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PLANTER MONITOR

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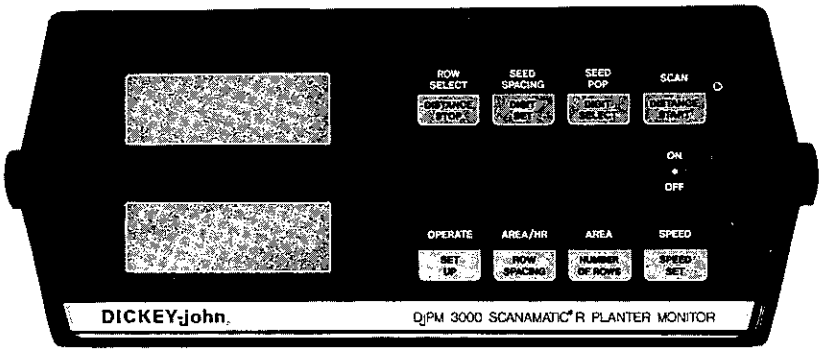
INTRODUCTION



G-0841-0001

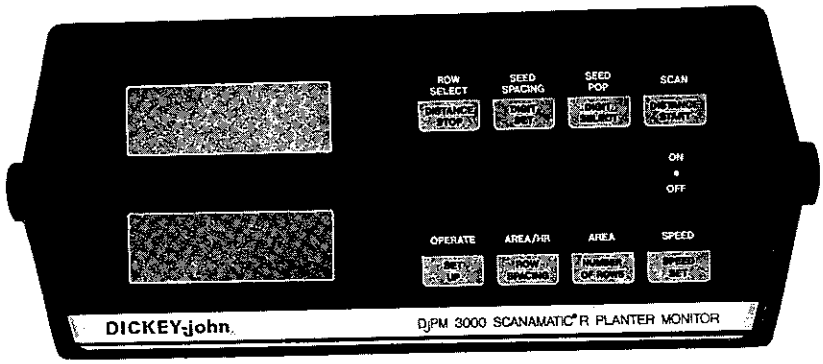
Congratulations on your purchase of the Dj PM3000 SCANAMATIC® R PLANTER MONITOR. This micro-processor based Planter Monitoring System uses the latest electronic technology to take the guesswork and doubt out of your planting operation. Any time a runner is plugged, or for any reason seed is not going to the ground, the monitor will sound an alarm and will indicate, by means of a numbered display row indicator and a failed row number message, which planter unit has stopped planting. This Monitoring System also provides the operator with valuable management information such as: Seed Spacing, Seed Population, Area, Ground Speed, and the projected Area/Hr (Area that will be planted in 1 hour at your current planting rate).

The Dj PM3000 SCANAMATIC®R PLANTER MONITOR System consists of a control console, ground speed sensor, up to 32 seed sensors, and a planter harness. The control console receives signals from each sensor, processes and stores the information or displays the operator selected function. The Radar Ground Speed Sensor is installed on the tractor and provides vehicle ground speed data to the console. The Seed Sensors are installed in the planter runners and provides seed flow data to the console. The Planter Harness is installed on the planter and connects the seed sensors to the console.

The 32-Row Planter Monitor Console can be used on planters having 1 to 32 rows. The console will automatically monitor the number of seed sensors that are connected to the planter harness.

DjPM 3000 PLANTER MONITOR

CONTROL CONSOLE



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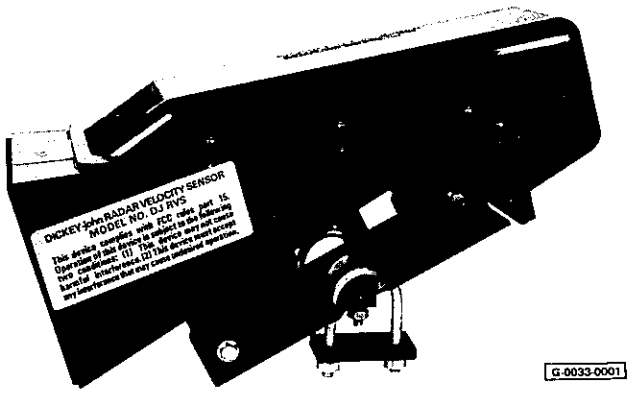
The Console features two large easy to read Liquid Crystal Displays (LCD). The upper display contains a four digit readout and several prompting messages. The four digit readout is used in the **SET UP** mode to display the constant values as entered by the operator and is used in the **OPERATE** mode to display numeric values of vehicle ground speed, seed spacing, seed population per acre, area, and projected area per hour. The prompting messages are word displays that inform the operator what the four digit numeric display is showing. The lower LCD is divided into 16 segments and each segment represents a planter row. The segment flashes dark each time a seed is detected by the seed sensor. For planters having more than 16 rows the row segments are divided equally between two displays, the LEFT and RIGHT halves of the planter.

The console front panel also contains nine (9) touch switches. These touch switches are used by the operator to enter constants in the **SET UP** mode and to select the desired functions to be displayed in the **OPERATE** mode.

RADAR GROUND SPEED SENSOR



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The radar ground speed sensor is installed on the tractor at a location where the face of the sensor has an unobstructed view of the ground. This sensor functions independently from all tractor parts and provides a true ground speed input for the control console.

SEED SENSORS

The seed sensor is a photoelectric device which is installed in each planter runner, normally at the lower end of the seed delivery tube. These sensors are located at this point to quickly detect seed flow stoppage to the ground.

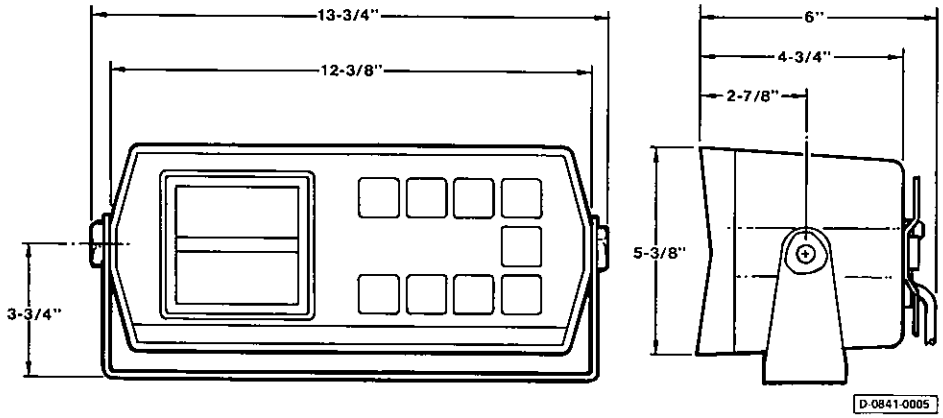
Since each planter runner differs with each planter model, seed sensors are designed to fit specific planter types. This provides optimum seed sensing for each planter model.

NOTES

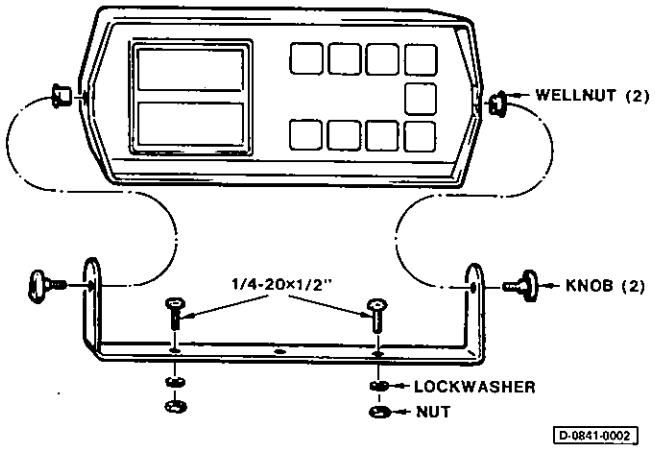
INSTALLATION

1. CONTROL CONSOLE

The control console should be located inside the tractor cab where it is accessible to the operator without obstructing his normal driving view. The mounting bracket can be attached to the control console with the mounting holes oriented up (overhead mounting) or down (dash mounting) as needed.



Step 1. Refer to the above illustration and select a location within the cab where the console can be viewed and easily operated.



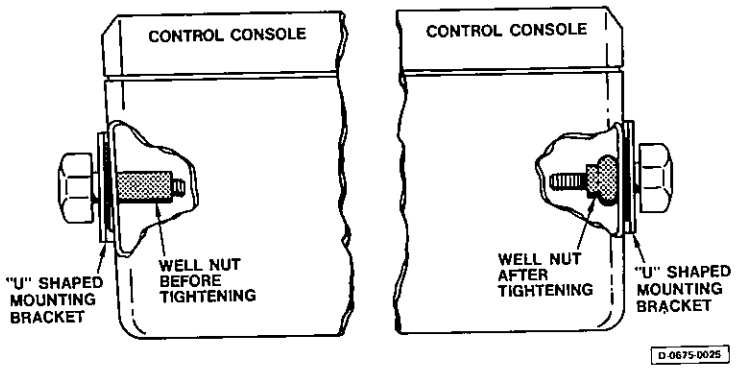
Step 2. Refer to the above illustration and using the U-shaped mounting bracket for a template, mark the location for two 9/32-inch mounting holes. Drill two 9/32-inch diameter holes.

NOTE: An alternate mounting method is the console mounting bracket secured to the mounting surface using a single bolt in the center hole of the mounting bracket. This mounting allows the console to swivel.

CAUTION: Make sure the opposite side of the drilling surface has ample clearance and that it is free of wiring, etc.

Step 3. Attach the mounting bracket to the mounting surface using two 1/4 — 20 x 1/2 inch bolts, lockwashers, and nuts provided.

Step 4. Secure the control console to the mounting bracket using the two knobs supplied.



CAUTION: The console has a wellnut on each side and care must be exercised when tightening the knobs. Refer to the above illustration and tighten the two knobs just enough to keep the console supported without slipping. DO NOT overtighten knobs as this will crack console sides.

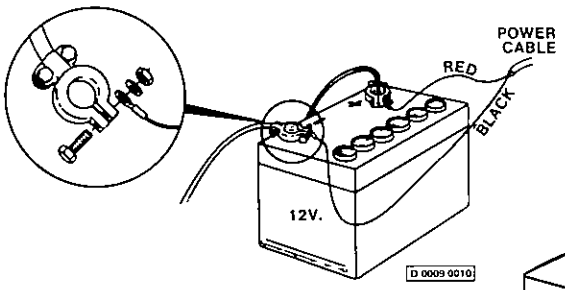
Step 5. Route the main console cable (with 37-pin CPC connector) to the rear of the tractor, near the hitch. The cable should run on the side of the tractor, opposite the alternator and spark plugs and be located where it will not be pinched, cut, stepped on; etc. Secure the cable in place with tie wraps, making certain it can be disconnected from the planter harness (at the hitch) without removing any tie wraps.

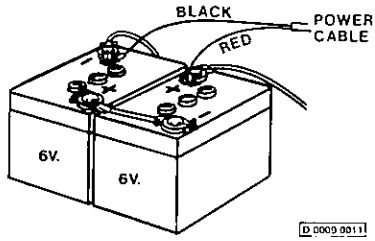
2. POWER CONNECTION

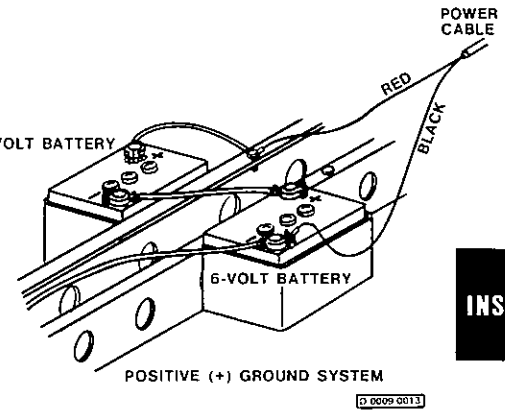
The Dj PM3000 Planter Monitor operates on 12VDC ONLY. The battery cable has two wires, a Black wire and a Red wire, each terminated with a ring terminal. Refer to the above illustration and note that the Black wire connects directly to the negative (—) terminal of the battery and the Red wire connects directly to the positive (+) terminal of the battery.

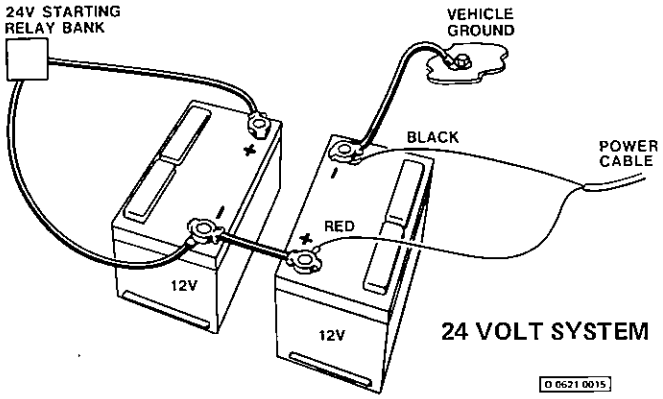
Secure battery cable with tie wraps furnished with console. DO NOT route console battery cable in close proximity to existing battery cables. **NOTE: THE BATTERY, IGNITION, AND ELECTRICAL SYSTEM OF THE TRACTOR MUST BE IN GOOD WORKING ORDER.**

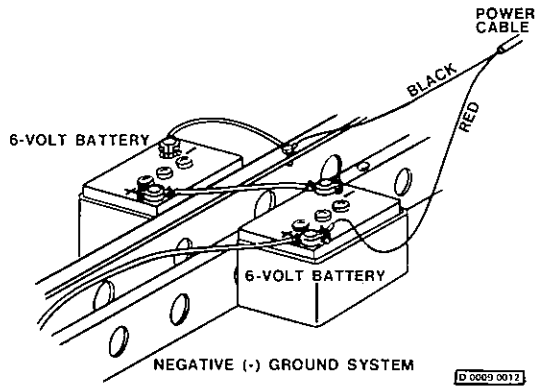
Refer to the following illustrations for typical battery connections.











INSTALLATION

If your tractor battery arrangement is different than those shown above, or if there is any question as to where to connect the battery cable, use a voltmeter to make sure you have from 11-volts to 14-volts across the Red and Black leads. On tractors using two 12-volt batteries, make sure console battery leads are connected directly to the grounded battery.

NOTE: Good battery connections are essential for proper monitor operation. Make sure connections are clean and tight. If console is connected to 6-volts or condition of 12-volt battery is less than 10-volts, a continuous audible alarm will sound and the display will be fragmented when the **ON/OFF** switch is depressed.

3. SEED SENSORS

The Seed Sensors and chutes are designed to fit specific planter types. Install the Seed Sensors as described in the Installation Instructions provided with the Sensors.

4. RADAR GROUND SPEED SENSOR

The Radar Ground Speed Sensor is installed on the tractor. Select the mounting location and install the Radar Ground Speed Sensor as described in the Installation Instructions provided with the Sensor. Perform the **SPEED SET CALIBRATION** procedure as described on page 13 of this manual.

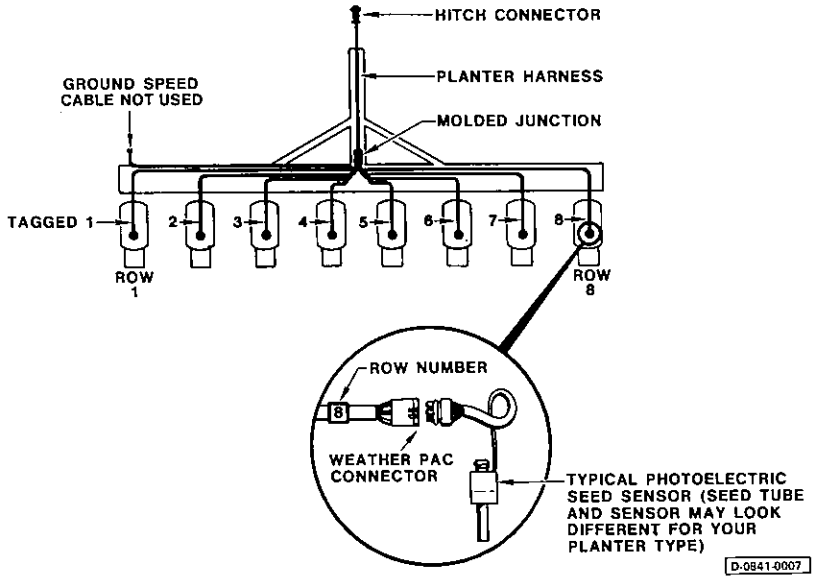
5. PLANTER HARNESS

The Planter Harness installation is not difficult, but you must use care to locate the harness where it will not be pinched, cut, or damaged by any moving parts during normal operation of your planter.

There are two different planter harness arrangements that can be used with the Dj PM3000 Planter Monitor. The Standard Harness is available for 4, 6, 8, or 12 row planters and a Squadron Harness for 8, 12, 16, or 24 row planters.

a. STANDARD HARNESS

The Standard Harness installation (4, 6, 8, or 12 row) will be the same except for the different number of row leads.



Step 1. Refer to the above illustration and secure the molded junction to the tool bar at the center of the planter.

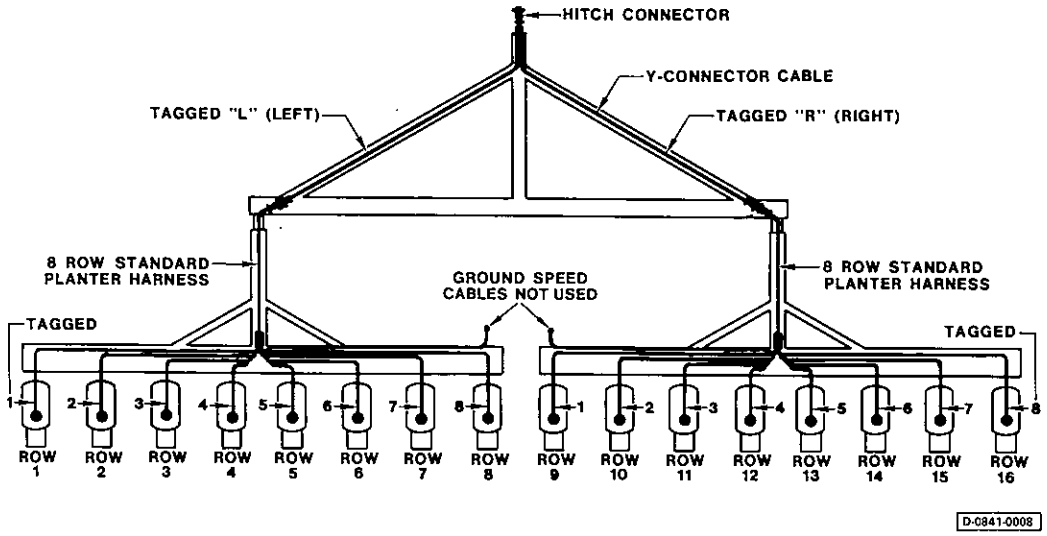
Step 2. Route the individual row leads (indentified with row number) to the corresponding planter row unit. Row 1 is on the left side of the planter.

Step 3. Route the cable containing the Hitch Connector to the planter hitch.

Step 4. Coil all excess cable and secure where it will not be pinched, cut, or damaged when the planter is in operation.

b. SQUADRON HARNESS

The Squadron Harness utilizes two Standard Harnesses and a Y-connector cable. Each of the Standard Harnesses are installed on 1/2 of the planter and connected to the Console by the Y-connector cable.



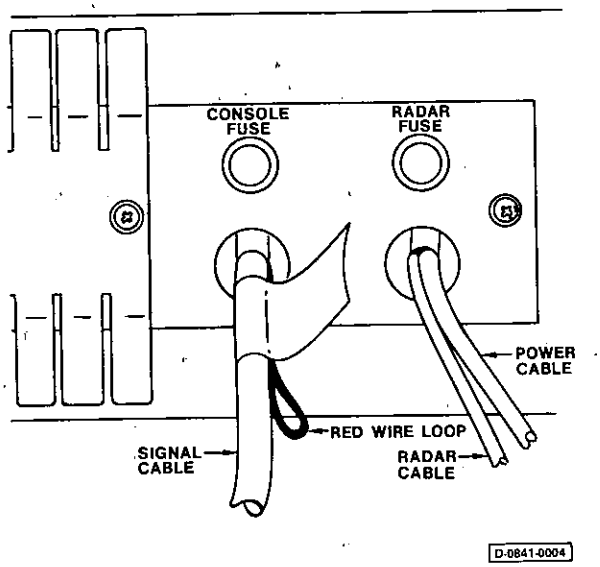
Step 1. Refer to the above illustration and install both standard harnesses as described in the Standard Harness installation procedure.

Step 2. Install the Y-connector cable as shown. **NOTE:** The Y-connector cable is tagged "L" (left) and "R" (right), the "L" goes to the left half of the planter and "R" goes to the right half.

Step 3. Coil all excess cable and secure where it will not be pinched, cut, or damaged when the planter is in operation.

AMERICAN OR METRIC MEASURES

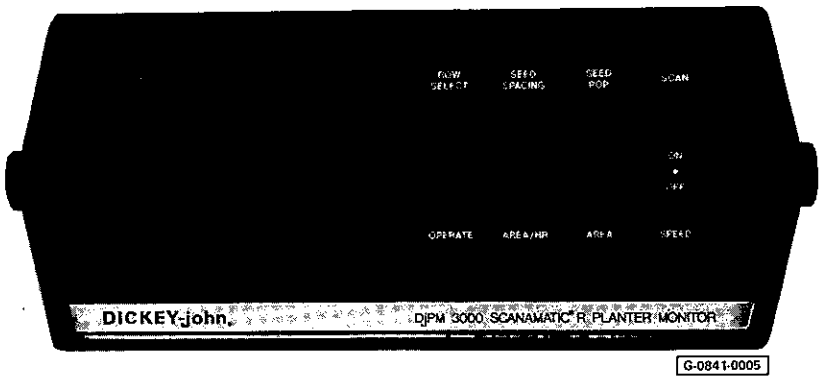
The Dj PM3000 console is shipped from the factory setup for use with American measures. To convert the console to Metric measures proceed as follows:



1. Refer to the above illustration and note the red wire loop adjacent to the signal cable on the back of the console. To convert the console to metric measures, cut the wire loop using a pair of wire cutters. **NOTE:** Tape the ends of the cut wire to prevent the two ends making contact with each other or the vehicle.

SET UP MODE [ENTERING CONSTANTS]

Upon initial power-up or whenever memory is lost there are three constants which must be entered before the system will enter the **OPERATE** mode. Determine and enter the constants as follows:



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ROW SPACING – Enter the distance between the planter rows in inches using the **DIGIT SELECT** and **DIGIT SET** switches. **NOTE:** If you have a skip row planter, take the distance between the two outside rows in inches (cm) and divide by the number of planter rows minus 1. This is the number to be entered as the **ROW SPACING** constant.

EXAMPLE: Planter has 30-inch row spacing and 16 rows.

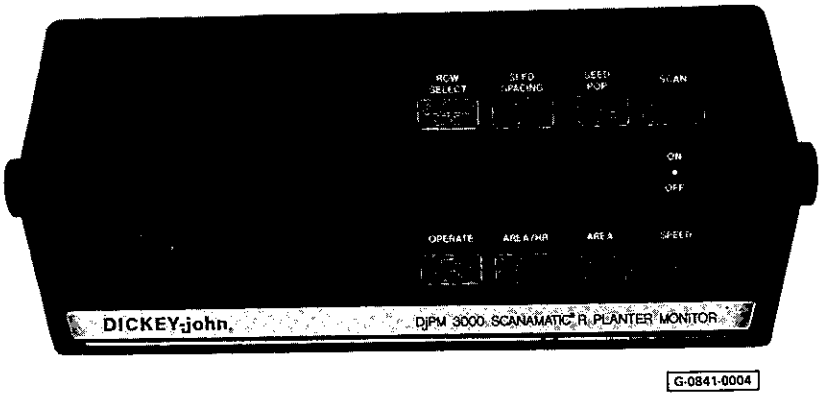
1. Press the **ROW SPACING** switch. The upper display will show: **SET UP, ROW SPACING, 000.0.**

   One of the four 0's will be flashing.

2. Press the **DIGIT SELECT** switch (a short alarm burst will be heard each time the switch activates) until the second **0** to the left of the decimal point is flashing.

3. Press the **DIGIT SET** switch until a **3** is shown in this location: **030.0**

   NOTE: Holding the **DIGIT SET** switch will cause the digit to increment from **0** through **9.**



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NUMBER OF ROWS – Enter number of rows on your planter using the **DIGIT SELECT** and **DIGIT SET** switches.

EXAMPLE: Planter has 16 rows.

1. Press the **NUMBER OF ROWS** switch. The upper display will show: **SET UP, NUMBER OF ROWS, 00.**

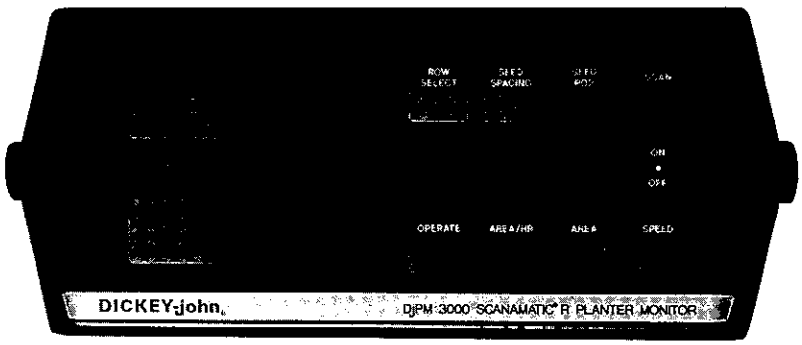
   One of the two 0's will be flashing.

2. If necessary, press the **DIGIT SELECT** switch until the right hand **0** is flashing.

3. Press the **DIGIT SET** switch until a **6** is shown in this location: **06.**

4. Press the **DIGIT SELECT** switch until the left hand **0** is flashing.

5. Press the **DIGIT SET** switch until a **1** is shown in this location: **16.**



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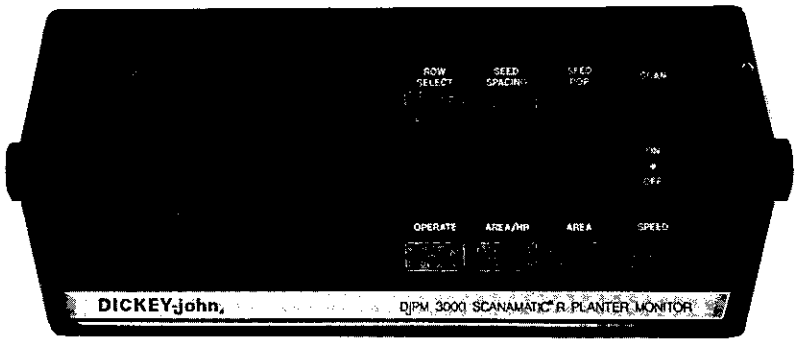
SPEED SET – The Speed Set calibration number matches the console to the ground speed sensor when calibrated over a specified measured distance. When the calibration procedure is completed and the **SPEED SET** constant established, the value should be written down and retained in the event battery voltage is removed from the console and the information in memory is lost. In this event, the constant could be re-entered manually using the **DIGIT SELECT** and **DIGIT SET** switches. The speed set calibration procedure must be repeated and a new speed set number established if the radar mounting is changed for any reason.

NOTE: When obtaining the following speed set number, actual in-field conditions should be simulated as close as possible.

1. Measure an accurate 400 foot (150 metre) in-field course, preferrably on level ground. Mark the "start" and "finish" of the course so it will be plainly visible from the cab as you drive past.
2. With the upper display showing messages **SET UP** and **SPEED** and the four digit display showing all zero's (to reset four digit display to zero's, press and hold the **SPEED SET** switch for approximately 5 seconds), drive up to the marked course at normal planting speed. When even with the "start" marker, press the **DISTANCE START** switch. Four dashes will appear on the console display.



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3. Keep at a steady speed through the entire course. When even with the "finish" marker, press the **DISTANCE STOP** switch.
4. The speed set number will be displayed. Record this number for future reference.

SPEED SET NUMBER_____

IMPORTANT: This procedure may have to be repeated after performing the Radar Vibration test.

Dj PM3000 CONSTANTS

The Dj PM3000 Planter Monitor is a microprocessor based unit, therefore, the operator must enter constants to describe the number of rows, row width, and vehicle speed. The following is a list of the required constants which must be entered for proper operation of the planter monitor. **NOTE:** The accuracy of the area computations, population, seed spacing, and vehicle ground speed readout are dependent upon the accuracy of the operator entered constants. Use care when determining the constants which describe your planter.

1. **NUMBER OF ROWS** — The Number of Rows on your planter (1 to 32).

2. **ROW SPACING** — The distance between the rows on your planter.

3. **SPEED** — A number that is the result of the speed calibration procedure.

DIGIT SELECT AND DIGIT SET SWITCHES

The **DIGIT SELECT** and **DIGIT SET** switches are used in the **SET UP** mode to enter constants.

DIGIT SELECT — Enter the Set Up Mode and note that one of the digits in the four digit display is flashing. The flashing signifies that this is the digit that will change if the **DIGIT SET** switch is pressed. Press the **DIGIT SELECT** switch and note that the digit to the left of the flashing digit begins to flash. Continue pressing the **DIGIT SELECT** switch and note that the flashing of the digit advances to the left. When the left digit is flashing and the **DIGIT SELECT** switch is pressed the digit on the right of the display will begin to flash.

DIGIT SET — Press and hold the **DIGIT SET** switch and note that the flashing digit sequences through all numbers. Release the **DIGIT SET** switch and note that the sequencing stops but the digit continues to flash. This is the number which will be entered into memory at this digit position.

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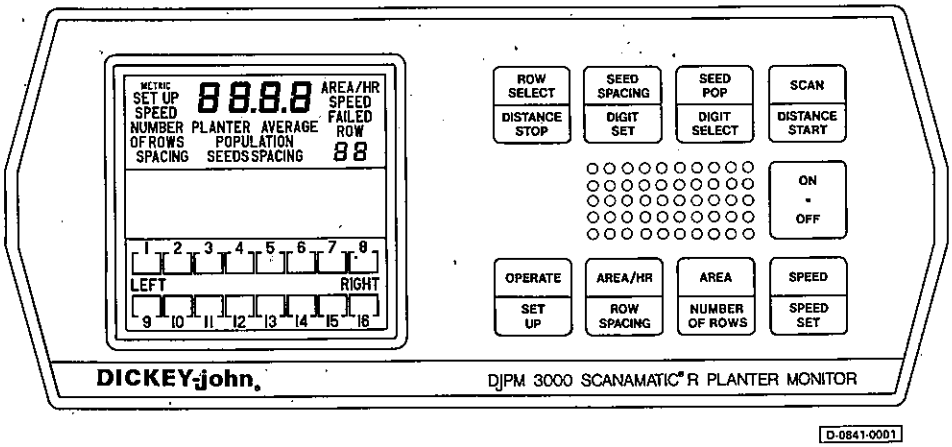
PLANTER MONITOR

DjPM 3000 OPERATOR CONTROLS



ENTERING CONSTANTS

The operator's controls on the front panel of the Dj PM3000 console consist of nine pressure sensitive switches. Eight of the nine switches are dual function switches, performing one function during the **OPERATE MODE** and another function during the **SET UP MODE.** All switch functions are color coded to define between the **OPERATE** and **SET UP** modes. The upper half of each dual function switch is olive brown in color and contains the Operate functions. The lower half of each dual function switch is tan in color and contains the Set Up functions.

SWITCH DESCRIPTIONS

ON • OFF — Turn monitor system **ON** or **OFF.**

OPERATE/SET UP — This switch is used to select the mode of operation of the monitor system. If the monitor is in the **OPERATE** mode, pressing this switch places the monitor in the **SET UP** mode (**SET UP** message is displayed in the upper visual indicator). Pressing it again returns the monitor to **OPERATE.**

OPERATE MODE (Olive brown switch color)

AREA/HR — Upper four digit display shows the predicted area (in acres) that will be covered in one hour if the same vehicle speed rate is maintained. **AREA/HR** message will also be shown.

AREA — Upper four digit display shows the total area covered (in acres) since the last reset (maximum accumulation is 9999 acres). **AREA** message will also be shown.

SPEED — Upper four digit display shows current vehicle ground speed. **SPEED** message will also be shown.

SCAN — The monitor scans each planter row and displays either row seed population per acre (displayed in thousands of seeds per acre) or seed spacing (in inches) as selected by the operator. The display message will be **POPULATION** or **SEED SPACING** as selected. Also shown in the lower right corner of the display is the planter row number being scanned. The scan rate is 3 seconds per row.

SEED POP — Upper four digit display shows seed population in thousands of seeds per acre. **POPULATION** message and **ROW** Number will also be shown.

SEED SPACING — Upper four digit display shows seed spacing in inches. **SEED SPACING** message and **ROW** Number will also be shown.

ROW SELECT — Stops the row scan function and allows the operator to select a specific row to monitor. Select the row to be monitored by pressing and releasing the **ROW SELECT** switch until the desired row number appears in the corner of the display.

SET UP MODE (Tan switch color)

ROW SPACING — Upper four digit display shows the last entered value. Display messages will be **SET UP** and **ROW SPACING.**

NUMBER OF ROWS — Upper four digit display (two digits used) shows the last entered number of planter rows. Display messages will be **SET UP** and **NUMBER OF ROWS.**

SPEED SET — Upper four digit display shows the last entered value of the speed constant. Display messages will be **SET UP** and **SPEED.**

DISTANCE START — Starts the accumulation of the **SPEED** constant when the speed calibration procedure is performed. Display messages will be **SET UP** and **SPEED.** Display will show four bars.

DIGIT SELECT — Selects the digit in the upper display which can be changed (selected digit is flashing).

DIGIT SET — Sets the flashing digit in the upper display to the desired number (0 – 9).

DISTANCE STOP — Stops the accumulation of the **SPEED** constant when the speed calibration procedure is performed. Four digit display will show the speed constant. Display messages will be **SET UP** and **SPEED.**

DISPLAY MESSAGES

Operate Mode (Upper Display)

POPULATION – This message is displayed when the four digit display is showing the seed population (thousands of seed per acre) being planted by the planter row unit. The planter row number is shown in the lower right corner of the display.

PLANTER AVERAGE POPULATION – This message is displayed when the four digit display is showing the average seed population for the complete planter in thousands of seed per acre (hectare). This display is shown immediately following the population readout of the highest numbered row of the planter.

SEED SPACING – This message is displayed when the four digit display is showing the seed spacing in inches (cm). The planter row number is shown in the lower right corner of the display.

PLANTER AVERAGE SEED SPACING – This message is displayed when the four digit display is showing the average seed spacing for the complete planter in inches (cm). This display is shown immediately following the seed spacing readout of the highest numbered row of the planter.

SPEED – This message is displayed when the four digit display is showing vehicle ground speed in MPH (kph).

AREA – This message is displayed when the four digit display is showing accumulated area in acres (hectares) since the last reset.

AREA/HR – This message is displayed when the four digit display is showing the predicted area that will be covered in the next hour if the current ground speed is maintained. This prediction is based on the last 10 seconds of operation.

Set Up Mode (Upper Display)

SET UP – This message is displayed when the monitor is in the set up mode.

SPEED – This message is displayed when the four digit display is showing the **SPEED SET** calibration number. This number can be altered by using the **DIGIT SELECT** and **DIGIT SET** switches. The flashing digit is the one that can be changed using the **DIGIT SET** switch.

NUMBER OF ROWS – This message is displayed when the four digit display (two digits active) is showing the number of rows of the planter. This number can be altered by using the **DIGIT SELECT** and **DIGIT SET** switches. The flashing digit is the one that can be changed using the **DIGIT SET** switch (32 maximum).

ROW SPACING – This message is displayed when the four digit display is showing the row spacing in inches (cm). This number can be altered by using the **DIGIT SELECT** and **DIGIT SET** switches. The flashing digit is the one that can be changed using the **DIGIT SET** switch.

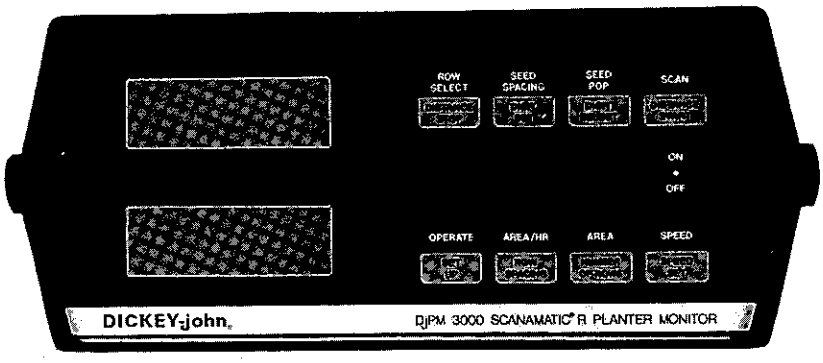
METRIC – This message is displayed in the **SET UP** and **OPERATE** modes, when the monitor is using and displaying metric measures.

LOWER DISPLAY

The lower visual display contains up to sixteen segments and each one corresponds to a planter row unit. When the monitor is turned on the console senses the number of seed sensors connected to the planter harness and activates a segment for each one. If up to 16 seed sensors are sensed the display will show segments for all sensors all the time. If more than 16 (17 - 32) seed sensors are sensed then the display is split and up to 16 sensors are shown for the **LEFT** and **RIGHT** side of the planter.

EXAMPLE: If a 24 row planter is being used – when the display message **LEFT** is on the segments are showing seed flow for planter rows 1 through 12. When the display message **RIGHT** is on the segments are showing seed flow for planter rows 13 through 24. The segment numbers shown on the display will correspond to the planter row numbers when the **LEFT** planter half is shown (1 through 12). When the **RIGHT** planter half is shown the segment numbers 1 through 12 will represent planter rows 13 through 24 (segment 1 is planter row 13, segment 2 is row 14, up to segment 12 is row 24).

OPERATION



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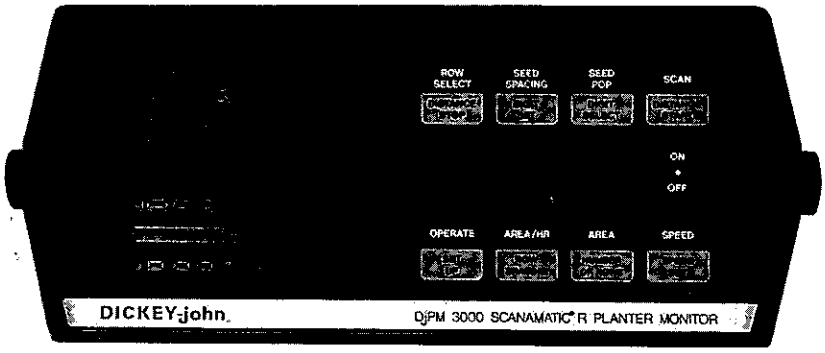
1. Turn console **ON** by pressing the **ON – OFF** switch.

Note that the upper display shows random segments for a short time then sequences through all entered **SET UP** constants (**SPEED, NUMBER OF ROWS,** and **ROW SPACING**). If the constants are not valid the alarm will sound for approximately four seconds and the monitor will enter the **SET UP** mode. If all constants are valid (as previously entered) the alarm will sound momentarily and the monitor will enter the **OPERATE** mode.



G-0841-0007

2. Select the desired function to be displayed by pressing the labelled switch (**OPERATE** functions are olive brown).

SEED POP – Displays the seed population of each planter row in thousands of seeds per acre (hectare). In the **SCAN** mode the display will sequence (approximately 3 seconds each row) through all planter rows. After the population for the highest planter row number is displayed, the average population for the total planter is shown. In the **ROW SELECT** mode a specific row can be selected and continuously monitored.

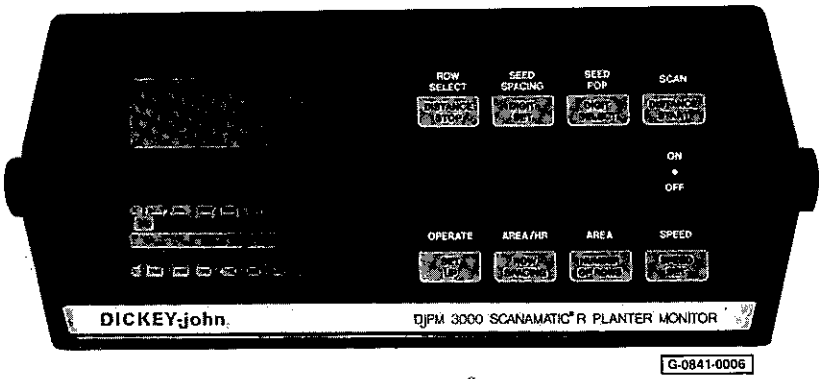
SEED SPACING – Displays the seed spacing of each planter row in inches (cm). In the **SCAN** mode the display will sequence (approximately 3 seconds each row) through all planter rows. After the seed spacing for the highest planter row number is displayed, the average seed spacing for the total planter is shown. In the **ROW SELECT** mode a specific row can be selected and continuously monitored.

AREA/HR — Displays the predicted area in acres (hectares) that will be covered in the next hour if the same planting rate is maintained. This prediction is based on the last 10 seconds of operation.

AREA — Displays the actual area covered in acres (hectares) since the last reset. To reset area to 0000, press and hold the **AREA** switch for approximately 5 seconds.

SPEED — Displays current vehicle ground speed in MPH (kph).

ROW FAILURES



Single Row Failure — A row failure will be indicated by the **FAILED ROW** number being displayed in the lower right hand corner of the upper display, the corresponding segment in the lower display will be blank, and the alarm will sound continuously.

Multiple Row Failures — Failures of more than one row will be indicated by the **FAILED ROW** number in the upper display sequencing through all failed rows, the corresponding segments of all failed rows in the lower display will be blank, and the alarm will sound continuously.

All Row Failure — When you lift your planter at the end of a row or stop in the field and seed flow stops in all planter units, the alarm will sound for approximately four seconds and all row indicator segments (lower display) will stop flashing. The upper display will show the **FAILED ROW** message and the number will sequence through all planter row numbers.

MEMORY RECALL

In the all row failure mode or immediately following power up, the operate functions (population, seed spacing, and area) can be displayed by pressing the touch switch labeled with the desired function. This display condition will remain for one minute after the last time a switch is pressed or until seeds are detected by the seed sensors.

GROUND SPEED SENSOR FAILURE

A ground speed failure will be indicated by the **SPEED FAILED** message being displayed in the upper display. To continue using the monitor system until a replacement ground speed sensor is obtained, disconnect the ground speed sensor cable, enter the **SET UP** mode, and enter your normal planting speed in MPH (kph) in place of the **SPEED SET** calibration number. **IMPORTANT:** The accuracy of the **POPULATION, SEED SPACING** and **AREA** readouts will depend on the vehicle ground speed. If you do not drive at the speed entered in **SPEED SET** memory these functions will not be accurate. **NOTE: AREA** will not accumulate in this mode.

CONTROL CONSOLE USED AS SPEED/AREA MONITOR

If a Radar Ground Speed Sensor is installed on the tractor and connected to the Dj PM3000 console, the monitor can be used to indicate ground speed and area covered when an implement other than a planter is used. To use the system as a **SPEED/AREA** monitor proceed as follows:

1. Place console in **SET UP** mode.
2. Enter 01 for **NUMBER OF ROWS** constant.
3. Enter Implement Width in inches (cm) for **ROW SPACING** constant.
4. Make sure **SPEED SET** constant is as determined in the **SPEED SET** calibration procedure.
5. Return to the **OPERATE MODE.** The following functions can be monitored, **SPEED, AREA,** and **AREA/HR.**

— IMPORTANT —

Under normal use the DICKEY-john PM3000 Planter Monitor will accumulate area whenever there is seed flow in at least one seed sensor. In the all rows failed condition, such as when turning around at the end of the field, the area accumulation will stop.

When using the Console as a Speed/Area Monitor an Implement Status Switch and an adapter cable (Dj Part Number 45841-0660) should be used to prevent area accumulation when the implement is raised.

SEED COUNTING

The monitor can be used to count seeds in a selected row by performing the following:

1. Place console in **SET UP** mode.

   IMPORTANT: Before performing Step 2 make sure you have recorded the SPEED constant.

2. Set the **SPEED** constant to 0000. This can be done by manually setting each digit to zero using the **DIGIT SELECT** and **DIGIT SET** switches or by pressing and holding the **SPEED SET** switch for approximately 5 seconds.

3. Enter the **OPERATE** mode by pressing the **OPERATE** switch.

4. Press and release the **ROW SELECT** switch until the desired planter row number is displayed in the lower right corner of the upper display. The monitor will now show seed counts for the selected row.

   To reset the display to zero and continue to monitor the same row unit, press the **SCAN** switch then the **ROW SELECT**.

   To select another row unit, press the **ROW SELECT** switch until the desired planter row number is displayed. Each time the **ROW SELECT** switch is pressed the row number will be incremented one unit and the four digit display will be reset to zero.

IMPORTANT: To return to normal operation, enter the SET UP mode and re-enter the SPEED constant.

TROUBLESHOOTING

The general procedure to use, if a problem occurs, is to isolate the cause to a sensor, sensor lead, planter harness, console cable, or the console, in that order. Make necessary repairs after problem has been isolated.

1. Sensors

Check for excessive dirt inside sensor. Check for cut or damaged wires. Connect sensor to the planter harness in a row that is operating properly. If it then operates correctly, sensor is good.

In some cases static electricity may cause dust and seed treatment to accumulate on the sensing elements in the sensor. Enough may accumulate to cause the sensor to malfunction, which can cause monitor to indicate a fault condition. Low humidity and dry soil conditions tend to cause this condition. When this occurs, clean the inside of the sensors, using a dry bottle brush.

If, for any reason a sensor becomes inoperative and a replacement sensor is not immediately available, disconnect the sensor lead connector from the planter harness, turn monitor off and then back on. This will keep the alarm from sounding for this row only. Replace the defective seed sensor as soon as possible. After sensor is replaced make certain the monitor is turned off and back on to reactivate the sensor position.

If sensor leads are damaged, carefully cut away the cable covering at the damaged area. Repair damaged wire or wires by soldering wires together, being sure to match wire colors, then tape each repaired wire. Finally, tape over cut portion of the cable cover. If necessary, move and secure cable so that the same type of damage will not occur again.

2. Planter Harness

Carefully examine planter harness for damage. If harness is cut or pinched, carefully cut away the cable covering. Repair cut or damaged wire or wires by soldering wires together, being sure to match wire colors. Tape each repaired wire, then tape over cut cable covering. If necessary, move and secure cable so that the same type damage will not occur again.

3. Console Cable

Carefully examine console cable for damage. If cable is cut or pinched, carefully cut away the cable covering. Repair cut or damaged wire or wires by soldering wires together, being sure to match wire colors. Tape each repaired wire, then tape over cut cable covering. If necessary, move and secure cable so that the same type of damage will not occur again.

4. Console

Check for a blown fuse, located on the console rear panel. Check battery connections and make certain they are clean and tight. Make certain battery is fully charged.

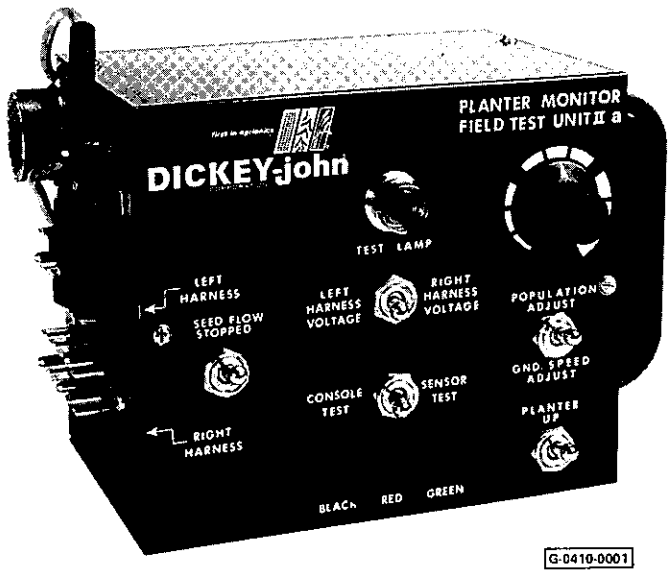
If console fuse is blown replace with a 5-amp type AGC. If fuse blows again, console needs repaired or replaced.

CAUTION: DO NOT REPLACE FUSE WITH A FUSE HAVING A HIGHER AMPERAGE RATING.

If the battery cable is not damaged, battery connections are clean and tight and the battery is fully charged, the console is defective and needs to be repaired or replaced.

Field Test Unit

Use a Field Test Unit (FTU IIa) which is available from most DICKEY-john Dealers. This unit will allow you to totally check out your console and seed sensors.



TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	ACTION REQUIRED
1. Display readout incomplete (fragmented) alarm sounds continuously.	Low Battery Voltage	Recharge or replace battery.
	Battery Connections Corroded	Inspect battery connection. If console power cable terminals or battery terminals are dirty or corroded, clean terminals as required.
	Console Defective	Repair or replace console. Contact your Parts and Service Dealer or call DICKEY-john for information (numbers are on inside back cover of this Manual).
2. One row indicator segment (lower display) fails to flash when planting. Population readout for the planter row is .0. Alarm sounds continuously. Seeds are being planted by the row unit.	Sensing elements inside the seed sensor are dirty.	Clean sensing elements using a dry bottle brush. NOTE: Some seed treatment chemicals are detrimental to the operation of seed sensors and refuse to be removed by dry brushing. To remove such treatment from the inside of a sensor proceed as follows: Wet a bottle brush with water, then apply a moderate amount of kitchen cleanser (such as Ajax or Comet) to the brush. Scrub inside of sensor until treatment is removed, then rinse sensor in clear cold water.

TROUBLESHOOTING CHART (Cont'd)

SYMPTOM	PROBABLE CAUSE	ACTION REQUIRED
2. (Cont'd)	Defective Sensor	Plug suspect sensor cable into an adjacent row that is operating correctly. If sensor does not operate, sensor is defective. If you wish to continue planting and a sensor is not available, disconnect the defective sensor cable from the planter harness, turn the monitor off and then back on. The monitor will ignore the disconnected row sensor and you can continue to monitor all other rows.
3. Monitor completely "dead".	Blown Console Fuse	Check console fuse, located on rear of console. If fuse is blown, replace with a 5-amp type AGC. If fuse blows again, console needs repaired or replaced. Contact your Parts and Service Dealer or call DICKEY-john for information (numbers are on inside back cover of this Manual).
	Poor Battery Connections	Check battery connections. Connections must be clean and tight.
	Cut or Broken Battery Cable	Visually inspect the battery cable for a cut or broken wire. If wires are cut or broken, splice the wires being sure to match wire colors. Solder the splices and tape each wire individually. USE ONLY ROSIN CORE SOLDER.

TROUBLESHOOTING CHART (Cont'd)

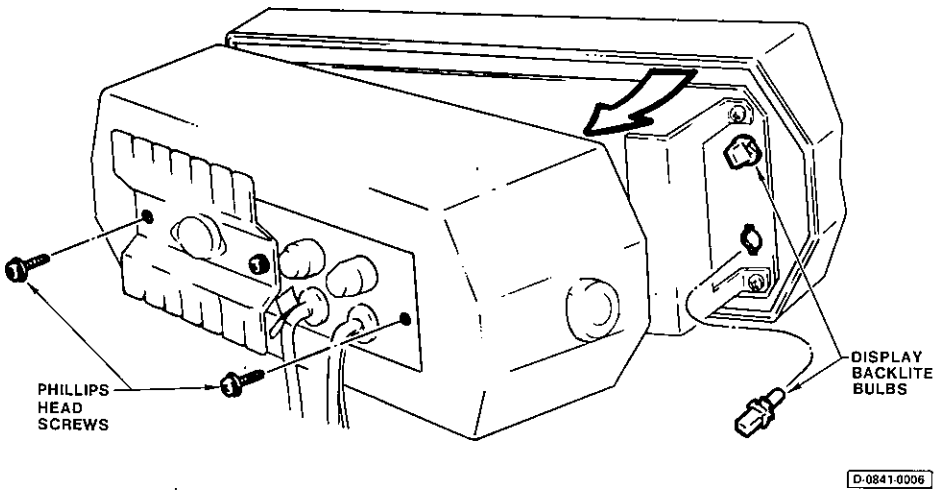
SYMPTOM	PROBABLE CAUSE	ACTION REQUIRED
3. (Cont'd)	Low Battery Voltage	Check battery voltage. Must be at least 12 volts, if not recharge or replace battery.
	Console Defective	Repair or replace console. Contact your Parts and Service Dealer or call DICKEY-john for information (numbers are on inside back cover of this Manual).
4. When monitor is turned "on", row display (lower display) remains blank. Upper display shows SPEED, NUMBER OF ROWS, and ROW SPACING constants. Monitor will not enter OPERATE mode.	Defective (shorted) seed sensor	Leave monitor turned on. Unplug seed sensors one at a time starting with row 1. When you disconnect a sensor and the remaining row display segments come on and the monitor enters the operate mode, the sensor or its cable is defective. Visually inspect the sensor cable, if damaged repair. If no cable damage is found, the sensor is defective and needs replaced. If all sensors are disconnected and problem still exists, the planter harness, console cable, or console is at fault.

TROUBLESHOOTING CHART (Cont'd)

SYMPTOM	PROBABLE CAUSE	ACTION REQUIRED
4. (Cont'd)	Planter Harness Shorted	Visually inspect the planter harness (including all row unit cables) for cuts, pinching and other types of damage. If damage is found, cut away cable covering and repair the individual wires. Tape over repaired wires and cable.
	Console Cable Shorted	Visually inspect the console cable for cuts, pinching and other types of damage. If damage is found, cut away cable covering and repair the individual wires. Tape over repaired wires and cable.
	Console Defective	If the console cable, planter harness, and seed sensors are normal, the console is at fault and needs to be repaired or replaced. Contact your Parts and Service Dealer or call DICKEY-john for information (numbers are on inside back cover of this Manual).

SERVICE PARTS

a. Display Backlite Bulb Replacement



1. Refer to the above illustration and remove the two outside Phillips head screws as shown. **NOTE:** DO NOT REMOVE THE CENTER PHILLIPS HEAD SCREW.

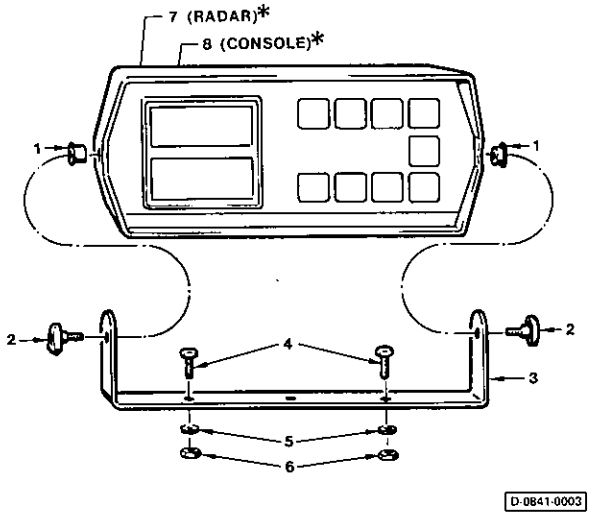
2. Carefully separate the console case from the front panel as shown.

3. Remove the defective bulb by turning the lamp assembly 1/4 turn counterclockwise and pulling straight out.

4. Replace bulb with a GE # 73 (Dj Part No. 21027-0003).

5. Carefully assemble the console front panel, case and rear panel and install the two Phillips head screws. **CAUTION:** Make sure that all wires are located where they will not be pinched or cut.

b. Customer Replaceable Parts



*FUSES LOCATED ON REAR PANEL

ITEM NO.	DESCRIPTION	Dj PART NO.
1	Wellnut	20137
2	Knob	20072-0022
3	Mounting Bracket	40344-0039
4	Bolt, 1/4 – 20 x 1/2, Hex Head	20014-0004
5	Lockwasher, 1/4, Split	20065-0001
6	Hex Nut, 1/4 – 20	20040-0011
7	Radar Fuse 2-amp Type AGC	20112-0001
8	Console Fuse 5-amp Type AGC	20112-0005