



OPERATOR'S MANUAL

Monitor N44049

Morris Version 3

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Introduction

Introduction

The monitor utilizes a multiplexed data communication system to monitor the functions of the Air Cart. In the multiplexed system, all sensors communicate with the monitor on the same three wires.

The system can monitor and display status of the following functions:

- Fan speed
- Ground speed
- Shaft speeds (up to 3)
- Bin levels (up to 3)
- Flow Blockage (up to 192 runs)

An audio alarm will sound upon detection of: low or high fan speed, low shaft speed, low bin level and failure of sensors. Also, loss of flow in any runs that are being monitored with Blockage Modules will generate alarms. Audio alarms persist until the alarm condition is removed or until the alarm is acknowledged by the operator by pressing the appropriate soft key.

In addition, the monitor can determine and display:

- Field Area
- Total Area
- Application Rate (weight per unit area) (VRT systems only)

The monitor allows the following settings to be changed:

- High and Low fan speed alarm point
- Low shaft speed alarm point for 3 meter shafts
- Ground speed pulses per 400 ft and pulses per revolution
- Pulses per revolution of fan and 3 meter shafts
- Low bin alarm for 3 bins
- The number of Blockage Modules that are connected to the monitor
- The width of the implement
- Imperial or metric units
- English or Russian language

The settings listed above, as well as field and accumulated areas are stored in nonvolatile memory. This means that the information is retained even when power is disconnected.

Two cables exit the rear of the monitor. There is a two wire power cable that connects to the tractor power supply. The other is a three wire cable that brings power and communications to the remote sensors through the main harness.

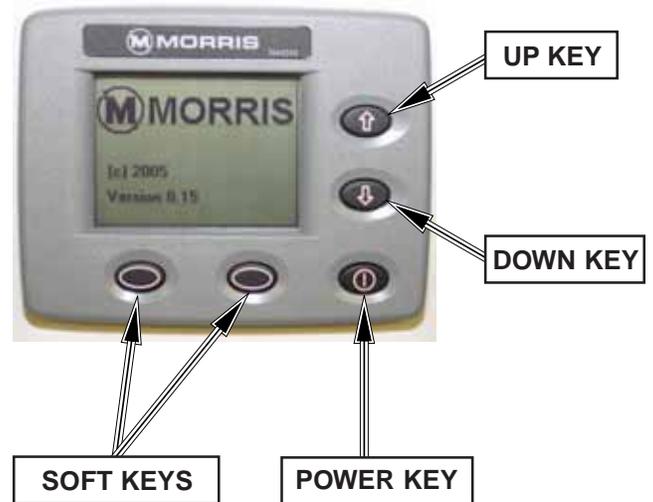


MONITOR - N44049

Identifying Monitor Switches

The five keys on the monitor face are used for controlling the monitor.

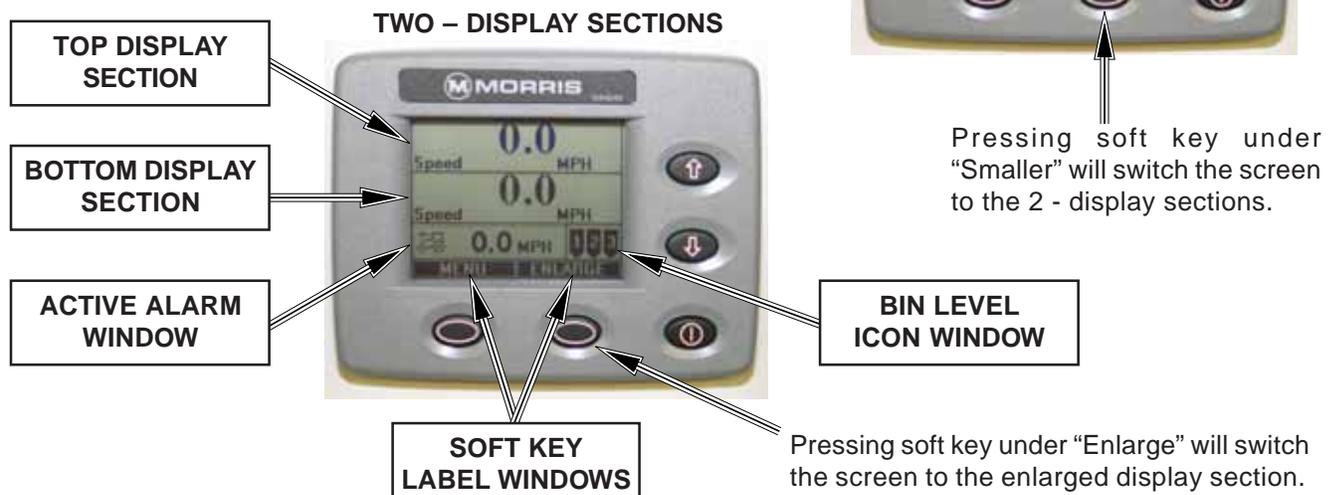
- Power Key** • Used to turn monitor on and off.
- Up Key** • Used for moving function selection icon. Also used to increment parameter when changing settings.
- Down Key** • Used for moving function selection. Also used for decrementing parameter when changing settings.
- Soft Keys** • Used to enter menus and selections. Also used for going to next parameter in program mode.



Identifying Monitor Displays

The Operating Screen is divided into the following areas:

- Two small display sections or one enlarged display section
- Active alarm window or, if there are no active alarms, the current ground speed is displayed
- Bin level icon window
- Soft key label windows



Introduction

Operating Screen

Display Section

The display has two Display Sections on the operating screen. These windows have their data periodically refreshed at ½ to 1- second intervals. Each window has the following information in it:

- Display object name (e.g. Shaft)
- Display object instance (e.g. 1), if applicable
- Display object data (e.g. 7)
- Display object units (e.g. RPM), if applicable

Active Alarm Window

All acknowledged alarms are displayed on the operating screen's "active alarm window" until the alarm condition is removed. If there is only one acknowledged alarm, it will flash on the display in order to draw the user's attention to the continued error. If there is more than one acknowledged alarm they will cycle on the display, with each alarm being displayed on the screen for 2 seconds.

Note: If there are no active alarms, the current ground speed is displayed

See "Alarms" for more details on when an alarm is first observed.

Bin Level Icon Window

The display has one window dedicated to graphically showing the status of product in up to 3 bins. When a bin is empty an alarm will be generated and the corresponding bin icon will flash.

Soft Key Label Windows

The display has two windows displaying the current function of the two available soft keys. The function of the soft keys change depending on the screen being viewed. On Operating Screen, MENU can be accessed with left soft key or bottom display ENLARGED.

Note: Monitor will show "communication errors" if the system installation (Sensor Learn Mode) was not completed. See Sensor Installation.



Operating Screen



Operating Screen with Alarm

Operating Screen - Continued

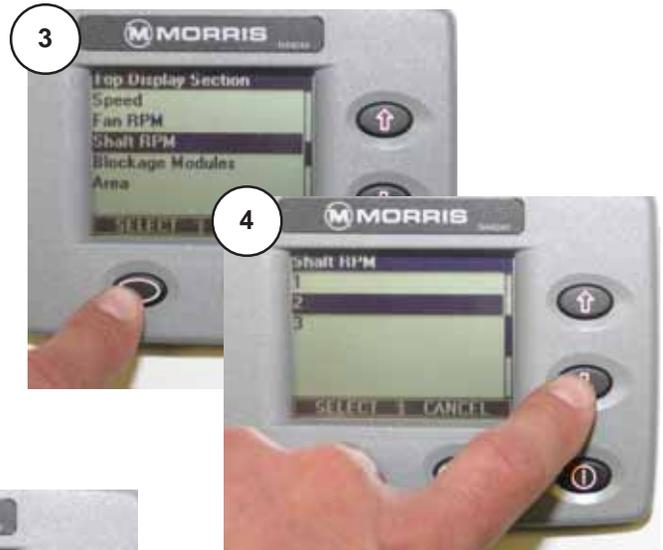
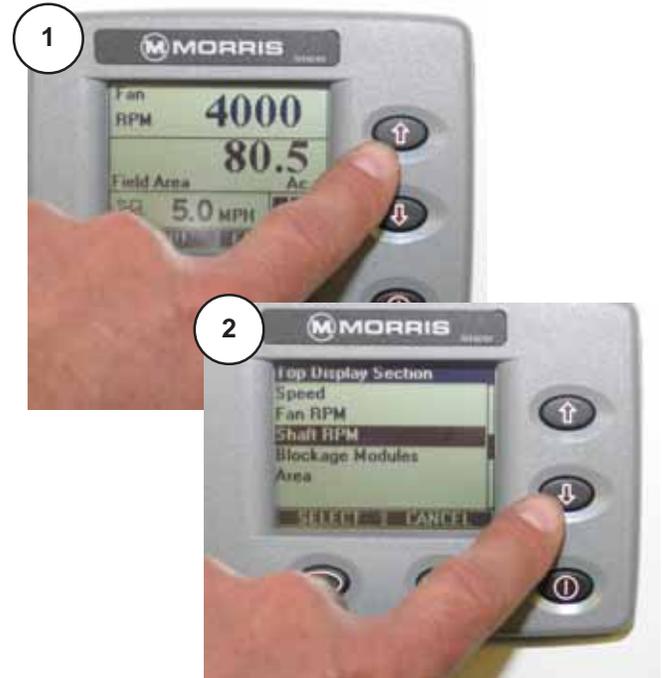
Navigating the Operating Screen

When the UP or DOWN key is pressed in the Operating Screen, this allows the user to select what is shown on the Top Display Section and the Bottom Display Section.

Example: Change the top display from Fan to Shaft 2

1. Press the UP key to enter the "Top Display Section".
2. Use the UP/DOWN keys to scroll to other display items. Press the DOWN key to highlight "Shaft RPM".
3. Press the SELECT key to enter "Shaft RPM", which will display the instances of Shaft RPM.
4. Use the UP/DOWN keys to change the selected shaft to 2.
5. Press the SELECT key to choose shaft 2. This will return the monitor to the main screen and the Top Display Section is no longer displaying Fan, but is now displaying Shaft 2 RPM.

Note: If the DOWN key were pressed in step 1 to enter into this mode, the title of the menu would be "Bottom Display Section" and the bottom display would be changed.



Introduction

Operating Screen - Continued

Enlarged Operating Screen

If the ENLARGE key is pressed, the Bottom Display Section will expand up into the Top Display Section and the text will increase in size.

When in the enlarged mode, the right most soft key will be re-labeled SMALLER. Press the key, to return to display of top and bottom sections.

In Enlarged mode, the UP and DOWN keys allow changing function displayed on screen.



Press soft key under ENLARGE to enlarge bottom section.



Pressing soft key under SMALLER will switch the screen back to the two - display sections.

Area Display

There are two area counters, field area and total area. They are both accumulated whenever the system “In Motion” condition is true. Area counts are stored in memory when the unit is turned off.

The area counts can be displayed on the “Operating Screen” as outlined in “Navigating the Operating Screen”. The FIELD AREA and the TOTAL AREA are displayed to the nearest tenth of an acre (or hectare).



Resetting Area

To clear FIELD AREA and/or TOTAL AREA follow the steps below.

- From the “Operating Screen” press the MENU key to enter the “Settings Menu”.
- Use the Up/Down keys to highlight “Implement Setup” press the SELECT key to enter the function.
- Use the Up/Down keys to highlight the desired function of “Clear Field Area” or “Clear Total Area” press the SELECT key to enter the function.
- The monitor will ask “Are you sure?” leave as “Yes”.
- Use the Up/Down keys to highlight “Enter Selection” press the SELECT key to clear area and return to the “Implement Setup” menu.
- Use the Up/Down keys to highlight “Exit and Save” press the SELECT key to save the changes and return to the “Settings Menu”.

Note: Field area will not be reset to zero when total area is reset.



Introduction

Notes

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Ground Drive

Installing Monitor

- Locate monitor and clutch switch in a convenient location in cab.
- Connect power cables directly to a 12V battery.
 - White or Red wires **positive**.
 - Black wires **negative**.
- Route cable harness to seeding tool and Air Cart. Ensure cables clear any pinch points (i.e. tractor articulation point, hitch point, etc.)
- Program monitor as described in *System Installation* and *Monitor Programming* Sections.

Note: Locate monitor, power and ground wires away from radio and antenna if tractor is so equipped.

Note: Do not connect monitor directly to starter switch.



Startup

Power On

Press the Power Key to turn the monitor on.

When the unit is turned on, the following display sequence takes place:

- MORRIS is briefly displayed along with the Version number of the monitor software. **This number should be included with any reports of faulty or unexpected system operation.**

This “Splash” screen is displayed for a short time – long enough to go through the system startup and wakeup all of the sensors (approximately 3 seconds).

- If any sensors are found, the monitor proceeds to the “Operating” screen
- If no sensors are found, the monitor proceeds to the “Installation” screen.

Power Off

Press and hold the Power Key for a couple of seconds until the monitor turns off.

Force Language

The user can press and hold the following keys when turning monitor on to force the display to a certain language:

Force English Language

- Press and hold the UP and DOWN keys. Push the power button. Release the UP and DOWN keys after the correct language is shown.

Force Russian Language

- Press and hold Soft key 1 and Soft key 2. Push the power button. Release the UP and DOWN keys after the correct language is shown.

Note: This language setting will not be retained when the monitor is turned off. To retain language setting, go to “Global Settings” and choose “Language” and select “Exit and Save” option.

Monitor ID
Version Number



Splash Screen



Operating Screen

Ground Drive

Startup - Continued

Startup Menu Screen

The startup menu screen provides the user with four different options:

- 1) **System Startup** – this will not install any sensors.
- 2) **Learn New System** – this is used to learn a new compliment of sensors, but not modify the menu parameters that have already been customized by the user.
- 3) **Default Settings** – this is used to restore all of the menu parameters to the factory configuration.
- 4) **Learn New System and Default Settings** – this performs the actions of number 2 and number 3 above.



System Startup Screen

Sensor Installation

The installation procedure is required to configure the monitor to the sensors attached to it.

The operator may have to redo the installation if:

- 1) An extra tank is added to the Air Cart.
- 2) Replacing or adding sensors.
- 3) Replacing monitor with a new monitor.

Installation Precautions

- 1) During installation the monitor has a predetermined order in which it wants the sensors attached. The installer must be sure that the proper sensor is plugged in the proper sequence.
 - i.e. If during installation the installer plugs in the Front Shaft and Ground Speed sensors in the wrong order, the monitor would not know this. The monitor would interpret Front Shaft rpm from the Ground Speed shaft and vice versa.
- 2) There may be occasions when the operator will not have use of all the sensors.
 - i) During sensor installation when the monitor prompts for an unused sensor to be plugged in, the operator can press the SELECT key to skip over the sensor. **The sensor will be assigned a disabled status.** A sensor disabled by this method can only be enabled by repeating the installation procedure.
 - ii) During operation the operator can disable shaft sensors by setting the pulses per revolution to zero. When pulses are set to zero alarms for that sensor and corresponding Bin Level sensor are ignored and no monitoring occurs.
- 3) Blockage modules attached to the harness are handled differently than the sensors attached to the harness. See Assembly Section "Blockage Module".

Pin Sensors - the blockage module **does not have to be removed from the harness** during initial system installation.

Optical Sensors - the blockage modules **have to be unplugged from the harness** before sensor installation can be performed and are connected like the other sensors requested by the monitor during sensor installation.

Note: Each monitor is unique to the sensors installed. If monitor is moved to another Air Cart it has to be reprogrammed to match the sensors.

Sensor Installation Order
Speed (Ground)
Fan
Shaft 1
Shaft 2
Shaft 3
Tank 1
Tank 2
Tank 3
VarCon (Variable Rate) (Unit calls for installation only if var controller is installed)
Optical Blockage Modules



Ground Drive

Sensor Installation - Continued

Installation Procedure

1. **Disconnect** all the sensors (3 pin connector) from the harness before turning monitor on.

Turn monitor on. With no sensors found, the monitor proceeds to the "Startup menu" screen.

Use the Up/Down keys to select "Learn New System". Press the soft key below SELECT to enter the "Install New System" mode.

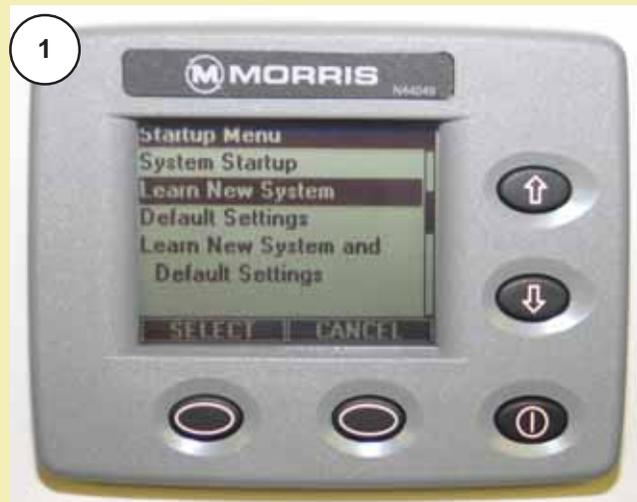
2. The monitor will ask if you want to proceed or exit.

With "Proceed" highlighted, press the SELECT key to enter the "Install New System" mode.

3. The display will indicate to install the speed sensor indicating that the ground speed sensor may now be connected. Connect the ground speed sensor.

The monitor will give a double beep when it acknowledges the sensor.

Continued on next page.



Sensor Installation - Continued

Installation Procedure - Continued

- The display will indicate to install the fan sensor indicating that the fan sensor may now be connected. Connect the fan sensor.

The process is the same for rest of the sensors in the sequence.

- When the monitor requests a sensor that **will not be used** in the configuration, use the Up/Down keys to select "Skip this Sensor" and press the soft key below SELECT and the monitor will skip the sensor and advance to the next one in the sequence.

Note: There are **12 Blockage Modules**. To skip past the blockage modules use the Up/Down keys to select "Skip this Type of Sensors" and press the SELECT key, the monitor will skip all of the blockage modules and advance to the next type of sensor in the sequence.

- When all sensors in the list have either been learned or skipped, the monitor will display "Installation Complete". Use the Up/Down keys to select "Exit" press the SELECT key to return to the main "Startup Menu".

To verify the installation, turn the monitor off, then turn it on again. The monitor will now proceed to the "Operating" screen.



OR



Ground Drive

Monitor Settings

Navigating Settings Screens

The settings screens contain all the configuration information required to tailor the monitoring capabilities to the installed system and user preferences. Only setting parameters that are relevant are displayed (i.e. if no Shaft 3 is installed, there will not be any Shaft 3 setting parameters made available).

Pressing the MENU key when in the “Operating Screen” enters this mode.

The menu system is made up of screens that have the following content:

- 1) A menu title
- 2) The body of the menu
- 3) The soft key descriptions - changed to “Select” and “Cancel”.

The Menu Title

The menu title is at the very top of the screen.

This indicates to the user what the rest of the screen is referring to. For example, if the user is in the “Speed Settings” menu, the field “Pulses Per Rev” refers to the ground speed sensor and if the user were in the “Seed Shaft Settings” menu, the field “Pulses Per Rev” would refer to the seed shaft speed sensor.

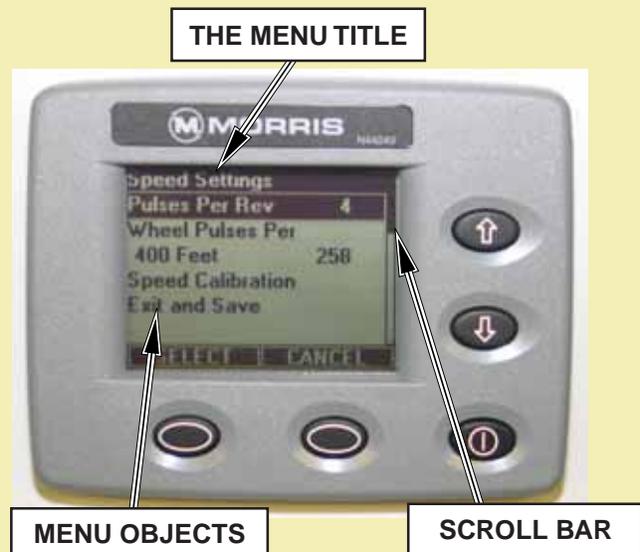
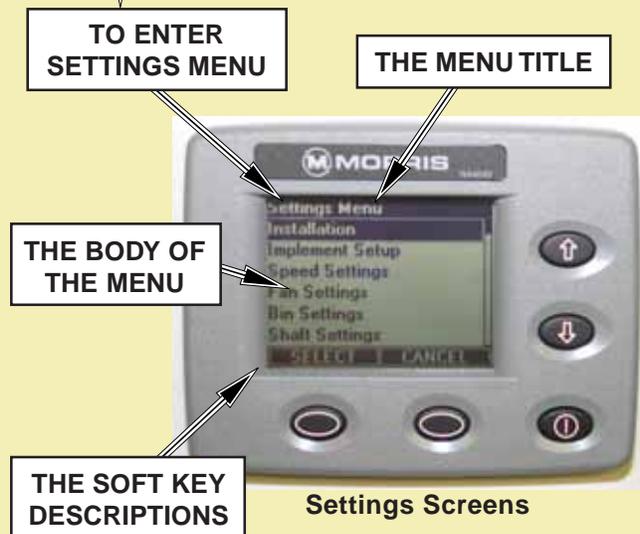
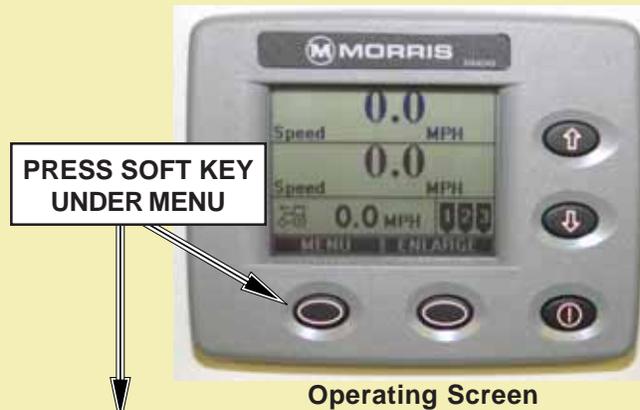
The menu title line is always highlighted so that it stands out from the rest of the screen.

The Body of the Menu

The main body of the menu is a list of objects. The objects in the menu system will take up 1 or more lines of space. The scroll bar on right hand side of screen indicates where the object is in the list and when the list has been wrapped.

When a menu is entered, the top object is always highlighted. The highlighting of the object indicates to the user the current object that they are on.

- If the Select key is pressed, the current object is selected.
- If the Up or Down arrow keys are pressed, the object above or below the current object is highlighted.
- If Cancel is pressed, the menu exits without saving anything and reverts back to the previous menu that was displayed.



Monitor Settings - Continued

Navigating Settings Screens - Continued

The Body of the Menu - Continued

When an object is selected, the value becomes highlighted.

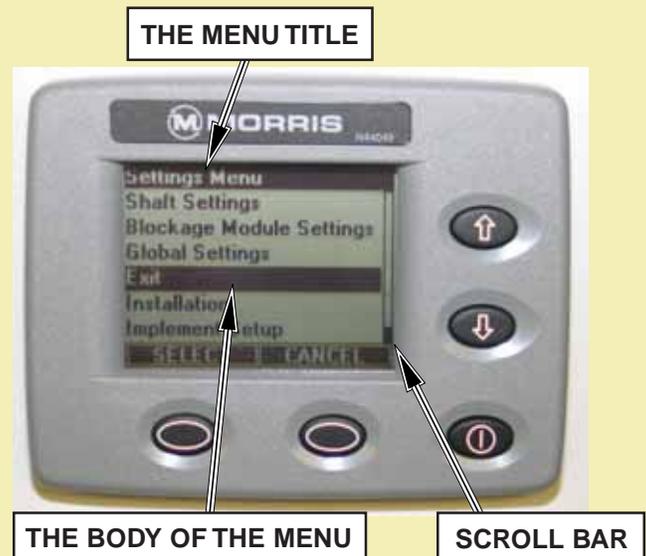
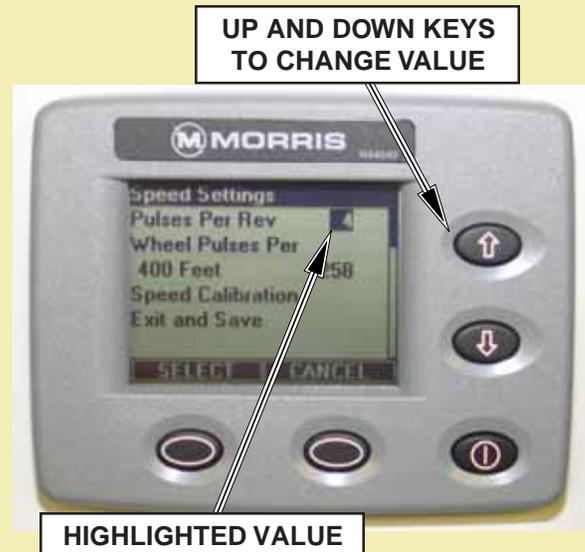
- Highlighted value can be changed with the Up and Down keys.
- Press “Select” key after changing value to enter value and return to object list.
- Select “Exit and Save” to keep any changes.

There are multiple ways to exit from the menu screens:

- 1) If the changes that were made on the menu screen need to be saved, the “Exit and Save” menu link must be selected.
- 2) If the changes are to be discarded or if the current operation is to be terminated (such as a calibration), the “Cancel” key can be pressed, or if it exits, the “Exit” link can be chosen.

The Menu Soft Key Descriptions

Like in the “Operating Screen”, the Menu also has two soft keys. These keys allow the user to select an item or object (the Select key) or to Cancel out of the current operation without saving anything (the Cancel key).



Note: The list shown has been wrapped. The scroll bar indicates that the highlighted item “Exit” is actually the last item in the list.

Important

The use of “Restore Default Settings” restores ALL of the menu parameters to the factory configuration.

(i.e. Implement width, Pulses Per Rev, Wheel Pulses Per 400 Feet, etc.)

Ground Drive

Monitor Settings - Continued

See charts on following pages for monitor settings.

Changing Monitor Settings

The following example explains the procedure for changing settings.

Entering the “Settings Menu”

Example: Change the implement width to 41.5 ft.

1. From the “Operating Screen” press the MENU key to enter the “Settings Menu”.

Use the Up/Down keys to select the desired function. Press the soft key below SELECT to enter the function “Implement Setup”.

2. Under each function there is a list of parameters that can be changed, see “Settings Menu” chart.

3. Use the Up/Down keys to select the parameter. “Implement Width”.

4. Press the SELECT key to highlight the value. Use the Up/Down keys to change the value to “41.5 Ft”.

5. Press the soft key below SELECT to enter the value and move to the next parameter in the list.

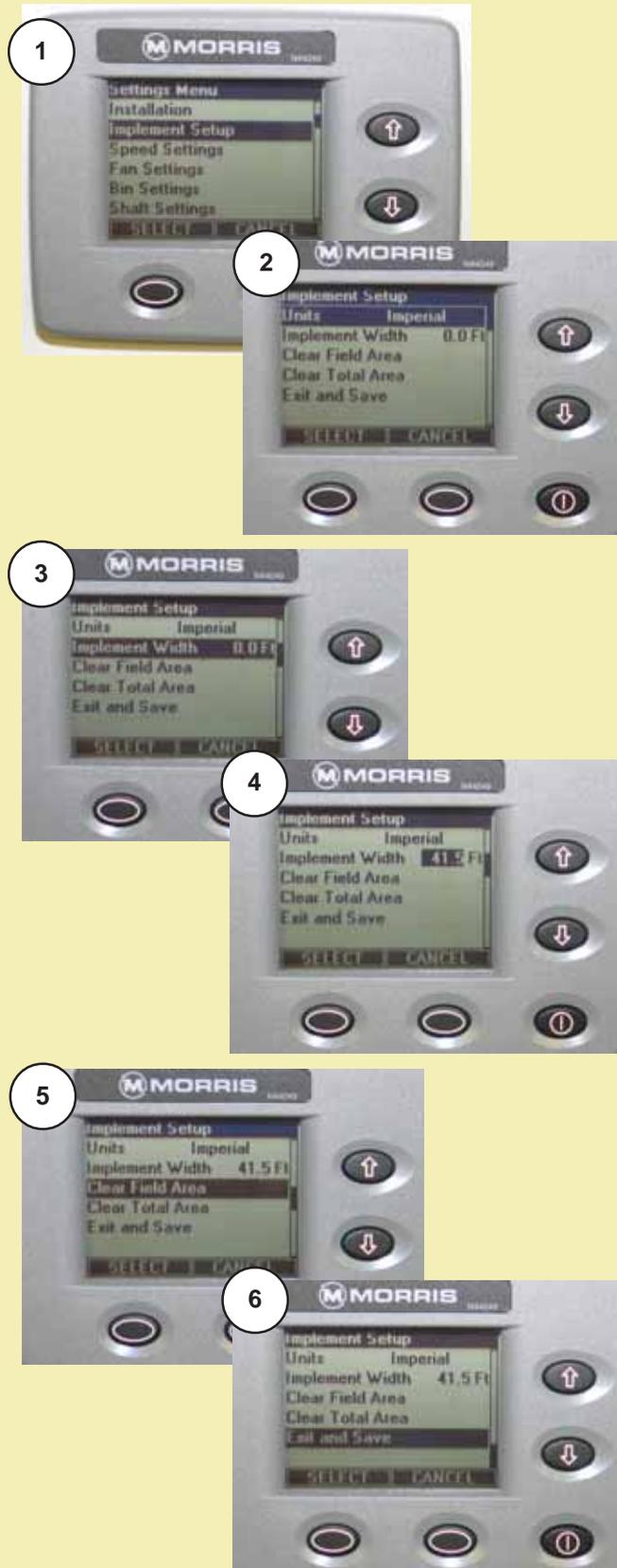
Set all parameters in the list as indicated in the above steps.

6. When all parameters in the list have been set, use the Up/Down keys to highlight “Exit and Save” press the SELECT key to save the changes and return to “Settings Menu”.

Proceed to set all function parameters as indicated in “Settings Menu” chart.

Saved settings are retained even after power has been removed from the monitor.

Note: When the operator is in any of the “Settings Menu” modes, the monitor will not generate normal monitor alarms (i.e. low fan speed, shaft speed and so on).



Settings Menu Chart - Standard Drive

Installation

Install New System _____	See "Sensor Installation"
Replace a Sensor _____	See "Sensor Replacement"
Add a Sensor _____	See "Sensor Replacement"
Remove a Sensor _____	See "Sensor Replacement"

Implement Setup

Units _____	Select Imperial or Metric
Implement Width _____	Set to width of seeding tool
Clear Field Area _____	See "Resetting Area"
Clear Total Area _____	See "Resetting Area"

Speed Settings

Pulses Per Rev _____	Set to 4
Wheel Pulses Per 400 Feet _____	See PP400 Chart
Speed Calibration _____	See "Pulse Counting Mode for PP 400"

Fan Settings

Pulses Per Rev _____	Set to 2
Low Alarm Point _____	Set to 3000 rpm
High Alarm Point _____	Set to 5000 rpm

Bin Settings

Tank 1 Alarm _____	Enabled (default)	Set to Disabled if tank is not in use.
Tank 2 Alarm _____	Enabled (default)	Set to Disabled if tank is not in use.
Tank 3 Alarm _____	Enabled (default)	Set to Disabled if tank is not in use.

Shaft Settings

Shaft 1 Settings _____	Pulses Per Rev	Set to 4
	Low Alarm Point	2.0 rpm - Can be adjusted to 0.5 rpm for low rates.
Shaft 2 Settings _____	Pulses Per Rev	Set to 4
	Low Alarm Point	2.0 rpm - Can be adjusted to 0.5 rpm for low rates.
Shaft 3 Settings _____	Pulses Per Rev	Set to 4
	Low Alarm Point	2.0 rpm - Can be adjusted to 0.5 rpm for low rates.

Blockage Module Settings

Runs per Module Setup _____	Set individual Module number of Runs
Individual Runs Setup _____	Allows Runs to be Enabled/Disabled
Blockage Module Test _____	See "Blockage Module Test"
Blockage Calibration _____	See "Blockage Calibration"

Global Settings

Language _____	Select English or Russian	
Volume/Pitch _____	50% (default)	Set as desired.
Backlight _____	50% (default)	Set as desired.
Contrast _____	100% (default)	Set as desired.
Restore Default Settings _____	Resets ALL Monitor Settings to defaults	

Note: Only setting parameters that are relevant are displayed (i.e. if no Shaft 3 is installed, there will not be any Shaft 3 setting parameters made available).

Important

Select "Exit and Save" in each Menu Setting to save changes.

Ground Drive

Monitor Settings - Continued

Wheel Pulses Per 400 Feet (PP400) Standard Drive

The chart contains average PP400 values, for the tire options offered by Morris.

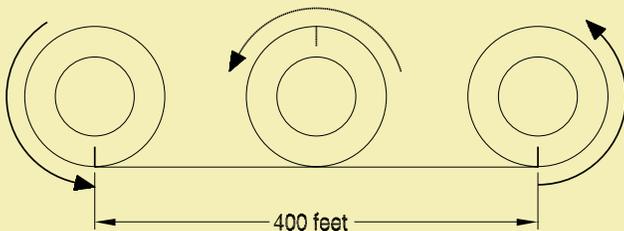
7000 Air Cart
7000 Air Cart
7000 Air Cart
7000 Air Cart

PP400 - Standard Drive			
Tire Size (Good-Year)	Tire Style	Rating	PP400
16.5L x 16.1	Softrac II	6 ply	516
	Sure Grip Traction	6 ply	498
21.5L x 16.1	Softrac II	6 ply	455
	Sure Grip Traction	8 ply	451
	Softrac II	10 ply	455
	Sure Grip Traction	12 ply	451
18.4L x 26	AWT (Implement)	10 ply	361
23.1L x 26	AWT (Implement)	8 ply	341
	TD8 Sure Grip	10 ply	310
	AWT (Implement)	12 ply	341

PP400 Math Calculation

To determine PP400 value, first determine the tire circumference as outlined in "Determining Tire Sprocket" under Operation Section.

Note: The PP400 can also be determined using the speed calibration feature.



Monitor PP400 Formula for Standard Drive

PP400 Imperial measurement = $56244/T_c$

T_c = Tire Circumference measured in inches

PP400 Metric Measurement = $1428.598/T_c$

T_c = Tire Circumference measured in meters.

Monitor Settings - Continued

Wheel Pulses Per 400 Feet (PP400) Standard Drive

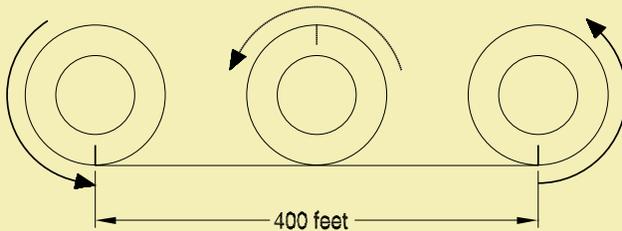
The chart contains average PP400 values, for the tire options offered by Morris.

PP400 - Standard Drive				
Tire Size (Good-Year)	Tire Style	Rating	Pressure	PP400
23.1 x 26	TD8 Lug	10 ply	28 psi	310
	AWT	12 ply	24 psi	341
30.5 x 32	AWT	12 ply	20 psi	382
			24 psi	380
	Lug	14 ply	20 psi	386
			22 psi	381
800/65 R32	Lug	LI 172	15 psi	382
			20 psi	381
900/60 R32	Lug	176 A8	17 psi	356
520/85 R38 Dual Wheels	Lug	155 A8	17 psi	377

PP400 Math Calculation

To determine PP400 value, first determine the tire circumference as outlined in "Determining Tire Sprocket" under Operation Section.

Note: The PP400 can also be determined using the speed calibration feature.



Calibration Formula - Imperial

Monitor PP400 Formula for Standard Drive

For 26" Rim = $56244/T_c$

For 32" Rim = $80640/T_c$

For 38" Rim = $80640/T_c$ **PP400 =** _____

T_c = Tire Circumference measured in inches

Calibration Formula - Metric

Monitor PP400 Setting:

For 26" Rim = $1428.5976/T_c$

For 32" Rim = $2048.256/T_c$

For 38" Rim = $2048.256/T_c$ **PP400 =** _____

T_c = Tire Circumference measured in meters

Ground Drive

Monitor Settings - Continued

Speed Calibration

If the operator does not know what the pulses per 400 feet should be, or, if more accuracy is desired for present levels of tire inflation or soil conditions, the monitor can be put into “Speed Calibration” mode, pulses will be counted while driving a specified distance.

To start the Pulse Counting Mode:

1. Measure and mark out 400 feet (121.92 m).

Select “Speed Settings” under the “Settings Menu”.

2. Then select “Speed Calibration”.

Use the Up/Down keys to select “Continue Calibration” at which point the monitor will request “Start Driving”.

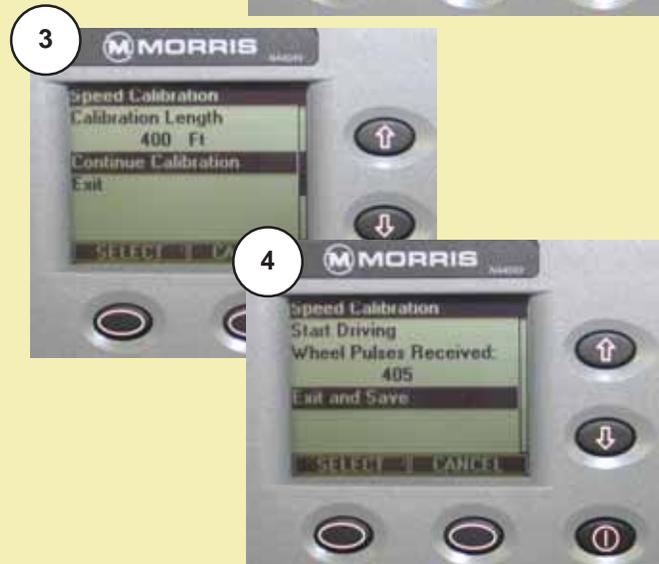
3. Drive the marked distance and the monitor will count the number of pulses.

4. When the distance has been travelled, stop, press the SELECT key to stop the pulse counting. This will “Exit and Save” the new pulse count under the “Speed Settings” menu.

5. The new value will now be displayed under “Wheel Pulses Per 400 Feet” (PP400).

6. Select “Exit and Save” to exit “Speed Settings” and return to the main menu.

Note: The monitor can accept PP400 values from 50 to 9999. Therefore, if the new count is less than 50, the existing count is not replaced. The monitor will state “Pulses Too Low” and display options to “Continue Driving” or “Cancel Calibration”.



Section 3: VRT Drive

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VRT Drive

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Identifying Variable Rate Console Switches

The variable rate console provides the means to:

- Turn on or off each/all metering shaft(s).
- Increase or decrease the application rate of any given shaft.

Master On/Off

Activates the shaft On/Off buttons. If any of the seed or fertilizer buttons are in an “On” state during a Master On, the variable rate controller will initiate any required motor rotation of the respective shaft at the currently selected application rate. Master Off will deactivate all the shaft On/Off buttons and stop all motor rotation. A LED indicates whether the button is on or off.

Shaft 1 On/Off

Used to turn shaft 1 on and off. A LED indicates the current state of the button.

Shaft 2 On/Off

Used to turn shaft 2 on and off. A LED indicates the current state of the button.

Shaft 3 On/Off

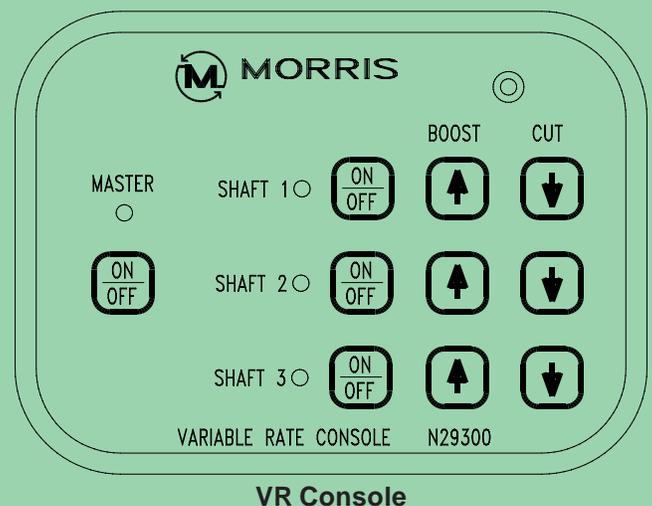
Used to turn shaft 3 on and off. A LED indicates the current state of the button.

Boost

Each push of the Boost button **increases** the application rate by **5%** of the **nominal rate** to a maximum of 50%. The respective LED will flash quickly indicating the application rate is higher than the nominal rate. To return the application rate to nominal, the respective shaft On/Off button is pressed once. The LED will stop flashing and will stay on.

Cut

Each push of the Cut button **decreases** the application rate by **5%** of the **nominal rate** to a minimum of 50%. The respective LED will flash slowly indicating the application rate is lower than the nominal rate. To return the application rate to nominal, the respective shaft On/Off button is pressed once. The LED will stop flashing and will stay on.



Note: The application rate can be increased or decreased up to 50%.

VRT Drive

Identifying Controller/Override Switches

The Controller/Override switches provide:

- Power to the variable rate control system.
- Manual override of the variable rate control system.

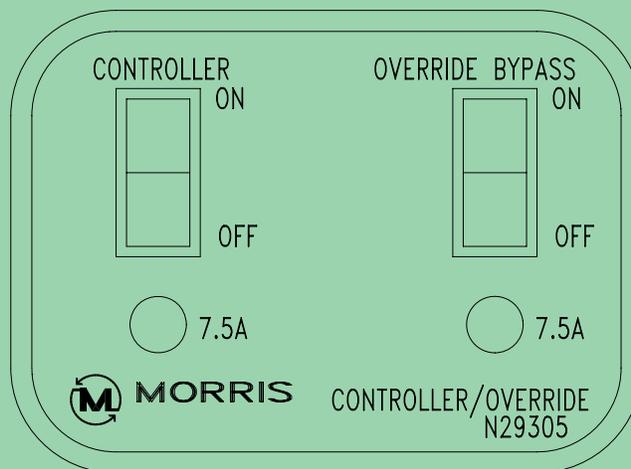
Controller On/Off

Activates the variable rate control system by supplying power to valve body.

Override Bypass

Used if a fault occurs in the electrical wiring of connections to the variable rate control system. The manual override system provides the ability to run the hydraulic motors at a fixed rate (not proportional to ground speed) and to turn the manual system on and off from the tractor cab. **This switch is normally left in OFF position.**

Note: The Controller Switch must be turned on before the monitor.



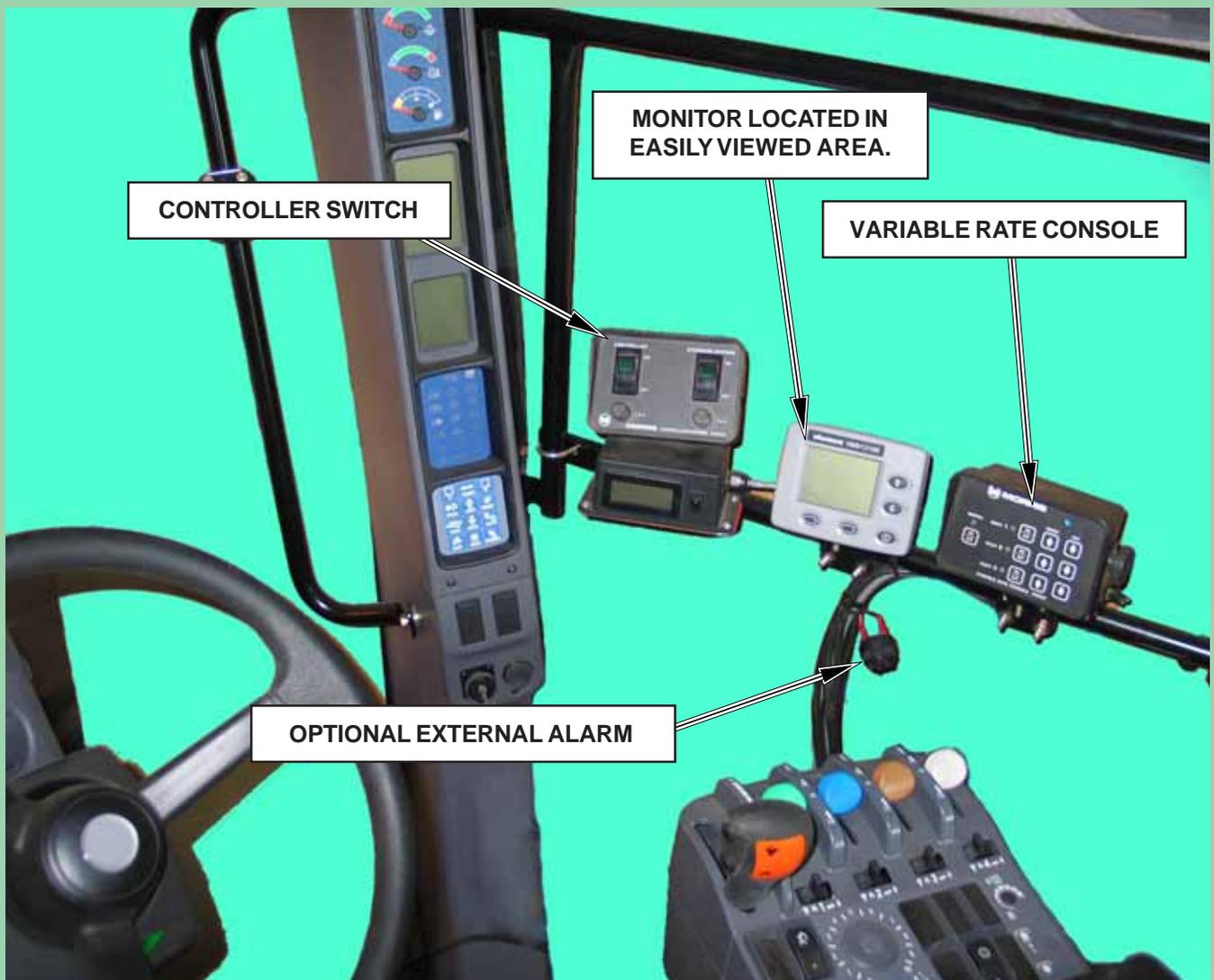
Controller Switch

Installing Monitor

- Locate monitor, variable rate console and controller/override switch in a convenient location in cab.
- Connect power cables directly to a 12V battery.
 - White or Red wires **positive**.
 - Black wires **negative**.
- Route cable harness to seeding tool and Air Cart. Ensure cables clear any pinch points (i.e. tractor articulation point, hitch point, etc.)
- Program monitor as described in *System Installation* and *Monitor Programming* Sections.

Note: Locate monitor, power and ground wires away from radio and antenna if tractor is so equipped.

Note: Do not connect monitor directly to starter switch.



VRT Drive

Startup

Turn power on in the following sequence:

1. **Controller Switch**
2. **Monitor**
3. **VRT Console** (To run metering system)

The VRT Hydraulic Motors will turn 1/2 revolution to check zero position when the tractor hydraulics are engaged to run the air cart System.

Power On

Press the Power Key to turn the monitor on.

When the unit is turned on, the following display sequence takes place:

- MORRIS is briefly displayed along with the Version number of the monitor software. **This number should be included with any reports of faulty or unexpected system operation.**

This “Splash” screen is displayed for a short time – long enough to go through the system startup and wakeup all of the sensors (approximately 3 seconds).

- If any sensors are found, the monitor proceeds to the “Operating” screen
- If no sensors are found, the monitor proceeds to the “Installation” screen.

Power Off

Press and hold the Power Key for a couple of seconds until the monitor turns off.

Force Language

The user can press and hold the following keys when turning monitor on to force the display to a certain language:

Force English Language

- Press and hold the UP and DOWN keys. Push the power button. Release the UP and DOWN keys after the correct language is shown.

Force Russian Language

- Press and hold Soft key 1 and Soft key 2. Push the power button. Release the UP and DOWN keys after the correct language is shown.

Monitor ID
Version Number



Splash Screen



Operating Screen

Note: This forced language setting will not be retained when the monitor is turned off. To retain language setting, go to “Global Settings” and choose “Language” and select “Exit and Save” option.

Startup - Continued

Startup Menu Screen

The startup menu screen provides the user with four different options:

- 1) **System Startup** – this will not install any sensors.
- 2) **Learn New System** – this is used to learn a new compliment of sensors, but not modify the menu parameters that have already been customized by the user.
- 3) **Default Settings** – this is used to restore all of the menu parameters to the factory configuration.
- 4) **Learn New System and Default Settings** – this performs the actions of number 2 and number 3 above.



System Startup Screen

VRT Drive

Sensor Installation

The installation procedure is required to configure the monitor to the sensors attached to it.

The operator may have to redo the installation if:

- 1) An extra tank is added to the Air Cart.
- 2) Replacing or adding sensors.
- 3) Replacing monitor with a new monitor.

Installation Precautions

- 1) During installation the monitor has a predetermined order in which it wants the sensors attached. The installer must be sure that the proper sensor is plugged in the proper sequence.
 - i.e. If during installation the installer plugs in the Front Shaft and Ground Speed sensors in the wrong order, the monitor would not know this. The monitor would interpret Front Shaft rpm from the Ground Speed shaft and vice versa.
- 2) There may be occasions when the operator will not have use of all the sensors.
 - i) During sensor installation when the monitor prompts for an unused sensor to be plugged in, the operator can press the SELECT key to skip over the sensor. **The sensor will be assigned a disabled status.** A sensor disabled by this method can only be enabled by repeating the installation procedure.
 - ii) During operation the operator can disable shaft sensors by setting the pulses per revolution to zero. When pulses are set to zero alarms for that sensor and corresponding Bin Level sensor are ignored and no monitoring occurs.
- 3) Blockage modules attached to the harness are handled differently than the sensors attached to the harness. See Assembly Section “Blockage Module”.

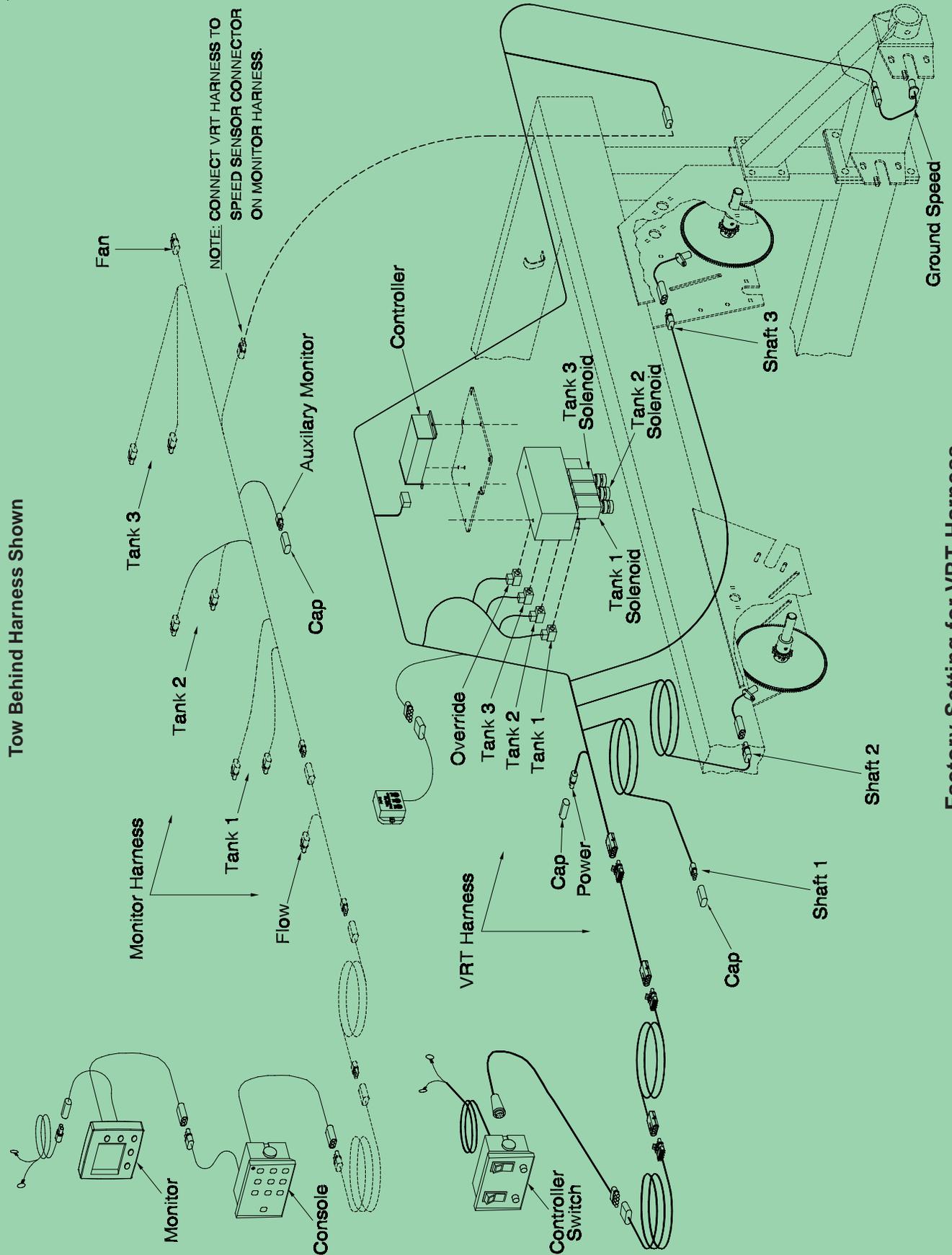
Pin Sensors - the blockage module **does not have to be removed from the harness** during initial system installation.

Optical Sensors - the blockage modules **have to be unplugged from the harness** before sensor installation can be performed and are connected like the other sensors requested by the monitor during sensor installation.

Note: Each monitor is unique to the sensors installed. If monitor is moved to another Air Cart it has to be reprogrammed to match the sensors.

Sensor Installation Order
Speed (Ground)
Fan
Shaft 1
Shaft 2
Shaft 3
Tank 1
Tank 2
Tank 3
VarCon (Variable Rate) (Unit calls for installation only if var controller is installed)
Optical Blockage Modules





Tow Behind Harness Shown

Factory Setting for VRT Harness

VRT Drive

Sensor Installation - Continued

Installation Procedure

1. **Disconnect** all the sensors (3 pin connector) from the harness on the air cart (**Black Coloured Connectors**).

Note: Do not disconnect the VRT sensors (Blue Colored Connectors).

Disconnect the Variable Rate Console (3 pin connector) from the harness.

Connect the harness (3 pin connector) into the monitor.

2. Turn on the controller switch.

Turn monitor on. With no sensors found, the monitor proceeds to the "Startup menu" screen.

Use the Up/Down keys to select "Learn New System". Press the soft key below SELECT to enter the "Install New System" mode.

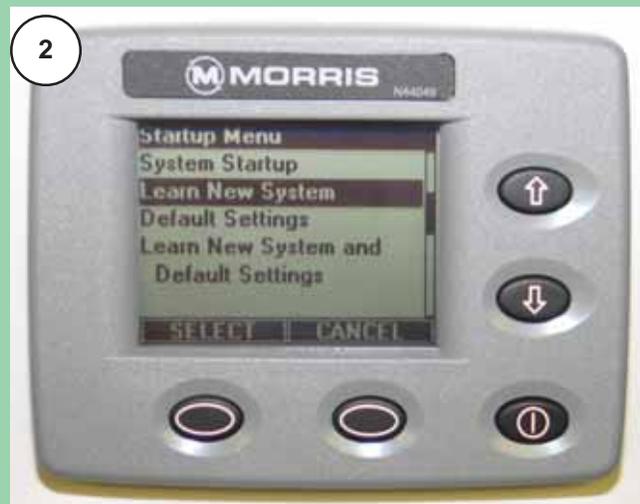
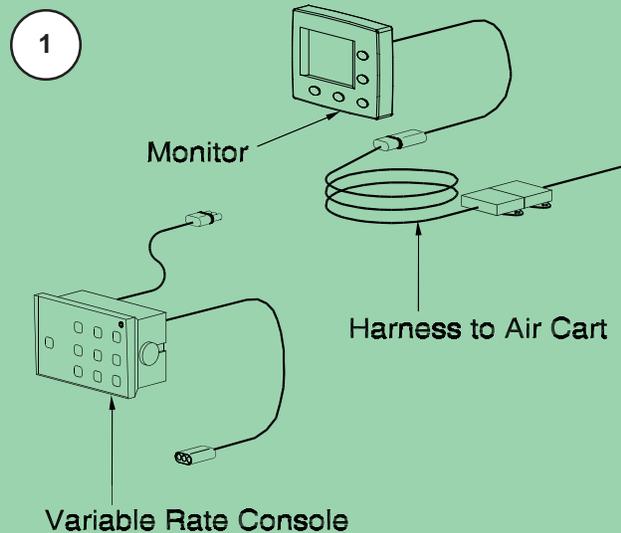
3. The monitor will ask if you want to proceed or exit.

With "Proceed" highlighted, press the SELECT key to enter the "Install New System" mode.

4. The display will indicate to install the speed sensor indicating that the ground speed sensor may now be connected. Connect the ground speed sensor.

The monitor will give a double beep when it acknowledges the sensor.

Continued on next page.



Sensor Installation - Continued

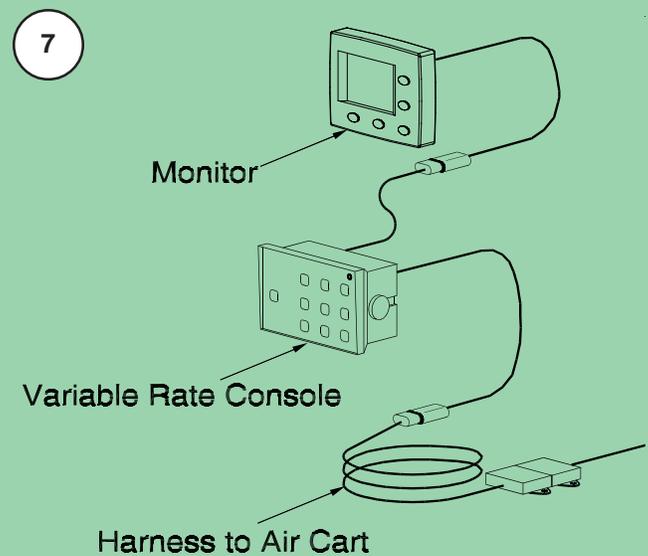
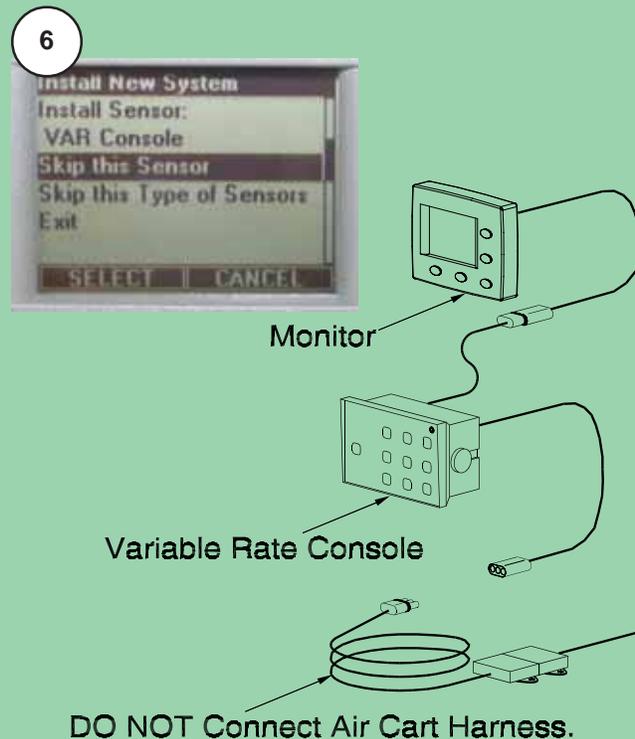
Installation Procedure - Continued

5. The display will indicate to install the fan sensor indicating that the fan sensor may now be connected. Connect the fan sensor.

The process is the same for rest of the sensors in the sequence.

6. When the monitor displays **VAR Console**, disconnect the harness from the monitor and connect the Variable Rate Console into the monitor **only**.
7. Once monitor acknowledges the Console, the air cart harness can be plugged into the Variable Rate Console.

Continued on next page.



VRT Drive

Sensor Installation - Continued

Installation Procedure - Continued

- When the monitor requests a sensor that **will not be used** in the configuration, use the Up/Down keys to select "Skip this Sensor" and press the soft key below SELECT and the monitor will skip the sensor and advance to the next one in the sequence.

Note: There are **12 Blockage Modules**. To skip past the blockage modules use the Up/Down keys to select "Skip this Type of Sensors" and press the SELECT key, the monitor will skip all of the blockage modules and advance to the next type of sensor in the sequence.

- When all sensors in the list have either been learned or skipped, the monitor will display "Installation Complete". Use the Up/Down keys to select "Exit" press the SELECT key to return to the main "Startup Menu".

To verify the installation, turn the monitor off, then turn it on again. The monitor will now proceed to the "Operating" screen.



OR



Monitor Settings

Navigating Settings Screens

The settings screens contain all the configuration information required to tailor the monitoring capabilities to the installed system and user preferences. Only setting parameters that are relevant are displayed (i.e. if no Shaft 3 is installed, there will not be any Shaft 3 setting parameters made available).

Pressing the MENU key when in the “Operating Screen” enters this mode.

The menu system is made up of screens that have the following content:

- 1) A menu title
- 2) The body of the menu
- 3) The soft key descriptions - changed to “Select” and “Cancel”.

The Menu Title

The menu title is at the very top of the screen.

This indicates to the user what the rest of the screen is referring to. For example, if the user is in the “Speed Settings” menu, the field “Pulses Per Rev” refers to the ground speed sensor and if the user were in the “Seed Shaft Settings” menu, the field “Pulses Per Rev” would refer to the seed shaft speed sensor.

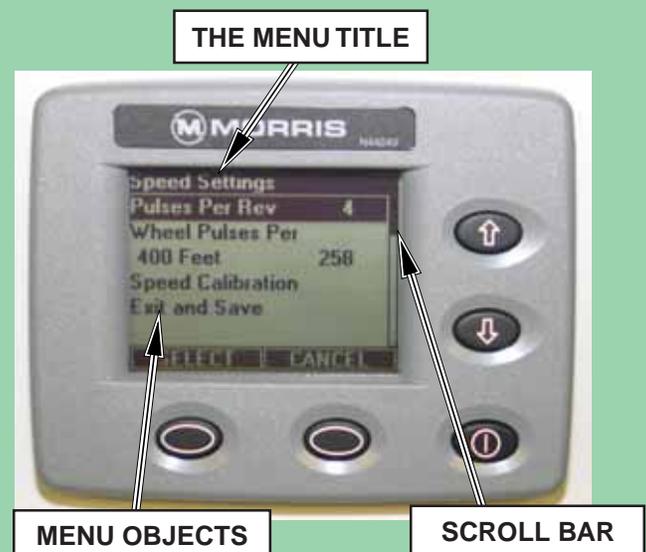
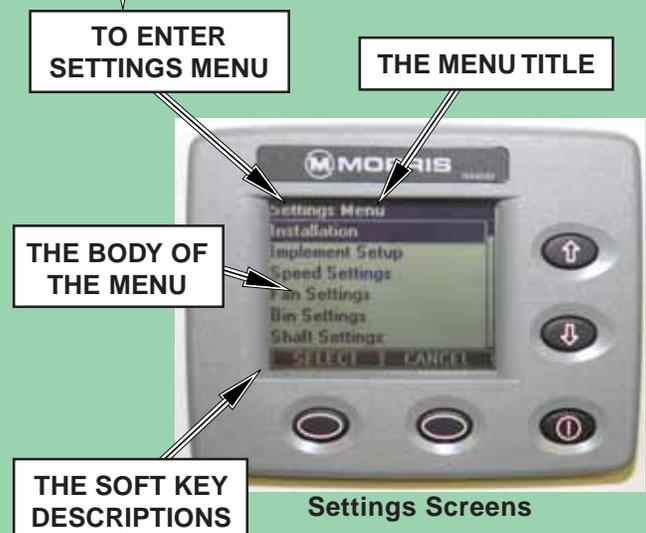
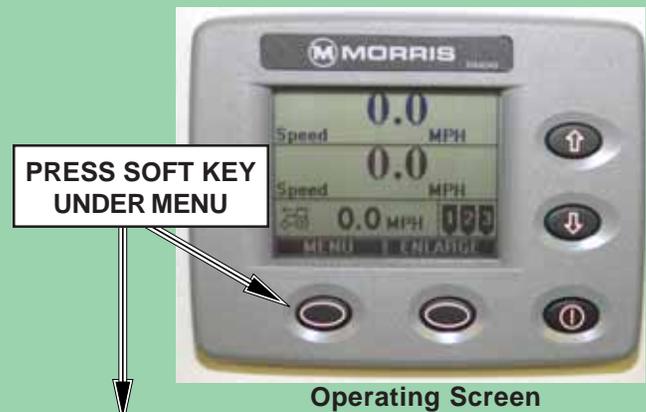
The menu title line is always highlighted so that it stands out from the rest of the screen.

The Body of the Menu

The main body of the menu is a list of objects. The objects in the menu system will take up 1 or more lines of space. The scroll bar on right hand side of screen indicates where the object is in the list and when the list has been wrapped.

When a menu is entered, the top object is always highlighted. The highlighting of the object indicates to the user the current object that they are on.

- If the Select key is pressed, the current object is selected.
- If the Up or Down arrow keys are pressed, the object above or below the current object is highlighted.
- If Cancel is pressed, the menu exits without saving anything and reverts back to the previous menu that was displayed.



VRT Drive

Monitor Settings - Continued

Navigating Settings Screens - Continued

The Body of the Menu - Continued

When an object is selected, the value becomes highlighted.

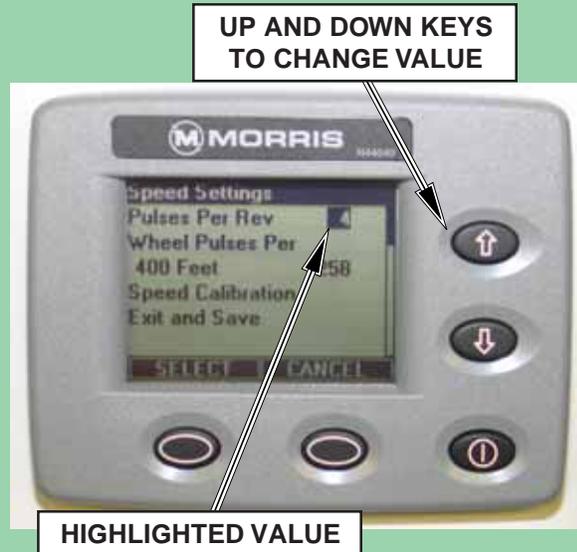
- Highlighted value can be changed with the Up and Down keys.
- Press “Select” key after changing value to enter value and return to object list.
- Select “Exit and Save” to keep any changes.

There are multiple ways to exit from the menu screens:

- 1) If the changes that were made on the menu screen need to be saved, the “Exit and Save” menu link must be selected.
- 2) If the changes are to be discarded or if the current operation is to be terminated (such as a calibration), the “Cancel” key can be pressed, or if it exits, the “Exit” link can be chosen.

The Menu Soft Key Descriptions

Like in the “Operating Screen”, the Menu also has two soft keys. These keys allow the user to select an item or object (the Select key) or to Cancel out of the current operation without saving anything (the Cancel key).



Note: The list shown has been wrapped. The scroll bar indicates that the highlighted item “Exit” is actually the last item in the list.

Monitor Settings - Continued

See charts on following pages for monitor settings.

Changing Monitor Settings

The following example explains the procedure for changing settings.

Entering the “Settings Menu”

Example: Change the implement width to 41.5 ft.

1. From the “Operating Screen” press the MENU key to enter the “Settings Menu”.

Use the Up/Down keys to select the desired function. Press the soft key below SELECT to enter the function “Implement Setup”.

2. Under each function there is a list of parameters that can be changed, see “Settings Menu” chart.

3. Use the Up/Down keys to select the parameter. “Implement Width”.

4. Press the SELECT key to highlight the value. Use the Up/Down keys to change the value to “41.5 Ft”.

5. Press the soft key below SELECT to enter the value and move to the next parameter in the list.

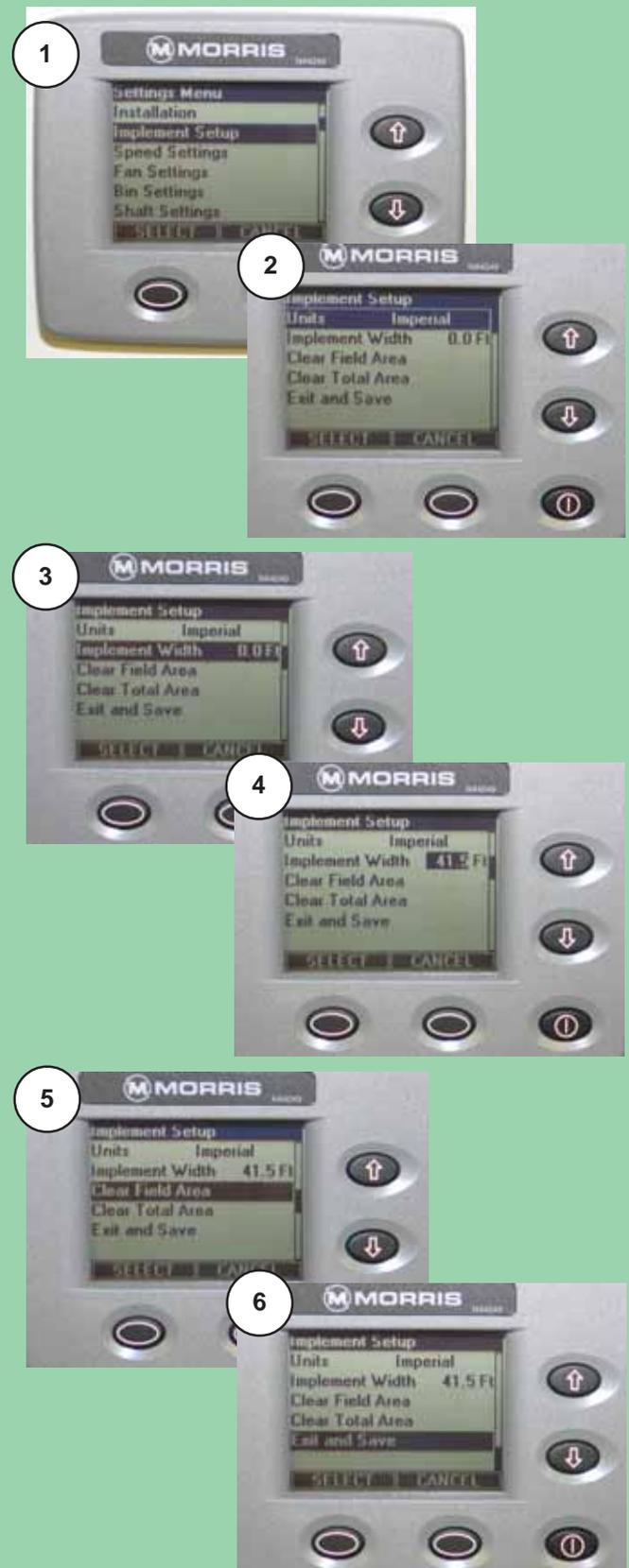
Set all parameters in the list as indicated in the above steps.

6. When all parameters in the list have been set, use the Up/Down keys to highlight “Exit and Save” press the SELECT key to save the changes and return to “Settings Menu”.

Proceed to set all function parameters as indicated in “Settings Menu” chart.

Saved settings are retained even after power has been removed from the monitor.

Note: When the operator is in any of the “Settings Menu” modes, the monitor will not generate normal monitor alarms (i.e. low fan speed, shaft speed and so on).



VRT Drive

Settings Menu Chart - VRT Drive

Installation

Install New System _____	See “Sensor Installation”
Replace a Sensor _____	See “Sensor Replacement”
Add a Sensor _____	See “Sensor Replacement”
Remove a Sensor _____	See “Sensor Replacement”

Implement Setup

Units _____	Select Imperial or Metric
Implement Width _____	Set to width of seeding tool
Clear Field Area _____	See “Resetting Area”
Clear Total Area _____	See “Resetting Area”

Speed Settings

Wheel Pulses Per 400 Feet ____	See PP400 Chart
Speed Calibration _____	See “Pulse Counting Mode for PP 400”

Fan Settings

Pulses Per Rev _____	Set to 2
Low Alarm Point _____	Set to 3000 rpm
High Alarm Point _____	Set to 5000 rpm

Bin Settings

Tank 1 Alarm _____	Enabled (default)	Set to Disabled if tank is not in use.
Tank 2 Alarm _____	Enabled (default)	Set to Disabled if tank is not in use.
Tank 3 Alarm _____	Enabled (default)	Set to Disabled if tank is not in use.

Shaft Settings

Shaft 1 Settings _____	App Rate	Set product application rate.
Shaft 2 Settings _____	Weight/Rev	Set the weight of product per revolution of shaft.
Shaft 3 Settings _____	Pulses Per Rev	Set to 4
	Low Alarm Point	2.0 rpm - Can be adjusted to 0.5 rpm for low rates.
	Shaft Calibration	See “Rate Calibration” in Operation Section.

Blockage Module Settings

Runs per Module Setup _____	Set individual Module number of Runs
Individual Runs Setup _____	Allows Runs to be Enabled/Disabled
Blockage Module Test _____	See “Blockage Module Test”
Blockage Calibration _____	See “Blockage Calibration”

Global Settings

Language _____	Select English or Russian	
Volume/Pitch _____	50% (default)	Set as desired.
Backlight _____	50% (default)	Set as desired.
Contrast _____	100% (default)	Set as desired.
Restore Default Settings _____	Resets ALL Monitor Settings to defaults	

Note: Only setting parameters that are relevant are displayed (i.e. if no Shaft 3 is installed, there will not be any Shaft 3 setting parameters made available).

Important

Select “Exit and Save” in each Menu Setting to save changes.

Monitor Settings - Continued

Wheel Pulses Per 400 Feet (PP400) VRT Drive

The chart contains average PP400 values, for the tire options offered by Morris.

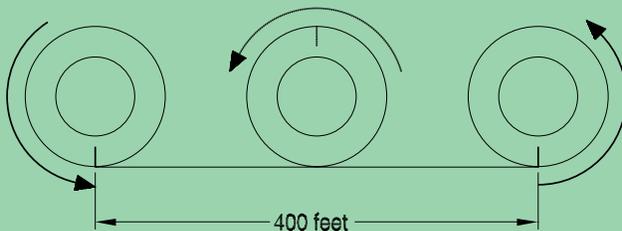
7000 Air Cart
7000 Air Cart

PP400 - VRT			
Tire Size (Good-Year)	Tire Style	Rating	PP400
16.5L x 16.1	Softrac II	6 ply	2,905
	Sure Grip Traction	6 ply	2,802
21.5L x 16.1	Softrac II	6 ply	2,560
	Sure Grip Traction	8 ply	2,539
	Softrac II	10 ply	2,560
	Sure Grip Traction	12 ply	2,539
18.4L x 26	AWT (Implement)	10 ply	2,033
23.1L x 26	AWT (Implement)	8 ply	1,919
	TD8 Sure Grip	10 ply	1,746
	AWT (Implement)	12 ply	1,919

PP400 Math Calculation

To determine PP400 value, first determine the tire circumference as outlined in "Determining Tire Sprocket" under Operation Section.

Note: The PP400 can also be determined using the speed calibration feature.



$$\text{New VRT - PP400 Value} = \left(\frac{109"}{\text{New Tire Circumference}} \right) \times 2,905$$

VRT Drive

Monitor Settings - Continued

Wheel Pulses Per 400 Feet (PP400) VRT Drive

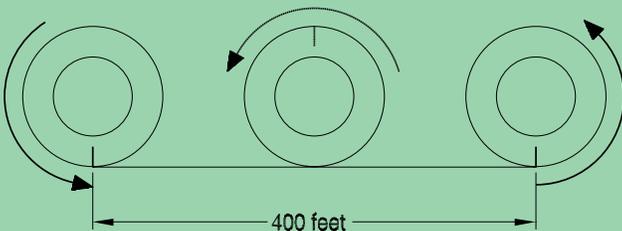
The chart contains average PP400 values, for the tire options offered by Morris.

PP400 - VRT				
Tire Size (Good-Year)	Tire Style	Rating	Pressure	PP400
23.1 x 26	TD8 Lug	10 ply	28 psi	1,164
	AWT	12 ply	24 psi	1,279
30.5 x 32	AWT	12 ply	20 psi	1,433
			24 psi	1,426
	Lug	14 ply	20 psi	1,447
			22 psi	1,428
800/65 R32	Lug	LI 172	15 psi	1,434
			20 psi	1,430
900/60 R32	Lug	176 A8	17 psi	1,337
			26 psi	1,317
520/85 R38 Dual Wheels	Lug	155 A8	17 psi	1,414

PP400 Math Calculation

To determine PP400 value, first determine the tire circumference as outlined in "Determining Tire Sprocket" under Operation Section.

Note: The PP400 can also be determined using the speed calibration feature.



$$\text{Formula for 26 inch rim} \dots \text{New VRT - PP400 Value} = \left(\frac{109}{\text{New Tire Circumference}} \right) \times 1,937$$

$$\text{Formula for 32 inch rim} \dots \text{New VRT - PP400 Value} = \left(\frac{302,400}{\text{New Tire Circumference}} \right)$$

Monitor Settings - Continued

Speed Calibration

If the operator does not know what the pulses per 400 feet should be, or, if more accuracy is desired for present levels of tire inflation or soil conditions, the monitor can be put into “Speed Calibration” mode, pulses will be counted while driving a specified distance.

To start the Pulse Counting Mode:

1. Measure and mark out 400 feet (121.92 m).
 Select “Speed Settings” under the “Settings Menu”.
2. Then select “Speed Calibration”.
 Use the Up/Down keys to select “Continue Calibration” at which point the monitor will request “Start Driving”.
3. Drive the marked distance and the monitor will count the number of pulses.
4. When the distance has been travelled, stop, press the SELECT key to stop the pulse counting. This will “Exit and Save” the new pulse count under the “Speed Settings” menu.
5. The new value will now be displayed under “Wheel Pulses Per 400 Feet” (PP400).
6. Select “Exit and Save” to exit “Speed Settings” and return to the main menu.

Note: The monitor can accept PP400 values from 50 to 9999. Therefore, if the new count is less than 50, the existing count is not replaced. The monitor will state “Pulses Too Low” and display options to “Continue Driving” or “Cancel Calibration”.



VRT Drive

Preparing VRT

Zero Shaft Hydraulic Motor Solenoids

Upon initial setup the preload of the solenoid valves must be set to match the tractor hydraulics.

Note: Tanks must be empty during this process.

Zero the shaft of the hydraulic motors by using the following procedure:

- Ensure there is no product in any tanks.
- Warm up hydraulic system by running fan system for 5-10 minutes. Hydraulic hoses at fan motor should be warm to touch.
- **Turn OFF** Monitor, VRT Console and Controller.
- Start with **all** adjusting screws **turned out fully**.
- Adjust each valve individually by following the procedure below:
 - Start with rear tank first adjusting screw '3' for three valve bank or screw '4' for four valve bank.
 - Remove cap nut and then loosen jam nut.
 - Turn adjusting screw IN until motor starts to turn.
 - Allow motor to turn for 1-2 minutes to allow for motor to reach optimal operating temperature.
 - Then turn adjusting screw OUT until motor stops turning.
 - Tighten jam nut to secure adjusting screw in place. Replace cap nut.
- Repeat the above procedure for the other valves.

Note: It is recommended to check the zero of the valves at the start of each season or if a different tractor is used on the system.

Note: If air cart is *NOT* equipped with a Third Tank or Granular Tank solenoid '1' must be unplugged and the adjusting knob turned out fully.



Remove Cap Nut and Loosen Jam Nut



Adjusting Screw

Preparing VRT - Continued

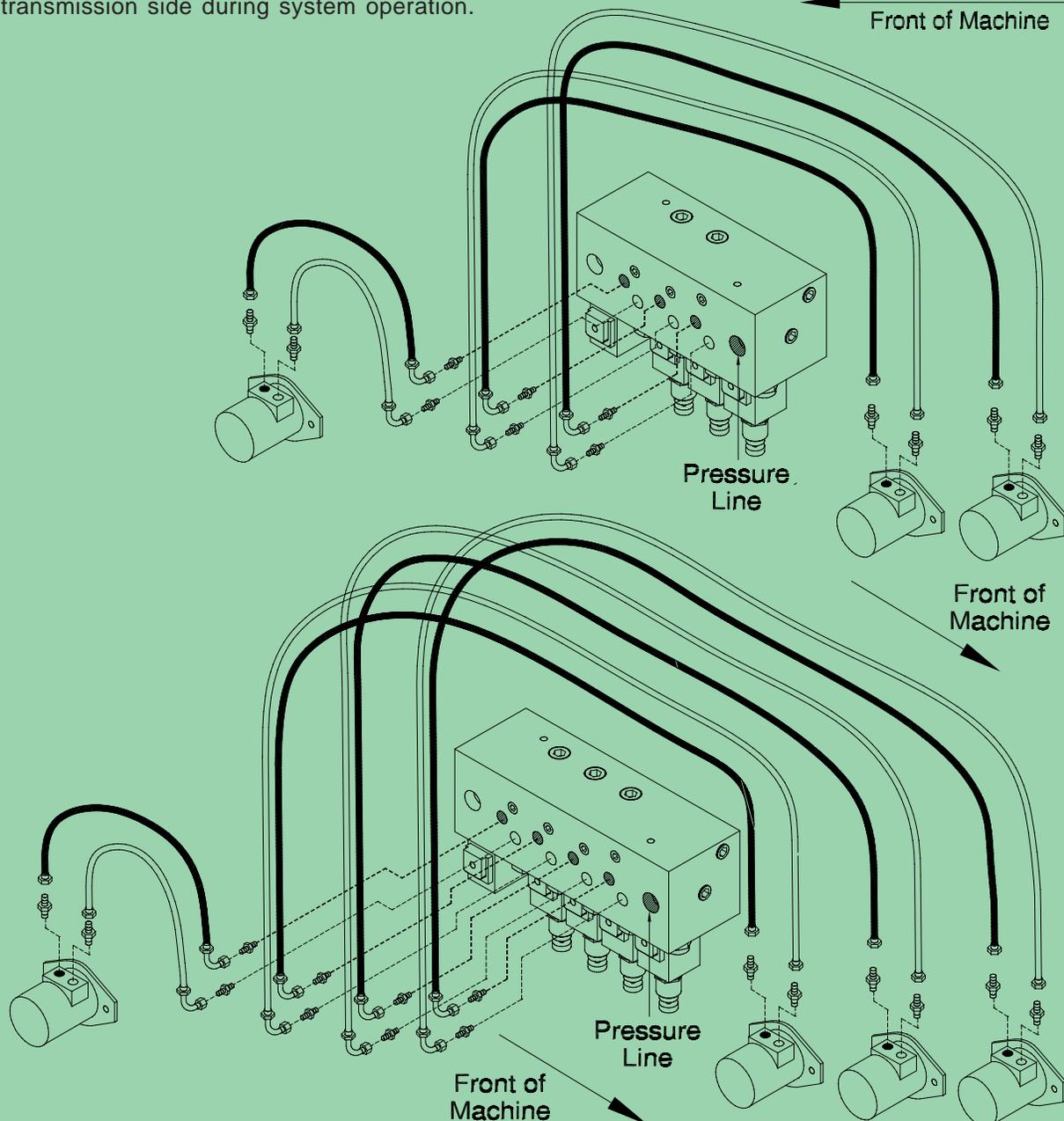
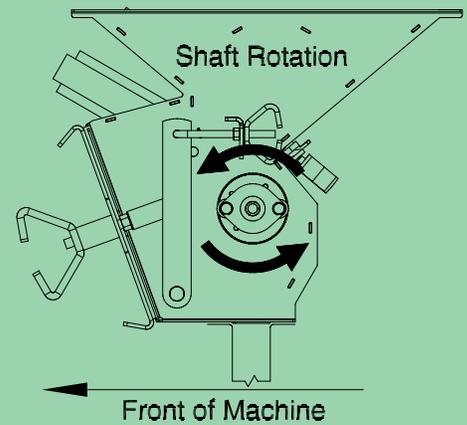
Verify VRT Hydraulic Assembly

VRT system should be run to confirm correct rotation of meter shafts.

The diagram below illustrates the correct hose orientations for the VRT valve body.

Note: The pressure line from the tractor is the front port of the valve body.

To ensure correct hose installation, the meter shafts will turn counterclockwise when viewed from transmission side during system operation.



VRT Drive

Rate Calibration

The practice of doing a rate calibration is strongly recommended as it will confirm the **actual** amounts of product per motor revolution (**WT/REV**).

The VRT system requires the **WT/REV** in order to determine the shaft motor rpm to deliver the correct application rate.

The following procedure should be followed for every change of product.

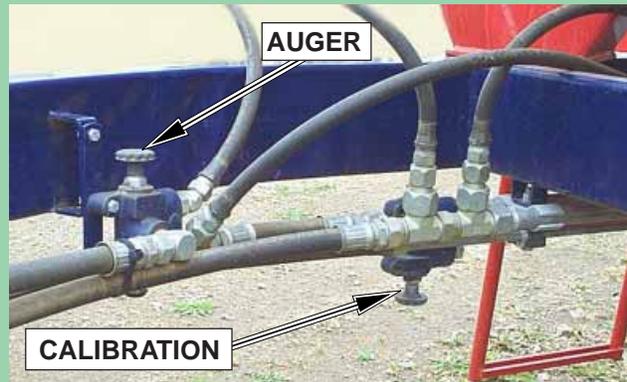
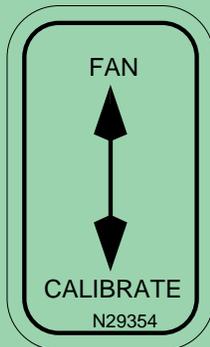
- Engage hydraulic lever to run Air Cart.
- **Turn off fan** by switching selector valve (located in the fan supply line) to calibration position.
- Remove the wing nuts on the collector bottom.
- Remove the bottom of the collector.
- Slide rate check box on the collector body.
- **Prime metering wheels first** by using the primer switch to start and stop the meter drive. Allow the drive to run until material begins to fall through the collector body.

Note: *Ensure the fan is not running.*

- Empty material from rate check box and reinstall it on the same collector.
- The monitor can be relocated to the remote monitor location for ease of calibration. The three pin plug connects to the monitor harness and the two pin connects to the VRT controller harness.

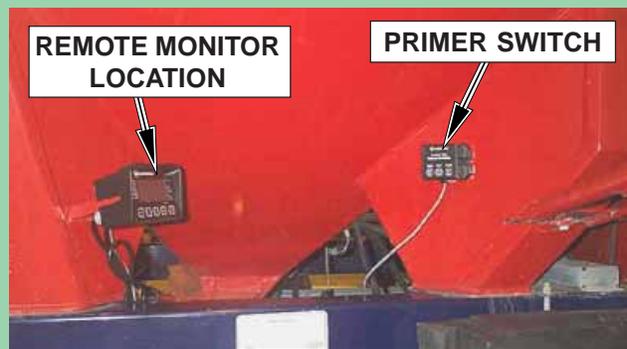
Actual Sample

- Enter Calibration Mode for **actual sample**.
- Use the UP or DOWN button to move the triangle icon to the desired shaft.
- Hold the **ACK** button until 4 short beeps and 1 long beep sounds. Release button after the long beep.



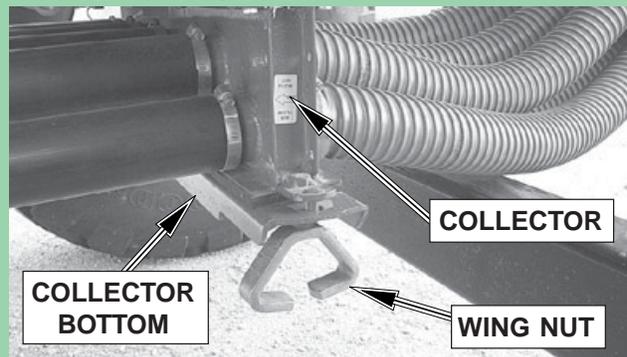
Selector Valves

7000 Air Cart Shown



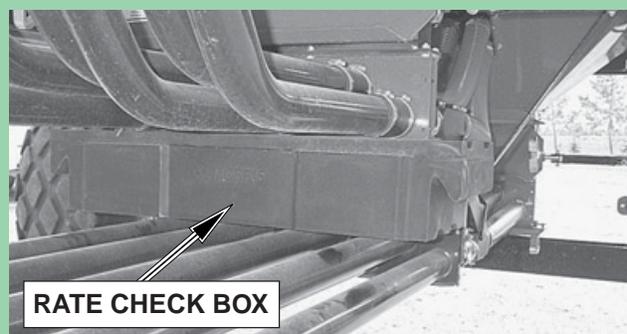
Primer Switch

7000 Air Cart Shown



Collector Bottom

7000 Air Cart Shown



Rate Check Box

Rate Calibration - Continued

Actual Sample

Example: Calibrate Shaft 1.

1. From the “Operating Screen” press the MENU key to enter the “Settings Menu”.

Use the Up/Down keys to select “Shaft Settings” press the SELECT key to enter function.

2. Under “Shaft Settings” use the Up/Down keys to select “Shaft 1 Settings” press the SELECT key to enter function.

3. Use the Up/Down keys to select “Shaft 1 Calibration” press the SELECT key to enter function.

4. Press the SELECT key to enter “Number of Revolutions”. Use the Up/Down keys to change the value to;

- 20 for Direct Drive
- 50 for Slow Speed Drive

Note: *Ensure the fan is not running.*

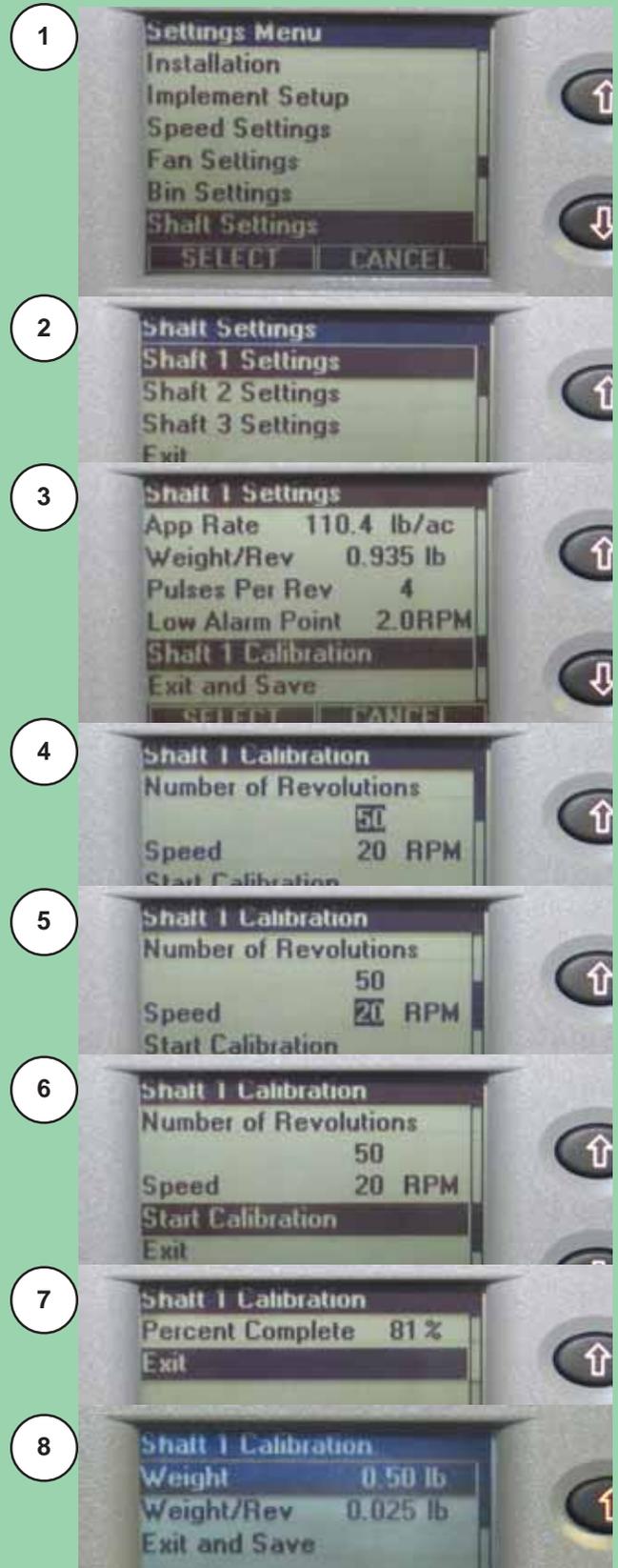
Press the SELECT key to enter the value and move to the next parameter “Speed” in the list.

5. Press the SELECT key to enter “Speed”. Use the Up/Down keys to change the value to **20 rpm**.

6. Press the SELECT key to enter the value and move to the next parameter “Start Calibration” in the list.

7. Press the SELECT key to enter “Start Calibration”. The monitor will display “Percent Complete” and shaft 1 motor will start turning the desired number of revolutions.

8. Once the monitor displays “Percent Complete 100%” the shaft motor will come to a stop and the monitor will now display “Weight”.



VRT Drive

Rate Calibration - Continued

Actual Sample - Continued

9. Remove the rate check box from the collector body.

Weigh the sample by using tarp straps to hook rate check box to spring scale.

Note: Remember to subtract the weight of the rate check box from the total sample weight. Accuracy of sample is critical for actual application rate accuracy.

10. Press the SELECT key to enter "Weight". Use the Up/Down keys to change the value to the sample weight.

Note: The "Weight/Rev" is automatically calculated for the value being entered under "Weight".

Press the SELECT key to enter the value and move to the next parameter "Weight/Rev" in the list. **Do not modify this value.**

11. Use the Up/Down keys to select "Exit and Save" press the SELECT key to save the changes and return to "Shaft 1 Settings" menu.

Note: The new "Weight/Rev" will appear under the "Weight/Rev" line of the "Shaft 1 Settings" menu.

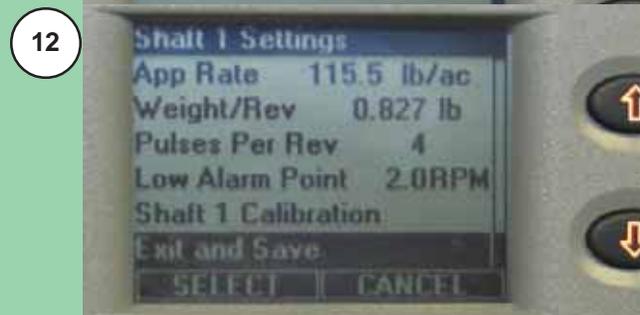
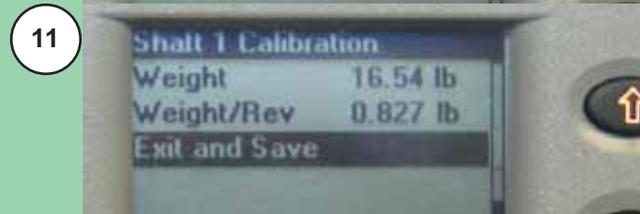
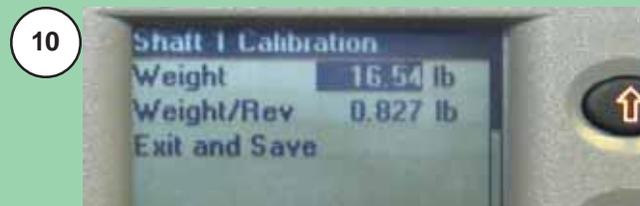
12. Use the Up/Down keys to select "Exit and Save" press the SELECT key to save the changes and return to "Shaft Settings" menu.

13. Replace the bottom of the collector. Place rate check box into storage bracket.

Follow the above procedure to check the rate of the other tanks.



7000 Air Cart Shown



7000 Air Cart Shown

Metering Rate Adjustment

The metering rate adjustment for all tanks is done in the same manner. A new rate is achieved by changing the APP RATE and or the WEIGHT/REV under the shaft program mode of the monitor.

Note: It is recommended to set “WEIGHT/REV” by doing a “Rate Calibration”.

If desired the product WEIGHT/REV can be determined from the charts located on the previous pages. To determine a products WEIGHT/REV from the charts follow the steps outlined below:

- Determine which calibration chart column the product to be applied falls into from the “Product Classification Charts” shown on previous page.
- Go to the specific chart column of the “Calibration Chart” and follow the column down to the number of outlets on seeding tool. It is recommended to use a highlighter to make the line easier to follow.
- At this intersection will be the required **WEIGHT/REV** for the product.

Change the **APP RATE** and **WEIGHT/REV** on monitor as follows:

Example: Adjust metering rate for Shaft 1.

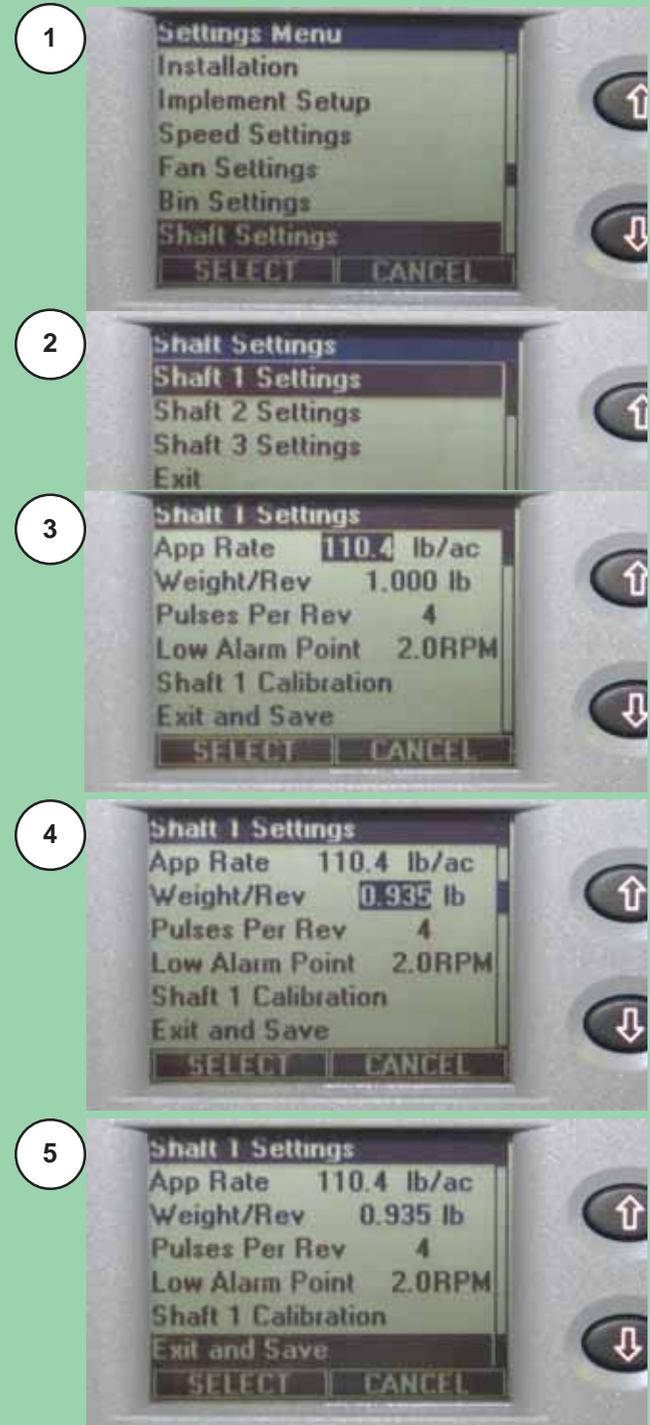
1. From the “Operating Screen” press the MENU key to enter the “Settings Menu”. Use the Up/Down keys to select “Shaft Settings” press the SELECT key to enter function.
2. Under “Shaft Settings” use the Up/Down keys to select “Shaft 1 Settings” press the SELECT key to enter function.
3. Press the SELECT key to enter “App Rate”. Use the Up/Down keys to change the value to the desired application rate. Press the SELECT key to enter the value and move to the next parameter “Weight/Rev”.
4. Press the SELECT key to enter “Weight/Rev”. Use the Up/Down keys to enter desired weight per rev of product from calibration chart. Press the SELECT key to enter the value and move to the next parameter “Pulses Per Rev”.

Note: It is recommended to set WT/REV by doing a “Rate Calibration”.

5. Use the Up/Down keys to select “Exit and Save” press the SELECT key to to save the changes and return to “Shaft Settings” menu.

Follow the above procedure to change the rate of the other tanks.

Note: The charts should only be used as a guide. Specific rates can be achieved by using the rate check method as outlined under “Rate Calibration”.



VRT Drive

Notes

Section 4: Alarms

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Alarms

Alarms

Introduction

All configured sensors and various other operating conditions are continuously monitored. Alarms fall into one of the following three categories:

- **Sensor alarms** are alarms which are generated when information returned by a sensor exceeds the appropriate threshold.
- **Communication alarms** occur when a sensor repeatedly does not respond to attempts at communication.
- **System alarms** are for various other conditions that are found to be in fault.

When an alarm condition occurs the monitor will beep repeatedly and an alarm screen will pop up indicating the fault condition.

The audio alarm and alarm screen persist until the alarm condition is fixed or until it is acknowledged by the operator. Follow the steps on the screen to fix or acknowledge the alarm.

After acknowledgement, the “Operating Screen” will be displayed with any unfixed alarms shown in the “active alarm window”. If there are more than one acknowledged alarms, they will cycle on the display.

When the alarm condition is corrected, the alarm notification is removed and ground speed will again be displayed in bottom window.

Nuisance Shaft Alarm

Low application rates of Canola may cause the seed shaft to rotate less than 2 rpm.

The low shaft rpm will cause the monitor to give a shaft alarm, since the shaft is rotating below the default alarm threshold of 2 rpm.

To avoid this nuisance alarm change the seed shaft low rpm alarm setting to 0.5 rpm.

Note: Change the setting back to 2 rpm when returning to higher application rates.



Alarm Screen



Alarm - Operating Screen

Note: To “TURN OFF” any shaft not in use set pulses to 0. This will eliminate any nuisance alarms caused by an inactive shaft. Also the corresponding bin should be “Disabled” to eliminate any nuisance alarms caused by an empty bin.

Alarms - Continued

“In Motion” Notification

The “In Motion” condition means that the monitor, based on ground speed and clutch state, considers that the system is supposed to be actively seeding.

The monitor emits a double beep whenever the “In Motion” condition becomes true or false. This condition is defined as *speed greater than 2 mph (3.2 Kph) and drive clutch engaged*.

1. If ground speed is less than 2 mph (3.2 Kph) for more than 30 seconds the monitor will alarm and display “Should be Seeding”.
2. If ground speed is greater than 2 mph (3.2 Kph) for more than 30 seconds and clutch is not engaged the monitor will alarm and display “Clutch Switch is Off”.



Low Fan Alarms

Low fan alarms are handled differently because a stopped fan can result in damage to the metering mechanics as unblown material accumulates. **Low fan alarms can not be acknowledged while the system is “in motion”.** Thus, if a low fan alarm occurs during active seeding, the user will **not be able** to silence the alarm with the soft key, but will need to stop the vehicle or disengage the clutch. When this happens, the monitor accepts it as an acknowledgement of the alarm, and an effective “automatic acknowledge” takes place, resulting in the beeper being silenced and the resumption of normal display with “Fan Low RPM” flashing in the alarm window.

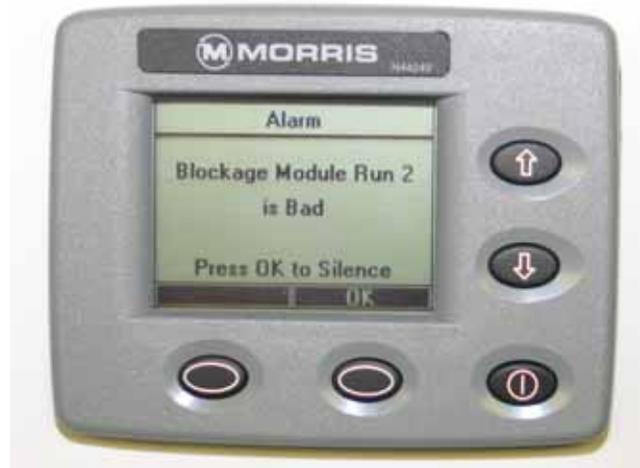


Alarms

Alarms - Continued

Optical Blockage Run Bad Alarms

If any monitored run does not pass the self-test mode on monitor power-up, the blockage module will report that run is bad. The optical sensor or wiring may be faulty or too much light may be getting into the tube.



Blockage Alarms

During seeding, if the blockage monitor senses a low seed count or does not see any seeds from a run sensor, an alarm will be displayed to show which runs are blocked.

The alarms can be silenced with the OK soft key.



Section 5: Blockage Monitoring

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Blockage Alarms	5-5

Blockage

Blockage Sensing

Module Installation

When blockage sensing systems are used, modules must be installed in the system, runs per module set, and calibration done while seeding.

Note: When optical modules are added, they must be learned by the monitor. See the “Sensor Installation”.

When pin sensors are added, the number of sensors is set in each module on the seeding unit and the number of blockage modules is set in the monitor.

Runs per Module Setup

The number of runs connected per blockage module must be set in order for the system to operate correctly. This should only need to be done when the blockage modules are first installed, and afterwards only if the number of sensors is changed.

Optical Sensors the number of runs connected is set in the monitor. Refer to “Monitor Settings”.

Pin Sensors the number of runs connected is set on each individual blockage module on the seeding unit. Refer to “Pin Sensor Installation” Section 10.



Individual Runs Setup

Optical Sensors Only

Runs can be enabled/disabled individually. This feature is useful for turning off runs that are not in use. Refer to “Monitor Settings”.



Blockage Sensing - Continued

Blockage Module Test

This test will check the blockage module for proper functioning. Number of runs reported should match the number of sensors connected to each module.

To perform the blockage module test follow the steps below.

1. Stop driving the machine.

From the "Operating Screen" press the MENU key to enter the "Settings Menu".

Use the Up/Down keys to highlight "Blockage Module Settings" press the SELECT key to enter the function.

Use the Up/Down keys to highlight "Blockage Module Test" press the SELECT key to enter the function.

2. The monitor will indicate when a module test is complete. Testing may take a few minutes depending on configuration and application.
3. Once all modules have completed their test the monitor will display how many optical sensors each module could communicate with. If this number does not match the actual number connected check the wiring and installation of the sensors.
4. Once all of the modules have been tested use the Up/Down keys to highlight "Exit" press the SELECT key to return to the "Blockage Module Settings" menu.

Use the Up/Down keys to highlight "Exit and Save" press the SELECT key to save the changes and return to the "Settings Menu".

At any time during this test, CANCEL may be pressed to exit the "Blockage Module Test".



Blockage

Blockage Sensing - Continued

Blockage Calibration

In calibration mode, the module determines the normal seed flow rate for each run. This calibrated flow rate is used to determine the threshold for indicating that a run is blocked.

To calibrate the blockage modules follow the steps below.

1. Start seeding in the field.

From the "Operating Screen" press the MENU key to enter the "Settings Menu".

Use the Up/Down keys to highlight "Blockage Module Settings" press the SELECT key to enter the function.

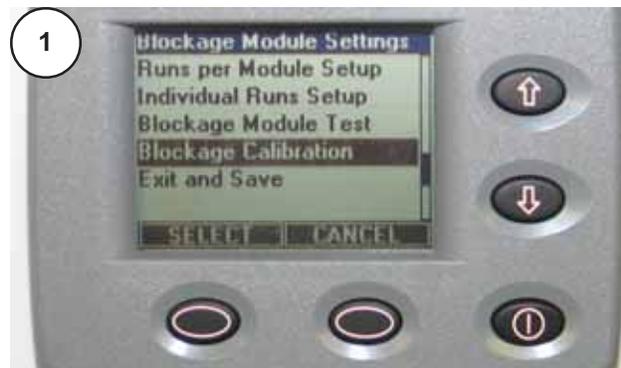
Under "Blockage Module Settings" use the Up/Down keys to highlight "Blockage Calibration" press the SELECT key to enter the function.

2. The monitor will indicate what number of sensors are "Calibrating", "Calibrated" and "Total" installed sensors. Calibration may take a few minutes depending on the number of sensors and application rate.
3. Once all of the sensors have been calibrated (calibrated = total) press the SELECT key to exit and return to the "Blockage Module Settings".
4. Use the Up/Down keys to highlight "Exit and Save" press the SELECT key to save the changes and return to the "Settings Menu".

At any time during this test, CANCEL may be pressed to exit the "Blockage Calibration" leaving the sensors uncalibrated.

Important

CALIBRATION must be done each time the seeding rate or the seed type is changed.



Blockage Sensing - Continued

Optical Blockage Run Bad Alarms

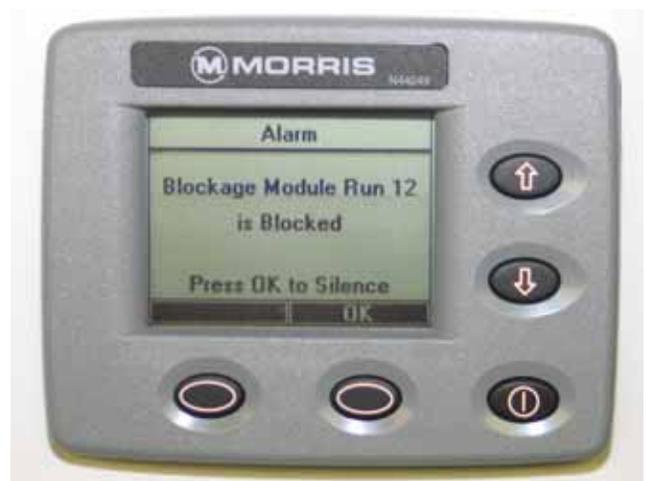
If any monitored run does not pass the self-test mode on monitor power-up, the blockage module will report that run is bad. The optical sensor or wiring may be faulty or too much light may be getting into the tube.



Blockage Alarms

During seeding, if the blockage monitor senses a low seed count or does not see any seeds from a run sensor, an alarm will be displayed to show which runs are blocked.

The alarms can be silenced with the OK soft key.



Blockage

Notes

Section 6: Trouble Shooting

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Checking Harness	6-5
Checking Sensors	6-5
Checking Blockage System	6-5

Trouble Shooting

Sensor Replacement

The monitor will alarm the operator if there is a faulty sensor in the system by displaying a communication error for the sensor.

To replace a faulty sensor follow the steps below.

Example: Replace Shaft 1 sensor.

1. From the "Operating Screen" press the MENU key to enter the "Settings Menu".

Use the Up/Down keys to highlight "Installation" press the SELECT key to enter the function.

2. Use the Up/Down keys to highlight "Replace a Sensor" press the SELECT key to enter the function.

3. The monitor will highlight "Select Sensor" press the SELECT key to enter the function.

Use the Up/Down keys to display desired sensor to be replaced (i.e. Shaft 1), press the SELECT key to accept selection.

4. "Proceed" will now be highlighted, press the SELECT key to enter mode.

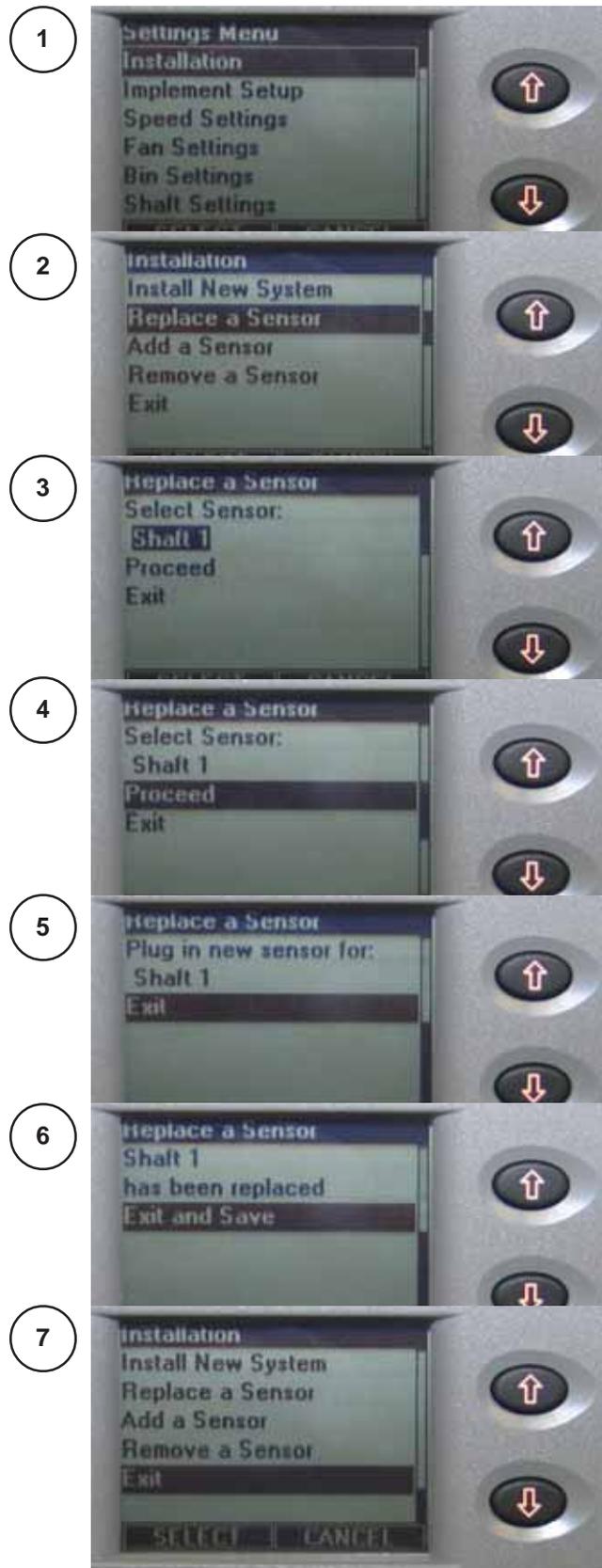
5. The monitor will then display "Plug in new sensor for: Shaft 1". Unplug the old sensor and plug in the new sensor.

6. Once the monitor acknowledges the new sensor, it will emit a double beep and acknowledge that the sensor has been replaced.

"Exit and Save" will be highlighted, press the SELECT key to save the changes and return to the "Installation" menu.

7. Use the Up/Down keys to highlight "Exit" press the SELECT key to return to the "Settings Menu".

Note: Sensors can also be added or removed from the system in the same manner by selecting the choice from step 2.



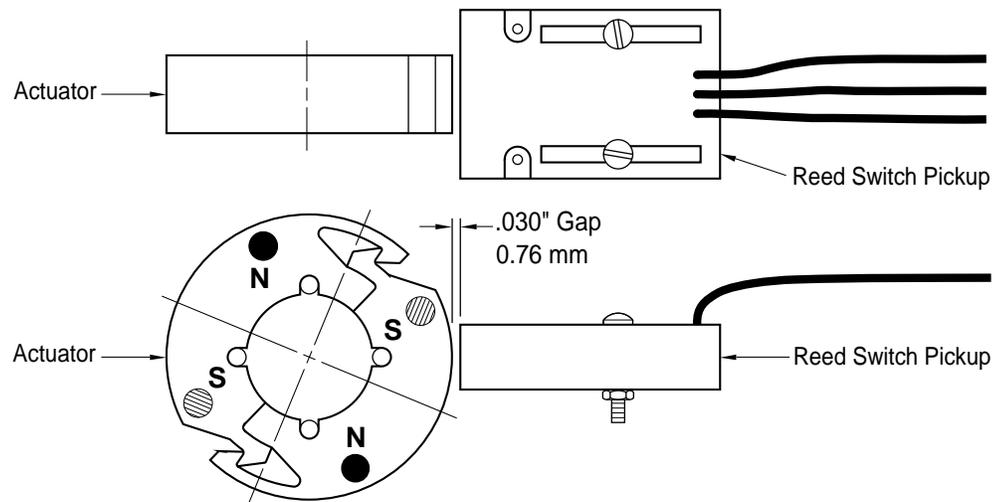
Sensor Gap Settings

Reed Switch Sensors

These sensors are used on slowly revolving shafts, in this case the meters and ground speed.

Check the gap between the sensor and actuator.

A gap of .030 inch (0.76 mm) is recommended.

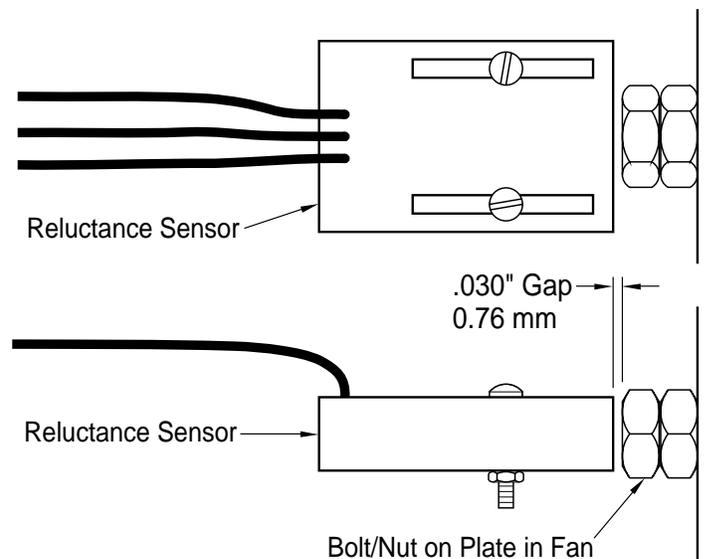


Variable Reluctance Sensors

These sensors are used on high speed shafts, in this case the fan.

Target to sensor gap is critical with these sensors.

A gap of .030 inch (0.76 mm) is recommended.



Trouble Shooting

Sensor Gap Settings - continued

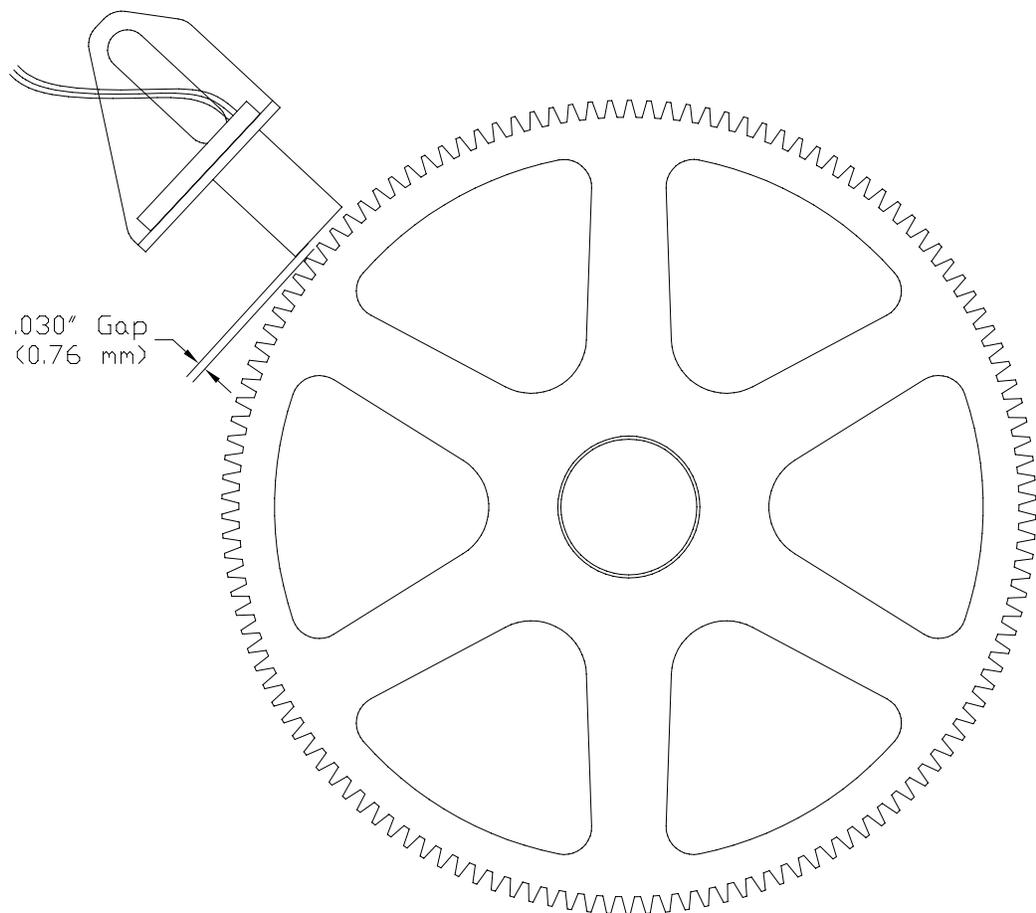
Hall Effect Sensors

These sensors are used on slowly revolving shafts, in this case the motors and ground speed.

Sensor wheel to sensor gap and position is critical with these sensors.

A gap of .030 inch is recommended.

The sensor must be centred on the sensor wheel.



Trouble Shooting Guide

Most electronic problems are usually one of the following:

- Harness connections.
- Damaged harness wires.
- Loose terminal in harness plug.
- Sensor to Actuator clearance.
- Defective sensor.

The monitor will alert the operator of these problems as a communication error.

Checking Harness

First, check for the obvious things like broken connections, loose terminals, insulation rubbed off and so forth.

- Check continuity of wires with ohm meter.

Checking Sensors

The best approach to testing a sensor is to substitute a suspected sensor with a known good one. If the problem goes away, the sensor is faulty. If it does not go away, it is faulty wiring.

Bin Level Sensors ensure there is no foreign material covering the optical sensor. Remove material with a cloth as not to damage lens.

Make sure sensor wires are not damaged.

Checking Blockage System

Check modules by performing a blockage module test on the monitor.

Optical sensors make sure the “optical eyes” are not coated with material or worn down. Remove material with a cloth as not to damage lens.

Pin sensors make sure there is no buildup of material on the pins. Remove material buildup with a knife and gently scraping away the material buildup.

Make sure sensor wires are not damaged.

Trouble Shooting

Notes



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