5.6 "IN MOTION" CONDITION

The "in motion" condition means that the monitor, based on ground speed and clutch state, considers that the system is actively applying product.

The monitor determines whether the system is intentionally active by examining both the ground speed and the ON/OFF clutch state. The monitor considers the system to be intentionally active and "in motion" when both of these are true:

1. Sensed Ground Speed is 2 mph (3.2 km/hr) or greater.
2. The Drive Clutch is engaged.

A double beep is emitted by the monitor when the seeding unit is entering or leaving the "in motion" condition. These conditions are met:

- The speed of the unit crosses 2 mph (3.2 km/hr) with the clutch engaged.
- The clutch is engaged or disengaged while the seeding unit is travelling at 2 mph or over. (For example, when turning on headlands and the magnetic clutch is disengaged, the monitor will emit a double beep. Another double beep will be emitted when the clutch is turned on.)

Refer to *Section 5.5.1 - Sensor Alarms*.

5.5.2 COMMUNICATION ALARM

A communication alarm occurs when an individual sensor fails to communicate with the monitor.

- This alarm occurs when communication between the sensors and the monitor is interrupted. This means that there is a disconnection somewhere between the sensor and the Air Seeder harness, or the sensor has failed.
- The pop up screen will indicate a communication error, the sensor type, and the sensor number.
- Once the alarm has been acknowledged, the icon for that alarm will remain flashing until the alarm condition no longer exists. Check the connections and harness, and refer to *Section 12.2 - Monitor Checking*.

5.5.3 SYSTEM ALARM

A system alarm results from a disconnection or interruption in communication between the Air Seeder Monitor Harness and the Monitor Head.

- A COMM ERROR message is displayed for SPEED SENSOR 1. Once acknowledged, a COMM ERROR message is shown for FAN1 SENSOR 2, then FAN2 SENSOR 3, through the complete list of sensors.
- The pop up error displays can be acknowledged one at a time and will cycle until they have all been acknowledged. The sensor icons will continue to flash until the system alarm has been corrected. Check the connection and harness, and refer to *Section 12.2 - Monitor Checking*.

For Manual Adjust, CRA or ZRC (manual mode only);

- Alarm will flash if the displayed rate is less than the alarm rate setpoint entered (Refer to *Section 7 - Calibration*).
  - A problem with the metering drive or metering auger is causing the torque limiting device to slip.
- The alarm can be silenced with 3 **OK** button presses when the displayed rate is greater than 0 and less than alarm rate, and 1 **OK** button press when the displayed rate is 0. The Shaft icon will continue to flash until the problem has been corrected.

5.5.1.8 FAN CONTROLLER ALARMS

- If the FAN controller cannot achieve the desired speed, a FAN1SPEED alarm will flash.
  a. Ensure the tractor has adequate hydraulic flow to operate the fan(s).
  b. There may be inadequate hydraulic oil flow to the fans. Adjust the flow as required at the tractor.
  c. The fan control flow valve or fan contoller (*Figure 5.13*) may not be functioning correctly. Repair or replace any faulty components.
- The alarm can be silenced by pressing the **OK** button, but the Fan icon will continue to flash until the problem has been corrected.

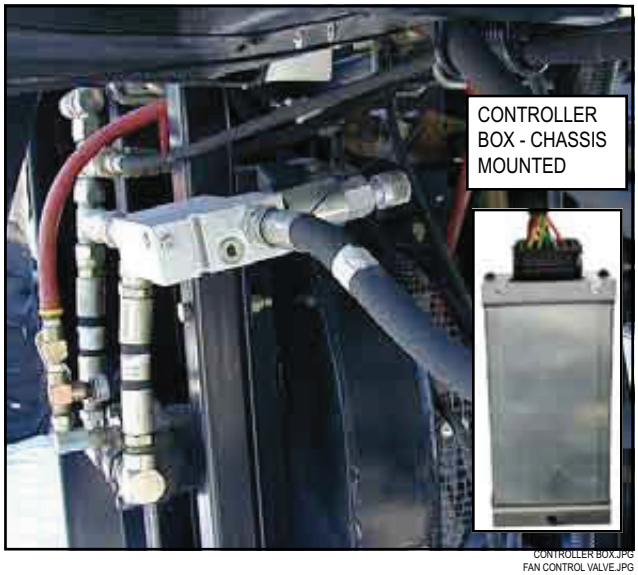


Figure 5.13 - Fan Controller Flow Valve & Controller Box - Radial Fan

5.5.1.6 CASE DRAIN PRESSURE ALARM

- The case drain hydraulic line is equipped with a pressure sensitive switch. An alarm will sound when the pressure in the case drain line reaches or exceeds 65 psi (448 kpa). Case drain pressure can be as high as 65 psi (448 kpa) on cold days before the oil is warm.
- Case drain pressure may reach as high as 200 psi (1 379 kpa) when the case drain line is not properly connected, causing damage to the hydraulic fan motor.
- When a high pressure condition occurs and this condition persists for approximately 30 seconds, the monitor alarm will sound and a pop up screen will indicate the problem.
- The alarm cannot be acknowledged with the **OK** key. Disengage the motor immediately. The pressure in the lines will drop, but it may take several minutes.

IMPORTANT

THE FAN MOTOR MUST NOT BE STARTED UNTIL THE CASE DRAIN LINE PRESSURE IS RELIEVED.

MOST INSTANCES OF DAMAGE OCCUR IF THE FAN MOTOR IS RESTARTED UNDER HIGH CASE DRAIN PRESSURE.

5.5.1.7 RATE ALARMS

For ZRC;

- If the ZRC controller cannot achieve the desired rate, a SHAFT1RATE alarm will flash.
  a. The current range (Hi/Low/Intermediate) cannot achieve the desired speed required to meter out the product. Stop the unit and switch ranges on the transmission.
  b. The actuator may be stuck or not working correctly. Check and repair or replace any problem parts.
  c. The shaft sensor may not be functioning correctly. Repair or replace the faulty sensor.
- The alarm can be silenced by pressing the **OK** button, but the Shaft icon will continue to flash until the problem has been corrected.

5.5.1.4 ZERO SPEED ALARM

- This alarm results when the monitor senses there is no seeding activity when the unit is "in motion". Conditions that will trigger this alarm include:
  - The unit is **stationary or travelling at less than 2 mph** (3.2 km/hr) for more than time defined by ZERO SPEED ALARM DELAY setting (1-99 seconds).
  - The **OK** button will silence the alarm, but the Speed icon will flash until the problem is corrected.

5.5.1.5 METERING SHAFT STOPPED ALARMS

- Each time the metering auger shaft turns, a sprocket tooth passes by the sensor, giving a pulse to the sensor. With the Air Seeder "in motion", 15 seconds must elapse after the last pulse is received before an auger shaft sensor alarm is sounded.
- If the "in motion" condition is no longer true, the monitor assumes that application of product has been temporarily suspended.
- The alarm can be silenced by pressing the **OK** button, but the Shaft icon will continue to flash until the problem has been corrected.

5.5.1.2 HIGH FAN RPM ALARMS

- High Fan Alarm alarm is based off of the "High Alarm" point set in *Section 5.3.3 Fan Settings*. The alarm will sound for excessive RPMs when the unit is "in motion" or not.
- High Fan Alarm can not be acknowledged with the **OK** button.
- If a High Fan Alarm occurs during active seeding, the operator will need to disengage the clutch or stop movement of the implement. When this happens, the monitor accepts it as an acknowledgement of the alarm and an effective "automatic acknowledgement" takes place, resulting in the beeper being silenced and normal display is resumed.
- The corresponding icon will continue to flash until the problem has been corrected.

IMPORTANT

RUNNING THE STANDARD AIR SEEDER FAN ABOVE 5000 RPM OR THE OPTIONAL HIGHER OUTPUT FAN ABOVE 6000 RPM MAY RESULT IN DAMAGE TO THE HYDRAULIC MOTOR.

5.5.1.3 BIN LEVEL ALARMS

- *Four level bin sensor* - As the product is used, the icon will display when the tank is full, ¾, ½, ¼, and empty. The black bar in the background will drop as the product is metered from the tank.
- When the tank is at the ¼ level, an alarm will sound, indicating that the tank is getting low on product. This alarm can be acknowledged with the **OK** button. The **OK** button will silence the alarm until the tank is empty. The icon will continue to flash until the tank is filled.
- When the tank is empty, an alarm will sound again, with the bin icon still flashing. The **OK** button will silence the alarm, but the icon will continue to flash until the tank is filled.

5.5.1 SENSOR ALARMS

The following list shows alarms which are generated when alarm thresholds are exceeded. Alarm points for some sensors are fixed, while others can be changed by the user. Refer to *Section 5.3 - Changing Monitor Settings*.

Each of these alarms types are associated with a display function that is shown on the face plate of the monitor. When a new alarm condition arises, the beeper will sound, the appropriate icon will flash, and a pop up error message will describe the error occurring.

To prevent nuisance alarms during setup, while the unit is in any of the special modes, none of the ordinary sensor type alarms will be generated. The special modes include:

- Change Settings Mode
- Application Rate Calibration
- Pulses Per Mile Count Mode
- Flow Sensor Calibration

5.5.1.1 LOW FAN RPM ALARMS

- Low Fan Alarms are treated specially, because a stopped fan can result in plugging and misses in the field.
- Low Fan Alarms can not be acknowledged with the **OK** button while the system is "in motion". Refer to *Section 5.6* for the "in motion" condition.
- If a Low Fan Alarm occurs while the system is not "in motion", an alarm will not be generated for the condition. The alarm will sound once the unit is "in motion". This alarm is based off of the "Low Alarm" point set in *Section 5.3.3 Fan Settings*.
- If a Low Fan Alarm occurs during active seeding, the operator will need to disengage the clutch or stop movement of the implement. When this happens, the monitor accepts it as an acknowledgement of the alarm and an effective "automatic acknowledgement" takes place, resulting in the beeper being silenced and normal display is resumed.

5.5 MONITOR ALARMS

All configured sensors are continuously monitored. Monitor alarms fall into these categories:

1. **Sensor Alarms:**

   Are generated when information returned by a sensor falls outside the operational limits that are either set by the operator or are default settings.

2. **Communication Alarms:**

   Occur when an individual sensor repeatedly does not communicate with the monitor.

3. **System Alarms:**

   Occur when all sensors fail to communicate with the monitor.

When an alarm condition occurs:

- the monitor emits a beep
- the alarm information is displayed in a pop up text screen.

The user can press the **OK** button to acknowledge the alarm, which (if there are no other alarms pending) results in:

- the silencing of the beeper
- the return of the normal display.

The icon of the problem sensor will continue to flash in the icon section until the problem has been corrected.

Several types of alarms will not be silenced by the **OK** button, and must be corrected to deactivate the alarm. These alarms are:

- excessive case drain pressure
- low fan RPM when unit is in motion.

ALARM MESSAGE	PROBLEM
FAN1 SPEED HIGH	Fan is spinning too quickly.
FAN2 SPEED HIGH	
FAN 1 SPEED LOW	Fan is spinning too slowly. This alarm cannot be acknowledged and the implement must be immediately stopped.
FAN 2 SPEED LOW	
HI FAN CASE PRES	Case drain pressure is too high.
SHAFT1 STOPPED	Shaft is not rotating.
SHAFT2 STOPPED	
SHAFT3 STOPPED	
SHAFT4 STOPPED	
SHAFT1 RATE	Displayed rate is less than Low Rate Alarm setpoint. (CRA & ZRC in Manual Mode).
SHAFT2 RATE	
SHART3 RATE	
SHART4 RATE	
BLOCKAGE MODULE	A blockage was detected. Blocked runs can be identified in the normal operating display by pressing the FLOW key.
BIN 1 LOW	Bin is nearly empty.
BIN 2 LOW	
BIN 3 LOW	
BIN 4 LOW	
BIN 1 EMPTY	Bin is empty.
BIN 2 EMPTY	
BIN 3 EMPTY	
BIN 4 EMPTY	
ZERO SPEED	The ground speed is zero.
COMM ERROR	Communication fails to a specific sensor.
	Communication fails to the air seeder harness.

TABLES_5000.XLS

Table 6 - Alarm Messages

If more than one alarm occurs at the same time, pressing the **OK** button will acknowledge each alarm in order of priority.

- Line 1 will indicate the highest priority alarm that has not been acknowledged.

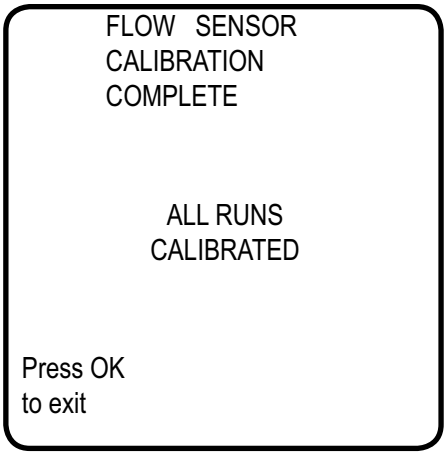
When all alarms have been acknowledged, the icons for each alarmed function will continue to flash in the icon section of the screen for as long as each alarm condition persists.

Once the alarm condition(s) has been corrected, the monitor will return to its normal operating mode.

4. Once calibration is complete, the monitor will prompt the user to press **OK**.

If the user wishes to abort calibration before it's complete, they can press the **CANCEL** key. It is **NOT** recommended to abort a calibration before completion as the runs which have not yet calibrated will cause the monitor to alarm on these runs, even if material is flowing.

Refer to the *Blockage Module Operator's Manual*.



Units operating with Cab Rate Adjust (CRA) or Zone Rate Control (ZRC) options:

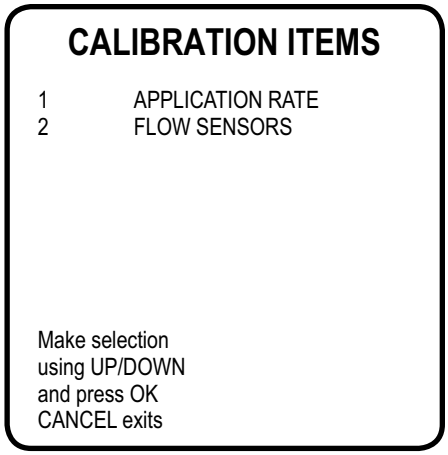
Varying the application rate of product will affect the operation of the blockage sensors. Recommendations are:

- recalibrate blockage sensors after each rate change
- calibrate blockage sensors at the lowest expected rate of application.

Refer to the *Blockage Module Operator's Manual*.

5.4 MONITOR CALIBRATION SETTINGS

Several features of the monitor must be calibrated for proper operation and to eliminate nuisance alarms. These features are found in the Calibration Items menu when the CAL button is pressed. The features listed are:



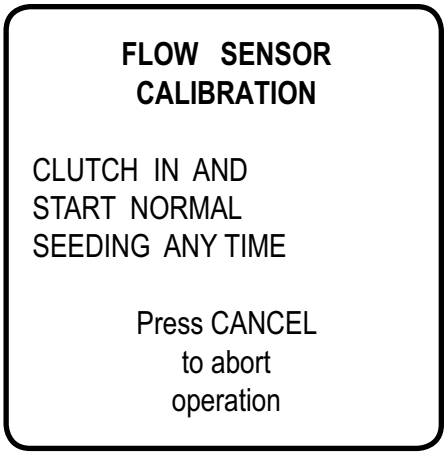
1. **Application Rate**: This feature allows the operator to determine the actual rate of product application the Air Seeder is applying after the rate setting has been applied on the transmission.

   Refer to *Section 7 - Calibration* for complete instructions on the different options for application rate calibration.

2. **Flow Sensors**: This feature is for units equipped with the optional blockage modules. During operation, the sensors for the blockage modules must be calibrated to account for temperature and humidity changes. Flow sensor calibration must also be performed at each product change and/or rate change.

   - when material is changed
   - when rate is significantly changed
   - unexplained flow alarms are generated
   - periodically throughout the day for temperature and humidity changes

This calibration must be done while regular seeding is happening.



1. Flow sensor calibration mode is entered by pressing the **CAL** key while viewing the normal operating display.
2. Select *Flow Sensors*, then press the **OK** key. The monitor will prompt the operator to engage the clutch and start normal planting.
3. The monitor will report each run of the total as they are calibrated. If the user wants to see specifically which runs have yet to calibrate, they can press the **OK** key and a list will show up, showing which ones still need to calibrate.

2. Obtain the acreage from the monitor.

Example

- AREA: 0.32 ACRES

3. Divide the actual field acres by the displayed acres and multiply by the current PPM that was entered into the monitor.

Example

- PPM for a Model 6550 with 650/75 R34 dual tires

  (see *Table 4*) = **25694**
- Apply formula: $\frac{0.32 \text{ acres}}{0.37 \text{ acres}} \times 25694 =$ **22222**
- **22222** will be the new PPM value to enter in the monitor.

IMPORTANT

ENSURE THAT THE TIRE PRESSURE ON THE UNIT IS CORRECT. REFER TO *SECTION 4.4 - PRE-OPERATION CHECKLIST* FOR THE TIRE PRESSURE CHART.

This will give a new PPM value that may be entered into the monitor. Refer to *Section 5.3.9 - Speed/Area Settings* to enter this new value.

NOTE

WHEN THE GROUND DRIVE CLUTCH IS DISENGAGED, AREA ACCUMULATION IS NOT COUNTED.

5.3.11 CONTRAST

The contrast setting allows the operator to adjust the contrast of the display screen monitor

a. CONTRAST

- Use the UP and DOWN keys to adjust the contrast value between 0 and 20. The value of 20 is very light, while 0 is very dark.

b. EXIT AND SAVE

- Pressing **OK** will save the new setting and exit the screen.

5.3.12 DISPLAY SETTINGS

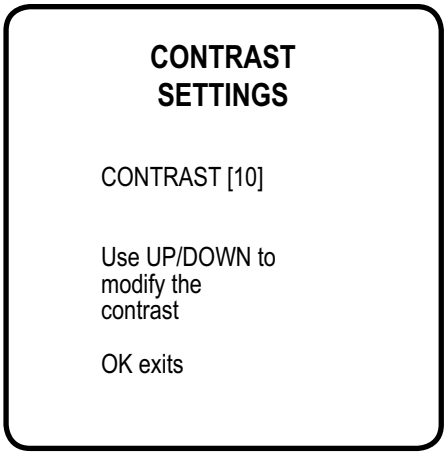
The Display Settings menu allows the user to configure the normal display to either 1, 3 or 4 readout groups.

a. NUMBER OF DISPLAY ITEMS

- Use the UP and DOWN keys to adjust the value between 1, 3 and 4.

b. EXIT AND SAVE

- Pressing **OK** will save the new setting and exit the screen.
- CANCEL exits without saving.



Area Method:

The Speed Sensor Calibration - **Distance** method (*Section 5.3.10*) is the preferred method to determine pulses per mile (PPM).

The Speed Sensor Calibration - **Area** method is a second option for the operator. It is ideal to perform the test with the air tank ½ full of product.

$$\frac{\text{Displayed Acres (Ha)}}{\text{Actual Field Acres (Ha)}} \times \text{Current PPM} = \text{New PPM}$$

Divide the displayed acres by the actual field acres and multiply by the current PPM that was entered into the monitor. This will give a new PPM value that may be entered into the monitor.

1. Refer to *Figure 5.12*. Set a distance for the seeding unit to travel. By knowing how far the seeding implement has travelled, the exact area can be determined.

   Example - Model 6550 with 650/75 R34 dual tires and 54 ft seeding implement.

   - Distance measured to travel is 300ft.
   - Put monitor into Calibrate mode for a more accurate acreage reading. Press the CAL button, then select the Application Rate from the menu.
   - Engage clutch and drive the measured 300ft.
   - Area covered = 300 ft x 54 ft = 16200 ft^2.
   - Actual Field Acres (1 acre = 43560 ft^2)
     = 16200 ft^2/43560 ft^2/acre
     = 0.37 acres

SPEED / AREA SETTINGS

UNITS	IMPERIAL
WIDTH FT	40.8
SPACING	9.8/10
PULSES/MI	25560
IMP SPRKT	41

EXIT AND SAVE
Press CAL to Start CALIB of distance sensor
Select setting and press OK
CANCEL exits

IMPORTANT

ENSURE THAT THE TIRE PRESSURE ON THE UNIT IS CORRECT. REFER TO *TIRE PRESSURE DECAL IN SECTION 4.4 OR ON THE AIR SEEDER TANK*.

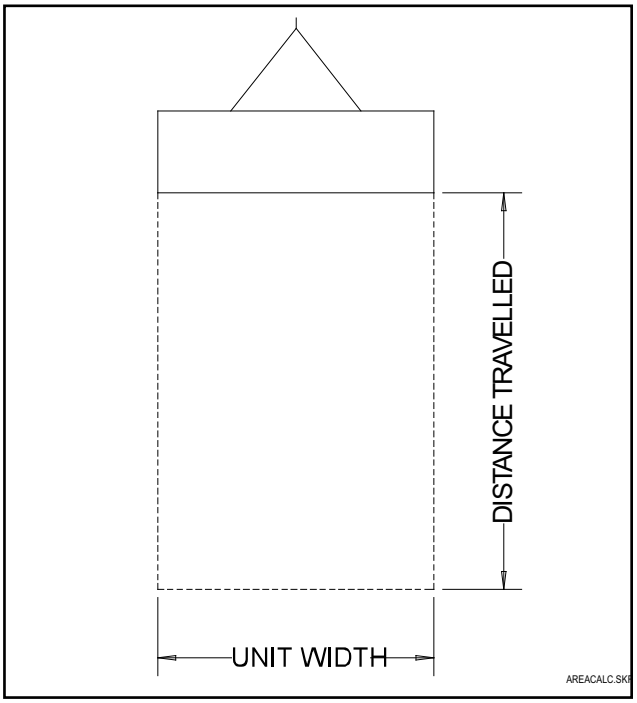


Figure 5.12 - Actual Area Calculation

IMPORTANT

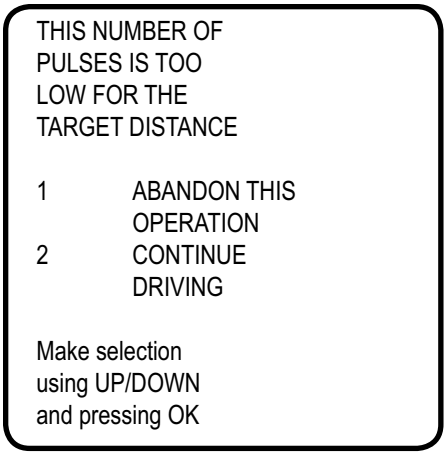
AFTER CHANGING THE PPM VALUE IT IS RECOMMENDED TO RECALIBRATE YOUR AIR SEEDER.

i. *Pulses Too Low* - If the user presses the OK button too soon in the operation, a warning screen will pop up. While this screen is up, the count is disabled.

   - If the unit was stopped prior to pressing the **OK** key and getting the "pulses too low" error, the operator may select item 2 and resume driving until they have reached the second flag.
   - If the unit was still in motion when the operator pressed the **OK** key and got the "pulses too low" error, the operator should select item 1 and restart the calibration.

j. The monitor will go back to displaying the Speed / Area settings menu, with the newly calculated pulses per mile displayed.

- Press **OK** on the **EXIT AND SAVE** item to save the new PPM value in the monitor.
- Pressing **CANCEL** will exit the field to the normal operating display without saving the changed values.



5.3.10 SPEED SENSOR CALIBRATION

Distance Method:

If the operator experiences area readings that are persistently high or low it is suggested that a quick calculation be performed to recalculate the PPM (Pulses Per Mile) that were entered.

This calibration will determine the number of pulses that the monitor receives from the speed sensor for every mile it travels (pulses per mile - PPM). This speed sensor calibration should be done to compare the recommended PPM from *Table 4* to an actual PPM. It is ideal to perform the test with the air tank ½ full of product.

Speed Sensor Calibration Mode:

a. Mark off a distance of at least 300 ft (91.5 m) with two flags. The tractor should be sitting directly across the first flag.

b. Press the **SET** key while viewing the normal operating display

c. Select the **SPEED/AREA** item

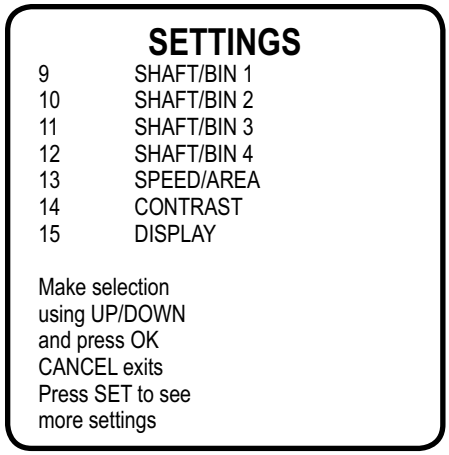
d. Select the **PULSES/MI** item. The screen will now indicate to press **CAL** to start calibration of distance sensor.

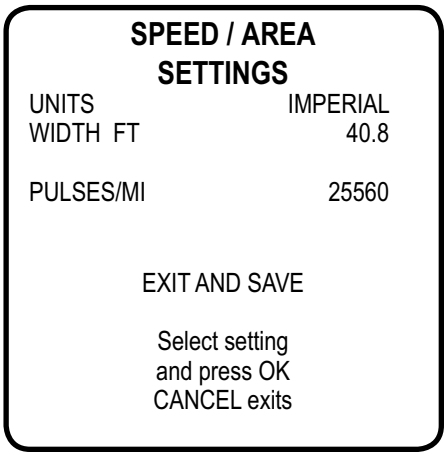
e. Press the **CAL** key.

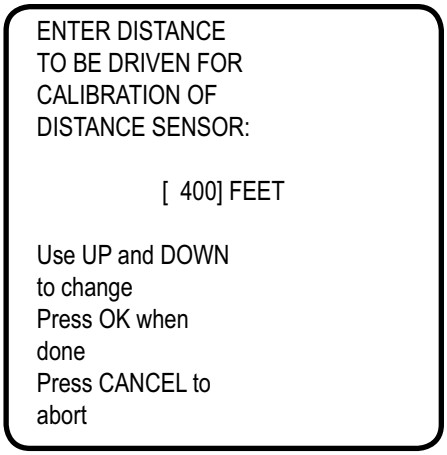
f. The menu displayed asks the user to enter in the number of feet (meters) they wish to drive to perform the calibration. The user can then enter in this distance to the monitor, and press **OK**. Any number between 50 feet and 9999 feet (15.24 m - 3048 m) may be used, but a minimum distance of **300 feet** (91.44 m) should be used for accuracy.

g. Proceed to drive until the tractor is directly across from the finish flag. While driving, the display should show the number of pulses accumulated.

h. Press **OK** to accept these pulses.







IMPLEMENT WIDTH RANGE	IMPLEMENT SIZING SPROCKET	IMPLEMENT WIDTH RANGE	IMPLEMENT SIZING SPROCKET
23'6" - 24'5"	24 Tooth	44'6" - 45'5"	45 Tooth
7.16 m - 7.44 m		13.56 m - 13.84 m	
24'6" -25'5"	25 Tooth	45'6" -46'5"	46 Tooth
7.47 m - 7.75 m		13.87m - 14.15m	
27'6" - 28'5"	28 Tooth	46'6" - 47'5"	47 Tooth
8.38 m - 8.66 m		14.17m - 14.45m	
28'6" - 29'5"	29 Tooth	47'6" - 48'5"	48 Tooth
8.69 m - 8.97 m		14.48 m - 14.76 m	
29'6" - 30'5"	30 Tooth	49'6" - 50'11"	50 Tooth
8.99 m - 9.27 m		15.09 m - 15.52 m	
31'6" - 32'5"	32 Tooth	51' - 52'11"	52 Tooth
9.60 m - 9.88 m		15.55 m - 16.13 m	
32'6" - 33'5"	33 Tooth	53' - 54'11"	54 Tooth
9.91 m - 10.19 m		16.15 m - 16.74 m	
33'6" - 34'5"	34 Tooth	55' - 56'11"	56 Tooth
10.21 m - 10.49 m		16.76 m - 17.35 m	
34'6" - 35'5"	35 Tooth	57' - 58'5"	58 Tooth
10.52 m - 10.80 m		17.38 m - 17.81 m	
35'6" - 36'5"	36 Tooth	58'6" - 60'5"	59 Tooth
10.82 m - 11.01 m		17.83 m - 18.42 m	
38'6" - 39'5"	39 Tooth	60'6" - 62'11	62 Tooth
11.74 m - 12.01 m		18.44 m - 19.18 m	
39'6" - 40'5"	40 Tooth	63' - 64'5"	64 Tooth
12.04 m - 12.32 m		19.20 m - 19.63 m	
40'6" - 41'5"	41 Tooth	69'3" - 70'2"	70 Tooth
12.34m - 12.62m		21.12 m - 21.41 m	
41'6" - 42'5"	42 Tooth	73'6"	74 Tooth
12.65 m - 12.93 m		22.40 m	

IMPLEMENT_SIZING.XLS

Table 5 - Implement Sizing Sprockets

d. ZERO SPEED ALARM DELAY

- Adjustable delay (1-99 seconds) alarm for no ground speed signal with fan engaged.

e. IMP SPRKT *(ZRC Units ONLY)*

- Enter the # of teeth on the Implement Sizing Sprocket of your unit. Check *Table 5 - Implement Sizing Sprocket* for the sprocket used on your unit.

f. SPACING *(ZRC units ONLY)*

- This field indicates the spacing of the unit. Pick the spacing closest to your unit from the list shown.

  7", 8", 9.8/10", 12", or 12.6"

g. EXIT AND SAVE

- Pressing **OK** will save the changed values exit to the normal operating display.
- Pressing **CANCEL** will exit without saving the changed values.

IMPORTANT

ALWAYS CHECK THE IMPLEMENT SIZING SPROCKET (REFER TO *TABLE 5*) THAT IS INSTALLED ON YOUR UNIT. REFER TO *SECTION 6.4.3* FOR THE LOCATION OF THIS SPROCKET.

Air Seeder Size	Tire Type	Rear Tire Size	Tire Sprkt (teeth)	Pulses per Mile (PPM)	Pulses per Kilometer (PPK)
550 Bu (19,300 Litres)	R1-W Lug	900/60 R32	29	25500	15850
		650/75 R34 (Dual)	30	25700	15970
	Rice (R2) Lug	20.8 R38 (Dual)*	30	25150	15630
450 Bu (15 900 Litters)	R1-W Lug	900/60 R32	29	25500	15850
		800/65 R32	31	25270	15710
	Rice (R2) Lug	30.5L X 32	30	25810	16040
		20.8 R38 (Dual)*	30	25150	15630
	R1 Lug	30.5L X 32	31	25440	15810
350 Bu (12 300 Litres)	Rice (R2) Lug	20.8 R38 (Single/Dual)*	30	25150	15630
		30.5L X 32	30	25810	16040
	R1-W Lug	800/65 R32	31	25270	15710
	R1 Lug	30.5L X 32	31	25440	15810
		28L x 26	34	25920	16010
	Rice (R2) Lug		34	25560	15890
280 Bu (9 900 Litres)	Rice (R2) Lug	20.8 R38	30	25150	15630
	R1 Lug	18.4 X 38	31	26020	16170
		28L X 26	34	25920	16010
	Rice (R2) Lug		34	25560	15890
	R1 Lug	23.1 x 26	34	26090	16220
	Rice (R2) Lug		34	25600	15910
200 Bu (7 000 Litres)	R1 Lug	18.4L X 26	38	25890	16100
	Rice (R2) Lug		37	25790	16030
	R1 Lug	23.1 x 26	34	26090	16220
	Rice (R2) Lug		34	25600	15910

TABLES_6000.XLS

* 20.8 R38 Duals were available prior to Feb 21, 2007 only.
* 800/65 R32 tires were available prior to May 15, 2007 only.

Table 4 - Pulses Per Mile vs Tires

5.3.9 SPEED/AREA SETTINGS

The Speed/Area settings menu allows the user to adjust settings related to the speed sensor and area accumulation. Refer to *Table 3 - Units / Area / Speed Settings*.

a. UNITS

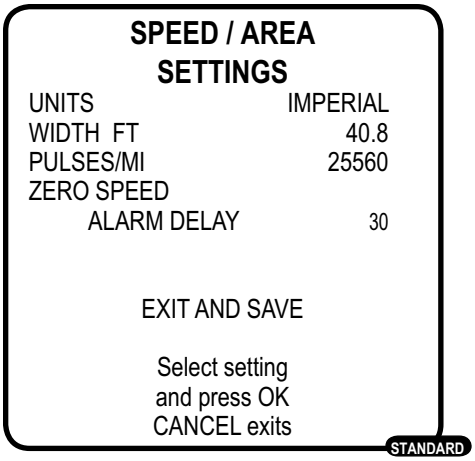
- Field can be modified to either **IMPERIAL** or **METRIC**.
- SAVE on EXIT is required for the monitor to accept and SAVE the UNITS change, prior to the Speed Sensor Calibration.

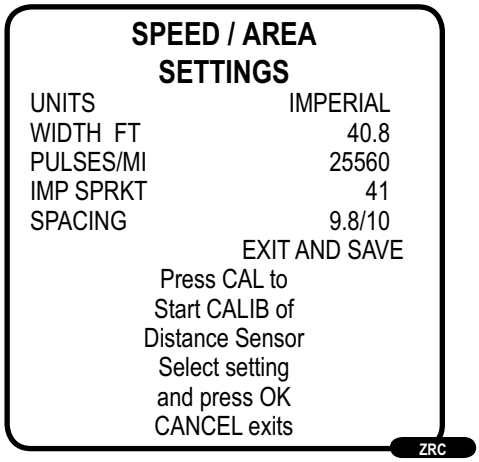
b. WIDTH FT or WIDTH CM

- Enter the width of the seeding implement, to the nearest 10th of a foot or nearest centimetre, i.e.: 52.0.

c. PULSES/MI or PULSES/KM

- Used to correspond the number of pulses from the speed sensor, to one mile or one kilometre travelled (PPM). A **20** tooth sprocket is used for the "pick-up" for the speed sensor.
- Refer to *Table 3* for the correct PPM value to enter for seeding unit and tires.
- The value can be determined by using the **Speed Sensor Calibration** feature.





IMPORTANT

BE SURE THAT THE CORRECT IMPLEMENT SIZING SPROCKET IS INSTALLED ON THE AIR SEEDER. REFER TO *TABLE 5*.

DISPLAY	FUNCTION	RANGE	COMMENTS
UNITS	Units of measure	IMPERIAL or METRIC	Default is Imperial.
WIDTH FT or WIDTH CM	Working width of the seeding implement	0 to 100 ft 0 to 99.9m	Default is 54ft or 1646cm.
PULSES/MI or PULSES/KM	Pulses to monitor / mile travelled	Refer to PPM Chart	Value can also be determined by performing the ground speed calibration. Default is 25500.
ZERO SPEED	Adjustible delay for no ground speed signal	1 to 99 Seconds	In effect only when fan engaged. Default is 20 s.
SPACING	Pick the shank spacing of your unit from the list given.	7", 8", 9.8/10", 12", 12.6"	Pick the spacing that represents your unit.
IMP SPRKT	Insert the Implement Sizing Sprocket for your unit.	Refer to Imp Sprocket Chart	Check the drive sprocket on your unit.

TABLES_5000.XLS

Table 3 - Units / Area / Speed Settings

- **OFF** disables the individual shaft settings screen. **Note:** This setting should never be used for any air seeder equipped with torque limiting clutches on the metering auger shafts. This setting will negate the monitor's ability to provide a low rate alarm. Refer to *Section 7 - Calibration.*

d. PULSES/REV

- Number of pulses sensed by the Hall Effect sensor for each revolution of the metering auger sprocket;
  - 13 tooth sprocket (units **without ZRC** installed). Set the value at **13**.

or

  - 26 tooth sprocket (units **with ZRC** installed). Set the value at **26**.

e. BIN ENABLED

- Selecting YES, will enable communication with the appropriate bin sensor, enable alarms for that sensor, turn on the bin display icon and allow the user to view the bin level on the normal display area.
- Selecting NO will disable communication with the selected bin sensor. It will disable the sensor alarms, turn off the bin icon on the display.

f. RANGE *(ZRC Units ONLY)*

- Enter either HIGH or LOW or MED that corresponds with the transmission setting for that shaft. This value directs the monitor to use the correct rate charts for the transmission.

g. CLUTCH INSTALLED *(ZRC Units ONLY)*

- Select either YES of NO, depending on if an auxiliary clutch is installed on the unit.

h. EXIT AND SAVE

- Pressing **OK** will save the changed values exit to the normal operating display.
- Pressing **CANCEL** will exit without saving the changed values.

IMPORTANT

THE PRODUCT APPLICATION RATE IS A CALCULATED THEORETICAL RATE. THIS RATE IS ONLY AS ACCURATE AS THE LB/REV (KG/REV) DETERMINED FOR EACH METERING AUGER. REFER TO *SECTION 7 - CALIBRATION*.

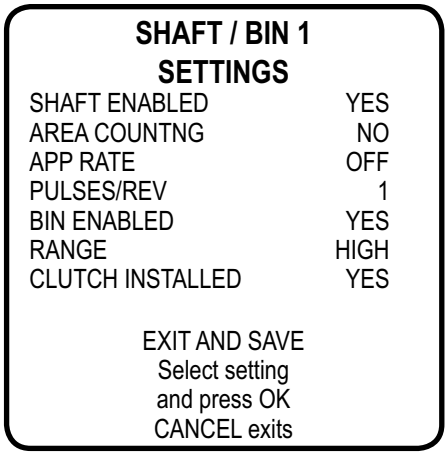
DISPLAY	FUNCTION	RANGE	COMMENTS
SHAFT ENABLED	Communication to metering auger shafts	YES or NO	
AREA COUNTNG	Area accumulation per shaft	YES or NO	Can be enabled only if SHAFT ENABLED is on.
APP RATE	Communication to the metering auger and main drive shafts.	QUICK, STEADY,AUTO, or OFF	Leave setting at OFF for 2135, 3000 & 4000 Series.
PULSES/REV	Number of pulses counted per shaft revolution	1, 13 or 26	**1** for 2135, 3000 & 4000 Series **13** for Standard & CRA 5000 & 6000 Series **26** for units with ZRC 5000 & 6000 Series
BIN ENABLED	Allows communication with the appropriate bin sensor.	YES or NO	Defaults to YES.
RANGE	Sets the "range" that each transmission is set at.	HIGH, MED or LOW	Only required for ZRC option (5000 & 6000 Series).
CLUTCH INSTALLED	Information on whether the Auxiliary Clutch is installed.	YES or NO	If there is an Auxiliary Clutch installed, set to YES. Only required for ZRC option (5000 & 6000 Series).

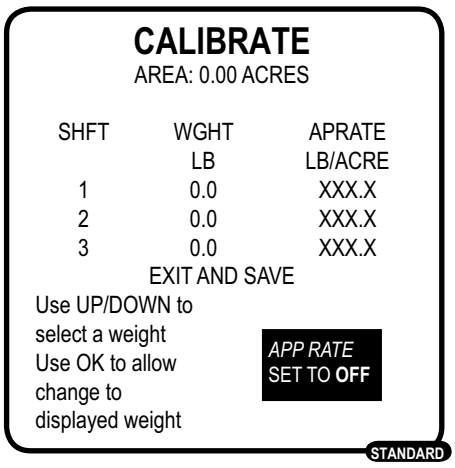
Table 2 - Shaft / Bin Level Settings

TABLES_491_V3_05.XLS

5.3.8 SHAFT/BIN SETTINGS

The Shaft/Bin settings menus allows the user to adjust settings related to the shaft and bin sensors. There are three or four such menus (depending on the number of metered tanks) each relating to its corresponding sensor. Refer to *Table 2 - Shaft / Bin Level Settings*.





a. SHAFT ENABLED

- **YES** will enable communication with the appropriate shaft sensor, enable alarms for that sensor, turn on the appropriate shaft icon in the normal operating display, and allow the user to view the shaft RPM and area in the normal operating display read-out.
- **NO** will disable communication with that shaft sensor, disable all of that sensors alarms, turn off the appropriate shaft icon in the normal operating display, and display **OFF** in the normal operating display read-out for shaft RPM and area. Disabling the shaft also turns off the shaft area accumulation (refer to item b).

b. AREA COUNTNG

- **YES** allows area to be accumulated for a shaft only if the shaft is enabled as described in item a. Area will be accumulated with the metering auger shaft RPM is greater then zero.
- **NO** prevents area from being accumulated on the specified shaft.

c. APP RATE

- **QUICK** will display the calculated product application rate for each 'enabled' shaft (refer to *Section 4.3.8*). The rate shown on the monitor will be in real time. The monitor will give a quick response, but may show some fluctuation.
- **AUTO** is the default setting for units with ZRC installed. This setting uses the "quick" algorithm until the displayed rate is within 5% of the target rate. When the rate is within 5% of the target rate, only the target rate is shown.
- **STEADY** will display the calculated product application rate. The rate shown on the monitor will be averaged over a longer period of time. The monitor will give a slower but more steady response to rate changes. This rate may be preferable if you are not changing rates on-the-go.

5.3.5 FLOW - GLOBAL (OPTIONAL)

The Flow settings menu allows the user to adjust settings related to the blockage module sensors.

Both pin-type and optical blockage (OBM) modules are supported, however, mixed systems are not permitted. One of two different menus will appear when this option is selected. Also, pressing the **CAL** button puts the monitor into flow sensor calibration mode.

Refer to the Blockage Module Installation and Operators Manual for more information.

5.3.6 FLOW - SINGLE (OPTIONAL)

Only optical blockage modules are installed. Option is available only if optical sesnors found in learn sequence.

5.3.7 FLOW INFO (OPTIONAL)

Entering the Flow Information screen will give the operator information on each of the modules (Pin-type or OBM) and its sensors.

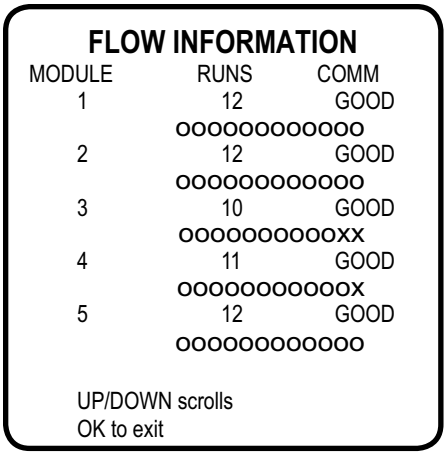
The monitor will show:

a. the module number that the monitor is attempting to communicate with;

b. the number of runs (or sensors) it has connected to it;

c. and whether or not the communication is valid.

Refer to the Blockage Module Installation and Operators Manual for more information.



Note: The Blockage Module calibration menu can be accessed from this screen by pressing the CAL button. Refer to *Section 5.4 Monitor Calibration Settings*.

e. UNITS

- Indicates the measuring unit for the seed treatment being applied. The measuring unit may be:
  - ml/bu (ml/m^3 in Metric)
  - ml/lb (ml/kg in Metric)
  - ml/25kg

f. LBS/BU (only if UNITS is set to ML/BU)

- Enter in the density of the seed product in pounds per bushel. This is only required if the UNITS is set to ML/BU.

g. PUMP DRIVE RATIO

- **Low Drive Ratio - 6:1** 60T pulley on the metering auger with 10T pulley on the pump.
- **Intermediate Drive Ratio - 9.6:1** 60T pulley on the metering auger to 10T/16T pulleys on jack shaft to 10T pulley on the Pump.
- **High Ratio - 14.4:1** 60T pulley on the metering auger to 10T/24T pulleys on jack shaft to 10T pulley on the Pump.

Refer to the *Seed Treater Operator's Manual* for more information and diagrams to show locations of each of the pulleys.

CRA/ZRC Option with Seed Treater: When set to operate with the Cab Rate Adjust, the product application rate setting (APP RATE) is not available in the Seed Treater Settings screen.

The product application rate will be taken from the value that is currently being displayed.

During operation, as the seed application rate is adjusted, the treatment application rate is adjusted accordingly. Even as the seeding rate will show an increase or decrease, the treatment application rate per lb (kg) of seed will remain the same, since the auger speeds up to achieve the higher seeding rate and the pump turns proportionally faster as well.

SEED TREATER SETTINGS

ENABLED	YES
PUMP SETTING	200
SHAFT NUMBER	1
APP RATE (LBS/ACRE)	15
UNITS	ML/LB
DRIVE RATIO	6.00

EXIT AND SAVE
Select setting and press OK
CANCEL exits

5.3.4 SEED TREATER SETTINGS (OPTIONAL)

The Seed Treater settings allows the operator to set the rates of seed treatment being applied to the seed. The rates shown are theoretical, derived from the values entered from the operator.

Refer to the Seed Treater Operator's Manual for setting the required flow rates. These values will be required for setting the monitor.

a. ENABLED

- **YES** will display the theoretical rate of flow when prompted in the Operation Mode.
- **NO** will disable the theoretical rate of flow.

Note: When the seed treater settings are enabled, an alarm will be sent to the operator if the theoretical pump speed exceeds 3600 rpm.

b. PUMP SETTING

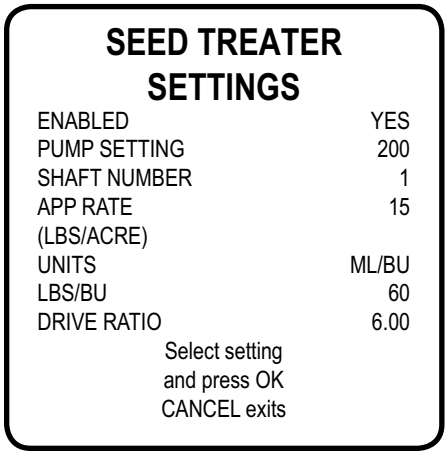
- This value is the pump setting for the rate of flow for the given treatment. The pump setting may be between 0 and 450.

c. SHAFT NUMBER

- Indicates which shaft has the seed treater mounted onto it.

d. APP RATE

- Application Rate is the **calibrated** rate of seed being applied by the Air Seeder in lbs/acre. This value should be the rate determined from a static and/or field calibration. **Calibrate the air seeder to verify the seeding rate prior to entering the value.**
- This field does not display when seed treater metering auger shaft is set to work with the CRA/ZRC option (APP RATE set to STEADY or QUICK for CRA/ZRC or to AUTO for ZRC). Refer to *Section 5.3.8 Shaft/Bin Settings*.



e. FAN CONTROL

- This field shows up ***ONLY*** when a ***FAN Controller*** is installed, and can be set to one of 3 values. These fields change the meaning of the FAN SPEED parameter as shown in *step f*.
- **AUTO** displays a percentage of the monitor recommended fan speed. This is the default setting for the Fan Control.
- **MNL** indicates that the fan is in manual mode and the operator will set an absolute fan RPM.
- **OFF** will turn off the fan controller and will only allow the user to monitor the fan RPM. The fan controller will not apply power to the motor valve and it is up to the operator to open this valve the desired amount, directly on the fan to achieve the desired fan RPM or open fully and adjust the speed with the tractor flow control.

f. FAN SPEED

- This field is displayed when the FAN Controller is installed and the FAN Control is set to either AUTO or MNL (refer to *step e*).
- If the FAN Control is set to AUTO, the Fan Speed will indicate a percentage between 0% and 200% (this value is set by the operator). This value indicates the percentage of the rate calculated RPM that the controller will try to achieve. The default value is set to 100% in the AUTO mode.
- If the FAN CONTROL is set to MNL, the Fan Speed displays an absolute fan RPM value that the operator wants the fan controller to achieve. The default value for MNL is 3500 RPM.

g. EXIT AND SAVE

- Pressing **OK** when this field is highlighted will save the changed values to the monitor and exit to the normal operating display.
- Pressing **CANCEL** will exit the field to the normal operating display without saving the changed values.

IMPORTANT

RUNNING THE STANDARD AIR SEEDER FAN ABOVE 5000 RPM OR THE OPTIONAL HIGHER OUTPUT FAN ABOVE 6000 RPM MAY RESULT IN DAMAGE TO THE HYDRAULIC MOTOR.

DISPLAY	FUNCTION	RANGE	COMMENTS
ENABLED	Enable connection to sensor	YES or NO	
FAN OIL PRES	Enable/Disable alarm for case drain pressure sensor	YES or NO	Will ALARM if pressure is more than 65 psi (440 kPa). OK button will NOT silence the alarm. Shut down the unit immediately and investigate.
LOW FAN	Low Fan RPM alarm point	0 to 9999 RPM	Factory default: 2000 RPM OK button will NOT silence alarm with drive clutch engaged.
HIGH FAN	High Fan RPM alarm point	0 to 9999 RPM	Factory default: 5200 RPM
FAN CONTOL	Determines the type of fan speed parameter setting	AUTO MNL OFF	Factory default: AUTO Displayed only if Fan Controller is installed.
FAN SPEED	Value of the Fan Speed to maintain	0 to 9999 RPM 0% to 200%	Factory default: 100% (AUTO) or 3500 RPM (MNL) Displayed only if Fan Controller is installed.

TABLES_3000.XLS

Table 1 - Fan Setting

5.3.3 FAN SETTINGS (FAN 1 & 2)

There are two fan settings menus, one for Fan 1 and one for Fan 2. Depending on which one is selected, the fan settings menu allows the user to adjust all the parameters relating to that particular fan sensor.

If the FAN 2 sensor has not be "learned", the display will skip over this selection.

a. ENABLED

- **YES** will enable communication with the appropriate fan sensor, enable alarms for that sensor, turn on the appropriate fan icon in the normal operating display, and allow the user to view the fan RPM in the normal operating display read-out.
- **NO** will disable communication with that fan sensor, disable all of that sensors alarms, turn off the appropriate fan icon in the normal operating display, and display **OFF** in the normal operating display read-out.

b. FAN OIL PRES

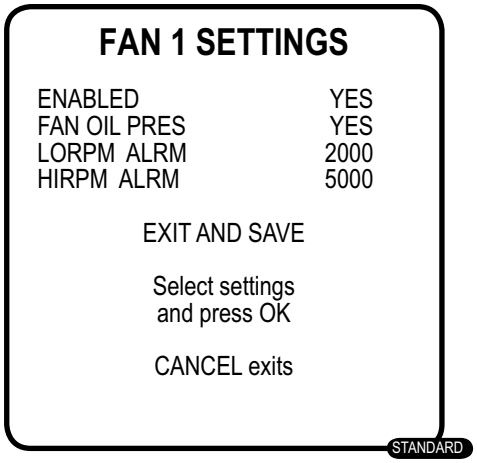
- Only shows up in the Fan 1 settings menu.
- Does not show up if the FAN Controller is installed.
- Select **YES** or **NO** to enable or disable the case drain pressure alarm.

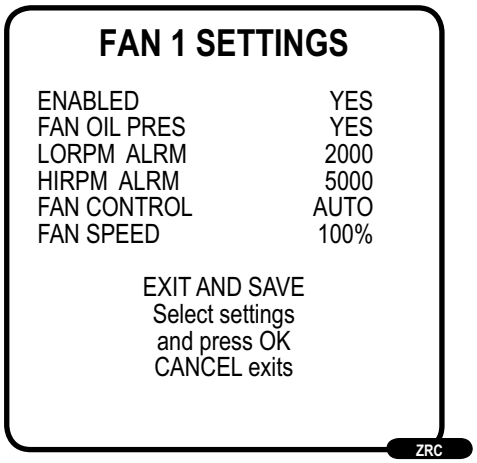
c. LORPM ALRM

- Used to set the low alarm point for the given fan sensor.
- When the fan RPM is detected below the set point while seeding, the monitor will alarm.
- If equipped with the FAN Controller, this is the lowest RPM the controller will set to.

d. HIRPM ALRM

- Used to set the high alarm point for the given fan sensor.
- When the fan RPM is detected above this point while seeding, the monitor will alarm.
- If equipped with the FAN Controller, this is the highest RPM the controller will set to.





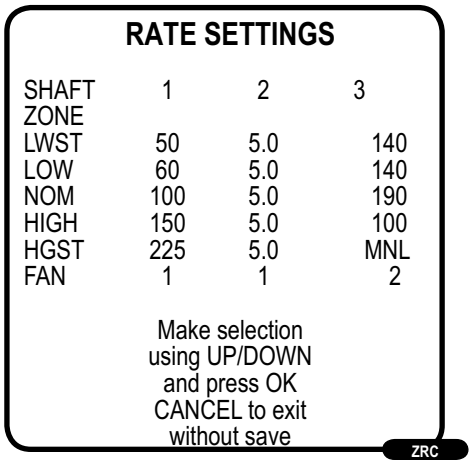
IMPORTANT

RUNNING THE STANDARD AIR SEEDER FAN ABOVE 5000 RPM OR THE OPTIONAL HIGHER OUTPUT FAN ABOVE 6000 RPM MAY RESULT IN DAMAGE TO THE HYDRAULIC MOTOR.

5.3.2 RATE *(UNITS WITH ZRC ONLY)*

The Rate Display feature is only available if the unit has been "learned' with the ZRC Controller installed. This feature allows the operator to configure the product application rate for each shaft with 5 "zones", as well as which fan is used with each shaft.

- All zones default to MNL when the monitor is first setup. MNL will not allow for any automatic rate control and the rate must be adjusted with the manual switch boxes.
- Each value must be set by the operator. It is recommended to set the NOM value to the "most common" rate that you will be applying with that shaft.
- The LWST to the HGST values must be within the range of values that the transmission can reach in the range (LOW, MED, HIGH) it is set.
- Use the arrow keys to pan through each of the values for each shaft, press OK to select and change a value.
- If a value is left at MNL in a zone, the transmission will not adjust automatically to any rate. The rate must be manually set with the switch box.
- Values are in increments of 0.1 from 0.0 to 9.9 and then in increments of 1 from 10 and up. To return a value to MNL, arrow down to below 0.0.
- The FAN setting toggles between 1 and 2 and should be set according to the fan that is used with that metering auger shaft.



IMPORTANT

IF A RATE IS SET THAT IS TOO HIGH OR TOO LOW AND THE SWITCH IS THEN SET TO THAT SETTING, THE MONITOR WILL RETURN WITH A "RATE" ALARM. RE-ENTER THE RATE THAT IS GIVING THE TROUBLE AND CONTINUE WITH OPERATION OR CHANGE TO AN APPROPRIATE RANGE IF POSSIBLE.

5.3.1 CLEAR AREAS

The Clear Areas menu allows the user to clear whichever of the area fields they wish. Each item is described in the sections below.

a. CLEAR FIELD AREA

- Pressing OK on this item will clear the field area to zero.

b. CLEAR TOTAL AREA

- Pressing OK on this item will clear the total area to zero.

c. CLR FLD AND TOTL

- Pressing OK on this item will clear the field and total areas to zero.

d. CLR SHAFT 1 (2, 3, 4) AREA

- Pressing OK on this item will clear the shaft 1 (2, 3, 4) area to zero.

e. CLEAR ALL AREAS

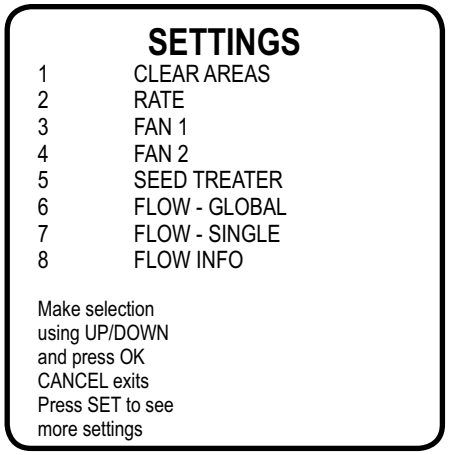
- Pressing OK on this item will clear all of the areas to zero.

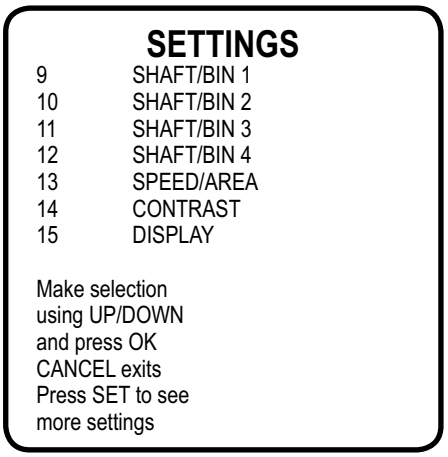
5.3 CHANGING MONITOR SETTINGS

Most of the monitor functions have settings that can be changed to reflect the application requirements.

The operator is able to access the setting menu by pressing the **SET** button on the keypad. This will launch the first of 2 screens available. Pressing **SET** again will launch the second screen.

- Use the **INCREASE/DECREASE** arrow keys to scroll through the selections. Press **OK** when the desired selection has been highlighted.
- Move through the options in each screen with the **INCREASE/DECREASE** keys.
- When the option to be changed is highlighted, press the **OK** key, and two brackets ([ ]) will surround the value.
- Use the **INCREASE/DECREASE** keys to modify the value. For fields that require a number, the longer the key is held down, the faster the numbers will scroll.
- Press **OK** when the correct value is set, or **CANCEL** to exit without saving.





5.2 SENSOR REPLACEMENT

5.2.1 SMART SENSOR/MUX BUS ADAPTOR

One or More Sensor(s) Replacement:

Where one or more smart sensors or Mux Bus adaptors are replaced, the user must perform a complete sensor learn. Refer to *Section 5.1.2.*

Incorrect Sensor Replacement:

If the incorrect sensor is connected to the harness, or sensors are connected out of order, the monitor will leave the "UNABLE TO LOCATE SENSOR" screen up, and issue a steady beep until the sensor is disconnected.

The monitor will issue a quick double beep once the correct sensor is connected, then move to the next sensor, or to normal operation mode.

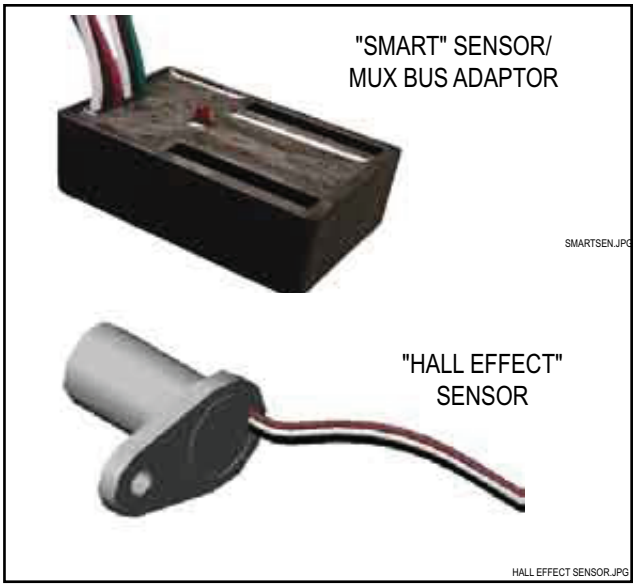


Figure 5.10 - Sensors

5.2.2 HALL EFFECT SENSORS

These sensors are not "smart" sensors and they require a "controller" box or smart sensors or Mux Bus adaptors to work. On standard units or units with CRA installed, these cylindrical sensors are connected to Mux Bus adaptors which are connected to the wiring harness.

On units with **ZRC** installed, the Hall Effect sensors are connected to the VRC Controller box. This controller box is the brains for the system. Units with the Fan Controller installed are treated the same way.

These Hall Effect sensors do not need to be re-learned if they are replaced. Disconnect the sensor from the harness (or the smart sensor) and replace with a sensor of the same type.

Figure 5.11 - Controller Box & Power Switch

5.2.3 CONTROLLER BOXES - VRC & FAN

Units with ZRC or the FAN Controller option installed, will have controller boxes installed on their units. These controller boxes will need to be "learned" in the sensor learn sequence. Plug these units into the main wiring harness when they are called for in the regular sequence. Refer to *Figure 5.11*.

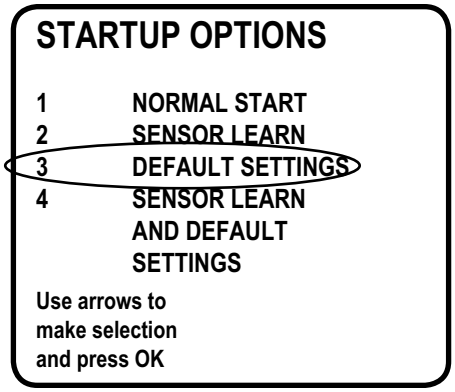
IMPORTANT

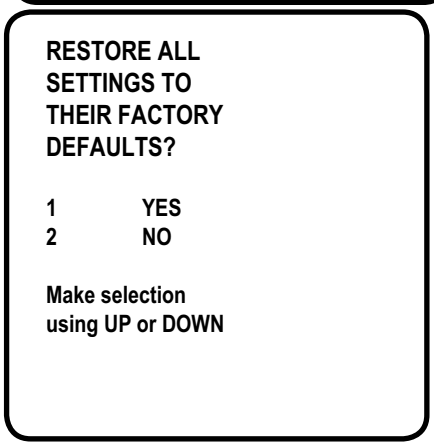
FOR UNITS WITH ZRC INSTALLED, THE POWER SWITCH (REFER TO *FIGURE 5.11*) FOR THE CONTROLLER BOX MUST BE TURNED ON BEFORE DOING A SENSOR LEARN. IF THE POWER IS NOT TURNED ON, THE SYSTEM WILL NOT FIND THE SPEED SENSOR (VR CONTROLLER BOX) AND IT WILL KEEP PROMPTING FOR THAT SENSOR.

5.1.3 DEFAULT SETTINGS

Select ***3. DEFAULT SETTINGS*** when it is necessary to reset all stored settings. When this mode is selected, all settings revert to pre-selected factory settings and the areas go to zero. (e.g. High/Low fan, Implement width, etc.).

After the values have been reset to the factory defaults, the monitor will return to the STARTUP OPTIONS menu.

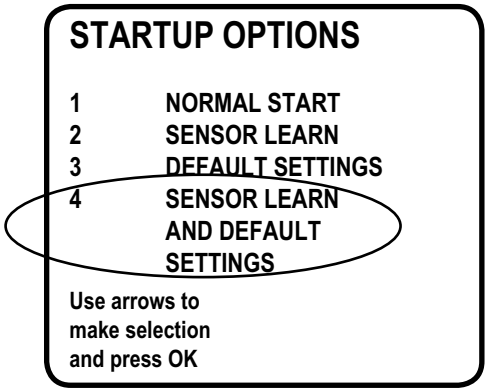




5.1.4 SENSOR LEARN AND DEFAULT SETTINGS

Selection ***4. SENSOR LEARN AND DEFAULT SETTINGS*** is a combination of option 2 and 3.

- The monitor will prompt the user to reset all values to factory defaults. Refer to *Section 5.1 Start-Up & System Installation*.
- The monitor will then run through the sensors in sequence, prompting when each sensor is to be installed. Refer to *Figure 5.2 or 5.3*.



IMPORTANT

MONITORS ARE NOT INTERCHANGEABLE BETWEEN AIR SEEDERS UNLESS THE MONITOR HAS BEEN "LEARNED" ON THAT PARTICULAR AIR SEEDER PREVIOUSLY. ONLY THE MONITOR USED DURING INSTALLATION WILL OPERATE PROPERLY ON THE SYSTEM.

c. If the fan 1 speed sensor (#2) is not equipped for case drain pressure leads, the monitor will recognize this and automatically disable the case drain pressure sensor option.

d. A good test for the case drain pressure switch is to disconnect the red lead from the pressure switch. After 30 seconds an alarm should be generated which can only be corrected by reconnecting the red lead to the switch.

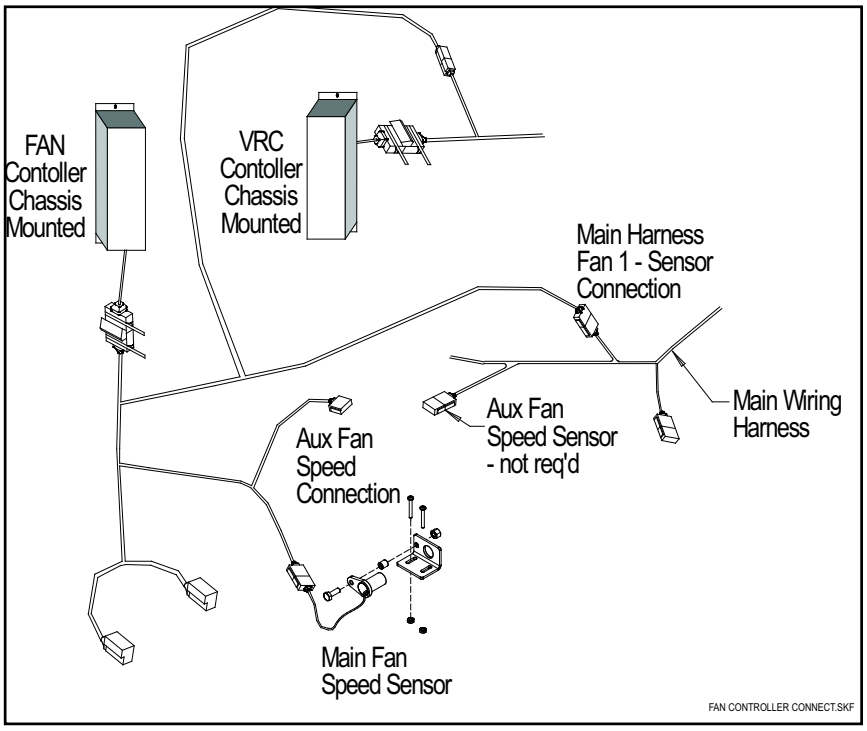


Figure 5.9 - FAN Controller connection to the Wiring Harness

8. If the fan controller is installed, connect the controller to the wiring harness when "Fan 1" is called for. The auxiliary connection on the main harness will not be required if the fan controller is installed. There is no connection for the Case Drain Pressure when the fan controller is installed. Refer to *Figure 5.9*.

9. The monitor will then display the normal operating screen.

Several functions can use the same type of sensor. This is why it is critical to connect the sensors in the sequence listed (refer to *Figure 5.2 or 5.3*). This way the monitor will "know" each sensor and its location on the air seeder harness.

If an incorrect sensor type is picked up during a sensor learn or sensor replacement and the monitor recognizes the error, it will emit a steady beep until the sensors have been disconnected and reconnected in the right order.

UNABLE TO
LOCATE SENSOR

FAN1

CHECK SENSOR
CONNECTIONS OR
REPLACE FAULTY
SENSOR

Press OK to
proceed without
this sensor

4. The sensor learn startup option confirmation screen will appear to verify that you wish to enter sensor learn mode.

5. The monitor will then prompt for a specific sensor (the name of the sensor will be displayed on the screen).

   If the speed sensor or ZRC harness (#1) is already connected to the main wiring harness (Refer to *Figures 11.22 & 11.23*), the monitor will double-beep through the first screen and go to sensor #2 fan 1.

6. **Install** - If you wish to install that sensor, plug it into the harness as it is prompted. The monitor will double beep and move on to the next sensor if it is plugged in properly.

   Skip - If you wish to skip that sensor, press **OK** at this time, instead of plugging in a sensor.

7. During the "learn" of the standard Fan 1, the monitor attempts to detect the Case Drain Pressure Switch. The Case Drain Pressure Switch must be properly connected to the fan speed sensor. The operator will not be prompted to hook up a sensor or for any input during this step.

   a. If the fan 1 speed sensor (#2) is equipped for case drain pressure leads, and is connected properly to the pressure switch on the hydraulic line, the monitor will automatically pick up the sensor.

   b. If the fan 1 speed sensor (#2) is equipped for case drain pressure leads, but the leads are not properly connected to the pressure switch on the hydraulic line or the switch is faulty, the monitor will enable case drain pressure sensing, and give a "High Fan1 Pressure" alarm when in operation. The operator must correct the connection to the pressure sensor, or turn off the pressure sensor option in the monitor. Refer to *Section 5.5.1 Sensor Alarms*.

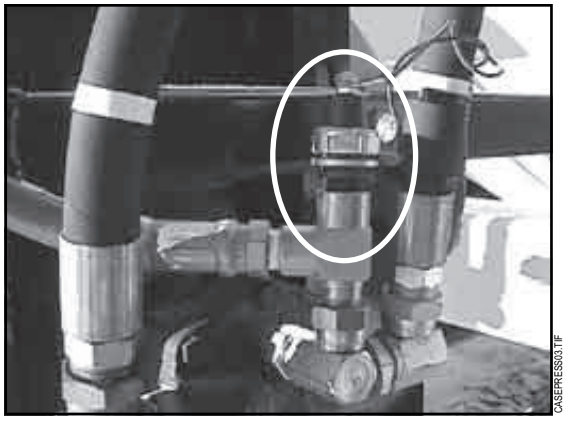


Figure 5.7 - Case Drain Pressure Switch

NOTE

ONLY THE MAIN FAN SENSOR SHOULD BE CONNECTED TO THE PRESSURE SWITCH, EVEN IF THE AIR SEEDER IS EQUIPPED WITH AN AUXILIARY BLOWER. ALSO, ENSURE THAT THE CASE DRAIN LINE IS NOT PRESSURIZED DURING THE LEARN SEQUENCE. CONNECT THE LINE TO THE TRACTOR OR RELIEVE ANY PRESSURE AT THE COUPLER.

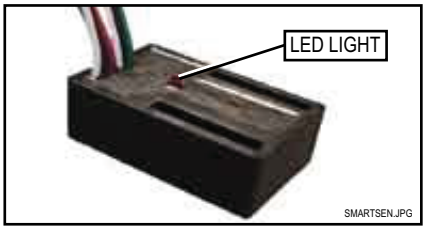


Figure 5.8 - "Smart" Sensor or Mux Bus Adaptor

NOTE

WHEN A SENSOR IS CONNECTED, THE RED LED LIGHT ON THE SENSOR SHOULD FLASH.

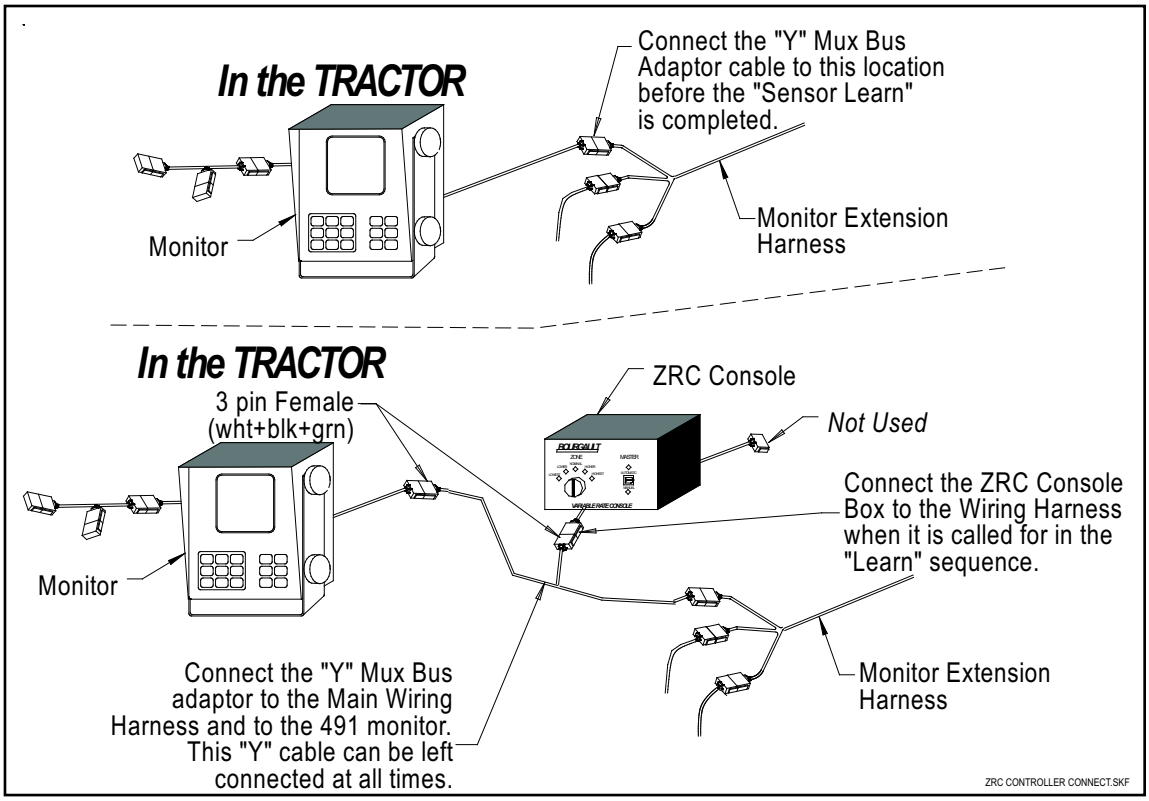


Figure 5.6 - ZRC Controller Connection to Wiring Harness

f. The ZRC console is like a sensor and it must be "learned" the same way a sensor is.

   i) The controller box should not be connected to the "Y" Mux Bus Adaptor cable until it is called for in the "Learn" sequence. Refer to *Figure 5.6*.

   ii) One connector on the back of the ZRC Controller box is not used at this time.

2. Power on all required items.

   a. For units with ZRC installed, the power for the controller box **MUST** be turned **ON** before doing a sensor learn. If the power is not turned on, the system will not find the speed sensor (VR Controller Box) and it will keep prompting for that sensor.

   b. Turn on the power on the 491 monitor.

3. When the STARTUP OPTIONS menu appears, select ***2. SENSOR LEARN*** or ***4. SENSOR LEARN AND DEFAULT SETTINGS.***

IMPORTANT

ALWAYS CONNECT THE SENSORS TO THE WIRING HARNESS IN THE PROPER SEQUENCE.

STARTUP OPTIONS

1 NORMAL START
2 SENSOR LEARN
3 DEFAULT SETTINGS
4 SENSOR LEARN AND DEFAULT SETTINGS

Use arrows to make selection and press OK

5.1.2 SENSOR LEARN

Sensor Learn will allow the operator to "learn" all of the sensors by prompting each sensor in a specific order. Any previous values entered in the monitor will be used for sensors installed.

1. Make sure that all "smart" sensors or Mux Bus adaptors are disconnected from the harness. The first sensor (#1) (from the list in *Figures 5.2 & 5.3*) can be left connected if desired.

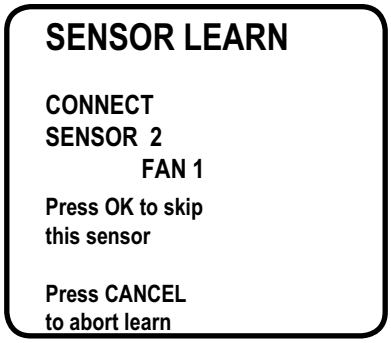
   a. "Smart" sensors or Mux Bus adaptors are the rectangular shaped sensors with a red LED light. Only the first sensor (#1) can remain hooked up, since it is the first one called for in the "learn". In this case the monitor will automatically LEARN it first then the remaining sensors can be hooked up in order.

   b. **Fan Sensor:** Do not disconnect the case drain pressure switch from the fan speed sensor.

   c. **Note - CRA/Standard Units:** If you have a standard unit or if the **CRA** system is installed, do not disconnect the cylindrical Hall Effect sensors from the "smart" sensor. Disconnect the "smart" sensor from the air seeder harness and then reconnect it to the harness when it is called for in the re-learn process.

   d. **Note - ZRC Controller:** If you have the **ZRC** controller installed, it is not necessary to disconnect the ground speed or shaft sensors, (cylindrical Hall Effect sensors), as it is the controller box itself that needs to be "learned".

   e. The ZRC harness can be left connected to the main harness at the "speed sensor" location, since it is the first one called for in the "learn". In this case the monitor will automatically LEARN the VR controller and associated sensors first, then the remaining sensors can be hooked up in order. Refer to *Figures 11.22 & 11.23* for the *Wiring Harness Schematics*.



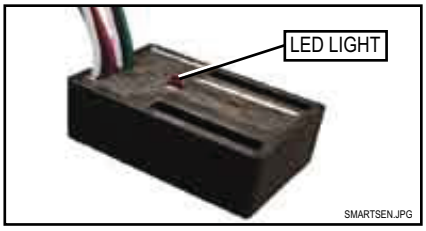


Figure 5.4 - "Smart" Sensor or Mux Bus Adaptor

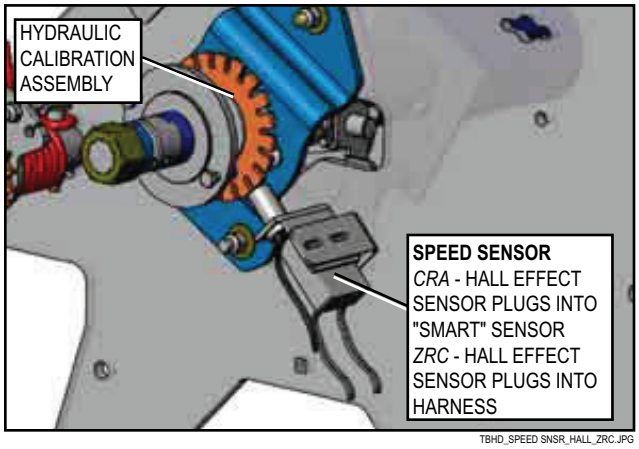


Figure 5.5 - Ground Speed Sensor Location

5.1 START-UP AND SYSTEM INSTALLATION

The monitor is designed to cycle through a specific sequence when it is turned on at start-up to inform the operator about the monitor, system, and sensors. Each time the monitor is turned on, a Startup Menu is shown after the version number is displayed. The startup options are:

1. **NORMAL STARTUP** - select this option to bypass any sensor learns and go directly into operation
2. **SENSOR LEARN** - will allow the operator to "learn" all of the sensors by prompting each sensor in a specific order. Any previous values entered in the monitor will be used for sensors installed.
3. **DEFAULT SETTINGS** - will reset all of the monitor parameters to the factory defaults.
4. **SENSOR LEARN AND DEFAULT SETTINGS** - will allow the operator to "learn" all of the sensors by prompting each sensor in a specific order, and will reset all of the monitor parameters to the factory defaults.

If the screen is left for more than 30 seconds, the monitor will automatically go into NORMAL START mode if a proper "learn" has been done previously and all sensors can be found.

STARTUP OPTIONS

1 NORMAL START
2 SENSOR LEARN
3 DEFAULT SETTINGS
4 SENSOR LEARN AND DEFAULT SETTINGS

Use arrows to make selection and press OK

Sensor List - 491 Standard or with CRA

The monitor will prompt for sensors in the following order:

Sensor 1: .....Speed	Sensor 7: ..... Shaft 4
Sensor 2: .....Fan 1	Sensor 8: ..... Bin 1
Sensor 3: .....Fan 2	Sensor 9: ..... Bin 2
Sensor 4: .....Shaft 1	Sensor 10: ..... Bin 3
Sensor 5: .....Shaft 2	Sensor 11:..... Bin 4
Sensor 6: .....Shaft 3	Sensor 12-23: ... Blockage 1-12

Refer to *Section 11.1.4.6 - Electrical Layouts*

Figure 5.2 - Sensor List Standard/CRA Units

5.1.1 NORMAL START

Normal Start will take the operator directly into the operation of the monitor. Any previous settings are used as the operational parameters.

A list of detected sensors are shown prior to the operation section. This list will show all the sensors that the monitor has picked up and are operational. Refer to *Figure 5.2* for Standard units or units with CRA. Refer to *Figure 5.3* for units with ZRC installed.

Any sensors that are not connected to the air seeder harness or are disabled will be excluded from the list.

Sensor List - 491 with ZRC

The monitor will prompt for sensors in the following order:

Sensor 1: .....Speed	Sensor 10: ..... Bin 3
Sensor 2: .....Fan 1	Sensor 12-23: ... Blockage 1-12
Sensor 3: .....Fan 2	
Sensor 8: .....Bin 1	
Sensor 9: .....Bin 2	Sensor 24: ..... VR Console

Refer to *Section 11.1.4.6 - Electrical Layouts*

Figure 5.3 - Sensor List ZRC Units

The Deluxe Air Seeder Monitor Model 491 uses a multiplexed data communication system to monitor the functions of an air seeder. In the multiplexed system, all sensors communicate with the monitor through three wires. This permits a reduction in wiring complexity as well as a reduced number of connectors. The system also allows a simple means of selection of different configurations (for example, two, three, or four shaft systems).

BOURGAULT

DELUXE

AIR SEEDER
MONITOR
VER 4.04

(c) 2000

Each operator should review this section of the manual at the start of each season and periodically during the season as required to remain familiar with monitor operation. Review the applicable section when using the monitor and Air Seeder.

Figure 5.1 - 491 Monitor

IMPORTANT

IT IS RECOMMENDED TO REMOVE THE MONITOR FROM THE TRACTOR AND STORE INSIDE FOR THE WINTER. THIS WILL HELP EXTEND THE LIFE OF THE MONITOR DISPLAY.

5 MODEL 491 AIR SEEDER MONITOR