VANGUARD SYSTEM

VANGUARD VM-5600

Startup Guide & Manual

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Introduction

The VM-5600 will monitor seed population or blockage. The maximum number of combined monitored inputs is 36. The monitor has three independent acre counters and can monitor 2 RPM Sensors, 2 VAC or Pressure sensors, 1 Hopper sensor and a lift switch.

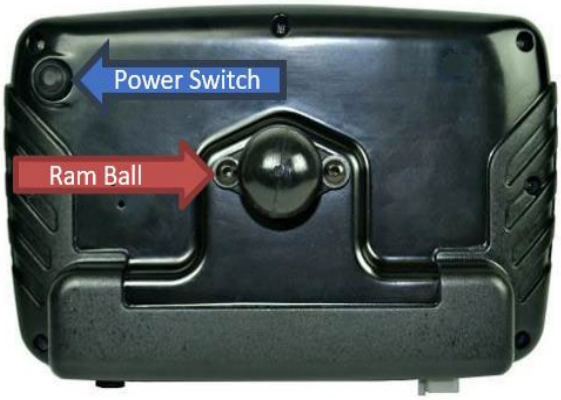
Technical Specifications

Operating Voltage	9 - 36 V DC
Operating Temperature	-20˚C - 70˚C (-4˚F - 158˚F)
Storage Temperature	-40˚C - 85˚C (-40˚F - 185˚F)
Size	27.30 cm W x 16.5 cm H x 5.08 cm D (10.75 in W x 6.5 in H x 2 in D)
Weight	3.08kg (6.8lbs)
Sensors	Compatible with Vanguard™ and most other seed sensors
Standard Mounting	RAM Mounts® 1 ½ in ball mounting
Alarm Adjustment	Five levels
Backlight Adjustment	Five increments plus Day/Night Mode

Installation

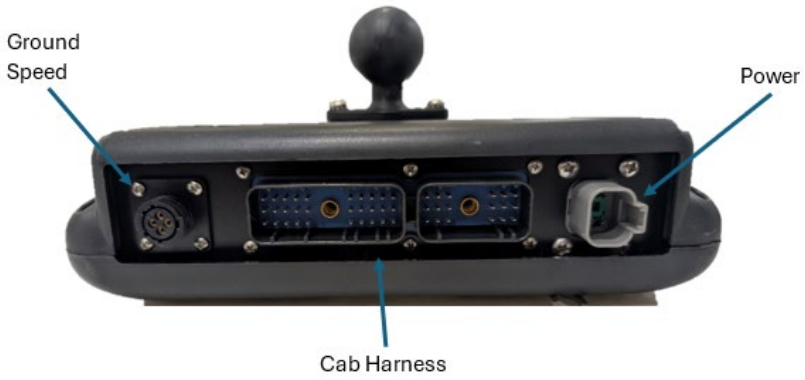
Mounting

Mount RAM 238U to back of monitor using the supplied hardware.



Monitor Connections

There are three connectors used in operating the monitor.



Power Harness

The monitor is powered through the switched power wire in a 3-pin Amp convenience port. Secure the harness so that it is routed to allow for strain relief at the connectors and has enough slack to accommodate any movement of the harness.

Cab Harness

Attach the cab harness to the monitor and tighten the jack screws in each connector to

1.7 – 2.3 Nm (15 – 20 in lbs). Secure the harness so that it is routed to allow for strain relief at the connectors and has enough slack to accommodate any movement of the harness.

The cab harness attaches to the implement with a 37-pin AMP CPC-style connector. The first 32 rows will attach to the fully populated connected labeled “Rows 1-32”. If necessary, connect the remaining rows to the connector labeled “Rows 33-36”.

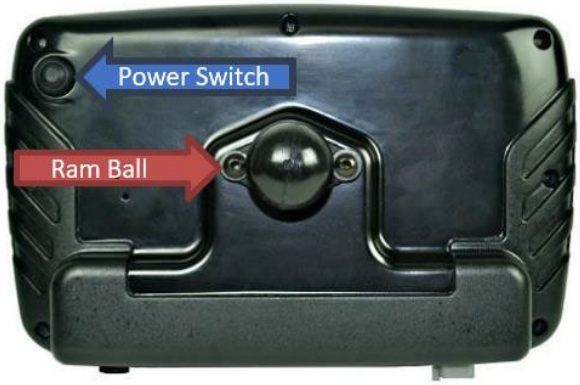
Ground Speed Source

Connect the included GPS based ground speed sensor to the 4-pin AMP CPC- style connector on the bottom of the monitor. The speed sensor should be placed with a clear view of the sky in as many directions as possible.

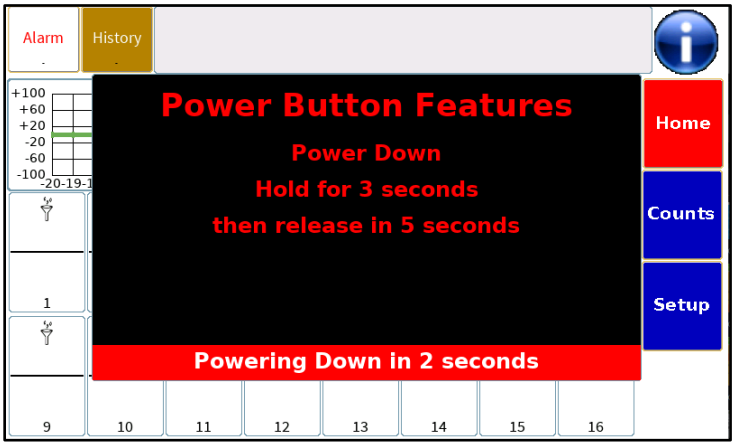
If using a different source for ground speed, connect it to the 4-pin connector and calibrate the monitor following the procedure described in this manual.

Operation

To turn on the monitor, press and release the power button on the rear of the monitor. After a splash screen is displayed, the monitor will bring up the Home Screen.

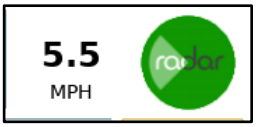


To turn off the monitor, press and hold the button on the rear of the monitor. A pop-up screen will display and show a countdown timer. Release the button after 3 seconds to turn off the monitor.

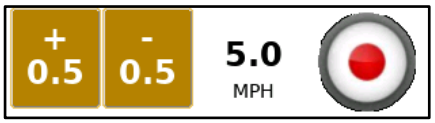


Ground Speed

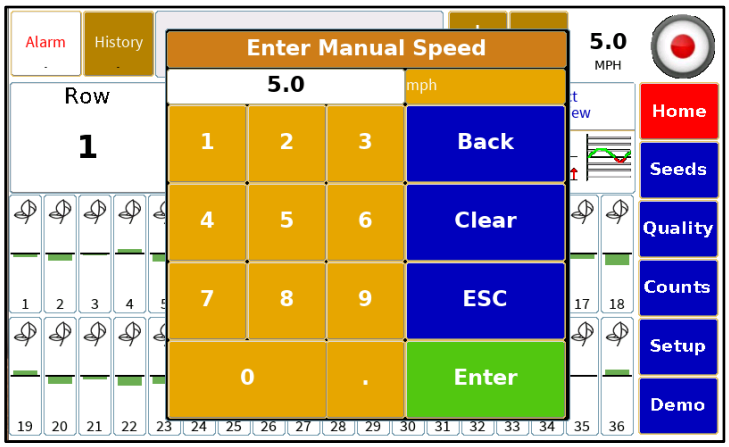
Ground speed can be toggled between a set Manual speed or External speed source. The green circle indicates the monitor is using the connected External source. *Calibration of this source should be done prior to operation*.



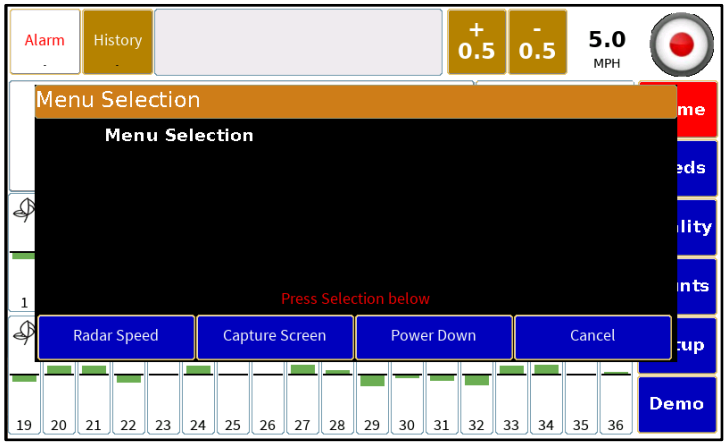
If manual speed is selected, a red dot and speed adjustment buttons are displayed on the screen. The desired speed is adjusted in 0.5 mph increments by using the plus (+) or minus (-) buttons.



A manual speed can also be set by selecting the speed and entering a value in the pop-up window.



To change the speed source, select the green or red icon and select the desired choice in the pop-up window. The source can also be changed in the implement setup section.

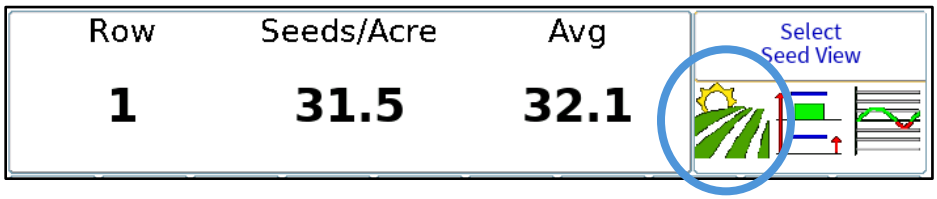


Console Information

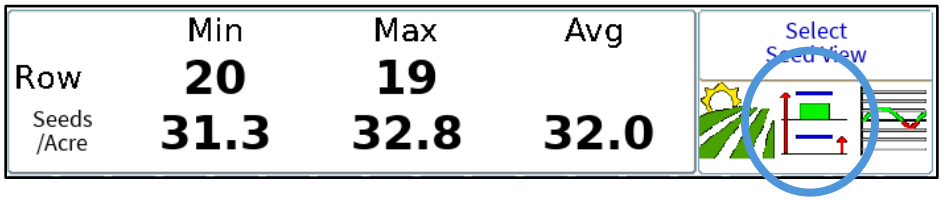
Console (Row-Specific) Information

Individual row information and implement averages are available in the console area of the home page.

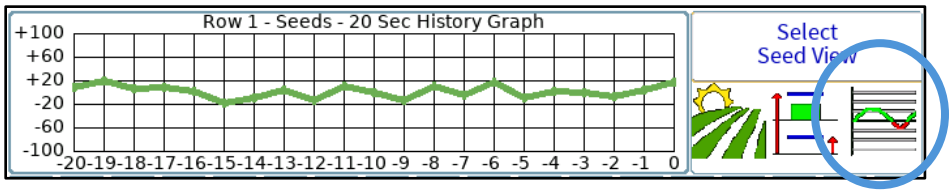
Selecting the Per Row icon or selecting a row from the bar graph area will display the row number, population, and the average across the planter.



Selecting the Min/Max icon will display the row number with the minimum or maximum rate and the average rate across the implement.

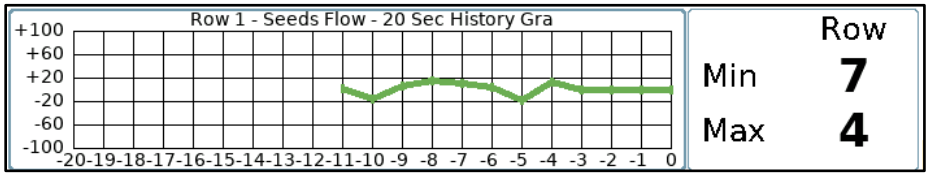


Selecting the graph icon will display a rolling history of up to 20 seconds of selected input on the desired row.



To monitor a different row, select the desired column from the bar graph area.

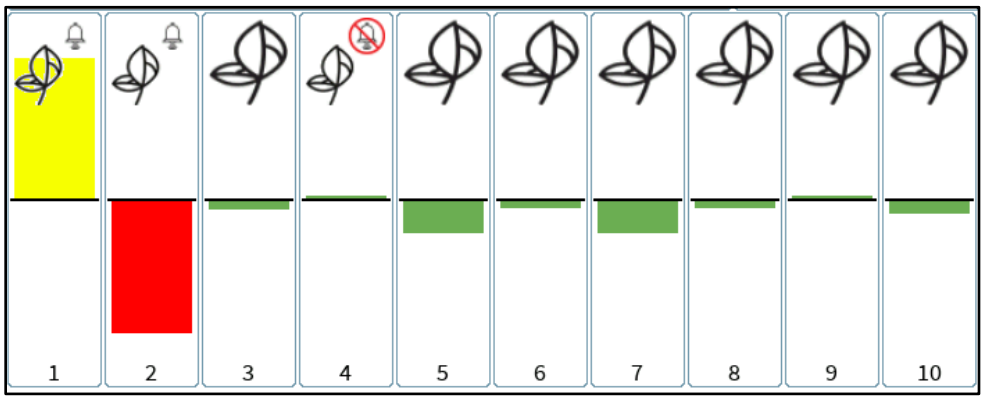
In a seed blockage only configuration, the view will show the row numbers for the minimum and maximum rates and a historical graph of the selected row.



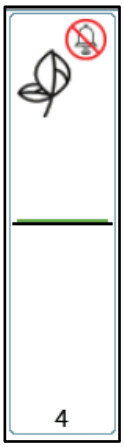
To switch to a different row, select the desired column from the bar graph area.

Bar Graph

The bar graph provides a visual indicator of each row compared to the target value or average value when configured for blockage sensors. The center horizontal line represents the target or average value for each rate. Green bars above or below the center line indicate over applying or under applying product within the allowable range of the set limits. Over applying a product above the set limit will result in a yellow bar. Under applying a product below the set limit will display a red bar. If bars are not visible, then the rate is on-target.



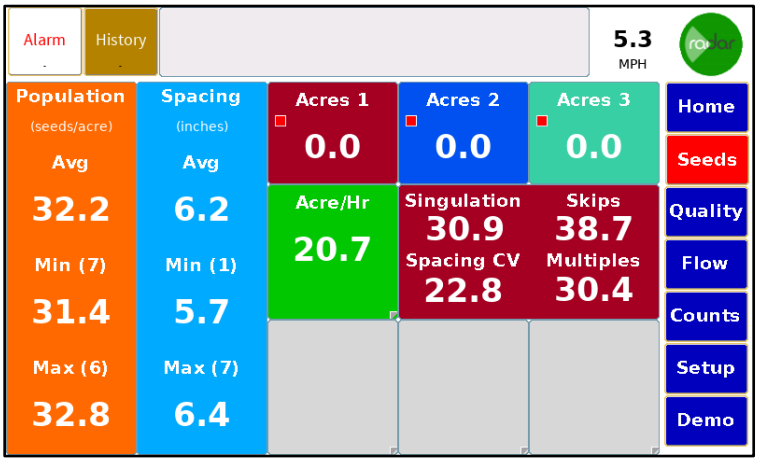
If the row is alarming, there will also be a bell displayed in the bar graph. To temporarily disable the alarm, touch and hold the alarming row for three (3) seconds. To re-enable the alarm, touch and hold the bar graph for three (3) seconds. *Note: An alarm will remain disable through an all rows failed or change in lift switch state but will be removed in a power cycle.*



If a row is disabled in the setup menu, it will display with a gray background.

Seeds Page

The Seeds Page is available when population sensors are used on an active implement. The Alarm History and Screen Navigation tabs are also visible on the seeds page. On the left side of the screen, Population and Spacing information are displayed. Acre counters, seeding quality, and productivity information are shown in the remaining area of the screen.

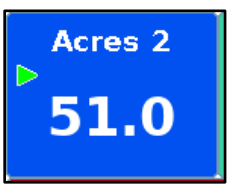


The **Population** tile shows the row numbers with the minimum and maximum population as well as the average population across the planter.

The **Spacing** tile displays the row numbers with the minimum and maximum distance (in inches) between seeds as well as the average distance (in inches) between seeds across the planter

There are three (3) independent **Acre Counters** available to track the area covered. They can be stopped, started, or reset as needed and the accumulated acres will be saved over a power cycle.

A green triangle indicates the acre counter is running.



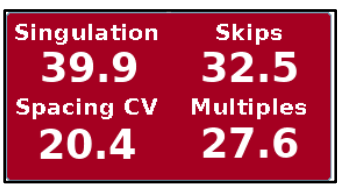
A red square indicates the counter is paused.

Pressing the acre counter for 3 seconds will bring up the controls to Start/Stop or Reset each acre counter.

The acre counters will start counting anytime product is being applied in a section. Each section will stop counting anytime product is not being applied in that section. A lift switch can also be used to aid accurate area calculation.

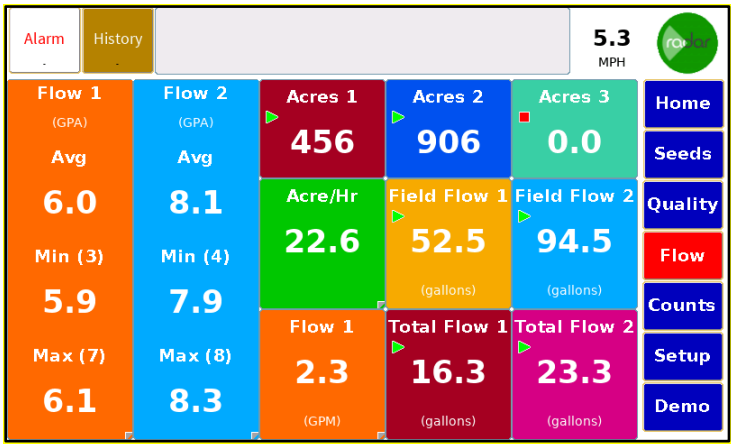
The **Productivity** tile shows the area covered per hour based on the current ground speed and width of the implement.

The **Quality** tile shows the Singulation, Skips, Multiples, and Spacing CV percentages. Per row data of this information is shown on the Quality Page.



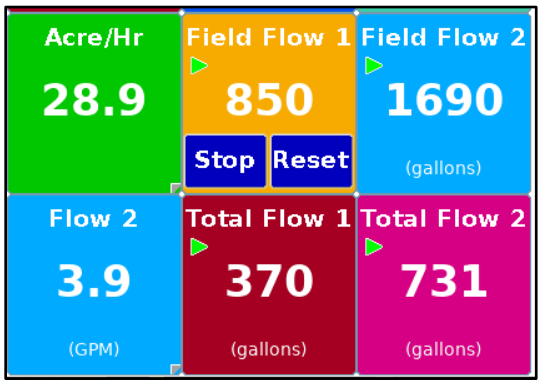
Flow Page

The Flow screen is available if an implement is configured to monitor flow rate. The Alarm history and Screen Navigation tabs are visible on the Flow screen. The left side of the screen shows the average flow rate, row with the minimum flow rate, and row with the maximum flow rate for Flow 1. Flow 2, if configured, is immediately to the right of this column.

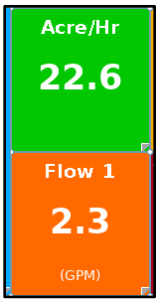


Three (3) independent acre counters are displayed across the top section. These are shared with the acre counters on the Seed page and can be started, stopped, or reset by pressing the tiles for 3 seconds.

Below the acre counters are the productivity tile and volume counters. Flow 2 counters are only visible if Flow 2 is in the active configuration. The Field Flow counters are intended to measure the amount of volume applied in a field and Total Flow is for tracking across multiples fields, however, they are independent and can be used as such. These volume counters can be paused, resumed, or reset by pressing the tile for 3 seconds.



Tiles with the peel icon can be changed by long pressing the tile and selecting a data option from a pop-up window.

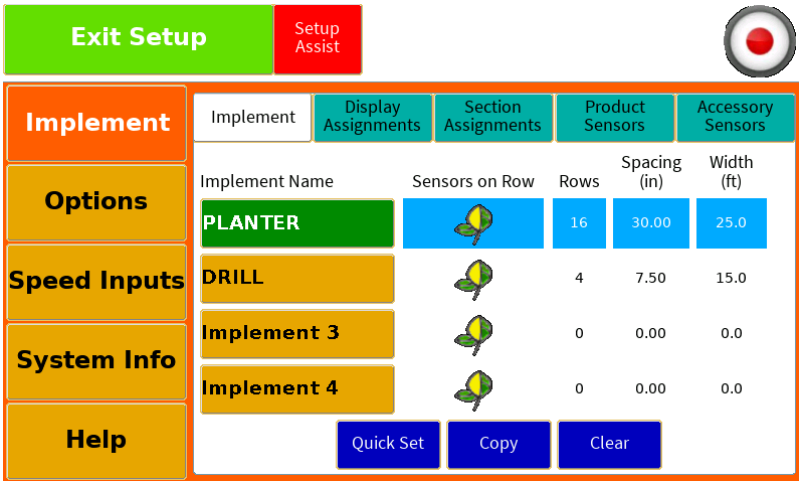


Set Up

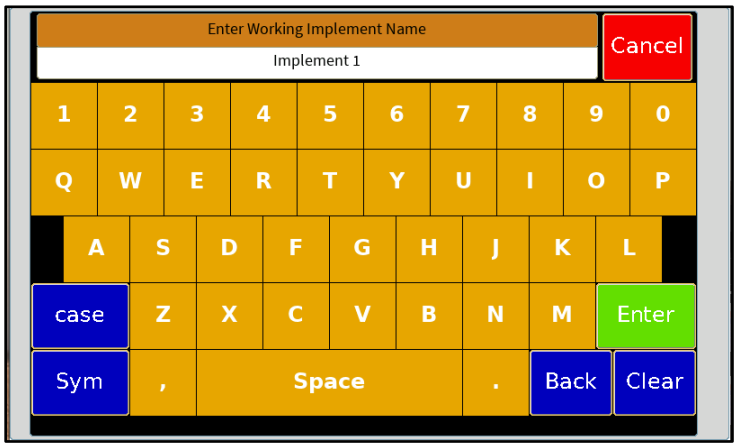
The VM-5600 stores up to four implements at a time to easily switch between different implement configurations. The setup screen has two navigation areas, one along the left side of the screen and a sub-navigation area below the top banner. The Setup Assist button will provide a guide through the necessary steps to configure a monitor.

Implement

To enter implement information, select one of the available implements. The selected implement name will be green, and the information tabs will be blue.



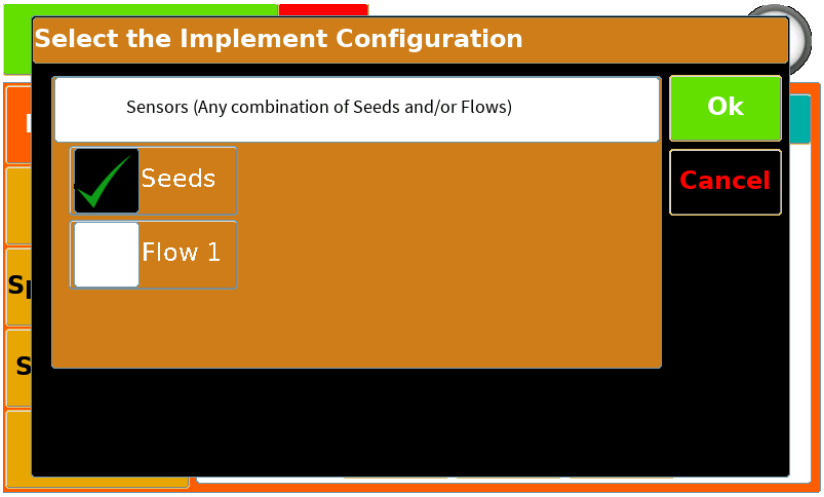
To change the implement name, touch the **Implement Name** tab for the active implement. Enter the name using the on-screen keyboard and press **Enter** to save.



Sensors on Row

To set the sensor type select the **Sensors on Row** tab. In the pop-up window select the correct sensors for the application.

Seeds: used for seed population, seed blockage, or dry blockage sensors



Number of Rows

Enter the number of rows that will be monitored. If a drill has 24 rows, but only 4 rows have sensors, then the number of rows entered would be 4.

Spacing

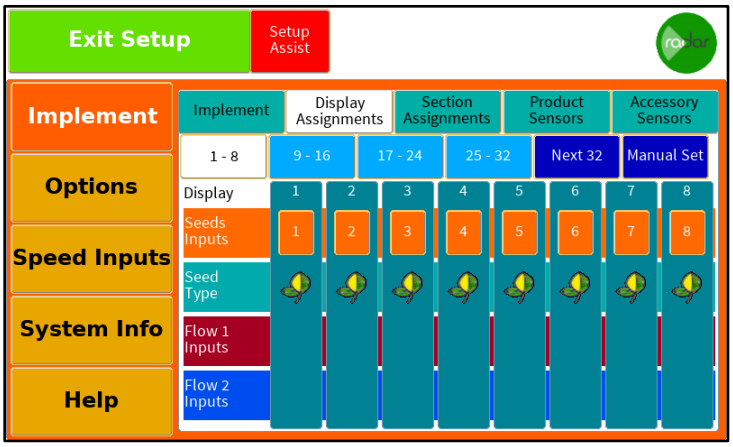
Enter the distance (in inches) between each row on the implement

Width

The implement width is automatically calculated using the number of rows entered multiplied by the row spacing entered. This number can be manually entered when needed. For example, a 24-row drill with 7.5 inches per row width with 4 sensors installed would auto calculate a width of 2.5 feet. This value could be changed to 15ft to reflect the actual width of the drill

Display Assignments

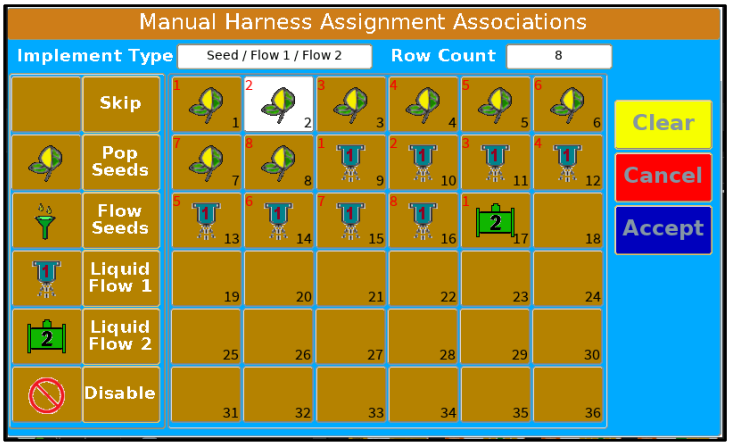
The Display Assignments page shows the configured sensors associated with each row. The type of sensor (population or blockage) as well as any configured flow sensors will be visible on the Display Assignments page.



Eight rows are visible at one time. Use the tabs to navigate to other rows.

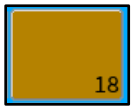
Manual Set

This screen allows for sensor types to be changed, inputs to be skipped or disabled, and manual assignment of implement harness inputs.



Each square represents an input into the monitor. The input assignment is indicated by the number in the lower right corner. The configured sensor type is shown in the middle of the square and the row number is displayed in the upper right corner.

A **skipped row** is indicated by a blank square. Skipping a row will shift the inputs to the next input while maintaining the number of rows available. This can be used for split row planters when only planting on half the rows.



A **Disabled** row will not report any population or be used in the average population calculations. It will show up on the Home screen with a dark background and row is used to turn off the row but keep it in the configuration.

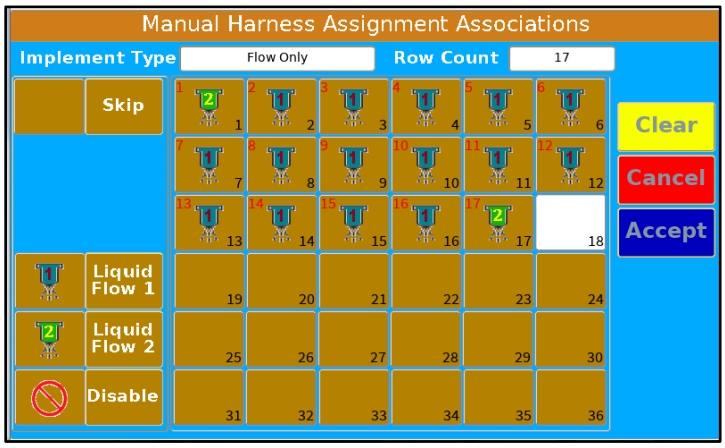
To configure an input, touch the input square which will be highlighted in white, and then select the sensor type or change from the menu on the left side of the screen.

The **Clear** button will remove any configured inputs and allow them to be setup as needed.

The **Cancel** button will exit this screen without saving any changes.

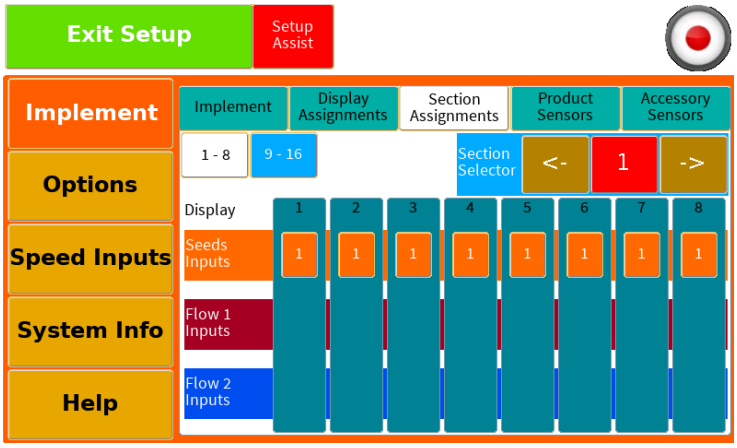
The **Accept** button will exit the screen and accept the changes.

Note: For liquid applicator with ½ or 1 ½ rate rows, the implement should be set up with Flow 1, Per Row on the implement setup screen. In the Manual Set screen, change the off-rate rows to Flow 2 . The screen below shows a 17-knife applicator with ½ rate nozzles on the outside rows.



Section Assignments

The Sections Assignments page allows the user to configure up to 16 sections that will allow assigned groups of inputs to shut off without having the monitor alarm continuously.



Note: When a section is shut off, it is not included in the acre count calculation

Product Sensors -Seeds

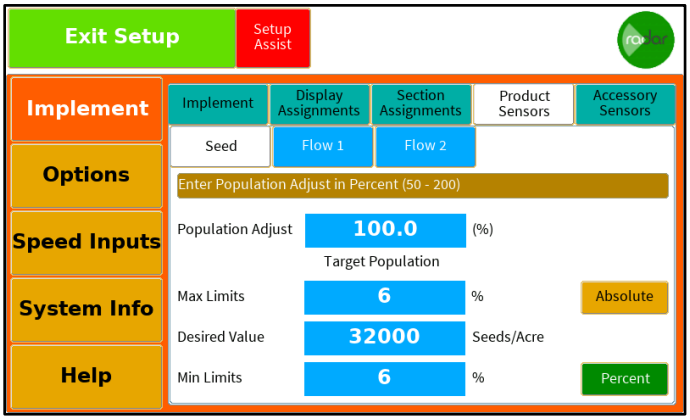
Population Adjust: In a high-rate application where sensors cannot accurately count the number of seeds being dropped, the Population Adjust feature allows the user to compensate for the extra seeds by raising the population by a desired percentage.

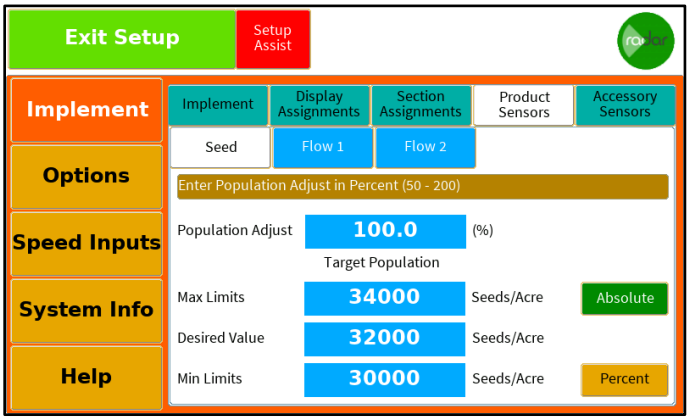
Max Limits rates exceeding the max limit will turn the bar yellow on the Home screen and cause the unit to alarm.

Desired Value is the target population in seeds/acre.

Min Limits: Rates below the min limits will turn red on the Home screen and cause the unit to alarm.

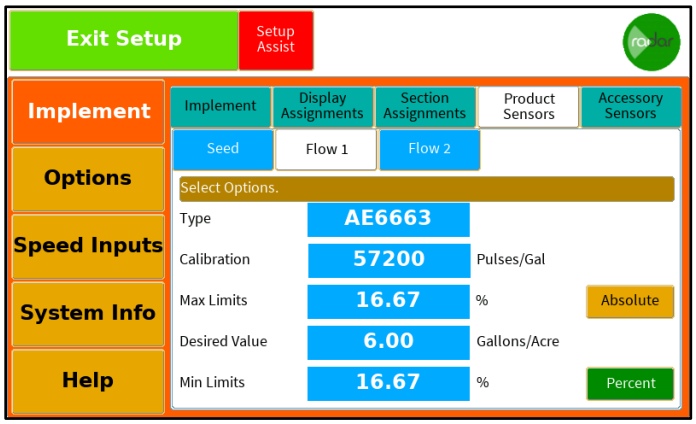
The **Absolute** and **Percent** tabs allow the user to set the limits using a percentage of the desired value or a selected value. The preferred method selection appears in green.





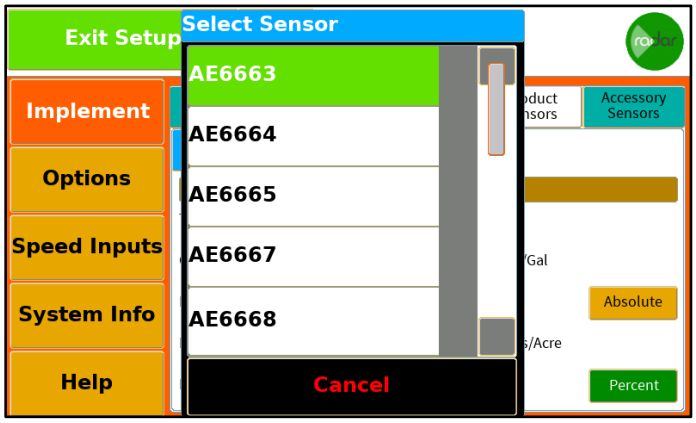
Product Sensor-Flow

A flowmeter type and calibration number must be entered to accurately measure flow rate.

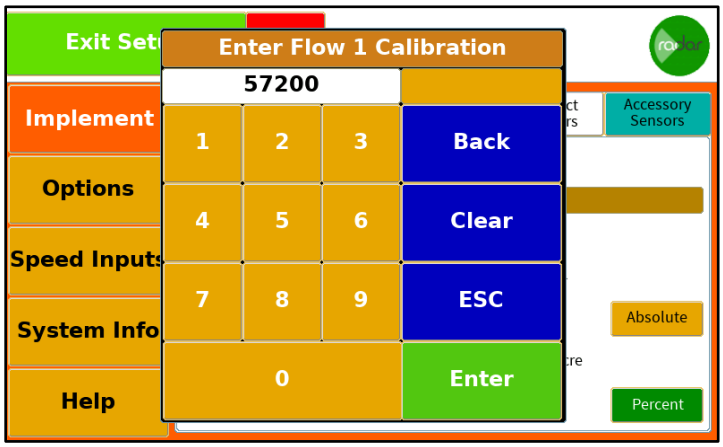


Type

The monitor is programed with a list of commonly used flowmeter part numbers and their calibration numbers. Choose the correct part flow meter from the drop-down menu and the default calibration number will automatically populate.



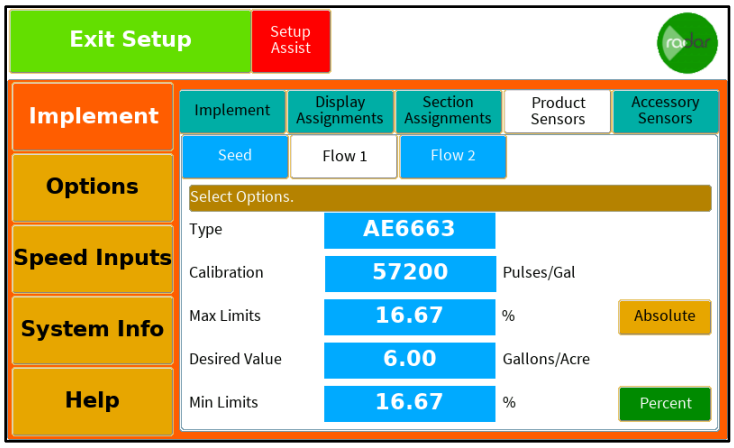
If the flowmeter in use is not visible in the list, then select **Custom 1** or **Custom 2** and manually enter the calibration number in pulses per gallon. Select the calibration number and then the **Edit** button. The calibration number for Custom 1 will be the same if used for Flow 1 and Flow 2 rates.



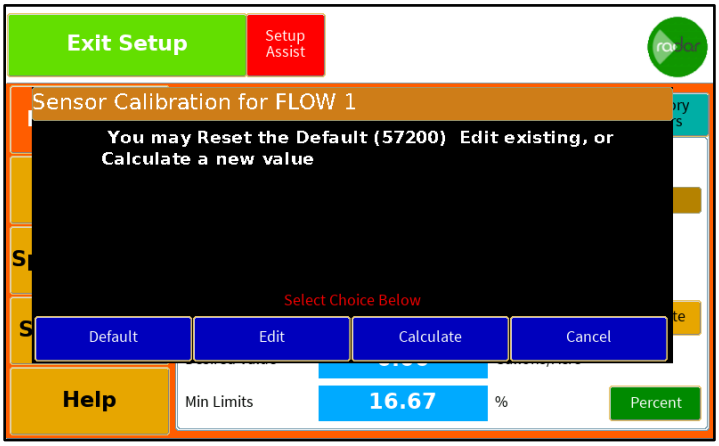
Calibration

Calibration numbers can also be calculated in the monitor after a product is applied and a known volume has been dispensed.

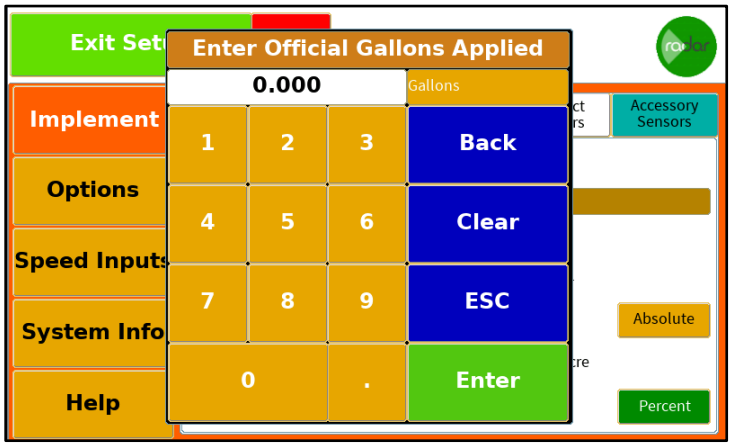
Select **Calibration**.



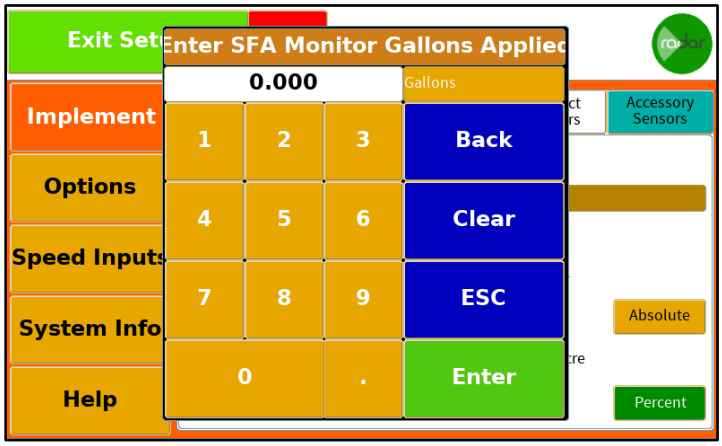
Select **Calculate.**



Enter the known number of gallons applied.



Enter the number of gallons recorded on the monitor.



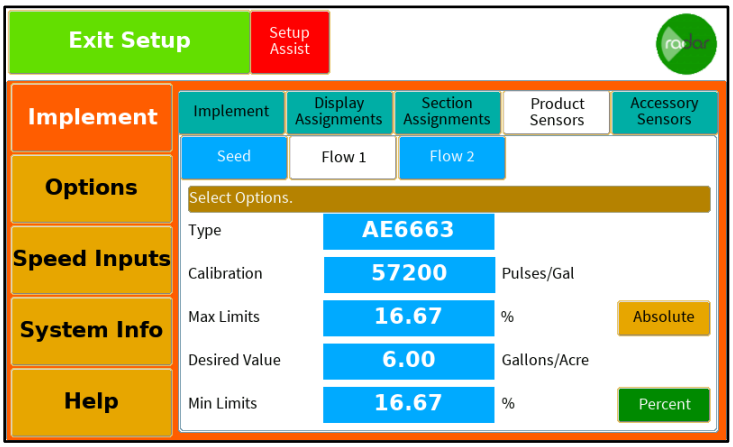
The monitor will calculate the new calibration number.

Desired Value: target flow rate in gal/acre

Max limits: rates exceeding the max limit will turn the bar yellow on the Home screen and cause the unit to alarm

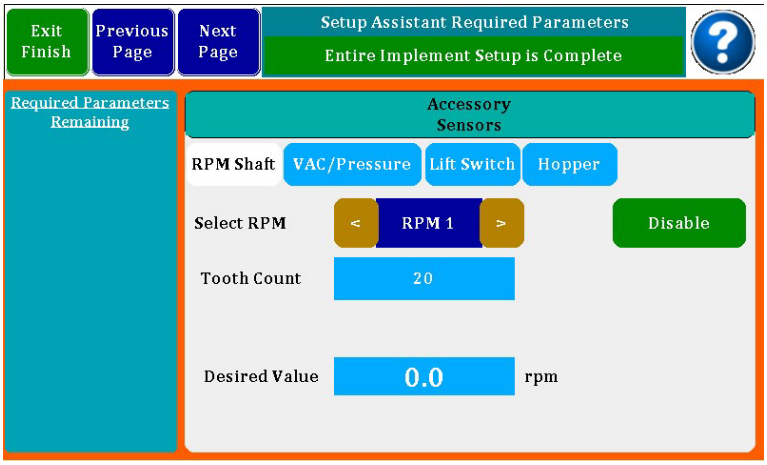
Min limits: rates below the min limits will turn red on the Home screen and cause the unit to alarm

The **Percent** and **Absolute** tabs allow the user to set the limits using a percentage of the desired value or a selected value. The preferred method selection appears in green.

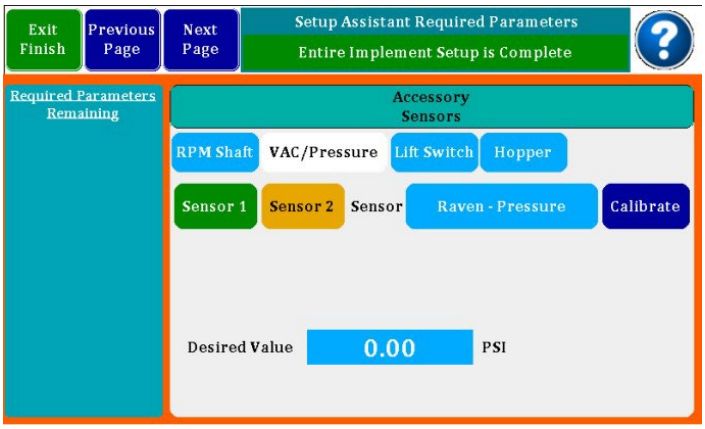


Accessory Sensors

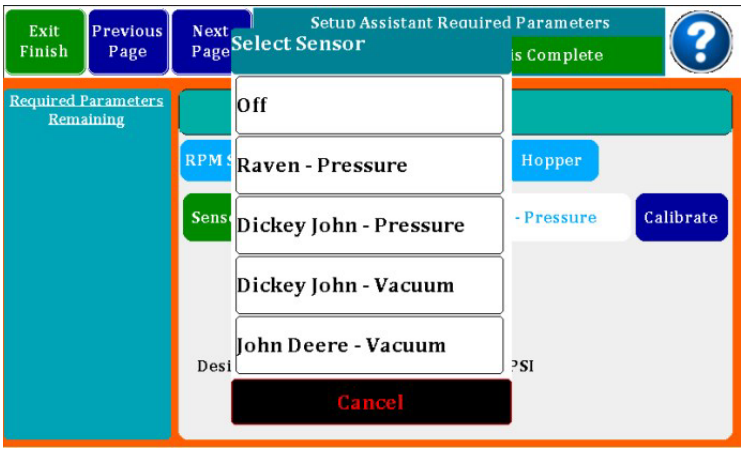
The VM5600 is capable of monitoring two RPM sensors. Select the desired RPM sensor with the arrows.
Enable the RPM sensor by touching the RED “Enable” button, which will change it to a GREEN “Disable” button.



This unit can also monitor two (2) sensors as either VAC or pressure sensors.

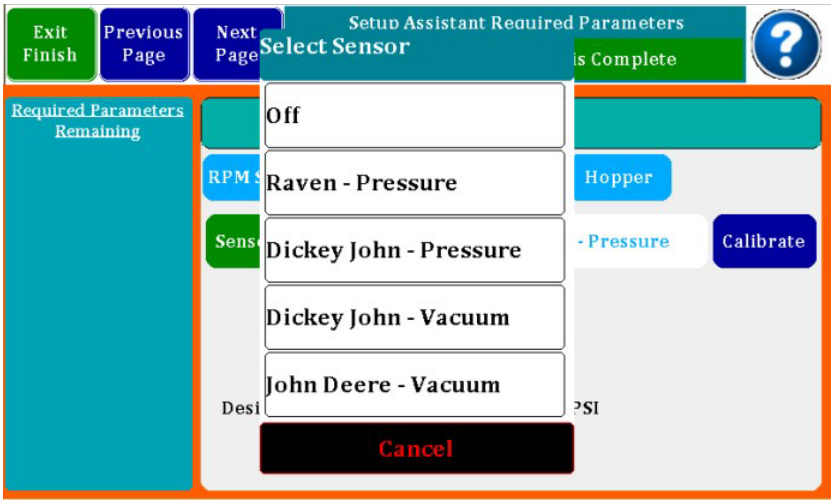


Select the desired sensor, type “Press” on the “Select Sensor” button. This button will provide a selection of sensor types. The list includes: “Off”; “Raven® – Pressure; “Dickey-john® Pressure”; “Dickey-john® – Vacuum”; and “John Deere® – Vacuum.”



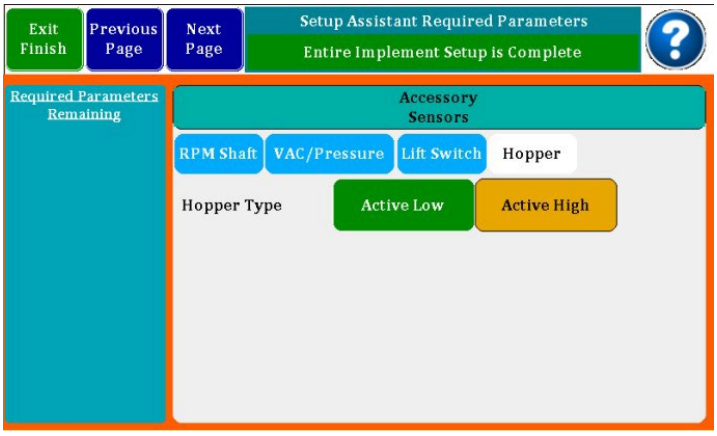
Lift switch

The unit can monitor a lift switch input. If no lift switch is connected, this setting should be **Normally Open**. If a lift switch is present the setting should be set to **Normally Closed,** and the switch should be installed in such a way that the contacts are closed when the implement is applying product.



Hopper

To enable the hopper sensor, select the **Enable** button. Once the sensor is enabled, it can be set to **Active High** or **Active Low** and the alarm can be enabled or disabled.



Options

Alarm

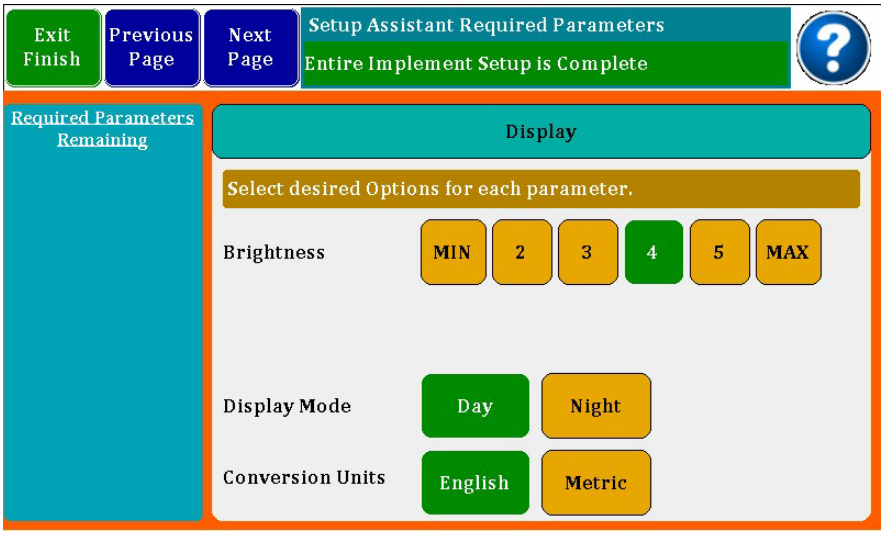
The **Alarm Volume** has 5 settings from off to max volume. The selected level will appear green.

Display

Brightness adjusts the backlight intensity of the display.

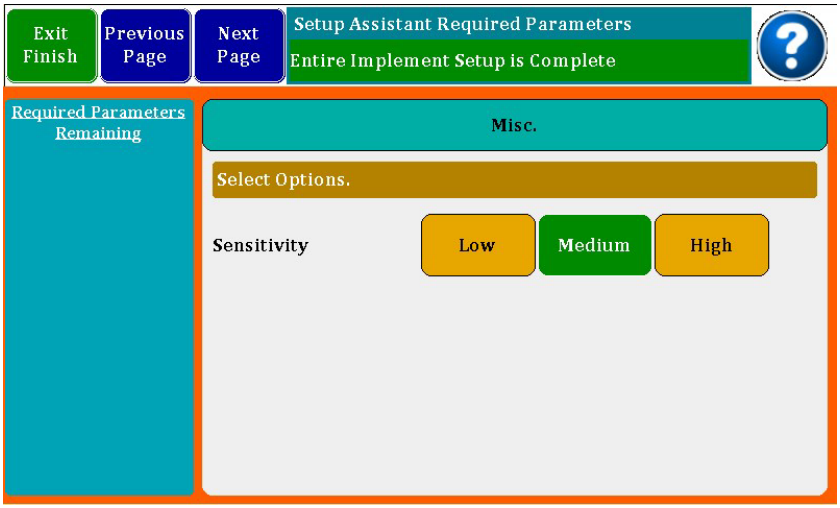
Display Mode allows selection of Day or Night mode. Night mode adjusts the color and backlight intensity for easier night viewing.

Conversion Units changes the units from English to Metric.



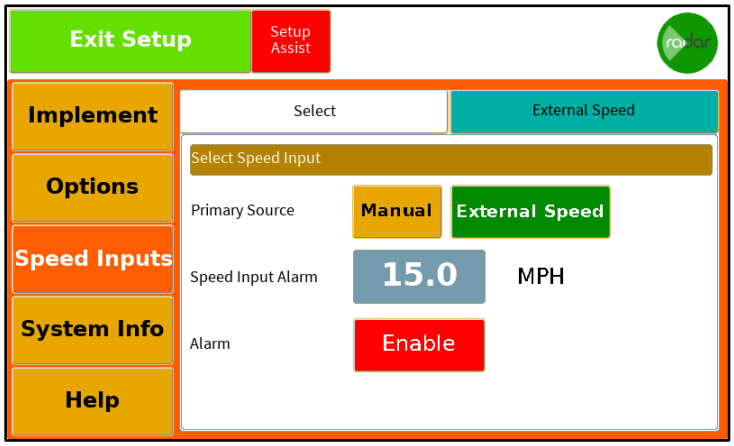
Misc.

Sensor Sensitivity changes the rate at which sensors react to population rate changes. Low sensitivity averages the monitored population over a longer time, rate changes are slower to display.



Speed Input

Select

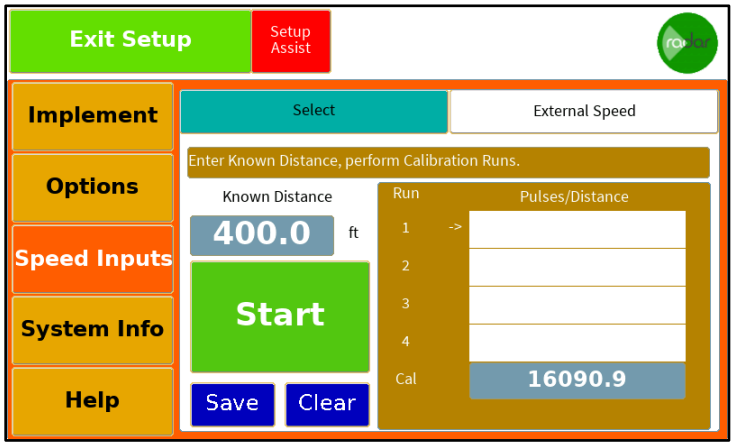


Primary Source: Select Manual or External Speed Source

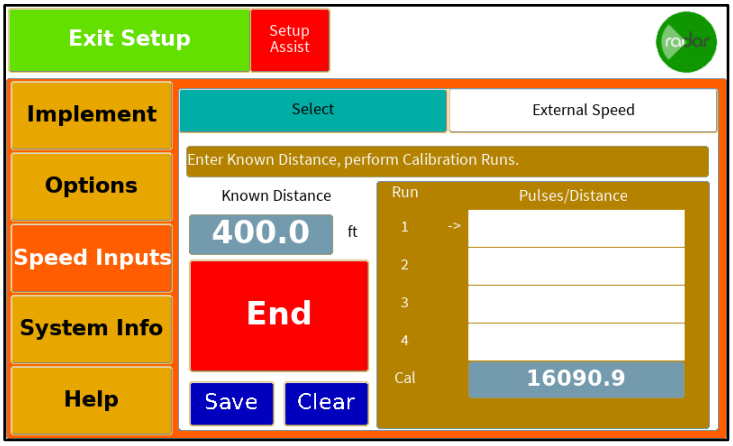
Speed Input Alarm: The monitor will alarm when the selected MPH has been exceeded

External Speed Calibration Procedure

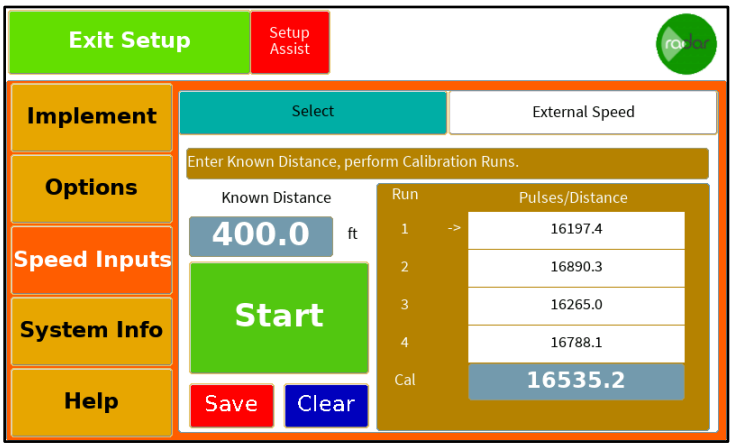
It is recommended to use a 400 ft course for the most accurate speed reading.



Mark off the measured course. Drive at a consistent speed past the first flag and hit **Start**. Maintain speed past the second flag, select the **End** button.

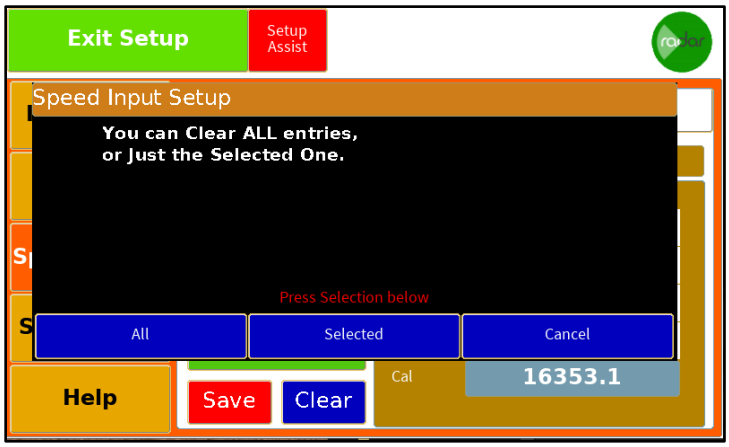


The monitor will populate the calibration number for each run, the active run is indicated by the arrow to the left of the calibration numbers.

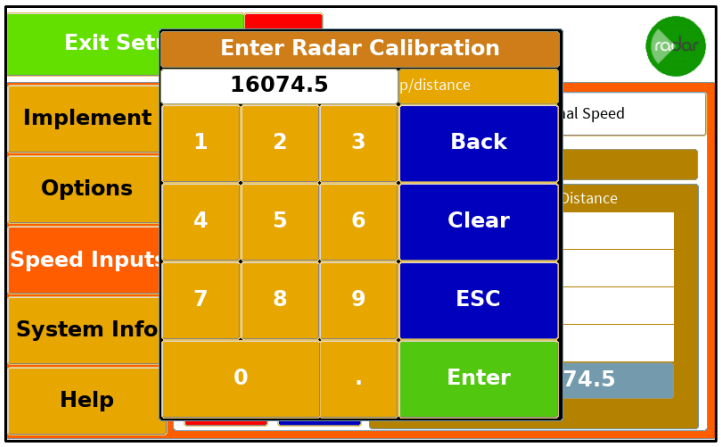


Once the four passes have been completed, select the **Save** button to store the new calibration number. The calibration number will be highlighted in blue when it has been saved. A red highlighted number indicates the calibration has not been saved.

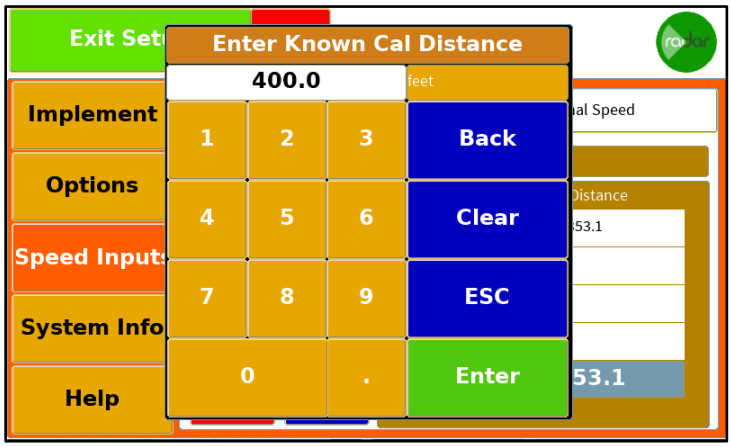
If a calibration run needs to be removed from the list, select the calibration number, then select the **Clear** button. A pop-up window will ask to clear **All**, **Selected** or **Cancel**.



Calibration numbers can also be entered by selecting the Cal number and entering the number in the pop-up screen.



If a 400-foot course is not available, this distance can be shortened by selecting the **distance** and changing this in the pop-up window. The longer the course, the more accurate the calibration will be.



Help

About

The About page shows the monitor serial number, software version, and boot block version.

Console Pinouts

Monitor Power

Description	4-Pin Console	Power
12V DC In	1	1
Ground	2	3
Alarm Out Positive	3	
Alarm Out Ground	4	

Radar

Pin	Description
1	Negative
2	Ground Speed Signal
3	12V Power
4	Radar Sense

Cab Harness

Description	30-Pin Console	18-Pin Console	37-Pin Row 1-32	37-Pin Rows 33-36
Row Input 1	A1		1	
Row Input 2	A2		2	
Row Input 3	A3		3	
Row Input 4	B1		4	
Row Input 5	B2		5	
Row Input 6	B3		6	
Row Input 7	C1		7	
Row Input 8	C2		8	
Row Input 9	C3		9	
Row Input 10	D1		10	
Row Input 11	D2		11	
Row Input 12	D3		12	
Row Input 13	E1		13	
Row Input 14	E2		14	
Row Input 15	E3		15	
Row Input 16	F1		16	
Row Input 17	F2		17	
Row Input 18	F3		18	
Row Input 19	G1		19	
Row Input 20	G2		20	
Row Input 21	G3		21	
Row Input 22	H1		22	
Row Input 23	H2		23	
Row Input 24	H3		28	

Row Input 25		A1	29	
Row Input 26		A2	30	
Row Input 27		A3	31	
Row Input 28		B1	32	
Row Input 29		B2	33	
Row Input 30		B3	34	
Row Input 31		C1	35	
Row Input 32		C2	36	
Row Input 33		C3		1
Row Input 34		D1		2
Row Input 35		D2		3
Row Input 36		D3		4
8V Power A	K2		24	
8V Negative A	K3		26	
8V Power B		F2	25	24,25
8V Negative B		F3	27	26,27
Hopper 1		F1		29
Hopper 2		E2		30
Lift Switch	K1			

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