

vDrive[®] Insecticide

**vDrive Insecticide Operator's Guide
For Gen 3 20|20 Displays**

Precision Planting[®]

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vDrive Insecticide - System Setup, Calibration, and Operation



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.

There are six requirements for the vDrive Insecticide system to function:

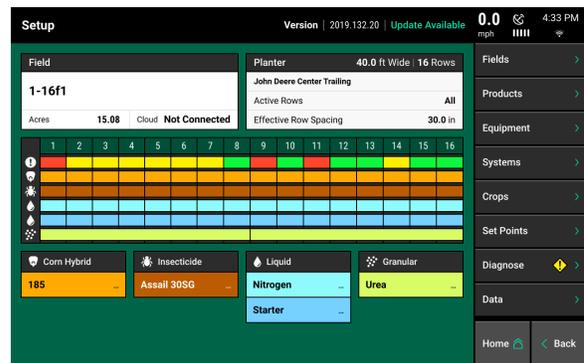
1. vDrive Insecticide must be configured on the 20/20 monitor.
2. There must be a Speed source.
3. The Master Plant Switch on the Cab Control Module must be in the up position.
4. The planter must be lowered.
5. vDrive Insecticide system must be enabled.
6. The Cal Mass Value must be greater than zero.

Configuring Monitor for vDrive Insecticide

Step 1:

Set up a Granular System under the Equipment menu.

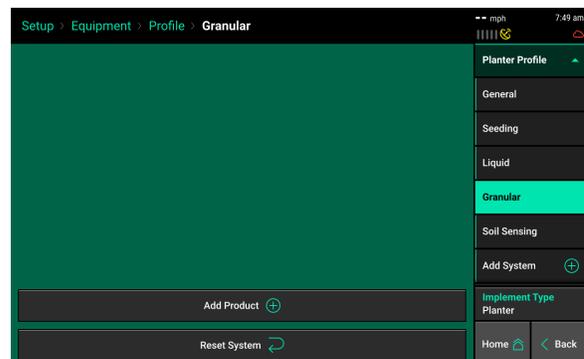
Navigate to the planter setup page by selecting, “Setup” – “Equipment”.



Step 2:

Press ‘Add System’ on the right side of the screen to add a Granular system.

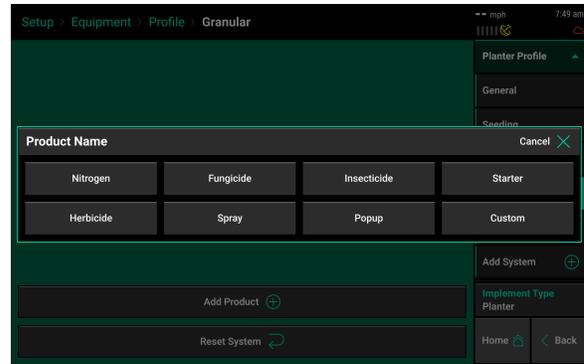
Note: In 2020.0.x and older software, add vDrive Insecticide under the Insecticide system.



Step 3:

Press 'Add Product', and select the granular system name.

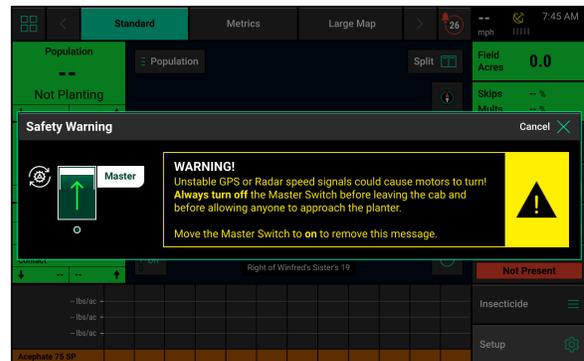
Note: Reset System at the bottom of the screen will reset all Granular system settings.



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.

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

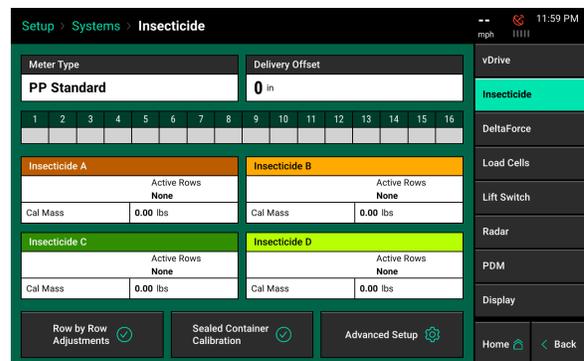


If a CCM is not installed, the cancel button can be used to bypass this warning. No control systems will operate until the Master Plant switch is toggled. This icon will be present in the status button in the top right if the Safety Warning was bypassed using the cancel button.

vDrive Insecticide Setup — 2020.0.x and Older Software

Step 1:

Navigate to "Setup" - "Systems" - "Insecticide" An exclamation point inside of a yellow diamond indicates that either the Insecticide system has not been setup or there is an issue with the current setup.



Step 2:

Select the correct Meter Type. Choose between a Precision Planting Standard Insecticide Meter or a Precision Planting Low Flow Meter. Verify that the meter type matches the type of meter installed on the planter. (Black Meter = Standard Flow and Grey Meter = Low Flow)

Step 3:

Set the Delivery Offset. The Delivery Offset identifies the distance between the seed drop point and the insecticide drop point. Entering this value will increase the accuracy of swath control. It may be left at zero on many planters where the seed and insecticide drop points are a couple inches apart. Measure the distance and enter it in this box.

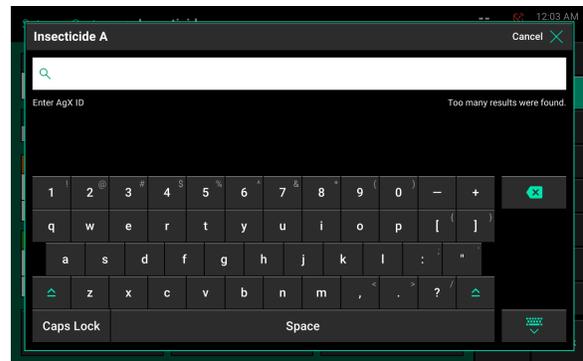
Step 4:

Configure Sections. At minimum, one section must be configured for the insecticide system to work properly and for it to display as green on the diagnose page. However, up to four different sections can be configured. Configure multiple sections if more than one product is being used on different rows or different rates will be applied on different rows at the same time. Press Insecticide A to begin setting up a section.

Step 5:

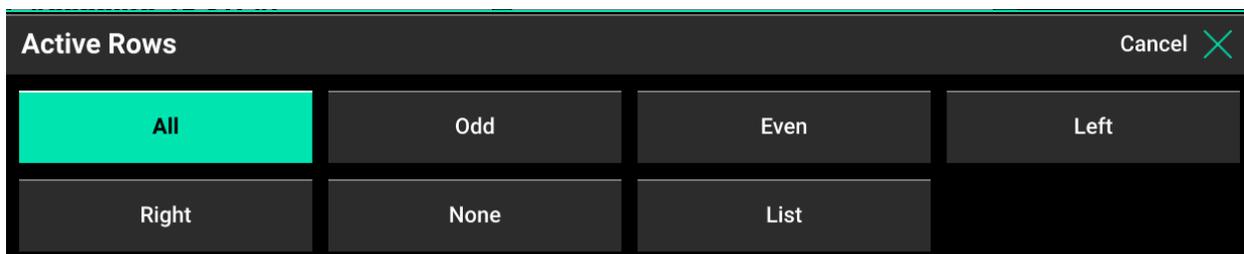
Type in the name of the product at the top of the screen or select a product that has already been added from the list. Select the correct product name when it is displayed.

Custom insecticide names cannot be created.



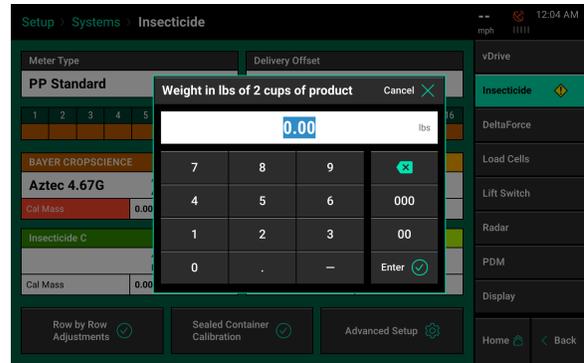
Step 6:

Once a product name is selected, select which rows that product will be used on. If different rows will use the same product, but apply it at a different rate only, select the rows which will use the same rate. Default options for rows that can be selected are: All, Odd, Even, Left, and Right rows. Select List to manually enter the rows. If using List, define the rows to be used by touching those row numbers so they turn green.



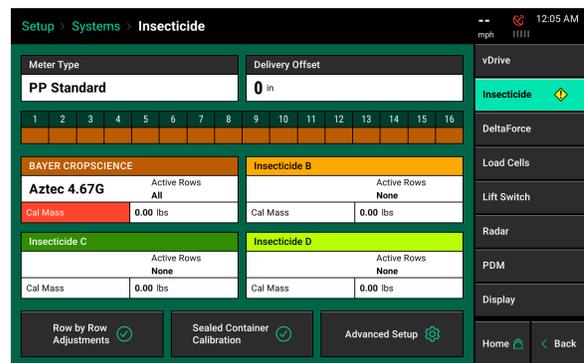
Step 7:

Finally, a calibration mass must be entered for the product. This step can be skipped by pressing the check mark; however, a Cal Mass **MUST** be entered before planting. If this step is skipped during the initial setup, press the red Cal Mass button under Insecticide A to enter it at a later time. Until it is entered an exclamation point in a yellow diamond will be next to the Insecticide Setup button on the navigation pane. See Insecticide Calibration on how to determine the calibration mass for a product.



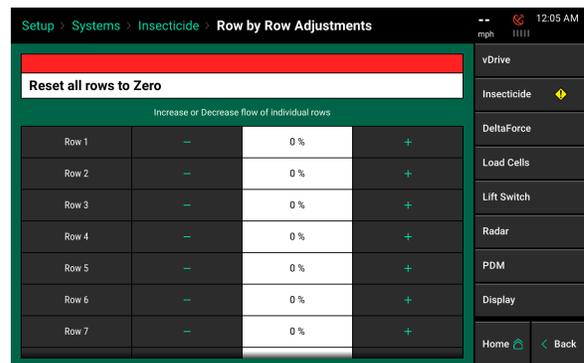
Step 8:

Repeat these steps to setup up additional sections. The row numbers below the meter type will be colored with each section that it is assigned to. This illustration shows a system set up for two sections with one section not having the Cal mass entered during the initial setup.



Step 9:

Row by Row Adjustments. Select the Row by Row Adjustments button at the bottom of the vDrive Insecticide Setup page. This function allows for the adjustment of individual rows whose application rate varies from the target rate. Adjustments are made in increments of 1% of motor speed.



For example: Though a full bag of insecticide is poured into every row, Row 3 consistently has 2 lbs. remaining in the hopper when all other rows are empty. Under applying by 2 lbs. from a 50 lb. bag means that Row 3 is applying 4% less than the other rows. To correct this, increase the flow on Row 3 by 4% in the Row Rate Adjust screen.

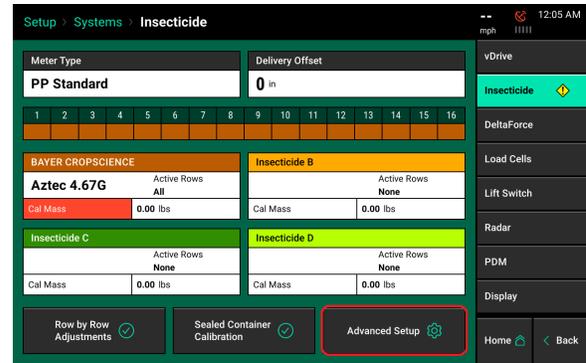
Whenever variations exceed 10%, visually inspect the meter, motor, harness, funnel and tube for damage, or, if under applying, for blockage.

Use the "Reset all rows to 0" button to remove any individual row adjustments.

Note: vDrive Insecticide will swath with vDrive motors so no separate swath control setup is required.

Step 10:

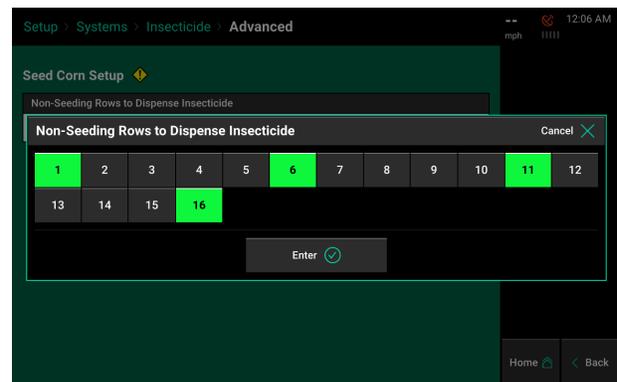
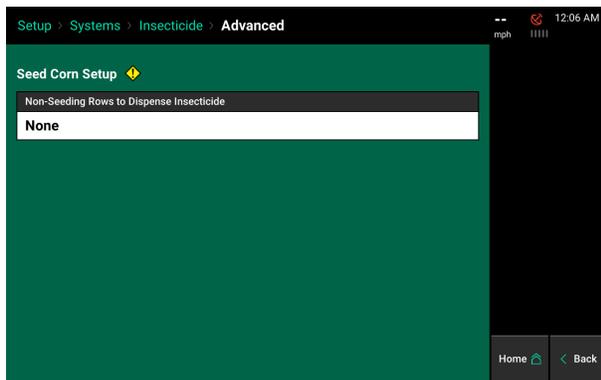
Press the Advanced Setup button at the bottom of the screen to access the Seed Corn Setup for vDrive Insecticide. This feature allows for insecticide to be applied without seeding in a scenario where insecticide will be applied before planting. Before using this feature, verify that all of the previous steps for setting up insecticide have been completed.



Step 11:

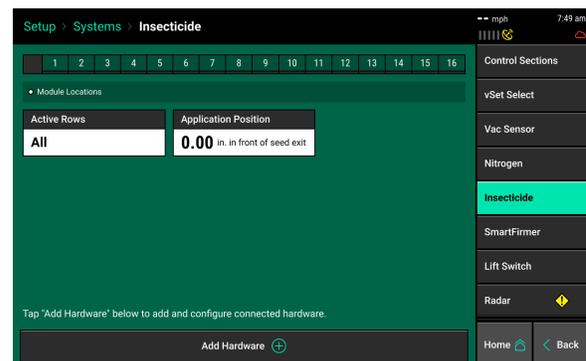
Select the Seed Corn Setup button and then select the row numbers that will be dispensing insecticide but not seed. Rows selected will be displayed in green.

Additionally, there must be two rate sections setup in the vDrive setup. The Seed Corn rows should be specified in one rate section, and the other rate section should have the non-seeding rows assigned. In the vDrive Control page the rate section that has the non-seeding rows MUST be assigned a manual seeding rate of zero.



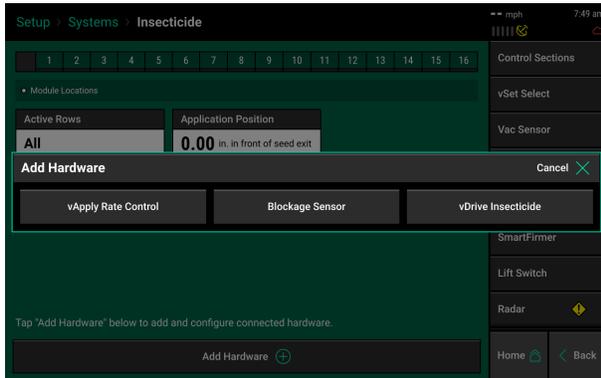
vDrive Insecticide Setup — 2020.1.x and Newer Software

Go to Setup — Systems — Insecticide to configure the Insecticide system.



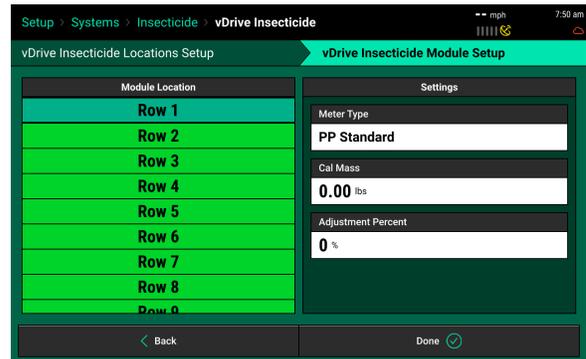
Add Hardware

Press 'Add Hardware' to add the Insecticide system hardware. Select what rows have vDrive Insecticide installed on them.



Module Setup

Enter in the Meter Type, Cal Mass, and Adjustment Percentage (as needed).

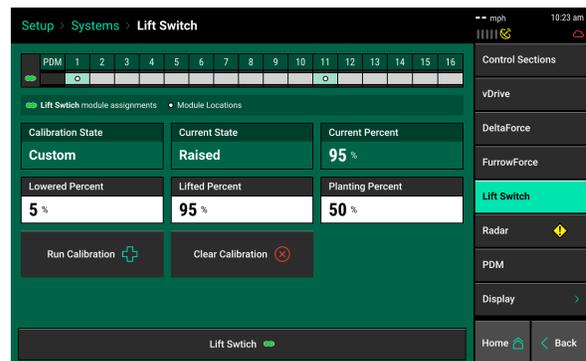


Lift Switch

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 all of the rows (or PDM) where lift switch(es) are plugged in at. 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.



Calibrate Lift Switch

To complete the Lift Switch calibration, press the “Run Calibration” button at the bottom of the screen. Follow the onscreen 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.

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**



Open Container Calibration

For sealed container calibration instructions, skip to the sealed container calibration section. The calibration process in this section will consist of calculating a bulk density. Included with the hardware is a measuring cup (2 Cup Dry). Any 2 cup dry measuring cup will work. If you switch products during the season (for example switching from Force to Aztec), a new density needs to be calculated. Not recalibrating can cause errors of 10-20% due to the differences in density from one product to another. In addition, failure to follow these steps precisely can result in a variation of up to 5%. For the most accurate results, weigh multiple samples and enter the average of the samples. Also, because different lots of the same product vary in density, calibration should be done for each lot to ensure accuracy.

Step 1:

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



Step 2:

Fill the measuring cup to the brim with the provided scoop/spoon. Do not use a larger scoop and do not use the measuring cup as a scoop. This will affect the 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.



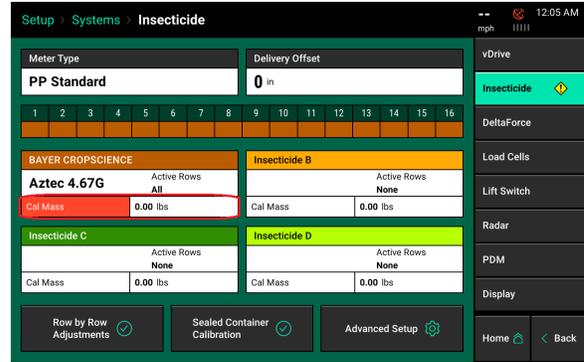
Step 4:

Place the full cup on the scale and record the weight in pounds (or ounces in metric mode). For best results, weigh multiple samples and calculate the average for entry into the 20/20 Display.



Step 5:

On the vDrive Insecticide screen, press CAL MASS for the product measured and enter the weight determined in steps 1-4.



Repeat Steps 1-5 for each section configured or anytime a new insecticide is used.

Sealed Container 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.

Note: Sealed container calibration is only used for SmartBox systems.

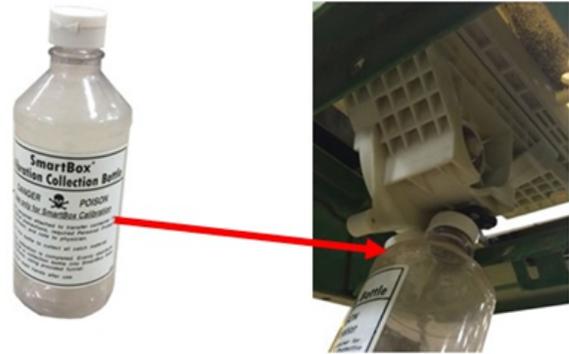
Step 1:

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



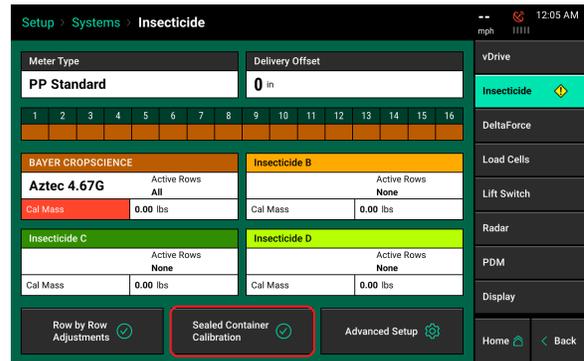
Step 2:

Secure the sealed container calibration bottles to the drop funnels on four rows.



Step 3:

On the vDrive Insecticide setup page, press Sealed Container Setup and follow the onscreen instructions. Select the four rows with calibration bottles, and press ENTER.



Step 4:

Combine the samples from the four rows together in the Calibration Cup. Use a straight edge to strike off the top of the cup. Weigh the cup and enter the weight in the Cal Mass box on the vDrive Insecticide setup screen.



vDrive Insecticide Set Points

Set Points for insecticide can be set by going to Setup – Set Points - Insecticide.

The Set Points are used in the vDrive Insecticide Control page. The values displayed in the eight boxes are quick adjust rates. Enter rates that the insecticide will be applied at. To set a rate, select a box and enter a value in pounds (or ounces in metric mode) per acre.



SRM System Calibrations

For vDrive Insecticide to function, the planter must be lowered and there must be speed.

1. Ensure that the Lift Switches have been calibrated and are functioning correctly. The Lift Switch systems page can be found by navigating to “Setup” – “Systems” – “Lift Switch”. See the 20|20 Operator’s Guide for more information on calibrating Lift Switches.
2. Both GPS and Radar should be used as speed sources. If Radar is installed, verify that the Radar calibration has been completed. The Radar Status systems page can be found by navigating to “Setup” – “Systems” – “Radar Status”.
3. The PDM must be setup correctly for vDrive Insecticide to have optimal performance. Ensure the PDM Mounting Location & Orientation are set correctly, and zero the gyro.

Note: In addition, for vDrive Insecticide to function, it must be configured on the display and the master plant switch on the Cab Control Module must be in the up position.

Note: If the Lift Switches, Radar, and PDM have already been configured and calibrated during the setup of a different product (e.g. vDrive) this process does not have to be repeated.

Home Screen

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

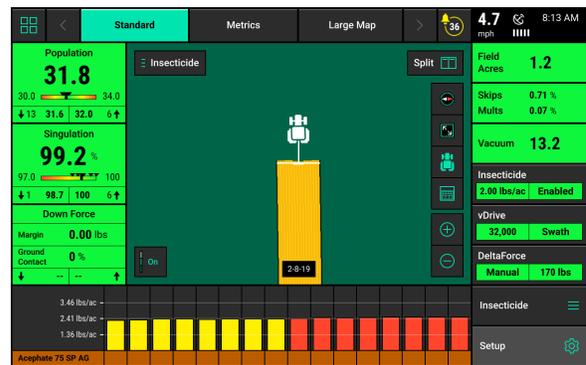
vDrive Insecticide Control

The vDrive Insecticide control is button is located on the home screen. The control button also shows the status of the vDrive Insecticide system. If the vDrive Insecticide control button is not on the home page it will need to be added. See the 20|20 operator’s guide for assistance in editing the home screen layout.

Indicators for the system status of the vDrive Insecticide Control button:

Enabled – system is ready and has been enabled.

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



Green: System is functional and has a commanded rate.

Yellow: There is a prescription assigned to the active field, but the system is set to plant a manual rate.

Red: Master plant switch is off.

Color indicators for the commanded rate portion of the vDrive Insecticide Control button:

Green: a Calibration Mass has been entered for the assigned Insecticide.

Red: a Calibration Mass has not been entered. Set a calibration mass for the assigned insecticide in the vDrive Insecticide setup.

A rate will be displayed if a single rate is being commanded across all rows.

“Multiple Rate” will be displayed if more than one rate is being commanded for different groups of rows.

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



Rate Control

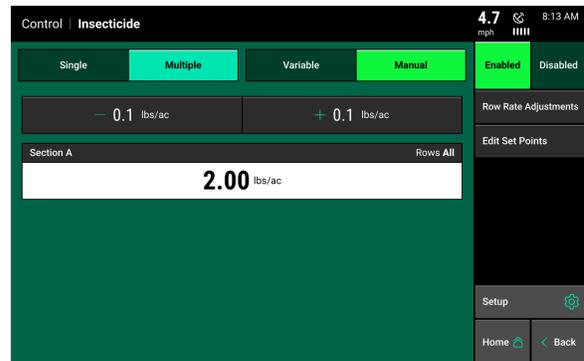
Press on the vDrive Insecticide button to access the Control Screen. To manually assign or adjust the application rate, select “Manual” at the top of the screen. If multiple insecticides were configured in the vDrive Insecticide setup, select between “Single” or “Multiple”. If only a single insecticide was configured, only “Single” can be used.

Single – Assigns the same application rate to all rows. Select a preset population from the list of population set points displayed on the screen (configure this list using the “Edit Set Points” button on the right hand side of the screen), use the +/- buttons to increase the rate by one tenth of a pound per acre, or tap on the white box displaying the current application to manually enter a rate.



The values displayed in the eight boxes below the active rate are quick adjust rates. Set these rates by selecting the “Edit Set Points” button on the right hand side. Once set, select a rate to quickly jump to instead of typing in the rate or using the +/- buttons to adjust it.

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



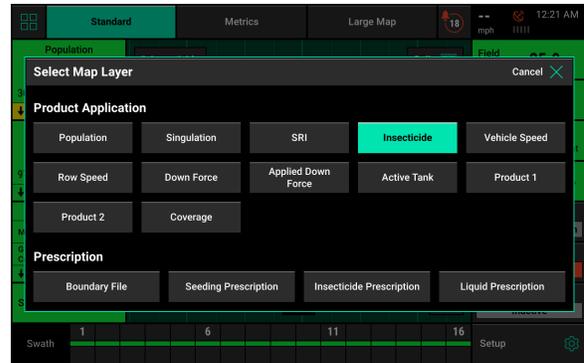
Variable – If an Insecticide Application prescription is assigned to the active field, “Variable” mode will be selected as the default setting. When in “Variable” mode, the system will control to the application prescription assigned to the active field.

Manual – Set an application rate for the vDrive Insecticide system to apply. This ignores any assigned insecticide application prescriptions and continues to plant at the assigned manual rate. When in “Manual” select either Single or Multiple when setting rates. “Manual” will turn yellow on both the vDrive Insecticide Control page and the Home Screen if a manual rate is selected when there is also an insecticide application prescription assigned to the active field.

Additionally, shortcut buttons to the “Row Rate Adjustments”, “Edit Set Points”, and the vDrive Insecticide “Setup” are included on the right hand side of the screen.

vDrive Insecticide Mapping

An Insecticide map is available to view on the home screen for vDrive Insecticide systems. The map will display the commanded vDrive Insecticide rates for each row. To view the Insecticide map, select the current map type name that is displayed at the top of the map. A list of all available map types available to be viewed will be displayed. Select “Insecticide” under the Product Application heading.



Insecticide Prescriptions

Importing Files into the Display

Variable rate Insecticide prescriptions can be implemented by the vDrive Insecticide system on a planter as long as the prescription is in the form of a shapefile and written in terms of pounds per acre (kilograms per hectare).

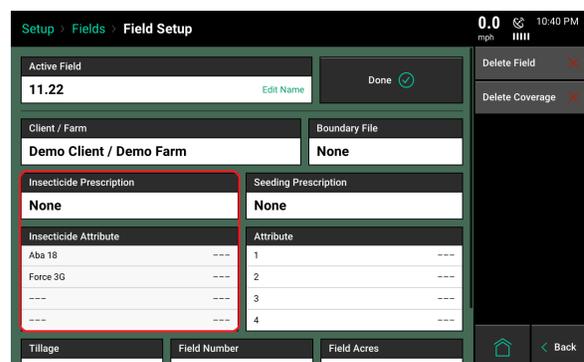
Prescriptions must be in the form of a shapefile and include at minimum the .shp, .shx, & .dbf file extensions. Load all of the files on the root of the USB drive or in a folder titled “Sendto2020”. Insert the USB drive into the side of the display. Then select “Setup” – “Data” – “Import” – “Prescription/Boundary”.

Once prescriptions have been imported into the display, they must then be assigned to the appropriate fields. Press “Setup” – “Fields” – Select either the Active Field or another Field name (selecting a different Client or Farm name may be required to locate the appropriate Field name). The Field Setup page has options to assign both a Boundary and Prescription.

Note: Only ONE prescription can be assigned to each individual field. Prescriptions can be for seeding, liquid, and/or insecticide. To combine multiple types into one prescription, create separate attributes within the same prescription shapefile for seeding, liquid, and insecticide. If no insecticide prescription/attribute is assigned, a manual rate must be selected in the vDrive Insecticide Control Page.

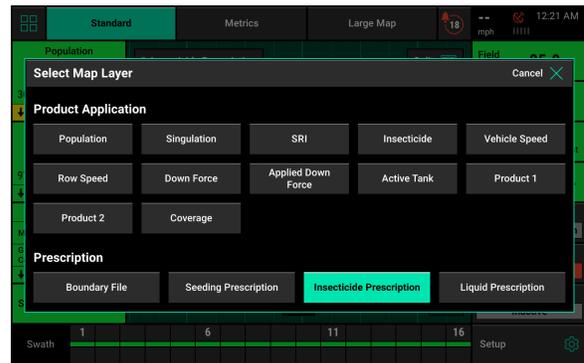
Assigning a Prescription to a Field Name

Note: A field can have either a Boundary or a Prescription, both a Boundary and Prescription, or neither assigned to it. A boundary file is only used for swathing off rows on the planter if they go outside of the boundary. A boundary file can have both an exterior and interior zones.



To assign an Insecticide Prescription/Attribute to the selected field, press the “Insecticide Prescription” button. (If there is not an option for an Insecticide Prescription then the vDrive Insecticide system has not been configured on the display.) This will display ALL shapefiles that have been imported into the display. Choose the appropriate prescription for the field name. After selecting the prescription name, an attribute MUST be selected for each rate section that has been setup for the planter. An attribute is based on a defined product and contains a single defined rate for each management zone, and is defined/named during the creation of the prescription. (Insecticide attributes should be written in pounds per acre.) A different attribute can be selected for each rate section that has been assigned to a row (allowing each rate section to be controlled by a different attribute/seeding rate), or the same attribute can be selected for each rate section.

Insecticide Prescription files that have been assigned to a field can be viewed on the home screen for the active field. Select the current Map Type displayed at the top of the page to see a list of available map types. Scroll to the bottom of the list and locate the map type called Insecticide Prescription.



Select this map type to view the shapefile that has been assigned to the active field as an Insecticide Prescription. If different attributes are assigned to each rate section, only one attribute can be viewed at a time.

vDrive Insecticide Diagnostic Information

Prior to planting, ensure that all planter diagnostic information is ok. Select “Setup” – “Diagnose”. Everything should be green on the diagnose page. If there is an issue on a row or rows, it will be indicated on the level 1 diagnose page by displaying the system that is having an issue in a color other than green.



Note: Modules may be updating during initial connection. Once updates are complete, all modules should be green. If the modules are not green, confirm that the number of rows and planter setup is correct. If still experiencing issues, refer to the Troubleshooting Guides in the Dealer Service Manual.

Color Legend:

Select “Color Legend” to view an explanation of what each color indicates

Green – the system is working correctly and communications are good. .

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.

The vDrive Insecticide button will be green if the system is working correctly and communications are good. If it is not green, press it to view vDrive Insecticide level 2 row-by-row diagnostics.

Row	lbs/ac		RPM		Supply Volts	Drive Amps	Duty Cycle
	Actual	Cmd	Actual	Cmd			
1	Not Apply	2.0	0.0	0.0	12.6	0.00	0%
2	Not Apply	2.0	0.0	0.0	12.6	0.00	0%
3	Not Apply	2.0	0.0	0.0	12.6	0.00	0%
4	Not Apply	2.0	0.0	0.0	12.5	0.00	0%
5	Not Apply	2.0	0.0	0.0	12.4	0.00	0%
6	Not Apply	2.0	0.0	0.0	12.5	0.00	0%
7	Not Apply	2.0	0.0	0.0	12.4	0.00	0%
8	Not Apply	2.0	0.0	0.0	12.5	0.00	0%
9	Not Apply	2.0	0.0	0.0	12.5	0.00	0%
10	Not Apply	2.0	0.0	0.0	12.4	0.00	0%
11	Not Apply	2.0	0.0	0.0	12.5	0.00	0%
12	Not Apply	2.0	0.0	0.0	12.4	0.00	0%
13	Not Apply	2.0	0.0	0.0	12.4	0.00	0%

System Status Indicators:

- Lift State: Lowered
- Radar Speed: Wait Signal
- GPS Speed: 0.0 mph
- FWD Accel: 0.000 ft/s/s
- Master Plant: On
- Turn Rate: 0.99 deg/s

LBS per Acre (lb/ac) Actual – Estimated application of product based on Actual RPM and application targets.

LBS per Acre (lb/ac) Cmd – Commanded RPM based on RPM and Application rates.

RPM Actual – Actual RPM of the meter.

RMP Command (Cmd) – The RPM the meter is being commanded to turn at to meet application rates.

Supply Volts – Voltage at vDrive Insecticide Module.

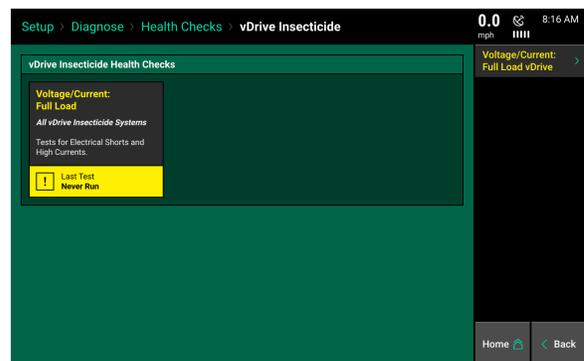
Drive Amps – vDrive Insecticide motor current draw in amps.

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

At the bottom of the vDrive Insecticide diagnostic page there are indicators of the state for the Lift Switch, Radar Speed, GPS Speed, Forward Acceleration Reading, Master Plant Switch, and the Turn Rate (degree the planter is turning based off the gyro in the PDM).

vDrive Insecticide Health Checks

Always perform a health check after installation or sitting for long periods of time. Access the vDrive Insecticide health check page by selecting “Setup” – “Diagnose” – “Health Checks” or by pressing the vDrive Insecticide Health Checks button on the vDrive Insecticide level 2 diagnose page. There is one vDrive Insecticide Health Check that can be run.



This health check will test the vDrive Insecticide system for electrical shorts and high currents. The meters will spin, so if there is insecticide in the boxes it will be dispensed.

Insecticide is not required for this health check. Follow the onscreen instructions to complete the test.

A 'report card' will be given for each row after completion of the Health Check.

Pass/Fail – Indicates if the row passed or failed the health check

Volts Min – minimum voltage during the health check

Volts Avg – average voltage during the health check

Amps – amps needed to perform the health check at each rps

DC Min – Duty Cycle Minimum at each rps.

DC Max – Duty Cycle Maximum at each rps.

Stability – Measures the variance of the drag on the motor. The higher the stability the smoother the motor is turning.

vDrive Insecticide												
Row	Pass/Fail	Volts		Speed Test at 9.57 RPS or 15 RPM			Speed Test at 63.8 RPS or 100 RPM					
		Min	Avg	Amps	DC Min	DC Max	Stability	Amps	DC Min	DC Max	Stability	
1	Pass	12.5	12.6	0.08	6.84	7.52	0.00	0.40	35.8	36.1	0.00	
2	Pass	12.5	12.7	0.00	6.84	7.52	0.00	0.39	35.9	36.1	0.00	
3	Pass	12.5	12.6	0.06	6.84	7.52	0.00	0.34	35.8	36.1	0.00	
4	Pass	12.4	12.6	0.08	6.84	7.52	0.00	0.41	36.0	36.3	0.00	
5	Pass	12.3	12.5	0.08	6.84	7.42	0.00	0.38	36.0	36.3	0.00	
6	Pass	12.4	12.6	0.00	6.93	7.52	0.00	0.29	36.0	36.3	0.00	
7	Pass	12.3	12.5	0.06	6.84	7.52	0.00	0.33	35.8	36.2	0.00	
8	Pass	12.4	12.6	0.00	6.93	7.52	0.00	0.29	36.1	36.4	0.00	
9	Pass	12.4	12.6	0.09	6.93	7.52	0.00	0.44	34.3	36.4	0.00	
10	Pass	12.3	12.5	0.06	6.93	7.52	0.00	0.34	36.3	36.6	0.00	
11	Pass	12.3	12.6	0.06	6.93	7.71	0.00	0.31	36.3	36.6	0.00	
12	Pass	12.3	12.5	0.07	6.93	7.42	0.00	0.37	36.2	36.6	0.00	