



## INTRODUCTION

### A. SYSTEM OVERVIEW

The VANGUARD VM-2300 Population Information Center™ Combination Grain Drill and Planter Monitor is a microprocessor-based device that can simultaneously monitor seed flow and display average population, speed and area. In case of row failure, low seed flow, or low hopper level, an alarm sounds and a message including row or hopper number displays on the console.

When configured as a grain drill monitor the Population Information Center is capable of monitoring up to six seed drop tubes and up to three hopper locations. In the planter configuration, the Population Information Center can monitor up to 12 rows. It is compatible with the DICKEY-john Hi-Rate Grain Drill Seed Sensor, Hi-Rate or Standard Planter Seed Sensor, Seed Hopper Level Sensor, Reluctance Distance Sensor, and Radar Distance Sensor.

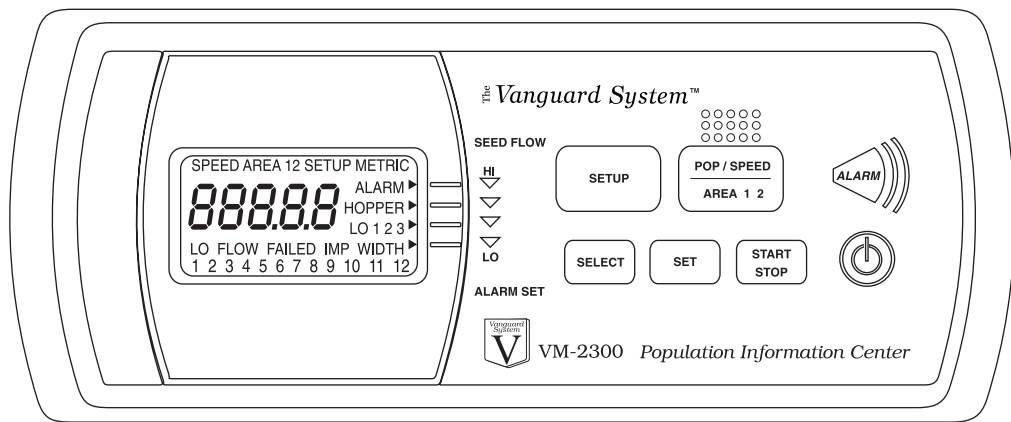
Major features of the Population Information Center include seed flow monitoring, seed hopper level sensing, audible and visual alarms, adjustable audible alarm volume, alarm silence switch, external

alarm line, and displays in English or Metric units. When used with an optional ground speed sensor, Population Information Center can display average population, ground speed, and area accumulation.

The Population Information Center Combination Grain Drill and Planter Monitor stores the setup constants entered by the operator as well as accumulated area data. This information is retained even when the console is powered down or disconnected from the tractor battery.

Figure 1 shows the Population Information Center console. The custom liquid crystal display (LCD) shows messages for the selected Operate Mode function, Setup Mode constant, or Alarm Mode identifier and respective values on a five-digit numeric display. When the Population Information Center is configured as a grain drill monitor, the console screen displays the status of each grain drill and hopper level sensor. When Population Information Center is configured as a planter monitor, the console screen displays the status of each seed sensor.

**Figure 1**  
**VANGUARD VM-2300 Population Information Center™**



## B. SWITCH OVERVIEW

Switches on the console panel are used to control system power, select the mode of operation, and enter setup constants. To distinguish between switch names and display messages in the text of this manual, switch names are always shown in **BOLD, ITALICIZED ALL CAPITAL** print. Display messages are always shown in ALL CAPITAL print. References to chapter names and section names are always shown in *italicized* print.

### 1. **ON • OFF**

Pressing this switch applies power to the monitor. Upon power up, the monitor performs internal diagnostic checks, determines if it is connected to a drill or a planter, determines the number of seed sensors or hopper level sensors, performs a test on all connected sensors, sounds the alarm and briefly illuminates all of the LCD

segments. Pressing the **ON • OFF** switch more than one second turns the monitor off.

### 2. **SETUP**

Press the **SETUP** switch for at least one second to enter the Setup Mode from the Operate Mode. Press again to step from one setup constant to the next as detailed in the *Setup Mode* chapter.

### 3. **POP / SPEED • AREA 1 • 2**

Population is the default function that first appears when the Population Information Center enters the Operate Mode. Press the **POP / SPEED • AREA 1 • 2** switch to step from population to SPEED. Successive presses step the display to AREA 1 (Field Area), AREA 2 (Total Area), and back to population. When the Population Information Center is in Setup Mode, pressing the **POP / SPEED • AREA 1 • 2** switch will return to the Operate Mode.

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## 4. **ALARM**

Pressing the **ALARM** switch silences the audible alarm during a LO FLOW, FAILED row or HOPPER LO condition. Pressing the switch for more than one second allows the operator to adjust the alarm volume level. As the switch is held pressed, the alarm sounds continuously and the volume level slowly decreases to a minimum, then increases to a maximum. Release the switch to set the desired volume level.

## 5. **SELECT**

**SELECT** is one of two switches used to change numeric constants in the Setup Mode. Press and release this switch to

select the digit to be changed. Successive presses will cause stepping from left to right. The selected digit will flash.

## 6. **SET**

**SET** is the second of two switches used to change numeric constants in the Setup Mode. After selecting a digit, press and release the **SET** switch to change the digit constant from 0-9.

## 7. **START • STOP**

In the Setup Mode, this switch is used during distance calibration by pressing and releasing as explained in the *Setup Mode* chapter.

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## OPERATE MODE

### A. STARTUP

Performance of the Operate Mode functions assumes that the Population Information Center console has been installed properly and setup is completed as detailed in the *System Installation* and *Setup Mode* chapters.

Each time the Population Information Center is powered up, a TEST message flashes on the screen until all diagnostics are complete. During this sequence, internal diagnostics are performed and the attached sensors are automatically detected and tested. When TEST is complete the console enters the Operate Mode and shows the population display. If an ERROR message is displayed on power up, refer to the *Troubleshooting* chapter, which begins on page (27).

After the power up TEST sequence, the row and hopper numbers will be displayed for all of the sensors that pass the self-test. If a sensor fails the self-test, its corresponding number will be off. Typically, all row numbers will flash FAILED after the TEST message due to the absence of seed flow. This FAILED message does not correspond to the results of the sensor self-test.

During the first startup, operators should follow these steps:

#### Step 1.

With tractor hitched to a planter or drill, press the **ON • OFF** switch to power up the Population Information Center. The console will sequence through the TEST functions and then enter the Operate Mode.

#### Step 2.

Press the **SETUP** switch to enter the Setup Mode. Following procedures from the *Setup Mode* chapter, select the LO FLOW ALARM threshold; enter values for the implement width, row width, distance calibration, manual ground speed, population gain; and select Metric or English units.

Manual ground speed must be set to 0.0 if a ground speed sensor is used. If a speed sensor is not installed, operators may set only the LO FLOW ALARM threshold to monitor only seed flow. If no speed sensor is used and operators intend to display estimated population and estimated accumulated area, they must enter a manual ground speed.

#### Step 3.

When all the constants are entered in the Setup parameters, return to the Operate Mode by pressing the **POP / SPEED • AREA 1 • 2** switch.

**Figure 2**  
**Speed Display – No Speed Sensor**



## B. NORMAL OPERATION

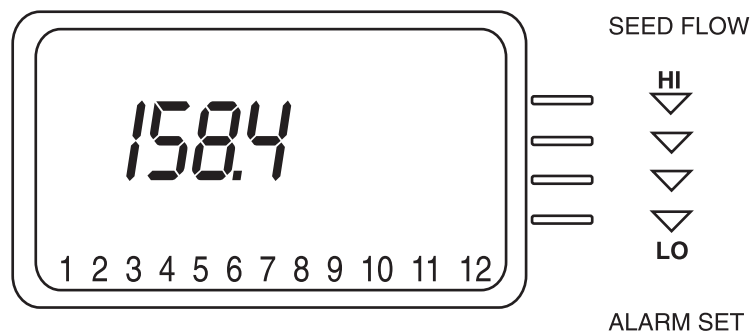
During normal operation, if all rows are planting with a seed rate above the LO FLOW ALARM threshold and at a rate greater than two seeds per second, row numbers corresponding to the number of seed sensors will be illuminated.

In addition to row status, the following functions can be displayed if an optional speed sensor is attached: average population, SPEED, AREA 1 (Field Area) and

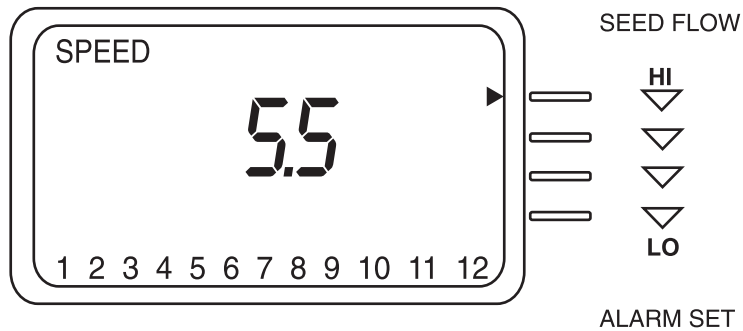
AREA 2 (Total Area). If no speed sensor is installed, SPEED, average population, AREA 1 and AREA 2 can be displayed and calculated from a manual ground speed that has been entered. Manual Ground Speed is further described in the *Special Operations* section.

If a speed sensor has not been installed and a manual ground speed has not been programmed, population will not be calculated, area will not accumulate, and 0.0 will be displayed for SPEED as shown in Figure 2.

**Figure 3**  
**Average Population Display**



**Figure 4**  
**Speed Display**



## 1. Average Population

Average population displays seed quantity in thousands of seeds per acre (hectare), as shown in Figure 3. The value represents the average seed population across all non-failed rows. Average population is the power-up default function in the Operate Mode, or may be selected by pressing the **POP / SPEED • AREA 1 • 2** switch to cycle through other Operate Mode functions.

After initial Population Information Center power-up, tractors must travel 88 feet before the average population will be displayed. The average population will then be updated every 88 feet.

When seed flow ceases and the console goes into an all-rows-failed condition or the tractor stops and the ground speed goes to zero, the console will retain the most recent average population displayed. This will serve as the starting value for the next average population update. When the Population Information Center is powered down, the average population number is not retained.

## 2. Speed

To select this function in Operate Mode, press and release the **POP / SPEED • AREA 1 • 2** switch until SPEED appears on the LCD. The numeric display represents ground speed up to 40.0 MPH (65.0 KPH) with a resolution of 0.1 MPH (0.1 KPH) as shown in Figure 4.

A speed value will be displayed only if a ground speed signal is detected or a manual ground speed is entered.

## 3. AREA 1 (Field Area)

This can be used as an accumulator for a single field, displaying acres with 0.1 resolution (hectares with 0.01 resolution). Area does not accumulate when ground speed signals are undetected or during an all-rows-failed condition.

Select this function in the Operate Mode by pressing and releasing the **POP / SPEED • AREA 1 • 2** switch until the AREA 1 message appears. When 9999.9 acres (999.99 hectares) is exceeded, the decimal

**Figure 5**  
**Area 1 Display**



point shifts to the right one place. When 99999 acres (hectares) is exceeded, it rolls over to zero and continues to accumulate. Figure 5 shows AREA 1 accumulator with 326.5 acres.

The AREA 1 accumulator can be cleared in the Setup Mode as described in the *Setup Mode* chapter.

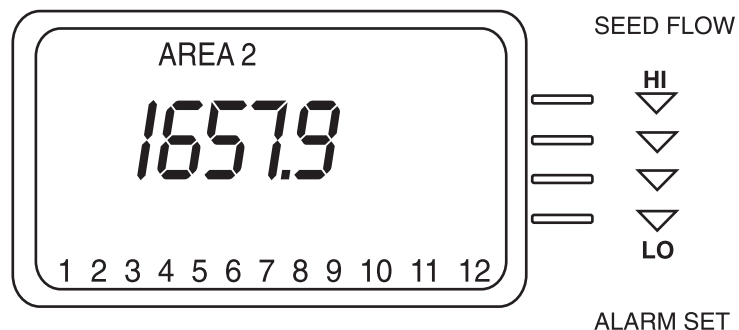
#### 4. AREA 2 (Total Area)

The AREA 2 accumulator can be used as a total area accumulator in conjunction with

the AREA 1 accumulator. Zero the AREA 1 counter when entering each new field and let AREA 2 accumulate all field areas without zeroing.

To select this function, press the *POP / SPEED • AREA 1 • 2* switch until the AREA 2 message is displayed. Operation of the AREA 2 accumulator is identical to operation of the AREA 1 accumulator. Figure 6 shows the AREA 2 accumulator display with 1,657.9 acres.

**Figure 6**  
**Area 2 Display**



**Figure 7**  
**Average Population Drill Configuration**



The AREA 1 and AREA 2 accumulators operate simultaneously while the planter or drill is in use. One accumulator cannot be selected to operate alone. All accumulated numbers are stored in the console's non-volatile memory and are retained if the console is disconnected from the battery.

## C. DRILL OPERATION

When connected to a special harness for drills, the Population Information Center automatically searches for hopper level sensors in addition to seed sensors during power up. When hopper level sensors are detected, the HOPPER message and corresponding hopper numbers are illuminated. Figure 7 shows the console configured as a 6-row, 3-hopper, drill monitor that is displaying 296,000 seeds per acre.

Pressing and releasing the **POP / SPEED • AREA 1 • 2** switch will cycle the console through the same average population, SPEED, AREA 1 and AREA 2 functions as described in Section B *Normal Operation* of this chapter.

## D. SPECIAL OPERATIONS

### 1. No Population Display

If row width in the Setup Mode is set to zero, the average population will not be displayed in the Operate Mode. The default display screen will be SPEED when the Population Information Center first enters Operate Mode, and pressing the **POP / SPEED • AREA 1 • 2** switch will only step the display from SPEED to AREA 1 to AREA 2 and back to SPEED.

### 2. No Ground Speed Sensor

If the ground speed sensor becomes inoperable or has not been installed, the Population Information Center can still display average population, SPEED, and AREA if the operator enters a manual ground speed constant. When a manual ground speed has been entered, the SPEED message flashes and the programmed speed is shown when the SPEED function is displayed in Operate Mode.



AREA 1 and AREA 2 calculations will continue as long as seeds flow. **It is important for the tractor to be operated at a constant speed that is as close as possible to the programmed speed. Operating faster or slower will generate significant errors in average population and AREA accumulation.**

It is important to note that as long as a manual ground speed constant is entered, the console will ignore any signals from ground speed sensors. In order for the console to acknowledge ground speed sensor signals, the manual ground speed value must be set to 0.0.

### 3. Speed / Area Monitor

If no seed or hopper sensors are connected, the monitor will accumulate AREA whenever it senses a speed signal. Therefore, if the monitor is equipped with an optional speed-sensing device, it can be used as a speed-and-area monitor without the planter or drill.

Enter the implement width and the distance calibration constant as described in the *Setup Mode* chapter. Without attachment to a planter or drill harness, seed sensor numbers will not be displayed during this mode of operation.

A ground speed sensor must be used in order to accumulate AREA when the Population Information Center is used as a speed-and-area monitor. Entering a manual ground speed will not enable this function.

## SETUP MODE

### A. GENERAL

Setup Mode is used to enter Population Information Center setup constants, which are listed in Figure 8 in the order of their presentation. Pressing the **SETUP** switch for more than one second places the console in the Setup Mode as identified by the **SETUP** message on the display. Additional messages uniquely identify the constant that is displayed and available for editing.

### B. SETUP CONSTANTS

Press the **SETUP** switch to step through the setup constants. All constants have a fixed number of digits, and leading zeroes are displayed.

In order to change the value of a constant in the Setup Mode, use the **SELECT** and **SET** switches. For each constant, press and release the **SELECT** switch to step from left to right and select a digit for change. A digit will flash as it is selected. Press the **SET** switch to increase the selected digit by one count. When the digit reaches the maximum value of 9, it rolls over to 0.

When the desired value is entered, or if there is no change from the original value, press the **SETUP** switch again. This will store the value and advance the Setup Mode to the next constant. To return to Operate Mode, press and release the **POP / SPEED • AREA 1 • 2** switch. All changes will be stored in non-volatile memory. Definitions

**Figure 8**

### Setup Constants

Order	Constant Name	Default	MIN	MAX	UNITS
1	Lo Flow Alarm	Off	Off	90	%
2	Area 1 (Field Area)	0.0	0.0	99999	acre/hect
3	Area 2 (Total Area)	0.0	0.0	99999	acre/hect
4	Implement Width	180.0	1.0	9999.9	in/cm
5	Row Width	30.0	0.0	999.9	in/cm
6	Distance Calibration	6096	250	9999	N/A
7	Manual Groundspeed	0.0	0.0	99.9	mph/kph
8	Population Gain	100%	1%	999	%
9	Units	English	N/A	N/A	N/A

and considerations when entering values for each constant are included in this chapter.

**IMPORTANT: It is advisable to record all setup values of constants on the *Setup Record* sheet on pages 31 and 32 for future reference.**

### 1. LO FLOW ALARM Threshold

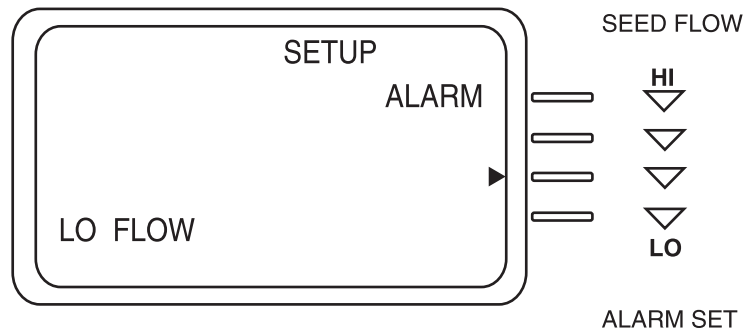
The first parameter displayed upon entering Setup Mode, this determines the flow rate for the LO FLOW ALARM. When in the Setup Mode, operators can also access this parameter by pressing and releasing the **SETUP** switch until the SETUP, LO FLOW and ALARM messages are displayed.

The arrow indicates percentages of the average seed flow as represented by the four positions within the bar column located on

the decal to the right of the LCD. From top to bottom, the alarm designations are set at (Hi) 90%, 80%, 60%, and (Lo) 40% of the average seed flow. Figure 9 depicts setup of the LO FLOW ALARM threshold in the position for 60% of average seed flow. Using this example, if the average seed flow of all rows is 100 seeds per second the Lo Flow Alarm will sound when the flow of one or more rows drops below 60 seeds per second.

Press and release the **SET** switch to move the arrow along the right edge of the display. When the arrow is positioned at the desired alarm percentage, press the **SETUP** switch to store the new threshold in non-volatile memory. The arrow will reappear in the selected position when the LO FLOW ALARM screen is accessed the next time.

**Figure 9**  
**Lo Flow Alarm**



Disable the LO FLOW ALARM threshold by pressing the **SET** switch until no arrow is displayed. The LO FLOW ALARM is active only if a threshold for this parameter has been set.

## 2. AREA 1 – Field Area Accumulator

To reset the Area 1 Accumulator, press and release the **SETUP** switch until AREA 1 and SETUP is displayed. Set each digit to zero on the AREA 1 display screen by pressing the **SELECT** switch to identify the digit and pressing the **SET** switch to advance the count to zero.

## 3. AREA 2 – Total Area Accumulator

To reset the Area 2 Accumulator, press and release the **SETUP** switch until AREA 2 and SETUP is displayed. Set each digit to zero on the AREA 2 display screen by pressing the **SELECT** switch to identify the

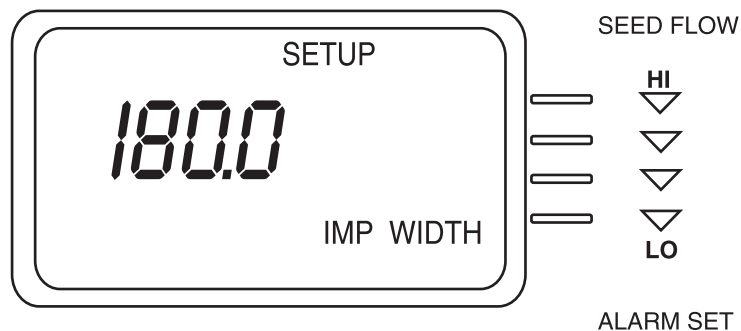
digit and pressing the **SET** switch to advance the count to zero.

## 4. IMPLEMENT WIDTH

IMPLEMENT WIDTH is the planting width of the grain drill or planter with a resolution of 0.1 inches (0.1 centimeters). When the grain drill or planter is equipped with an optional speed sensor, IMPLEMENT WIDTH is one of the constants necessary for the Population Information Center to calculate area.

Press and release the **SETUP** switch until SETUP and IMP WIDTH appear on the display screen. IMP WIDTH is determined by multiplying the number of rows times the row width. Figure 10 depicts an IMP WIDTH of 180 inches. Press and release the **SELECT** switch to select the digit and the **SET** switch to change each digit value to the correct working width.

**Figure 10**  
**Implement Width**



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The Vanguard System™

## a. Width Calculations – Skip Row

### Model Planters

Operators need to add two “skipped” rows to the width of skip-row model planters in order to determine the correct planter width. An example is a 6-row 30" planter and 3-row skip 15".

$$\begin{aligned} 9 \text{ rows} \times 15" &= 135" \\ +2 \text{ skipped rows} \times 15" &= 30" \\ 135" + 30" &= 165" \end{aligned}$$

Therefore, 165" is the number that the operator enters as the IMP WIDTH of this planter.

## b. Width Calculations – Rear Fold

### Model Planters

Operators need to add one “skipped” row to the width of rear fold model planters when the planter is operated folded *without* the extra row unit. An example is a planter that is 12-row 15" when folded.

$$\begin{aligned} 12 \text{ rows} \times 15" &= 180" \\ + 1 \text{ skipped row} \times 15" &= 15" \\ 180" + 15" &= 195" \end{aligned}$$

Therefore, 195" is the number that the operator enters as the IMP WIDTH of this planter.

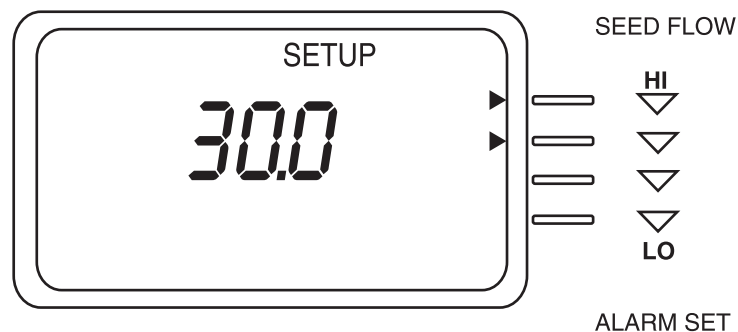
## c. Width Calculations – Grain Drills and Air Seeders.

The overall width of the grain drill or air seeder is the number to enter as the IMP WIDTH for these planters. The row width is entered as the actual distance between rows, not the distance between seed sensors.

## 5. Row width

Row width is the distance in inches (centimeters) between furrows, with a resolution of 0.1 inches (0.1 centimeters). To access this parameter, press and release the **SETUP** switch until the SETUP message and top two arrows appear on the display screen as depicted in Figure 11, which shows a row width of 30.0 inches. Press and release the **SELECT** switch to select the digit and **SET** switch to change the digit value to the correct row spacing.

**Figure 11**  
**Row Width**



**Figure 12**  
**Distance Calibration**



## 6. Distance Calibration Constant

The distance calibration constant is based on the number of pulses generated by the ground speed sensor while traveling a distance of 400 feet (122 meters). Figure 12 shows the display with the **SETUP** and **SPEED** messages and the default value of 6096, which is the nominal pulse count for the radar ground speed sensor. A smaller number, typically 3100, results with a reluctance ground speed sensor.

Use the following method to perform the distance calibration. This procedure must be repeated whenever the ground speed sensor is moved or replaced.

### Step 1.

Measure a straight 400-foot (122-meter) course that represents actual field conditions. Mark the start and finish points so that they are plainly visible from the tractor cab.

### Step 2.

Press and release the **SETUP** switch until the **SPEED** and **SETUP** message appears. A constant also appears until the **START • STOP** switch is pressed.

### Step 3.

With the tractor moving at a planting speed of between 2 and 5 mph (3.2 and 8 Km/h), approach the start marker. Press and release the **START • STOP** switch when the tractor is exactly even with the start marker. The display showing the distance calibration constant zeroes, then counts the ground speed pulses, which will appear on the display screen. Continue to drive at a constant speed.

### Step 4.

As the tractor comes even with the finish marker, press and release **START • STOP** switch again. The distance constant is now displayed.

**Figure 13**  
**Manual Ground Speed**



### Step 5.

To ensure the best accuracy, perform this procedure at least three times. Record the count each time, then manually calculate the average. Use the **SELECT** and **SET** switches to enter the average as the distance calibration constant.

### 7. Manual Ground Speed

Manual ground speed is a function that is available to operators if their equipment has no ground speed sensor or when the ground speed sensor fails during operation. Setting manual ground speed to a value greater than the default setting of 0.0 mph will cause the console to calculate AREA 1 (Field Area), AREA 2 (Total Area), and average population based on the operator-set ground speed value. Press the **SETUP** switch until the SETUP message appears and the SPEED message flashes on the display screen as shown in Figure 13. Input the operating

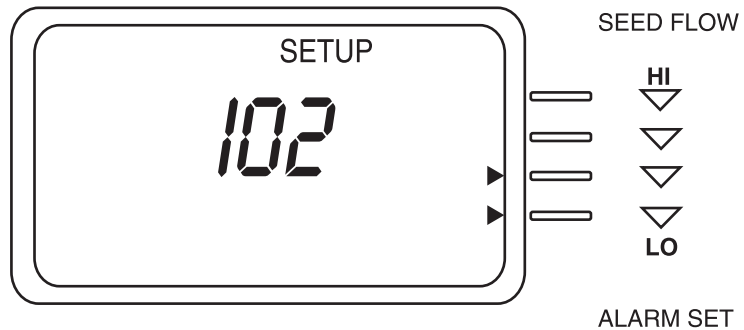
speed by pressing and releasing the **SELECT** switch until the correct digit is selected, then pressing and releasing the **SET** switch to change the value of the selected digit.

### 8. Population Gain

Population gain is a multiplier number that fine tunes the average population readout to reflect the characteristics of different planters or drills and potential undercounting by the seed sensor.

Adjustment of the population gain number changes the average population by 1% increments. For example, a value of 102, as shown in Figure 14, will add 2% to the average population readout. The highest allowable entry is 999, or a 999% increase in the average population readout. The percent symbol (%) is not shown on the display.

**Figure 14**  
**Population Gain**

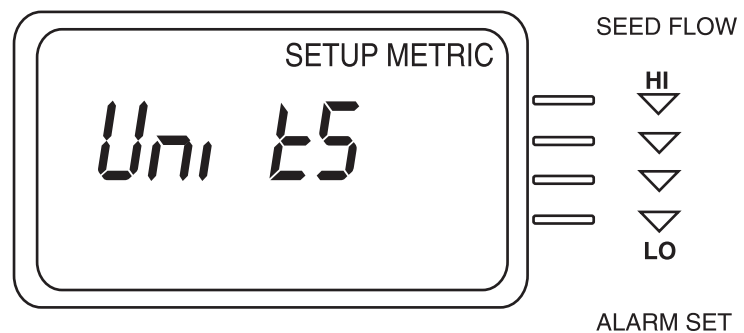


In order to reset the population gain number, press the **SETUP** switch until the bottom two arrows show along the right side of the display screen. Press and release the **SELECT** switch until the correct digit is selected, then press and release the **SET** switch to change the value of the selected digit.

## 9. Units (English/Metric)

The operator selects the system of either English or Metric units using this constant. Press and release the **SETUP** switch until the SETUP message and the word “UnitS” appear on the display. Press the **SET** switch to toggle between English and Metric. The message METRIC illuminates when Metric units are selected, as shown in Figure 15 and is absent when English units are selected.

**Figure 15**  
**Units**



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## ALARMS

### A. GENERAL

#### 1. Lo Flow Alarm

The LO FLOW alarm activates when the seed rate for any row drops below the threshold preset by the operator. The LO FLOW alarm will not activate if the operator has set the LO FLOW alarm threshold to 0% while in Setup Mode.

The LO FLOW alarm is based on the average seeding rate of all rows. Therefore, if all rows are planting at a lo flow, no alarm will sound.

When the seed flow of one or more rows drops below the preset percentage of the average of all rows, the audible alarm beeps until it is acknowledged by pressing the **ALARM** switch. The LO FLOW message and the corresponding row numbers flash for all rows in which the seed rate is below

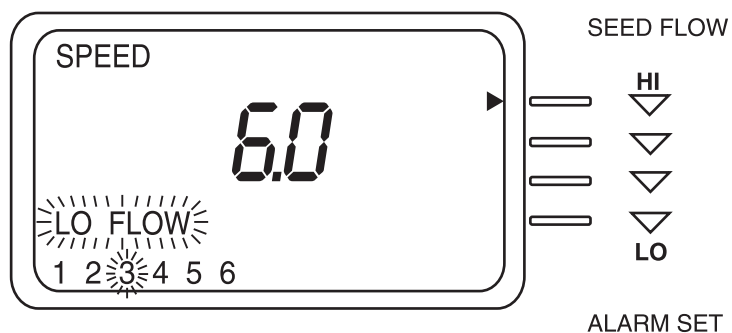
the threshold. Figure 16 shows row 3 and the LO FLOW message flashing. Row numbers that correspond to a seed flow rate higher than the LO FLOW threshold will be displayed, but will not flash.

#### 2. Failed Row Alarm

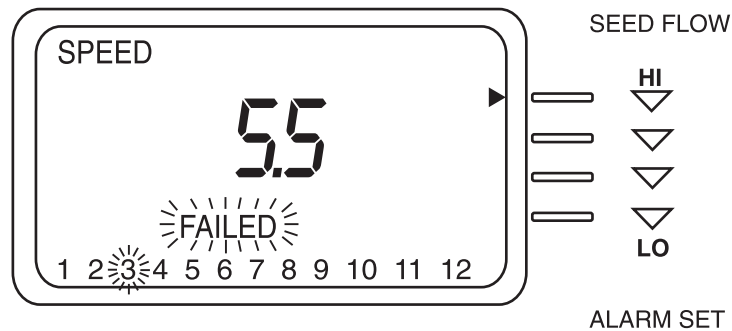
The FAILED row alarm occurs when fewer than two seeds per second are detected in any seed tube. A FAILED row alarm always overrides the LO FLOW alarm.

The audible alarm sounds continuously until it is acknowledged by pressing the **ALARM** switch. The number of each failed row and the FAILED message flash on the display, as shown in Figure 17. Numbers corresponding to those rows planting above two-seeds-per-second will be illuminated continuously.

**Figure 16**  
**Lo Flow Alarm**



**Figure 17**  
**Failed Row Alarm**



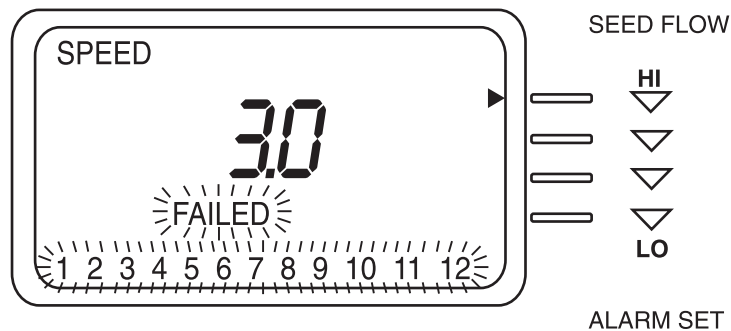
### 3. All Rows Failed Alarm

The all-rows-failed alarm activates when the seed rate of all rows falls below two seeds per second. This typically occurs when the planter or drill is lifted from the ground at the end of each row. The audible alarm sounds continuously for three seconds, then automatically silences. The visual alarm consists of the **FAILED** message and all row numbers flashing on the display screen, as shown in Figure 18.

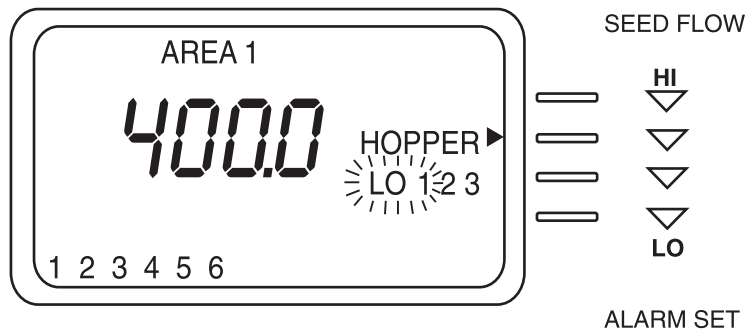
### 4. HOPPER LO Alarm

If a hopper level sensor detects seed, the appropriate hopper sensor number will be on continuously. If no seed is detected at the mounted sensor position, the **HOPPER LO** message and corresponding sensor number flash as shown in Figure 19. The audible alarm sounds continuously until it is acknowledged by pressing the **ALARM** switch.

**Figure 18**  
**All Rows Failed**



**Figure 19**  
**Lo Hopper Alarm**



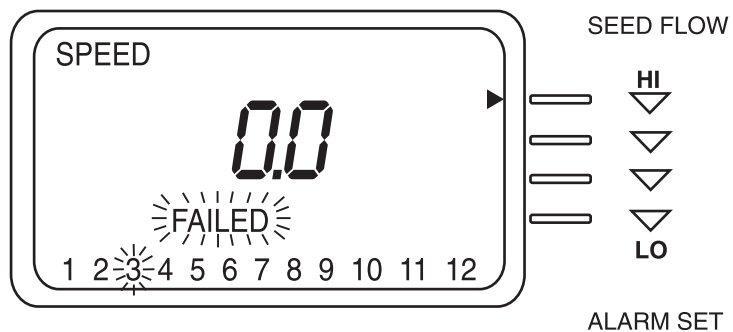
## B. LOCK ON FAILED ROW

As an aid in troubleshooting, if the operator stops the planter when there is a FAILED row alarm, Population Information Center locks on the failed row number as a reminder to the operator. The console first goes into the all rows failed mode for three seconds and then freezes the display on those rows that failed prior to stopping. The FAILED message and the numbers corre-

sponding to those rows that were failed prior to stopping, flash as shown in Figure 20. Numbers corresponding to rows that were not failed prior to stopping will be illuminated continuously.

This lock-on feature does not activate if the operator stops in response to a LO FLOW alarm.

**Figure 20**  
**Lock on Failed Row**





### C. AUDIBLE ALARM SILENCING

Pressing the **ALARM** switch momentarily when the alarm sounds acknowledges the alarm condition by silencing the audible alarm. The visual alarm message continues to be displayed as long as the alarm condition remains. If additional warnings occur after the first alarm is acknowledged and silenced, the audible alarm will sound again until the **ALARM** switch is pressed.

## SYSTEM INSTALLATION

### A. CONSOLE MOUNTING

Mount the Population Information Center console inside the tractor cab at a location that is accessible to the operator without obstructing the driving view.

Refer to Figure 21 for typical console mountings using the U-bracket and hardware provided with each unit. Install the Population Information Center as follows:

**WARNING:**

**The console must not obstruct the view or interfere with operation of the tractor.**

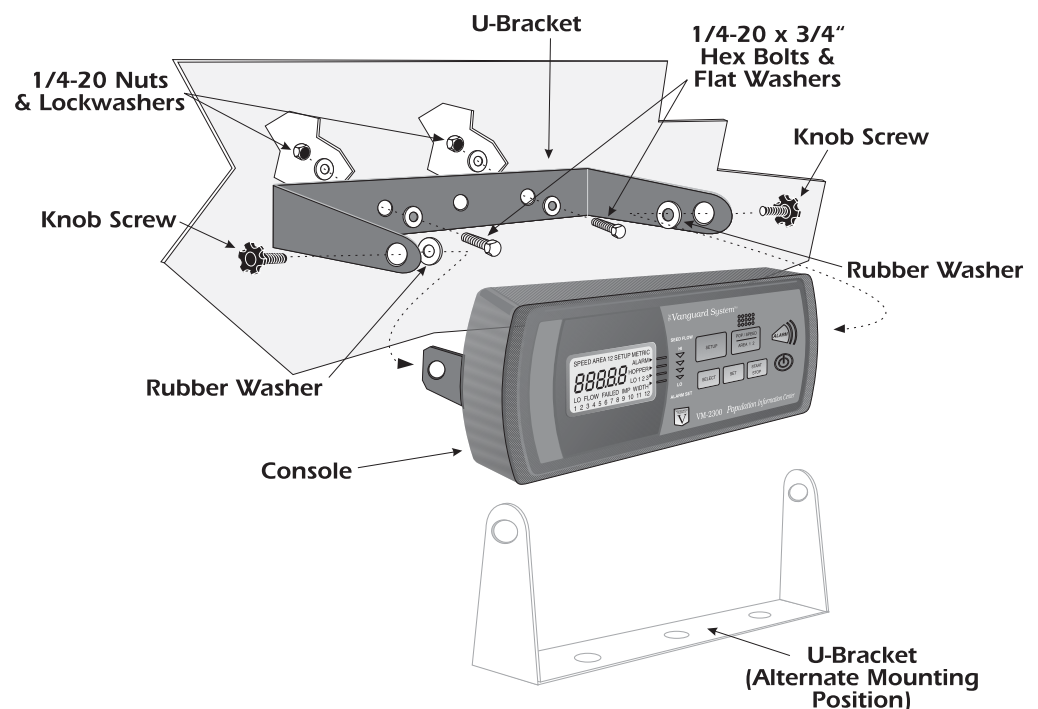
**Step 1.**

Check behind the selected mounting surface to verify that there are no wiring or other obstructions. Be certain that there is sufficient clearance for inserting and tightening the console mounting bolts and for the harness connections.

**Step 2.**

Use the U-shaped mounting bracket as a template to mark the two outside holes of the bracket on the selected location and drill

**Figure 21**  
**Console Installation**



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two 9/32-inch holes. If selecting the mounting method that allows the console to swivel, mark and drill only the center bracket hole.

### Step 3.

Attach the mounting bracket to the mounting surface using the 1/4 - 20 x 3/4-inch hex bolts and flat washers, lockwashers, and 1/4 - 20 nuts as shown.

### Step 4.

Secure the console to the mounting bracket using the two knob screws. Insert a rubber washer between the bracket and each side of the console.

## B. CONSOLE HARNESS

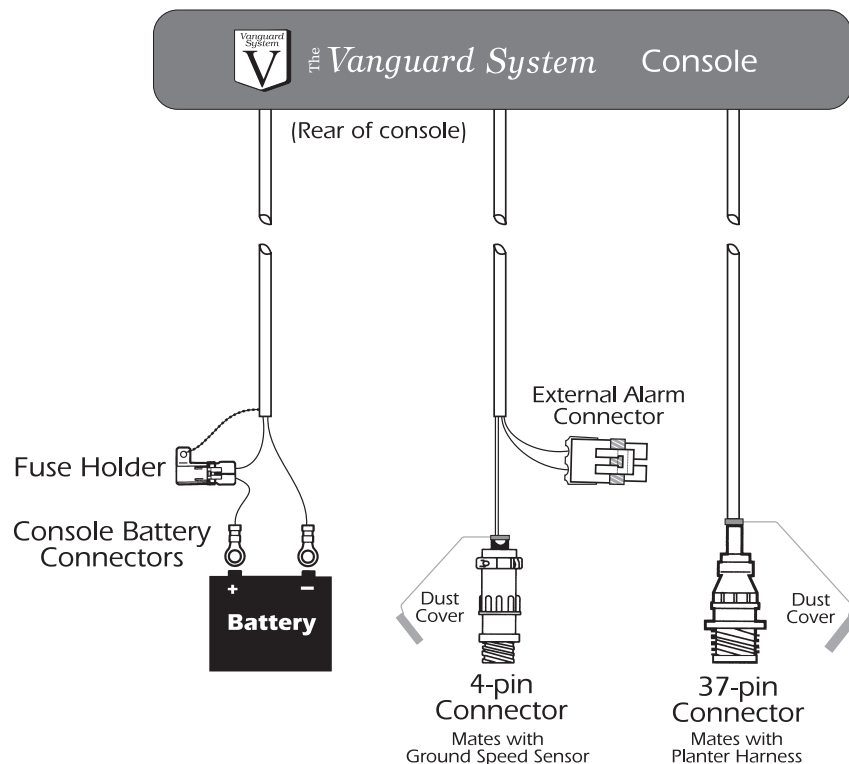
Input signals are transmitted to the Population Information Center console through a pigtail harness permanently connected to the rear of the unit. Components of the console harness are shown on Figure 22.

Route the Population Information Center console harness to the rear of the tractor, near the hitch. Locate the harness to prevent it being pinched, cut, or stepped on, and secure it with wire ties.

Mate the 37-pin connector with the planter or drill harness. The external alarm connector mates to an optional external alarm that is available as a separate piece of equipment.

**Figure 22**

### Console Harness



## C. GROUND SPEED SENSORS

Population Information Center is compatible with radar or reluctance ground speed sensors, which are available separately. Sensor mounting instructions accompany each sensor. Mate the sensor with the designated connector on the Population Information Center harness.

On power up, the console will automatically detect which speed sensor is connected. If switching between ground speed sensors, the console must be powered off, then back to on to detect the newly connected sensor.

## D. POWER CONNECTION

**Power connections are made last to avoid accidental shorts during harness installation.** The Population Information Center operates on +12 volts DC *only*. The battery connections consist of two wires, each

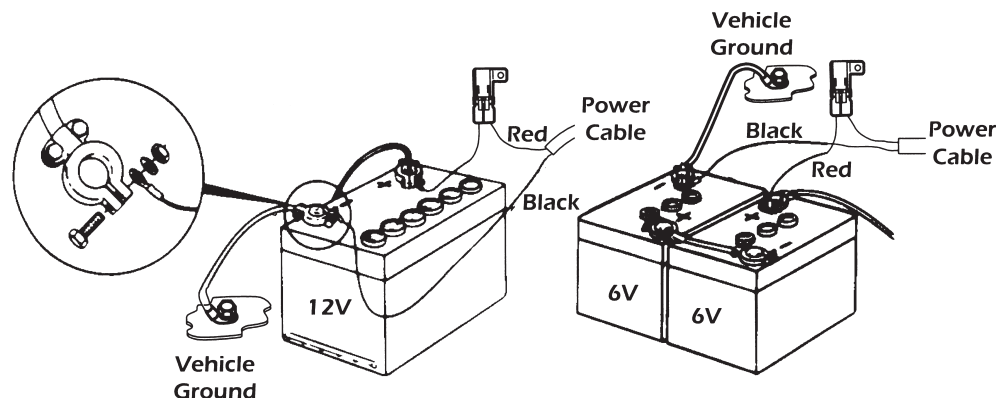
terminated with a ring terminal as shown in Figure 22.

Before making the battery connections, determine the tractor battery arrangement from Figures 23, 24, or 25. When the 12-volt source is known, connect the black wire from the harness directly to the negative (-) terminal of the battery. The red wire, which contains the fuse link, connects directly to the positive (+) battery terminal.

Make sure the connections are clean and tight. Avoid routing battery wires close to the alternator, existing battery cables, spark plugs, or other magnetic field sources. Secure the battery wires with wire ties.

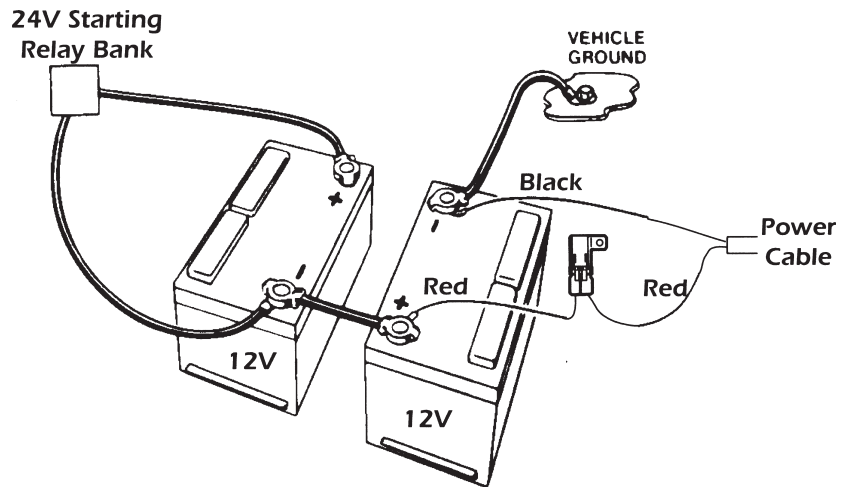
If there is doubt about the battery voltage, if the tractor battery arrangement differs from those shown, or if there is any doubt about how to connect wires to the battery, operators should use a voltmeter first to verify 11 to 14 volts across the battery connection points.

**Figure 23**  
**12-Volt Battery Source Connections**



**Figure 24**

## 24-Volt Battery Source Connections



If the tractor uses two batteries, operators must make certain that the connection is made to the grounded battery. The red lead must always be connected to the positive

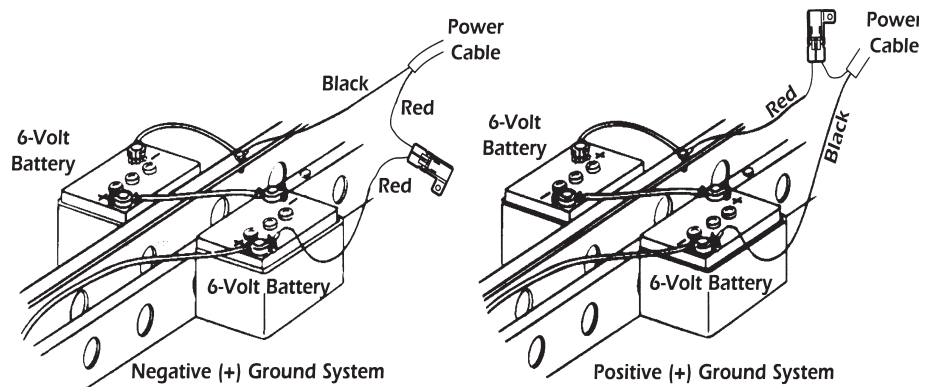
(+) battery terminal and the black lead to the negative (-) terminal, regardless of whether the tractor uses a negative or positive ground system.

### WARNING:

Before welding on the frame or chassis, operators must disconnect battery leads.

**Figure 25**

## Negative or Positive Sources Connections



## TROUBLESHOOTING

### A. CONSOLE INOPERATIVE

#### Probable Cause

1. Blown console fuse.
2. Poor battery connections.
3. Defective battery cable.
4. Low battery voltage.
5. Reversed power connections.

#### Remedy

1. Check the console fuse. If blown, replace with a 3-Amp fuse. (Bussman type ATC-3, violet). If it blows again, check the wire harnesses for cuts, crimps, etc.

**WARNING: Only replace fuse with 3-amp automotive type fuse.**

2. Clean and tighten connections.
3. Replace or repair by splicing, soldering, and individually taping each wire. USE ONLY ROSIN CORE SOLDER. In-line fuse must stay in the +12V, red lead.
4. Verify battery voltage is at least 12 volts. If not, recharge or replace.
5. Correct connection.

### B. NO ROW SENSORS DETECTED DURING POWER-UP

#### Probable Cause

1. Planter or drill harness not connected to console harness at hitch.
2. Planter or drill console harnesses cut or defective.

#### Remedy

1. Connect planter or drill with console harness.
2. Inspect cable/connectors for damage or use ohmmeter for continuity check from row sensors to hitch.

### C. INCORRECT NUMBER OF ROW OR HOPPER SENSORS DETECTED

#### Probable Cause

1. Individual sensors may be disconnected from harness.
2. Harness may be damaged.
3. Defective row or hopper seed sensor.

#### Remedy

1. Check that all row or hopper sensors are plugged into planter harness.
2. Check harness for cuts or damage.
3. Replace row or hopper sensor.



### **D. NO GROUND SPEED OR AREA ACCUMULATION WHILE PLANTING**

#### **Probable Cause**

1. Radar or reluctance ground speed sensor cables or connector are damaged or disconnected from sensors to hitch.
2. Distance constant or implement width set at zero during setup.
3. Radar or reluctance ground speed sensor defective.
4. Reluctance sensor too far from sprocket.
5. Switched ground speed sensors without powering the console off.

#### **Remedy**

1. Inspect cable/connectors for damage or use ohmmeter for continuity check from reluctance sensor to hitch; repair or replace.
2. In Setup Mode, enter the correct distance constant and implement width.
3. Repair or replace.
4. Adjust sensor clearance.
5. Cycle power on the console.

### **E. ERROR MESSAGE DURING POWER-UP**

#### **Probable Cause**

1. Console defective or needs reprogramming.

#### **Remedy**

1. Contact your VANGUARD distributor for assistance.

### **F. MONITOR DIGITAL DISPLAY IS FRAGMENTED**

#### **Probable Cause**

1. Low battery voltage.
2. Corroded battery terminals.
3. Defective console.

#### **Remedy**

1. Recharge or replace 12-volt battery.
2. Clean battery terminals.
3. Replace console.



## G. ALARM VOLUME TOO LOW

### Probable Cause

1. Alarm volume set too low.
2. Operating environment louder than alarm.

### Remedy

1. Adjust alarm volume as described on page 3.
2. Use external alarm.

## H. ALL SENSORS INDICATE FAILED

### Probable Cause

1. Harness shorted.

### Remedy

1. Inspect and correct short in harness.

## I. ONE SEED SENSOR INDICATES FAILED

### Probable Cause

1. Defective sensor.
2. Shorted harness.

### Remedy

1. Replace sensor.
2. Replace or repair harness.

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## SETUP RECORD SHEET

Parameter Name	Entered Value
Implement Width	_____
Row Width	_____
Distance Calibration	_____
Manual Ground Speed*	_____
Population Gain	_____

\* Manual ground speed must be set to 0.0 if speed sensor is used

Parameter Name	Entered Value
Implement Width	_____
Row Width	_____
Distance Calibration	_____
Manual Ground Speed*	_____
Population Gain	_____

\* Manual ground speed must be set to 0.0 if speed sensor is used



### SETUP RECORD SHEET

Parameter Name	Entered Value
Implement Width	_____
Row Width	_____
Distance Calibration	_____
Manual Ground Speed*	_____
Population Gain	_____

\* Manual ground speed must be set to 0.0 if speed sensor is used

Parameter Name	Entered Value
Implement Width	_____
Row Width	_____
Distance Calibration	_____
Manual Ground Speed*	_____
Population Gain	_____

\* Manual ground speed must be set to 0.0 if speed sensor is used

## **The Vanguard System™ Warranty**

Agri Motive Products, Inc. warrants to the original purchaser for use that, if any part of the product proves to be defective in material or workmanship within one year from date of original installation, and is returned to Agri Motive Products, Inc. within 30 days after such defect is discovered, Agri Motive Products, Inc. will (at our option) either replace or repair said part. This warranty does not apply to damage resulting from misuse, neglect, accident or improper installation or maintenance. Said part will not be considered defective if it substantially fulfills the performance specifications. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESS OR IMPLIED. Agri Motive Products, Inc. neither assumes nor authorizes anyone to assume for it any other obligation or liability in connection with said part and will not be liable for consequential damages. Purchaser accepts these terms and warranty limitations unless the product is returned within fifteen days for full refund of purchase price. In no case shall Agri Motive Products, Inc. be liable for any incidental, special, consequential, or similar damages.

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call -800-637-3302 in either the U.S.A. or Canada

This product may be covered under  
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Pat Number 4,555,624

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