

vDrive[®] Insecticide

vDrive Insecticide Operator's Guide
Gen 3 20|20 — 2024.1.x Software

 Precision Planting[®]

Contents

vDrive Insecticide Requirements	3
Home and Control Screens.....	4
System Setup	12
Hardware Setup	13
System Settings	17
Alerts	21
Insecticide Calibration.....	23
Mass Calibration.....	24
Manual Test	26
Diagnostics	28

vDrive Insecticide Requirements



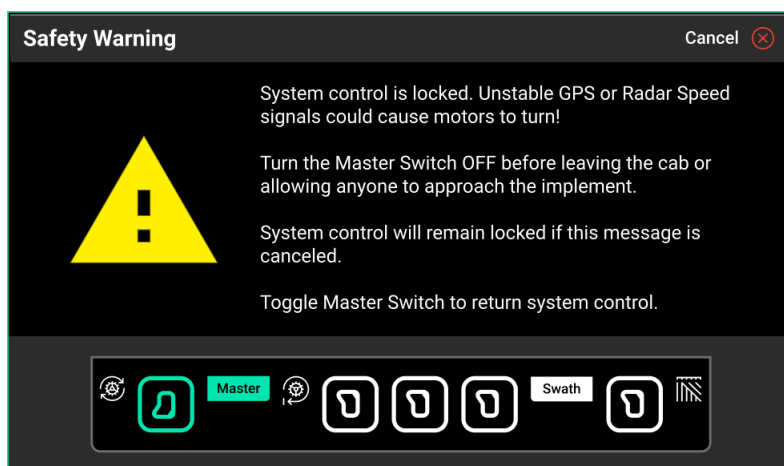
The calibration of vDrive Insecticide requires the handling of dangerous materials (insecticide). Always wear appropriate personal protective equipment when handling dangerous materials. Always wear protective gloves, mask, and eyewear.

vDrive Insecticide operation requirements:

1. vDrive Insecticide system configured on the 20|20 monitor.
2. Speed source active.
3. CCM master plant switch in the up position.
4. Implement must be lowered.
5. vDrive Insecticide system enabled.
6. Calibration mass value greater than zero for each row.

Safety Warning

If 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 may 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.



If a CCM is not installed, press cancel to bypass this warning. No control systems will operate until the Master Plant switch is toggled. The Master Icon:

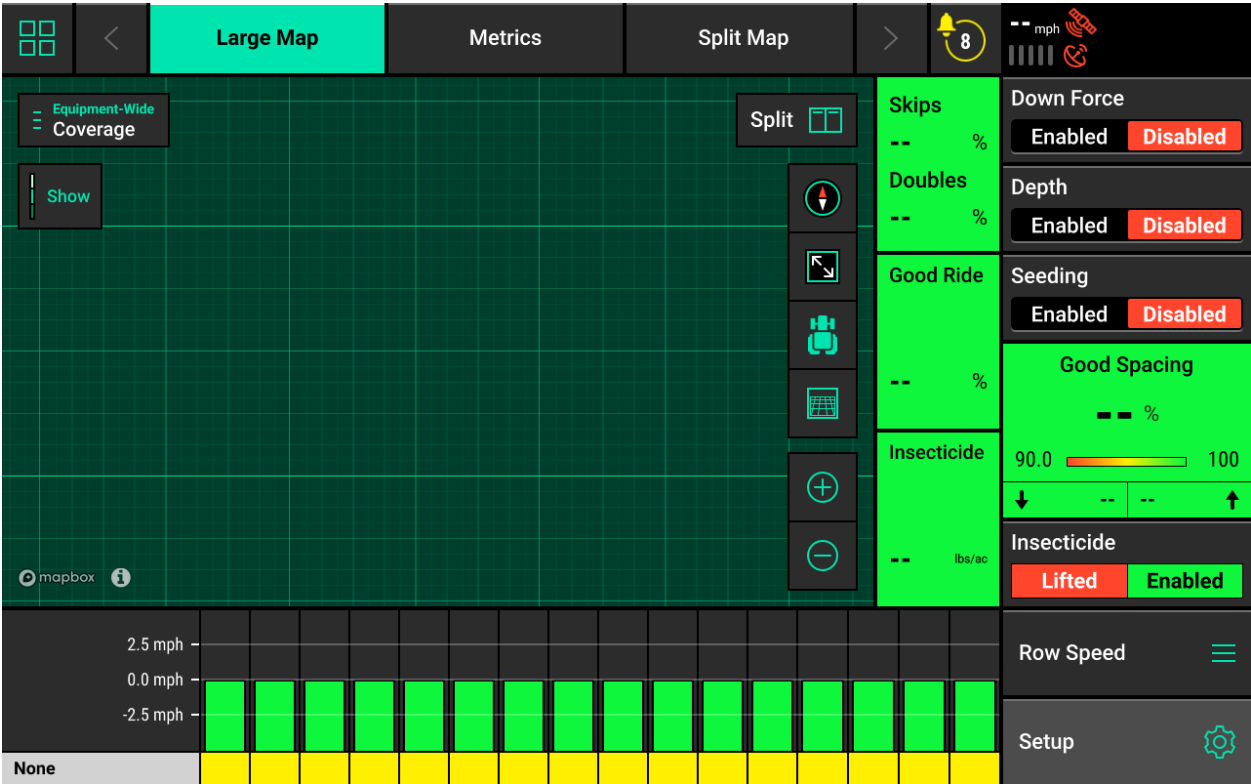


will be present in the top right if the Safety Warning was bypassed pressing cancel.

Home and Control Screens

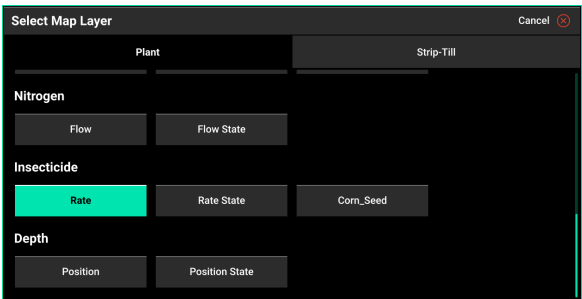
Home Screen

The home screen displays information for controlling and mapping the vDrive Insecticide system.

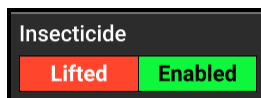


vDrive Insecticide Mapping

An Insecticide map is available to view on the home screen for vDrive Insecticide systems. To view the Insecticide map, press the current layer name that is displayed in the top left corner of the map. A list of all available map layers will be displayed. Under the Insecticide heading, select Rate (to display commanded rate) or Rate State (to display module health). If an insecticide prescription is assigned, Prescription will be available as a map layer.



Control Widget



The vDrive Insecticide control widget may be placed on the home screen. The control button displays the status of the vDrive Insecticide system. If the vDrive Insecticide control button is not on the home screen, it must be added before system operation. See the *Gen 3 20|20 Operator's Guide — 2024.1.x Software* for more information on editing the home screen layout.

Indicators for system status on the vDrive Insecticide Control widget:

Enabled – system is ready and has been enabled.

Disabled – system will not function due to being disabled. To enable the system, press on the control button and select Enable.

Lifted — planter is lifted and system will not function. To enable the system, lower the planter

Master off — master plant switch is off and system will not function. To enable the system, toggle the master plant switch.

Green — System is functional and has a commanded rate.

vDrive Insecticide Control Screen

Press the control button on the Home Screen to open the vDrive Insecticide Control Screen.



To enable or disable the vDrive Insecticide system, press the vDrive Insecticide control button and select either Enabled or Disabled in the top right corner of the screen.



Rate Control

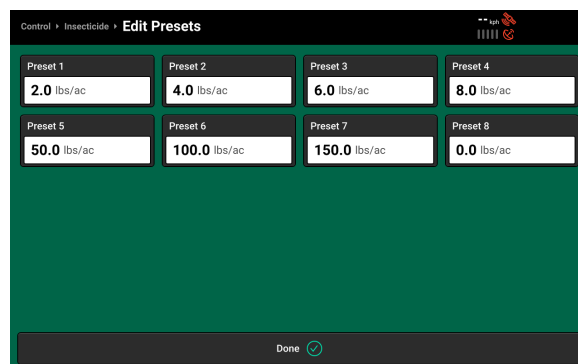


Manual – Set an application rate for the vDrive Insecticide system to apply. This ignores any assigned insecticide application prescriptions and continues to apply at the assigned manual rate.

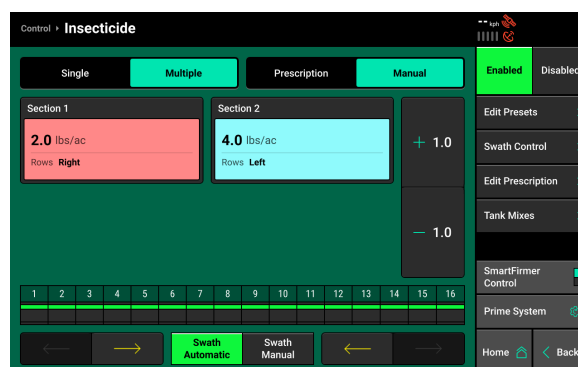
If multiple control sections were configured during vDrive Insecticide system setup, select Single or Multiple. If only one control section was configured, only Single may be used.



Single – Assigns the same application rate to all rows. Select a preset rate from the list of set points displayed on the screen. Use the +/- buttons to increase the rate by one tenth of a pound per acre, or press the white box displaying the current application to manually enter a rate. Press Edit Presets in the navigation menu to open the Edit Presets screen, which allows the user to configure preset population points. Press Done to return to the Control screen.

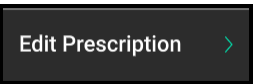
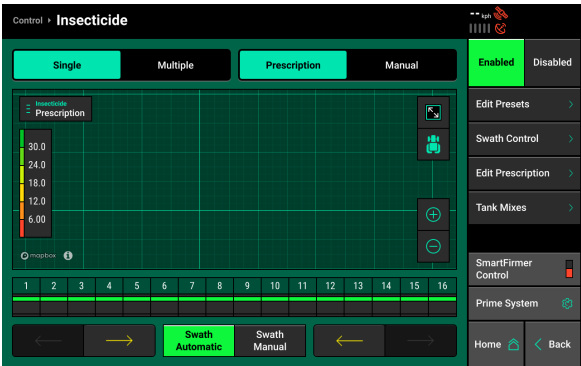


Multiple – Assign a different application rate to each insecticide section that was configured during vDrive Insecticide setup. Use the + and – buttons to adjust the populations up or down the same amount for each section, or press either section to manually enter a new rate that section.





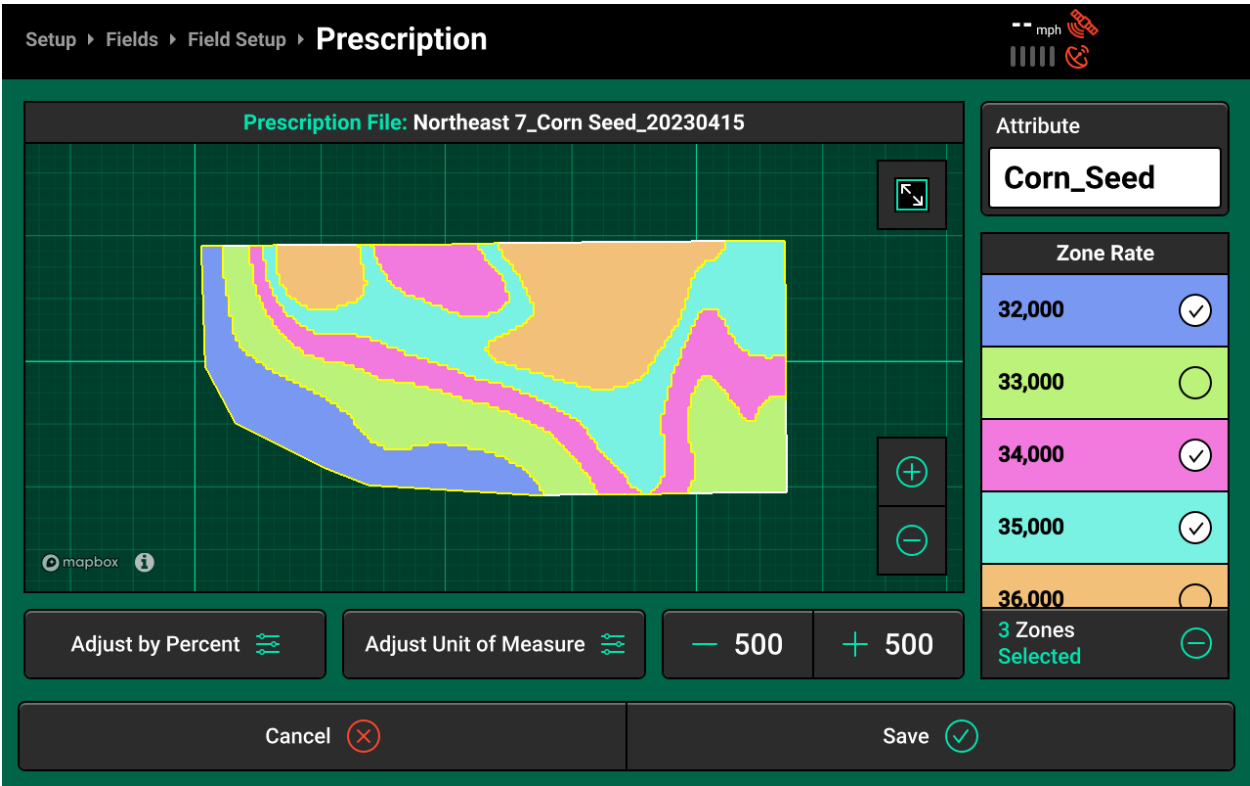
Prescription– If an Insecticide Application prescription is assigned to the active field, Prescription mode will be selected as the default setting. When in Prescription mode, the system will control to the application prescription assigned to the active field. Press Edit Prescription in the navigation menu to open the prescription edit screen.



Prescription Edit Screen

The Prescription Edit screen allows the user to edit certain prescription parameters. A graphic representation of the prescription is displayed on-screen.

Note: Zone rates/adjustment buttons will display different values depending on the prescription type (Seeding, Insecticide, etc.)

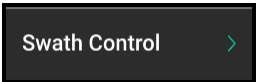


If the prescription file contains multiple attributes, press Attribute in the top right to open a pop-up which allows the user to select the desired attribute.

Select a rate in the Zone Rate table, or press Select All to select all rates.

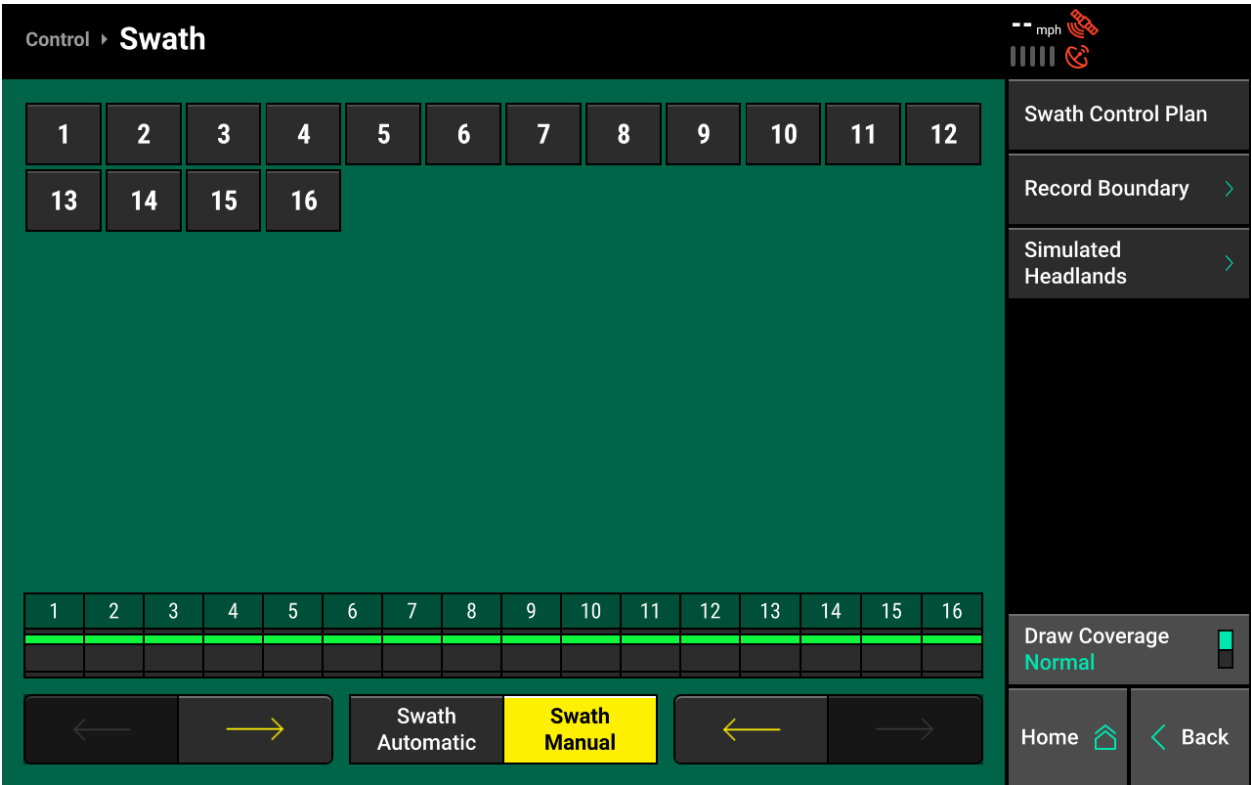
Use the quick adjust buttons to change the selected rate(s) by a preset amount. Use the Adjust by Percent button to adjust rate(s) by a custom amount. Press Adjust Unit of Measure to toggle between Metric and Imperial measurements. Press Save when all adjustments are completed to return to the system control screen.

Note: All prescriptions must be manually assigned to the desired field before editing is enabled. See the Fields and Settings sections of the Gen 3 20|20 Operator’s Guide — 2024.1.x Software for more details.



Swath Screen

Press Swath Control to open the Swath screen. The Swath screen allows the user to manually swath rows on and off, configure a swath control plan, record a boundary file, simulate headlands, or set the implement to always draw coverage.

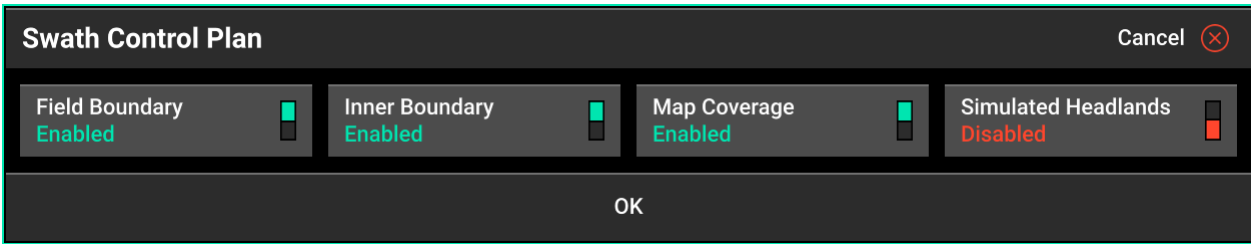


Manual Swath Control

The row table and Swath Control Bar on this screen may be used to manually swath rows on and off. See *Manual Swath Control* in the Gen 3 20|20 Operator's Guide - 2024.1.x Software for more details on controlling swath manually.

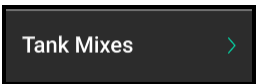
Swath Control Plan

Press Swath Control Plan to open a pop-up that allows the user to select which swath events the 20|20 will use to turn swath on/off.

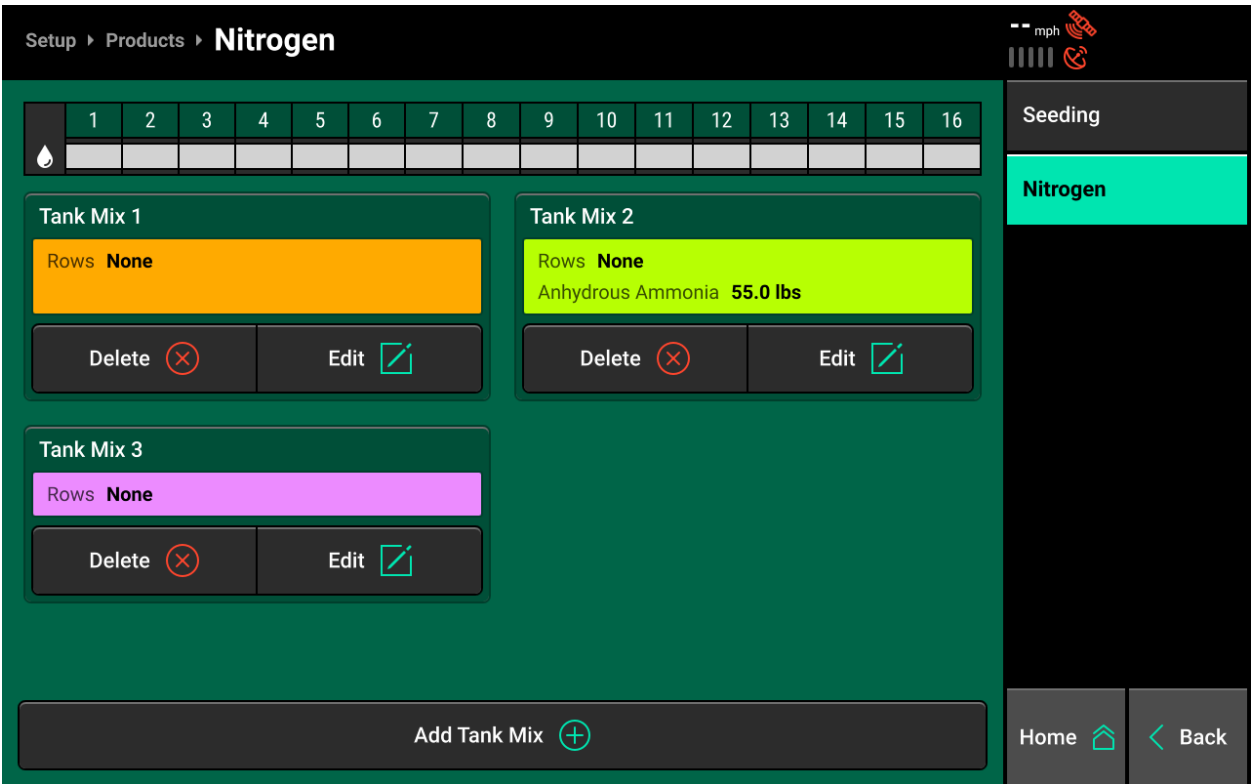


Press each option to set it on or off.

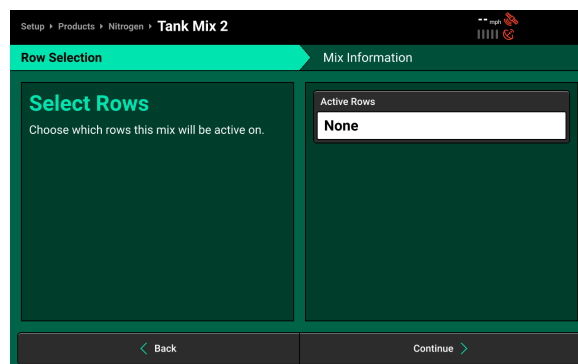
The Swath screen may also be used to record a boundary or configure simulated headlands. See the *Swath Screen* section of the *Gen 3 20|20 Operator’s Guide — 2024.1.x Software* for more details on recording boundaries and using simulated headlands.



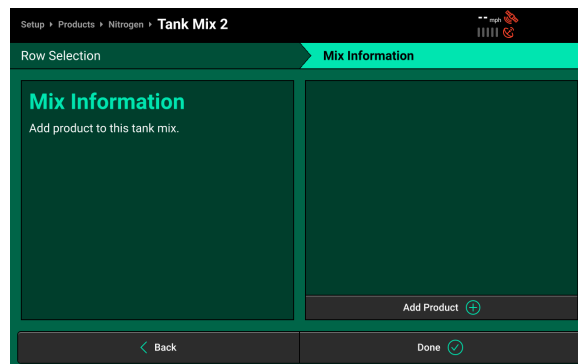
Tank Mix — Press Tank Mixes on the vDrive Insecticide Control screen to open the Products screen for the selected system. Press Add Tank Mix to set up a new tank mix, or select Edit under an existing tank mix. Press Delete under any tank mix to erase it.



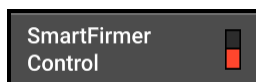
Press Active Rows to configure which rows are applying the product. Select from a list of preset configurations or press Custom to manually configure active rows, then press Continue.



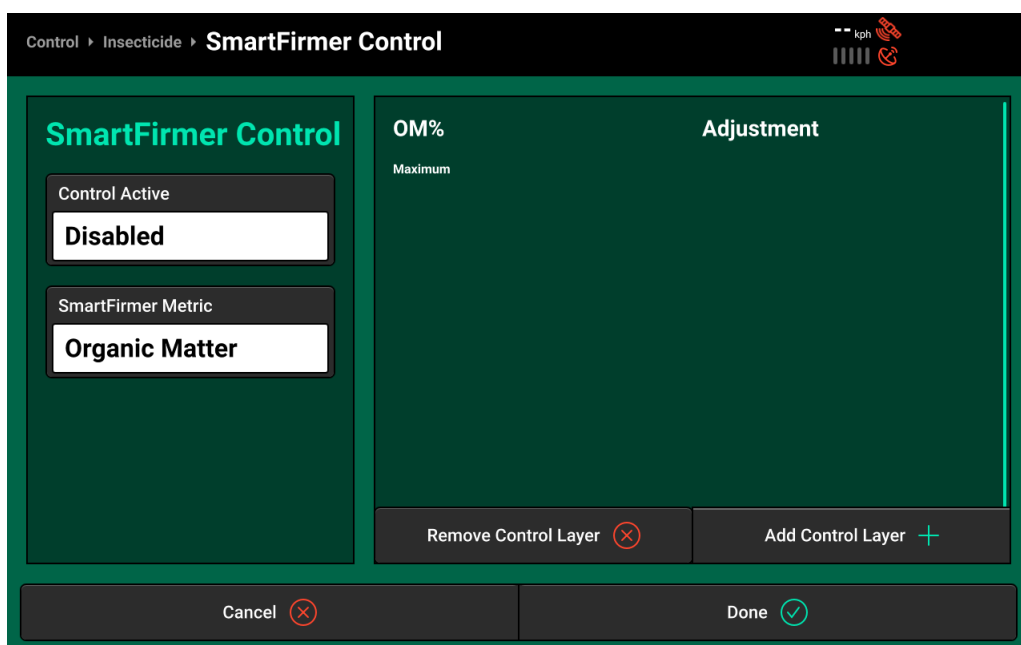
Press Add Product to select a Liquid or Granular product to add to the tank mix. Select Granular, then select a product from a database, or press Add Custom to manually enter a product name. After selecting or entering a name, enter the appropriate weight of product in the tank and press Enter. Repeat for all products in the tank mix.



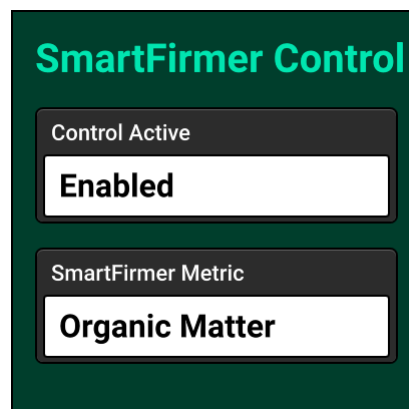
Press Done to return to the Products screen, then press Back to return to the Control screen.



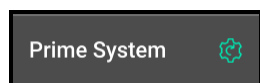
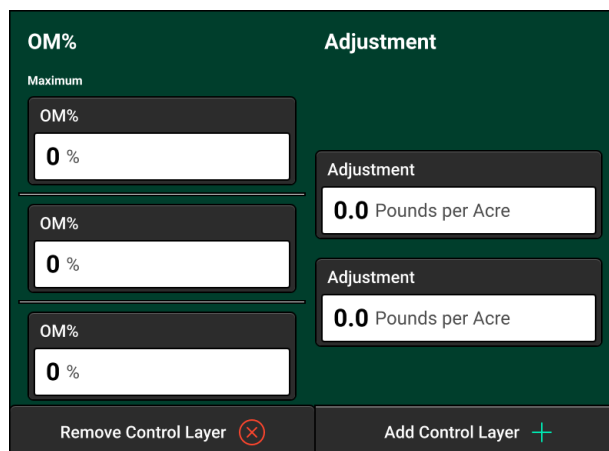
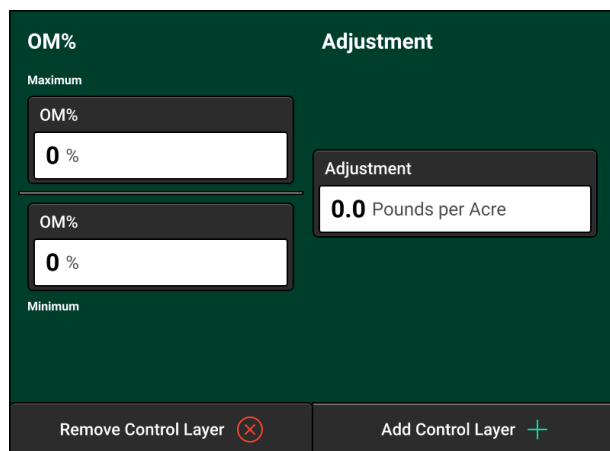
SmartFirmer Control (Optional) — If SmartFirmers are configured/installed on the implement, SmartFirmer control may be enabled if desired. SmartFirmer control changes system rate based on soil conditions. Press SmartFirmer Control to access the SmartFirmer Control screen.



Press Control Active and select Enabled to enable SmartFirmer control. Press SmartFirmer Metric to toggle between organic matter (OM) and cation exchange capacity (CEC) control modes.

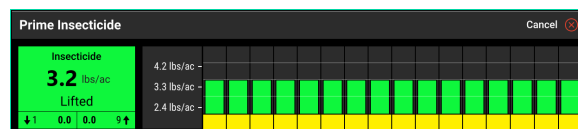
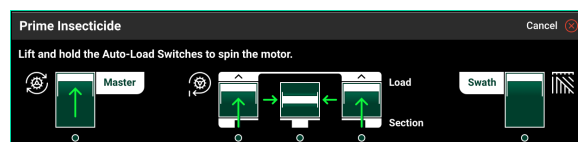


Press Add Control Layer to configure the OM/CEC levels at which the SmartFirmer control feature will adjust rate. Press Maximum, Minimum, or Adjustment, then enter the desired value for each parameter. Press Add Control Layer again to add additional layers of control. Press Remove Control Layer to remove the current minimum layer. Press Done to return to the Control screen.



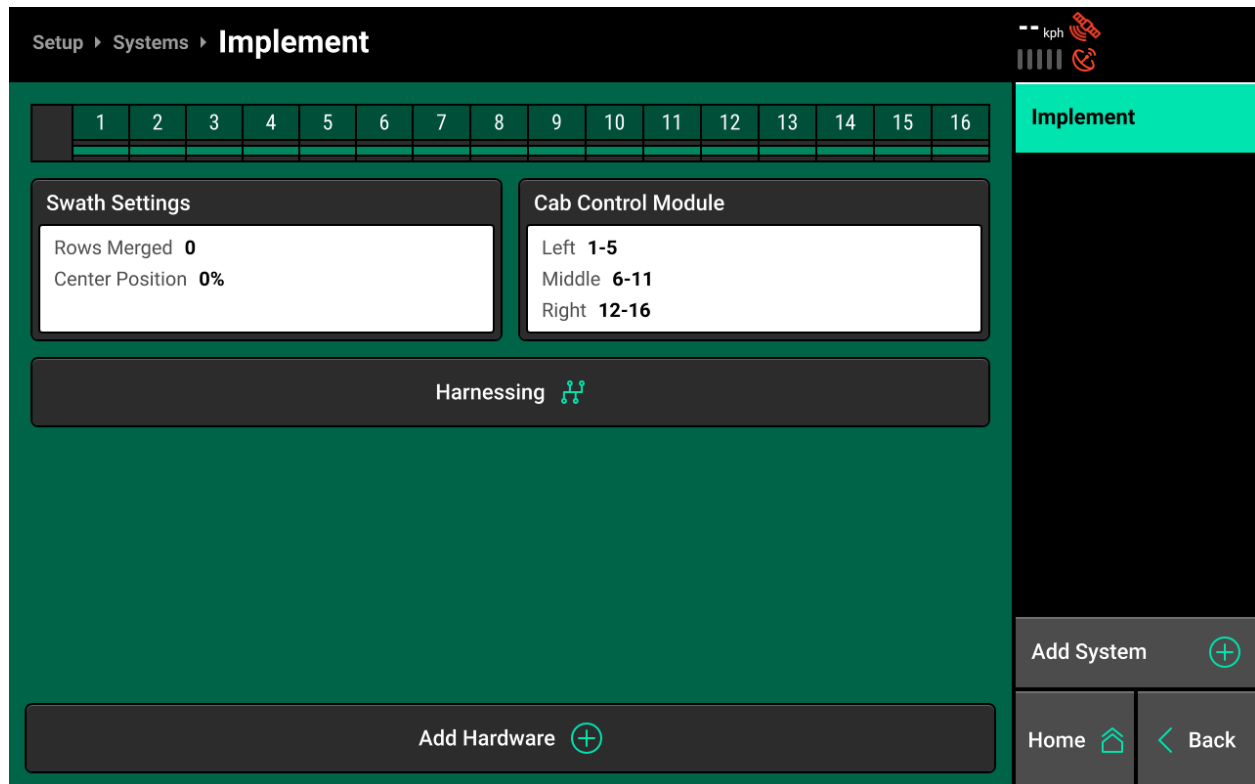
Prime System —Press Prime System to open a pop-up that will instruct the user to switch the Master Plant switch on, and to hold up the left and right Swath switches.

Hold the Swath switches up to prime the system. A pop-up will open displaying commanded rate for each row. Meters will spin and dispense product. The pop-up will automatically close when priming is complete.



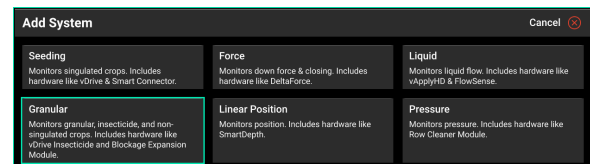
System Setup

vDrive Insecticide must be configured in a granular system. To add a granular system to an implement, navigate to Setup > Systems. This guide assumes that all Equipment, harnessing, and implement-wide modules have already been configured and calibrated. See the *Gen 3 20|20 Operator's Guide — 2024.1.x Software* for more details on setting up/calibrating harnessing and implement modules.



Step 1:

Press Add System and select Granular.



Step 2:

Select a preset system name, or press Custom and use the pop-up keyboard to enter a custom name.



Hardware Setup

To configure vDrive insecticide system hardware, select the granular system in the navigation menu, then press Add Hardware in the bottom of the screen.

Setup > Systems > Insecticide

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Control Sections
1 Section

Coverage Overlap
No Offset

Start/Stop Offset
0.00 / 0.00 in

Coverage Pattern
50 %

Delivery Offset
0.00 in / In Front

CCM Autoload
Enabled

Active Rows
All

Default Rate
0.0 lbs/ac

Remove

Add Hardware

Implement

Insecticide

Add System

Home < Back

Step 1:

Scroll up/down on the list of available modules and press vDrive Insecticide.

Add Hardware

Cancel

vApply Module
Controller that plugs into the SRM for cart and meter control

Rate Control Module
Controller that plugs into the SRM for cart and meter control

Blockage Input Module
Sensor that plugs into the SRM

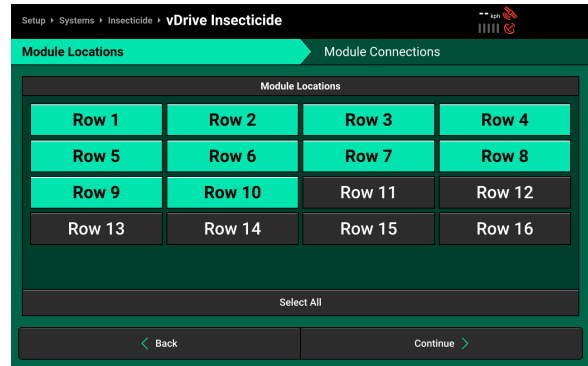
Fan Speed Sensor
Sensor that plugs into Fan Speed

BXM Sensor
Sensor that plugs into the BXM (Blockage Expansion Module)

vDrive Insecticide
Controller on the row unit insecticide meter

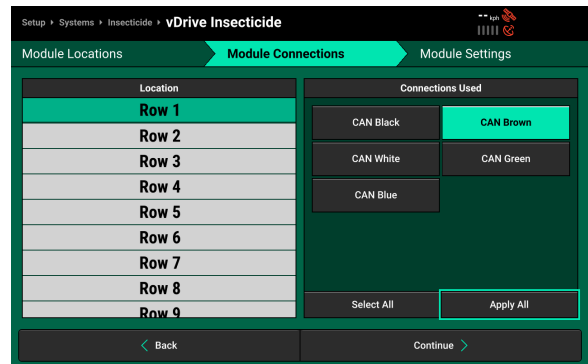
Step 2:

Press on each row that vDrive insecticide is installed on, or press Select All to highlight all rows, then press Continue to advance to Module Connections.



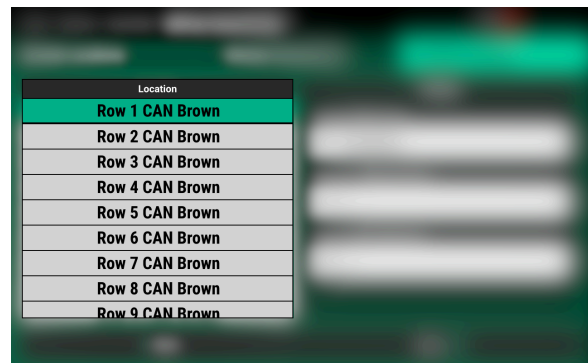
Step 3:

Select the color of CAN jumper that connects vDrive insecticide to the SRM/CAN Expansion Hub. Press Apply All to apply the selection to all rows if all vDrive insecticide modules are plugged in with the same color of CAN jumper, then press Continue to advance to Module Settings.



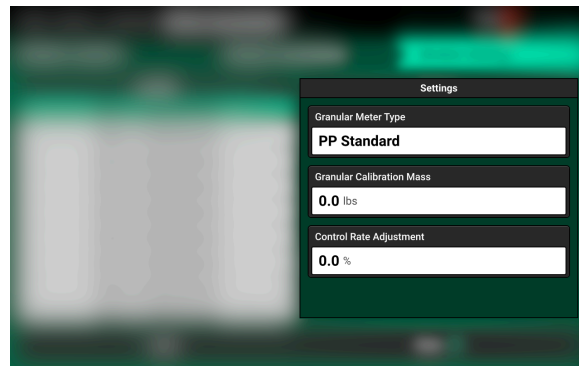
Step 4:

Scroll down on the list under Location to verify correct number of modules/CAN jumper color.



Step 5:

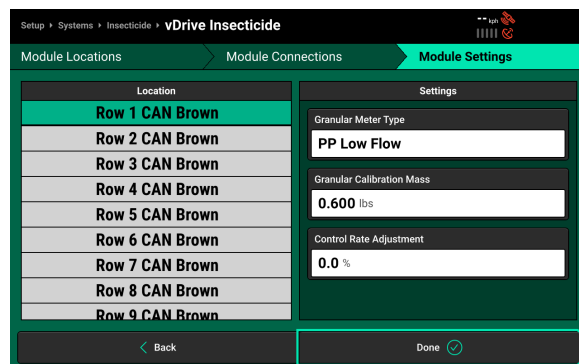
Use the Settings options to change meter type (Low Flow/Standard/High Flow) and Granular Calibration Mass, or to enter a Control Rate Adjustment.



- *Granular Meter Type* — Meter type will correspond to physical meter color (unless customizations have been made). Low-flow meters are light grey, Standard meters are black, and High-flow meters are white.
- *Granular Calibration Mass* — Necessary for the 20|20 to calculate correct application rate. This setting may be left blank during initial setup (e.g. when using sealed container calibration), but must be input before system operation. A calibration mass must be entered for *each row*. Enter calibration mass for each row individually, or use the group module changes feature, described later in this section. See the *Insecticide Calibration* section of this guide for more details on calculating calibration mass.
- *Control Rate Adjustment* — Necessary on any rows which deviate consistently from the target rate. Determine the adjustment by dividing weight of remaining product by total fill weight. (E.g. Row 3 consistently has 2 lbs. of product remaining in the hopper when all other rows are empty. Hoppers are filled with 50 lbs. of product. Divide 2 lbs. by 50 lbs for a result of 0.04 (4%). Press Control Rate Adjustment and enter 4, then select row 3 in the group module changes pop-up, then press done to apply an adjustment of 4% to row 3.)

Step 6:

Review all module settings, then press Done to complete hardware setup.



Group Module Changes

When making changes to various module settings in the 20|20, selecting an option that could apply to multiple modules of the same type will open a pop-up which allows the user to apply that selection to some or all of those modules simultaneously. This feature is demonstrated here using Granular Calibration Mass.

Press Granular Calibration Mass on the Module Settings screen for vDrive Insecticide, type the calculated calibration value and press Enter.

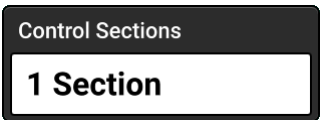
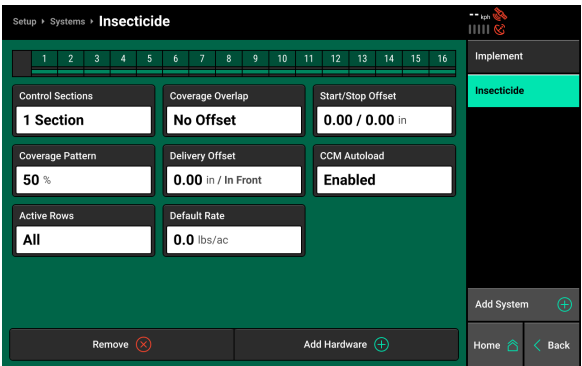
Granular Calibration Mass				Cancel
.60				lbs
7	8	9		
4	5	6		
1	2	3		
0	.		Enter	

A pop-up displaying all modules that the value input previously could apply to will open. Press each desired module, or press Select All to highlight all modules. Press Done to apply the value to all selected modules.

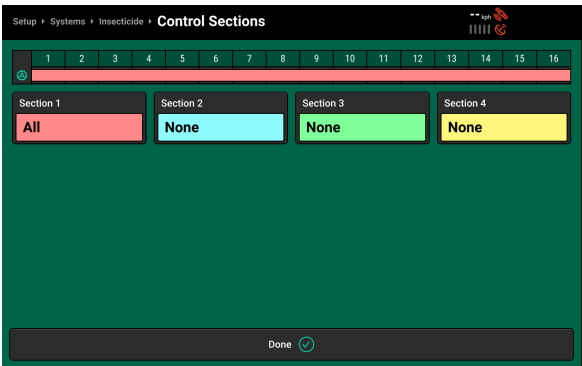
Granular Calibration Mass				Cancel
Row 1 CAN Brown	Row 2 CAN Brown	Row 3 CAN Brown	Row 4 CAN Brown	
Row 5 CAN Brown	Row 6 CAN Brown	Row 7 CAN Brown	Row 8 CAN Brown	
Row 9 CAN Brown	Row 10 CAN Brown	Row 11 CAN Brown	Row 12 CAN Brown	
Row 13 CAN Brown	Row 14 CAN Brown	Row 15 CAN Brown	Row 16 CAN Brown	
Select All		Clear Selection	Done	

System Settings

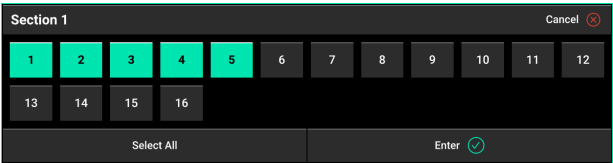
To configure vDrive insecticide system settings, select the [Insecticide system name] system in the navigation menu. Press the desired setting to modify it.



Press Control Sections to open the control sections screen. Use this screen to set up multiple control sections, and to assign different rows to those sections. The default number of control sections is 1. A default rate may be set for each control section using the control widget on the home screen. See the *Home Screen* section of this guide for more details.



Press any section to open a pop-up which allows the user to assign a preset group of rows to that section, or to assign a custom row selection to that section. Press List to assign custom rows.



Coverage Overlap

No Offset

Press Coverage Overlap to open the Coverage Overlap screen. Use this screen to configure how the 20| 20 will swath modules on/off when entering/leaving existing coverage. Select one of the presets, or press Custom to enter a custom overlap setting. No Offset is the default setting.

Start/Stop Offset

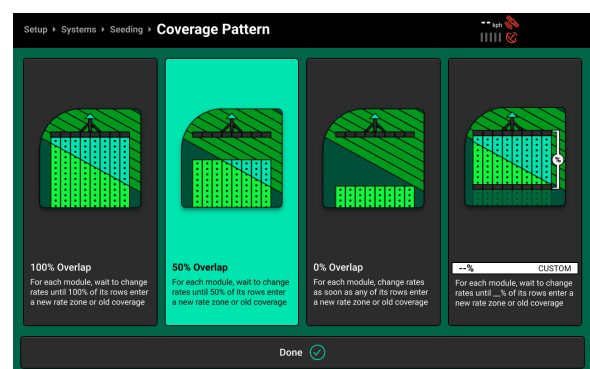
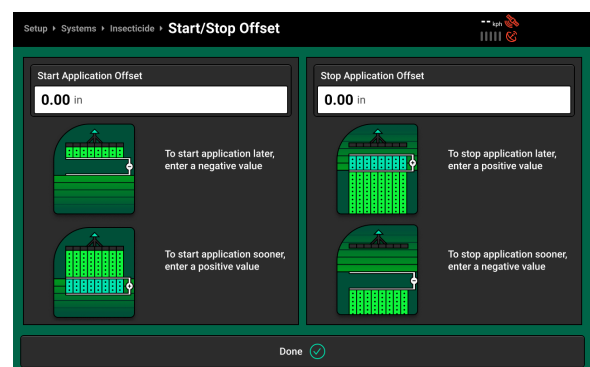
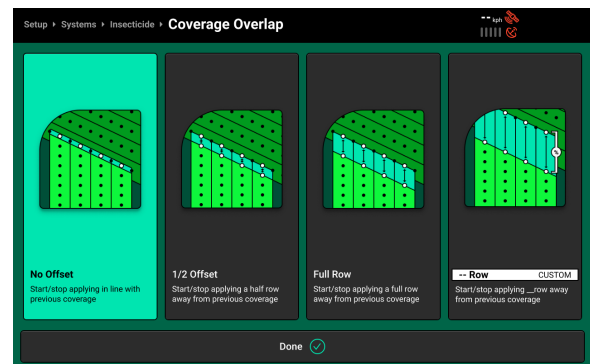
0.00 / 0.00 in

Press Start/Stop Offset to open the Start/Stop Offset screen. Use this screen to fine-tune the coverage overlap setting when GPS signal is inaccurate, or when other swathing issues occur. Press Start or Stop Application Offset and enter a negative or positive value to adjust the selected value.

Coverage Pattern

50 %

Press Coverage Pattern to open the Coverage Pattern screen. Use this screen to change how any merged row sections or section control modules swath on/off to existing coverage. Select one of the presets, or press Custom to enter a custom coverage pattern setting. 50% Overlap is the default setting.



Delivery Offset

0.00 in / In Front

Press Delivery Offset to open the Delivery Offset screen. Use this screen to modify the application point of the product. Measure the distance from the seed exit to the product application point. Press In Front of or Behind Exit depending on physical location of the application point, then enter the measured value. The 20|20 will use the modified value for the selected system only when swathing on/off.

CCM Autoload

Enabled

Press CCM Autoload to open a pop-up which allows the user to select whether the insecticide system will run when the swath switches on the CCM are held up. The default setting is Enabled.

Note: *CCM Autoload may be enabled/disabled for each application system individually.*

Active Rows

All

Press Active Rows to open a pop-up which allows the user to select the active rows for the system. Select a preset section, or press List to select a custom section. Use this setting to disable any rows if desired.

Active Rows

All

Odd

Even

Left

Right

None

Custom

Setup > Systems > Insecticide > Delivery Offset

Enter the distance from the application discharge position to the center of the configured exit position (see Equipment Setup for value)

0.00 in

7	8	9
4	5	6
1	2	3
0	.	<X>

A In Front of Exit

B Behind Exit

Done

CCM Autoload

Enabled

Disabled

Cancel

Active Rows

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

Select All

Enter

Cancel

Default Rate

0.0 lbs/ac

Press Default Rate to open a pop-up which allows the user to input a system-wide default rate.

Default RateCancel

1 lbs/ac

7	8	9	⌫
4	5	6	000
1	2	3	00
0	.		Enter

Alerts

The Alerts menu is used to configure product and system specific alerts and alarms. Navigate to Setup > Alerts and select the [Insecticide System Name] system, then press any box to open a pop-up which allows the user to adjust the percentage at which the 20|20 will deliver an alert or alarm. An Insecticide system must be configured to access the insecticide alerts screen.

Note: This guide will detail the options listed under Rate Control. The options listed under Rate Monitoring are only configured if the system is utilizing blockage sensors. Most vDrive Insecticide systems will not apply a rate that is detectable by blockage sensors. See the Clarity Operator's Guide for information on the options under Rate Monitoring.

Selects the threshold at which the 20|20 will display an alert. This value corresponds to vDrive Insecticide actual RPM when compared to commanded RPM. Select a preset value, or press other to enter a custom value.

Rate Failure Limit

70 %

Selects the threshold at which the 20|20 will perform the action selected under Rate Failure Action. This value corresponds to vDrive Insecticide actual RPM when compared to commanded RPM. Select a preset value, or press other to enter a custom value. Press Rate Failure Limit Enabled to disable rate failure alarms.

Rate Failure Limit Cancel

10%	25%	50%	70%
90%	Other		

Rate Failure Limit Enabled Enter

Rate Failure Limit Disabled

Rate Failure Action

Jump to Row De...

Select the action that the 20|20 will perform when the rate failure threshold is reached.

- Jump to Homepage — The 20|20 will go to the Home screen when the failure threshold is reached.
- Jump to Row Details — The 20|20 will go to the Row Details screen when the failure threshold is reached.
- No Action — The 20|20 will not take any immediate action when the failure threshold is reached.

Rate Failure Action Cancel

Jump to Homepage	Jump to Row Details	No Action
------------------	---------------------	-----------

Rate Alert/Failure Time

3 sec

Allows the user to modify the amount of time that the failure threshold must be active before the 20|20 will display an Alert or Alarm.

Rate Alert/Failure Time Cancel

3 sec

7	8	9	⬅
4	5	6	
1	2	3	
0			Enter ✓

Insecticide Calibration

Warning: The calibration of vDrive Insecticide requires the handling of dangerous materials (insecticide). Always wear appropriate personal protective equipment when handling dangerous materials. Always wear protective gloves, mask, and eyewear.

Tools Required for Calibration

Item	Picture
Insecticide Scoop (Included in Base Kit: 732060)	
Measuring Cup -2 Cups Dry- (Included in Base Kit: 732060)	
Scale—REQUIRED A recommended scale is Ozeri: Pronto Digital Kitchen Not included in vDrive Insecticide. This scale may be purchased at Amazon, Home Depot, Walmart, Kmart, and other locations.	
SMARTBOX SYSTEMS ONLY	
Calibration Collection Bottle SmartBox (AMVAC) Included in Amvac SmartBox Kit- SB022299. Required for SMARTBOX Calibration	

Mass Calibration

Calibration requires an input of the product density.

Step 1:

Place the provided measuring cup on the purchased scale and press TARE to zero the scale.



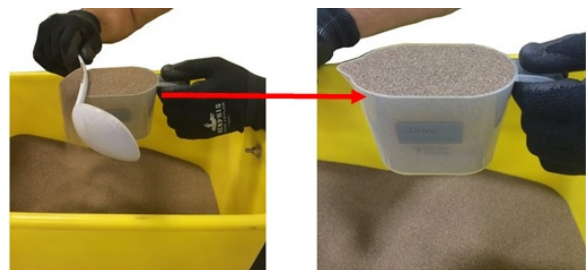
Step 2:

Fill the measuring cup completely with the provided scoop/spoon. Using a different scoop or using the measuring cup as a scoop will affect product density and create errors of up to 5%.



Step 3:

Use a flat edge to remove excess product from the cup. Do not press down or shake to compact. This will affect density and application rates.



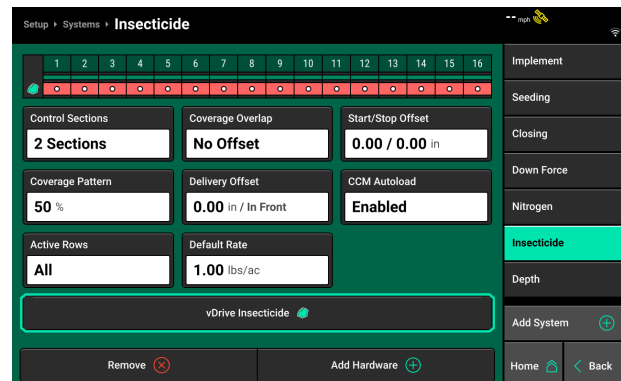
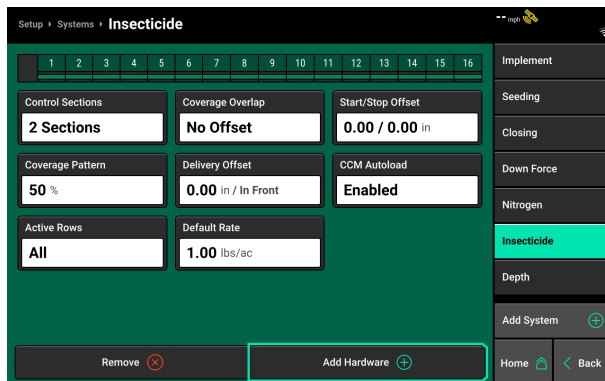
Step 4:

Place the full cup on the scale and record the weight. For more accurate results, weigh multiple samples and calculate the average, then record all values for entry into the 20|20 Display during system setup.



Step 5:

Navigate to Setup > Systems > [Insecticide System name]. Then press Add Hardware > vDrive Insecticide, or press the vDrive Insecticide module in the center of the screen if it has already been added.



Step 6:

Advance to the Module Settings screen, then enter the weighed value on all applicable rows.

Mass Calibration Complete

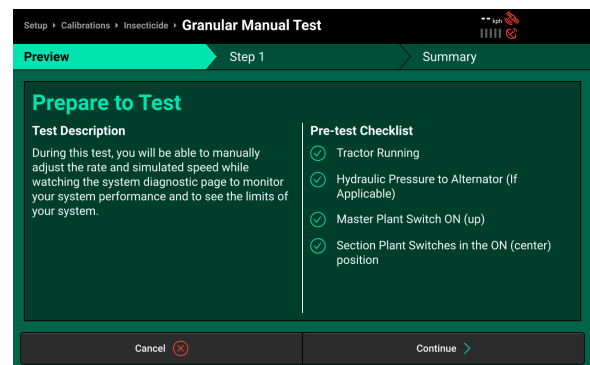
Manual Test

Navigate to Setup > Calibrations > [Insecticide system name] and select Manual Test to access the vDrive Insecticide manual test. This calibration will test the vDrive Insecticide system for correct operation, and should be performed on all new installations and at the start of each season. This calibration will spin the meters, dispensing any insecticide in the hoppers.

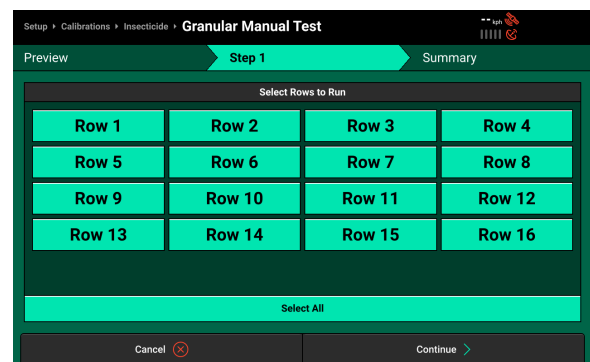


Press Continue once all calibration conditions are met.

Note: *Insecticide is not required in the hoppers for this test*



Press Select All to run calibration on every row, then press Continue.



Use the +/- buttons to adjust rate and speed.
 Monitor all columns for any irregularities, such as actual/commanded RPM not matching, abnormal duty cycle differences across rows, excessive amp draw (>.05A), or low supply voltage (<12 V).

Setup > Calibrations > Insecticide > Granular Manual Test

Preview Step 1 Summary

Rate Adjust 0.0 lbs/ac +

Speed Adjust 5.0 mph +

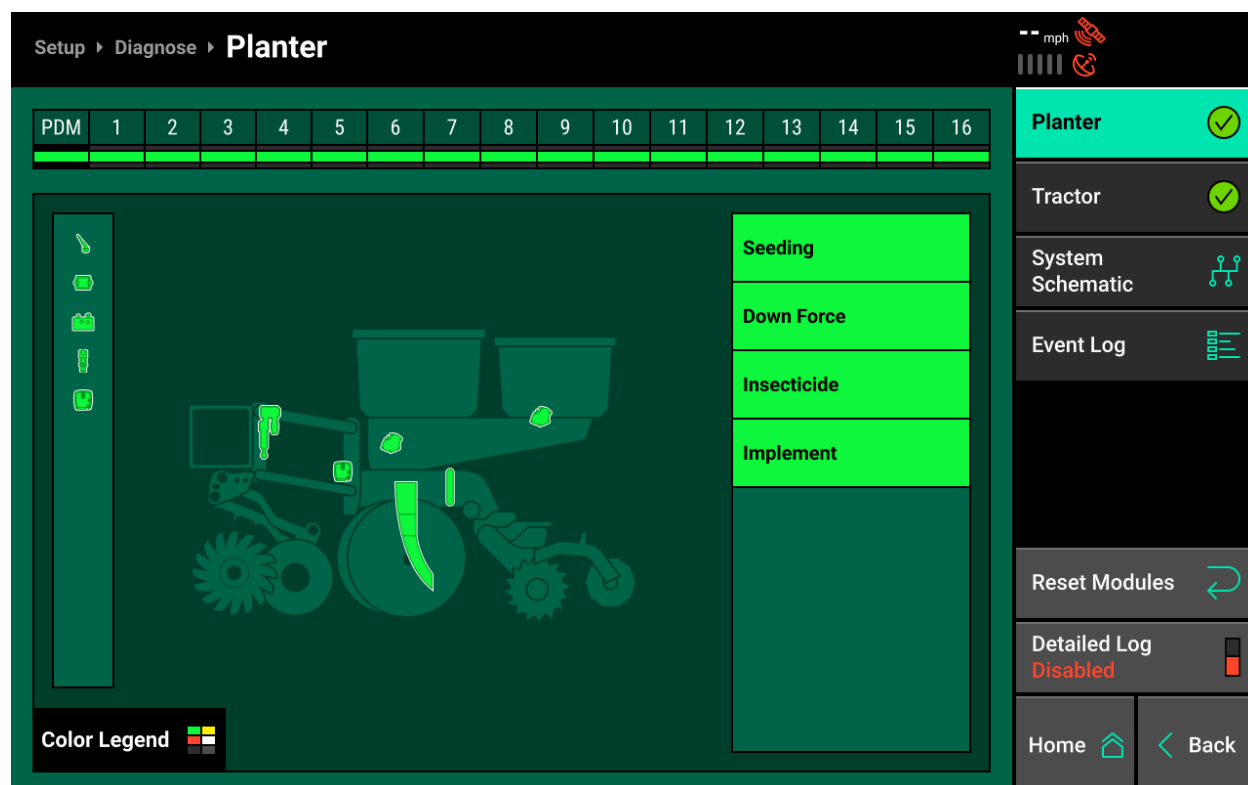
	Actual (rev/min)	Command (rev/min)	Duty Cycle	Current (A)	Supply (V)
1	0.0	0.0	0.0%	0.0	12.8
2	0.0	0.0	0.0%	0.0	13.0
3	0.0	0.0	0.0%	0.0	12.8
4	0.0	0.0	0.0%	0.0	12.9
5	0.0	0.0	0.0%	0.0	12.9
6	0.0	0.0	0.0%	0.0	12.9
7	0.0	0.0	0.0%	0.0	12.9
8	0.0	0.0	0.0%	0.0	12.9

Restart Done

Diagnostics

Diagnose Screen

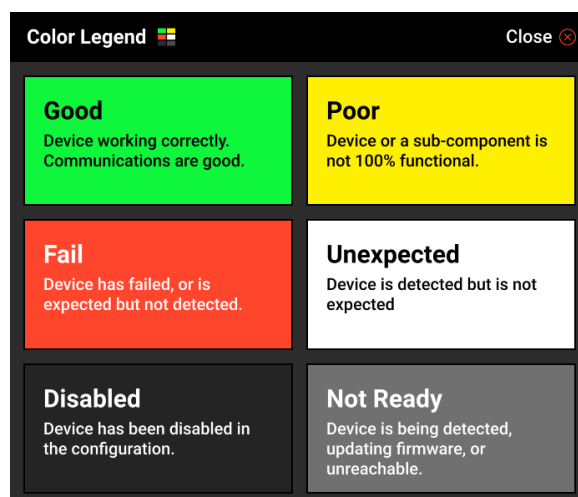
Navigate to Setup > Diagnose to view the Diagnose screen. The Diagnose screen is the primary location for troubleshooting issues related to the operation of the 20|20 system and all products configured on the monitor. An icon for each configured system is superimposed over a graphic of the appropriate implement. An implement bar at the top of the screen displays the health of each row.



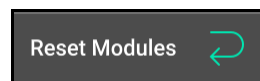
Color Legend



The modules and system names displayed on the implement graphic and bar will appear in different colors depending on module health. Press Color Legend in the lower left corner of the screen to view a description of what each color indicates.



Reset Modules



Press the Reset Modules button to break and reestablish all CAN communication and daisy chain identification. This function is often used as a troubleshooting tool for communication issues. It may be necessary to press reset modules after setting up a new system(s) to cause the 20|20 to recognize system modules.

Note: Due to software changes for sprayer and seeder compatibility, after performing a Reset Modules or power cycle in limited release software versions 2023.1 and onward, if a daisy chain break is present in the physical harnessing, all components after the daisy chain break will display red on the diagnose screen. The break must be addressed before functionality is restored.

vDrive Insecticide Diagnostics

Press [Insecticide System Name] to view all configured modules for that system. Press vDrive Insecticide to view detailed diagnostics for those modules.



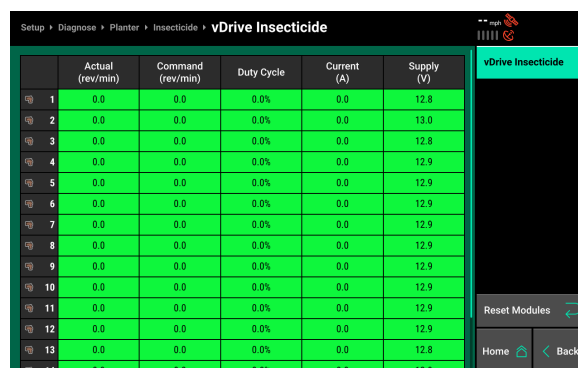
Actual (rev/min) – RPM of the meter.

Command (rev/min) – The RPM the meter is being commanded to turn at to meet application rates.

Duty Cycle – Displays the vDrive Insecticide motor output over the operating range, 0 – 100%.

Current (A) – vDrive Insecticide motor current draw in amps.

Supply (V) – Voltage at vDrive Insecticide Module.



	Actual (rev/min)	Command (rev/min)	Duty Cycle	Current (A)	Supply (V)
1	0.0	0.0	0.0%	0.0	12.8
2	0.0	0.0	0.0%	0.0	13.0
3	0.0	0.0	0.0%	0.0	12.8
4	0.0	0.0	0.0%	0.0	12.9
5	0.0	0.0	0.0%	0.0	12.9
6	0.0	0.0	0.0%	0.0	12.9
7	0.0	0.0	0.0%	0.0	12.9
8	0.0	0.0	0.0%	0.0	12.9
9	0.0	0.0	0.0%	0.0	12.9
10	0.0	0.0	0.0%	0.0	12.9
11	0.0	0.0	0.0%	0.0	12.9
12	0.0	0.0	0.0%	0.0	12.9
13	0.0	0.0	0.0%	0.0	12.8
14	0.0	0.0	0.0%	0.0	12.9

Common Troubleshooting Issues

The Diagnose screen may be used to quickly identify system health and determine troubleshooting steps. Verify bus device/module health using the color legend provided earlier in this section. Common issues include:

- Red bus devices or modules, which may indicate damaged/disconnected modules and harnessing.
- White bus devices or modules, which may indicate incomplete system configuration.
- An incorrect number of bus devices with some devices displayed in white or red, which may indicate incorrect CAN harnessing setup

For more troubleshooting information see the Dealer Service Manual.

Physical Diagnostics

When troubleshooting vDrive Insecticide, inspect the physical modules to quickly identify possible issues using the LED light present on each module.

Light Pattern	Indicated Status
No Light	Device unpowered
Solid Light	Device updating
5hz Blink	Device powered, lost CAN communication
1hz Blink	Device Healthy
Erratic Blink	Device powered, CAN communication never established