

Warranty -----

This System is under warranty against defects in material or workmanship for a period of two years from the date of retail sale.

Defective monitors must be returned to the place of purchase within the warranty period. Components will be replaced or repaired at factory discretion. This warranty applies only to those systems which have been installed in accordance with published instructions.

This warranty is in lieu of all warranties, expressed or implied, and the manufacturer expressly disclaims all other warranties, including without limitations any implied warranties of merchantability and fitness for a particular purpose.

The manufacturer liability under this warranty shall not exceed the cost of the product. Under no circumstance shall the manufacturer be responsible for equipment on which it's monitors are installed, field service calls relating to this equipment or for indirect, consequential or special damages.



Operator's Manual

The 9000 Monitor System represents the latest in technology for monitoring and displaying information on seed planting status. There are several microprocessors in the 9000 that monitor speed, distance, seed activity, and display information requested by the operator. The system console is housed in an attractive durable case and features a touch display keypad. The graphic display can be easily read and has a backlight for viewing at night. The 9000 will alert you when you run out of seeds, plug a row or have a mechanical breakdown that stops or alters desired flow of seeds. There are two alarms that can be set by the operator to alert you in the case of high population or low population. The monitor will alert you and display the following errors.

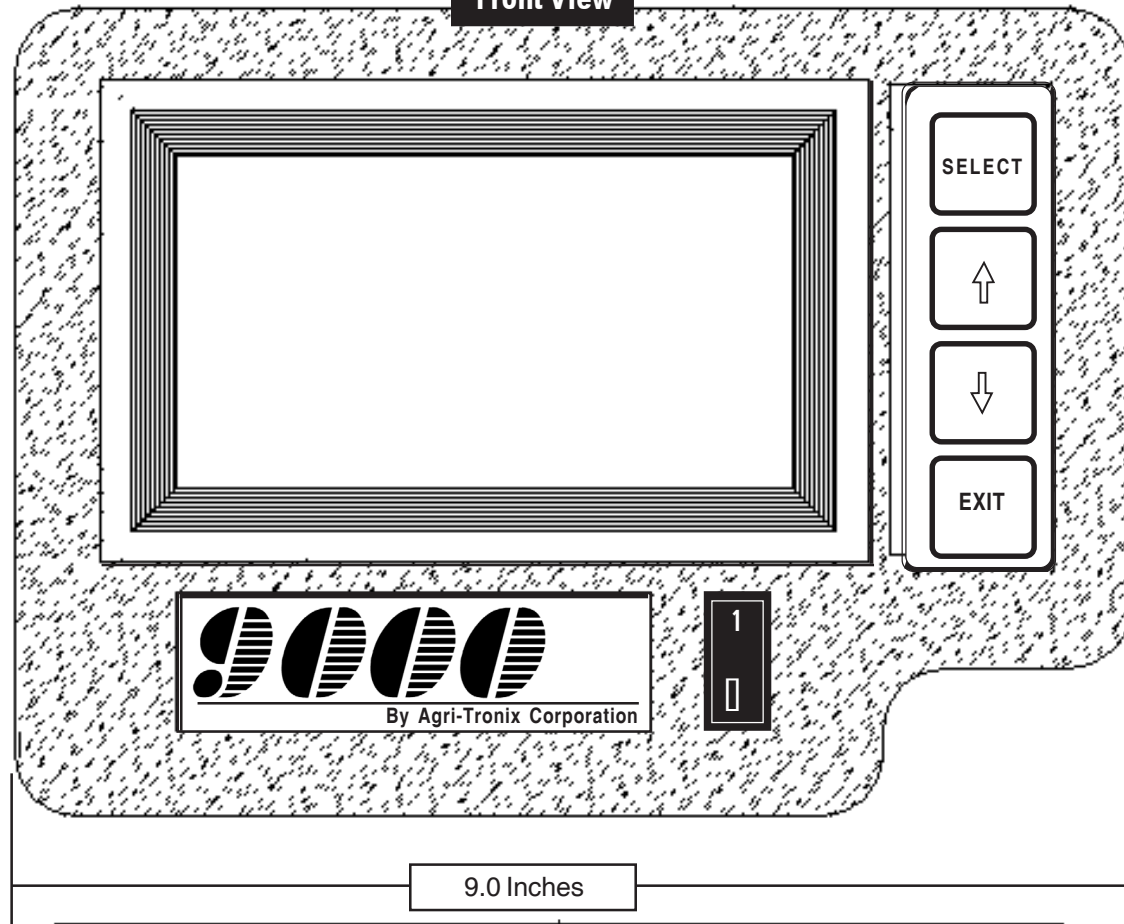
```
POPULATION HIGH  
POPULATION LOW  
ROW FAIL  
SPEED FAILURE !!
```

The graphic display will display the population of all enabled rows in a bar graph format so the operator can easily determine if any rows are planting higher or lower than the other rows. The value of each bar on the graphic display can be reviewed by using the ROW SCAN function.

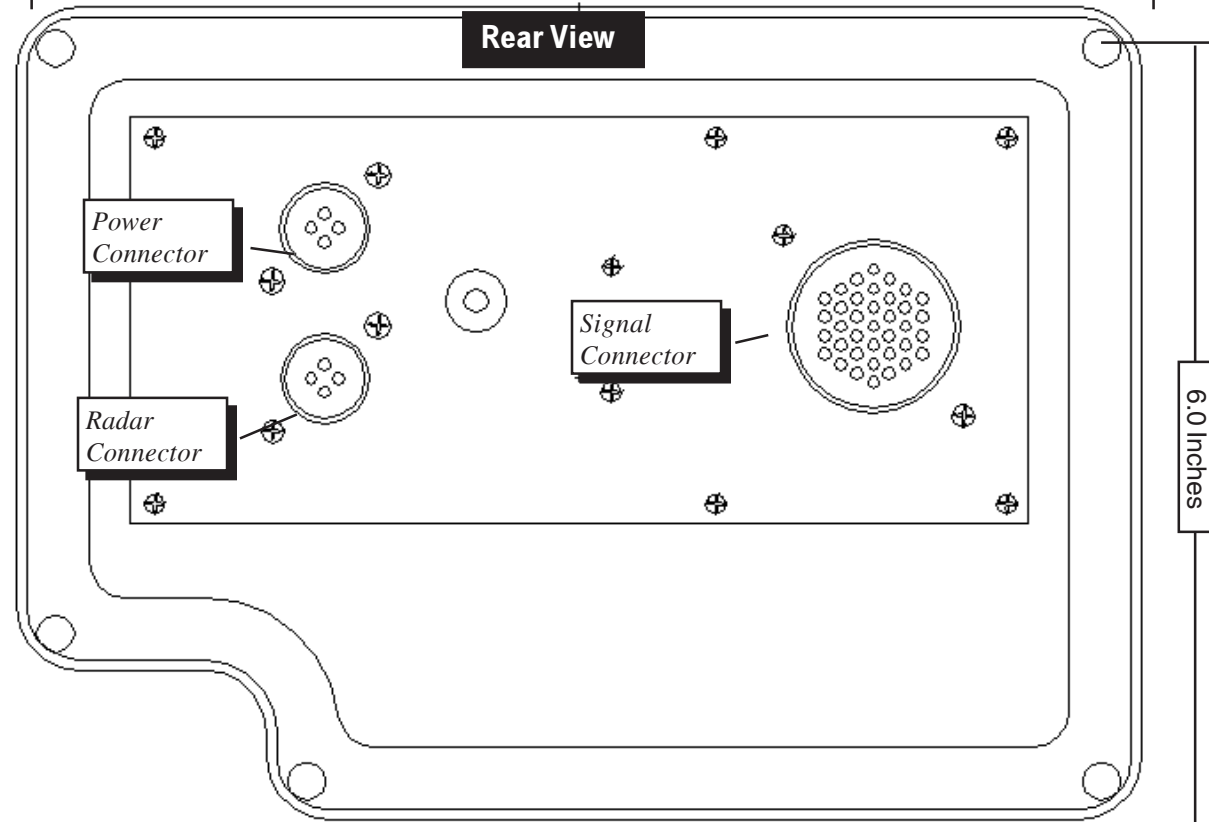
The 9000 is a technological advancement in monitoring and displaying planter and drill activity.

Dimensions

Front View

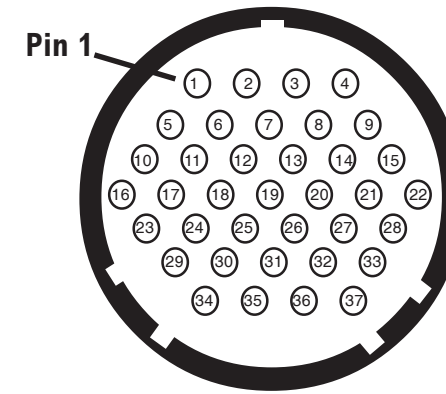


Rear View



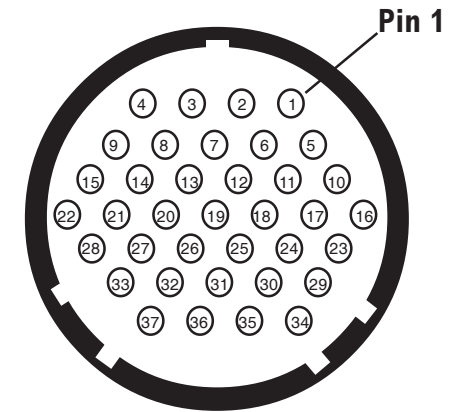
Wiring Diagram

Monitor Connector



1	Row 1 Signal
2	Row 2 Signal
3	Row 3 Signal
4	Row 4 Signal
5	Row 5 Signal
6	Row 6 Signal
7	Row 7 Signal
8	Row 8 Signal
9	Row 9 Signal
10	Row 10 Signal
11	Row 11 Signal
12	Row 12 Signal
13	Row 13 Signal
14	Row 14 Signal
15	Row 15 Signal
16	Row 16 Signal
24	+8 volts to Seed Sensors
25	+8 volts to Seed Sensors
26	Ground to Seed Sensors
27	Ground to Seed Sensors
34	Power (Monitor Power)
35	Ground (Monitor Power)
36	Limit Switch Input
37	Distance Signal Input

Harness Connector



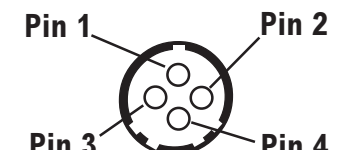
1	Row 1 Signal
2	Row 2 Signal
3	Row 3 Signal
4	Row 4 Signal
5	Row 5 Signal
6	Row 6 Signal
7	Row 7 Signal
8	Row 8 Signal
9	Row 9 Signal
10	Row 10 Signal
11	Row 11 Signal
12	Row 12 Signal
13	Row 13 Signal
14	Row 14 Signal
15	Row 15 Signal
16	Row 16 Signal
24	+8 volts to Seed Sensors
25	+8 volts to Seed Sensors
26	Ground to Seed Sensors
27	Ground to Seed Sensors
36	Limit Switch Input
37	Distance Signal Input

Power Connector



1	Ground
2	Power (12 volts)
3	No Connection
4	No Connection

Radar Connector



1	Ground
2	Signal
3	Power (12 volts)
4	No Connection

Test Mode -----

The 9000 monitor has a built-in TEST mode that will test the sensors, wiring and connectors that lead to the monitor. To place the 9000 in TEST mode, select the "TEST" menu item.

Select the TEST function using the "ARROW" keys and press the "SELECT" key to enable the TEST feature.

Press the key under "SELECT" and the following screen will appear:

Pressing either of the "ARROW" keys will reset all counters to zero. With the unit in this mode, dropping seeds down the chute will cause the counter to increment. (The counters will count to a maximum of 255 and then must be reset to zero.) If the sensor connectors, and wiring are intact, the counters will show activity..

NOTE!!! This test procedure was designed to test the circuitry between the sensor and the monitor. It was not designed to test the accuracy of the sensor and will not count the seeds dropped accurately. The 9000 will count the seeds accurately when in run mode due to a difference in how the seed sensor inputs are monitored.

Alarm Silence -----

Anytime an alarm occurs that sounds the audible alarm, it may be silenced by pressing any of the 4 keys located on the front of the 9000.

Sensor Test -----

Each time the 9000 is turned on, it will perform a diagnostic test on the sensors and determine if the sensor is functioning. Should a sensor not pass the diagnostic test, it will disable that sensor and ignore any input from that row.

Powerup -----

When the 9000 is powered up, the computer sends a signal to the seed sensors and checks for a return signal. As long as all connections, the wire and sensor are operating properly, the 9000 will automatically enable the row. After POWER UP, the following screen will appear:

This number indicates the number of sensors found to be working correctly.

This number indicates the total number of seed drops entered while in SETUP mode.

The 4 boxes with numbers indicate which rows, out of the possible 16, have been enabled and disabled.

In the event the planter harness is not connected to the 9000 a screen will appear that says:

NO SENSORS FOUND
PRESS ANY KEY TO CONTINUE

After pressing any key the 9000 will go to the setup screen where you can perform diagnostics or go to the ACRE MODE.

If the 9000 found a least one functioning seed sensor, the 9000 monitor will enter the RUN MODE screen as shown below:

IMPORTANT !

Before using your 9000 for the first time, it is necessary to enter SETUP information!

Press the "EXIT" key and follow the SETUP information outlined in the following pages.

Battery Connection

Connect the power leads to a 12 volt D.C. system. The power leads may be run directly to the battery or fuse block. (The optimum choice is to run the leads directly to the battery) Connect the red wire to the positive 12 volt side of the battery and the black wire to the negative side of the battery. The 9000 contains special circuitry that maintains setup information and acres without power being applied to the unit.

Setup

The 9000 Model II monitor system has been designed with the user in mind. The SETUP and INFORMATION screens are menu driven. It is necessary only to read the screens and answer the questions to prepare the 9000 for field use. The 9000 utilizes a constant memory feature that does not require power or internal batteries to maintain backup. Once the unit has been setup for your application it will retain the information indefinitely.

Before using your 9000 the first time, the following four variables must be entered to operate properly.

Number of rows - (1 -99) This number is the total number of rows on the drill or planter. This number is used to calculate the total width of the implement and to calculate acres covered. Enter the total number of rows that have sensors, plus the number of any rows that do not have sensors. The 9000's internal computer will automatically perform a sensor check and disable the monitoring of any rows that do not have working sensors on them.

Row width - (6.0 - 120.0) This number is the distance between your seed rows. Enter this number to the nearest one tenth of an inch. (i.e. 7 1/2 inches would equal 7.5) This number is used by the computer to calculate population and total implement width.

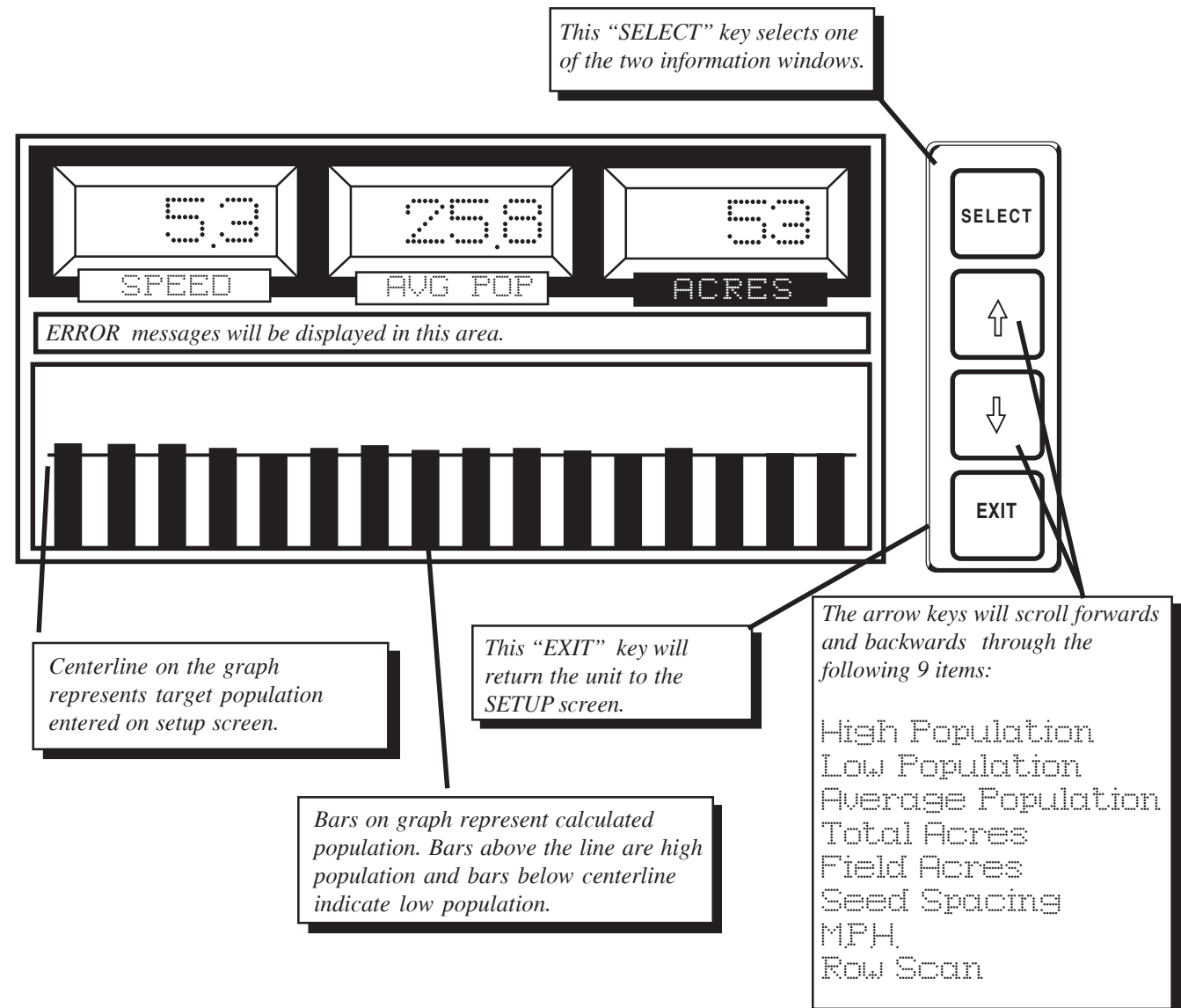
Distance calibration - (2500 - 5000) This number is used to calibrate the 9000 to the distance sensor you are using. This distance calibration number enables the 9000 to accurately calculate ground speed, acres, seed spacing and population.

Target Population - (5000 - 999,000) Set this number for the desired population you are wanting to plant. This number sets the reference line of the bar graph so that all population readings on the bar graph are relative to this target number.

The push buttons to the right of the screen will allow you to select different menu items and enter data.

Operation

From the SETUP screen, press the "EXIT" key to place the 9000 in seed monitoring mode.

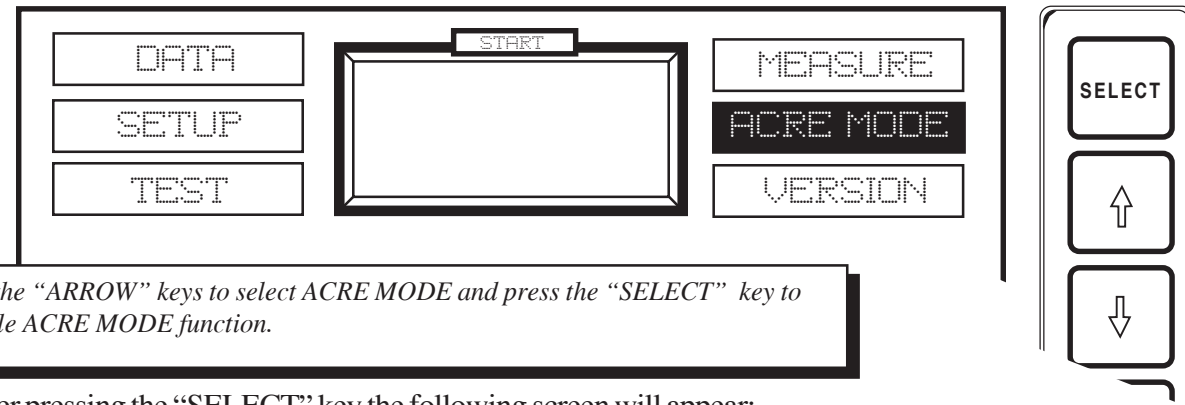


Resetting Acre Counters

Resetting the acre counters can be achieved by displaying the acre counter in the one of the data windows. Press the "SELECT" key until the text inverts under the acre counter you desire to reset to zero. Press and hold the "SELECT" key (for approximately 3 seconds) and the acre counter will reset to zero.

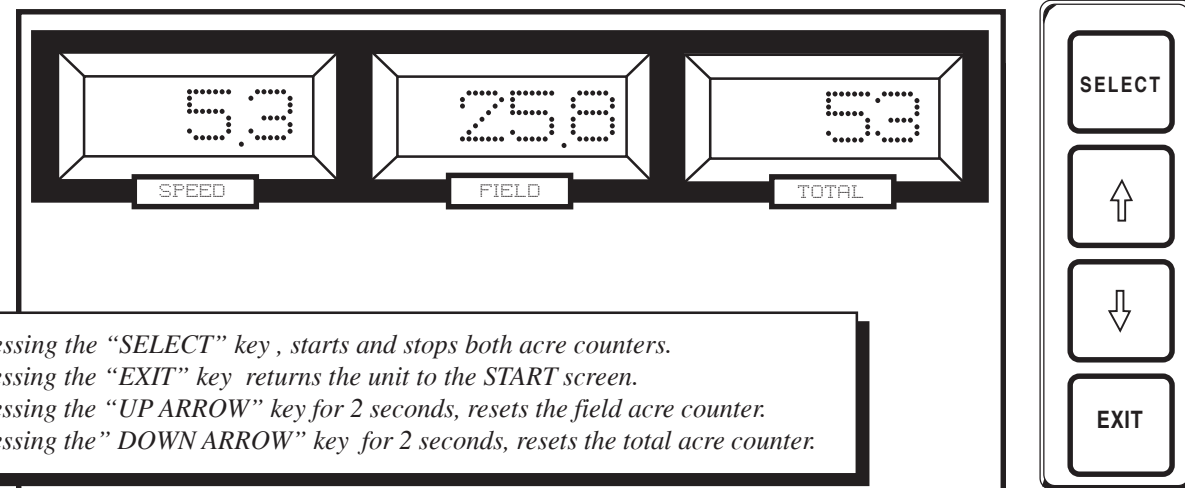
Acre Mode -----

The 9000 has a mode, called ACRE MODE, that enables the 9000 to be used as a M.P.H. and acre counter without a planter or drill being connected to the monitor. To place the 9000 in ACRE MODE go to the START screen and using the "ARROW" keys, highlight the menu selection called "ACRE MODE".



Use the "ARROW" keys to select ACRE MODE and press the "SELECT" key to enable ACRE MODE function.

After pressing the "SELECT" key the following screen will appear:



Pressing the "SELECT" key, starts and stops both acre counters.
 Pressing the "EXIT" key returns the unit to the START screen.
 Pressing the "UP ARROW" key for 2 seconds, resets the field acre counter.
 Pressing the "DOWN ARROW" key for 2 seconds, resets the total acre counter.

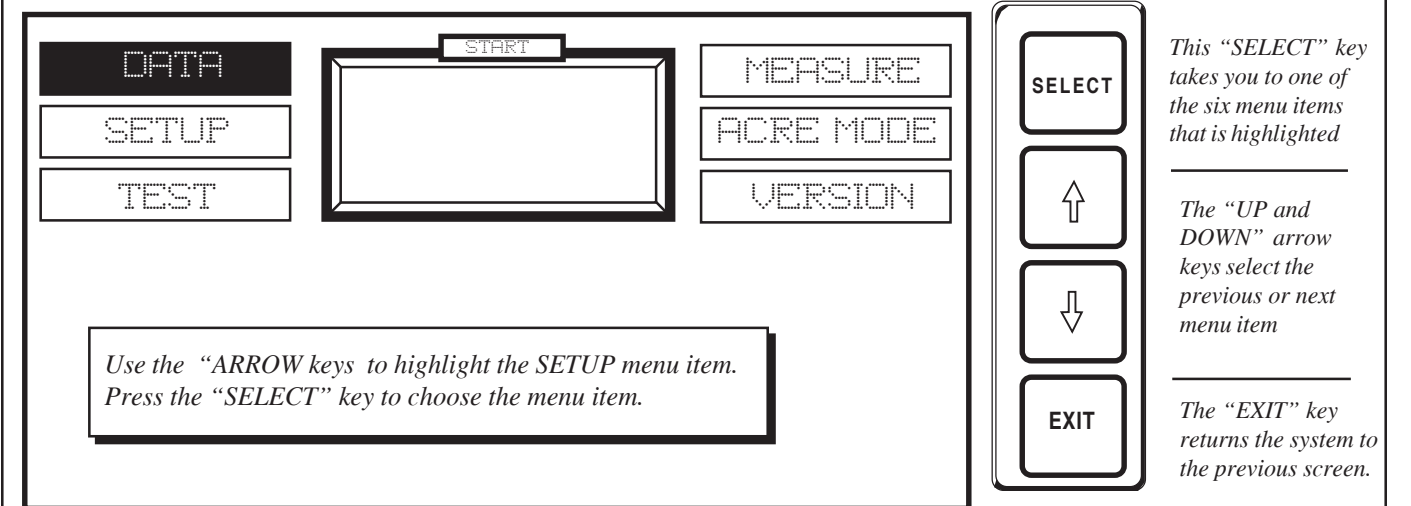
If the operator presses the "SELECT" key, then the text "RUN" will change and read "HOLD". The numbers in FIELD and TOTAL will begin to flash to alert the operator the acre counters are not counting.

LIMIT SWITCH OPTION - An optional limit switch can be installed in the system to automatically start and stop the acre counters. The limit switch is tied to pins 36 and 26 in the 37-pin connector. When the limit switch is activated (pins 36 and 26 shorted together) the text on the screen will read "LIMIT" and the numbers in the FIELD and TOTAL windows will begin to flash.

EXIT - Press the "EXIT" key to return to the START screen.

Start Screen -----

The MENU screen on the 9000 monitor system was designed to be informative and user friendly. The best way to become familiar with the 9000 is to turn it on and go through the different screens. All MENU screens operate the same and an explanation of how to operate the screens follows:



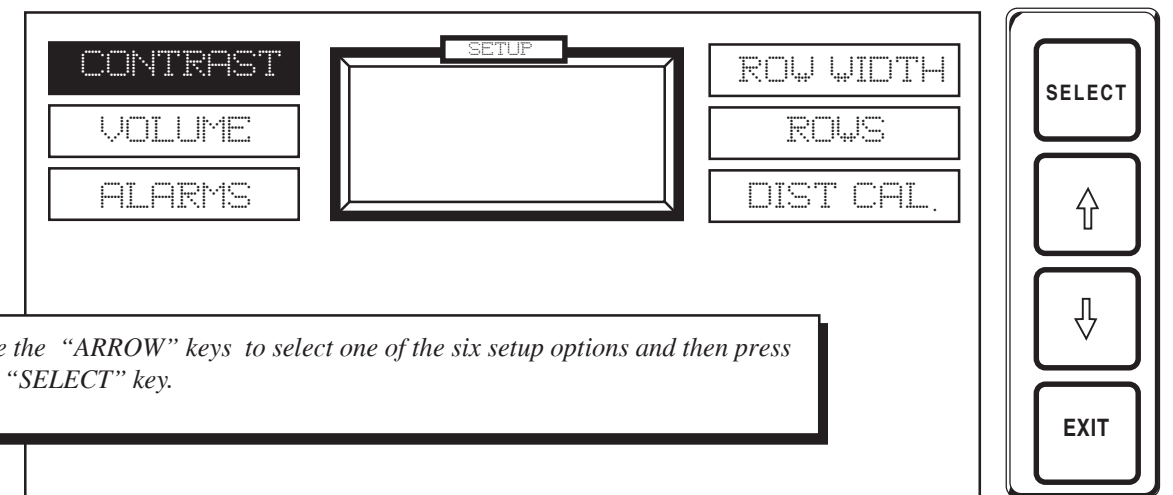
Use the "ARROW" keys to highlight the SETUP menu item. Press the "SELECT" key to choose the menu item.

This "SELECT" key takes you to one of the six menu items that is highlighted

The "UP and DOWN" arrow keys select the previous or next menu item

The "EXIT" key returns the system to the previous screen.

Setup Screen -----



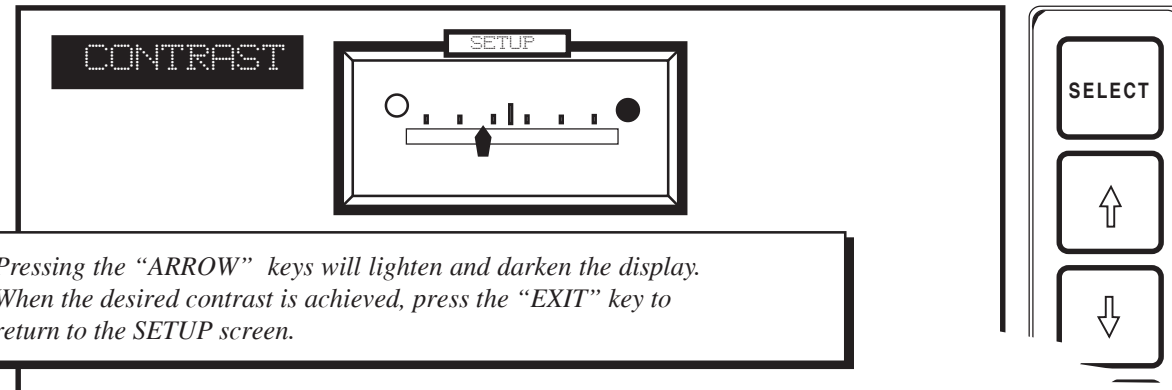
Use the "ARROW" keys to select one of the six setup options and then press the "SELECT" key.

This screen allows you to select the following options:

- CONTRAST: Controls the contrast of the display.
- VOLUME: Adjusts the volume of the alarm horn.
- ALARMS: Sets the target population and the high and low alarm point.
- ROW WIDTH: Sets the row width value in inches.
- ROWS: Sets the number of rows on the planter or drill.
- DIST CAL: Sets the distance calibration number for the radar sensor.

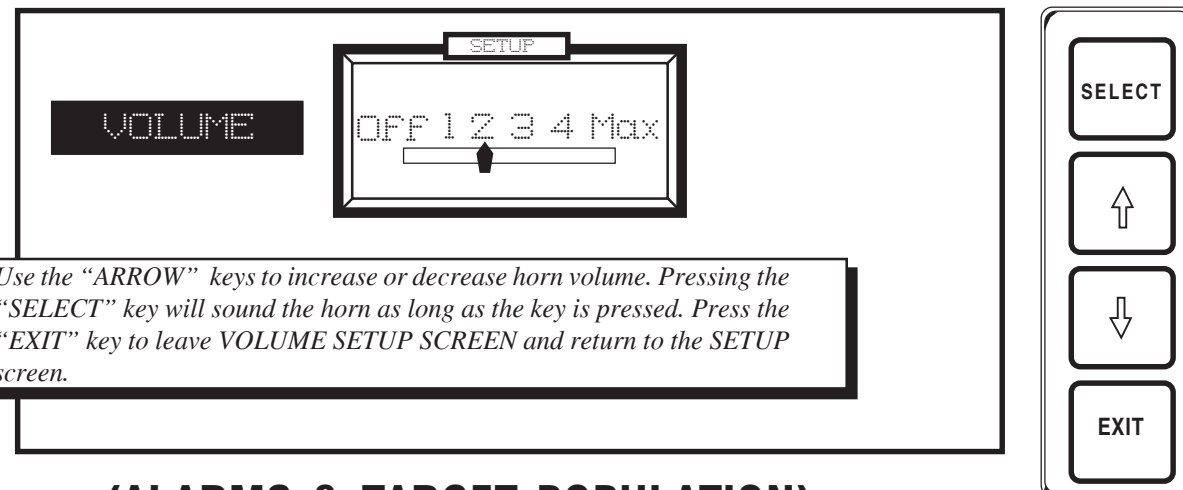
Setup (CONTRAST) -----

The contrast adjustment is used to lighten and darken the display. Press the "SELECT" key with the contrast selection highlighted and the following screen will appear:



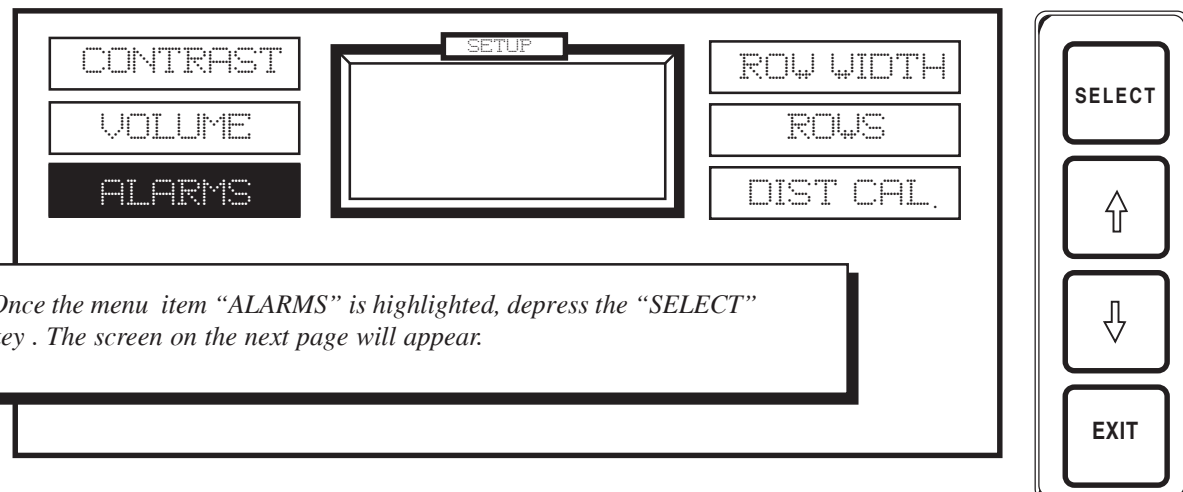
Setup (VOLUME) -----

Using the "ARROW" keys, highlight the selection labeled "VOLUME", press the "SELECT" key and the following screen will appear:



Setup (ALARMS & TARGET POPULATION) -----

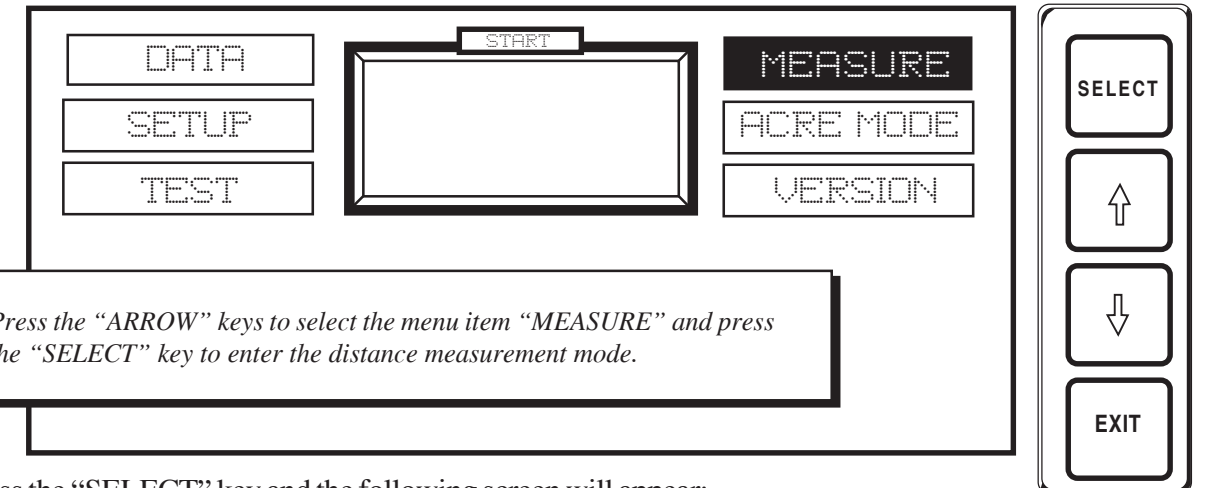
To set the alarm points and target population, use the "ARROW" keys to highlight the menu selection labeled "ALARMS".



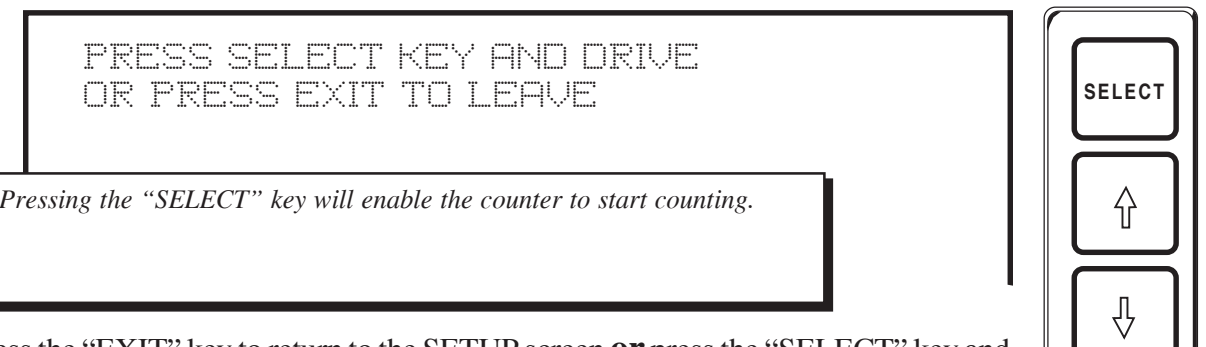
Distance Measuring -----

The 9000 has a distance measuring mode that enables you to use the 9000 to measure the perimeter of fields, lengths of fences, etc. (Note: When in distance measuring mode, the 9000 will not monitor acres, speed, population, or seed failure.) The 9000 reads in feet and inches and will read to approximately 1500 feet.

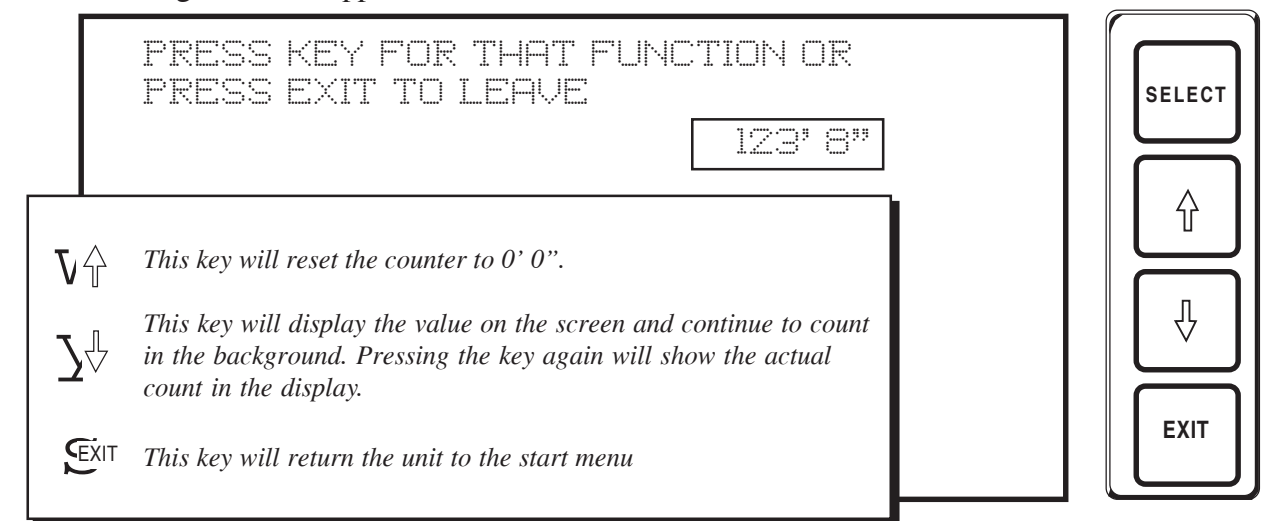
To place the 9000 in distance measuring modes, go to the START screen and select the menu item labeled "MEASURE" using the "ARROW" keys.



Press the "SELECT" key and the following screen will appear:



Press the "EXIT" key to return to the SETUP screen **or** press the "SELECT" key and the following screen will appear:



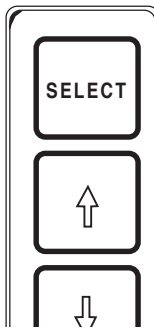
Setup (FIELD CAL.)

Field Calibration is used to calibrate the radar gun signal to the monitor by driving a known distance.

PRESS SELECT KEY TO DRIVE
A CALIBRATION RUN

PRESS EXIT TO QUIT

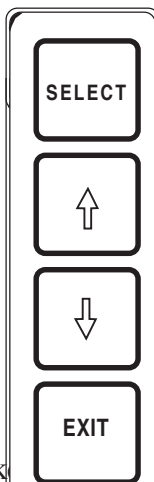
Press the "SELECT" key to continue with field calibration.
Press the "EXIT" to abort.



PRESS SELECT KEY AND DRIVE 400 FEET

PRESS EXIT WHEN FINISHED

Press the "SELECT" key at the beginning of the 400 feet run.
Press the "EXIT" at the end of the 400 feet run.



Mark off 400 feet in a straight line and mark the beginning and end so they can be easily viewed from the tractor cab.

1. Drive to the beginning marker at normal planting speed and press the "SELECT" key. The markers should be even with the beginning marker. A digital counter will begin counting on the right side of the screen and will continue to count until the "EXIT" key is pressed.
2. Drive until even with the finish marker and press the "EXIT" key. (The number must be larger than 2500 and less than 5000 or the 9000 console will load the default data.)

Your unit has now had the calibration sensor calibrated and will read M.P.H. correctly to the nearest .1 M.P.H.

NOTE!!! - Each count represents approximately .3 inches of travel. When performing the field calibration several times in a row it is normal to get slightly different number each time. Due to operator reaction time of pressing the buttons at exactly the correct time, a difference of 10 to 50 counts (3 inches to 15 inches) is normal and will not adversely affect readings.

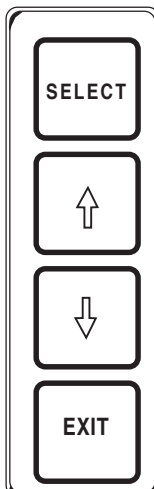
FIELD CAL. SETUP

ADJUST CAL. 3900

DISTANCE CALIBRATION RUN

This screen allows the user to manually adjust the calibration number.

By selecting the menu item "ADJUST CAL" and pressing the "SELECT" key it is possible to enter the calibration number manually.
Press the "EXIT" key to return to SETUP menu.

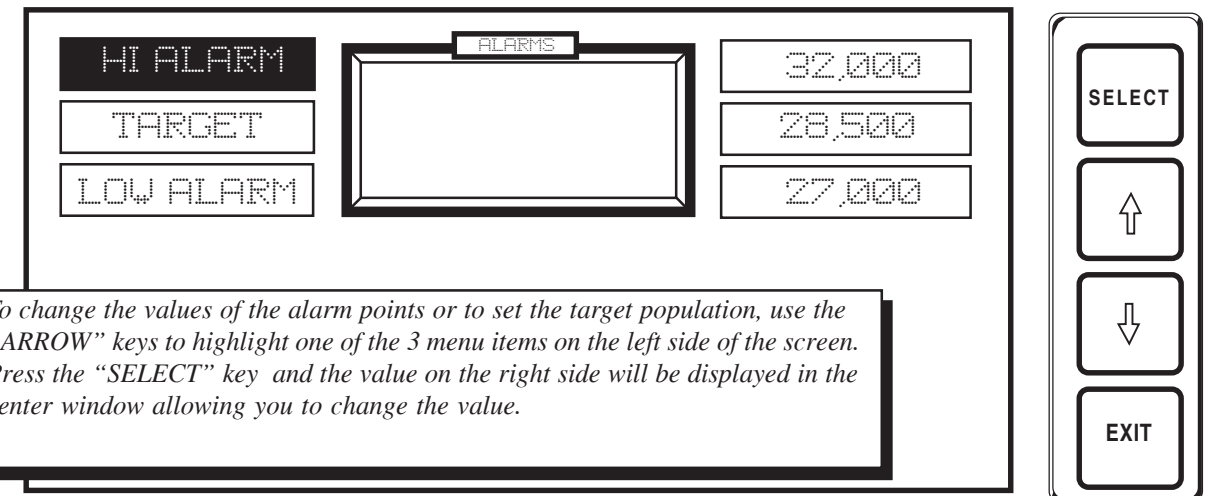


The screen shown below is used to set the following features:

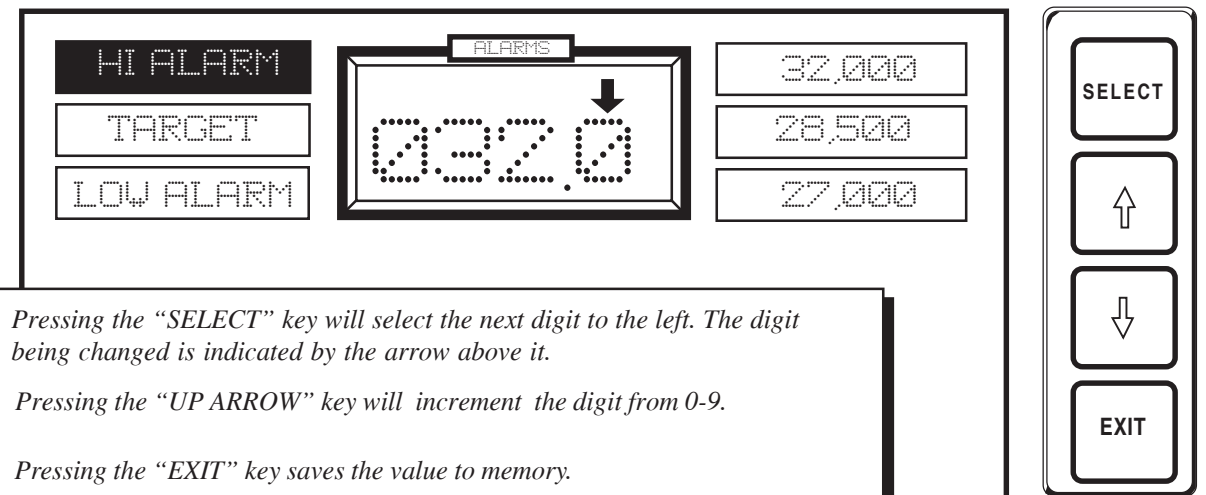
HIGH ALARM - If the population exceeds the value entered in this screen a warning will appear in the center portion of the screen alerting the operator.

TARGET - This value sets the center line on the bar graph. This value should be the desired planting population of your planter or drill.

LOW ALARM - If the population should fall below the value entered in this screen, a warning message will appear in the lower portion of the screen alerting the operator.



To change the values of the alarm points or to set the target population, use the "ARROW" keys to highlight one of the 3 menu items on the left side of the screen. Press the "SELECT" key and the value on the right side will be displayed in the center window allowing you to change the value.



Pressing the "SELECT" key will select the next digit to the left. The digit being changed is indicated by the arrow above it.

Pressing the "UP ARROW" key will increment the digit from 0-9.

Pressing the "EXIT" key saves the value to memory.

Using the "SELECT" key and the "UPARROW" key, enter the desired alarm points and target population.

WARNING!!! If the alarm points are set too close to the target population, excessive population alarms will occur.

Setting the low population to 000.0 will disable low population warning.

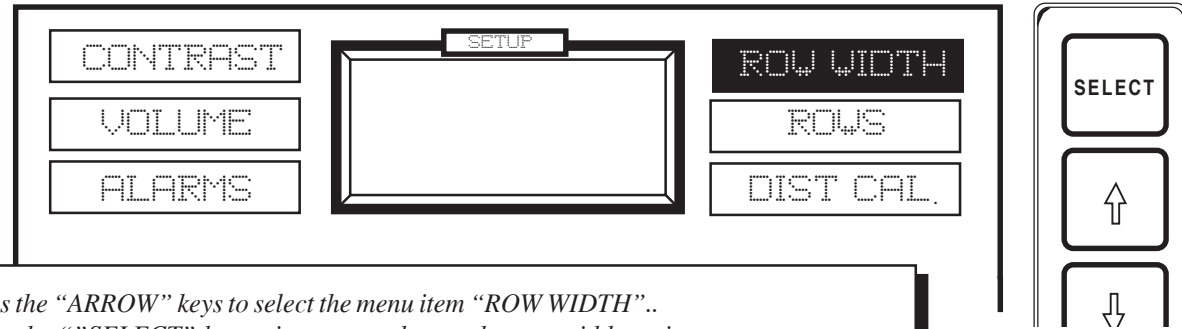
Setting the high population to 999.9 will disable high population warning.

Press the "EXIT" key to record the value to memory. Press the "EXIT" key again to return to the SETUP screen.

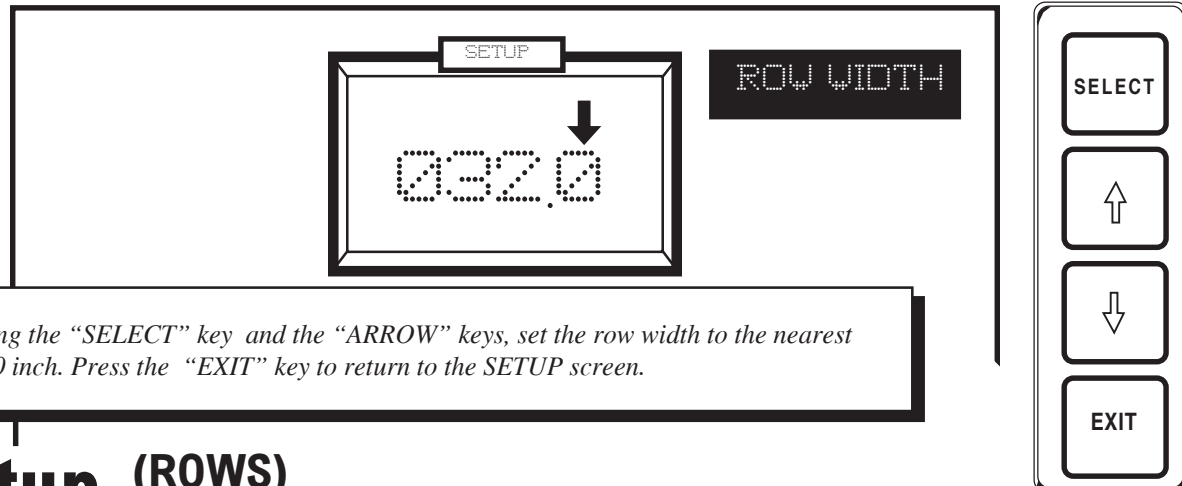
Setup (ROW WIDTH)

The row width is the distance (in inches) between the rows. This measurement is used to calculate population and is combined with the number of rows entered to calculate implement width.

To change the row width, use the “ARROW” keys to highlight the menu selection labeled “ROW WIDTH”.



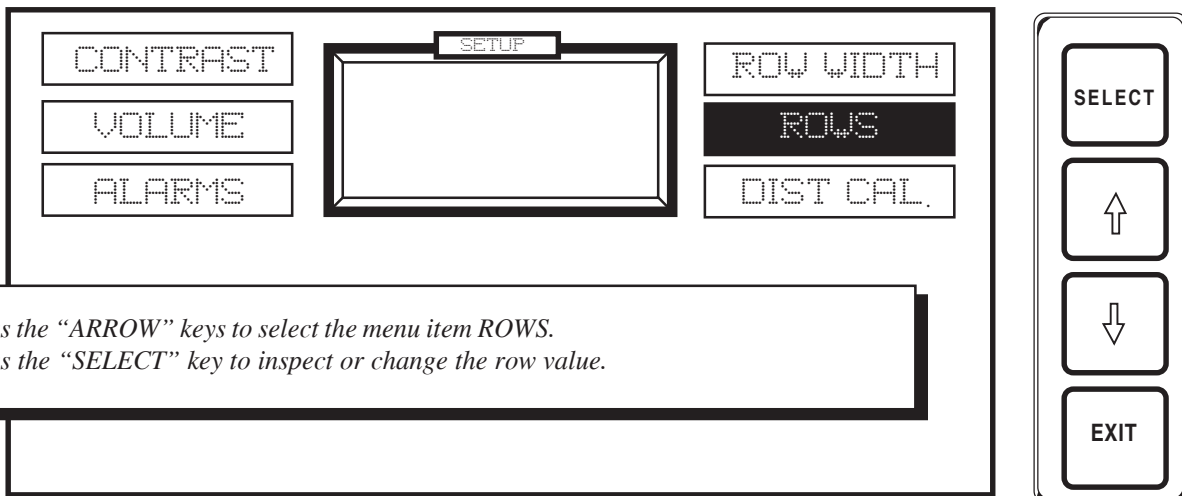
Press the “ARROW” keys to select the menu item “ROW WIDTH”..
Press the “SELECT” key to inspect or change the row width setting



Using the “SELECT” key and the “ARROW” keys, set the row width to the nearest 1/10 inch. Press the “EXIT” key to return to the SETUP screen.

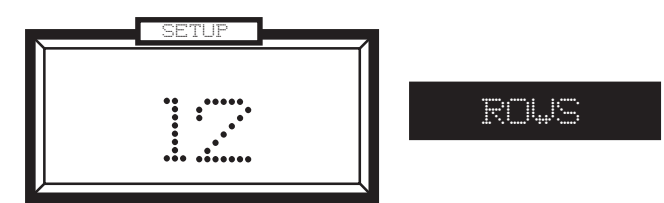
Setup (ROWS)

The menu item “ROWS” is used to calculate the width of the implement. In this screen, enter the total number of rows on the planter or drill. Count all rows whether or not they have a sensor. (i.e., If you are using a drill with 4 sensors, enter the **total number** of seed drops, **not 4**.)



Press the “ARROW” keys to select the menu item ROWS.
Press the “SELECT” key to inspect or change the row value.

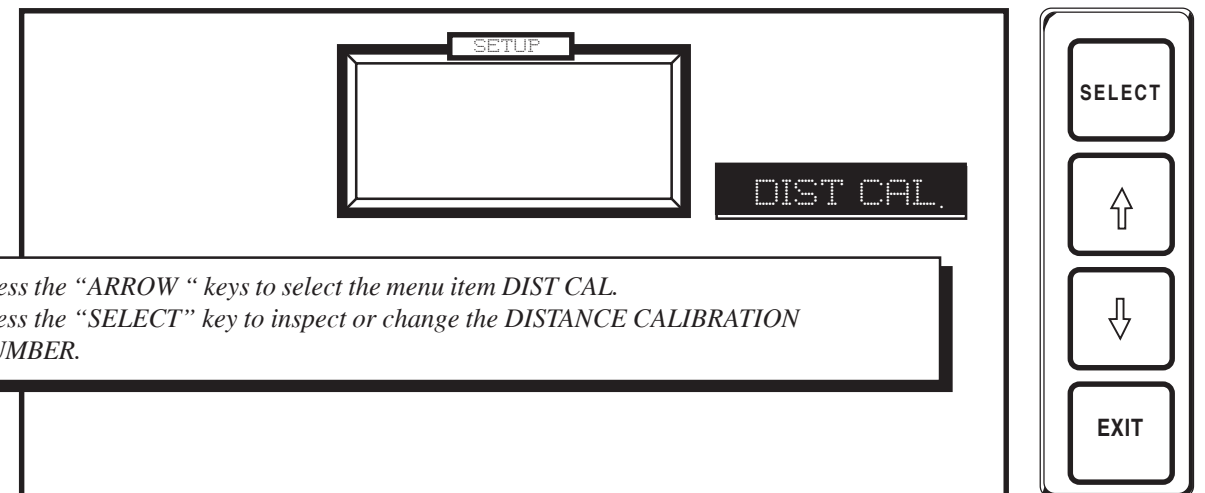
ENTER ROWS
INCLUDE
ROWS WITH
NO SENSORS.



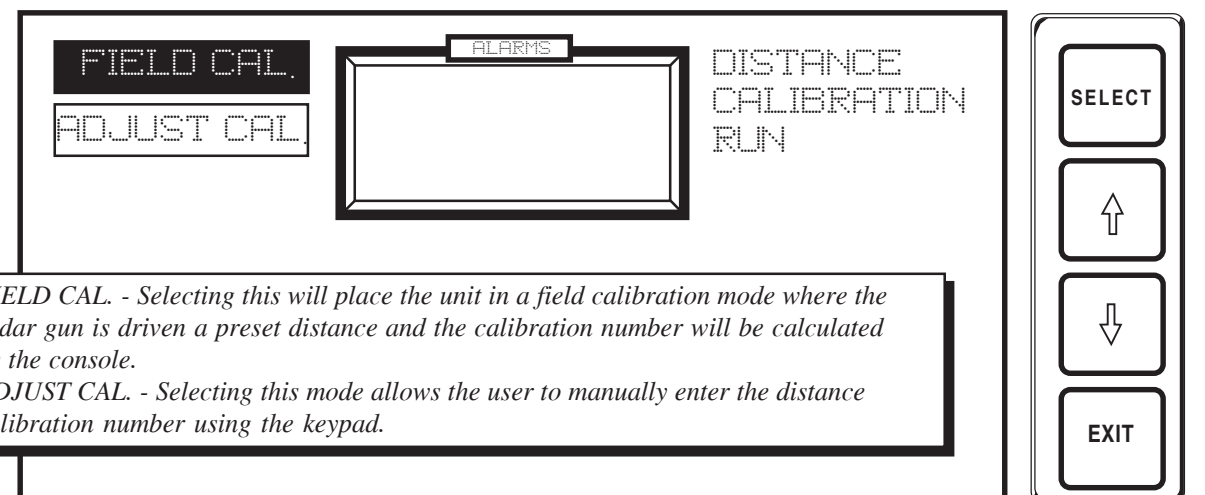
Using the “ARROW” keys, increase or decrease the value on the screen to the desired number of rows. (HINT -If you continue to press and hold the “ARROW” keys without releasing, the numbers will auto-increment.)
Press the “EXIT” key to return to the SETUP screen.

Setup (DIST CAL.)

Distance Calibration is used to calibrate the radar gun signal to the monitor.



Press the “ARROW” keys to select the menu item DIST CAL.
Press the “SELECT” key to inspect or change the DISTANCE CALIBRATION NUMBER.



FIELD CAL. - Selecting this will place the unit in a field calibration mode where the radar gun is driven a preset distance and the calibration number will be calculated by the console.
ADJUST CAL. - Selecting this mode allows the user to manually enter the distance calibration number using the keypad.