vApply Granular Gen 3 Ops Guide

Precision Planting®

955804_3 07/07/2021

Contents

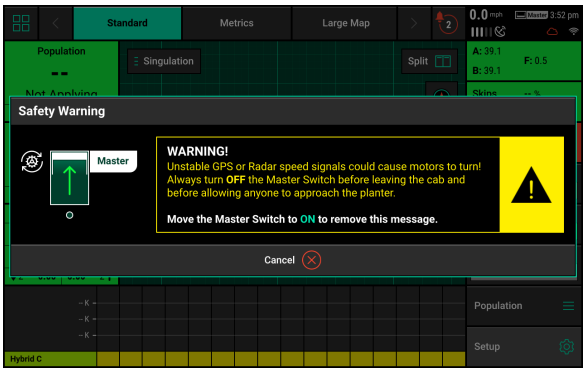
vApply Granular Requirements

There are 6 requirements in the 20|20 for the vApply Granular System to function:

1. The vApply product must be configured in the 20|20.
2. There must be a speed.
3. The Master Plant Switch on the Cab Control Module must be in the up position.
4. The implement lift switch must register “lowered” in the 20|20.
5. The product must be “Enabled” in the control page.
6. An application rate must be set.

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.

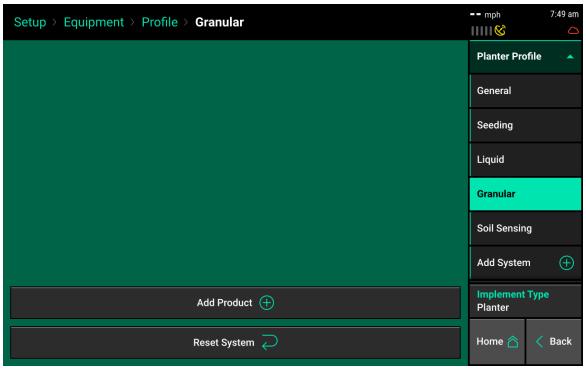
Master

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.

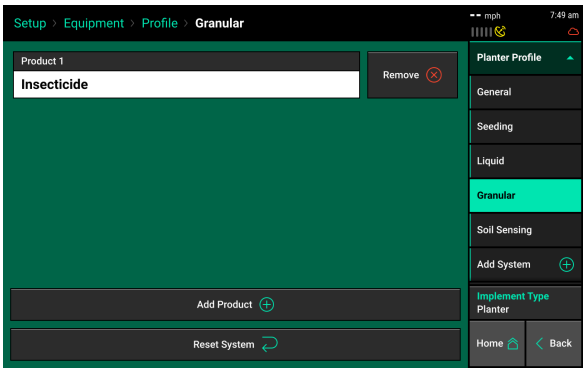
Configuring the 20|20 for vApply

From the Home screen go to Setup — Equipment. Press ‘Add System’ on the right side of the screen to add a Granular system.

Select ‘Add Product’ at the bottom of the screen to add a Granular system.



Once a Granular system has been configured, it will display at the top of the screen. The Remove button can be used to remove the product, and the Reset System button at the bottom of the screen can be used to reset all Granular products.



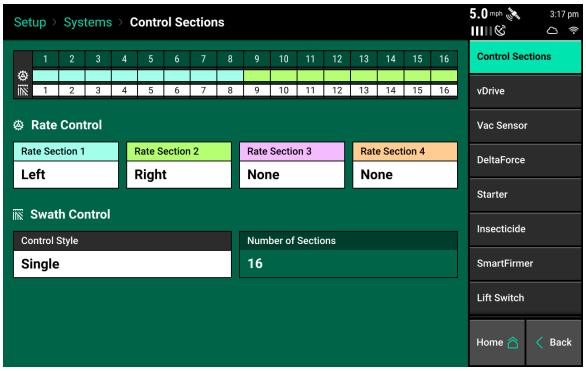
Control Sections Setup

Navigate to Setup — Systems to configure the Control sections of this implement. The Control Sections will apply to all rate control products configured on this monitor. This includes seeding control, liquid fertilizer control, and granular fertilizer control.

Note: This section only applies to 2020.1.x and newer software, for 2020.0.x and older software, proceed to the next section of the manual.

Rate Section Setup

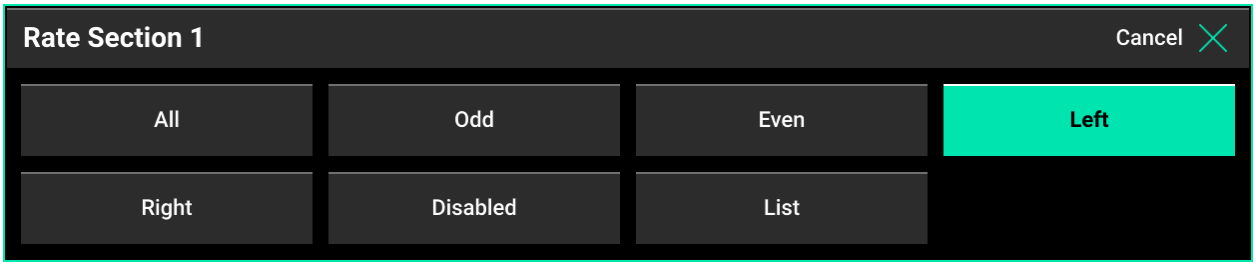
Setup the “Rate Control”. Rate Control Setup allows the operator to determine which rows to set to certain rates. The monitor can control up to 4 different rate sections at once. Each rate section can be assigned a different target rate or prescription attribute. A rate section can be any combination of rows.



If all rows will be controlled with the same rate or the same prescription attribute only one rate section needs to be configured. If only one rate section will be used select “Rate Section 1” and then select “All”. Use multiple rate sections when controlling different rates between rows or sections.

To setup a rate section, select one of the four Rate Sections. Assign appropriate rows to the rate section. This may be Odd, Even, Left, Right or List. When selecting “List”, define which rows are to be used by touching those rows numbers so they turn green.

Note: Ensure that all rows are assigned to a rate section. Any row not assigned to a rate section will not operate.



Swath Setup

Set up the Swath Control. Swath Section Setup allows the operator to divide the planter into different swath sections. There are four different options for Swath Control.

Note: If setting up multiple Swath Sections, they **do not** have to be the same as Rate Sections.

Disabled — Rows with not shut off seeding when entering an area that is already planted.

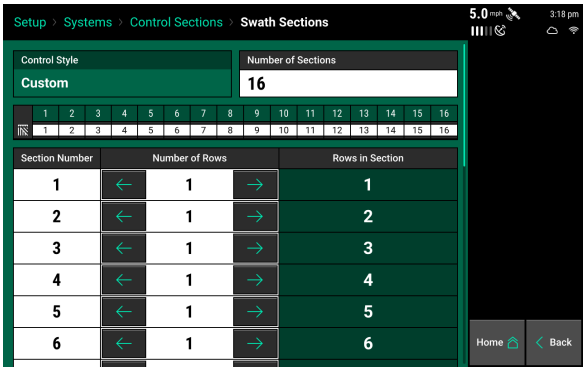
Single Row — Each row will shut off individually as that row enters an area that is already planted.

Dual Ends — The outside two rows on each end of the planter are linked together. The inside rows are single row swath. Generally used with WAAS GPS correction.

Custom — If one of the pre-set settings is not acceptable, a custom setting can be selected. This will allow the operator to group any rows together for swath control.

Custom Swath Setup

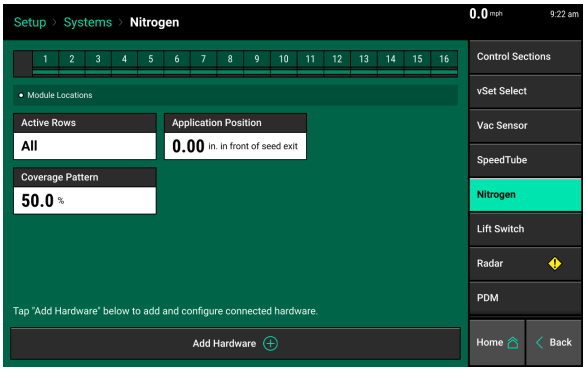
If Custom is Selected:



1. Select the total number of sections to set up.
2. For each section select the number of rows by pressing on the white box in the Number of Rows column and manually enter a value or by using the arrows to increase or decrease the number of rows in a section number
3. The Rows in Section will auto-populate as the Number of Rows is determined.
4. If a section does not have rows assigned to it, that section number will be ignored.

Setting up The vApply Granular Module

Once a granular system has been configured in the equipment setup, the granular product name will show up in the Systems tab. Navigate to Setup — Systems — Product Name to configure the granular system.

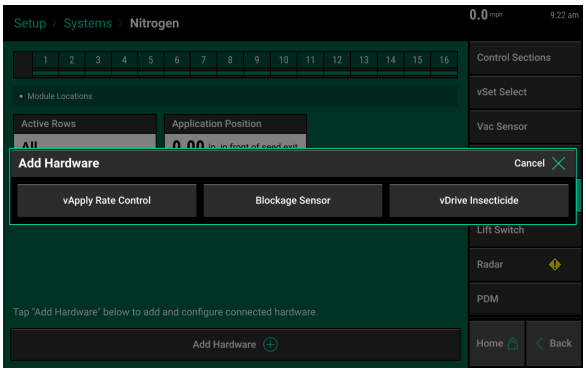


Active Rows: Select what rows are active for this product

Application Position: Input the distance — in front of or behind the seed exit — that the fertilizer application point is.

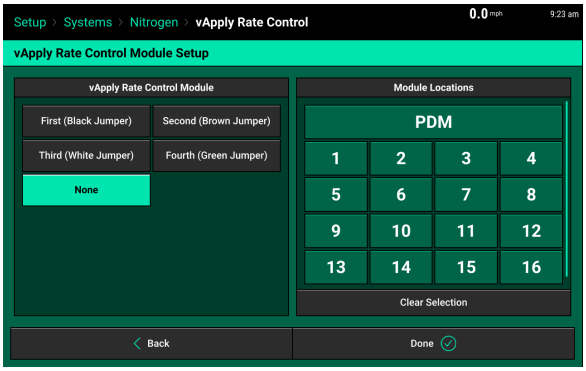
Coverage Pattern: Select what percent of a swath section is into coverage before control is stopped. Ex: If set at 50 percent on a system with motor/pump control only (one large planter wide swath section), 50 percent of the planter will be into a swathed area before the motor/ control is stopped. Set between 1 and 99.

Press the ‘Add Hardware’ button at the bottom of the screen to add granular hardware to the system. Select the vApply Rate Control module.



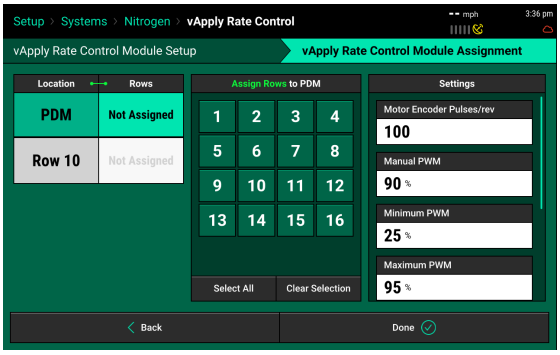
Note: For vDrive Insecticide setup, refer to the vDrive Insecticide Operators Guide.

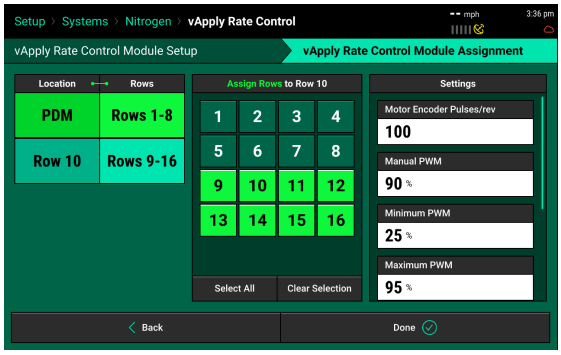
Select “vApply Pump Control Module” and select the jumper color that is connected into the Granular Module . Next, select the module location(s) on the right menu.



Note: If multiple modules will be plugged into the same SRM (PDM or row), a different jumper color will need to be used for each module. Please reference the installation guide for more information.

Next, assign any row that will have fertilizer dispensed to it from the motor being controlled by the vApply Rate Control module. If there are multiple modules, each module will need to be set up individually by pressing on the module location.





This page also allows the user to set up the motor and Granular Ratio, which is used for control. If there are multiple motors, touch on the row number under “Location” to toggle back and forth and set each motor up accordingly.

Gear Ratio - Calculated by dividing driven sprocket by drive sprocket. For information on more complex gear ratio set ups, visit the Motor Calibration Sheet on the Precision Planting Cloud (Doc No.955346).

Granular Ratio - pounds (or kilograms) per shaft revolution per row. This number will be zero upon initial set up. The user will have to input a number here to get started. This ratio could vary greatly from planter to planter, so don't worry about finding the perfect ratio. The proper ratio can be input after the Motor Calibration is complete. This could be changed based on the results of the calibration.

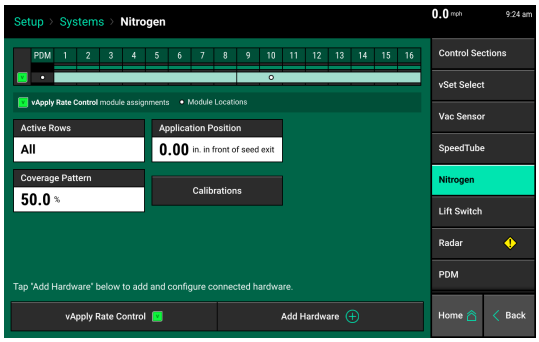
Motor Encoder Pulses/rev - Precision Planting hydraulic motors should be set to 100, see manufacturers recommendations for all others. Must be set when running vApply Granular.

Manual PWM - It is not recommended to change this unless being told by someone with Precision Planting.

Minimum PWM -The Minimum PWM percentage the user would ever want to run. It is not recommended to change this unless being told by someone with Precision Planting.

Maximum PWM -The Maximum PWM percentage the user would ever want to run. It is not recommended to change this unless being told by someone with Precision Planting.

When setup is complete, the product page will display a summary of the configured module location(s) and section(s) at the top of the screen.

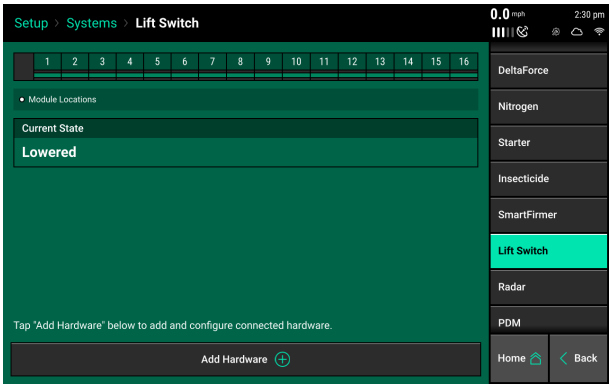


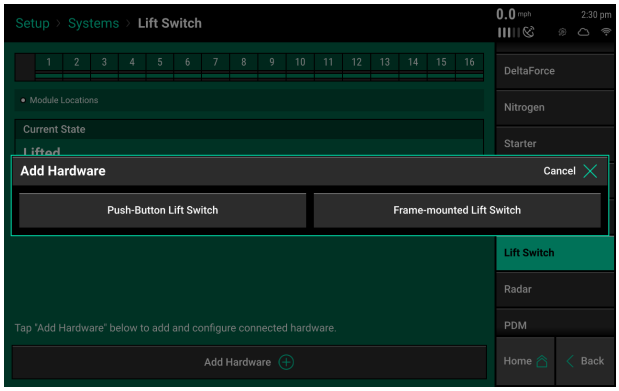
Lift Switch

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.

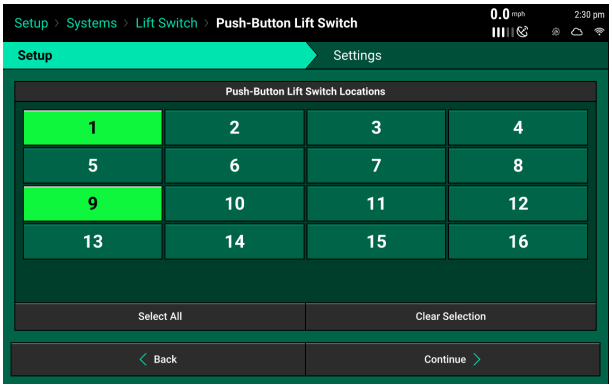
Note: Configuration of lift switch row locations is only required on 2020.1.x and newer software.

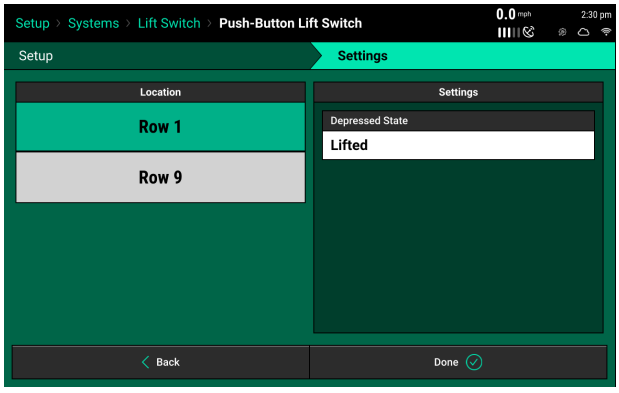




Push Button Lift Switches

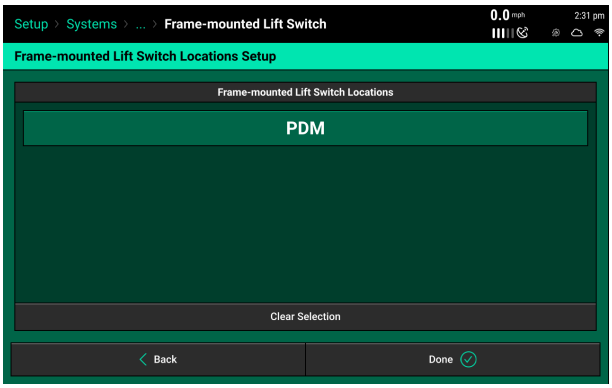
Select what rows have push button lift switches installed, then press ‘Continue’. In the settings page, select if the push button is depressed (pushed in) when lifted or lowered. A calibration will not need to be performed for push button lift switches.

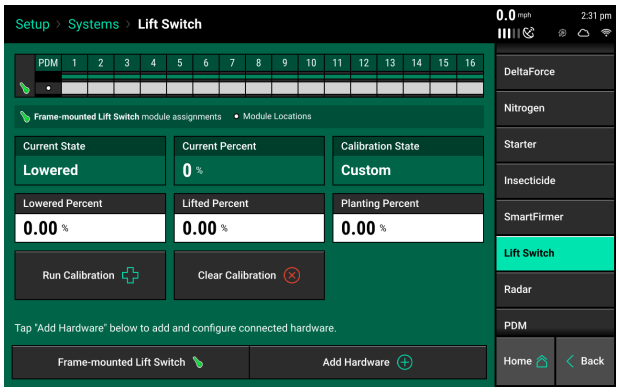




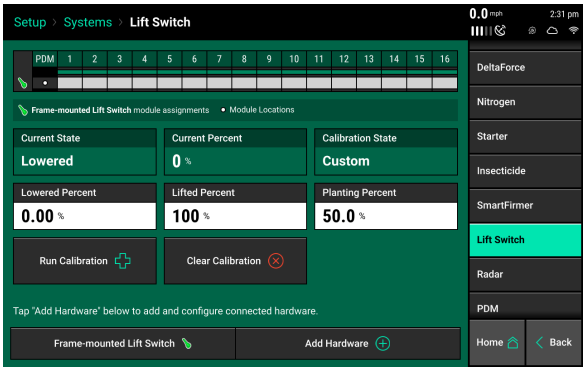
Frame Mounted Lift Switches

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



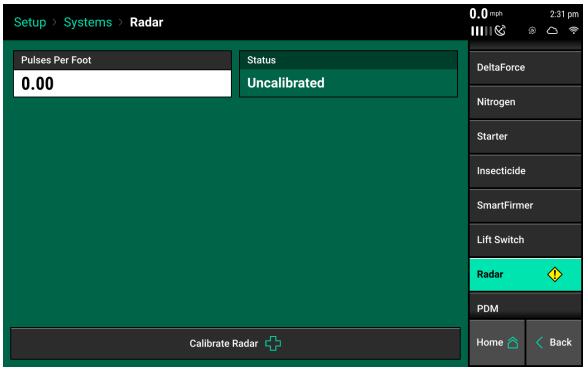
To complete the Lift Switch calibration, press the "Run Calibration" button at the bottom of the screen. Follow the on-screen instructions for the different positions the planter must be in. The results will then be displayed on the main Lift Switch Page. For issues with the lift switch not calibrating 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.



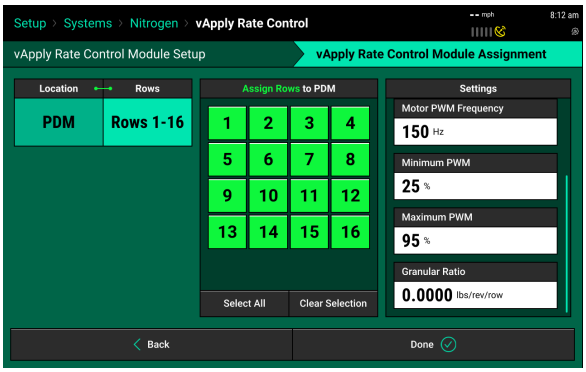
Select the “Calibrate Radar” button at the bottom of the screen and then follow the onscreen instructions.

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.

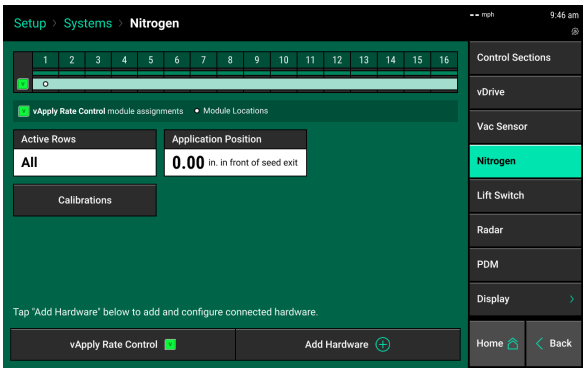
vApply Granular Calibration

For the test to begin, the user must have a Granular Ratio input as a starting reference. To input a Granular Ratio, click on “vApply Rate Control” in the product setup screen and then click “Continue” on the module assignment page. In the motor settings page find the box for the “Granular Ratio” and input a starting value.

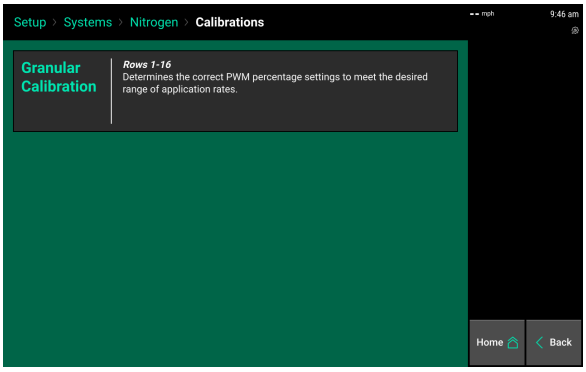


Note: Some manufacturers provide a “displacement” or “output” amount to use. If this information is not available, generally .001 lbs/rev/row is a reasonable starting ratio.

After the product has been completely set up, product calibration can be completed. Select “Calibrations”.

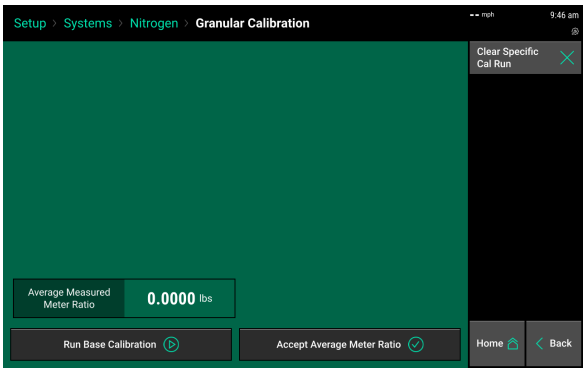


Proceed to the picture on the right where a “Granular Calibration” box will appear for all motors assigned under this product. Select the “Granular Calibration” box.

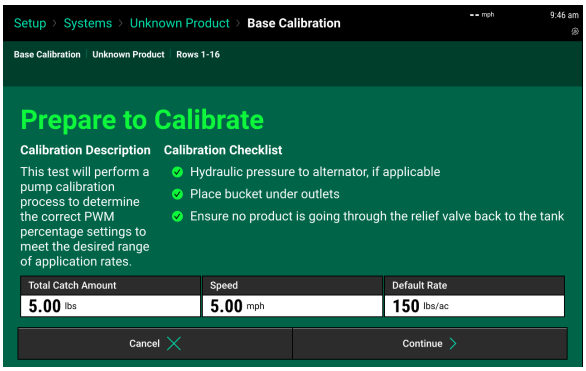


Next, select “Run Calibration”.

Note: The calibration will require the user to “catch” and measure total output. Be prepared to do so before starting the calibration.

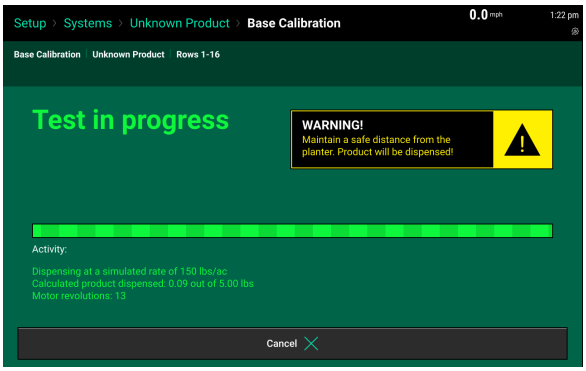


Input a desired amount to catch, speed, and default rate. The speed should be as close to the planters actually planting speed as possible. The default rate should be the rate the grower is using most often.



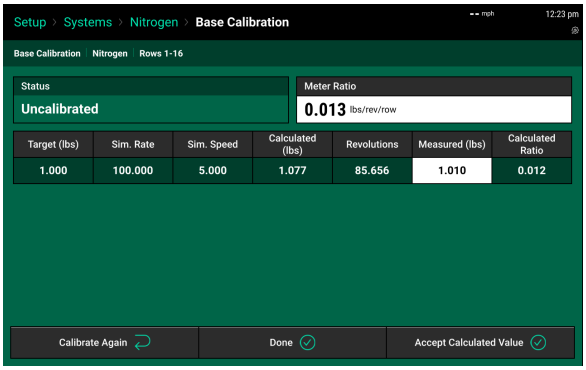
Once this is complete make sure all of the items on the “Pre-test Checklist” are complete and select “Continue”.

The test will run until the total catch amount that was entered in the calibration page is achieved per row based on the granular ratio that was initially input. Catch the output from this motor.



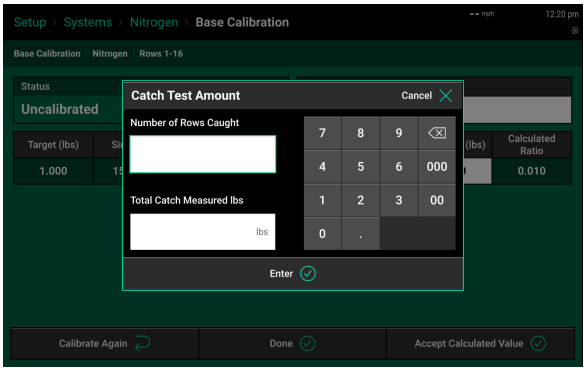
Note: It is recommended to catch the total output of the motor (or meter). If that is not possible, catching multiple rows will help to get a more accurate representation of the Granular Ratio on the planter.

When the test is complete, the 20|20 will take the user to the results page. To input the amount that was caught, click on the white box under “Measured”.

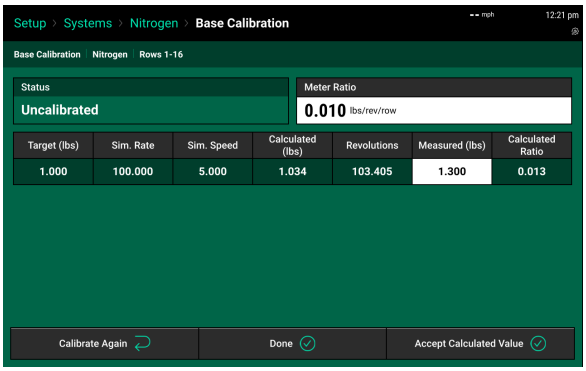


A “Catch Test Amount” box will then appear. Input the number of rows product was caught from. Then input the total amount caught from those rows. When complete, hit “Enter”.

Note: Be sure to subtract the weight of the container from the total amount caught.



If not all rows are caught, the 2020 will do the math to calculate the Granular Ratio (lbs/rev/row) and display that in the box labeled “Calculated Ratio”.

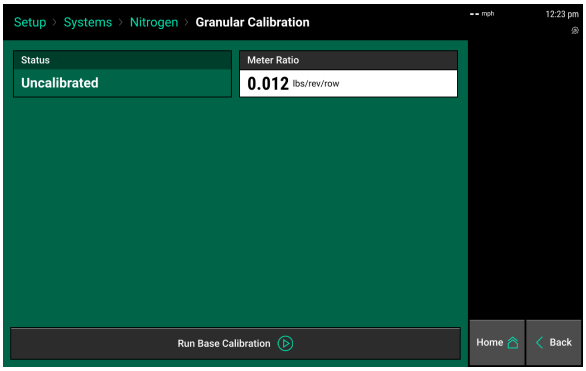


If the user would like for the “Calculated Ratio” to become the “Granular Ratio” select the button marked “Accept Calculated Value” and the ratio will be saved. If the user does not want to save the proposed value, select “Done” to continue on with the current Granular Ratio, or “Calibrate Again” to rerun the calibration.

Once an acceptable Granular Ratio has been reached, select “Done” to complete the calibration.

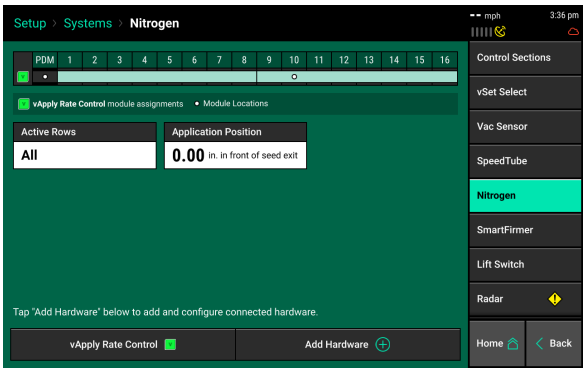
The Granular Ratio will now be displayed in the Granular Calibrations screen.

Note: It is not possible to go back and access old calibration screens once the user has left. The only way to re-access the calibrations results screen is to run the calibration again.

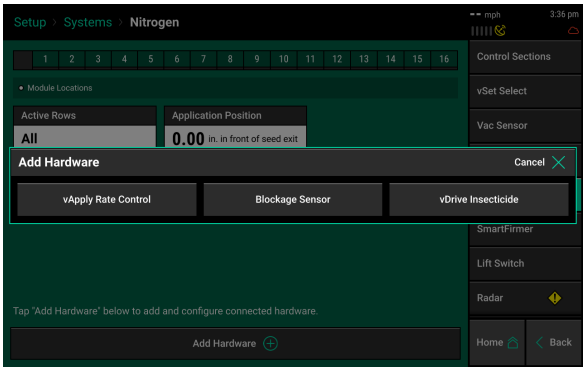


Setting Up Blockage Sensors

From the Home screen, navigate to Setup — Systems, and select the product the blockage sensors are monitoring.

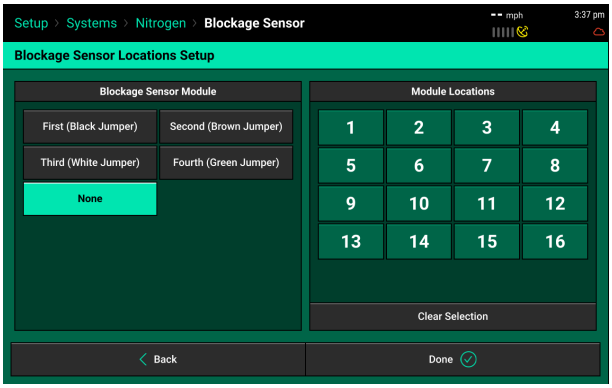


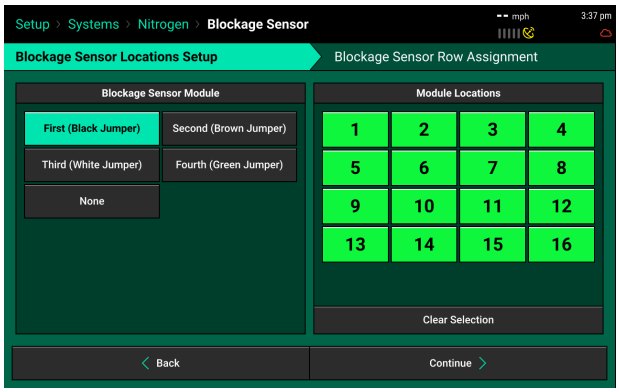
At the bottom of the page, select ‘Add Hardware’ to add the Blockage Sensors.



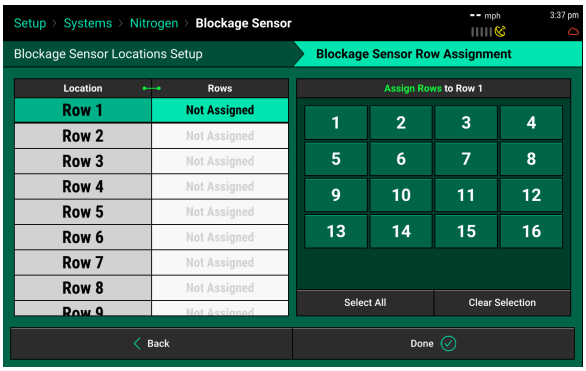
Select the jumper color that is connected into the Blockage Sensors. Next, select the module location(s) on the right menu.

Note: If multiple modules will be plugged into the same SRM (PDM or row), a different jumper color will need to be used for each module. Please reference the installation guide for more information.

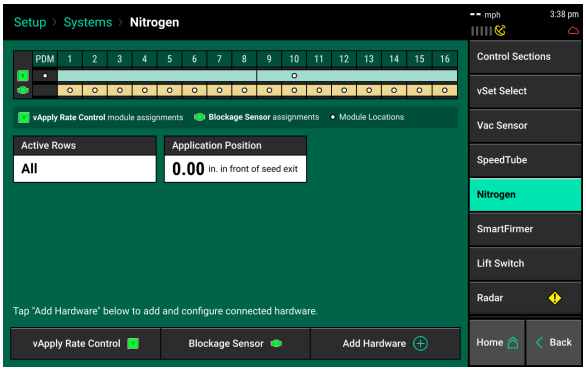




Assign the Row number(s) each sensor is monitor to each corresponding blockage sensor. No more than one blockage sensor can be installed per row.

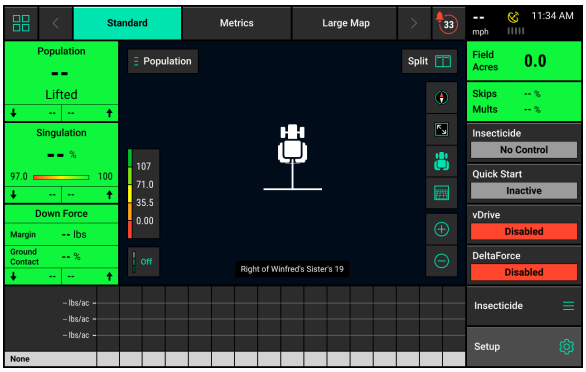


When setup is complete, the product page will display a summary of the configured module location(s) and section(s) at the top of the screen.

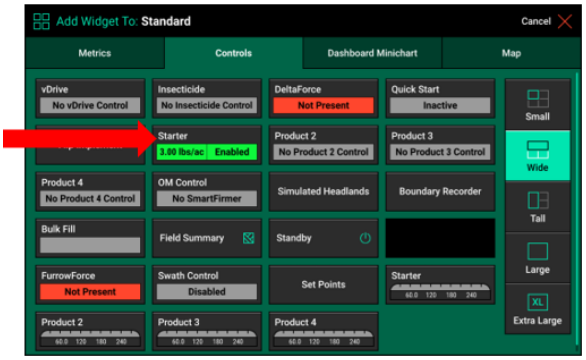


vApply Control Page

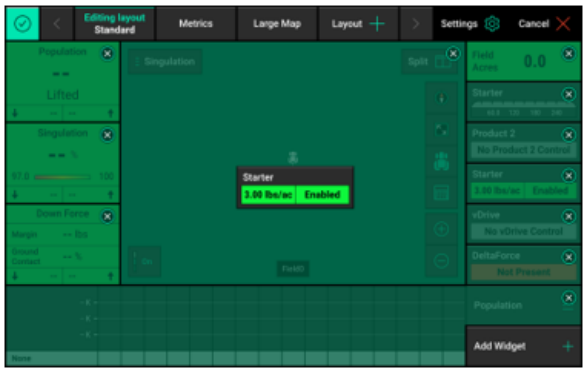
The product control page is the central location for rate control and it is where the product in enabled. To put the control button on the home screen, tap the button with four boxes in the top left corner of the 20|20.



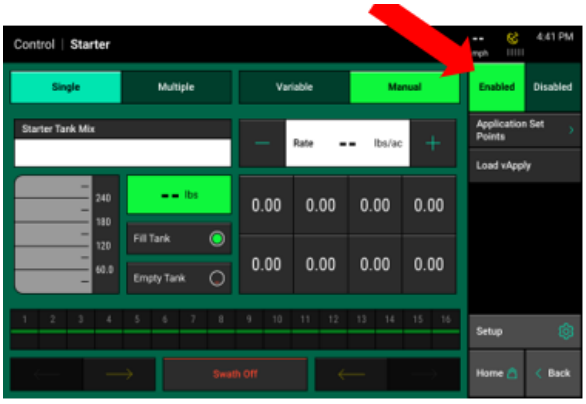
The control button can be found under the "Controls" tab and will be indicated by the product nickname that was assigned during set up. The control button is available in various sizes. Select the size that is appropriate for the desired area on the 20|20.



Drag the control button into the desired spot and click the check mark in the upper left corner to complete the button assignment process.

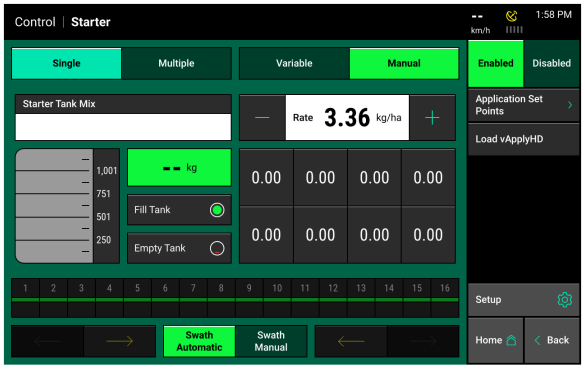


Tap on the control button and select "Enabled" on the product control page to enable the product.



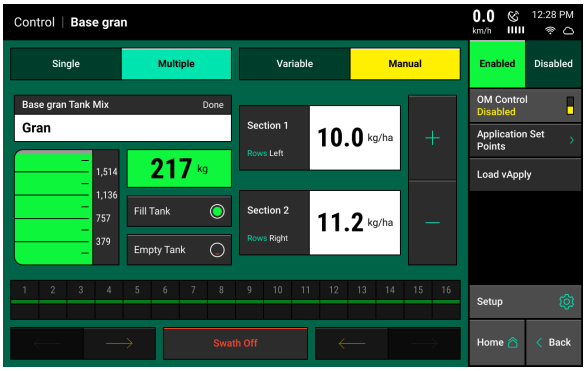
Rate Control

If a variable rate liquid prescription is being used the status button will say “Variable”. The current rate being applied will be displayed in the white box.



Select “Manual” to switch to manual control. This ignores any prescription that may be assigned and applies a constant rate. If no prescription is assigned to the active field, Manual mode will automatically be selected. When in Manual mode, the rate displayed in the white box is the rate being commanded. This rate can be adjusted manually by pressing on an Application Set Point button and selecting one of eight preset rates (set points can be set by pressing on an Application Set button found near the top of the page), adjusting one KG/HA at a time by pressing the plus or minus buttons to either increase or decrease the rate by 1 KG/H, or by pressing on the white box and typing the rate.

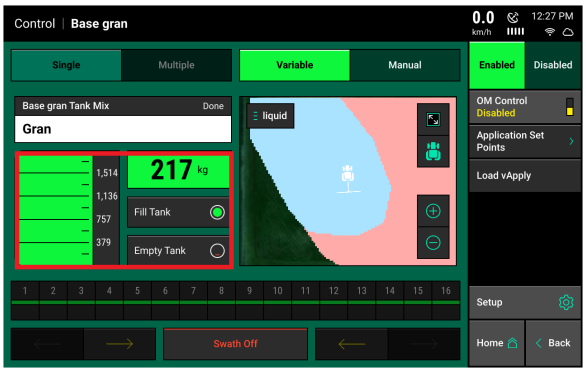
Manual Mode



When in Manual mode the operator can choose a single rate or multiple manual rates. Use the “Single” and “Multiple” buttons to change between a single rate or multiple rates being applied. If “Single” is selected, the planter will apply a single rate across all rows. If “Multiple” is selected, a different rate can be assigned to each “motor/module”. Multiple mode or multiple rate sections will follow the vDrive rate section setup. Meaning the rate sections setup for Granular must match the vDrive rate sections setup for the manual function to work properly. Select each rate sections rate being applied by selecting each individual box and either typing in a rate or select a rate from the liquid set points. If the plus and minus buttons are used all rate sections will increase or decrease by 1 gal/ac.

The tank level can be managed from the vApply control page. The chart on the right indicates the current amount of fertilizer remaining in the tanks (assuming that the tank level was initially set correctly). The total volume of the tank will be equal to the tank volume set in the vApply setup.

Select “Fill Tank” to tell the system the tanks are full, “Empty Tank” to indicate an empty tank, or select the volume remaining (indicated by 0.00 Kg in the illustration) to manually enter the weight in the tank.



As fertilizer is applied the volume of the tank will decrease. A tank level metric can be added to the home screen so the operator can view the current volume of fertilizer remaining in the tank. For the “Tank Level” metric to maintain accuracy, a tank volume must be specified (selecting “Fill Tank” or manually entering a tank volume) when fertilizer is added to the tanks.

Note: Alert and Alarm settings for tank level can be configured by going to Setup – Crops – Application Alerts.

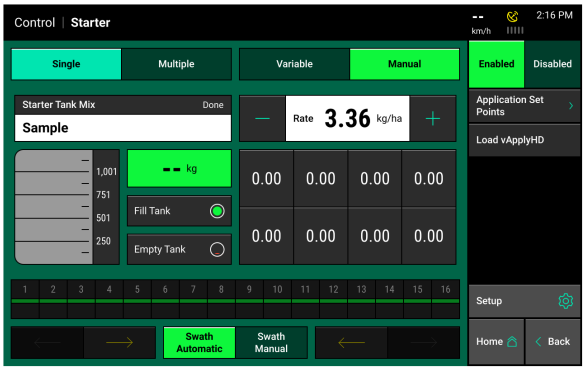
Load vApply

There is also a button to “Load vApply” on the navigation pane of the product control screen. This button allows the user to spin the granular motor to load the meter. To perform this test, click the “load vApply” button and hold up the “autoload” switches (first and third switches on the CCM). There is no signal to show the meters are loaded, as long as the autoload switches are held up the motors will turn.

Note: The user must select “Load vApply” to load the granular meter. Simply holding up the autoload switches will spin the vdrive motors and may cause unwanted seed to spill.

Tank Mix

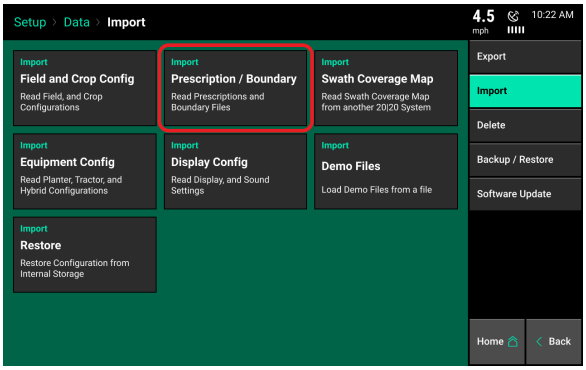
The Tank Mix is optional information that can be added to help keep track of what mix is being applied to a field (similar to a hybrid/variety). Tank mixes are made up of a carrier and ingredients along with the volume of each. This way the exact mixture being applied to a field can be recorded. Once tank mixes have been created, they are saved and can be selected at any time.



Prescriptions and Boundaries

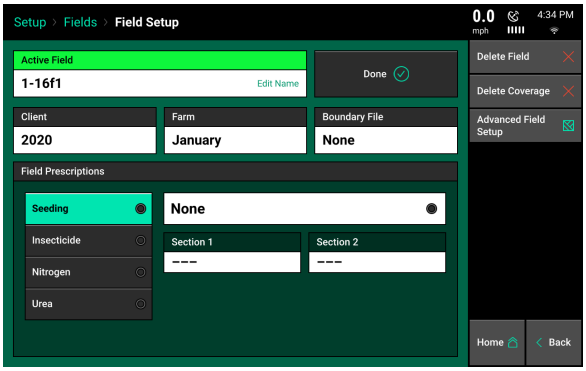
Importing Files onto the Display

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



Assigning Prescriptions and Boundaries to a Field Name

Once Prescriptions/Boundaries have been imported into the display, they must then be assigned to the appropriate field names. To assign to a field select "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: 2020.0.x and Older Software Only: 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 for seeding, liquid, and insecticide. If no seeding prescription is assigned, a manual rate must be selected in the vDrive Control Page.

Note: A field can have either a Boundary or a Seeding Prescription, both a Boundary and Seeding 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.

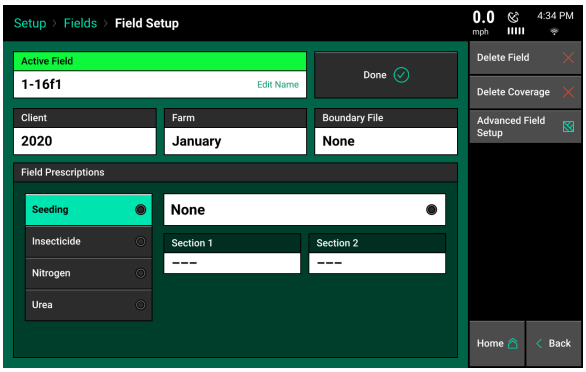
Note: The option to assign a prescription will only be available if vDrive is configured as the Drive Type and a rate section has been configured.

Boundary:

To assign a Boundary File to the selected field, press the "Boundary File" button. This will display ALL shapefiles that have been imported into the display. Ensure that the appropriate boundary file is selected. After selecting the boundary file name, an attribute can be selected. It is not necessary to select an attribute for a boundary file.

Note: Boundary files that have been recorded by the display can also be assigned to the field using the same process.

Seeding Prescription:



To assign a Seeding Prescription to the selected field, press the "Seeding Prescription" button. 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. A different attribute can be selected for each rate section (allowing each rate section to be controlled by a different attribute/seeding rate), or the same attribute can be selected for each rate section.

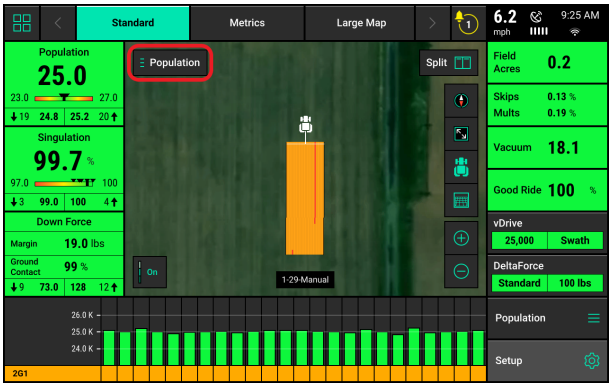
The name of the prescription assigned to the field will be displayed in the Seeding Prescription box while the Attribute names assigned to rate sections will be displayed in the Attribute box.

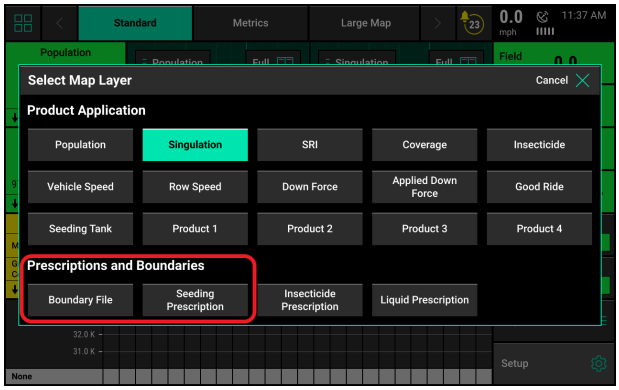
Prescription & Boundary Processing Modes

Under the Advanced Field Setup screen there is an option to adjust the Prescription Polygon Processing Mode. While this mode can be adjusted, the "Standard" setting is the default setting and is the processing mode most commonly used. Changing the mode to "All Exterior" adjusts the way the monitor reads the polygons that create the different zones. They are changed so the display reads all the zones as exterior polygons (ignores interior polygons). This polygon processing mode should only be changed if there are issues with the display correctly reading the prescription or boundary file.

Viewing the Boundary and Prescription

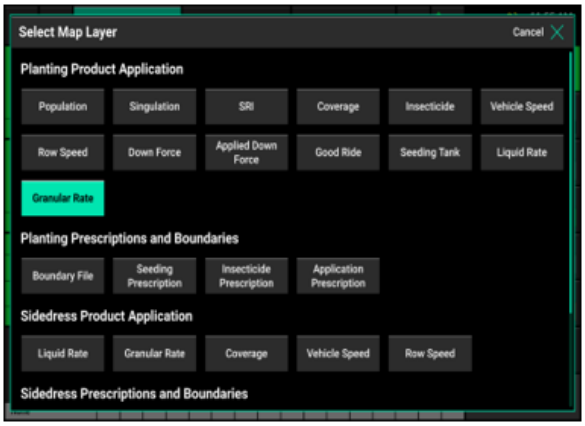
Boundary and Prescription files that have been assigned to a field can be viewed on the home screen for the active field. Select the current Map Type displayed at the top of the page to see a list of all available map types. Scroll to the bottom of the list and locate the two map types called Boundary File and Seeding Prescription. Select these map types to display the Seeding Prescription map or Boundary map assigned to the active field on the home screen.





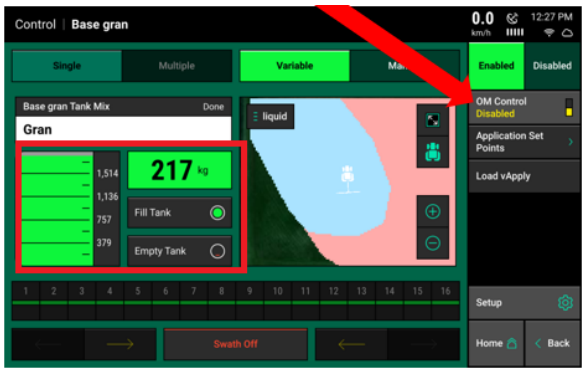
Mapping

A map will be built on the 20|20 of the commanded Granular rate. Enable the “Granular Rate” map as shows in the picture on the right to view this map.

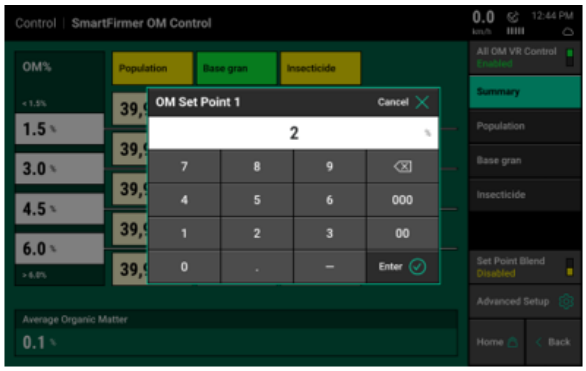


OM Control

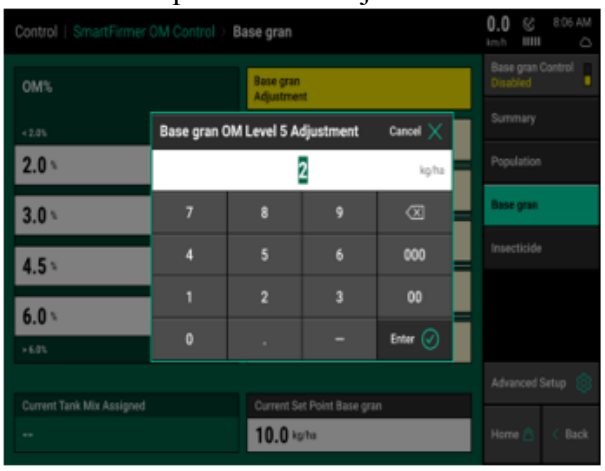
It is possible to automatically change desired fertilizer rate with vApply Granular and OM percentage from SmartFirmer readings. To do so, there will need to be at least 1 SmartFirmer every 120 inches across the planter. To enable this feature, select the “OM Control” button in the vApply Product Control page.

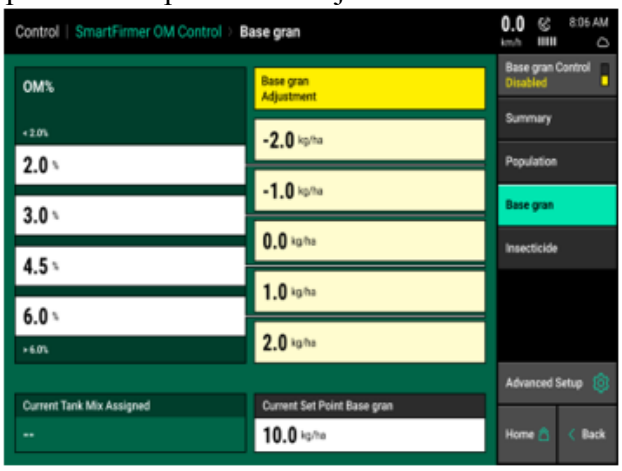


It is possible to change the range between the OM percentages to control to. To do so, click on the box of the OM percentage to be changed and input the new OM percentage.

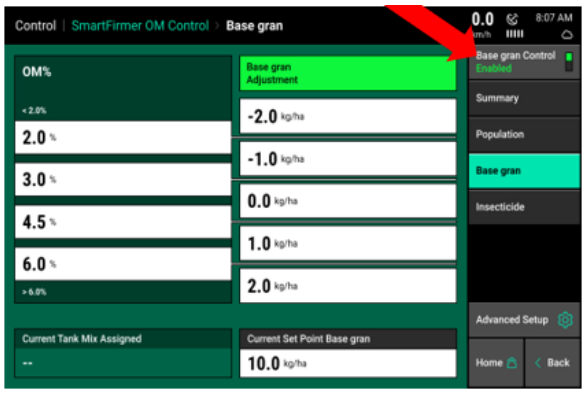


To input the desired rate changes touch on the specific product name in yellow (in this case it is called “Base Gran”). The rates that are input will either add to or subtract from the commanded rate. For example if the command rate is 10 kg/hectare (or lbs/acre) and the user wants to apply 12 kg/ha in an area where the OM is above 6%, input a positive value of 2kg/ha in the box corresponding box. Do not input the desired rate for a given OM percentage as it will add it to the command rate (in this example that would make the rate above 6%, 22kg/ha). The pictures below show how to put in a rate adjustment and an example of a completed rate adjustment table.

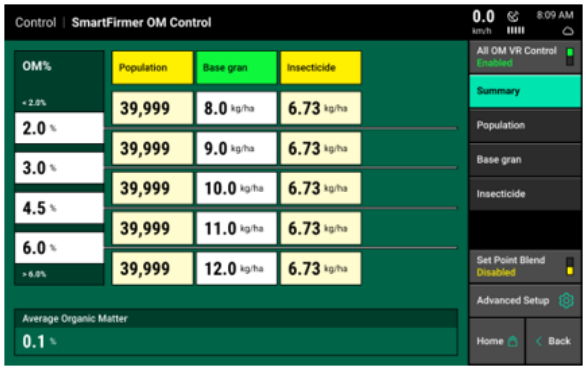




Once the table is completed, enable the Individual Product OM Control. An arrow is shown in the picture to the right to show this button. Once control is enabled the “Adjustment” box with the product name should turn green.



Select “Back” to return to the SmartFirmer OM Control page. The 2020 will apply the rate changes made in the specific product OM Control page and show the new target rate for each OM percentage range.



For more information on SmartFirmer OM Control with other products, as well as OM control with prescriptions, please visit the Smartfirmer Operators Guide (955714).

Note: Precision Planting is in no way making a recommendation of what fertilizer rate to apply, but simply showing an example of how the system could be set up. For a better understand of what fertilizer rates to apply, talk to an agronomist or fertilizer salesman/specialist.

Diagnose Page

To diagnose issues with vApply Granular go to “Setup” and “Diagnose”. The “vApply” box will indicate the health of the system. If the box is green the components are healthy and communicating. A yellow or red box would indicate and issue with the product that should be further investigated.

Touch on “vApply” to view each vApply CAN product. The tabs at the top allow the user to toggle between multiple Granular or Liquid products and multiple CAN products for each product. Notice under the vApply tab in this page the 20|20 will display Motor RPM Actual/ Command, PWM Percentage, and Supply Volts for each Granular Module assigned to a product.

Note: vApply Granular must be installed and operated on an SRM system. For more information on setting up the 20|20 with SRM systems (such as the PDM, Lift Switches, or calibrating radar) please visit the 20|20 Operators Guide (955709).