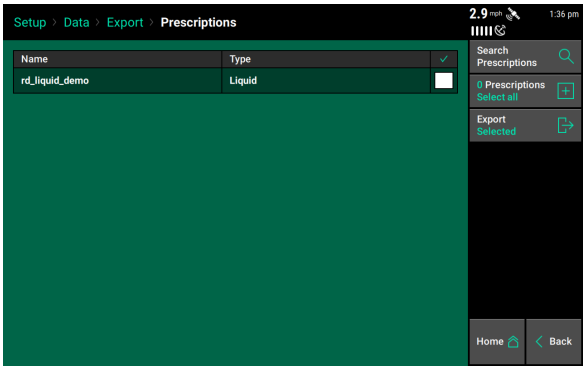
After the desired attribute and zones are selected, you can either adjust it by a percent, or bump the values up or down using the + or - buttons on the screen. Once the prescription has been edited, tap on 'Cancel' to discard any changes made, or tap on 'Save' to save the changes made to the prescription.





Exporting Prescription Files

Follow the below steps to export prescription file (s).

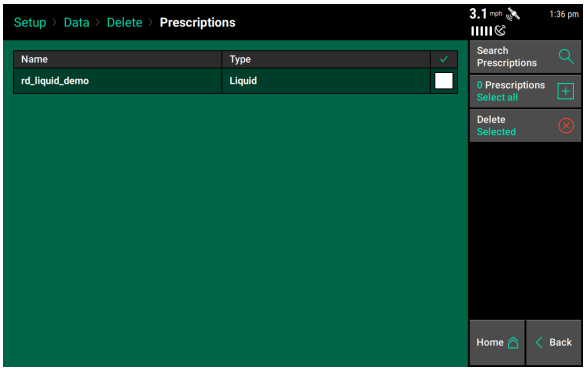


1. Navigate to Setup - Data - Export.
2. Insert a USB drive into the Display.
3. Tap on the 'Export Prescriptions' button.
4. Select the prescriptions to export, or tap on 'Select All'.
5. Export the files.

Note: The 20|20 exports a .2020 file format of prescription file.

Deleting Prescription Files

Follow the below steps to delete prescription file (s).



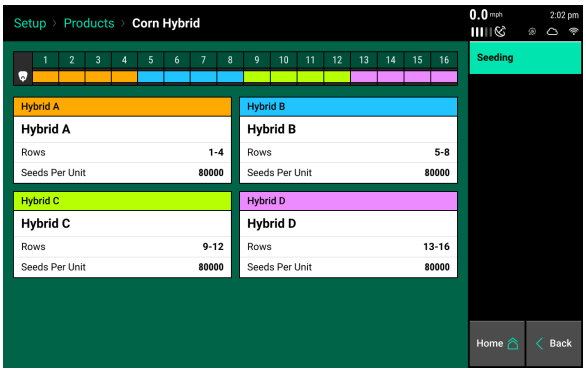
1. Navigate to Setup - Data - Delete.
2. Tap on the 'Delete Prescriptions' button.
3. Select the prescriptions to export, or tap on 'Select All'.
4. Delete the files.

Note: Deleting files is an irreversible operation, and cannot be undone. Follow the above steps with caution, as deleted files cannot be restored.

Products

The Products menu in the Navigation Pane is used for assigning seeding (hybrids/varieties), liquid, and insecticide product names that are being applied. Seeding hybrids/varieties can always be assigned, while Liquid and Insecticide product names can only be assigned if control products for these are configured on the monitor.

Up to four different Hybrids and four different Insecticides can be assigned at any given time. vApplyHD liquid systems can only be assigned one product name per vApplyHD system installed on the implement.



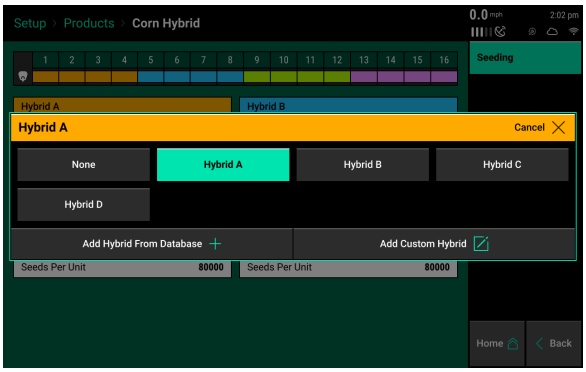
To begin, first select the product type to configure from the navigation menu on the right hand side of the screen (Seeding, Insecticide, or Liquid).

Select either Hybrid A (for seeding), Insecticide A (for insecticide), or Product 1 (for liquid) to view the list of previously selected products.

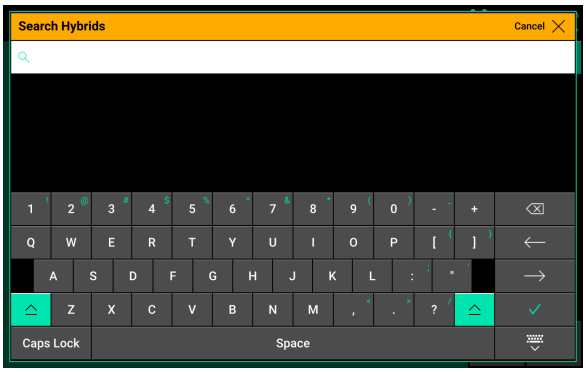
Note: For the example below, hybrids will be configured. See the vApplyHD or FlowSense operator's guides for more information on configuring a Liquid product name and the vDrive Insecticide operator's guide for configuring an Insecticide product name.

Begin by selecting Hybrid A. Previously used hybrid names will be displayed and can be selected. If no products have ever been setup, the only option will be "None".

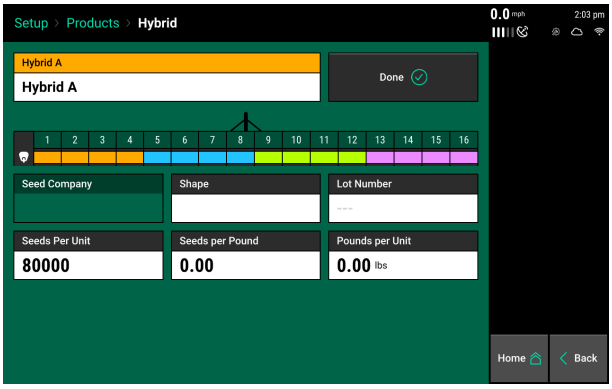
To add a new hybrid, select "Add Hybrid from database" for selecting a hybrid from the AgX database. Or select " Add custom hybrid" to manually type a hybrid name in.

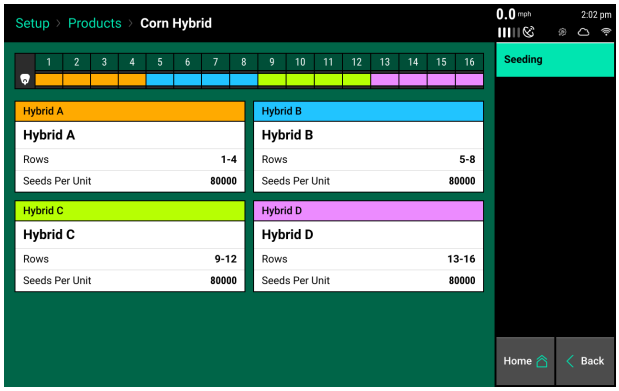


If "Add hybrid from database" was selected, Use the on screen keyboard to search for the name of the product. Select the appropriate name when it is displayed at the top of the screen. If the name is not displayed select the checkmark button the right side of the screen to the typed name as a custom hybrid name.



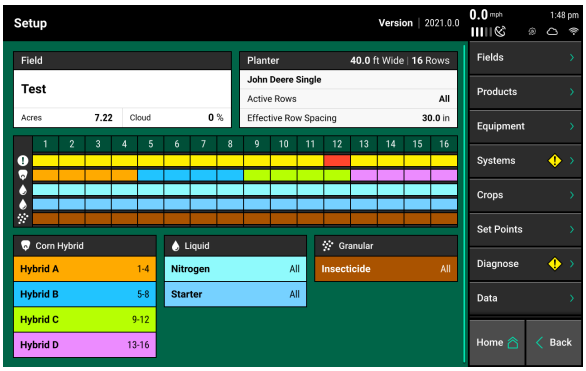
Once the hybrid name has been added to the list, select the name to configure it. Select the "Rows Active" button to set which rows the chosen hybrid is being applied on. Additionally, other information relevant to the product can be entered. Shape, Lot Number, Seeds Per Unit, Seeds Per Pound, Pounds Per Unit do not have to be entered, but provide useful information for record keeping. Once this information has been entered, press "Done". Once product information has been entered the individual rows will be colored in with the corresponding product that was assigned to it.





Insecticide product setup is follows the same steps as hybrid setup except no custom insecticide product names can be created. Only insecticides from the AgX database are available for selection. Liquid product setup redirects the operator to the liquid setup pages. Use the vApplyHD or FlowSense guides for more information on configuring liquids.

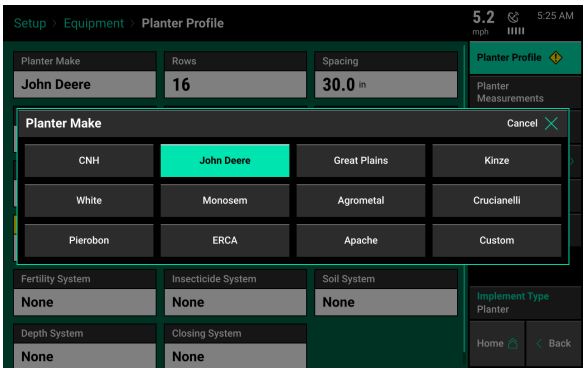
The same product information that is configured in the Product Menu will also be displayed on the main Setup page. Individual rows will correspond to a color that matches a product listed at the bottom of the page.



Note: The active crop type can be changed on the Seeding product page. If the desired crop name is not available from the list, additional crop types can be added in the Crops menu.

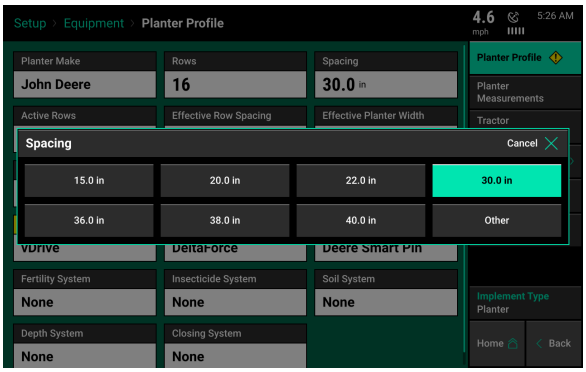
Equipment — Profile — 2020.0.x and Older Software

Press the “Planter Make” button. Select the appropriate make of the planter. Choosing the Planter Make will define some of the choices available in later selection screens.



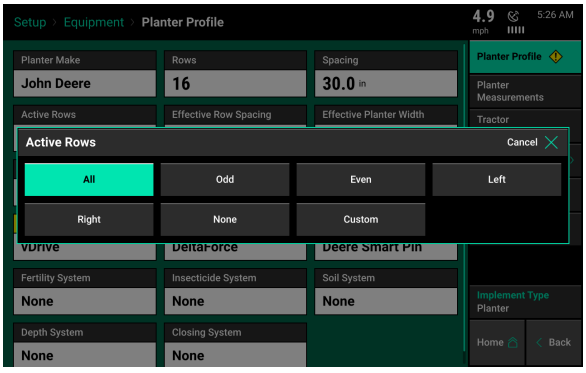
Press the “Rows” button to select the correct number of physical rows on the planter. If needed, scroll down for more options. There may be some options that define year of planter and/or the bar configuration. If the correct number of rows is not available as an option, select Custom as the Planter Make.

Press the “Spacing” button to select the spacing for the rows on the planter. If the correct spacing is not available, select “Other” to manually enter the row spacing.



Press the “Active Rows” button to define the planter rows that will actively be planting. The system defaults to all rows active. Preset row options for Odd, Even, Left, or Right rows can be selected. To define specific rows, select “List”. When listing out the active rows, rows marked by a green box are active rows.

Note: If this is a split row planter, refer to the Crops menu on how to tie Active Rows to each crop type the system will plant.

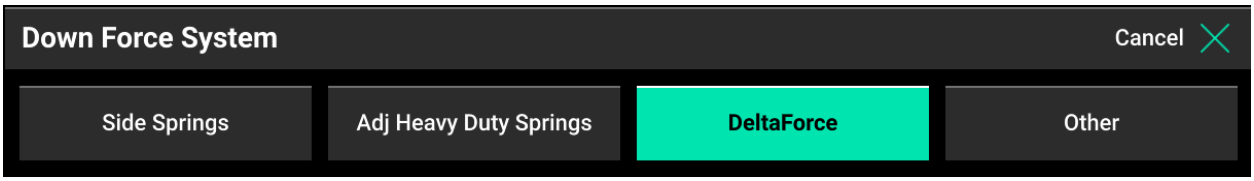


Press the “Drive Type” button to select the system driving the seeding. Select the correct Drive type from the list. If vSet Select is selected as the Drive Type, then a feed system must also be selected.

Note: Selecting the Drive Type will enable control products to be setup in the Systems menu.

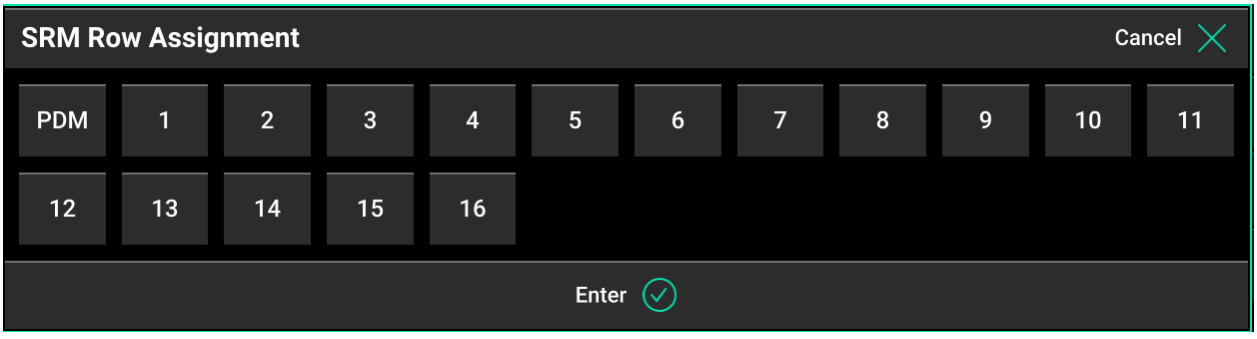
Press the “Down Force System” button to select the down force system installed on the planter.

Note: Selecting the Down Force system will enable control products to be setup in the Systems menu.



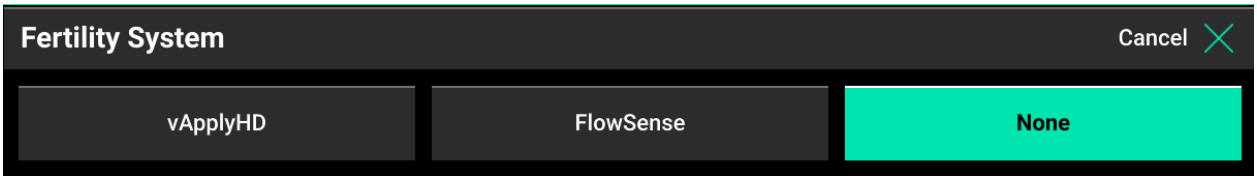
After a Down Force System has been selected, a Down Force Sensor Type must be selected. Available options will depend on the chosen Planter Make. If Custom is selected, a calibration factor can be entered on the Load Cells page in the Systems menu.

If Ground Drive or Other was selected for the Drive type, and DeltaForce was not selected as the Down Force system, SRM Row Mapping must be selected. Select what rows have SRMs installed, including if there is a PDM installed.



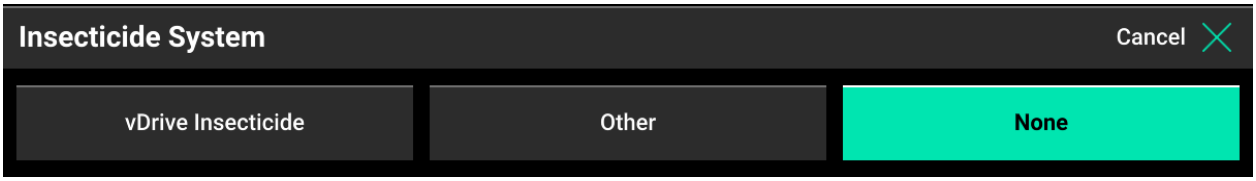
Press the “Fertility System” button to select a fertility system installed on the planter and being ran through the 20|20.

Note: Selecting a Fertility system will enable control products to be setup in the Systems menu.



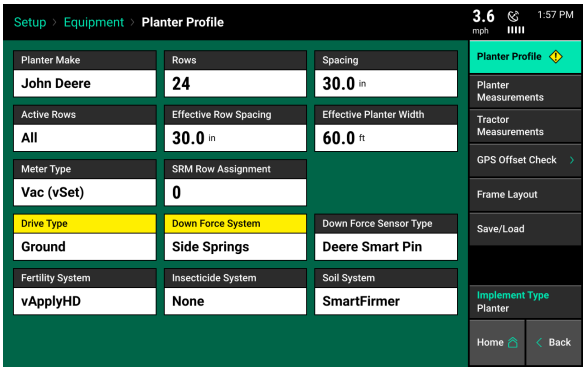
Press the “Insecticide System” button to select the insecticide system installed on the planter that is being run through the 20|20.

Note: Selecting an Insecticide system will enable control products to be setup in the Systems menu.



Press the “Soil System” button if SmartFirmers are installed on the planter. Selecting SmartFirmer will enable data mapping and controls on the 20|20.

At the bottom of the page “Effective Row Spacing” value is used for population calculations and is automatically calculated based on row width and active rows. Additionally, the “Effective Planter Width” is used for acre calculations and is automatically calculated based on row width, number of rows, and active rows. If either of these values is incorrect, select the button showing these values to manually enter a new value.

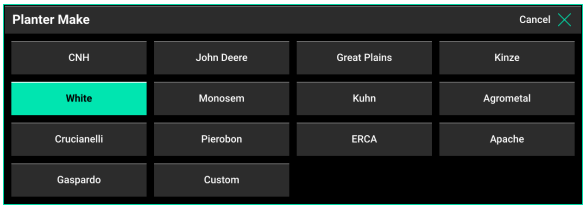


Equipment — Profile — 2020.1.x and Newer Software

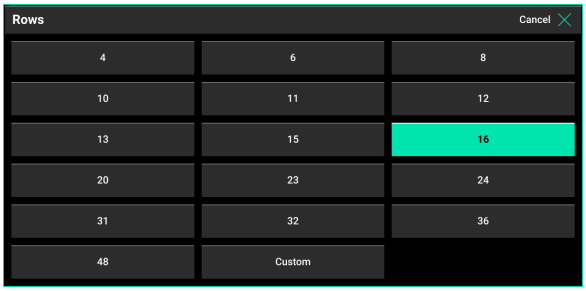
General

The Equipment Profile will be organized into systems, displayed on the right menu under the Equipment Profile. To access the rest of the menu, scroll down.

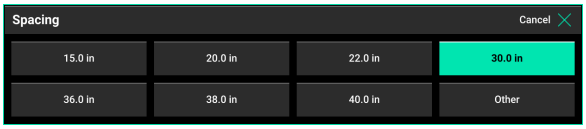
Press the “Planter Make” button. Select the appropriate make of the planter. Choosing the Planter Make will define some of the choices available in later selection screens.



Press the “Rows” button to select the correct number of physical rows on the planter. If needed, scroll down for more options. There may be some options that define year of planter and/or the bar configuration. If the correct number of rows is not available as an option, select Custom as the Planter Make.



Press the “Spacing” button to select the spacing for the rows on the planter. If the correct spacing is not available, select “Other” to manually enter the row spacing.



Press the “Active Rows” button to define the planter rows that will actively be planting. The system defaults to all rows active. Preset row options for Odd, Even, Left, or Right rows can be selected. To define specific rows, select “List”. When listing out the active rows, rows marked by a green box are active rows.

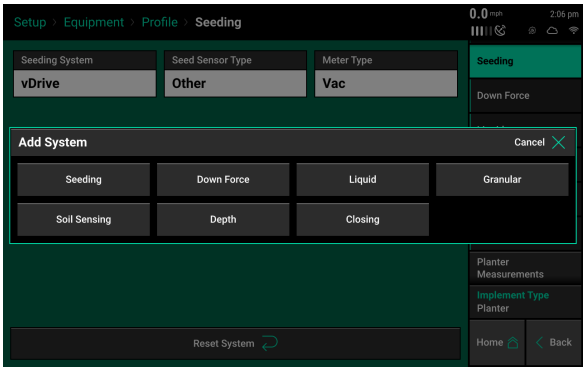
Note: If this is a split row planter, refer to the Crops menu on how to tie Active Rows to each crop type the system will plant.

The Effective Row Spacing value is used for population calculations and is automatically calculated based on row width and active rows. Additionally, the Effective Planter Width is used

for acre calculations and is automatically calculated based on row width, number of rows, and active rows. If either of these values is incorrect, select the button showing these values to manually enter a new value.

Add System

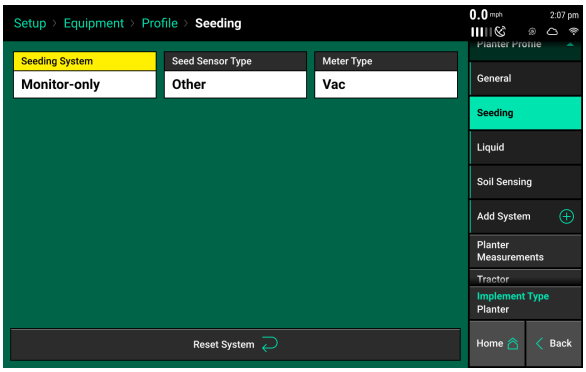
Each System the 20|20 is connected to will need to be configured in the planter profile by pressing ‘Add System’ on the right side of the screen. Select from the available systems to configure each individual system on the planter.



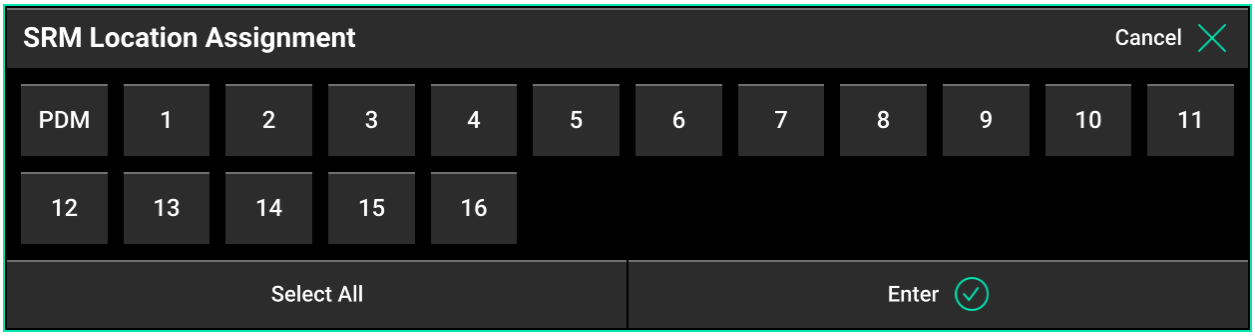
Seeding

Press the “Drive Type” button to select the system driving the seeding. Select the correct Drive type from the list. If vSet Select is selected as the Drive Type, then a feed system must also be selected.

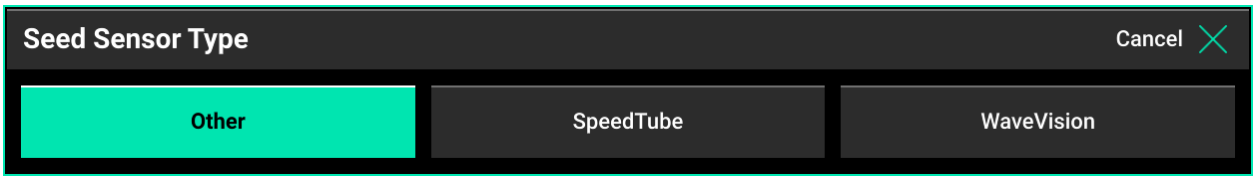
Note: Selecting the Drive Type will enable control products to be setup in the Systems menu.



If Monitor-only is selected for the Drive type, and DeltaForce was not selected as the Down Force system, SRM Row Mapping must be selected. Select what rows have SRMs installed, including if there is a PDM installed.



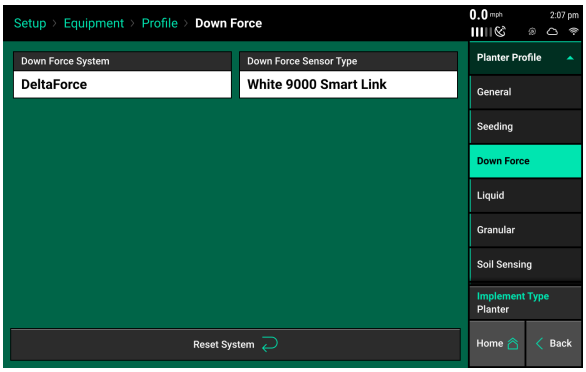
Press the “Seed Sensor Type” to configure what seed tube sensor type will be installed on this system.

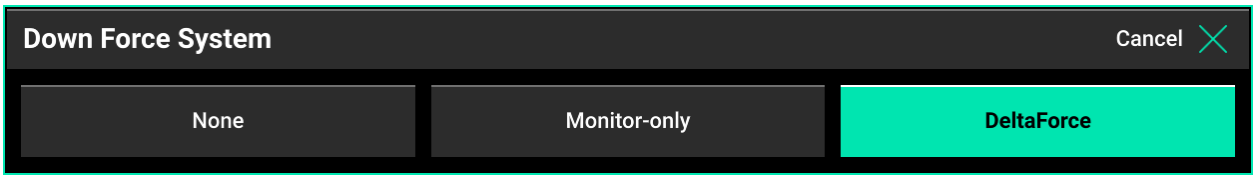


Down Force

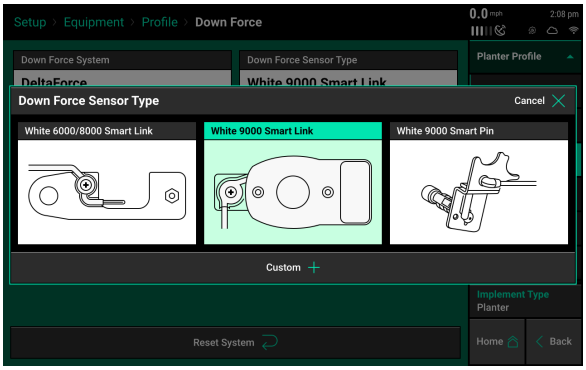
Press the “Down Force System” button to select the down force system installed on the planter.

Note: Selecting the Down Force system will enable control products to be setup in the Systems menu.





After Selecting the down force system, the down force sensor type also needs to be selected.

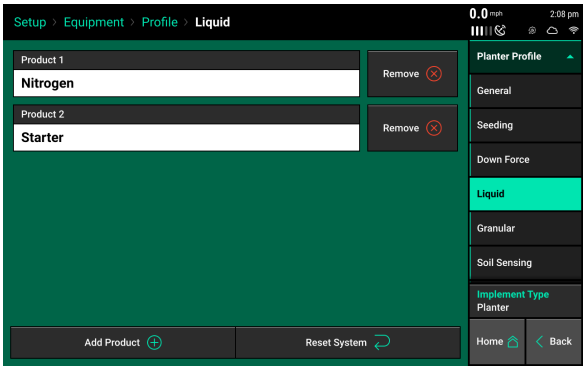


Liquid

Press the ‘Add System’ to add a Liquid product to this system.

Note: Adding a liquid product will require additional setup in the Systems menu.

Note: Press the Reset Systems button to delete all liquid products and the product setup under the Systems tab. Remove can be used to remove the individual products.

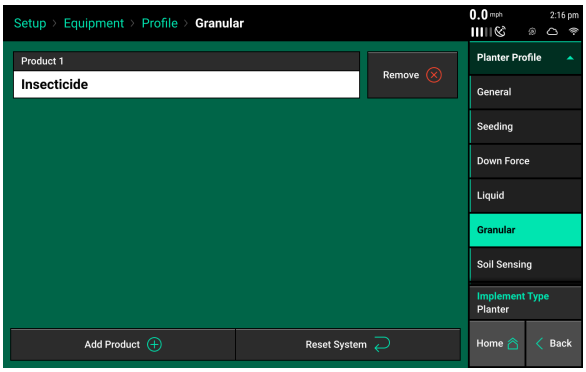


Granular

Press the ‘Add System’ to add a Granular product to this system.

Note: Adding a Granular product will require additional setup in the Systems menu.

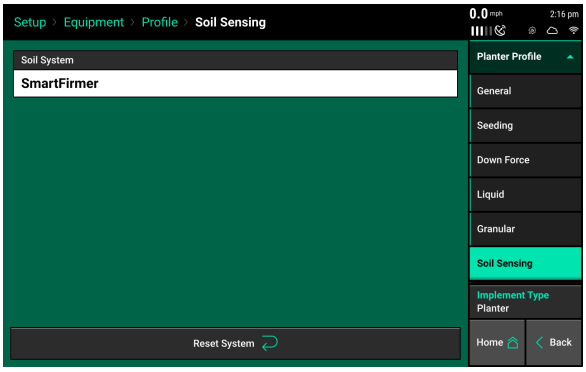
Note: Press the Reset Systems button to delete all granular products and the product setup under the Systems tab. Remove can be used to remove the individual products.



Soil Sensing

If SmartFirmer is installed on this system, select a Soil System.

Note: Adding SmartFirmer will require additional setup in the Systems menu.

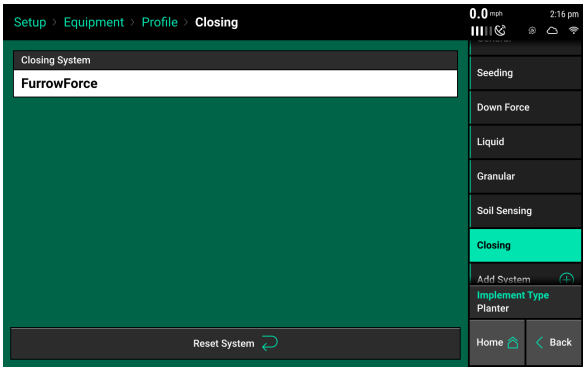


Closing

If FurrowForce is installed on this system, select a closing system.

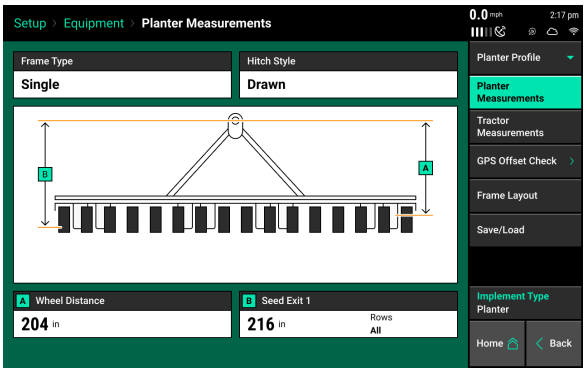
Note: Adding FurrowForce will require additional setup in the Systems menu.

Note: Press the Reset Systems button to delete the closing system setup and the product setup under the Systems tab.



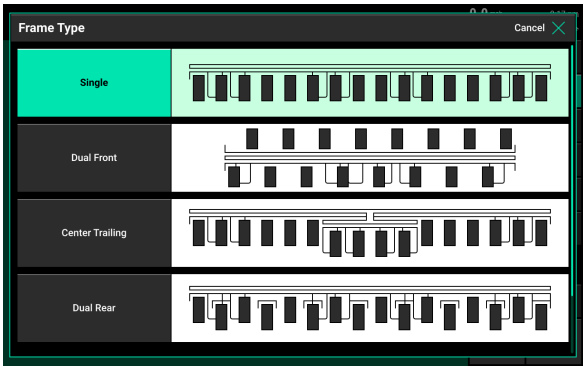
Equipment — Planter Measurements

GPS offset measurements must be setup prior to planting in order for the monitor to correctly control and model the planter. From the home screen select Setup – Equipment – Planter Measurements.



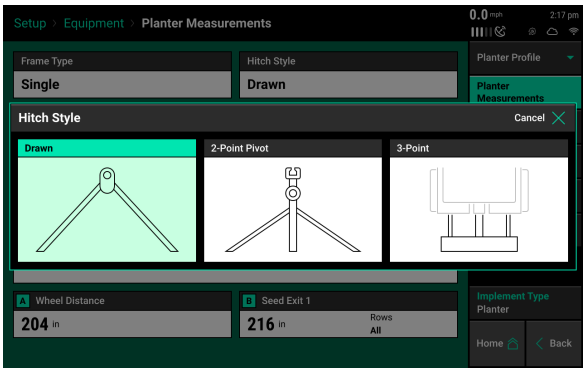
Note: A custom table setup is available in the Crops menu to enter in the exact location of each row.

A “Frame Type” must be selected for modeling purposes. Select the Frame Type that best fits the planter. Single should be selected when all seed exits are the same distance from the planter bar. If the planter is a split row planter use “Dual Front”, if the bar has pusher units then use “Dual Rear” when all rows are behind the planter bar. Center Trailing is used when the seed exits of the center rows are further back than the seed exits on the planter wings.

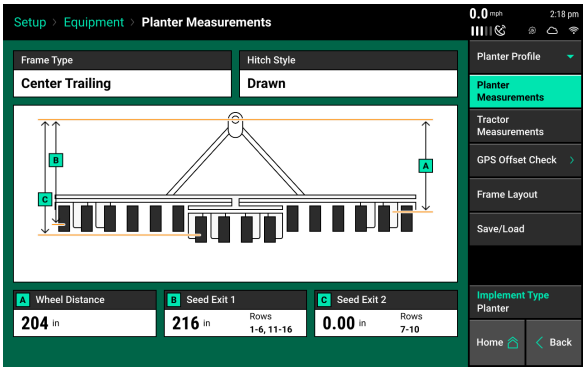


Note: Do not select “Center Trailing” if there are rows set back other than just the center rows. In a scenario where the center rows and some rows on the wings are set back select Dual Rear as the frame type and define the rows that are set back further using Seed Exit 2.

A “Hitch Style” must also be defined. Select the hitch style that best fits the planter.



Depending on the Frame Type and Hitch Style selected, two to seven different measurements will need to be entered into the system.

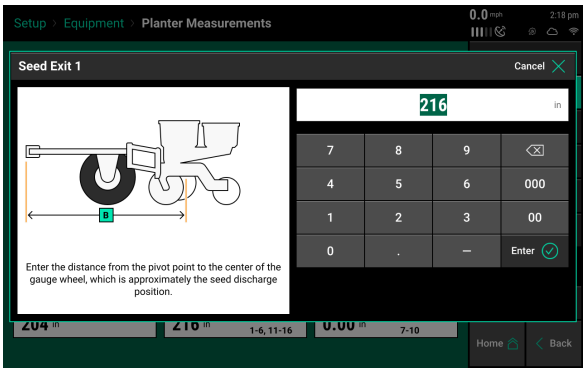


A - ***Wheel Distance*** (All Frame Types)

With the planter lowered measure the distance from the center of the drive wheels to the Pivot point. Enter this measurement in box A. Press the check mark button after entering the measurement.

Note: For a 3-Point hitch style, measure to the center of the tractor's rear axle.

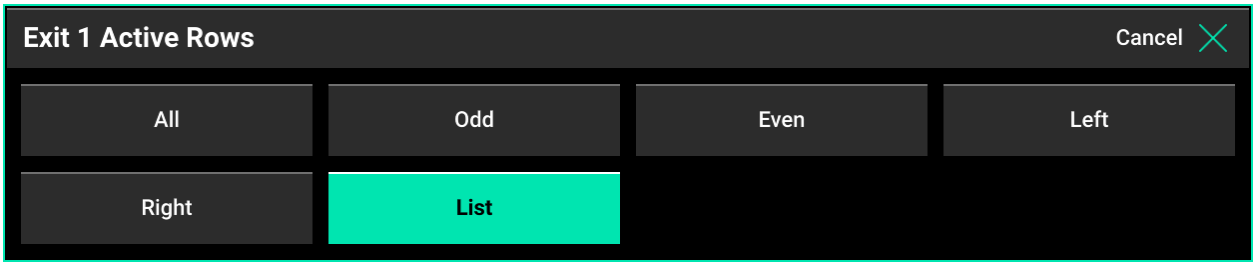
B - ***Seed Exit 1*** (All Frame Types)



Measure the distance from the pivot point to the seed tube exit for all rows (if frame type is Single), or measure to the forward most rows (for all other frame types). Enter this measurement in Box B.

Note: For a 3-Point hitch style, measure to the center of the tractor's rear axle.

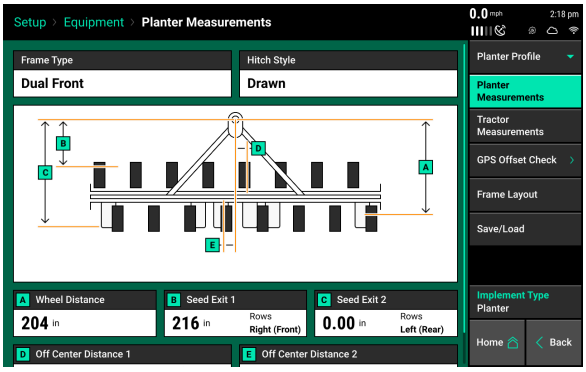
For frame types other than single, after entering Seed Exit 1 and 2 distances, define which rows' numbers on the planter correspond to each distance. Odd, Even, Left, and Right are preset options that can be selected. Use List to manually select rows.



C - ***Seed Exit 2*** (Center Trailing, Dual Front, & Dual Rear Frame Types)

Measure the distance from the pivot point to the seed tube exit on the rear most set of rows. Enter this measurement in Box C.

D - ***Off Center Distance 1*** (Dual Front & Dual Rear Frame Types)



The left/right offset of the forward most rows must be entered. This is the distance from the centerline of the tractor to the center of the forward most rows. Enter this distance into Box D. Select "Measure from Left" if the rows are offset to the left side of the centerline of the tractor and "Measure from Right" if the rows are offset to the right side of the centerline of the tractor.

E - ***Off Center Distance 2*** (Dual Front & Dual Rear Frame Types)

The left/right offset of the rear most rows must be entered. This is the distance from the centerline of the tractor to the center of the rear most rows. Enter this distance into Box E. Select “Measure from Left” if the rows are offset to the left side of the centerline of the tractor and “Measure from Right” if the rows are offset to the right side of the centerline of the tractor.

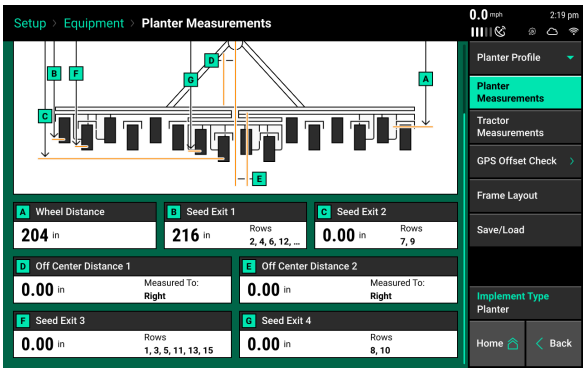
Note: When measuring Off Center Distances, it is possible that either distance 1, 2 or both will be zero. In this case it does not matter if “Measure from Left” or “Measure from Right” is selected.

F- ***Seed Exit 3*** (Dual Rear, Center Trailing)

Measure the distance from the pivot point to the seed tube exit on the rear most set of rows. Enter this measurement in Box F.

G- ***Seed Exit 4*** (Dual Rear, Center Trailing)

Measure the distance from the pivot point to the seed tube exit on the rear most set of rows. Enter this measurement in Box G.



Equipment — Tractor Measurements

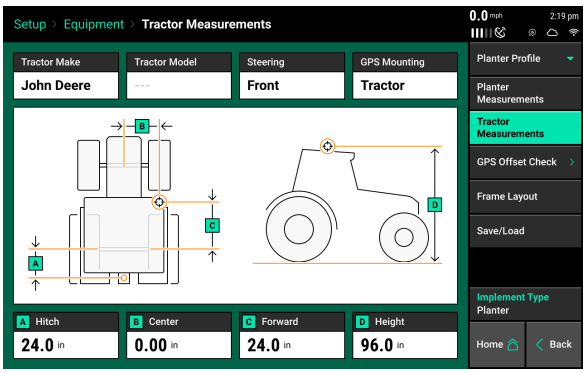
Tractor GPS measurements must also be setup prior to planting in order for accurate modeling and control of the planter. From the home screen select Systems – Equipment – Tractor Measurements to enter measurements for the tractor.

Note: Some GPS systems do not output the location of the actual GPS globe. Verify the GPS output location with the GPS manufacturer.

The options for Tractor Make and Tractor Model provide useful troubleshooting information, but are not necessary information to enter.

A "Steering" type must be selected. There are three steering options: Front, Track, and Articulated. Each steering has different GPS measurements that must be entered.

Steering Type: Front



A - ***Hitch:*** Measure the distance from the center of the rear axle the hitch (or pivot point on a two point pivot planter hitch).

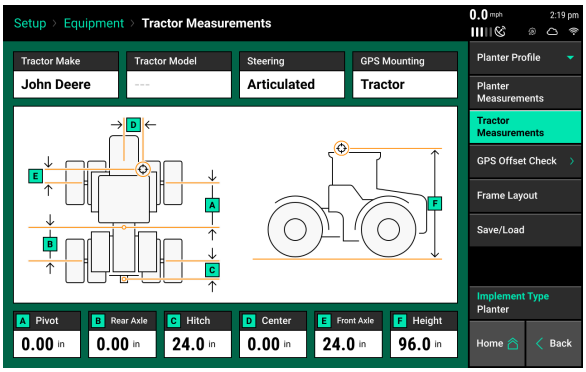
Note: If a 3 pt planter hitch is connected, enter 0.

B - ***Center:*** Measure the distance from the center line of the tractor to the GPS output location. Then select if the GPS output location is to the left or right side of the tractor's center line.

C - ***Forward:*** Measure the distance from the center of the rear axle to the center of the GPS antenna.

D - ***Height:*** Measure the distance from the ground to the base of the GPS output location.

Steering Type: Articulated



A - ***Pivot:*** Measure the distance from the center of the front fixed axle to the articulation point.

B - ***Rear Axle:*** Measure from the articulation point to the center of the rear fixed axle.

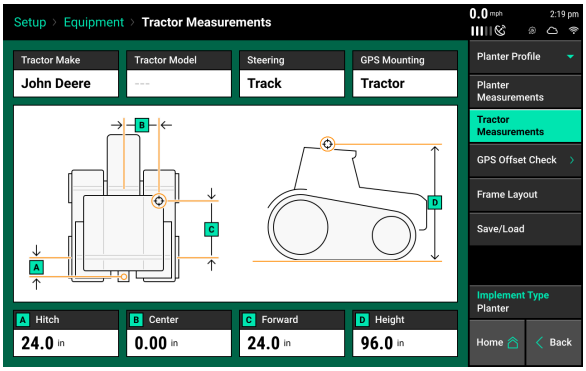
C - ***Hitch:*** Measure the distance from the pivot location at the hitch to the center of the rear fixed axle.

D - ***Center:*** Measure the distance from the center line of the tractor to the center of the GPS antenna. Then select if the GPS receiver is to the left or right side of the tractor's center line.

E - ***Front Axle:*** Measure the distance from the center of the front fixed axle to the GPS output location. Indicated if the GPS output location is in Front or Back of the front axle.

F - ***Height:*** Measure the distance from the ground to the GPS output location.

Steering Type: Tracked



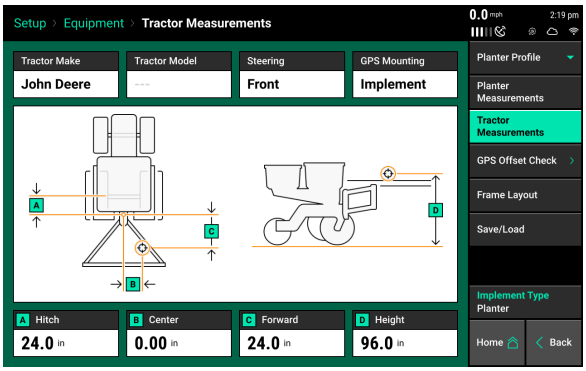
A - ***Hitch:*** Measure the distance from the pivot location to the hitch (or pivot point on a two point pivot planter hitch).

B - ***Center:*** Measure the distance from the center line of the tractor to the GPS output location. Then select if the GPS output location is to the left or right side of the tractor's center line.

C - ***Forward:*** Measure from the track pivot to the GPS output location. Indicate if the GPS output location is in Front or Back of the pivot location.

D - ***Height:*** Measure the distance from the ground to the base of the GPS output location.

Planter Mounted GPS



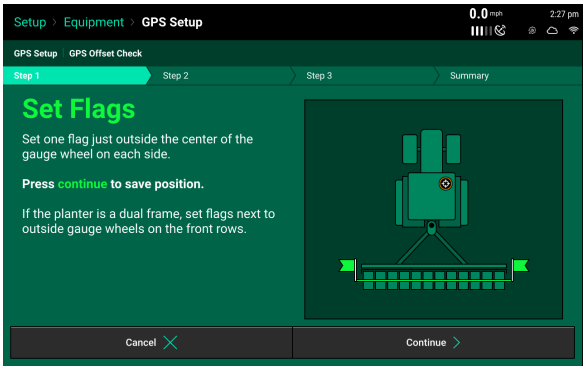
The “GPS Mounting” location can be changed from the “Tractor” to the “Planter Bar”. Select the “GPS Mounting” button to change the GPS measurements to allow for a planter mounted receiver.

Note: Verify GPS output location from GPS manufacturer. The output location is not always the actual GPS receiver mounted on the planter. Always take measurements from the GPS output location.

Measurements for planter mounted GPS systems are very similar to tractor mount GPS systems, except that measurements will be taken from the GPS output location on the planter instead of an output location on the tractor.

Equipment — GPS Offset Check

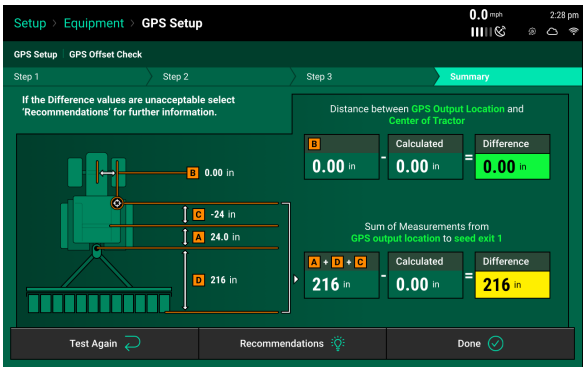
Once the GPS measurements for both the planter and tractor are entered, a GPS Offset Check is required to verify measurements. Select “GPS Offset Check” from the navigation pane when in the equipment menu.



Note: The GPS Offset Check will require good GPS signal and driving on flat ground.

Note: The GPS offset check only works with front and track steering types.

Follow the on screen instructions for completing the check. The check will require setting flags next to the outside two gauge wheels and then driving, turning around, and stopping with the gauge wheels in the same position (with the tractor and planter facing the opposite direction). Once the GPS Offset Check is complete, a summary page will appear. The summary is divided into a left/right offset (top summary box) and a forward/back offset (lower summary box).

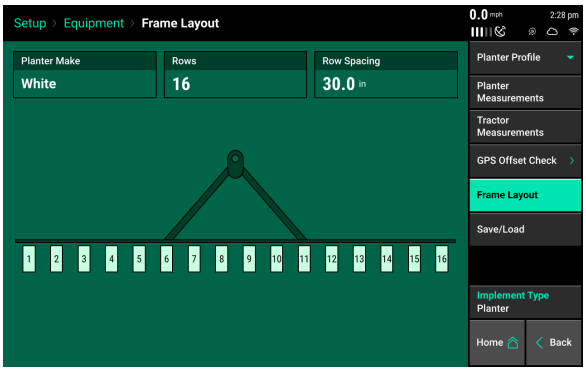


The box labeled “Difference” shows how far apart the distances that were entered in the planter and tractor measurements are from the calculated distances that were done during the GPS Offset check. The goal is to have the “Difference” as close to zero as possible. Use the “Recommendations” button at the bottom of the summary screen to help determine if and what adjustments should be made.

Note: Accuracy will also be determined by the level of correction the GPS receiver has.

Frame Layout

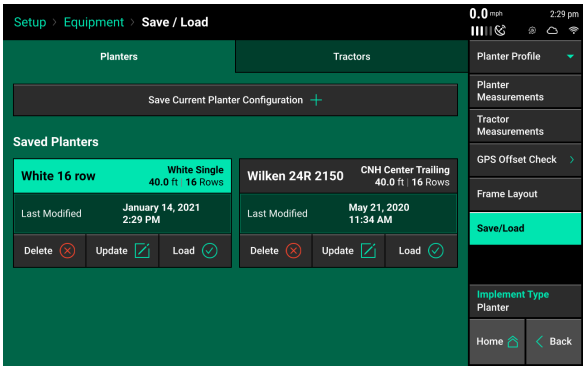
View the frame layout to ensure the planter is setup correctly. The image on the Frame Layout should match the physical layout of the planter. This image reflects how the 20|20 will place each row when controlling, monitoring, and mapping. If this image is not correct, adjust the Planter Measurements and/or Custom Table Setup accordingly



Save/Load

Both Tractor and Planter configurations can be saved in the 20|20. Once a tractor and or planter has been configured (GPS measurements only) press the Save/Load button to save these setup configurations. Select “Vehicles” at the top to save tractor configurations and “Implements” save planter configurations. Press the “Save Current Vehicle (or Implement) Configuration” button to create a name for the current configuration on the 20|20. It will be saved under the entered name.

Planters that are saved under the Implements heading saves both the planters setup/GPS measurements and all the configurations for all products setup on the planter (i.e. vDrive, DeltaForce,….). Vehicle configurations saves tractor and combine setup and GPS measurements.

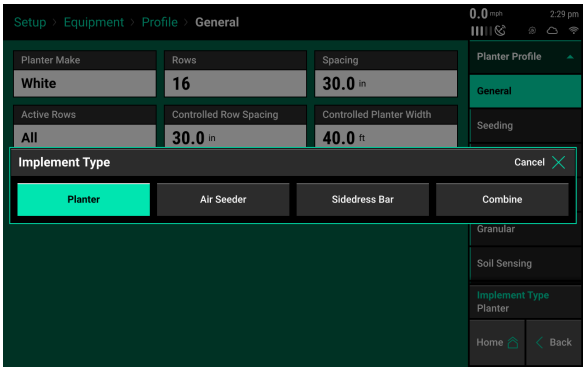


Configurations can then be reloaded later by pressing the Save/Load button and then selecting the “Load” Button. This will reload a saved configuration. Saved configurations that no longer apply can be deleted by pressed the “Delete” button.

It is important to note that when changing the Implement Type, all configurations will be reset back to factory defaults. Using the Save/Load feature will allow the operator to quickly load a previously saved configuration after changing the implement type.

Implement Type

The Gen3 20|20 has different implement modes that can be enabled. These modes include Planters, Combines, Air Seeders, and Sidedress Bars. To switch modes, select Setup – Equipment – Implement Type.



Note: Use the Save/Load option in the equipment menu to save the Tractor, Implement, Combine and Head configurations. Any configurations have been set up in each implement mode **MUST** be saved before changing to a different implement type, or the active implement settings will **be lost**.

Systems Menu

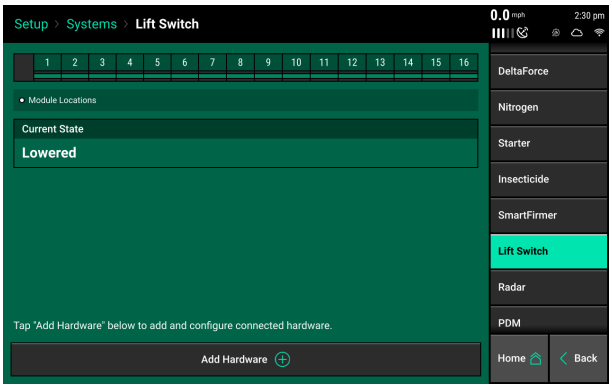
The Systems menu contains setup for all the control products that are installed: Lift Switch, Radar, PDM, and the Display. The available options in the System menu will change depending on what control products (e.g. vDrive, DeltaForce, vApplyHD etc…) are configured in the equipment menu. Each control products' operation guide contains the setup and configuration information that needs to be done in the systems menu. Refer to these guides for more detailed instructions on control products, as this operators guide only focuses on the Lift Switch, Radar, PDM, and Display.

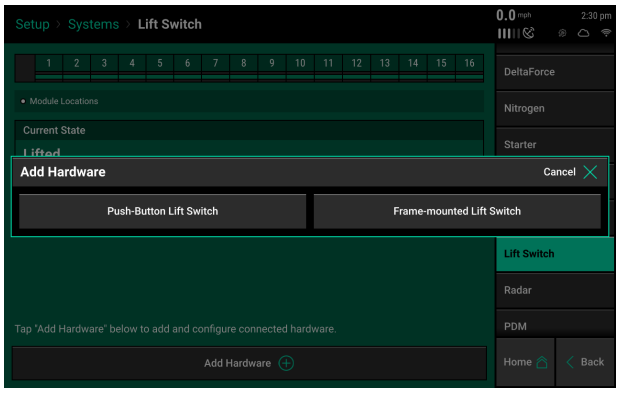
Lift Switch

One of the requirements for all control products to function is for a lift switch to be installed, and reading lowered.

Configure the connected lift switches by selecting 'Add Hardware'. Select the type of lift switch (es) plugged in. A summary of lift switch locations will be displayed at the top of the screen.

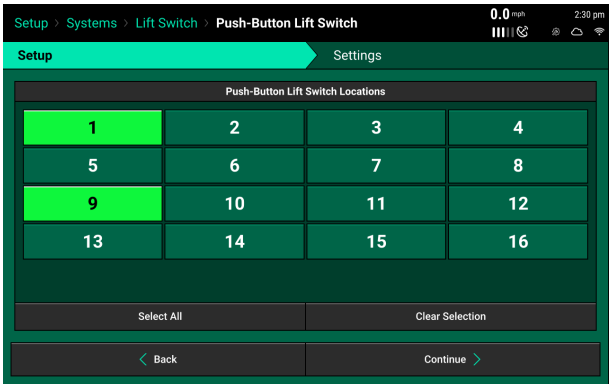
Note: Configuration of lift switch row locations is only required on 2020.1.x and newer software.

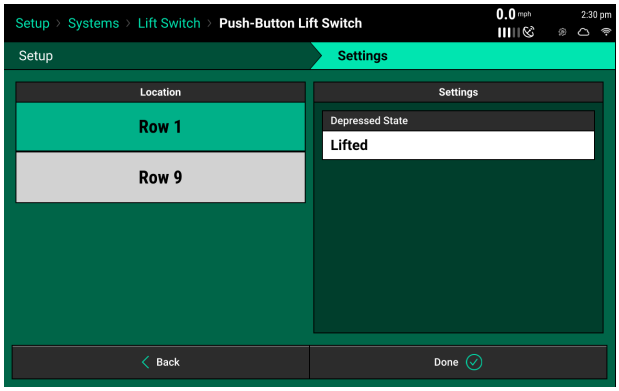




Push Button Lift Switches

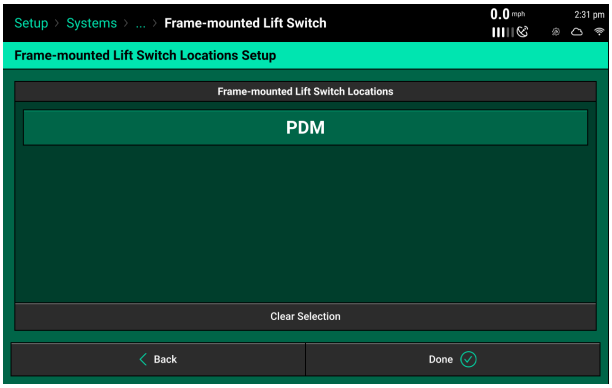
Select what rows have push button lift switches installed, then press 'Continue'. In the settings page, select if the push button is depressed (pushed in) when lifted or lowered. A calibration will not need to be performed for push button lift switches.

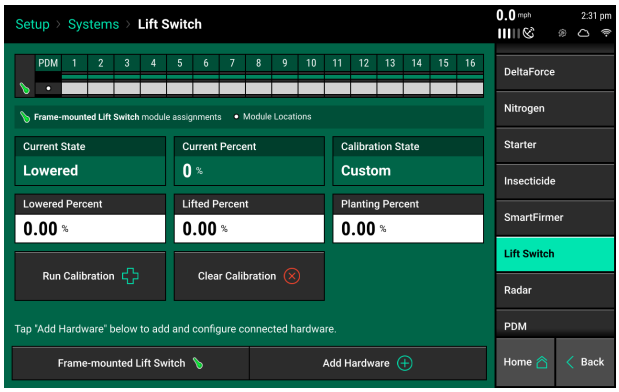




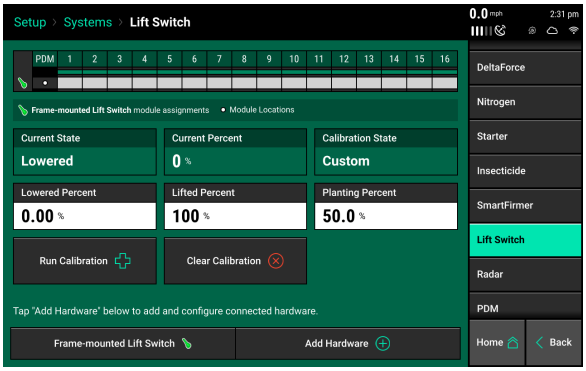
Frame Mounted Lift Switches

For a frame mounted switch, configure the plug in location as the PDM. Once the PDM is selected as the location, the system will then need to be calibrated for lifted and lowered position.





Calibrate Lift Switch



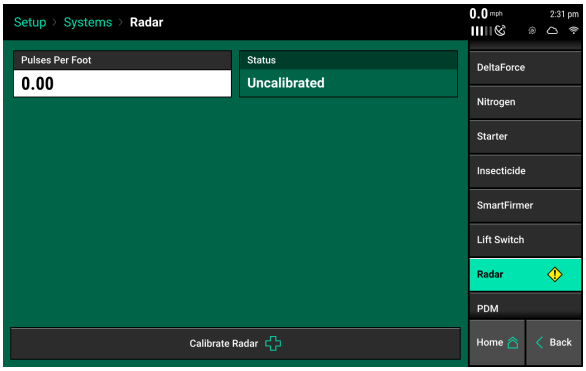
To complete the Lift Switch calibration, press the "Run Calibration" button at the bottom of the screen. Follow the on-screen instructions for the different positions the planter must be in. The results will then be displayed on the main Lift Switch Page. For issues with the lift switch not calibrating or functioning correctly, see the Troubleshooting Guides for Lift Switches in the Dealer Service Manual. After a calibration has been completed, verify the system is reading the lift switch correctly by watching the "Current State" information on the Lift Switch page. Ensure the "Current State" is correct when lowering and lifting the planter.

Manual entry of values can be done by selecting the "Lowered Percent", "Lifted Percent", or "Planting Percent" buttons and entering a value.

To clear out the current calibration press the "Clear Calibration" button located at the bottom of the screen.

Radar

Receiving a speed reading from a tractor mounted radar is recommended when running a control product. The Radar Status page allows the operator to calibrate the radar.



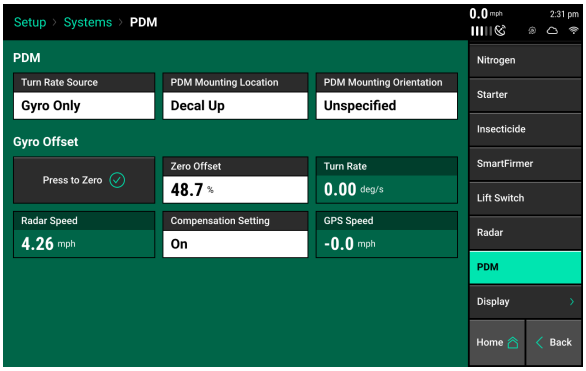
Select the “Calibrate Radar” button at the bottom of the screen and then follow the onscreen instructions.

The calibration process will require a good GPS signal as well as having the operator drive straight for at least 300 feet at a constant speed of 4 mph or greater.

If the Pulses Per Foot is already known, enter this value manually be selecting the “Pulses Per Foot” box.

PDM

The Power Distribution Module [PDM] must be configured in order for control products that connect through the SRM infrastructure to operator properly.



Turn Rate Source - Select the input source for calculating turn compensation when planting through curves. Select between “Gyro then GPS”, “Gyro Only”, and “GPS Only”. “Gyro Only” is the recommended setup.

Note: For the system to be able to recognize forward acceleration quickly and start seeding correctly, the position of the Gyro inside of the PDM must be known. Ensure that the PDM Mounting Location and PDM Mounting Orientation are set correctly. Otherwise performance will be degraded.

PDM Mounting Location - Determine if the PDM is mounted with the decal on the PDM facing up or if the decal on the PDM is facing down.

PDM Mounting Orientation - Determine the orientation of the fuses. The orientation is based on the operator sitting in the cab. Fuses can be orientated either: Forward, Right, Backwards, or Left.

"Press to Zero" - use this button to zero the gyro. The gyro should always be zeroed when setting up a new system. There will be a Zero Offset percentage recorded after the gyro has been zeroed. Make sure the planter is straight behind the tractor when zeroing the gyro. If the turn compensation seems to be off or if getting warnings about the gyro, re-zero the gyro.

Zero Offset - Displays the zero offset set when the Gyro was zeroed.

Turn Rate - Displays the radius of a turn in degrees per second, of the turn that is being read from the gyro while turning. This is the degree that will be used for turn compensation.

Compensation Setting - Press on this button to adjust the turn compensation.

On - This is the RECOMMENDED and default setting for all SRM systems. In this setting, both control and monitoring will be based on the speed of each individual row. For example; all rows will keep a consistent seed spacing around curves.

Control Only - Each row will control to its own calculated speed and will keep consistent seed spacing. However, the reporting will only show a population based on the center of the planter. There will be a higher population on the outside rows and lower population on the inside rows of the curve.

Monitor Only - Control for all rows will be based on the center of the planter. However, reporting will show a population based on the distance each individual row traveled. Resulting in a higher population for the inside rows and lower populations for the outside rows.

Off - both control and monitoring will be based on the speed of the tractor. Seed Spacing will be closer on the inside of the curve and further apart on the outside of the curve.

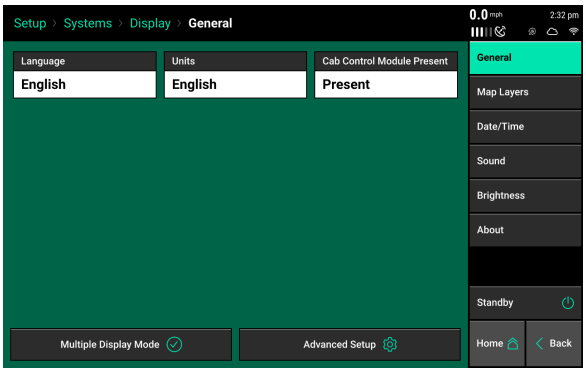
Radar Speed - displays the speed being read from the Radar. Press on this button to be directed to the Radar Status page.

GPS Speed - displays the speed being read from GPS. Press on this button to be directed to the GPS Communication page.

Display General

Select the "Display" option in the Systems menu to configure the Display Settings.

If two displays are being used, each display has its own display settings that can be adjusted.



Language - Change the language of the display.

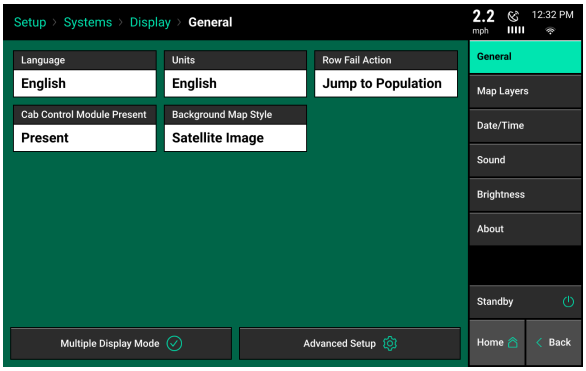
Units - Select this option to change between English and Metric units.

Cab Control Module Present - If a Cab Control Module is **NOT** connected to the display, change this to “Not Present”. If using two displays, the display that does not have a CCM must also change this to “Not Present”.

Multiple Display Mode - Select this option to disable certain notifications on the active monitor. Options include: “Alerts and Alarms”, “Screen Jump”, and “Event Popups”.

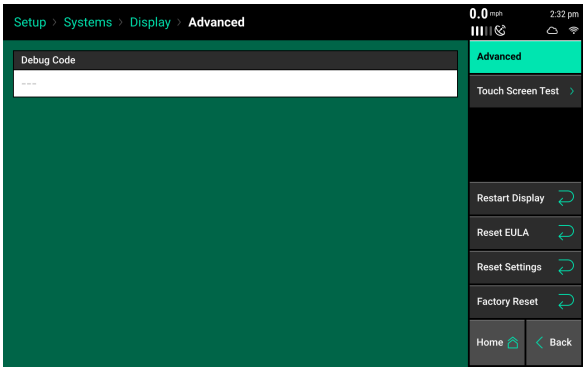
2020.0.X and Earlier Systems

Background Map Style - Once the system has been connected to WiFi, use this option to change the Home Screen map background between the standard grid to a background map.



Display — Advanced Setup

Debug Code - if a code has been provided from a Precision Planting representative for a specific support issue, it must be entered in this location.



Touch Screen Test - Tests to see if all areas of the touch screen work correctly. When in the test, touch to the screen to paint the screen a different color of where it was touched to see if that area of the screen is responding to touch correctly. Hold a finger in a stationary spot for five seconds to exit the test.

Reset EULA - Resets the User License Agreement. This will reset the EULA so that it will need to be agreed to when the display boots up next.

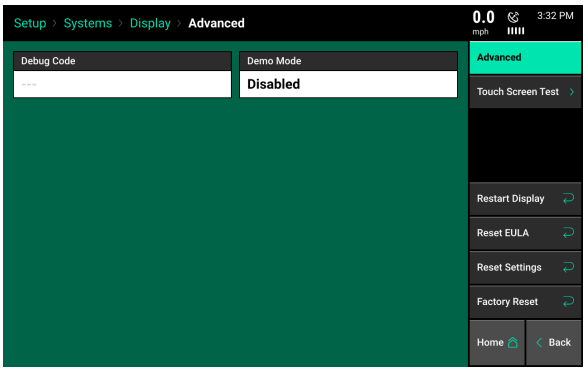
Restart Display - Restarts the display screen only. The connected modules will not restart.

Reset Settings - Resets ALL display settings and ALL configurations for tractor, planter, and control products back to the default.

Factory Reset - Wipes all data from the Display Base Module and resets all settings back to default.

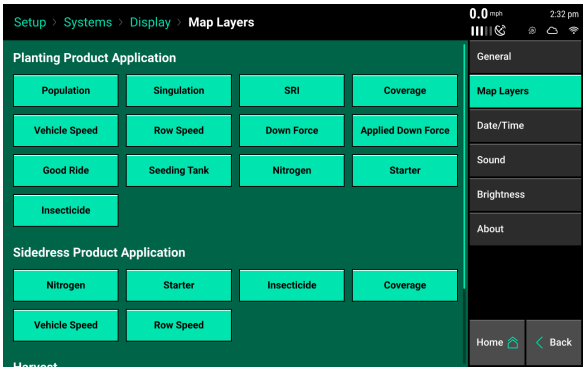
2020.0.X and Earlier Systems

Demo Mode - Enables the demo mode which will display planting or harvest data on the display. A demo file is required for this to mode to function. Press on this button to Enable demo mode.



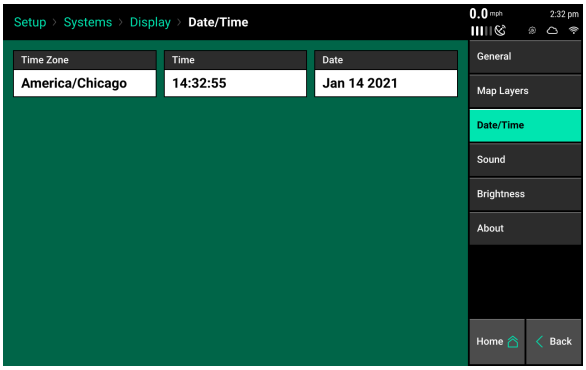
Display — Map Layers

Use the Map Layer option to enable or disable map layer availability on the Home screen. Select a map layer to disable it. Active map layers will be highlighted in Green, inactive map layers will turn grey.



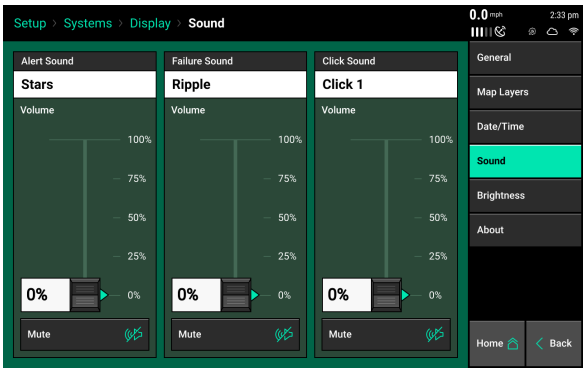
Display — Date/Time

The date and time for the 20|20 are set by the GPS system that is connected. If an adjustment is needed, the Time Zone, Time, and Date can be adjusted on this settings page.
Select each box to adjust the settings. For the Time, enter the time in the standard 0-23 hour clock.



Display — Sound

Select the Sound option in the navigation pane when in the Display menu to configure the sound settings. The volume can be controlled using the volume sliders below each sound type. Selecting each sound type allows the selection of different sound options. If a sound option is selected, a demo will play. If no sound is desired for a certain sound type, select the “Mute” button under the slider bar.



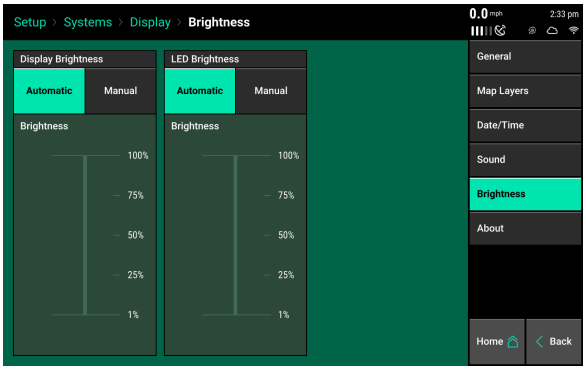
Alert - This sound will play when an item is yellow on the home screen.

Alarm - This sound will play when an item is red on the home screen.

Key Press - This sound will play when the touch screen is pressed.

Display — Brightness

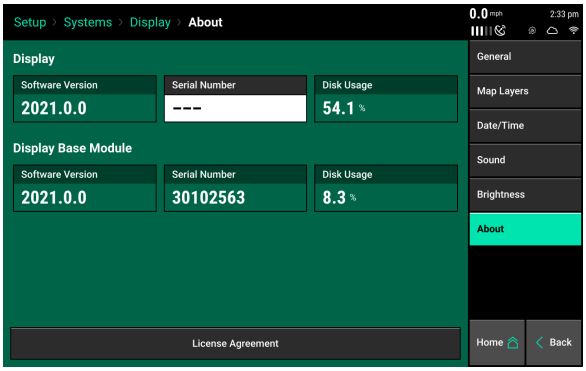
Select the Brightness option in the navigation pane when in the Display menu to configure the brightness of the display and the LED lights on the Cab Control Module (switch box connected to the display).



The default setting is “Automatic” for both the Display Brightness and LED Brightness. Automatic mode uses an ambient light sensor to change the brightness for day/night. Select “Manual” to display a slider bar to manually adjust the brightness.

Display — About

View software versions and serial numbers for both the Display and the Display Base Module. Press on the software versions to be directed to the Software Update Screen. Serial Numbers cannot be manually entered, but will automatically update when plugged into a Display and Display Base Module.



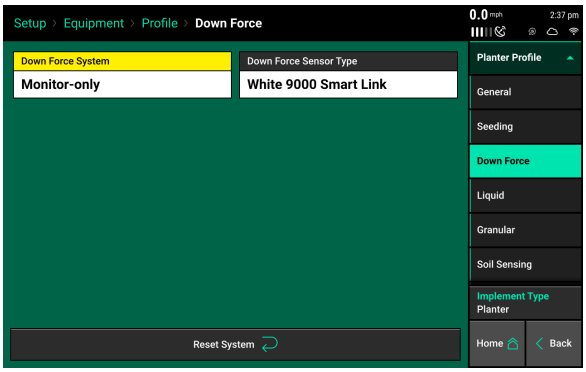
The Disk Usage shows the percent of the total memory that is being used.

The License Agreement can also be viewed by pressing the License Agreement button at the bottom of the screen.

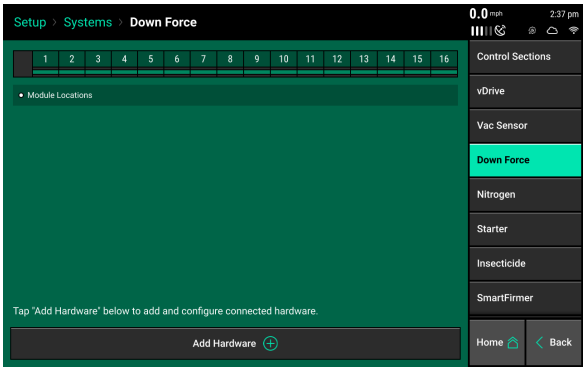
Monitor Only Load Cell Setup

When the down force system is set up as a Monitor-only system under the equipment profile, the down force sensors must be assigned in the Systems tab under Down Force.

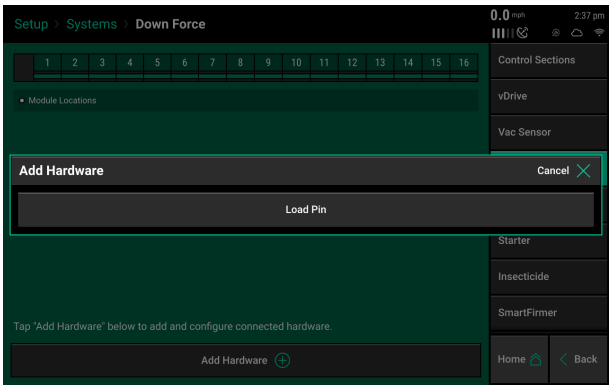
Note: This configuration is only required in 2020.1.x and newer software.

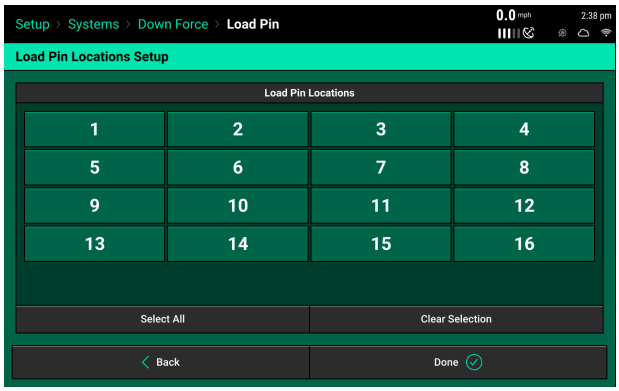


Navigate to Setup — Systems — Down Force to configure the down force sensors.

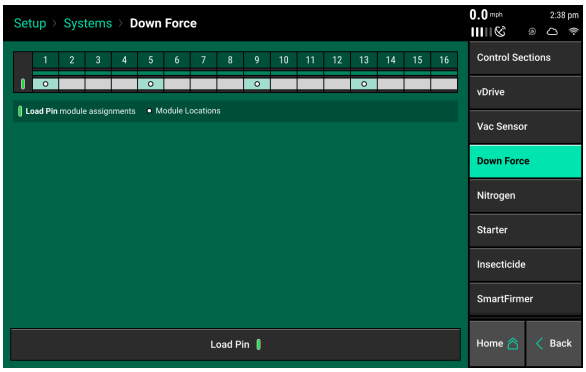


Press ‘Add Hardware’ at the bottom of the screen to begin the setup process. Assign what rows have a down force sensor installed, and press ‘Done’.





When finished, the screen will display a summary at the top of the screen showing what rows have assigned down force sensors.

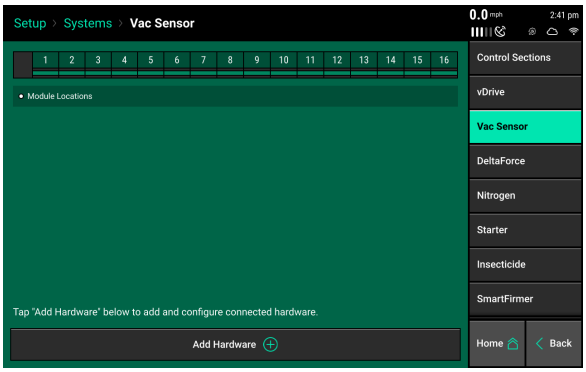


Vac Sensor Setup

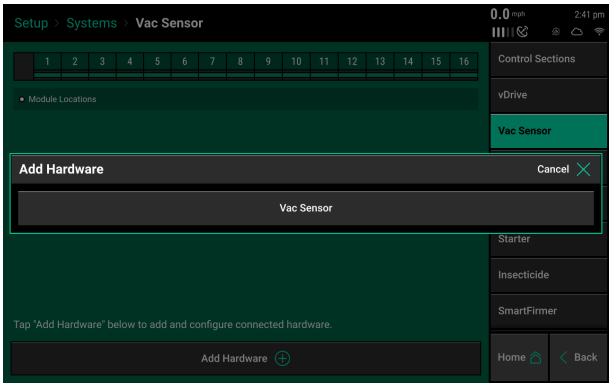
Once the drive system has been configured, vac sensors must be assigned in the Systems tab under the drive system.

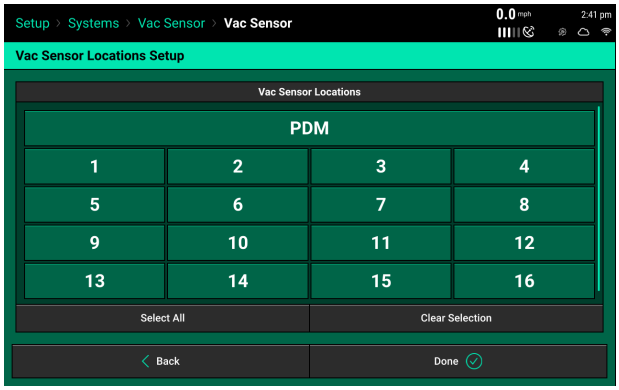
Note: This configuration is only required in 2020.1.x and newer software.

Navigate to Setup — Systems — Vac Sensor to configure the vac sensors.

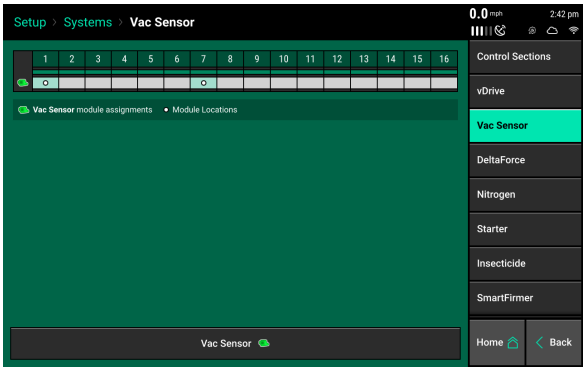


Press ‘Add Hardware’ at the bottom of the screen to begin the setup process. Assign what rows have a vac sensor installed, and press ‘Done’.



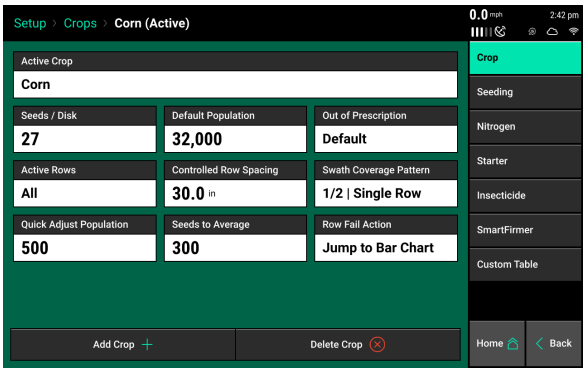


When finished, the screen will display a summary at the top of the screen showing what rows have assigned vac sensors.



Crops

To configure monitor settings for individual crop types, select the “Crops” menu button from the navigation pane. All settings within this menu are saved under the Active Crop type (displayed at the top of the page). As settings are changed, they will be saved under the respective crop that was active at the time and when the active crop type is changed, all settings for the new crop will be loaded. This includes all settings in the Adjustments, Alerts, and Custom Table Setup.



Note: The Liquid and SmartFirmer Alert settings on the navigation pane will only be available if these systems are configured on the 20|20.

To change the active crop type, select the “Active Crop” button at the top of the page. If the desired crop type is not available, select the “Add Crop” button at the bottom of the main Crops page to view a list of all crop types that can be added to the list.

Seeds/Disk - This is the numbers of Cells/Fingers in the seed meter. The available options are determined by what meter is selected in the Planter Setup. If necessary, a custom option is available so that a specific number of cells/fingers can be entered.

Default Population - The population that the motors will plant when operating in an area without a prescribed population. If using vSet Select or mSet systems, a default tank/meter must also be set. (Orange or Blue)

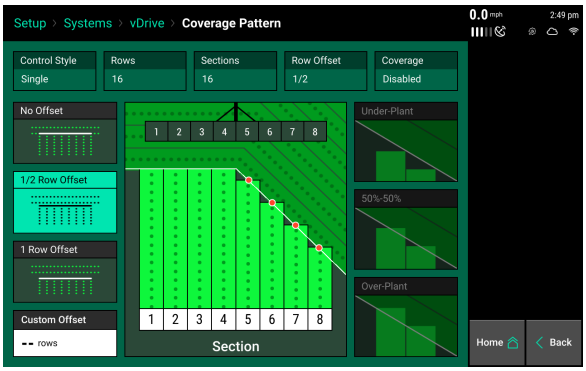
Out of Prescription - When planting with a prescription script and are outside of that prescription, this allows you to plant at the default population set point or continue with the current prescription rate.

Active Rows - The planter rows expected to plant in a selected crop. Common examples for split row planters are Odd/Even or Left/Right for corn and All for soybeans.

Controlled Row Spacing - the “spacing” between the rows of the planter.

Swath Coverage Pattern - Define how the motors operate when entering and leaving already planted areas. Select the “Swath Coverage Pattern” to configure the swath coverage.

On the left hand side of the screen select a Row Offset. This is the distance from the headlands that seeds start and stop. On the right hand side of screen a coverage pattern can be selected. This is used when rows are tied together in swath sections. Determine how these swath sections control when entering/leaving prior coverage.



Single row swath sections can adjust the offset, but not the coverage pattern (due to each row acting independently of each other for swath control).

If any swath section has more than one row, then both the offset and coverage pattern can be adjusted.

Select an Offset:

No Offset - The planter will place the last seed when stopping and the first seed when starting right at the beginning of the headland.

½ Row Offset - The planter will stop/start seeding half the distance of the planter's row spacing from the headland.

1 Row Offset - The planter will stop/start seeding 1 row from the headland.

Custom Offset - You manually set the distance away from the headlands the planter will start/stop seeding.

Select the Coverage

Underplant - The section will shut off when the first row in the section hits the offset point.

50%-50% - The section will shut off when the middle of the section hits the offset point.

Overplant - Will shut off the section when the last row in the section hits the offset point.

Note: "Section" refers to the swath sections that were setup for the Swath Control Style in the vDrive Setup. Each section will control independently of each other.

Quick Adjust Population - Defines the number of seeds that will be added or subtracted to the population when using the plus and minus buttons in the vDrive Control Page. See the vDrive Operations Guide for more information.

Seeds to Average - Defines the number of seeds used in the rolling average of seed data to calculate Population, Singulation, and SRI. This should be set to about 1% of expected population.

Row Fail Action - Select this option to change the display action when a row failure occurs.

Jump to Row - This option will redirect the screen to the Row Details page when a row failure occurs.

Jump to Dashboard - This option will redirect the screen to the Population Dashboard to display Row-by-Row population information.

None - This option will cause no redirection of the screen when there is a row failure.

Note: Row Fail Action is not available when in Harvest mode.

Add Crop – Add a crop type to the quick crop selection. The added crops will be available to be selected as the Active Crop. Added crop types will also be available in the Products menu when assigning hybrids.

Delete Crop - Delete crop types from the quick selection menu. Deleted crops will not be available when pressing the Active Crop button nor will they be available when assigning hybrids.

Crops — Seeding Limit Adjustments

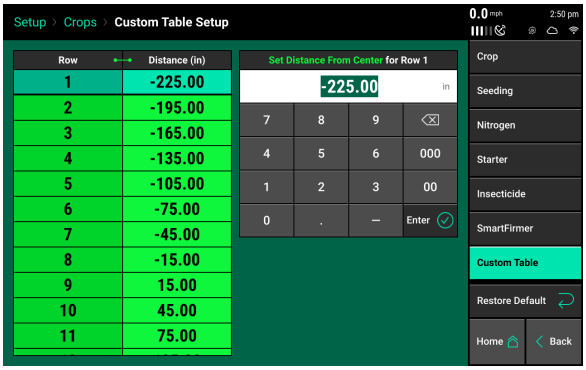
Population Alert Limit - Defines how far the population can stray from the population target before the Population metric on the home screen turns yellow.

Population Failure Limit - Defines when a row is considered to be in a Row Fail state and the alarm is sounded. The percentage indicates the percent of the population target that a row's population must drop too before a row fail is detected. 80% is the default setting.

Singulation Alert Limit, Good Ride Alert Limit, Ground Contact Alert Limit, & SRI Alert Limit - Defines when each of these metrics turn yellow on the home page. This will depend on accuracy of meters, tillage, and ground conditions.

Custom Table Setup

If a planter does not conform to any of the planter setups available in the Planter Measurement setup screen or if the planter row configuration changes when planting different crop types, the Custom Table Setup to enter the location of every row on the planter. This setup is saved by each crop type.



For each row number, set the “Distance from Center” number for each row and select enter after entering the distance before moving to the next row. Distance set in the Custom Table Setup will be reflected in the Frame Layout found in the Equipment menu.

Liquid Product Alerts

Liquid Product Alerts

Configure the Liquid Product Alerts in order to correctly give the operator, the warning and alarms when needed.

Navigate to “Setup” “Crops” and then select the correct liquid product to change the alerts for each product.

Flow Alert Limit: Select a flow percentage range. If flow is outside the selected range, the metric and control buttons on the home screen will turn yellow and the “alert” sound will be activated periodically.

Flow Failure Limit: If the flow drops below the selected threshold, the metric and control buttons will turn red on the home screen and the “alarm” sound will be activated. This feature can be disabled by toggling to “Disabled” and the button will highlight with yellow. Disabling will stop the alarm sound and the “Flow Failure Action” from occurring. If you want to enable the feature again, touch again on the “Enabled” button and it will highlight with a bright green color.

Tank Alert Limit: When the tank level is below the selected percentage, the Tank Volume metric on the home screen will turn yellow and the “alert” sound will activate periodically. This feature can be disabled by toggling to “Disabled” and the button will highlight with yellow. Disabling this feature will prevent the alert sound from occurring. If you want to enable the feature again, touch again on the “Enabled” button and it will highlight with a bright green color.

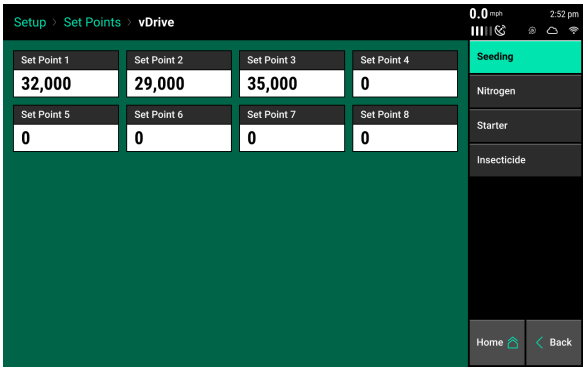
Tank Failure Limit: When the tank level is below the selected percentage, the Tank Volume metric on the home screen will turn red and the “alarm” sound will be activated. This feature can be disabled by toggling to “Disabled” and the button will highlight with yellow. Disabling this feature will prevent the alarm sound from occurring. If you want to enable the feature again, touch again on the “Enabled” button and it will highlight with a bright green color.

Flow Failure Action: Select the action the monitor should take if the Flow Failure Limit is triggered. Select between Jump to Bar Chart, Jump to Homepage, Jump to Row Details, or No Action.

Flow Alert/Failure Time: Enter the amount of time a failure event needs prior to triggering the alert/alarm.

Set Points

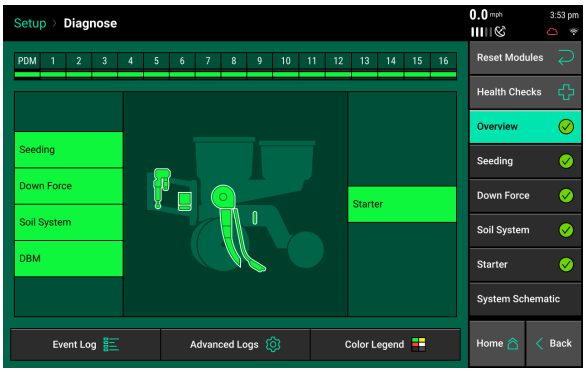
Use the Set Points menu to preset rates for both seeding, liquid, and granular (vDrive Insecticide). The preset rates will be available in the rate control screens to quickly assign a manual rate. Up to eight different rates can be entered for quick selection in the control screens.



The seeding Set Points are also used when the system is only monitoring population instead of controlling population. When only monitoring population, enter the population(s) being targeted in the field to allow the system to give proper alerts and alarms if needed.

Diagnose

The Diagnose Menu is the primary location for trouble shooting issues related to the operation of the 20|20 system itself and all products configured on the monitor. The schematic on this page shows each component including the Base Module that the display screen connects to. Each product that is configured is displayed along with a row unit showing a drawing of the product(s). Additionally, there is planter bar at the top of the screen displaying the health of each row.



Color Legend

Green - the system is working correctly and communications are good. Select “Color Legend” to view an explanation of what each color indicates.

Yellow - a Device or sub-component is not 100%.

Red - Device has failed, or is expected, but not detected.

White - Device is detected, but is not expected.

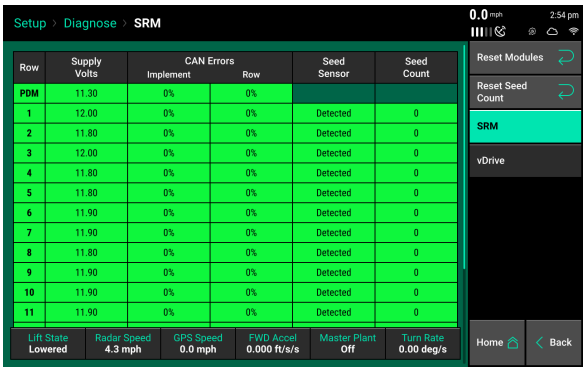
Black - Row has been disabled in the planter configuration.

Gray - Device is being detected, updating firmware, or unreachable.

All systems should be Green before using the system in the field. The color of each system on the top level diagnose page will be reflected by any issues within the system. For example if there is an issue on one row, that row number will be a color other than green at the top of the page and the system (e.g. vDrive, DeltaForce, etc….) will also be red. Touch on the system name to view the row by row level two details page. Anything on the level two detail pages that is working correctly (indicated by a green color) will be marked by a different color that fits the color legend. If a system is green on the top level page, then everything will also be green on the level two diagnose page for that system. For more information on product specific diagnose page information page, see the operation guide for that specific product.

Note: For assistance with diagnosing issues that are indicated on the diagnose page, see the troubleshooting guides in the Dealer Service Manual.

The Navigation Menu on the right hand side of the screen offers additional options within the Diagnose Menu.



Display Base Module (DBM) - Displays information about the DBM including the CAN bus usage, Temperatures, voltages, Ethernet ports, and software versions.

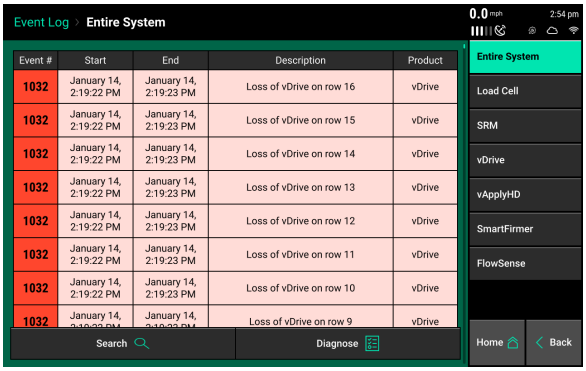
Reset Modules - Pressing this button breaks and reestablishes communication between the 20|20 components and is often used as a troubleshooting tool for communication issues.

Health Checks - Perform health checks on the different systems configured on the monitor. Health checks will give a report card for the system after completion. Follow the on screen instructions for each health check. For more information on specific health checks, see the operation guide for each specific product.

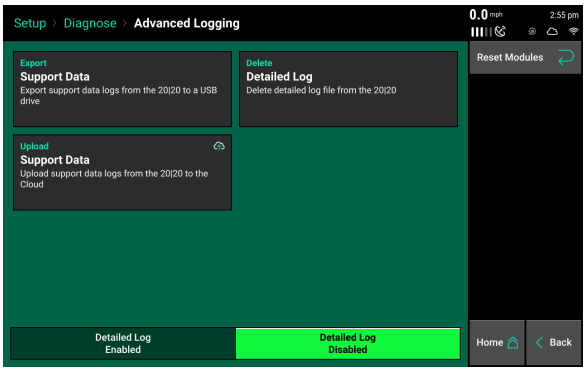
Event Log

Select the Event Log button to view a list of all event codes/error codes that have happened on the system. The Event Log is in order from the most recent event to the oldest event with the newest event codes at the top of the list. All events will have a number and a date/time when the event happened along with a description of the event. Select any event code to view additional details for that specific code

Additionally, event codes can be sorted by a system type. Select the system type on the right hand of the screen (e.g. SRM). System types will only be available for selection if there are event codes for specific systems. Otherwise, select “Entire System” to view all event logs.

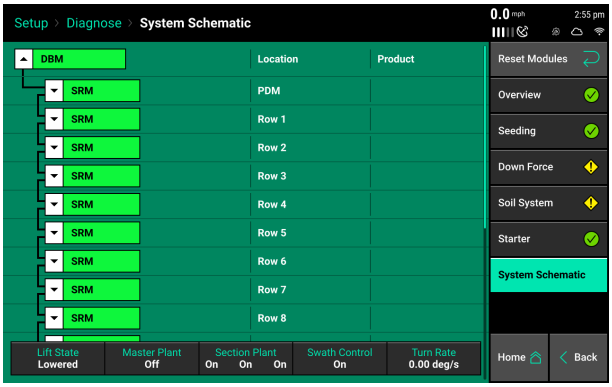


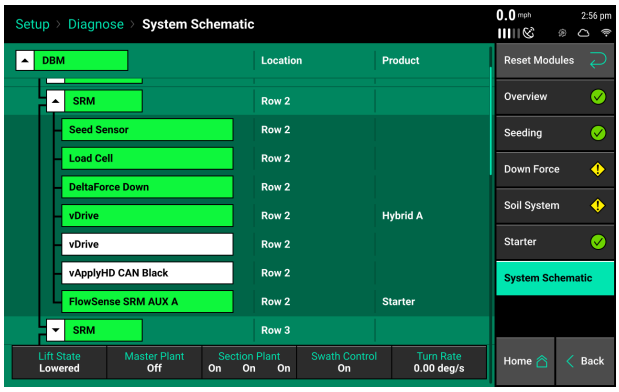
Advanced Logs - Allows for a detailed log to be Enabled, Exported, and Deleted. To begin a detailed log, press the “Enable Detailed Log” so that it turns Green. Detailed Logs are taken when requested by the Precision Planting Support Team. A detailed log will run for one minute and then automatically be disabled. Once a log is captured, select the “Export – System Data Log” button to export the log to a USB drive plugged into display. Once exported logs can be deleted by pressing the “Delete – Log File” button.



Systems Schematic - This schematic displays information for all products giving feedback. This page is a summary of all system modules configured in the display.

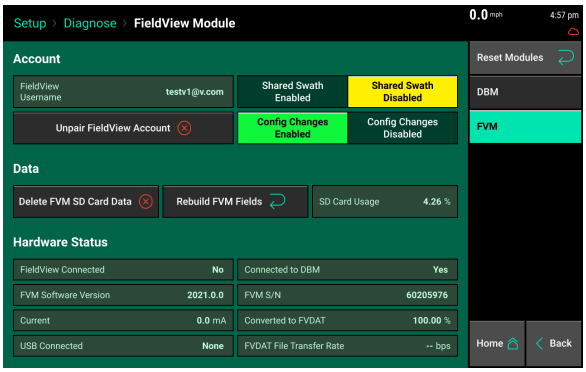
Press the drop down button on each module to view current readings from all systems connected to that module. This is a quick guide to view information on multiple systems at the same time.





FieldView Info

Select the FVM option on the diagnose page to view the FieldView Module settings.



Shared Swath— Sharing swath between equipment in a field can also be toggled between enabled or disabled. For this to work, shared swath must be enabled on all 20|20s in the field.

Config Changes— This setting changes the ability for configuration changes to be accepted from the FieldView platform can be enabled or disabled. (including all settings changes such as Client/Farm/Field, Prescriptions) This setting choice will be prompted the first time a FieldView Module is plugged into the 20|20 system.

Unpair FieldView Account— Displays the firmware version installed on the FVM.

Delete FVM SD Card Data— Deletes all field map data on the FVM.

REbuild FVM Fields — Allows the user to rebuild specific fields on the FVM. Any field rebuilt will automatically have the field map data deleted and rebuilt on the FVM.

Converted to FVDAT— Displays the percentage of fields that have been converted from .2020 files to .DAT files.

FieldView Connected — Indicates if the system is communicating with the FieldView Cab app.

DBM Connected — Indicates if the Display Base Module is communicating with the FVM.

The FieldView Username displays the username that the 20|20 is linked to. This username is saved when an operator selects “Yes” this is my 20|20 on the FieldView Cab app.

Sharing swath between equipment in a field can also be toggled between enabled or disabled. For this to work, shared swath must be enabled on all 20|20s in the field.

Load Cells

Navigate to “Setup” – “Diagnose” – “Load Cells”

This page displays Load Cell information as well as control for zeroing and disabling load cells.

Load Cell values can be zeroed by pressing the “Zero All” button at the bottom of the page. Ensure the planter is raised when zeroing load cells.

Reading (lbs) - displays the current weight that is being measured on each individual row.

Sensor Source - Identifies the type of module the Load Cell is plugged into.

Status - displays the status of each load cell. Selecting a row in the status column will allow the operator to disable (ignore) the load cell on that row. To make a load cell active that has been ignored select that row in the status column.

Reference Value - This is a value that is used to give a Load Cell a true zero. A healthy reference value is between 28 and 36. Reference values will vary across the planter but all should be within this range.

Note: If a load cell is ignored, that row will control DeltaForce to the 80th percentile of all other properly operating rows.

Note: If the system suspects an issue with a load sensor, it will automatically ignore that load sensor.

Calibration Factor - The calibration factor will auto-populate based on the planter make and model selected and the Downforce Sensor type.

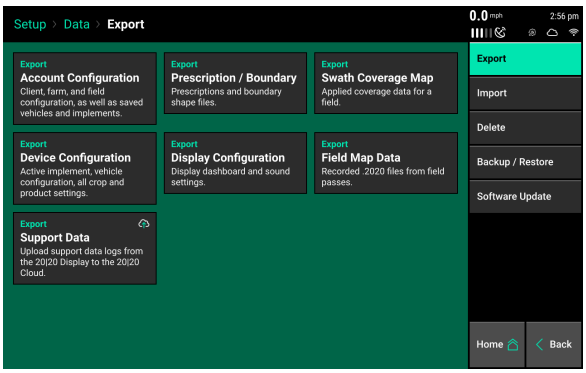
Calibration Factors for each type of load cell:		
Load Cell	**Row Units**	**Calibration Factor**
1/2” Load Pin	John Deere 7000 and Kinze 2000 row units	85
5/8” Load Pin	John Deere XP row units and newer	85
Kinze Link	Kinze 3000 & 4900 row units	65
White Smart Link	White 6000 & 8000 row units	65
White Smart Pin	White 9000/Precision Ready Row units	143
Case 1200 Sensor	Case IH 1200 row units	65
Case 2100 Sensor	Case IH 2100 row units	196
Monosem 5/8” Load Pin	Monosem NG+ 3 and 4	88

Data

The Data menu has features that assist with exporting, importing, and deleting information. Information is exported and imported through the USB slot on the left hand side of the display. The Backup/Restore option allows for backup or restore of an entire monitor or configurations in one action. Software Updates are also done through the Data tab and can be done with a USB drive.

Data — Export

Account Configuration – Exports all client, farm, and field names, as well as vehicle and implement settings to a USB Drive. After selecting "Account Configuration" enter a name for the configuration. This is done to separate configurations if multiple configurations have been exported to the same USB drive. This data can be imported back into a display.



Prescription / Boundary – Exports all prescription and boundary shapes files to a USB drive that had been previously imported into the monitor.

Swath Coverage Map – Export to a USB drive the active field's swath coverage map. This map can then be imported into another display so that the second implement swaths off to the original implement's coverage map.

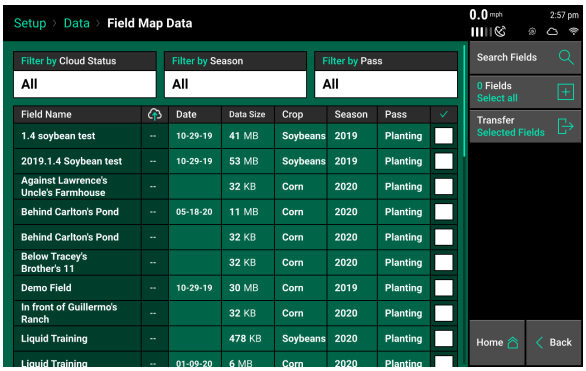
Device Configuration – Exports the active implement type (e.g. planter, combine, or seeder), crop and seeding, liquid, & insecticide settings to a USB Drive. After selecting "Device Configuration" enter a name for the configuration. This is done to separate configurations if multiple configurations have been exported to the same USB drive. This data can be imported back into a display.

Display Configuration – Exports all Display, Sound, and Layout Settings to a USB drive. After selecting "System Configuration" enter a name for the configuration. This is done to separate configurations if multiple configurations have been exported to the same USB Drive. This data can be imported back into a display. If dual displays are being used only the Display Config for the display that the USB is connected to will export the Display Config. Each display will have its own config.

Support Data – Uploads Field Map data and diagnostic logs to Precision Planting Product Support.

Note: This requires WiFi connectivity prior to uploading.

Field Map Data – Displays a list of all data for all implement types. Data is organized by Name, Data Size, Acres, Season, and Pass. Only fields that have data will be displayed. Select the column header to reorganize the list. Use the "Search Fields" button on the navigation pane to search for a specific field name.

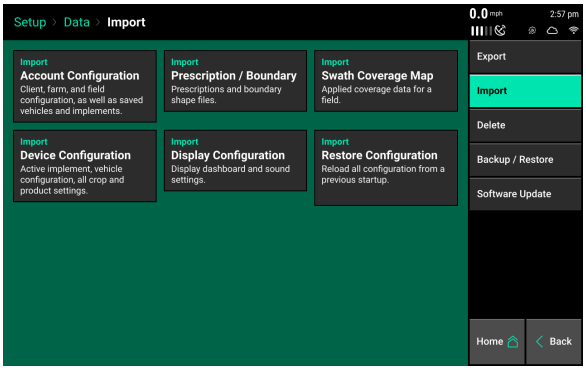


Data can be filtered by Season or by the type of field pass at the top of the screen.

The "Transfer All Fields" will export all data for all fields to a USB drive. To export specific fields, select the field(s) to export by pressing on them (selected fields will be highlighted) and then press the "Transfer Selected Fields" button.

Data — Import

Select the Import button on the navigation pane to import files onto the display. Files to import into a display must either in a folder that was exported directly from another display or placed directly onto the root directory on the USB drive.



Account Configuration – Import all client, farm, and field names, as well as vehicle and implement settings from another 20|20.

Prescription / Boundary – Imports prescription and boundary files from a USB Drive. Files must be in the form of Shape Files and include the .shp, .shx, and .dbf file extensions.
2021.1.x Software – When you import prescriptions, you will select whether the shapefile you are importing is for Seeding, Liquid, Granular, or Depth. You will only select one per import. This will make that prescription file available in the Field Setup for that system type (Seeding, Liquid, Granular, or Depth) only. If the shapefile contains attributes for more than one of these options, you will need to import the shapefile again and select the prescription type for the 2nd attribute (or 3rd or 4th) to make it available in Field Setup for that additional system type.

Swath Coverage Map – Import a Swath Coverage Map from another implement, currently running in the same field. This allows the system that is importing the file to swath off in the areas of the field planted/applied/harvested by the other implement.

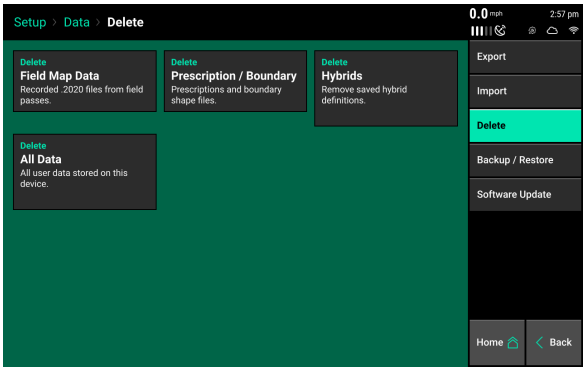
Device Configuration – Import configuration files to change the active implement (e.g. planter, tractor, combine, or seeder). Crop and system settings such as population, liquid, & insecticide setting will also be imported.

Display Configuration – Import a Display configuration to change the home screen layouts as well as all other settings that can be adjusted on the Display pages under Setup-Systems.

Restore Configuration – Monitor Configurations are automatically backed up and saved by date. Select a date to restore the configuration settings that were saved on that date.

Data — Delete

Select the Delete button on the navigation tab delete data from the display. Different types of data can be deleted.



Field Map Data – Displays a list of fields that have data. Data can be filtered by Season or by the type of field pass at the top of the screen. Select an individual field, multiple fields, or all fields to delete the data. This does not delete the Client-Farm-Field name for the field.

Prescription and Boundary Files – Displays a list of all shape files imported into the display and recorded on the 20|20. Select either individual, multiple, or all files to be deleted.

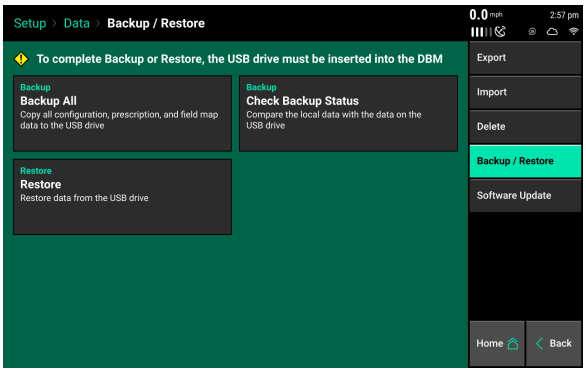
Hybrids – Displays a list of hybrid files that are in the display. Select either individual, multiple, or all files to be deleted.

All Data – This deletes ALL user data from the 20|20. All settings, configurations, data, fields, and shapefiles will be deleted. This is a irreversible operation.

Note: Once data is deleted, it cannot be recovered.

Backup/Restore

The Backup/Restore tool backs up all data and configuration files on the monitor to a USB drive. The files saved to the USB drive can then be used to restore just the configurations or to restore an entire system by bringing back all the data and configurations to a monitor.



Backup All – Copies all Configurations, Data, and Imported Files from the monitor to a USB drive. Ensure the USB drive is large enough to handle an entire backup. The internal memory in the Display Base Module is 32 gig. Place the USB drive into the USB port on the DBM.

Check Backup Status – Compares the data on a USB stick with the data on the hard drive to determine if the monitor is completely backed up. Will also display the date of when the last backup was done.

Restore – Select Restore to put files back onto a 20|20 that had been previously been backed up to a USB drive from either the same or different 20|20.

Once Restore has been selected, all Backed Up files on the USB drive will be displayed. Select a specific backed up file to restore. Then select either:

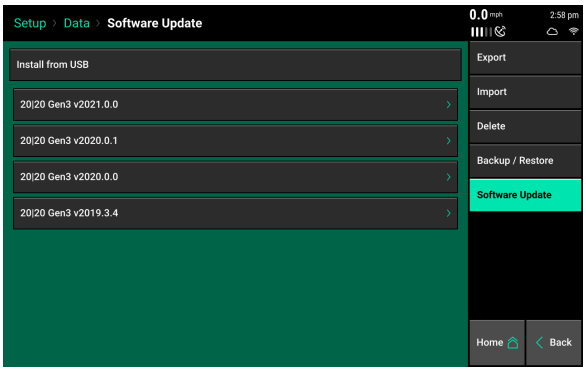
Restore All – to restore everything that had been backed up (including field data, prescriptions/ boundaries, and all settings). Essentially this makes a duplicate 20|20 of the one that had been previously backed up.

Restore Config – Restore just the configurations to the 20|20 (Equipment Configurations, Display Configurations, and Field & Crop Configurations)

Software Update

Select the Software Update button on the navigation tab to change the software version on the Display Base Module and Display.

Install from USB – Software can be downloaded for free from the Precision Planting website and saved to a USB drive. Ensure the software file is on the root directory on the USB drive. Place the USB drive in the side of the display and then select “Install from USB”. All software versions that are correctly saved to the USB drive will be displayed. Select the software version to update the monitor too and wait for the monitor to reboot. This process will update both the Display Base Module and Display. If two displays are connected, an extra reboot may be necessary for the second display to update (or go through the update process a second time, with the USB stick plugged into the second display.)



Install over WiFi – Software can be downloaded over WiFi once the system has been connected to WiFi. There will be a list of software versions below ‘Install from USB’ that the system can be upgraded/downgraded to.

Cab Control Module [CCM]

The CCM is installed below the display. If two displays are being utilized only one CCM should be installed (it does not matter which display it is connected to). All planter control products being run through the 20|20 require a CCM to be installed as it has a Master Plant switch and swath control features.

The switch on the left hand side is the Master Plant switch. For all control products to function the Master Plant switch must be in the up position. If it is in the down position, all control products will immediately be disabled.

The three switches in the middle are swath section switches. Toggle these to the down position to swath off a rate section. If all rows are assigned to the same rate section the planter will be divided into the three parts with each toggle switch controlling swath for one third of the planter. If these switches are in the down position, the rows assigned to the switch will be shut off. Assign rows to rate sections in the vDrive/vSet Select setup screens.

The outside two switches in the middle are also used to auto load the meters. Raise these two switches up together for one second to load the meters. Meters will spin and dispense some seed as seed is loaded to the disk. This allows seed to immediately be dispensed from the meter when beginning to plant.

To continue to spin the meters, lift and hold these two switches. Meters will continue to spin as long as they are held up.

The switch on the right side is the Master Swath switch. If this switch is in the down position, all rows will immediately be swathed off.

Appendix A

Understanding the Home Screen Metrics

Population: The large black number at the top of the population button indicates the planter average population in thousands of seeds. The rainbow chart displays the planter average (large black diamond) and individual rows (small diamonds) as they vary from the planter average. The two boxes at the bottom of the population button display the current low and high rows for population.

Singulation: The layout of this button mirrors that of the population button with the large black number at the top representing planter average singulation and the rainbow chart and the low/high boxes showing you variation from the planter average. Singulation is a measure of meter performance showing the percentage of seeds that are properly singulated - where the meter releases one seed rather than a skip or multiple.

SRI: SRI is an acronym for Seed Release Index. SRI measures the consistency of seed spacing. It only takes into account properly singulated seeds so that skips and multiples are factored out of this measurement. It is a rolling average of the last 300 seeds (or whatever "Seeds to Average" value is selected in the Limits Adjustment menu). The lower the number, the more consistent the seed spacing is. A theoretically perfect SRI score would be zero (0) and would indicate that every seed was placed in the exact correct position relative to its neighbors. Seed Release Index values over 32 mean that consistency of seed spacing is so erratic that it is considered to be random. Many factors, including meter type, meter performance, drive type, sensor location, ride quality, and seed characteristics, affect SRI. The expected SRI will be different for different planters with different meter and drive type combinations. Regardless of these differences, SRI commonly begins to have agronomic implications when it rises to 20 or higher. Because of this, the SRI button is configured by default to turn yellow when SRI reaches 20. This can be changed in the Limit Adjustments menu. Note that SRI on the planter will be higher than SRI on a MeterMax test stand.

Down Force: This indicates the force acting on the gauge wheels. This is achieved by measuring the pressure against the depth stop created when the gauge wheels push against and converting that pressure into pounds of pressure. This is accomplished with a load cell installed on the row unit. For information on setting down force controls, see the relevant operators guide.

Down Force Average: This displays the average measurement of all load cell readings on the planter over a given period of time. This time period varies depending on the down force system installed.

Margin: This is the lowest measured load cell reading in a given period of time on one row (varies with down force system installed). The Margin value displayed on the home screen Down Force button is an average of this value across all load cell-equipped rows on the planter.

Ground Contact: The percentage of time the system can confirm that the gauge wheels have met the depth stop, which generally indicates that the row unit is planting at the depth to which it

has been set. This is calculated by the percentage of time that the load cell is measuring 20 pounds or more.

Skips/Multiples: This metric identifies the breakdown of improperly singulated seeds among skips and multiples.

Acre Counters: There are three acre counters. Acres A & Acres B are acre counters that can be reset at any time by the operator. Press the acre counter for the Reset button to appear. The third Acre Counter shows the acre count for Acres A & Acres B along with the total acres for the active field. The field acres cannot be reset.

Vacuum: Vacuum displays the readings from vacuum sensors connected to SRMs. Up to two values are displayed. If more than two vacuum sensors are installed, the leftmost and rightmost sensors on the planter will be displayed as “left” and “right”. Additional vacuum sensors can be seen by pressing the vacuum button.

Good Ride: The Good Ride metric displays the percent of time when ride quality is sufficient not to interfere with seed spacing. This measurement provides assistance in diagnosing spacing errors caused by rough row unit ride. It is primarily used to help maximize speed while maintaining good SRI performance. When SRI is high and good ride is high, slowing down may improve SRI performance.

Product 1 & 2: The layout of Product metrics buttons will mirror the layout of the population, singulation, and SRI buttons with the large black number indicating planter average and the rainbow chart and low/high rows as they vary from the average. These buttons are used when liquid systems, such as vApplyHD or FlowSense are installed.The name of the button will correspond to the product nickname assigned during the setup of the liquid system(s).

Furrow Moisture: This button displays the three day seed weight percentage of the moisture of the furrow as measured by SmartFirmer. Range is from 0 – 60% with a goal of 20% or higher.

Clean Furrow: Clean Furrow displays the absence of crop residue in the seed furrow as determined by SmartFirmer data. Range is from 0 – 100% with a goal of 95% or higher.

Uniform Furrow: This displays the variation in furrow changes (e.g. light, cloddiness, moisture changes, etc.) as measured by SmartFirmer. Range is from 0 – 100% with a goal of 95% or higher.

Organic Matter: Organic Matter estimates Soil Organic Matter as determined by SmartFirmer data with a range is from 0 – 60%. SmartFirmer is most accurate in OM ranges of 1 - 5%.

Soil Temperature: This SmartFirmer metric provides a real-time soil temperature reading. Temperature ranges from 32F – 100F (0C - 38C) are reported.

Gyro: This displays the radius of turn, in degrees per second, as measured by the gyro, when turning. This is the measurement that is used for turn compensation.

Acres per Hour: This displays the total number of acres per hour that can be covered by the implement based on implement width and speed.

Bulk Fill: Displays the pressure valve reading from Flow Reducers and Blower Control Valves for vSet Select systems.

Product 1 & Product 2 Remaining: This displays the amount of liquid remaining in the tanks for each product being applied. As with the buttons displaying product application, the word "Product" is replaced by the product nickname assigned when the system is configured.

Average Spacing: This metric indicates the average spacing of seeds in the seed trench. It is calculated by dividing a number of seeds by the distance traveled while planting those seeds. It is not an indication of spacing accuracy.

Diagnose: Indicates the color of the diagnose page. Press the button to be directed directly to the diagnose page.

Flip Planter: This control button can be pressed to flip the implement icon on the map page if it is moving through the field backwards.

vDrive/vSet Select Quick Start: This control button starts a countdown when pressed. When the countdown reaches zero, the meters will begin spinning at a simulated speed of 3 mph. When the planter reaches 3 mph, the meter speed will adjust with the current speed source. The quick start will automatically shut off if no speed is detected within seven seconds to limit wasted seed.

Appendix B

Mapping

Product Application Maps

Population: Maps the population rate as measured for each individual row. The legend can be edited to change the upper & lower ends as well as the number of steps that are displayed. The legend displays seed counts in thousands of seeds per acre (K/ac).

Singulation: Maps the performance of each meter in percentage of properly singulated seeds. Singulated seeds are mapped in green, Skips in red, and Multiples in blue.

Insecticide: Maps the expected applied rate for each row with vDrive Insecticide.

Vehicle Speed: Maps the planter speed as shown by the speed reading in the top right hand corner of the display. This map is a planter wide map.

Row Speed: Maps the calculated speed for each row.

Down Force: Maps the minimum weight measured from the load cell on that row within a fifth of a second.

Applied Down Force: Maps the commanded force in pounds for each row from the active Downforce system.

Coverage: Maps the coverage in the field of the implement.

Seeding Tank: Maps the meter that is actively planting on a row by row basis for vSet Select and mSet.

SRI: Maps the SRI as calculated for each individual row.

Liquid Maps: Maps the applied rate in gallons per acre as measured for each individual row. The legend can be edited. The maps will be named the same as the product nickname that was selected during the liquid setup.

Prescription Maps

Boundary File: Displays the boundary file that is currently assigned to the active field. The map displays both external and internal boundaries.

Seeding Prescription: Displays the seeding prescription attribute(s) assigned to the active field. If more than one attribute is assigned, the operator will be asked which attribute to display on the map.

Insecticide Prescription: Displays the insecticide prescription attribute(s) assigned to the active field. If more than one attribute is assigned, the operator will be asked which attribute to display on the map.

Liquid Prescription: Displays the liquid prescription attribute assigned to the active field.