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SAFETY NOTICES

Safety notices are one of the primary ways to call attention to potential hazards.



This Safety Alert Symbol identifies important safety messages in this manual. When you see this symbol, carefully read the message that follows. Be alert to the possibility of personal injury or death.

⚠ WARNING

Use of the word **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Use of the word **CAUTION** with the Safety Alert Symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

Use of the word **CAUTION** without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in equipment damage.

OPERATOR'S MANUAL





INTRODUCTION

SYSTEM OVERVIEW

The VM-2200 Planter Monitors provide incredible versatility and unsurpassed accuracy. The VM-2200 Planter Monitor provides monitoring for 1-16 rows. It is perfectly suited for any planter or grain drill monitoring application where only the detection of seed flow is necessary. The monitors provide:

- Monitoring of 1-16 rows
- Automatic Sensor Detection
- Reliable LED Row Indicators - no replacing incandescent bulbs
- Dual function row failure indication - allows all LED's to blink while planting and go out to indicate row failure, or may be set to illuminate to indicate row failure
- LED brightness adjustment

Figure 1

VM-2200 Planter Monitor



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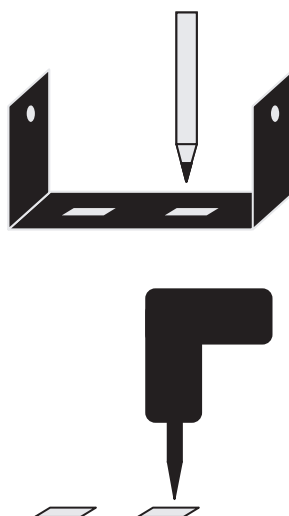
INSTALLATION

CONSOLE MOUNTING

To mount the VM-2200 console, use the mounting bracket as a template for drilling. Mount the console in a location that is easy to view and easy to reach for threshold adjustment and alarm silencing.

Figure 2

Console Mounting



Before drilling, ensure that the power and main hitch harness may be routed in the proper manner. Harness retention and routing outside of the cab is also important.



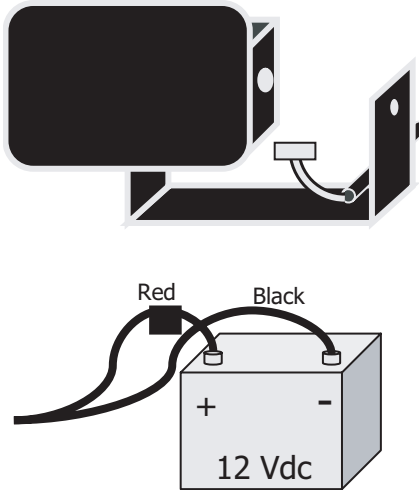
Do not use the enclosure as a guide when drilling. This may cause damage to the mounting bracket.

MONITOR AND POWER CONNECTIONS

Route the power leads of the main harness to the battery. Allow some slack to tie the harness off to the console bracket for strain relief and protection of the harness.



Figure 3
Monitor And Power Connections

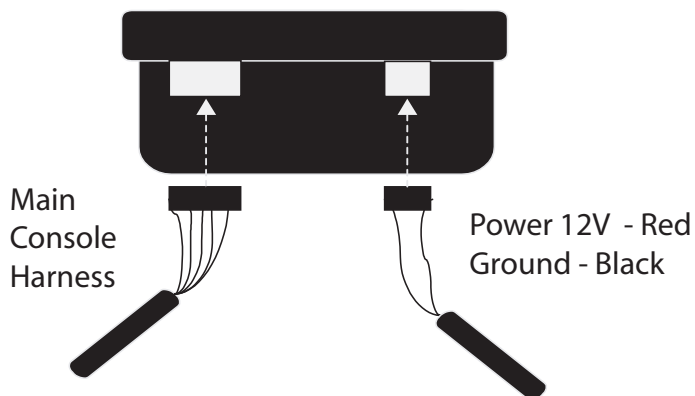


The monitor operates on 12 Vdc only. The red (fused) lead should be connected to the positive battery terminal and the black lead should be connected to the negative battery terminal.

VM-2200 CONSOLE MAIN HARNESS

Insert the connectors of the harness into the mating connectors inside the bottom of the console. Each connector is different and may only be inserted into its mate.

Figure 4
Main Harness Connection



Route the main harness to the rear of the tractor. Mount the relay (part of the main harness) to a suitable location at the rear of the hitch, assuring the connector will reach the implement connector at the hitch.



SYSTEM CONFIGURATION

THRESHOLD SETTINGS

The threshold settings allow for establishing a minimum number of seeds per second that will cause a seed row to fail and an alarm to sound.

To set the minimum seeding rate, perform the following:

1. Power up the console and wait until startup is complete.
2. Momentarily hold the +/- switch in either the "+" or "-" position to change the threshold adjustment setting.
3. Refer to Figure 5 and enter the desired threshold.
4. Holding the +/- switch to the "+" position will increase the LEDs.
5. Holding the +/- switch to the "-" position will decrease the LEDs.

Figure 5

Minimum Seeding Rate Table

VM-2200	Threshold Seeds/Second
1	2 seeds every second
2	3 seeds every second
3	4 seeds every second
4	6 seeds every second
5	8 seeds every second
6	12 seeds every second
7	20 seeds every second
8	30 seeds every second
9	40 seeds every second
10	50 seeds every second
11	60 seeds every second
12	70 seeds every second
13	80 seeds every second
14	100 seeds every second
15	120 seeds every second
16	150 seeds every second



CONVERSION FOR SEEDING RATE

Use the following formulas to determine the threshold in seeds per second.

IF POPULATION IN SEEDS PER ACRE IS KNOWN

$$\text{Seeds per second} = P \times R \times V / 360000$$

P = Population in seeds per acre

R = Row width in inches

V = Tractor speed in miles per hour

EXAMPLE = Population is 30000, Row width is 30 inches, Tractor speed is 6 miles per hour.

$$\text{Seeds per second} = P \times R \times V / 360000$$

$$\text{Seeds per second} = 30000 \times 30 \times 6 / 360000$$

$$\text{Seeds per second} = 15$$

$$2/3 \text{ of } 15 = 10$$

Set the threshold on the monitor to 2/3 of the nominal seeds per second or round down to the next setting.

IF SEED SPACING IS KNOWN

$$\text{Seeds per second} = 17.6 \times V / S$$

V = Tractor speed in miles per hour

S = Seed spacing in inches

Examples: Tractor speed is 6 miles per hour, seed spacing is 7 inches between seeds.

$$\text{Seeds per second} = 17.6 \times V / S$$

$$\text{Seeds per second} = 17.6 \times 6 / 7$$

$$2/3 \text{ of } 15 = 10$$

Set the threshold on the monitor to 2/3 of the nominal seeds per second or round down to the next setting.



SYSTEM OPERATION

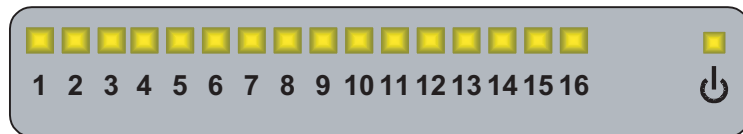
POWER SEQUENCE

Moving the I-O (power) switch to the center position turns on the monitor. Upon power up, the monitor provides the operator with an indicator test by illuminating all 16 rows. The alarm will output a single chirp during the display test.

The VM-2200 automatically detects which sensors are connected. To disable a row from being monitored, turn the monitor OFF and unplug the sensor at the row unit. Turn the monitor back ON and the row will be disabled.

Figure 6

Power Up Indicator And Alarm Test



MONITOR MODE

The VM-2200 may be configured in MONITOR mode or ALARM mode. In MONITOR mode, each time a seed is detected, the row light will blink. The maximum blink rate is 20 times per second. Rows that are planting at a slower rate will appear to be less intense. Any row failure that is detected or seed application that falls below the established minimum threshold will be indicated by a row number that remains unlit.

To position the VM-2200 in MONITOR mode, toggle the I-O switch from Off (O) to On (I). All lights will illuminate for 2 seconds.

DIMMING

Once the unit has completed the self test, and if no alarms are sounding, the light intensity may be dimmed by toggling the I-O switch UP to the momentary position. The alarm will chirp for each dimming step and provide a long chirp if a minimum or maximum setting is reached. Once the dimmest setting is reached, the indicator will reverse and start to brighten.

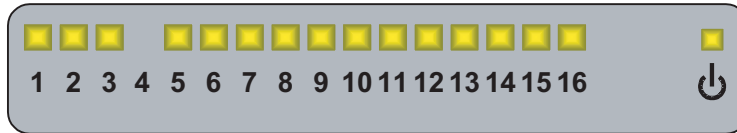
ROW FAILURE

In MONITOR mode, if an ALL ROWS FAILURE is detected, all rows will darken and an alarm will sound. If one or more rows fail, the corresponding row(s) will darken and an alarm will sound. The alarm may be silenced by moving the I-O switch UP momentarily. The alarm will remain silenced until an ALL ROWS FAILURE condition occurs (typically at the end of a row), the row begins working again, or the monitor power is cycled.



Figure 7

Example Of Row Failure - Monitor Mode



ALARM MODE

In ALARM mode, rows are illuminated only when row failure is detected. All lights remain darkened while planting rates on all rows remain above the established threshold. If a row falls below the established threshold, the row light(s) will illuminate and an alarm will sound.

To position the VM-2200 in ALARM mode, toggle and hold the I-O switch from Off (O) to On (I) to the upper position for 1 second. The monitor will blink and the alarm will sound, indicating ALARM mode is enabled. Release the switch.

DIMMING

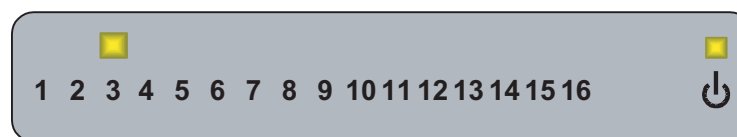
Once the unit has completed the self test, and if no alarms are sounding, the light intensity may be dimmed by toggling the I-O switch UP to the momentary position. The alarm will chirp for each dimming step and provide a long chirp if a minimum or maximum setting is reached. Once the dimmest setting is reached, the indicator will reverse and start to brighten.

ROW FAILURE

In ALARM mode, if an ALL ROWS FAILURE is detected, all rows will be illuminated and an alarm will sound. If one or more rows fails, the corresponding row(s) will be illuminated and an alarm will sound. The alarm may be silenced by moving the I-O switch UP momentarily. The alarm will remain silenced until an ALL ROWS FAILURE condition occurs (typically at the end of a row), the row begins working again, or the monitor power is cycled.

Figure 8

Example Of Row Failure - Alarm Mode





TROUBLESHOOTING

UNIT WILL NOT POWER ON. NO LEDS WILL LIGHT DURING THE POWER UP SEQUENCE

Probable Cause:

1. Loose connection between power harness and monitor.
2. Blown fuse.
3. Defective monitor.
4. Poor battery connection.
5. Insufficient system voltage.

Corrective Action:

1. Assure harness connections are centered and fully inserted. Assure the power harness is properly connected to the monitor.
2. Check the fuse in the power harness near the battery. If it is blown, replace with a 3A AGC. Assure the positive and negative connections are not reversed.



Do not replace fuse with one having a higher amperage rating - the console could be damaged internally.

3. If fuse blows again, the power harness or the console may be faulty and require replacement. Contact your distributor Department.
4. Check battery connections and assure they are clean and tight.
5. Make sure battery voltage is between 10 and 16 Vdc.

AN INDICATOR DOES NOT LIGHT OR THE ALARM DOES NOT SOUND DURING POWER UP

Probable Cause:

1. Defective monitor.

Corrective Action:

1. Contact Agri Motive Products, Phone# 260-375-2415 or visit www.ag-electronics.com



ONE ROW INDICATOR FAILS TO FLASH WHEN PLANTING. ALARM SOUNDS CONTINUOUSLY. SEEDS ARE BEING PLANTED BY ROW UNIT.

Probable Cause:

1. Defective seed sensor.
2. Poor harness connection at the console or at the sensor that is intermittent.
3. Defective sensor or harness wire that is intermittent.

Corrective Action:

1. Clean sensing elements using a dry bottle brush. Some seed treatments require scrubbing with water and a commercial cleanser.
2. Check planter harness connections at the console, hitch, and sensors.
3. Check planter harness for pinched, worn, or broken elements. Swap the sensor with another row. If the problem moves, the sensor is faulty. Otherwise, the harness or monitor is faulty.

UNIT POWERS ON, ALL LEDS LIGHT, BUT NO SENSORS ARE DETECTED

Probable Cause:

1. Planter harness is not properly connected.
2. Defective (shorted) harness.
3. Defective (shorted) seed sensor.
4. Defective monitor.

Corrective Action:

1. Check planter harness connections at the console, hitch, and sensors.
2. Check planter harness for pinched, worn, or broken elements. Check sensors for pinched, worn, or broken wires.
3. Contact Agri Motive PH# 260-375-2415 or visit www.ag-electronics.com



VM-2200 SERVICE PARTS - 16 ROW

MONITOR

VM-2200 Monitor	46794-0114
Mounting bracket	46794-0080
Fuse, AGC 3A	20112-0049
Power harness	46794-0530
16 row cab harness	46794-0510

PLANTER HARNESSSES

Standard, 4 row	45841-0530
Standard, 6 row	45841-0550
Standard, 8 row	45841-0570
Standard, 12 row	45841-0590
Standard, 16 row	45841-1080

PLANTER Y CABLES

Y-Cable, 8 row squadron	45968-0610
Y-Cable, 12 row squadron	45968-0960
Y-Cable, 16 row squadron	45968-0950

PLANTER EXTENSIONS

Extension cable, hitch, 6'	45841-0810
Extension cable, hitch, 15'	45968-0320

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VM-2200 SERVICE PARTS - 8 ROW

MONITOR

VM-2200 Monitor	46794-0113
Mounting bracket	46794-0800
Fuse, AGC 3A	20112-0049
Power harness	46794-0530
8 Row Cab Harness, 37 pin AMP CPC	46794-0500

PLANTER HARNESSSES AND EXTENSIONS

4 Row Harness	46794-0540
6 Row Harness	46794-0550
8 Row Harness	46794-0560
2m Extension Harness	46794-0570

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