

# **VERSA**

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***Ag Leader***<sup>®</sup>  
***Technology***

Operators Manual

Firmware Version 3.3

Ag Leader PN 4002722 Rev. C



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# ABOUT THIS MANUAL

## INTRODUCTION AND COMPANY PROFILE

### ABOUT US

Welcome to the Ag Leader Technology family. Ag Leader Technology, Inc. is the global leader in yield monitor and precision farming systems and is committed to meeting the present and future needs of the agriculture industry by providing high quality products and first class customer support.

### INNOVATION

Ag Leader Technology manufactures and sells products which support a wide array of precision farming practices. These include grain yield monitoring, application rate control and monitoring, variable rate fertilizer application, site-verification, GPS guidance and interface to Autosteer technologies.

### COMPATIBILITY

Ag Leader Technology offers compatibility and supports integration of many different types and brands of equipment used for precision farming. The latest equipment available is supported as well as older series of combines, planters, sprayers, tillage equipment, etc.

### QUALITY AND SUPPORT

Ag Leader Technology continues to provide the best customer support in the industry. Precision farming doesn't come without questions. Ag Leader is committed to providing the most responsive, knowledgeable and friendly technical support available. Our technical support team is available seven-days-a-week during peak seasons to answer your questions on the operation of Ag Leader products.

### WE WANT TO HEAR FROM YOU!

Feel free to call and discuss:

- Operational questions about the display
- Features you would like to see implemented to improve the system or features you would like to see added to the system to increase functionality

## DISPLAY

The display is a full-featured, year-round hub of any precision farming operation. A full-color, high-brightness, high-resolution touchscreen display is easy to read and offers powerful, year-round precision farming tools. Built-in manual guidance, full-screen mapping, planter and application control, yield monitoring, real-time data logging and automated steering make up the core functionality of the display.



**WARNING:** Read manual completely before operating display. Understand and follow all operating and safety instructions for proper use of this display. Failure to use display properly could result in an impairment of the safety features of this product.

## SERVICE

There are no user-serviceable parts inside the display. Contact the manufacturer for a Return Material Authorization (RMA).

ph: (515) 232-5363

fax: (515) 232-3595

e-mail: support@agleader.com



**CAUTION:** *This display has an internal lithium coin cell battery that is good for the life of the product and does not need to be replaced. There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the battery manufacturer's instructions.*

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## SYSTEM USES

- Manual Guidance
- ParaDyme™ automated steering
- Video Camera Inputs
- Mapping tillage operations
- Mapping and logging product application
- Mapping of all field boundaries, sub-boundaries, waterways and terraces
- Grain yield monitoring
- Variety logging
- Granular and liquid fertilizer application
- Liquid spray system control
- NH3 application control
- Application control of multiple bin spinner spreaders

## SYSTEM FEATURES

- Sunlight-readable screen
- Rugged sealed enclosure
- Compatible with most NMEA GPS receivers
- DirectCommand and SeedCommand product control using industry- standard CAN-bus interface
- Adjustable volume control
- Perspective 3D View Map
- Automatic field selection
- Automated module firmware upgrade
- Advanced GPS Diagnostics
- USB media slot
- 28-pin plug compatible with InSight, EDGE, INTEGRA, and VERSA displays.
- 28-pin auxiliary connection
- RAM mount

## USB FLASH DRIVE

Display kits include a USB Flash Drive which you can use to save and transfer your data in and out of the display.

## COLOR TOUCH SCREEN

The display features a color touch screen display. The touch screen allows easy and intuitive navigation through the screens on the display without the need for any external keypad or mouse devices. Here are a few key things to remember if you are new to using a touch screen device:

- Do not use any sharp objects for running the touch screen device, this could result in damage to the display. Using the tip of a finger is the recommended method of operating the display touch screen.
- Do not use any harsh chemicals to clean the touch screen. Using a damp soft cloth or an anti-static wipe made specifically for cleaning computer displays is the correct way to clean the screen and the enclosure.
- The touch screen requires only a gentle touch of about half-second in duration to operate correctly. A common mistake is to try to navigate too quickly through the system using firm taps instead of gentle presses.

## CAN BUS TECHNOLOGY

This system uses Controller Area Network (CAN) technology. CAN systems are comprised of individual modules, each with their own high speed processor, connected through a high-speed communications cable. CAN has many benefits, including greater ability to configure and expand the system, compatibility, simpler installations with less wiring, and increased system dependability.

## TECHNICAL SPECIFICATIONS

Do not exceed the specifications below:

- Storage Temperature: -20°C to +80°C (-4°F to +176°F)
- Operating Temperature: -10°C to +70°C (14°F to +156°F)
- Operating Input Voltage: 9 –16 V DC
- Max Current Rating: 4.0 amp
- Environmental Protection Rating: IP64
- No Protective Grounding required
- Use 150V insulation rating for external circuits



**CAUTION:** Exceeding these specifications may result in degraded operation and/or damage to the display.

## SYSTEM AND UPGRADES

Ag Leader Technology will periodically provide operating program updates that will improve the performance of your display. Required software updates will be available free of charge for download from [www.agleader.com](http://www.agleader.com). On occasion, major releases will be made available that have significant

product feature additions or enhancements. These optional software updates may have an additional fee associated with them.

## AUTOMATED MODULE FIRMWARE UPGRADE

In the display, all display and module firmware upgrades are packaged in a single.fw2 file. The module firmware files are stored internally in the display. A warning alerts you when a module upgrade is required. You can upgrade all files in a single batch by using an upgrade screen. For more information, see *“Advanced tab” on page 29*.

## PRODUCT REGISTRATION

When registering your Ag Leader Technology products by one of the following methods, you can elect to receive notice of any new product updates or features.

Register by mail: Ag Leader Technology

2202 South Riverside Dr.

Ames, IA 50010

Register by Fax: 515-232-3595

Register at the Ag Leader Web site at <http://www.agleader.com>

## CONVENTIONS USED IN THIS MANUAL

## CAUTIONS AND WARNINGS

The operators manual uses the following text formatting schemes to call attention to information related to simplifying system operation and proper operating practices to prevent accidental data loss. If in doubt about the results of performing an action or deleting an item from the system, back up all system files to the USB external drive prior to proceeding with the action.



**Note:** *Provides informative tips to assist with system setup, calibration, and operation.*

---



**CAUTION:** *Indicates specific settings, calibrations, and procedures that must be followed for proper system performance and operation.*

---



**WARNING:** *Indicates specific instructions to avoid accidental loss of data and system configurations settings.*

---

## CROSS-REFERENCES AND WEB LINKS

Throughout this manual, numerous cross-references are provided to other pages or sections. These cross-references are always shown in blue, italic text; and list the title and page number as in the following example: To find the information you're looking for, see *“[How to Find Information You're Looking For](#)” on page 5*. If you are viewing this manual in PDF format, you can click on this blue text and go directly to the link.



Links to web sites are shown in blue, italicized, and underlined text, as in the following example: To view the web site, go to: [www.agleader.com](http://www.agleader.com).

## VIEWING THIS MANUAL ONLINE

This operators manual can be viewed online at Ag Leader's Web site. To view an online version, go to the Ag Leader Web site and click the Customer Support link. You will see a page titled "Product Manuals."

To view and/or print the Operators Manual online, you will need the Adobe Acrobat or Adobe Reader .pdf file format. The Adobe Reader software comes pre-installed on most personal computers. If Adobe Reader is not installed on your computer the program is available for download at no charge. A link to the Adobe download site is located at the Ag Leader Web site.

## HOW TO FIND INFORMATION YOU'RE LOOKING FOR

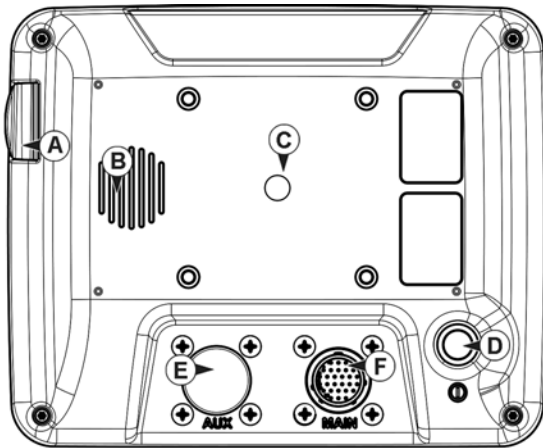
What do you do if you cannot find the information that you're looking for? There are three different ways at your disposal to find specific information quickly. These steps can include:

1. Look up the information in the Table of Contents.
2. Look up the information in the section indexes that are located at the end of each manual section (Planting, Tillage, Application, and Harvest).
3. Use the Adobe Reader's search function. While viewing this manual online in PDF format, press the **CTRL+F** buttons on your keyboard. A search menu should appear, and from here, you may enter in a search term.



# INSTALLATION

## DISPLAY HARDWARE



- **(A) USB media slot**

Used for data transfer in and out of the display.

- **(B) speaker**

The built-in speaker is used for audible warnings. The volume can be adjusted through the display setup routine.

- **(C) RAM mount**

- **(D) Power/Reset switch**

The Power/Reset switch is used for turning the display on and off in installations where the system is connected to a continuous power supply. If the display ever stops responding, the manual power switch may be held in for five seconds to restart the system. Only do this as a last resort,

data loss could occur during times of improper shutdown.

- **(E) 28-pin auxiliary connection**

Used for camera input.

- **(F) 28-pin plug**

The 28-Pin round connector contains CAN, RS-232 serial, and system power and ground connections. It is compatible with the InSight, EDGE, INTEGRA, and VERSA displays. Ethernet for ParaDyme automated steering is included in connection.



- **(A) USB media slot**

- Used for data transfer in and out of the display.

## INSTALLATION INSTRUCTIONS

All machine installation and mounting kits are shipped with instructions specific to that kit. Instructions include special details relating to mounting, wiring and display configuration.

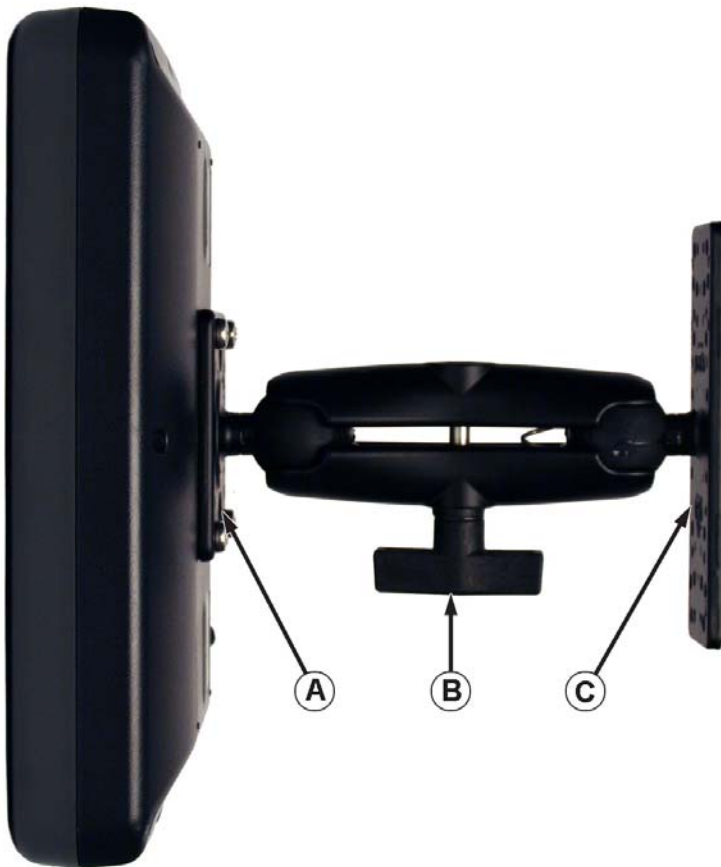
Mount the display to a secure support inside the vehicle cab. The following must be considered when choosing a mounting location:

- The display must be readily accessible to the machine operator.

- The display must not obstruct the machine operator's normal driving view.
- The display must not interfere with or limit access to any of the existing machine controls.
- The CAN system cabling be routed and secured without interfering with existing machine controls.

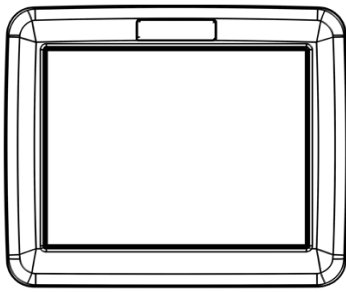


**WARNING:** If drilling holes is required during the mounting process, care must be taken to insure that damage is not done to existing vehicle wiring, mechanical, or cab structure. Refer to vehicle manufacturer documentation for specific details on your equipment. Follow all OEM instructions, cautions, and warnings when working around equipment.



- (A) RAM Base
- (B) RAM Arm - 5"
- (C) 2"X6" Base

# FUSE INSTALLATION AND REPLACEMENT

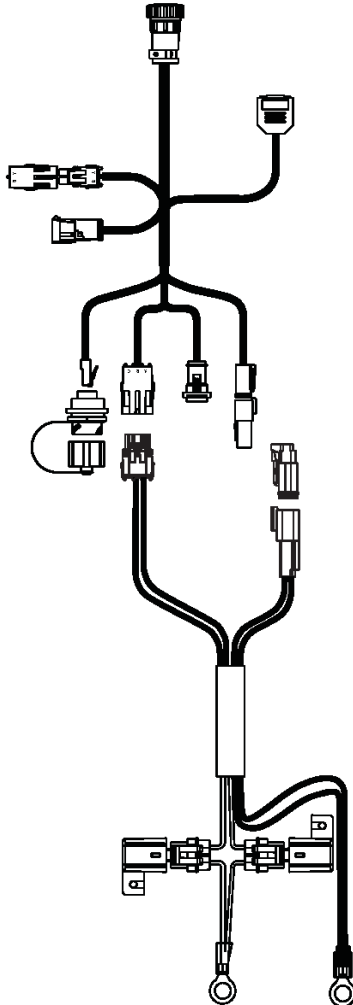


Fuse Type: Blade Style (ATO/ATC)

Rating:

Fuse Holder (orange wire) 5A, 250 VAC

Fuse Holder (pink wire) 15A, 250 VAC



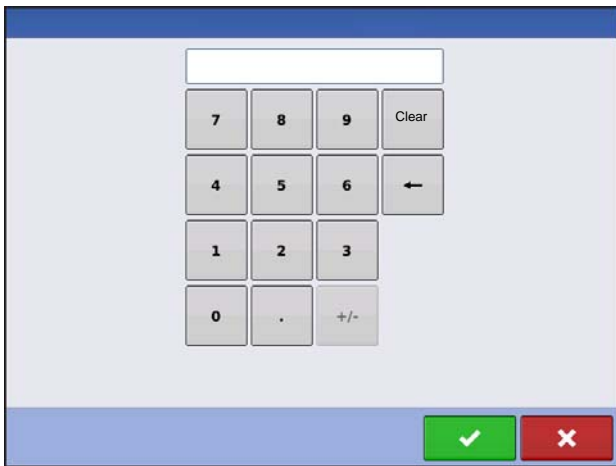
**CAUTION:** The fuse is to be placed in the fuse holder in-line with the battery power cable and used with display only.

## SCREEN ICON CONVENTIONS

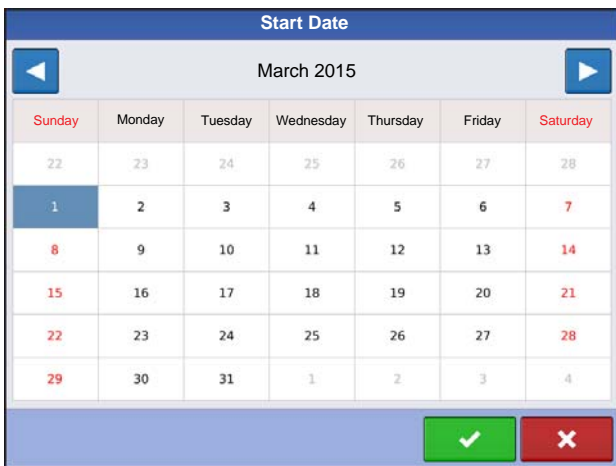
The following control buttons are made available for entering names and calibration values into the system.



An on-screen Keyboard is made available when appropriate for use during all setup processes. Press the keyboard button to access the on-screen text entry screen.



An on-screen Numeric Keypad is made available for changing configuration settings and calibration numbers. Press the keypad button to access the on-screen numeric entry screen.

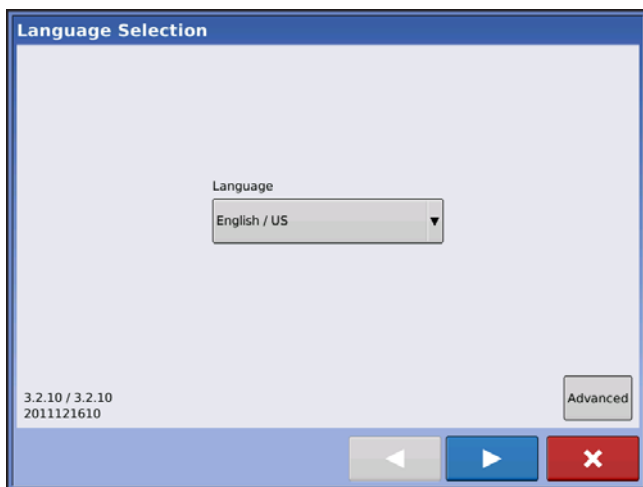


An on-screen calendar is made available for changing dates. Press the calendar button to access the calendar screen.



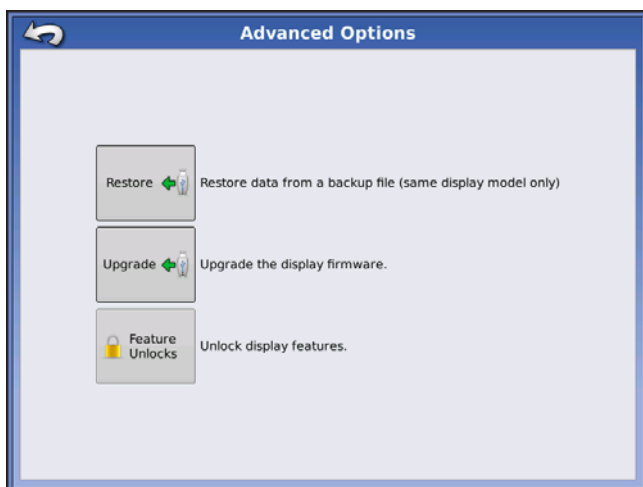
# CONFIGURATION

## INITIAL STARTUP



An Initial Setup wizard is presented on startup. The wizard is presented if the display is brand new out-of-the-box with 3.0 or following the 3.0 upgrade. Once the wizard is completed, it is not shown again unless the display memory is cleared.


## ADVANCED OPTIONS



Press “Advanced” button on Language Selection screen (first screen to appear on initial startup).

- Restore Backup
- Upgrade Firmware
- Unlock Display Features

---

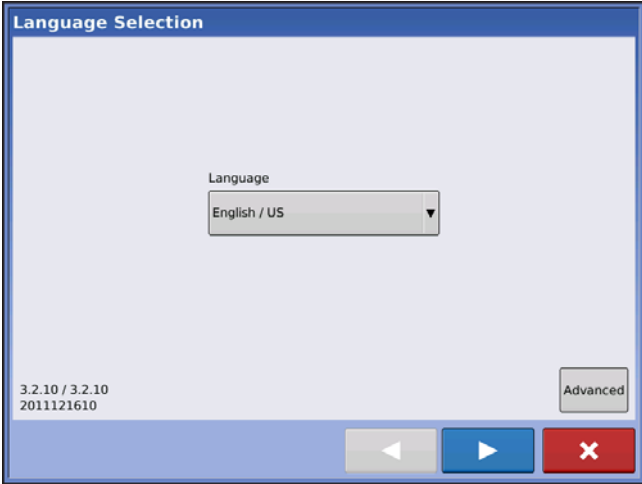
 **Note:** Using the Restore backup option is not the proper method to get multiple displays set up to be the same. Use the AGSETUP file.

---

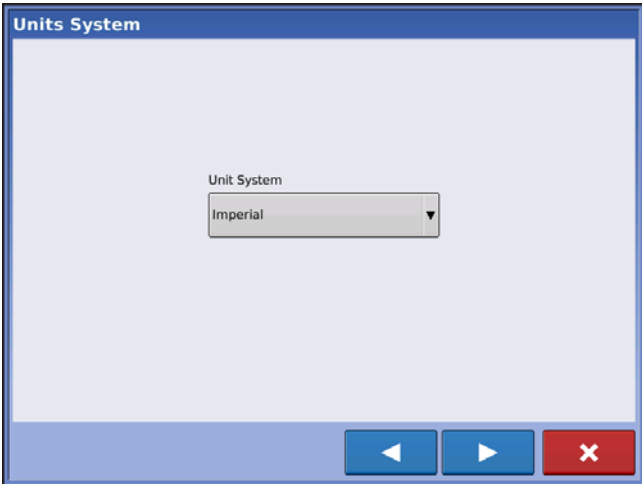
It is acceptable to complete the initial setup wizard and then upgrade. Setup information will not change.

- On a “clean” display going out for service, to stand in for a failed display, the customer should use the Restore backup option in the initial setup wizard.

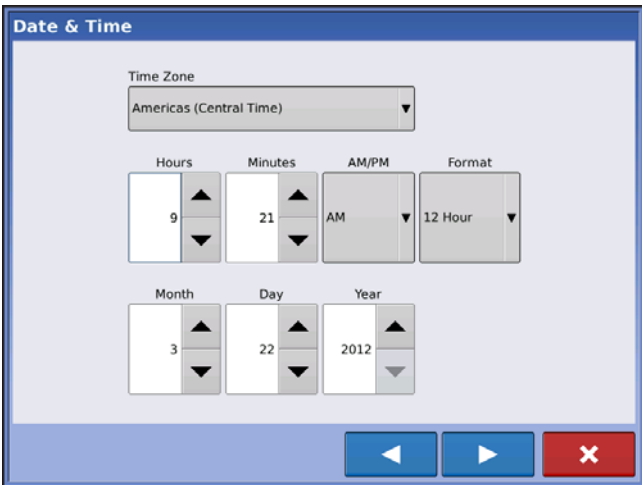
# LOCATION SPECIFIC SETUP



## 1. Language



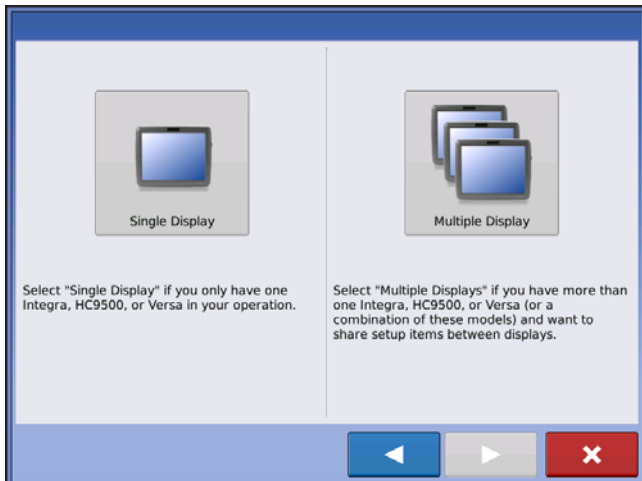
## 2. Unit System Imperial or Metric




## 3. Date and Time

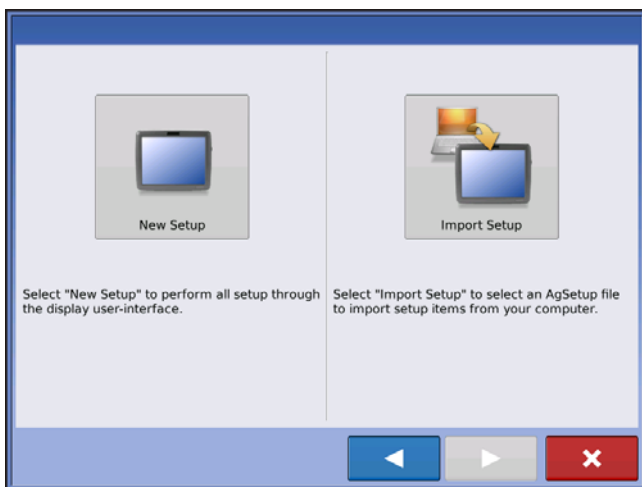



## SINGLE DISPLAY

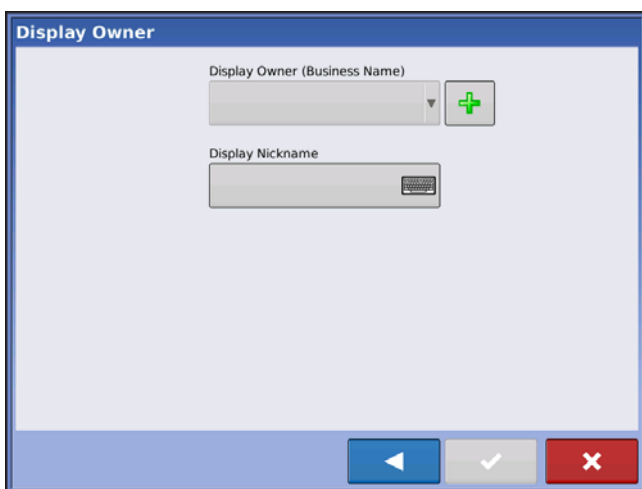



Press “Single Display” button then  to continue.



## NEW SETUP




Press “New Setup” button then  to continue.

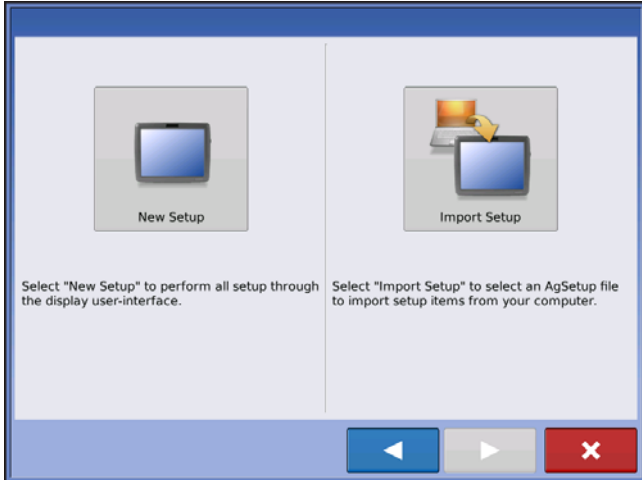



Press  to enter a Display Owner (Business Name).

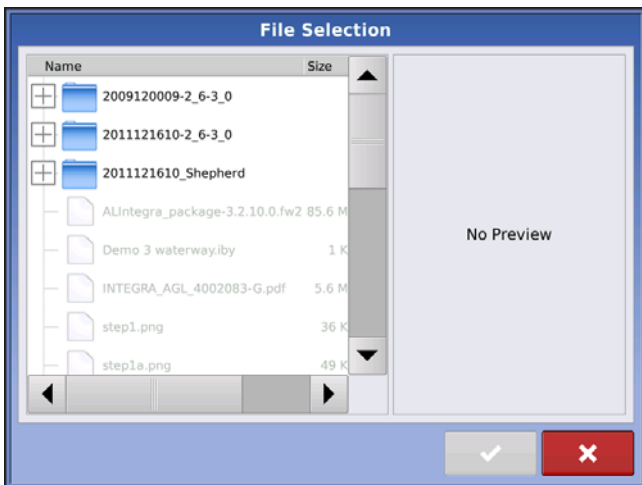
Press  to enter a display nickname. Press  to continue.

Press  to accept the setup and return to Home screen.


## IMPORT SETUP



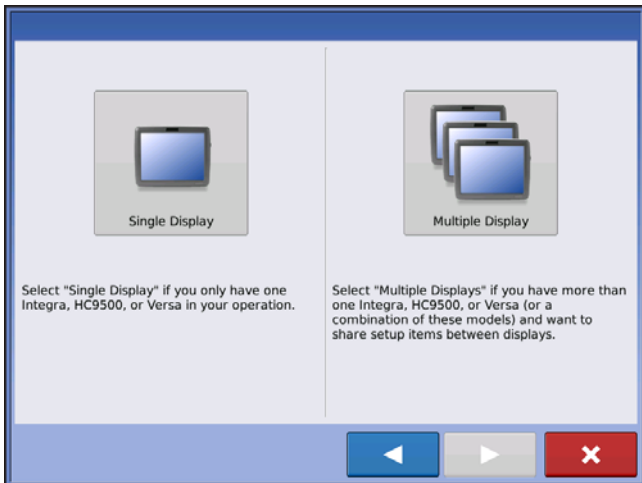
Press “Import Setup” button then  to continue.




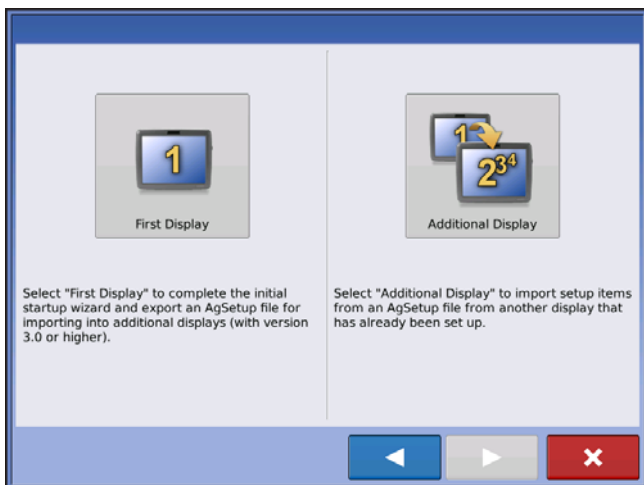
Select desired setup file from directory.

Press  to accept the setup and return to Home screen.

## MULTIPLE DISPLAY SETUP - FIRST DISPLAY

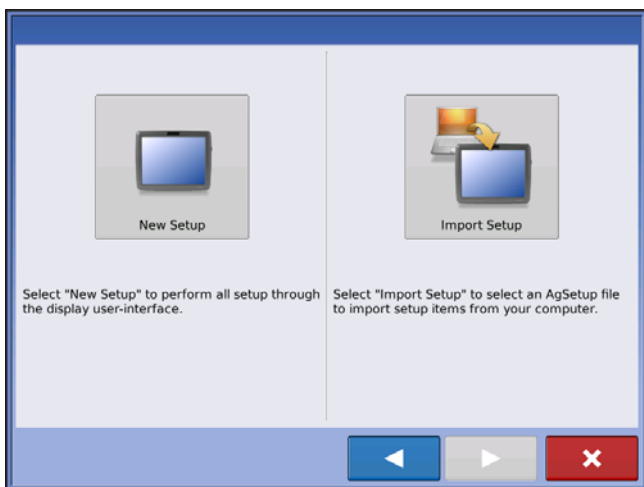



Press “Multiple Display” button then  to continue.

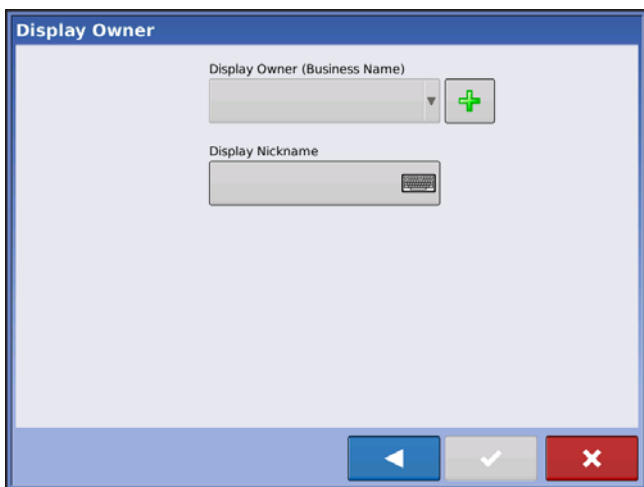



Press “First Display” button then  to continue.



**NEW SETUP**




Press “New Setup” button then  to continue.

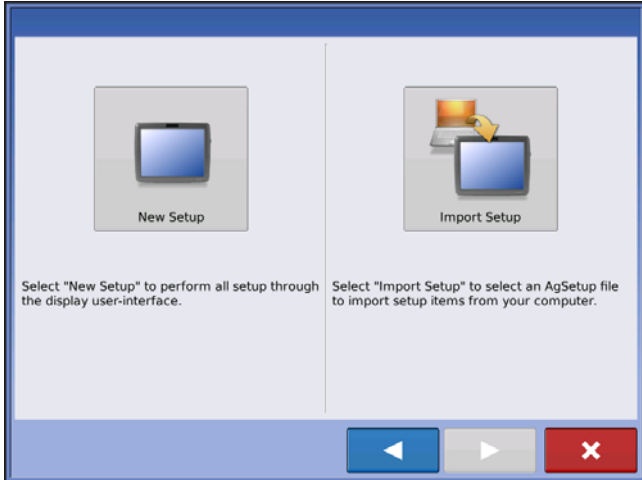



Press  to enter a Display Owner (Business Name).

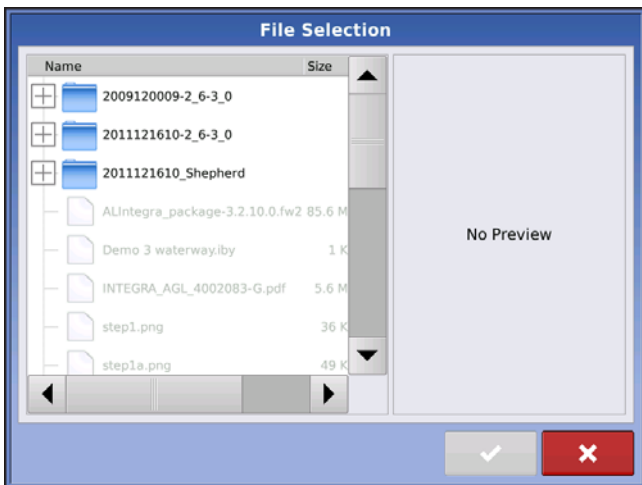
Press  to enter a display nickname. Press  to continue.

Press  to accept the setup and return to Home screen.


## IMPORT SETUP



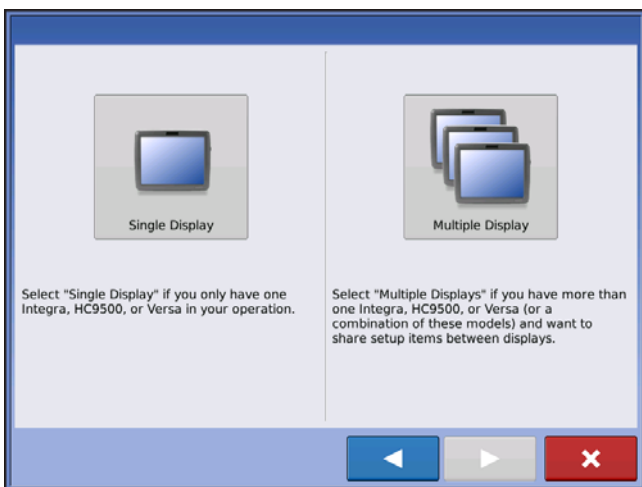
Press "Import Setup" button then  to continue.




Select desired setup file from directory.


Press  to accept the setup and return to Home screen.

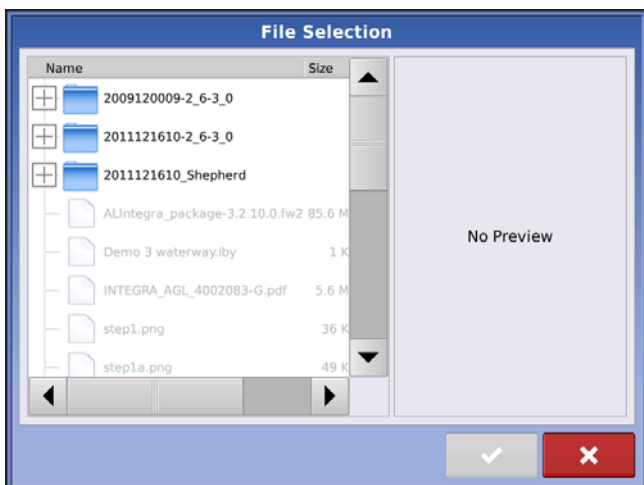
## MULTIPLE DISPLAY SETUP - ADDITIONAL DISPLAY




Press "Multiple Display" button then  to continue.



Press “Additional Display” button then  to continue.



Select desired setup file from directory.

Press  to accept the setup and return to Home screen.



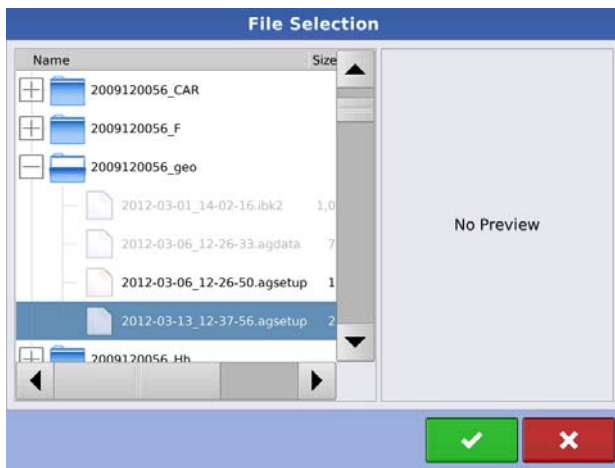
**Note:** The business created on the first display, and any other management and equipment items, will be imported to the additional displays.

## IMPORT SETUP DATA

### IMPORT FILES



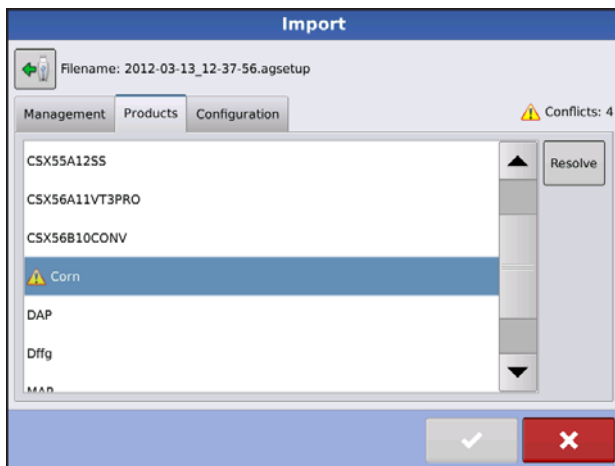
Press: Home button > External Storage button > Import Files




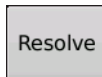
Use the scroll bar to find the file you wish to import.

When a setup file is created it is saved in a folder titled with the display's serial number \_nickname. The file will include a date and have the .agsetup suffix.

Select the desired setup file from directory and press



Highlight item with conflict 




Press



Conflicts can be resolved by:

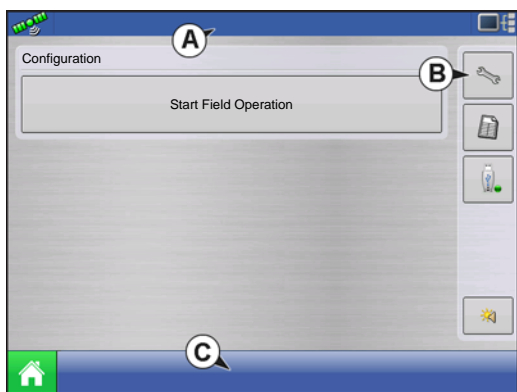
- Rename Import
  - Rename Existing
  - Merge
- Product Mixes and Configurations can not be merged. The Merge button will be greyed out and not selectable for these items.

Once all conflicts have been resolved, press .

## HOME SCREEN



Press: Home button



Most of the functionality of the display is not available until the basic setup process is completed.

- (A) Status bar
- (B) Setup button
- (C) Task bar

You must complete these initial configuration steps for the Run Time Environment to be active:

1. **Grower, Farm, and Field management**  
For more information, See *“Management button” on page 23.*

**2. Equipment Operating Configuration**

You can access Configuration Setup by pressing the **Setup (wrench) button (B)** at the upper right-hand portion of the Home screen. For more information, see *“Configuration button” on page 20.*

**3. Product setup**

For more information, see *“Product tab” on page 21,* as well as the additional configuration information described in each Operations chapter.

**4. Start Field Operation**

For more information, *“Setup Field Operation” on page 33.*

## SETUP BUTTONS



Press: Home button > Setup (wrench) button

The Setup buttons shown at the bottom of the Setup screens, are where you can toggle between screens that adjust settings for Configuration, Management, GPS and display.



**• Configuration button**

Press to adjust the configuration settings particular to your vehicle and equipment; as well as enter and edit product information. For more information, see *“Product tab” on page 21,* as well as *“Configuration Setup Screen” on page 37.*



**• Management button**

Press to access and edit Grower, Farm, Field and Operator information. For more information, see *“Management button” on page 23.*



**• GPS button**

Press to adjust Guidance settings, GPS settings, and lightbar settings (if applicable). For more information, see *“Guidance” on page 81.*



**• Display button**

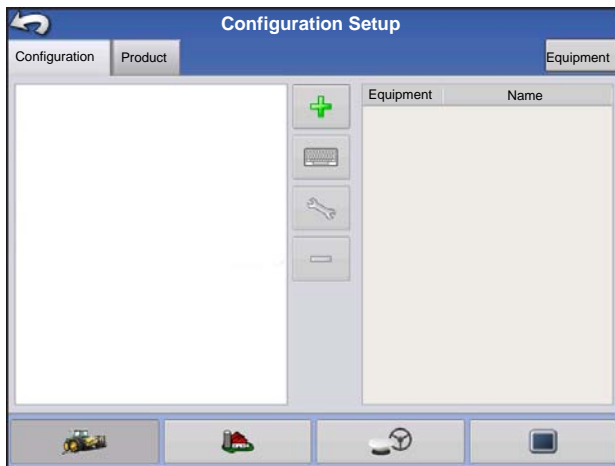
Press to adjust settings for Time and Date, brightness and volume settings, operating units, language; enable video; view features; and also create and restore backups.

# CONFIGURATION BUTTON

## CONFIGURATION TAB



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab



The Configuration tab is where you can create, view and change configuration settings.

An operating configuration is a task-specific association of vehicle, implement, controller, and speed source that is saved for use over different seasons and on different displays.



### • Add button

Press to add an operating configuration. A wizard takes you through the process of creating a configuration.

- When finished, the new configuration appears in the list on the left side of the screen.
- When you highlight the configuration, the equipment in the configuration are listed in the box on the right side of the screen.
- Information regarding configurations for specific operations is given in each operations chapter.



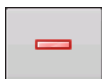
### • Rename button

Press to rename the configuration.



### • Setup button

Press to adjust configuration settings.

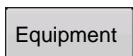


### • Remove button

Press to remove a configuration.



**CAUTION:** When you remove a configuration all data logged with that configuration will also be removed! However, all log files will remain in memory until exported to the USB drive.



### • Equipment button

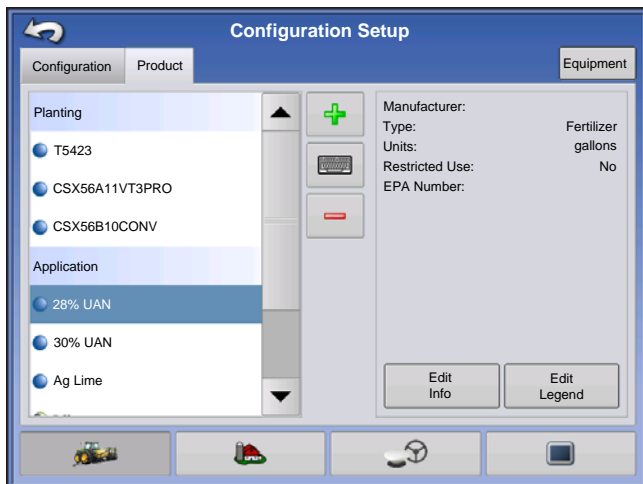
Press to add, edit, or remove information for a specific vehicle, implement or controller.



## PRODUCT TAB



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Product tab



The Product tab is where you can add, edit, or remove product information.

The Product tab is where you can perform the following tasks:

- Add or import Planting products.
- Add or import Application products.
- Add Application Product mixes (such as a tank mix, or a dry blend of multiple products).
- Add or import Harvest products.



• **Add button**

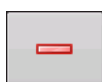
Press to add or import a Product. At the following screen, choose a Product Option: Add Product, Import Product, or Add Product Mix (if in Application). From here, an on-screen wizard continues you through each step of the setup process.

- When finished, the new product appears in Product Tab.
- When you highlight the product, information about the product appears on the right side of the screen.
- Specific planting and application product information can be viewed in those respective chapters.



• **Rename button**

Press to rename the product.



• **Remove button**

Press to remove a product.



**CAUTION:** When you remove a product all regions using that product will also be removed!

## Planting Settings

• **Edit Info button**

Press to edit the following information for the highlighted product in the Product List.

- Manufacturer

- **Edit Legend button**

Press to change the legend settings listed below.

- Average
- Range Spacing
- Color Scheme
- Ranges
- Reset to Default Legend

For more information, see *"Legend Settings" on page 44.*

## Application Settings

- **Edit Info button**

Press to edit the following information for the highlighted product in the Product List.

- Product Units
- Manufacturer
- EPA Number
- check box for restricted use pesticides

- **Edit Legend button**

Press to change the legend settings listed below.

- Average
- Range Spacing
- Color Scheme
- Ranges
- Reset to Default Legend

For more information, see *"Legend Settings" on page 44.*

## Grain Harvest Settings

- **Crop Settings**

Press the Edit button to open the Grain Settings screen where you can adjust the following settings:

- **Dry%** The percentage of grain moisture used to calculate Dry Bushels
- **Weight to Volume** The Weight to Volume conversion number used to calculate bushels.
- **Expand bushels for all grains below dry%** If the moisture of the harvested crop is below the dry percentage, the display increases weight to show the weight which would be shown if the crop equalled or exceeded the dry percentage.

- **Legend Settings**

Choose Yield or Moisture from drop down box.

Press Edit Legend to change the settings listed below.

- Average
- Range Spacing
- Color Scheme
- Ranges
- Reset to Default Legend

For more information, see *"Legend Settings" on page 44.*

# MANAGEMENT BUTTON

The Management tabs, which are accessible from the Management button on the Setup screen, include Grower/Farm/Field, Season, and Operator.



Press: Home button > Setup (wrench) button > Management (Barn) button

## GROWER/FARM/FIELD TAB



Press: Home button > Setup (wrench) button > Management (Barn) button > Grower/Farm/Field tab

### Grower

The Grower refers to the business or person that the system is in operation for. Contact information can also be entered for each Grower. The Grower information will be passed into mapping software for automatic Grower setup within desktop software.



• **Add button**

Press to add a Grower.



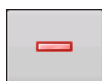
• **Rename button**

Edit an existing name of a Grower by highlighting that name and pressing button.



• **Setup button**

Press to enter information for the Grower's Name, Tax ID and Memo.



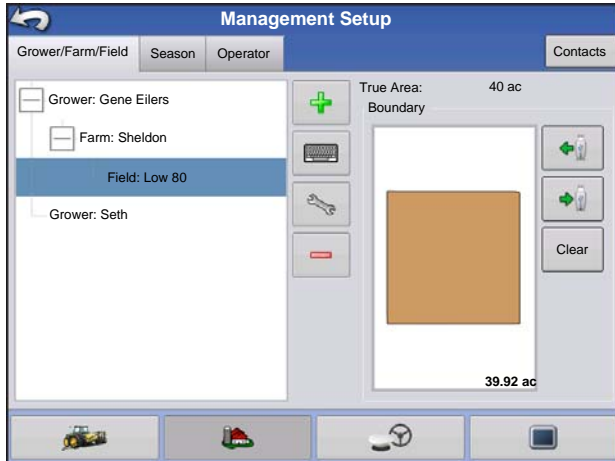
• **Remove button**

Press to remove a Grower.



**Note:** Personal Information entered at this screen can be added or edited at any time.

## Farm and Field



In the display, farms are subdivided into fields. You can associate Field names with a particular Grower. If the display will be used for multiple Growers, enter each Grower business name and associate the field names with the correct grower when the fields are set up within the system.

In the Field Tab, select a Grower underneath the drop-down menu at the top. Each farm of that particular grower is shown in a list, with the fields within that farm as subcomponents within that list.



• **Add button**  
Press to add a Field.



• **Rename button**  
Edit an existing name of a Field by highlighting that name and pressing button.



• **Setup button**  
Edit the Farm and Field information by highlighting that name and pressing button. The Field Information screen appears.



• **Remove button**  
Press to remove a Field.

The Field Information screen opens, showing the name of that field in the Title Bar. Field Name information that can be added or edited by pressing



including **Farm, County, Township, Range, Section Number, Area, FSA Number, FSA Area** and **Legal Description**.


• **Area**  
shown in the total acres (hectares) of the field.

• **FSA Number**  
refers to the U.S. Farm Service Agency's four-digit number assigned to every field.

• **FSA Area**  
refers to tillable acres as established by the FSA.


• **Clear Bounds button**

Press to center the map on the current GPS position.

 **Note:** The Clear Bounds feature is particularly useful if you have flyer points or have logged a point outside the mappable range of your current location.

**Importing and Exporting Field Boundaries**

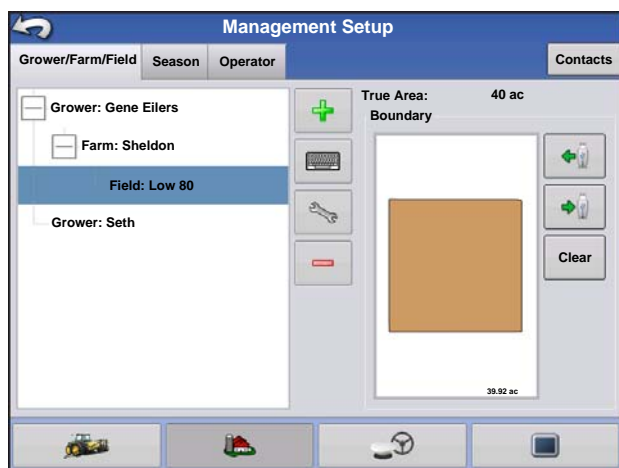
Boundaries can be created with the display or imported from desktop GIS software. Any boundary files present in the display can also be exported for use in desktop mapping software.

 **Note:** For more information on creating boundaries, see “Create Boundary” on page 47.



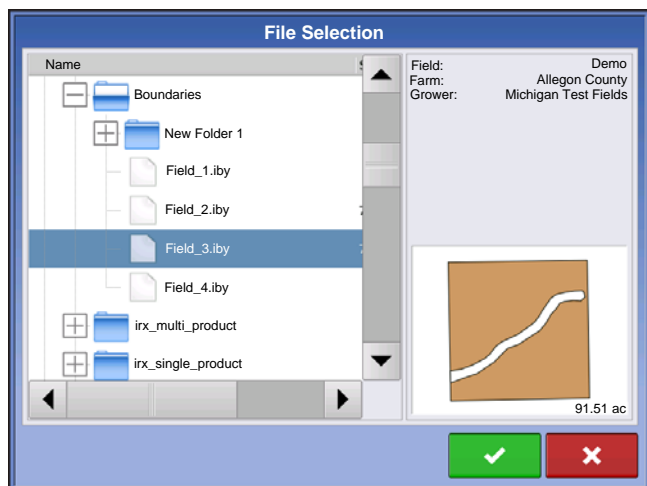
• **USB Import button**

To import a boundary from the USB drive, first go to the Setup Field tab, highlight the correct field in the Farm/Field list and press the USB Import button.



The File Selection screen appears. Highlight the desired file to import.

Operator can import/export all fields and boundaries at once with an .AGSETUP file. For more information on .AGSETUP files see [See “.AGSETUP” on page 239.](#)




Press  to complete the import process.

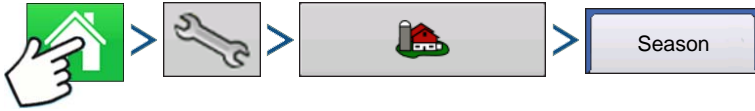


• **USB Export button**

To export a boundary to the USB drive, highlight the correct field in the Farm/Field list and press the USB Export button. At the File Selection screen, highlight the desired field to export.

A screen will appear telling you that the boundary was exported successfully. Press  return to the field setup screen.

## SEASON TAB



Press: Home button > Setup (wrench) button > Management (Barn) button > Season tab

A season is defined as the calendar year that the crop will be harvested. A season has a start and an end date. Creating a season and setting it to active is required prior to the system logging any data.

The seasons are displayed in lists, with the Active season displayed in bold face type. All new data is logged to the active season; therefore a season must be set as Active before you can log any new data to it.



• **Add button**

Press to add a Season.



• **Edit button**

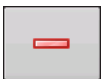
Edit an existing name of a Season by highlighting that name and pressing button.

• **Set Active button**

Press to set the season selected in the Summary list box to the active season.

• **Season Reminder button**

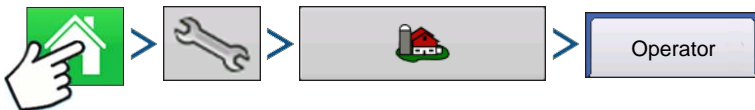
Press to set the date that the system will prompt the operator to create a new season.



• **Remove button**

Press to remove a season.

## OPERATOR



Press: Home button > Setup (wrench) button > Management (Barn) button > Operator tab




• **Add button**

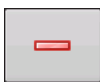
Press to add an Operator.



• **Setup button**

Press to edit operator information by highlighting that name and pressing button. At the

Personal Information screen, you can press  to add or edit information for that operator, including name, business phone, fax, address, applicator license, home phone, mobile phone, and email.

- 
**Remove button**  
 Press to remove an operator.

## DISPLAY SETTINGS BUTTON



Press: Home button > Setup (wrench) button > Display button

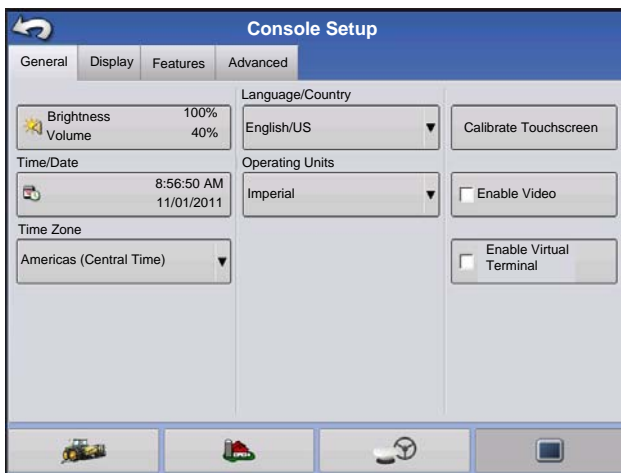
The Display screen contains the following tabs:

- General tab**  
 displays settings related to Time, Date, display screen settings, operating units, video and display owner information.
- Display tab**  
 contains functionality for setting up a Display Owner and making any needed edits to the owner personal information.
- Features tab**  
 lists unlocks for a particular display.
- Advanced tab**  
 includes information related to log files and system backups.




## GENERAL TAB




Press: Home button > Setup (wrench) button > Display button > General tab





The Setup General Tab is consists of the following items:

- Time/Date button**  
 Press button and use  /  to adjust the hours, minutes, A.M./P.M. settings, month, date and year. To make these changes effective, press  .

 **Note:** The display will then shut down immediately. If you do not want to shut the display down, press the Close (Red X) button; however the time/date changes will not be accepted until the display is shut down and restarted.

- **Brightness and volume percentages.**

To change these, press the Brightness/Volume button and use  /  to change the percentage of the Display Brightness and Speaker Volume.

- **Calibrate Touchscreen.**

Press this to launch the Touch screen Calibration wizard. Calibrate the touch screen by following the on-screen instructions.



**CAUTION:** Do not use any sharp objects to operate the touch screen or the display may be damaged.

- **Time Zone**

Use the drop-down menu to select your time zone.

- **Language/Country Selection**

Use the drop-down menu to select the language.

- **Operating Units**

Select either Imperial or Metric.

- **Enable Video**

Enables input from up to four video cameras.

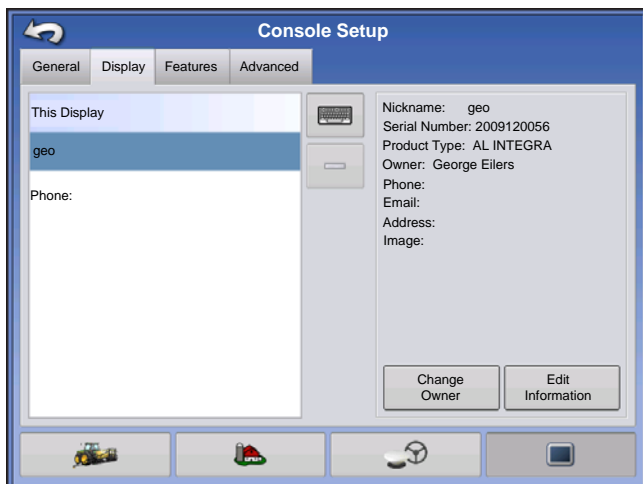
- **Enable Virtual Terminal**

Must be unlocked

## DISPLAY TAB



Press: Home button > Setup (wrench) button > Display button > Display tab



The Display tab contains functionality for setting up a Display Owner and making any needed edits to the owner personal information. The Display Owner information is used in the product application report feature of application rate control.

- Nickname
- Serial Number
- Product Type
- Owner
- Phone
- Email
- Address

- Image
- Change Owner
- Edit Information



## FEATURES TAB



Press: Home button > Setup (wrench) button > Display button > Features tab

### Unlocking Features



The Features Tab is where you can enter unlock codes. Unlock codes are unique to the serial number of each display and the feature registration number. You must supply these numbers to your dealer when purchasing any unlock codes. Press to enter the unlock code and press to enable the feature.

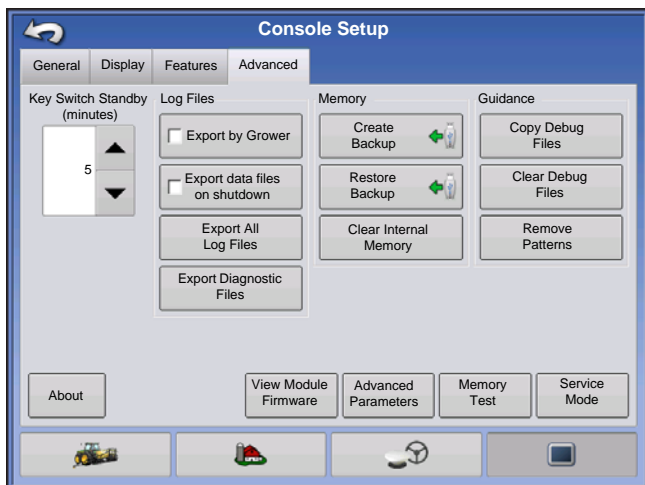


**Note:** Once a feature is unlocked, that feature remains with that display and cannot be transferred to another.

## ADVANCED TAB



Press: Home button > Setup (wrench) button > Display button > Advanced tab



The Advanced Tab allows you to specify settings for copying log files; specify Key Switch Standby settings; view and manually upgrade module firmware; and create and restore backup files.





**CAUTION:** The **Export Diagnostic Files**, **Advanced Parameters**, **Copy Debug Files**, **Clear Debug Files** and **Service Mode** functionality on the **Advanced Tab** is reserved for use by the manufacturer. **DO NOT** change any of these settings without specific instruction from the manufacturer.

---

### • Key Switch Standby

This setting allows the display to remain powered up after the vehicle power has been shut down. Instead, the display will switch into standby mode and will appear to be shut off; however the power light will change to an amber color. Pressing the touchscreen while it is in standby mode will immediately turn the screen back on again.

Use  /  to specify a length of time that you wish the display to remain powered up in standby mode after the vehicle power has been shut down.

---



**Note:** When the time you specified in **Key Switch Standby** is nearly expired, then the amber-colored power light will flash on and off immediately preceding shutdown. If you wish the display to remain powered up for a longer period of time, touch the display to restart the **Key Switch Standby** countdown.

---

### • About button

Displays product licensing information and copyright information.

### • Log Files

These settings allow you to copy your data in the display.

- **Export by Grower** Press of export log files by growers.
- **Export Data Files.** Press to copy all logged data in the display to the USB drive.
- **Export Data Files on Shutdown.** Checking this checkbox will copy all log files to the USB drive when the display is powering down.
- See *“Export Files” on page 50* for more information.

### • Memory

Adjusts information stored in the display’s internal memory.

- **Create Backup.** Press to create a backup file of all configuration settings, products, and Grower-Farm-Field Management data structure on the USB drive. Backup files are stored using the .ibk2 file format.
  - **Restore Backup.** Press to restore a backup file from the external data drive to the internal memory of the display.
  - **Clear Internal Memory.** Press this button to clear the internal memory of the display. The system will present a warning dialog box and ask if you would like to create a backup file prior to clearing the memory.
- 



**CAUTION:** Once you clear the system’s internal memory, this information is deleted and cannot be restored unless a backup has been made.

---

- **View Module Firmware.** Displays the Module Firmware Management screen, which is a list of all firmware modules and firmware versions that are available for the display.
- 



**Note:** The *Module Firmware Management* list includes module firmware that you may not be running.

---

- **Import** - Imports any firmware stored on the USB drive into the display memory.
- **Direct Upgrade** - Upgrades an individual module directly from the USB.

- **Remove** - Removes unwanted module firmware from the Module Firmware Management list.



**Note:** *Pressing the Remove button does not remove firmware from the module itself. It merely removes the upgrade file from the display.*

---

- **Remove Patterns.** Pressing this button permanently erases all guidance patterns from the display's memory.



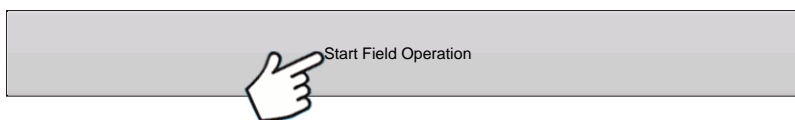
# MAP SCREEN

## SETUP FIELD OPERATION

You must have already created the following:

- A **Season, Grower, Farm** and **Field** in Setup Management. For more information, see *“Management button” on page 23.*
- An **Operating Configuration** at the Setup screen's Configuration Tab. This Operating Configuration consists of Equipment, Vehicle, Implement, Controller (optional), Container (in Application), and Ground Speed Source.
- A **Product** (if you are creating an Application or Planting Field Operation) at the Setup Product Tab. For more information, see *“Product tab” on page 21.*

All of these are referenced by the Field Operation Wizard during the Field Operation setup process.



Press the **“Start Field Operation”** button and follow the steps in the wizard.

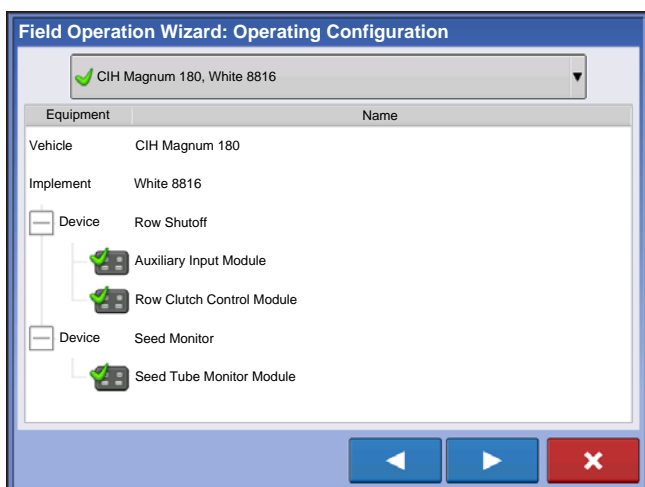
### 1. Grower, Farm and Field Selection

Enter a Growing Season and Grower either by pressing / to select existing ones, or by pressing to create a new one. Then add a Farm and Field either by pressing / to select existing ones, or by pressing to create a new one. Press to proceed to the next step.

### 2. Operating Configuration Selection

Use / to select an operating configuration.

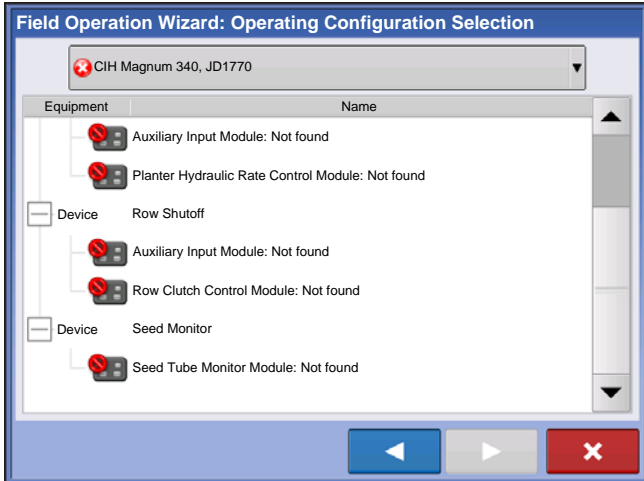
#### All Modules Detected





Configuration can be loaded and is detecting all modules setup in the configuration.

Display is detecting the module.

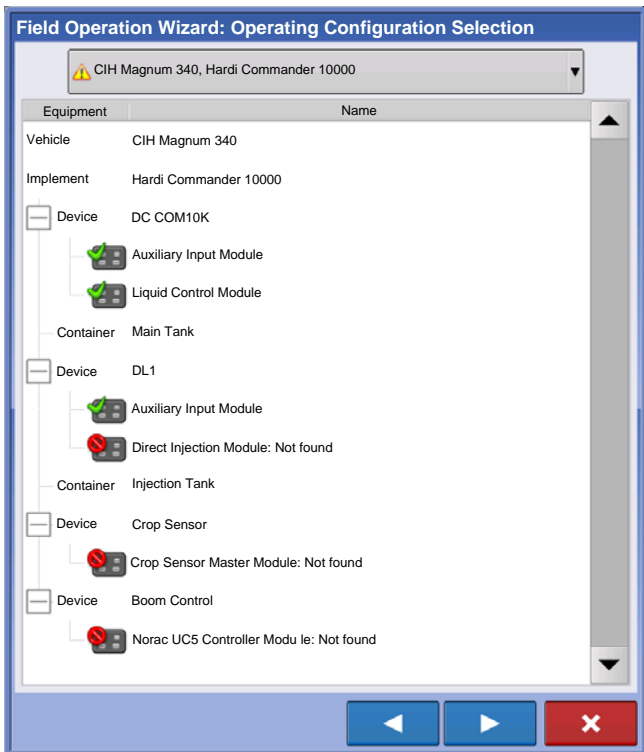
## Modules Missing





 Configuration can not be loaded.


 Display is not detecting module.

## Some Modules Not Detected

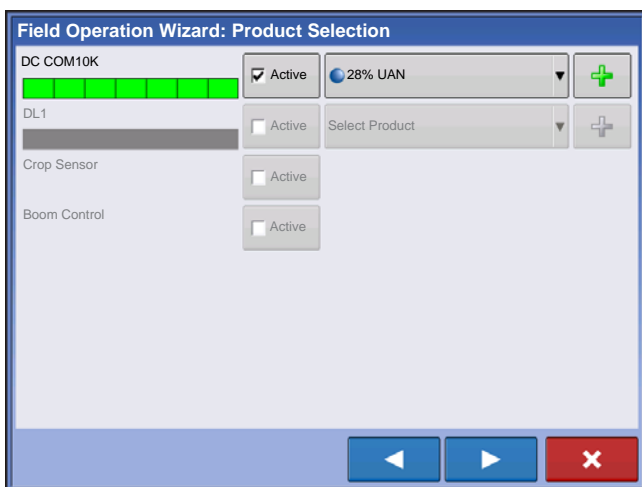


 Configuration can be loaded but is not detecting all the modules associated with the configuration. When loaded, it will not perform the functions of the missing modules.

 Display is detecting module.

 Display is not detecting module.

An example of an application configuration is shown. The Direct Command module is detected by the display but the Direct Injection, Crop Sensor, and Boom Control modules are not.



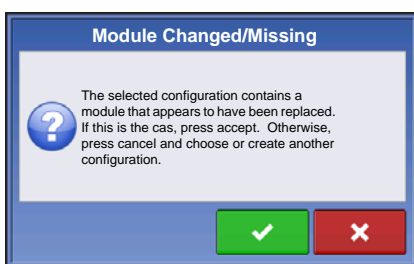
If the configuration is loaded, the screen will show that the Direct Command module is active but Direct Injection, Crop Sensor, and Boom Control modules are greyed out and not functional.


All Modules Detected - Not all Modules are the same as previously used



⚠ Configuration has a module that was not used previously.



🔧 Module is not the one that was previously used.



⚠ If an operator selects a configuration that has a 🔧, the Module Changed/Missing window will appear, verifying that you want to load the configuration. If you press , the configuration will be updated with the modules currently being used.


Press  to continue.

### 3. Product Selection

A planting or application configuration must include a product. Select product from the drop-down list or press  to create a new one. Press  to continue.

- If you are selecting an application product, you may check the box marked **Show Only Tank Mixes and Blends** at the Product Selection screen. If this box is checked, the display will only allow the selection of tank mixes that were previously set up.

### 4. Region Options

Press  to edit or change the region name from the system default if desired. At this screen, you can also create a new region or change the controlling product.

## 5. Return to Home screen

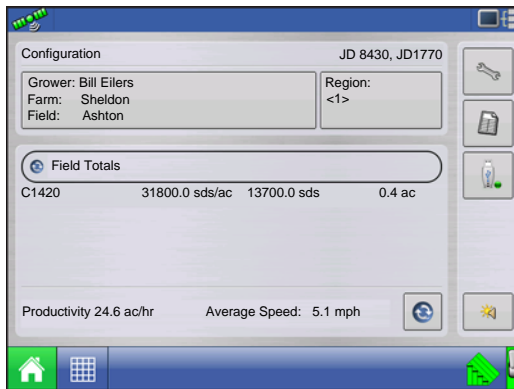
When you complete the steps in the Wizard, you will return to the Home screen.

- For information on Run screen operations, see [“Run screens” on page 39](#).

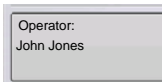
## FIELD FINDER

If you have an existing field boundary, and your current GPS position is within that field boundary, the display will automatically pick the correct Grower, Farm and Field combination when you start a Field Operation.

## HOME SCREEN AFTER CONFIGURATION

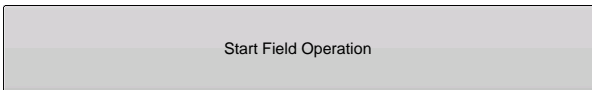


After you have created an Equipment Operating Configuration and then selected a Grower, Farm and Field for that configuration, the Home screen will appear.



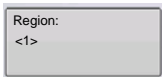
### • Operator button

Allows you to select a machine operator from the drop-down list. Machine operator information is logged with all field operations. Operator information may be entered in Management Setup at [“Management button” on page 19](#)



### • Start Field Operation button

Opens the Field Operation Wizard where you can enter information relating to your Growing Season, Grower, Farm, Field, Operating Configuration Selection, Crop Type and Product. You can also Change Operations and End Operations. For more information, see [“Setup Field Operation” on page 33](#) and also [“Field Operation Options” on page 37](#).



### • Region button

A region is used to subdivide a field into smaller sections. The region in which data is currently being logged is listed on the Region button. A new region can be created at any time as you are performing a field operation.

To change between or add a new region to a field, press the Region button and follow the on-screen instructions.

The Operation Summary area of the Home screen is where you can view instantaneous field totals. If you are using a multi-product configuration, the field totals for each product is displayed separately. At the bottom of this area of the screen, current data is shown for **Productivity**, **Average Speed**, **Operating Time**, **Area Complete** and **Area Remaining**.



### • Setup button

Opens the Setup screen. For more information see [“Configuration button” on page 19](#).

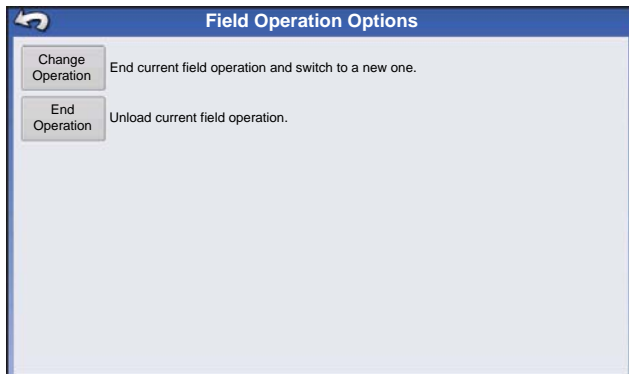




• **External Storage Operations button**

Copy your field data; upgrade display firmware; as well as import, export and manage files. For more information, see *“External Storage Operations” on page 49.*

## FIELD OPERATION OPTIONS



During a field operation, you can change or end the field operation by pressing on the Grower Farm Field (Start Field Operation) button. This opens the Field Operation Options screen.

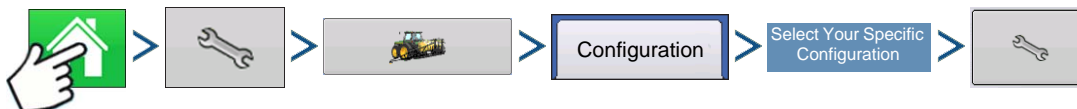
• **Change Operations**

Pressing this button ends the current field operation and allows you to start a new one. Pressing this button ends the current field operation and opens the Field Operation Wizard, where you may create a new field operation.

• **End Operation**

Pressing this button ends the current field operation. The Home screen then appears as before the creation of a field operation, as shown on *“Home Screen” on page 18.*

## CONFIGURATION SETUP SCREEN



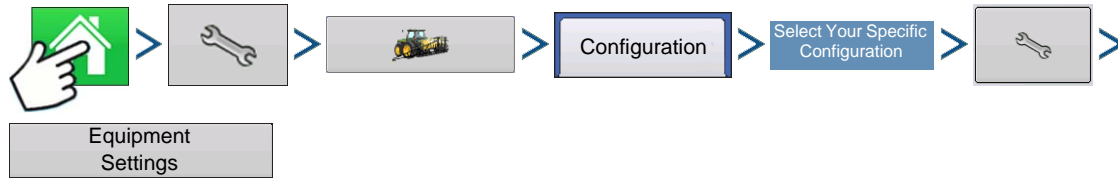
Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button

The Configuration Setup screen is where you can make settings adjustments for your equipment, ground speed, GPS, and controllers.

The appearance of this Configuration Setup screen varies, based on your particular configuration. Some DirectCommand and SeedCommand configurations include settings that are mentioned in those individual chapters. Most Configuration Settings screens will include the following buttons.

- **Equipment Settings.** For more information, see *“Equipment Settings”* below.
- **Speed Input.** For more information, see *“Speed Input Settings” on page 55.*
- **AutoSwath.** For more information, see *“AutoSwath” on page 58.*
- **GPS Offsets.** For more information, see *“Vehicle Offsets” on page 59.*
- **Swath Section Offsets.** For more information, see *“Swath Section Offsets” on page 60.*
- **Controller Settings.** For more information, see information in the SeedCommand and DirectCommand chapters.
- **Calibrate Pressure.** Used in DirectCommand Liquid Application configurations.

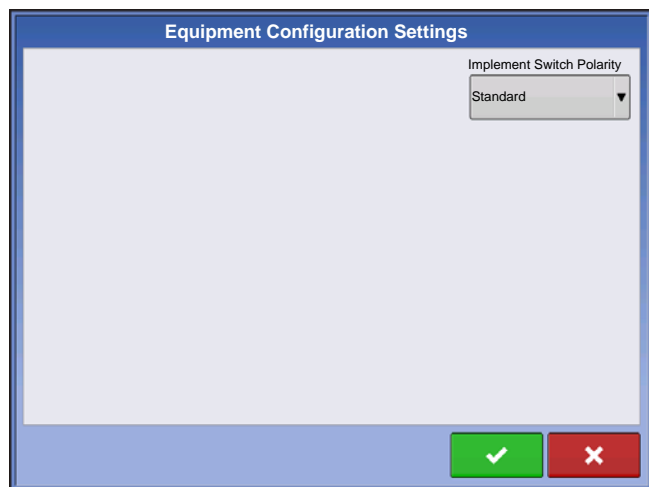
## EQUIPMENT SETTINGS



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Equipment Settings button

Press the Configuration Settings button on the Configuration Setup screen to view or edit the name of your Equipment Configuration Settings. The appearance of this button will vary, depending upon whether you are using a Area Logging operating configuration (with or without an implement switch); or whether you are using Rate Logging/Control for a DirectCommand or SeedCommand operating configuration. Area Logging settings are explained below. If you have an operating configuration with Rate Control, see *"Equipment Configuration Settings for Rate Control" on page 39.*

### Implement Switch Settings (for Area Logging)



If you are using an Area Logging (Site Verification) operating configuration (meaning that the configuration does not use Rate Logging or Rate Control) then you must specify an Implement Switch Setting. At the Configuration Setup screen, press the Configuration Settings button.

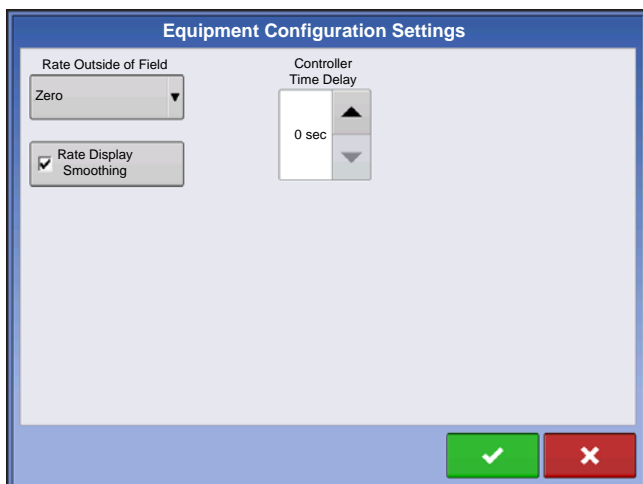
The Equipment Configuration Settings screen appears.

If you will be using an implement switch choose **Standard** or **Reversed** polarity.

If an implement switch is not in use, select **None**.


Press  to return to the Configuration Setup screen.

## Equipment Configuration Settings for Rate Control



If you are using an operating configuration with Rate Control, (such as for certain DirectCommand and SeedCommand configurations) you must specify Equipment Configuration Settings. At the Configuration Setup screen, press the Configuration Settings button. The Equipment Configuration Settings screen appears.

These settings are directly related to that specific combination of Vehicle, Implement, and Controller.

- The configuration name can be changed by pressing  .
- The **Rate Outside of Field** selection determines product control channel behavior when the field boundary is exited.
  - **Zero Product** - Product application will turn off.
  - **Last Good** - Product application will continue at the last value used by the control system.
  - **Rx Default** - Product will be applied at the default rate setting

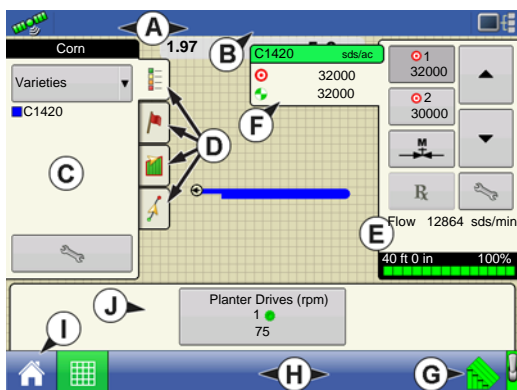
### • Rate Display Smoothing setting

Determines how the feedback from the control channel rate sensor will be displayed on the map screen. When de-selected, the system will display raw feedback from the rate sensor. When checked, the system will display target rate when the application rate is within 10% of the target rate setting.

### • Controller Time Delay setting

Compensates for any latency in the control system when changing between different product flow rates during variable rate application. The typical setting range for this is 0 - 1 seconds.

## RUN SCREENS



- (A) Status Bar
- (B) On-screen Light bar
- (C) Mapping toolbox
- (D) Mapping Function tabs
- (E) Product Control toolbox
- (F) Product tabs
- (G) Function buttons
- (H) Task bar
- (I) Main Screen buttons
- (J) Equipment tab

The appearance of the Map screen varies, depending upon which operation you are performing, and your specific operating configuration.

The task bar displays buttons relating to various functions of the display. These buttons and status indicators include Home, Mapping, Autoswath, Logging, and Auxiliary Input Status. These buttons are shown in front of a green background when you are at that screen; otherwise they are shown in front of a blue background.



**Home button** Pressing the Home button takes you to the Home screen.

**Map button.** Pressing the Map button takes you to the Map screen. Pressing it more than once cycles the Map screen to zoom in and out.



ZOOM DETAILS



ZOOM TO EXTENT



PERSPECTIVE VIEW



**Note:** The Perspective View is only available when guidance is active.



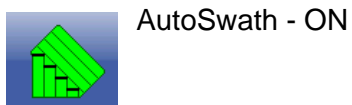
**Video button.** Pressing this button takes you to the video screen. Pressing this button repeatedly cycles through the video inputs.



**Note:** For more information on the Video screen, see “Video” on page 48.

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**AutoSwath button.** Pressing this button turns the AutoSwath feature on and off. When AutoSwath is on, the icon is green; when it is off the icon is white.



AutoSwath - ON



AutoSwath - OFF

**Area Logging Status button.** This button appears for configurations that do not use rate control, such as Tillage, Harvest, Planting operations that do not use SeedCommand, and Application operations that do not use DirectCommand. Pressing this button turns logging on and off.



ON



OFF

The NORAC Engage button enables boom height control. This button can toggle back and forth between Automatic Mode and Manual Mode.

- When you enable Automatic Mode, this button turns green with three lines appearing underneath the triangle. At the same time, the display beeps three times.
- When you disable Automatic Mode on any part of the boom and the display switches to Manual Mode, this button turns grey and the display beeps twice. If less than the full boom remains in Manual Mode, the display will continue beeping twice every three seconds.



NORAC Engage - Enabled



NORAC Engage - Disabled

The Engage icon shows that the autosteer system is on, off, or off but ready to engage. The appearance of this icon displays the following:



Engage - ON

**Green** if the autosteer system is on.



Engage - Ready

**Grey** if the autosteer system off but ready to engage.



Engage - Not Ready

**Grey** with a red circle and slash if the autosteer system is off and unable to engage.



**Note:** For more information, see ["Guidance" on page 81](#).

Master Switch Status. This bar shows that the Master Switch is active.



Master Switch - ON (GREEN)



Master Switch - OFF (RED)

## GPS SIGNAL INDICATOR

The GPS button in the upper left-hand corner of the Map screen, displays the following colors:



Differential GPS

**Green** if you are receiving a differential GPS signal



GPS - No differential

**Yellow** if you are receiving GPS, but no differential signal



No GPS

**Grey** if you are receiving no GPS signal.

The Flex Mode icon appears for ParaDymes using Flex Mode. Flex mode provides continuity of position solution to maintain automated steering by seamless flexing (transitioning) to a lower accuracy mode when a higher accuracy mode is lost; such as loss of the RTK radio link.



Flex Mode - ON (GREEN)



Flex Mode - Exceeded (YELLOW)



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**Note:** For more information, see the ParaDyme Insert.

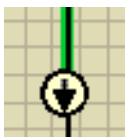


The Device Information button opens screens that display Device Information, Memory, Display, and display diagnostics.



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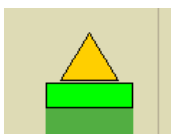
**Note:** For more information, See "Device Information" on page 53.



Vehicle Icon - Zoom to Extent

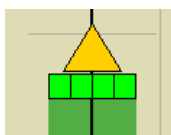
The Vehicle Icon is shown by an arrow inside a circle if the Map screen is viewed in Zoom to Extent.

The vehicle appears as a gold-colored triangle if the Map screen is viewed in Zoom Detail. The appearance of the zoomed-in icon changes depending upon the data being logged in the field.



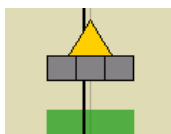
Vehicle Icon - logging

If the vehicle is logging, the implement icon appears as a green bar behind it.



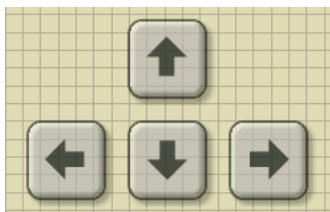
Vehicle Icon - with sections

If the vehicle is logging data from an implement split into sections, (for instance during a planting or application operation), then these sections appear in the implement icon.



Vehicle Icon - not logging

If the vehicle is not logging data, then the implement icon appears as a grey bar.



Press the grid area of the Map screen, and four arrow icons appear at the bottom right of the Map screen. An example showing these arrow buttons is at left. Pressing these arrow icons will move the center of the Map screen in the direction of the arrow button.



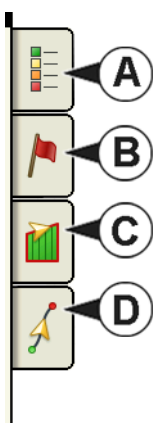
The Zoom Tool icons, which resemble a magnifying glass, are shown at the right-hand side of the Map screen.

Pressing the zoom tool with the plus sign increases the scale of the Map screen.

Pressing the zoom tool with the minus sign decreases the scale of the Map screen.

Pressing the zoom tool with the four arrows underneath re-centers the Map screen and brings its scale back to the default.

## MAPPING TOOLBOX



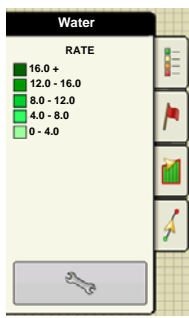
At the upper left hand side of the Map screen is the Mapping Toolbox. Press any of the four buttons on the toolbox and it expands. The toolbox consists of the following buttons:

- (A) Map Legend
- (B) Map Markers
- (C) Boundary
- (D) Guidance

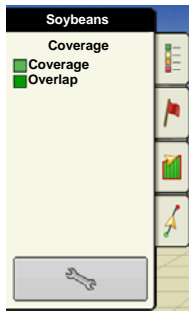
The Map Legend, Map Markers and Boundary buttons are explained in the rest of this chapter. The Guidance button is described in *"Guidance" on page 81*.

### Map Legend tab

Press the Map Legend button at the top of the Mapping Toolbox, and the Legend appears, either for Rate or Coverage.



## Map Legend - Rate



## Map Legend - Coverage



Legend Select — Press the Legend Setup (wrench) tool, and the Legend Select screen appears. Here you can adjust Legend Settings, clear the map

- **Clear Map**

Permanently removes on-screen map from the active field operation, but the log data will still be exported to the USB drive.

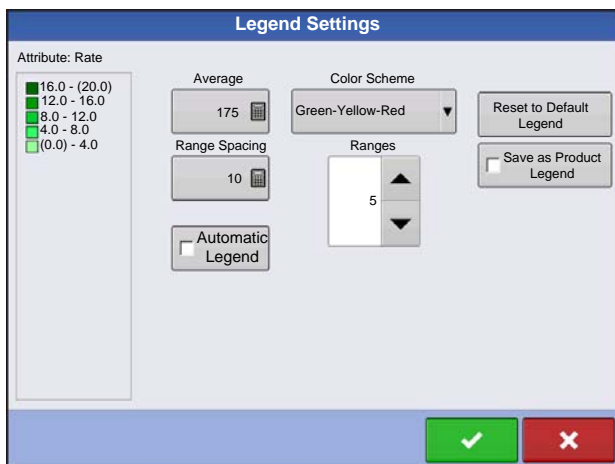


**CAUTION:** Once you clear the map, this information cannot be retrieved.

- **Load Reference**

Loads a list of maps of previous operations performed in that field. For each operation, you can view As-Applied or Coverage attributes; and Varieties if you are performing a Planting operation.

## Legend Settings



On the Legend Select screen, press the Setup (wrench) button next to the Rate button, and the Legend Settings screen appears. The Legend Settings screen allows you to change the default legend.

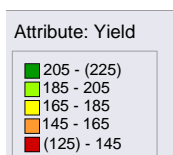


Notes:

- The Legend Settings screen can also be accessed by pressing the **Edit Legend** button on the Setup screen's Product Tab.
- Legend settings changes that are made at the Legend Settings screen will affect all regions.

The Legend Settings screen includes the following items:







**• Attribute**

Appears at the top left of the Legend Settings screen. Attributes shown for Harvest include Yield and Moisture. The Rate attribute is shown for Planting and Application operations. You can adjust the color scheme, spacing and ranges as they appear on the map screen, by using the buttons described below.

**• Average**

The Average button changes the average rate for the legend. Press  to specify the average of the ranges shown on the map legend.

**• Range Spacing**

The Range Spacing button changes the difference between the rates in one color range. Press  to edit the legend range spacing value, which is the total number of units represented by a particular color.

**• Ranges**

The Ranges  /  change the number of range increments displayed in the legend.

**• Color Scheme**

The Color Scheme can be modified by using the drop-down list. Choices include the following:

- Green-Yellow-Red
- Single Hue (blues or greens)
- Rainbow

**• Reset to Default Legend**

Resets the legend to the default settings.

**• Automatic Legend**

If the Automatic Legend checkbox is selected, the average automatically sets itself to the field average and updates as the field average changes

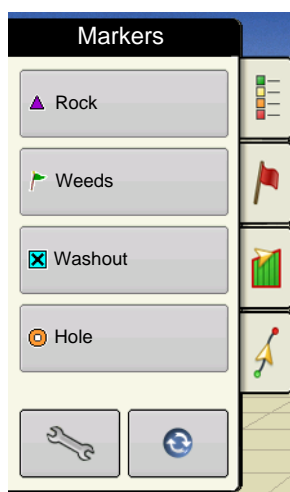
**• Reset to Default Legend**

Press the reset legend to the system default.

**• Save as Product Legend**

Select the Save as Product Legend checkbox if you wish to set the current legend as the default legend for all regions of the same product.

Markers tab



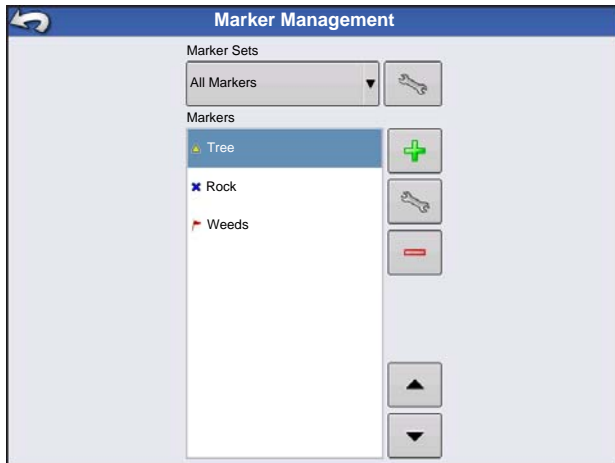
Markers are a collection of point objects that are available on the Map Markers tab of the Mapping Toolbox. Map markers allow you to map points on the go in order to identify specific features within a field. Press an individual marker to indicate a Map Marker on the Map screen.

If all of the Markers that you created are not immediately visible in this screen, use the Cycle Markers button to view more that you created.


Cycle Markers








## Edit Markers



### Marker Sets

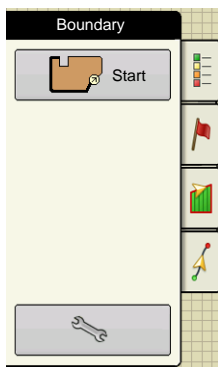
Pressing  allows operator to create, name, and delete marker sets.

### Markers

- Press  to add a marker.
- Press  to edit a marker.
- Press  to remove a marker
- If you have numerous map icons, you can cycle through them by pressing  / .

- When creating or editing a marker, check the **Georeferenced Note** button if you wish to add a Field Note that is referenced to the current GPS position when that marker is used.

## Boundary Tab

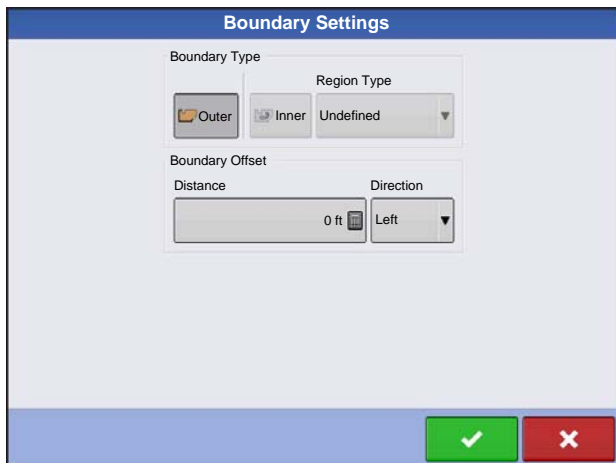


Pressing the Boundary button on the Mapping Toolbox opens the Boundary Tab. Here you can Create, Import, Export, and Clear Boundaries. Before the creation of a boundary, the Start button appears at the top of the Boundary Tab.



During the creation of a boundary, the Stop button appears, and underneath it is the Pause/Resume button.

## Boundary Settings




Pressing the Start button opens the Boundary Settings screen.

Underneath the Boundary Type area, you have the choice of creating either an Outer Boundary or an Inner Boundary.

- Outer boundaries delineate the borders of an entire field.
- Inner boundaries mark specific features within that field, such as waterways or buildings.

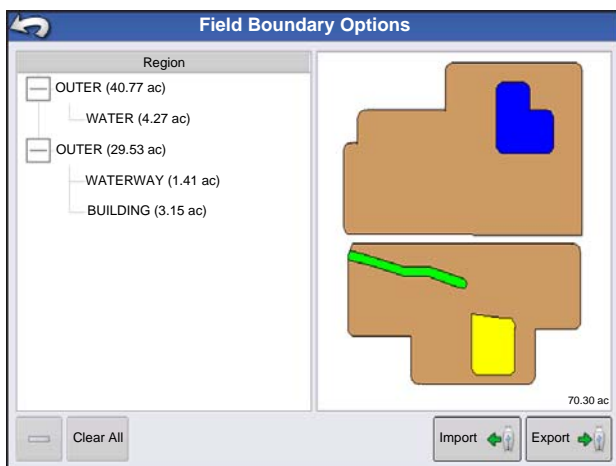
### Create Boundary

1. Choose whether to create either an Outer boundary or Inner boundary by pressing one of the two Boundary Type buttons.
2. If you chose to create an Inner Boundary, use the Region Type drop-down menu to choose the type of boundary. Choices include: **Roadway**, **Body of Water**, **Waterway**, **Buildings** or **Undefined**.
3. The Boundary Offset feature enables mapping a boundary at a user-defined distance to the left or right of the GPS antenna center line. If desired, specify a Boundary Offset distance by choosing a direction and distance from the GPS antenna center line.
4. Press  to start the boundary.
5. Press the **Stop** button to complete the boundary. At the Boundary screen, choose whether to **Save**, **Resume** or **Discard** the boundary.

### Pause Boundary

When creating a boundary, you can use the Pause Boundary button to create a straight line between two points. To do this, drive the vehicle to a point, press the Pause Boundary button, then drive to the second point. When you press the Resume Boundary button, a straight line is created between your current point and your pause location.

### Editing Boundaries



Press the Edit button on the Boundary Tab, and the Field Boundary Options screen opens. Here you can Import Boundaries, Export Boundaries, and Clear All Boundaries.

- **Importing and Exporting Boundaries.** For a description of Importing and Exporting Boundaries, see [“Importing and Exporting Field Boundaries” on page 25.](#)
- **Clear All Boundaries.** Press **Clear All** to permanently delete all Boundary information for that field.



**CAUTION:** Once you clear this information, it cannot be retrieved.

## VIDEO



- **Video button**

Press and the Video screen appears.



- **Brightness**

Press  /  to increase or decrease the brightness of the video input.

- **Contrast**

Press  /  to increase or decrease the contrast of the video input.

- **Camera Number Selection**

The display can receive input from up to four video cameras. Press the numbered buttons to switch views between video cameras.



**Note:** You can adjust the brightness and contrast of each input individually.

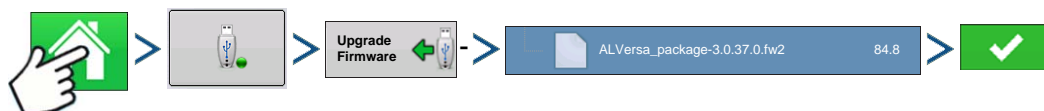
# EXTERNAL DRIVE

## EXTERNAL STORAGE OPERATIONS





The External Storage Operations button is where you can copy your field data; upgrade display firmware; as well as import, export and manage files.

### UPGRADE FIRMWARE



Press: Home button > External Storage button > Upgrade Firmware button > specific .fw2 file on USB drive > Check button

Pressing the Upgrade Firmware button allows you to upgrade the display firmware from the .fw2 file stored on the USB drive. At the File Selection screen, scroll through the list of files on the USB drive until you find the .fw2 firmware file. Highlight the .fw2 file and the box at the upper right-hand side of the File Selection screen shows the version of this file. Press  to continue, and the Upgrade screen informs you that the upgrade is beginning. At the Upgrade Ready screen, press .



**CAUTION:** Do not disconnect display power when the upgrade is taking place.

### IMPORT FILES



Press: Home button > External Storage button > Import Files

The File Selection screen opens. Use the scroll bar to find the file you wish to import. File formats that you can import:

#### .AGSETUP

Use to transfer setup information from display to display or from SMS and display

- Replaces MSF, IBY, PAT, IRX, REF
- Allows full synchronization of the following file formats:
  - Management Data (Growers, Farms, Fields, Seasons, Operators)
  - Products and Product Mixes
  - Boundaries
  - Guidance Patterns

- Marker Sets and Markers



**Note:** Do not use the IBK to “clone” a display anymore. Use AGSETUP.

---

## .AGDATA

- Includes all the necessary data to fully archive in SMS
- Includes recorded operation data
- Equipment Used
- Products Used
- Marks Logged
- Boundaries
- Guidance Patterns
- Flexible export options
- Will be able to export by Grower

## EXPORT FILES

### .AGSETUP



Press: Home button > External Storage button > Export Setup File

Use to transfer setup information from display to display or from SMS and display

- Replaces MSF, IBY, PAT, IRX, REF
- Allows full synchronization of the following items:
  - Management Data (Growers, Farms, Fields, Seasons, Operators)
  - Products and Product Mixes
  - Boundaries
  - Guidance Patterns
  - Marker Sets and Markers



**Note:** Do not use the IBK to “clone” a display anymore. Use AGSETUP.

---

## .AGDATA



Press: Home button > External Storage button > Export Data File

- Includes all the necessary data to fully archive in SMS
- Includes recorded operation data



- Equipment Used
- Products Used
- Marks Logged
- Boundaries
- Guidance Patterns
- Flexible export options
- Will be able to export by Grower

## MANAGE FILES



Press: Home button > External Storage button > Manage Files

Use the scroll bar to view a list of all files and folders. A bar at the bottom of the window shows how much memory is available on the USB drive.

To delete files, highlight specific file and press . The Memory Management screen warns that the selected files will be permanently deleted. Press  to permanently delete file.





# DEVICES

## DEVICE INFORMATION



Pressing on the Device Information button, located in the upper right corner of the display, opens the Devices screens. Technical support may request that you look at these screens for help in diagnosing a problem.

## DEVICES



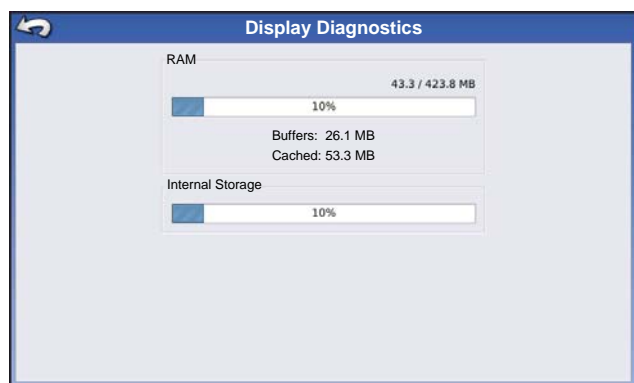
The Devices screen displays the modules that are connected to the CAN A and CAN B bus (CAN B is for ISOBUS). Select a device to display its particular firmware and hardware information.

Device Information includes **Firmware Version**, **Firmware ID**, **Hardware ID**, **Serial Number**, **Revision**, **Run Time** shown in hours:minutes:seconds and Display **Boot Counter**.



**Note:** Check the CAN device list to ensure that all hardware modules appear there.

## DISPLAY DIAGNOSTICS



Press Display on the CAN Device list, then press the **Diagnostics** button on the Devices screen to open the Display Diagnostics screen. This screen includes information about the system memory usage and available memory.

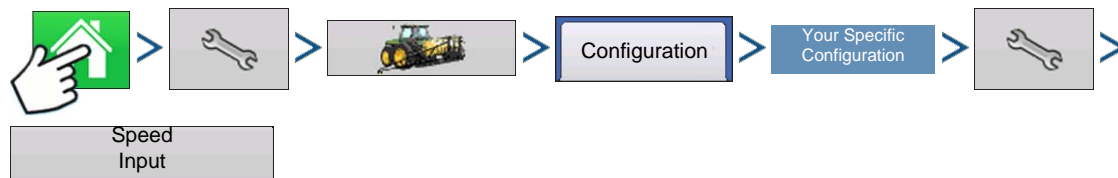


**Note:** For information on Auxiliary Input Settings Diagnostics, see [“Auxiliary Input” on page 56](#).

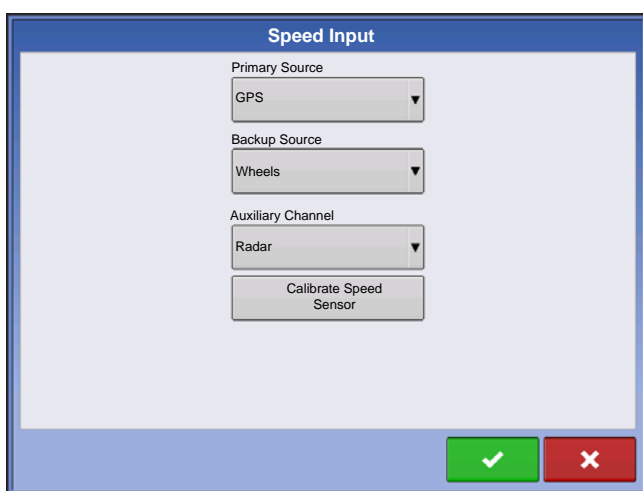


# SETTINGS

## SPEED INPUT SETTINGS



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Speed Input button



The Speed Input Settings screen is where you can calibrate the ground speed input for accurate speed and area calculations.

In most cases **GPS** is the primary speed source with **Radar** serving as backup. If you will be using **GPS** as the primary you will need to select a **Backup** source.

Choices for **Primary Source** include:

- GPS
- Wheels
- Radar
- Manual
- Other Possible Options:
  - Hardi ISO (on Hardi equipment)
  - Claas (on Claas Cebis)

Choices for **Backup Source** include:

- Wheels
- Radar
- Filtered - This setting is used only as a backup speed source for low pulse ground speed sensors. In times when primary speed source is lost, this setting allows you to calibrate and operate with a speed sensor that has a pulse output below the standard threshold of 305 pulses/100ft (imperial) or 10 pulses/meter

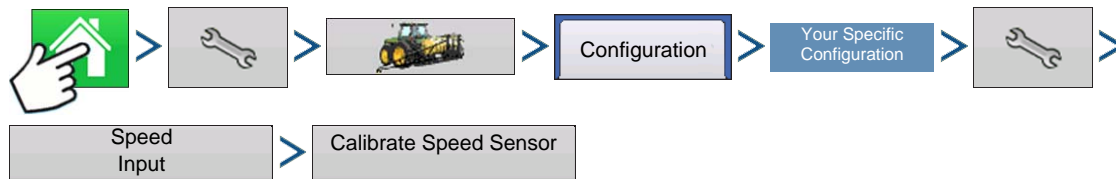
(metric). Using the “filtered” selection will allow calibration values down to 15 pulses/100ft (imperial) or 0.5 pulses/meter (metric). When the calibration values fall in this lower range, the speed sensor input will be filtered to achieve a more accurate rate control.

**Other Notes:**

- If you are using a backup radar speed source it is recommended that you calibrate it before the season begins.
- It is recommended to **Calibrate Distance** in the event of GPS loss. For more information, see “*Calibrate Distance*” on page 56.

## CALIBRATE DISTANCE

If you are not using GPS for ground speed, then after you have created a configuration you must calibrate the ground speed input for accurate speed and area calculations. If you are using GPS, it is recommended to calibrate distance in the event of GPS loss. Use the following procedure to calibrate distance:

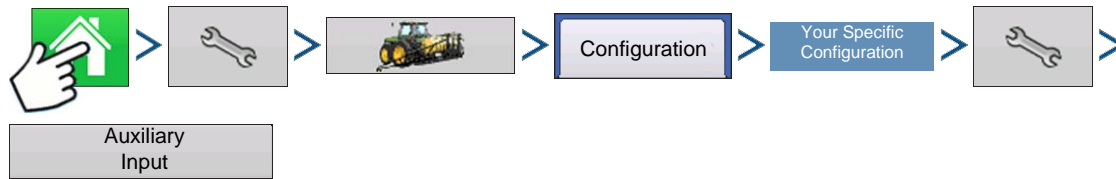


Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Speed Input button > Calibrate Speed Sensor

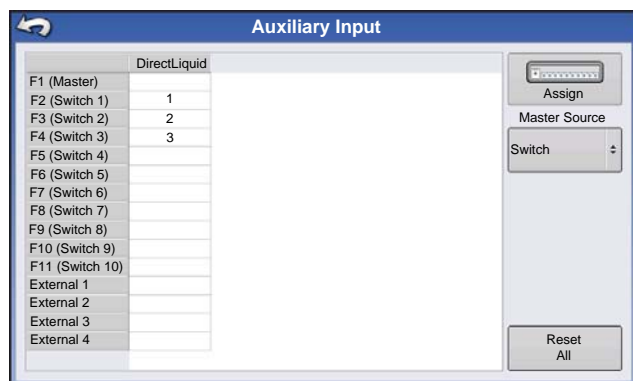
Follow instructions on screen to calibrate sensor.

**Note:** Calibration settings can be manually adjusted if desired by pressing **Enter CAL Number** and making small changes to the setting.

## AUXILIARY INPUT



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Auxiliary Input button



This Switch Mapping function is active only for DirectCommand or SeedCommand. The Auxiliary Input Settings screen displays settings for the Master Switch and other switches on a DirectCommand or SeedCommand Switch Box.

Auxiliary Input Settings can be adjusted by going to the Auxiliary Input Summary screen. Go to the Configuration Setup screen and press the Auxiliary Input button. The Auxiliary Input Summary screen

appears. This screen lists each switch on a switch box and which functions (if any) are assigned to particular switches.

The **Assign** button, located at the upper right-hand corner of this screen, opens the Auxiliary Input Assignment screen, where you can assign functions to switches and external inputs. For more information, see *“Auxiliary Input Settings” on page 57.*

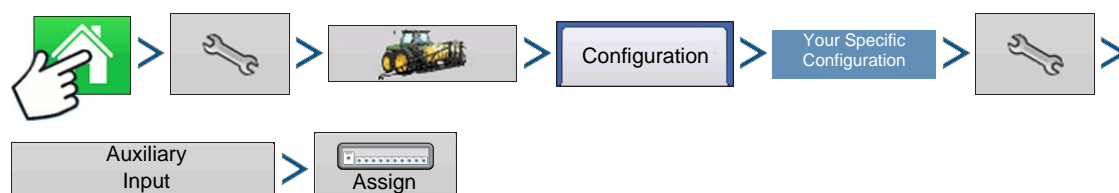
The Master Switch Source drop-down menu controls the master switch for your entire configuration. You may see the following options underneath this menu:

- **Switch** - Controls the master switch.
- **External 2** - This setting can control an optional, floor-mounted master switch.
- **External 1, 3 & 4** - Not used at this time.

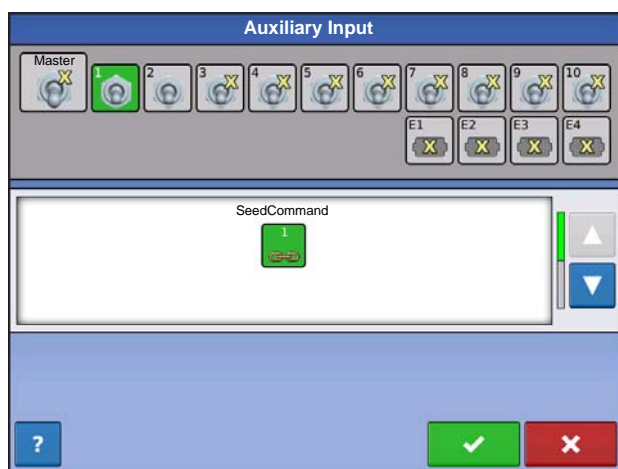
The F1-F11 switches can be assigned to any implement sections. You can use these to choose the switches that control a particular section or controller planting clutch. You can also make the following changes to the switch settings.

- Add a switch setting. For more information, see *“Auxiliary Input Settings” on page 57.*
- **Reset All.** This button resets the settings to defaults.

## AUXILIARY INPUT SETTINGS




Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Auxiliary Input button > Assign button



This screen shows all the switches and external inputs. Unassigned switches and external inputs are shown with a yellow “X”.

Change a switch’s function by selecting a switch from the top row and a function from the bottom menu.

## AUXILIARY INPUT: HELP

 If you need help adjusting the Auxiliary Input settings, then press the question mark key. The Auxiliary Assignment Help screen appears, which provides definitions for each of the icons.



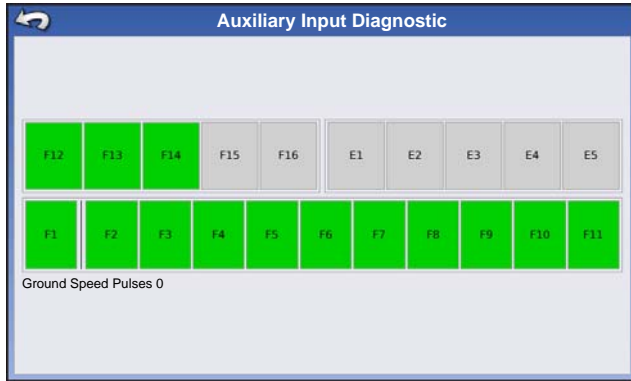


**Note:** DirectCommand can control fence row nozzles through a DirectCommand switch box by mapping the switches in Auxiliary Input Settings. The fence row nozzles can be mapped to any switch.

## AUXILIARY INPUT DIAGNOSTICS



Press: Display Information button > AUX DEVICE button > Diagnostics button



The Auxiliary Input Diagnostics screen lists the active switches. These color-coded boxes display the following diagnostics:

- **Green**

The switch box is connected to the Auxiliary Module in the On position.

- **Black**

The switch box is connected to the Auxiliary Module, but is in the Off position.

- **Grey**

The switch box is not connected to the Auxiliary Module.

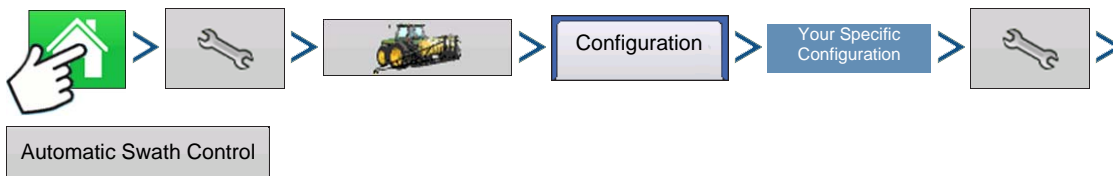
Below the list of switches is the number of Ground Speed Pulses coming in from the radar to the Auxiliary Module.

Technical support may request that you look at this screen for help in diagnosing a problem.

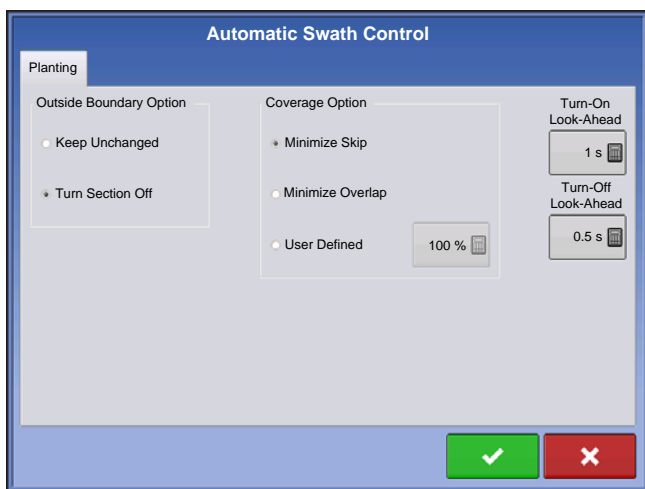


**Note:** The E2 position is the indicator for the foot box.

## AUTOSWATH



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Automatic Swath Control button



The Automatic Swath Control feature turns sections off and on automatically based upon the following conditions:

- Entering and exiting internal and outer field boundaries.
- Entering and exiting previously-applied areas within a field.

At the Configuration Setup screen, press the AutoSwath button. Assuming you are performing a Tillage, Application or Planting operation, the Automatic Swath Control screen appears.



**Note:** If you are performing a Harvest operation, see “AutoSwath Sensitivity Settings” on page 226.

**• Outside Boundary Option**

Select one of the two options to determine system behavior when a section exits a field boundary.

**• Coverage Option**

In the Coverage Option area, you must choose between three options:

- The Minimize Skip option turns off the implement section after the entire section is fully inside your coverage area. This prevents the possibility of skips.
- The Minimize Overlap option turns off the implement section when that section first enters your coverage area. This prevents the possibility of overlaps.
- The User Defined option allows you to choose what percentage of the implement section is within the coverage area before that section turns off. For example, if you choose 50%, then the section will switch off when half of it is within your coverage area.

**• Turn-On Look Ahead**

This setting determines how far ahead the system looks to turn the sections back on. This setting compensates for delay in the planting control system when the implement sections are turned on.

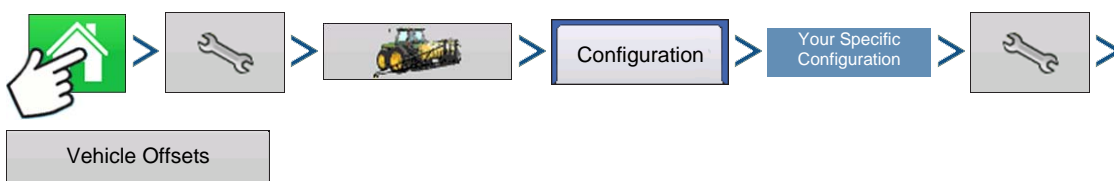
**• Turn-Off Look Ahead**

This setting determines how far ahead the system looks to turn the sections off. This setting compensates for delay in the product control system when the sections are turned off.



**Note:** To use AutoSwath for planting operations, you are required to use a 5 Hz or higher GPS output rate. AutoSwath control will not allow sections to be turned on until the master and planting section switches are on. If you have less than a 5 Hz GPS output rate and you select AutoSwath, a warning appears, telling you that AutoSwath Control is not available at less than 5 Hz.

## VEHICLE OFFSETS



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Vehicle Offsets button

After completing the process of setting up a Vehicle, you must configure vehicle offsets. These offsets define where the machine's rear axle and hitch is in relation to the GPS antenna. These settings are used by mapping.

The GPS Offsets settings consist of two tabs: the Antenna Tab and the Hitch Tab.

## ANTENNA OFFSETS TAB


At the Antenna Tab, enter the distance from locations on the vehicle to the antenna.

- Measure and enter the horizontal distance from the rear axle to the position of the GPS antenna. Select IN FRONT or BEHIND to indicate the position of the antenna in relation to the rear axle.
- Measure and enter the horizontal distance from the centerline of the vehicle to the position of the GPS antenna. Select LEFT or RIGHT to indicate the position from the vehicle centerline.
- Measure and enter the vertical height of the antenna above the ground.



**Note:** Accuracy when measuring for a specific setting is essential to ensure proper machine performance.


## HITCH TAB SETTINGS TAB

The Hitch Tab allows you to enter in the distance from four different mounting positions on the tractor to the rear axle. Press  to enter these values in if using the hitch point.




**Note:** Accuracy when measuring for a specific setting is essential to ensure proper machine performance.

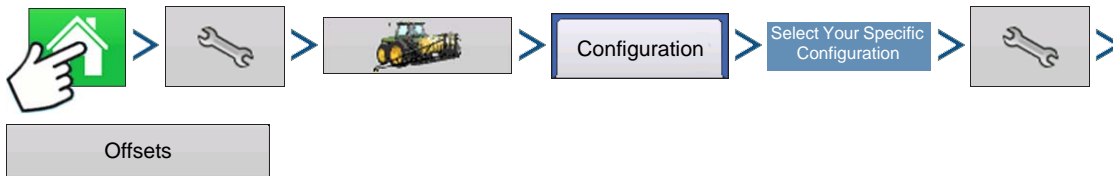
## MOUNT TAB SETTINGS (FOR SOME APPLICATION VEHICLES)

The Mount Tab will only be available when using a self-propelled application sprayer or spreader. This allows you to enter in the application location from the rear axle. Press  to enter in the distance and the drop-down box to select if it is in front or behind of the axle.

## HEAD TAB (FOR HARVEST VEHICLES)

The Head Tab allows you to enter in the distance from the head attachment point to the rear axle. Press  to enter the distance to the axle.

## SWATH SECTION OFFSETS






Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > select your specific configuration > Setup (wrench) button > Offsets button

The Implement Offsets screen opens. Depending upon your configuration, this screen may consist of up to two tabs: the Section Offsets Tab and the Hitch Offsets Tab.



## Section Offsets


- Press the first  to enter the distance from the mid-point of the swath section to the machine's centerline. Select to the left/to the right to indicate the direction the swath section is located from the vehicle centerline.
- Press the second  to enter the distance that the swath section is located from the hitch point. Press  when finished.



**Note:** Accuracy when measuring and entering implement offsets is required to ensure proper machine performance.

## ADVANCED SECTION OFFSETS

Width	F/B Offset	L/R Offset
2.500 ft	12.00 ft behind	18.750 ft left
2.500 ft	12.00 ft behind	16.250 ft left
2.500 ft	12.00 ft behind	13.750 ft left
2.500 ft	12.00 ft behind	11.250 ft left
2.500 ft	12.00 ft behind	8.750 ft left
2.500 ft	12.00 ft behind	6.250 ft left
2.500 ft	12.00 ft behind	3.750 ft left
2.500 ft	12.00 ft behind	1.250 ft left
2.500 ft	12.00 ft behind	1.250 ft right
2.500 ft	12.00 ft behind	3.750 ft right

Pressing the Advanced button opens another Implement Offsets screen which shows the swath section offset locations. Press  to change swath section offset measurements.



# VIRTUAL TERMINAL

The display is compatible with the ISO 11783 (ISOBUS) Virtual Terminal Standard. This enables support of many ISOBUS compliant implements on the display. Virtual Terminal functionality enables the compliant implement's user interface to be viewed and controlled on the display.



**Note:** Requires an unlock.

## COMMON TERMINOLOGY

- **ISOBUS Working Set**

One or more ISOBUS modules that control an implement's functionality

- **Working Set Master (WSM)**

Main module responsible for coordinating all communication between the VT and the Working Set including loading of the Object Pool to the VT screen

- **Object Pool**

Defines graphical components that ISOBUS modules present on a compatible display.



**WARNING:** Before operating an ISOBUS implement with the display, read the operator's manual provided by the implement's manufacturer and follow all safety information provided in the manual. When this display is used with an ISOBUS implement, the information and functions on the display are provided by the implement ECU and are the responsibility of the implement manufacturer.



**CAUTION: OnTrac2 and Virtual Terminal each utilize CAN B for communication. These systems can not be used at the same time. Verify which hardware has been installed.**



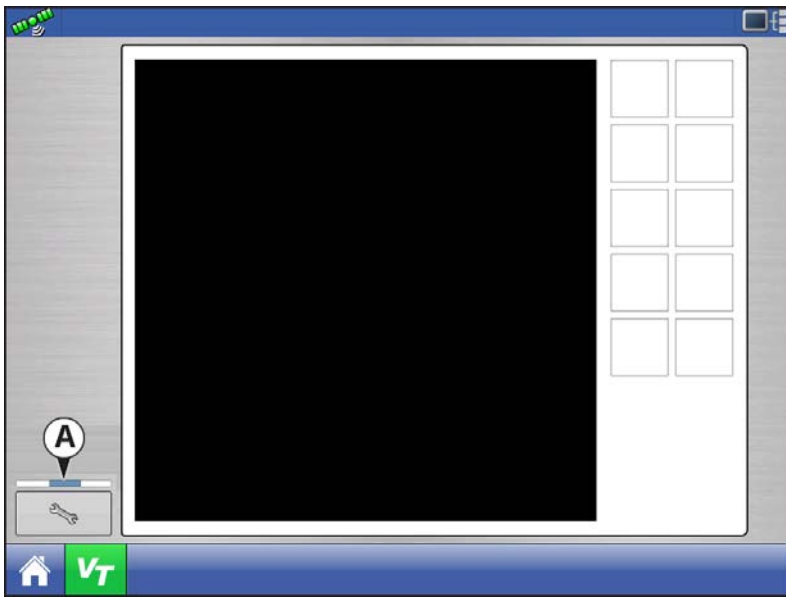
**CAUTION: OnTrac2+ communicates on CAN A, independent of Virtual Terminal communication on CAN B. These systems can be used at the same time. Verify which hardware has been installed.**

To enable the Virtual Terminal:

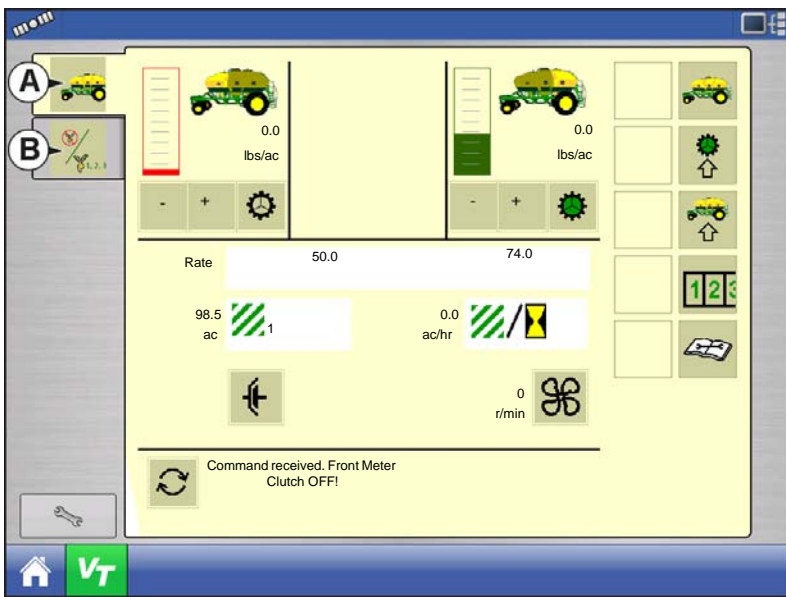



Press: Home button > Setup (wrench) button > Display button > Enable Virtual Terminal checkbox

Once a Virtual Terminal has been enabled  will appear in the task bar. Toggle between the Virtual Terminal run screen and other display functions by pressing the VT button.



When an ISOBUS compliant implement is connected to the display for the first time, the implement WSM sends its graphic interface, called the Object Pool, to the display. **Status bar (A)** appears while Object Pools are being loaded. This process might take several minutes depending on the number of Object Pools being loaded. Once loaded, object pools are stored in the display memory.

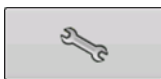


If there are multiple ISO implements connected, press the VT button  to toggle between Working Sets.

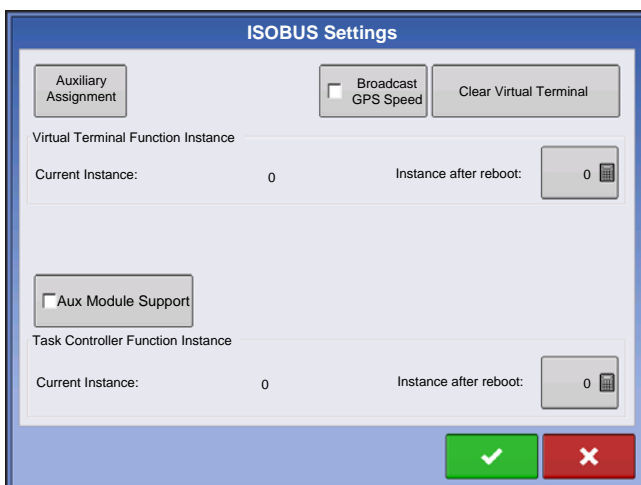
The Working Sets can also be accessed by pressing tabs (A) or (B) individually.



Advance through multiple screens of buttons. This button remains hidden unless more than 10 buttons are present.



Opens the Virtual Terminal Settings screen.



• **Auxiliary Assignment**

Assign implement functions to ISO compatible inputs.

• **Broadcast GPS Speed**


Checking this box allows the implement to use GPS ground speed that has been gathered by the display.

• **Clear Virtual Terminal**

Allows operator to clear the Object Pools sent to the display from the implement WSM. After the object pools have been cleared, the next time the implement is connected the object pools will be transferred from the implements WSM to the display again. When this button is pressed, a warning dialogue box appears with the following message:

“Are you sure you want to clear the saved interface files from all virtual terminal devices? Each device will resend its interface the next time it is connected.”

• **Virtual Terminal Functional Instance**

Always set to 0 except when there are multiple VTs on the ISO Bus Use  to change instance. Reboot Display

• **Task Controller Function Instance**

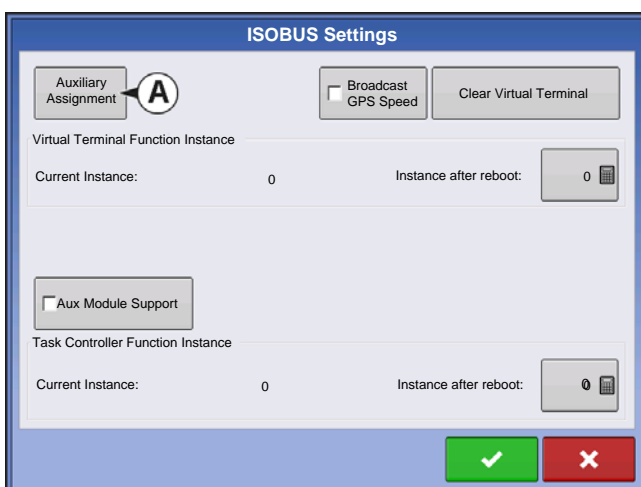
Only Applicable for HARDI Sprayers

- Full Task Controller implementation is planned for future release.

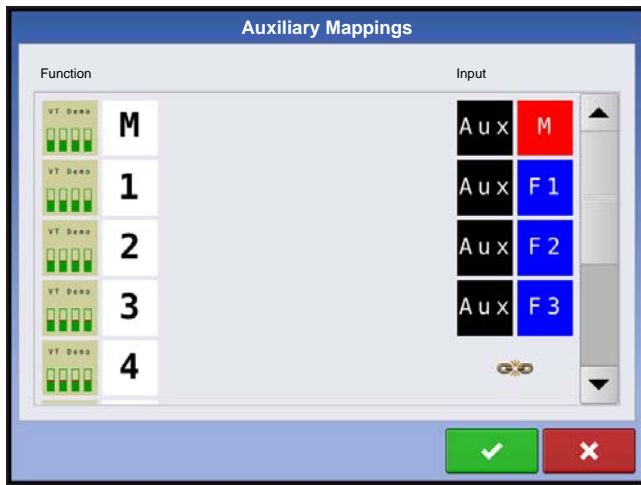
• **Aux Module Content Support**

Allows AgLeader Auxiliary Module to be used as an ISO device.

## AUXILIARY ASSIGNMENT



Press the **Auxiliary Assignment button (A)** on the Virtual Terminal Settings screen to access the Auxiliary Mappings screen.



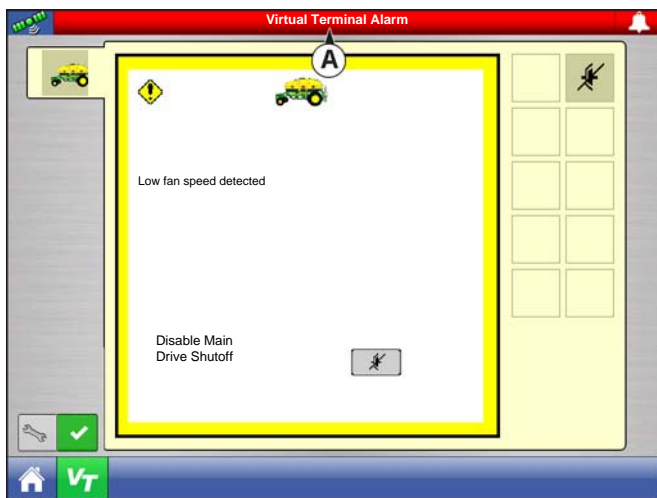
Assign implement functions to ISO compatible inputs.

The number of functions and inputs shown on the Auxiliary Mappings screens will vary depending on the implement and input devices connected to the display.



**Note:** Implement functions can not be mapped to Ag Leader switches.

## VT ALARMS AND TROUBLE CODES



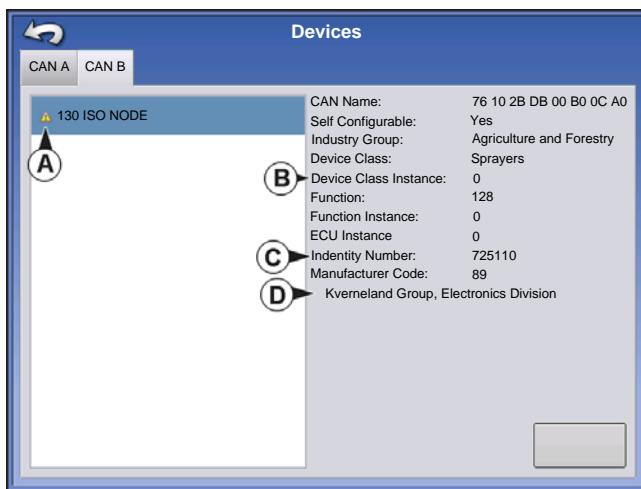
If the display receives an active trouble code, the **Virtual Terminal Alarm (A)** will appear in the Status bar at the top of the screen.

When an alarm is activated on the VT, the display will indicate the alarm by flashing “Virtual Terminal Alarm” in the status bar.

Alarms are acknowledged and cleared by pressing

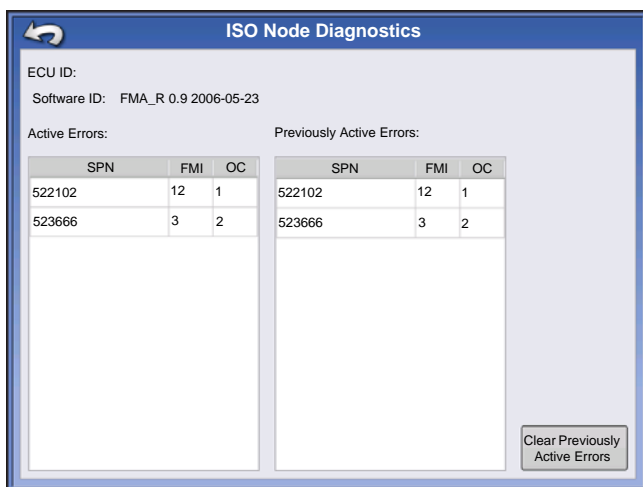


This button is only present when a virtual terminal alarm has been activated.



The Devices screen displays the following information:

- **(A) Caution icon indicates module has active trouble codes (DTCs)**
- **(B) Equipment Type**
- **(C) ECU Serial Number**
- **(D) VT Manufacturer, name and code**



Pressing the Diagnostics button on the Devices screen brings up the ISO Node Diagnostics screen which shows the following information.

- **SPN**  
“Suspect Parameter Number” = Error Number
- **FMI**  
“Fault Mode Indicator” = Error State.
- **OC**  
“Occurrence Count”
- **DTC**  
Diagnostic Trouble Code

This is a combination of the SPN and the FMI (for

example 522102.12).

Cross-reference DTC in equipment manufacturer’s operator manual for description of error.





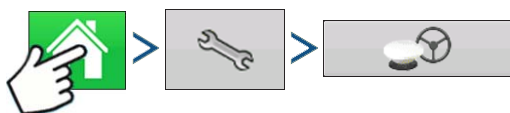
# GPS

## GPS BUTTON



During your field operation, the GPS (satellite) button in the upper left-hand side of the Status Bar should appear as green, which means you are receiving a differential GPS signal. If this icon appears yellow, you are still receiving GPS but are not receiving a differential signal; and if it appears gray then you have lost GPS. In either case, you should check your GPS settings.

## SETUP



Press: Home button > Setup (wrench) button > GPS button



### • Guidance/Steering, Lightbar Settings, and Required Differential Correction for Guidance

For more information, see the Guidance chapter at [“Guidance” on page 81](#).

### • Differential Source

Select choice of WAAS/EGNOS, Satellite (OmniSTAR®) or Beacon (Coast Guard) differential sources.

### • Wrench button

Pressing the Wrench button opens different settings screens, depending on whether you are using OmniSTAR® or Beacon.



**Note:** If using OmniSTAR, see [“OmniSTAR Settings” on page 70](#).

### • GPS Rate (Hz)

The GPS Position Rate drop-down menu represents the cycles per second that the display receives guidance information from viewable satellites. Select one of the available Hz rates from the drop-down menu.

### • Age of Differential

Displays the elapsed time since reception of last differential correction signal. The Age of Differential button is only functional when GPS is connected.

- **Port Settings**

Displays the Serial Port Settings screen, where you can adjust GPS output. For more information, see [“Serial Port Settings” on page 73.](#)

- **Force TSIP Connection**

Forcibly connects to TSIP GPS receiver. Pressing this button will force the port to TSIP communication.

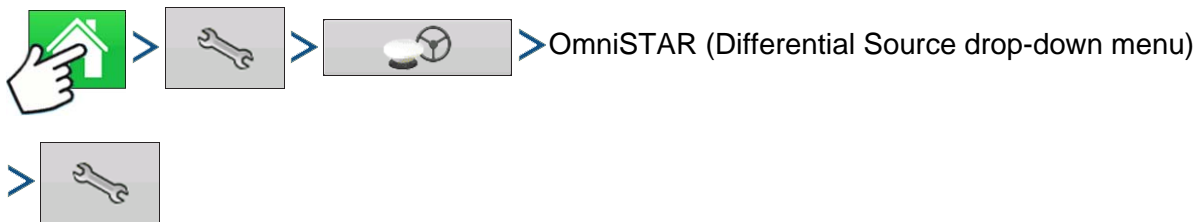
- **Reset to Defaults**

Press the Reset to Defaults button to restore receiver settings to the factory default. This will remove all custom settings.

- **Ignore NMEA Checksum**

Check this to ignore intermittent GPS message errors.

## OMNISTAR SETTINGS



Press: Home button > Setup (wrench) button > GPS button > OmniSTAR (Differential Source drop-down menu) > Setup (wrench) button



**Note:** If using the GPS 2500 receiver, see [“OmniSTAR Settings — GPS 2500” on page 71.](#)

The screenshot shows the 'OmniSTAR Setup' screen. It has two main sections: 'Serial Number' and 'Provider Settings'. The 'Serial Number' section contains a text box with '0224019369' and a 'Differential Source' section with three radio button options: 'VBS', 'HP/XP' (which is selected), and 'HP/XP with VBS Backup'. There is also a checked checkbox for 'Fast Restart'. The 'Provider Settings' section includes a 'Frequency' dropdown menu set to 'Central USA (MSV-C)', a 'Custom Frequency' text box with '1557.835', and a 'Baud Rate' dropdown menu set to '1200'. A green checkmark button is at the bottom center.



**Note:** The use of OmniSTAR® differential requires purchase of a subscription from OmniSTAR. Settings related to using satellite differential correction vary based upon your geographic location. Setup details are explained on the following pages. More specific information can be obtained by contacting OmniSTAR.

- **Serial Number/OmniSTAR User ID**

This box shows the serial number of your receiver. It may also display your OmniSTAR User ID.



**Note:** You will need to know this number when contacting OmniSTAR in order to set up the receiver.

### • Differential Source

The choices include VBS, HP/XP, and HP/XP with VBS backup. These three options are described below.

- VBS - OmniSTAR VBS is a "sub-meter" level of service.
- HP/XP - The OmniSTAR XP service is more accurate than VBS, but slightly less accurate than HP. The OmniSTAR HP (High Performance) service is the most accurate of the three options.
- HP/XP with VBS backup - If this option is chosen, and you lose your HP/XP signal, your receiver will automatically switch to VBS.

### • Frequency

In the Frequency drop-down list box, select the geographic region where you are located. If you wish to enter a Custom Frequency, select Custom. Then enter the frequency number in the text box below.



**Note:** The display does not come with custom frequency numbers. Enter a number only if directed to by OmniSTAR.

### • Baud Rate

The baud rate represents the speed at which your receiver obtains information from the satellite.



**Note:** You should always keep the baud rate set at 1200 unless directed by OmniSTAR or Technical Support.

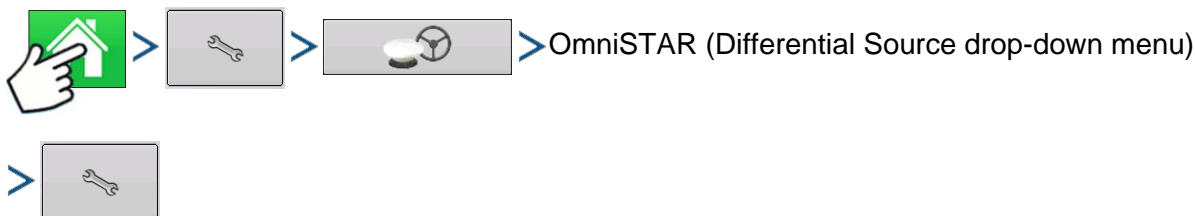
### • AutoSeed Fast Restart

Checking this box before the vehicle is shut down allows the receiver to utilize shutdown time to acquire the appropriate satellites in order to ensure a quick and efficient startup. This reduces the time taken for satellite convergence after startup, and thus increases accuracy in the field.



**Note:** To get the most benefit from AutoSeed technology, you should shut down the vehicle in a place where the receiver has a clear view of the sky. Do not move the vehicle before powering up again.

## OMNISTAR SETTINGS — GPS 2500



Press: Home button > Setup (wrench) button > GPS button > OmniSTAR from Differential Source drop-down menu > Setup (wrench) button



**Note:** The use of OmniSTAR® differential requires purchase of a subscription from OmniSTAR. Settings related to using satellite differential correction vary based upon your geographic location. Setup details are explained on the following pages. More specific information can be obtained by contacting OmniSTAR.

---

• **Serial Number/OmniSTAR User ID**

This box shows the serial number of your receiver. It may also display your OmniSTAR User ID.



**Note:** You will need to know this number when contacting OmniSTAR in order to set up the receiver.

---

• **Differential Source**

- VBS - OmniSTAR VBS is a "sub-meter" level of service.
- HP/XP - The OmniSTAR XP service is more accurate than VBS, but slightly less accurate than HP. The OmniSTAR HP (High Performance) service is the most accurate of the three options.

• **Fast Restart**

Checking this box before the vehicle is shut down allows the receiver to utilize shutdown time to acquire the appropriate satellites in order to ensure a quick and efficient startup. This reduces the time taken for satellite convergence after startup, and thus increases accuracy in the field.



**Note:** To get the most benefit from Fast Restart, you should shut down the vehicle in a place where the receiver has a clear view of the sky. Do not move the vehicle before powering up again.

---

• **GGA (GLONASS)**

Checking this box allows the additional GLONASS satellites to be displayed in the GGA message.

• **AutoTune Frequency check box**

Receiver will automatically select the strongest frequency.

- **Frequency**

In the Frequency drop-down list box, select the geographic region where you are located. If you wish to enter a Custom Frequency, select Custom. Then enter the frequency number in the text box below.



**Note:** The display does not come with custom frequency numbers. Enter a number only if directed to by OmniSTAR.

- **Baud Rate**

The baud rate represents the speed at which your receiver obtains information from the satellite.



**Note:** You should always keep the baud rate set at 1200 unless directed by OmniSTAR or Technical Support.

- **Convergence Threshold**

## SERIAL PORT SETTINGS



Press: Home button > Setup (wrench) button > GPS button > Port Settings

The Serial Port Settings screen is the place where you can adjust GPS output. The appearance of the Serial Port Settings screen varies depending upon your model of GPS receiver. Shown to the left is the Serial Port Settings screen as it would appear for an operator of a GPS 1500 or 2500 antenna.

,The appearance of this TSIP receiver GPS Port Setup screen is the same for both Ports A and B.

- **Output Type**

Displays what type of protocol the receiver is using. (NMEA or TSIP).

- **Output Baud Rate**

Displays the speed at which the receiver communicates with the display. For optimal performance, the GPS baud rate should be set at 192000 or higher.

- **Output Parity**

Displays either Odd or None.

- If using TSIP, this setting should be Odd.
- If using NMEA, this setting should be None.



**Note:** Parity refers to a technique for checking data integrity after transmission.

---

- **GPS Pos. Rate (Hz)**

Represents the cycles per second (shown in Hz) that the display receives position information from viewable satellites. (This is the same number as shown on GPS Rate (Hz) drop-down list menu located on the General Tab).

- **Output Rate (Hz)**

Represents the cyclical rate (in Hz) at which the receiver sends information to the display. This field shows a value of either 1 or ASAP.

- The default rate is 1 Hz.
- ASAP represents a Hz value of more than 1.

- **NMEA Messages**

These checkboxes represent various communication protocols or formats that have been set by the National Marine Electronics Association (NMEA), and used in information “strings” or sentences output by the GPS Receiver. At present, the display only requires two NMEA Message formats: GGA and VTG.

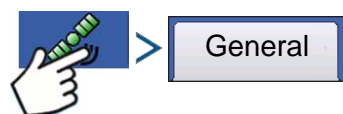
- GGA: position in longitude and latitude.
- VTG: ground speed
- GSV, GSA: required to view the Satellite Plot, but are not required for GPS information.
- GLL, ZDA, RMC, MSS: Leave these other NMEA message formats unchecked, unless you are connected to a third-party monitor and have been directed to do so.

## GPS INFORMATION

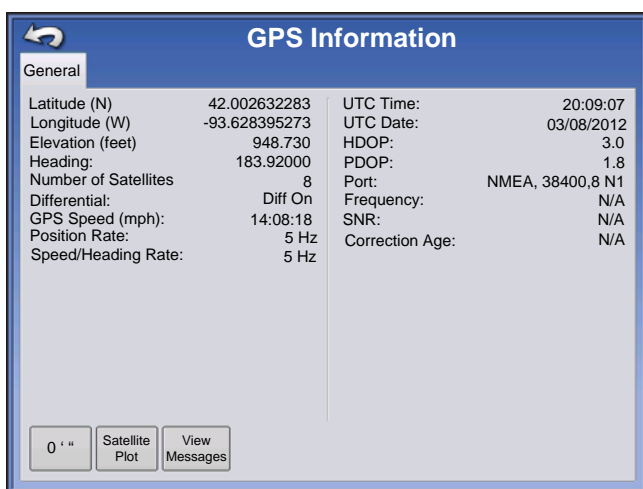


To access diagnostic information about the GPS signal, press the GPS (satellite) button that appears in the in the upper left-hand side of the Status Bar. GPS Information then appears on General, Receiver, and OmniSTAR tabs. Information on these GPS Information screens is described on the following pages.

### GPS INFORMATION - GENERAL TAB



Press: GPS (satellite) button > General tab



### • Latitude, Longitude, Elevation

Displays current position (in longitude and latitude) and elevation.

### • Heading

Displays degree heading of travel.

### • Number of Satellites

### • Differential

If a TSIP receiver is being used, the differential status will display the differential source, (i.e. WAAS, Beacon or OmniSTAR). This message field will display either Diff On or Diff Off.

- Diff On: Indicates the receiver is receiving a differential

GPS signal.

- Diff Off: Indicates the receiver is not receiving a differential GPS signal.

Otherwise, if RTK or NTRIP is being used, the differential status will display one of the following status messages:

- RTK Fixed: The ParaDyme roof module is receiving a Valid RTK differential source.
- RTK Float: The ParaDyme roof module is receiving information from the Base Station, but the signal is not strong enough for an RTK fix.

### • GPS Speed

### • Position Rate

The frequency that the receiver is sending the display your position in longitude and latitude (GGA). For example, at 5 Hz the display would be receiving a position message 5 times every second.

### • Speed/Heading Rate:

The frequency that the receiver is sending the display your ground speed and heading (VTG)



**Note:** Position Rate and Speed/Heading Rate should both be set at a minimum of 5 Hz for guidance or steering.



### • Change Longitude/Latitude Format

Pressing this button changes the Longitude/Latitude format. These can either be shown in Degrees, Minutes and Seconds; or Decimal Degrees.

### • View Messages

To view the NMEA or TSIP messages coming from the receiver, press the View Messages button.

### • UTC Time

UTC is an acronym for Coordinated Universal Time, a high-precision atomic time standard that defines local time throughout the world. Different versions of universal time use atomic clocks to correct for irregularities in the Earth's rotation and orbit. UTC is used in navigation, astronomy, aviation, Internet broadcasts, and amateur radio. If you are receiving information from the satellite, then the UTC Time should automatically update.

### • UTC Date

If you are receiving information from the satellite, then the UTC date should automatically update.

- **HDOP**

Horizontal Dilution of Precision (HDOP) indicates the quality of the horizontal GPS position. Lower HDOP numbers are optimal, higher numbers are undesirable.

- **PDOP**

Position Dilution of Precision (PDOP) is a unitless measure indicating when the satellite geometry can provide the most accurate results. When satellites are spread around the sky, the PDOP value is low and the computed position is more accurate. When satellites are grouped close together, the PDOP is high and the positions are less accurate. Lower PDOP numbers are optimal, higher numbers are undesirable.

- **Port**

The connection between the display and the GPS as established at a message format and baud rate.

- **Frequency**

The Correction Frequency indicates the GPS satellite frequency used by the receiver.



**Note:** The Correction Frequency diagnostic does not show for WAAS connections.

- **SNR**

If your receiver is using Beacon differential corrections, the frequency and signal to noise ratio (SNR) will be displayed. Signal-to- Noise Ratio (SNR) indicates the strength of the differential correction signal in relation to the amount of background noise that can interfere with signal reception.

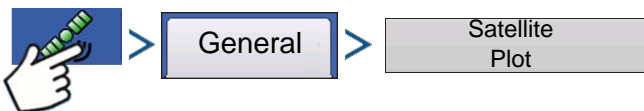
- **Correction Age**

The length of time since the GPS receiver has obtained its last update.

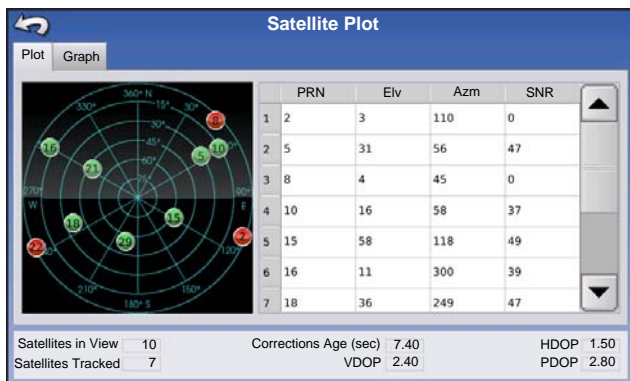


**Note:** The age of the DGPS corrections (as delivered to the GPS receiver) will vary from one second to several seconds, depending on the characteristics of the individual satellite signals.

## Satellite Plot

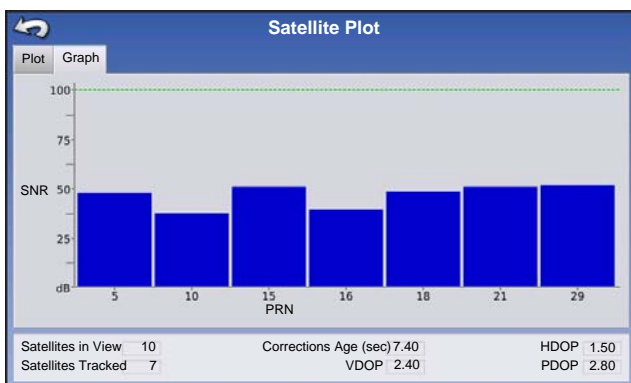


Press: GPS (satellite) button > General tab > Satellite Plot button



The Satellite Plot feature can display either as a plot or a graph. The information on these screens is used as an advanced diagnostic tool for GPS satellite availability. In the event of GPS availability issues, technical support may request you to view these screens.



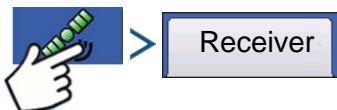


Satellite Plot - Graph

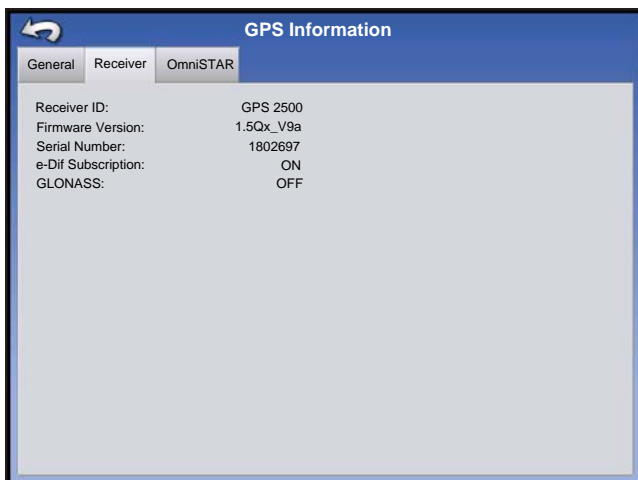


**Note:** In order to use Differential GPS, you must have at least four available satellites. In order to use RTK differential sources, you must have at least five available satellites.

## GPS INFORMATION - RECEIVER TAB

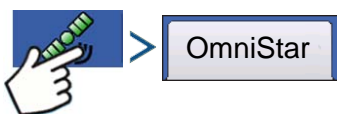


Press: GPS (satellite) button > Receiver tab

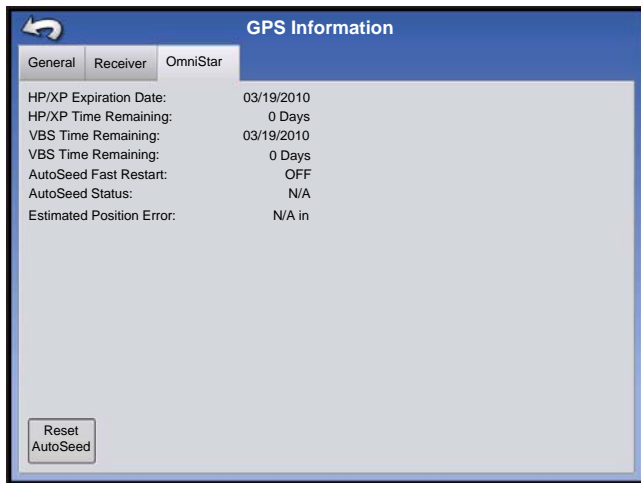


- Receiver ID
- Firmware Version
- Serial Number
- e-Dif Subscription
- GLONASS

## GPS INFORMATION - OMNISTAR TAB



Press: GPS (satellite) button > OmniStar tab



- **HP/XP Expiration Date**
- **HP/XP Time Remaining**
- **VBS Expiration Date**
- **VBS Time Remaining**
- **AutoSeed Fast Restart**
- **AutoSeed Status**
- **Estimated Position Error**

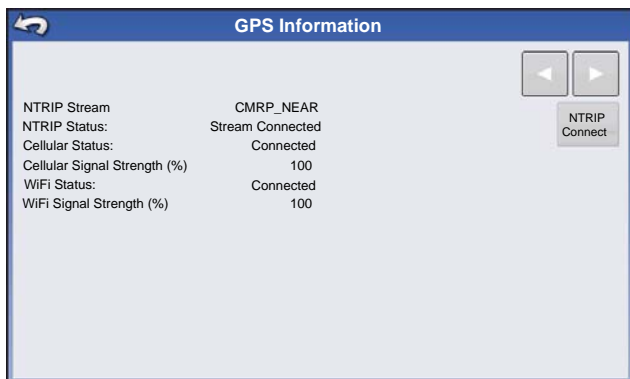
## RTK/NTRIP Information

The following information appears on the second GPS Information screen for RTK or NTRIP.

- **Convergence (%)**  
Successful communication between Base Station and ParaDyme Roof Module.
- **Radio Throughput**  
Displays percentage of data received from Base Station.
- **Distance to Base**  
Shows distance to Base Station in miles (kilometers).
- **Base Channel**  
Displays Channel ID of Base Station.
- **NTRIP**  
(NTRIP users only) Shows either Connected or Disconnected.

## GPS INFORMATION - NTRIP

Users of the NTRIP guidance system can also view the NTRIP Information screen below, in addition to the GPS Information screens discussed previously.



- **NTRIP Connect**  
Connects the display to the NTRIP correction source.
- **NTRIP Stream**  
Network mount point.
- **NTRIP Status**  
Displays NTRIP connection; either Connected or Disconnected.
- **Cellular Status**  
Displays status of ParaDyme cellular modem; either

Connected or Disconnected.

- **Cellular Signal Strength (%)**  
Displays a number between 0 and 100%.

- **WiFi Status**

Displays status of WiFi router; either Connected or Disconnected.

- **WiFi Signal Strength**

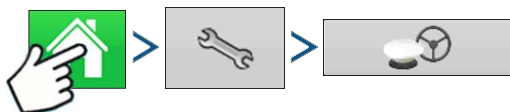
Displays a number between 0 and 100%.



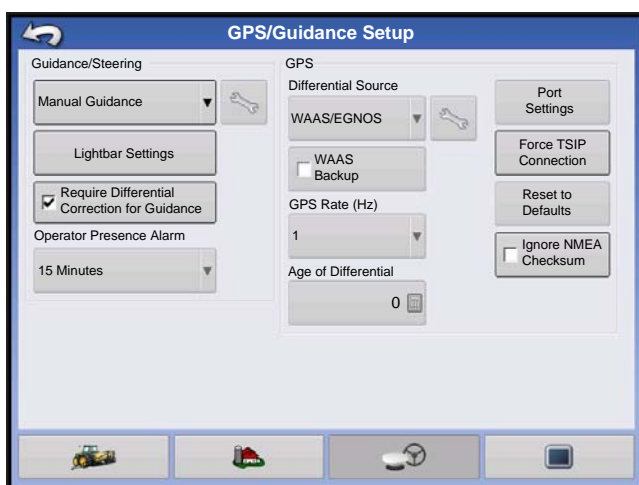
# GUIDANCE

## GUIDANCE/STEERING CONTROL

### SETUP



Press: Home button > Setup (wrench) button > GPS button



- **Manual Guidance**

Select this to perform guidance by lightbar while manually steering the vehicle.

- **OnTrac2/OnTrac2+**

For more information, see the OnTrac2 section.

- **ParaDyme Steering**

For more information, see the ParaDyme insert.

- **Lightbar Settings**

For more information, see [“Lightbar Settings” on page 81](#).

- **Required Differential Correction for Guidance**

When un-checked allows guidance to operate without differential correction.

- **Operator Presence Alarm**

(ParaDyme users only) The Operator Presence Alarm disengages guidance control if the operator does not have any interaction with the display for a specified period of time. Use the drop-down menu to specify the period of time before guidance is automatically disengaged.



Pressing the Setup (wrench) button on the Guidance Tab opens the guidance system settings for the selected guidance system.



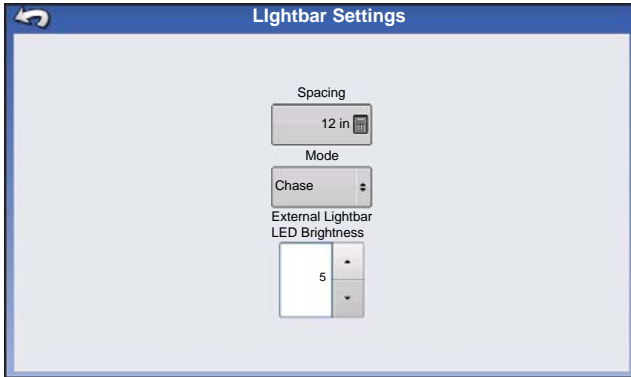
**Note:** In order to use guidance with the display, you must have a GPS receiver capable of a GPS output rate of 5 Hz or more.

## LIGHTBAR SETTINGS

### SETUP



Press: Home button > Setup (wrench) button > GPS button > Lightbar Settings button



To adjust lightbar settings, press the Lightbar Settings button on the GPS Setup screen. The Lightbar Settings screen appears.

- **LED Spacing**



Enter in an amount specifying the distance represented by each square of the lightbar. You can enter in a number ranging between 6 and 72 inches.

- **Mode**

This determines which method to use the GPS information provided on the display's Map screen to center the vehicle on the AB Line. Select either Chase or Pull.

- If you select Chase, then in order to center the vehicle on the AB Line, you must follow the indicator lights on the lightbar.
- If you select Pull, then in order to center the vehicle on the AB Line, you must turn the vehicle in the opposite direction of the indicator lights on the lightbar.

- **External Lightbar LED Brightness**

If applicable, press  /  to enter in a number specifying the brightness of the LED lights on the optional L160 external lightbar. The number 1 is the dimmest setting and 10 is the brightest; the default setting is 5.

## GUIDANCE TAB ON MAPPING TOOLBOX

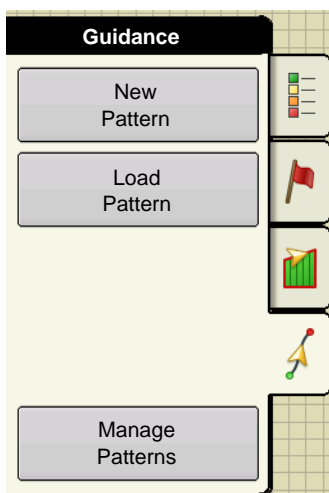
The Guidance Tab on the Mapping Toolbox allows you to you can create a new pattern, load an existing pattern, or adjust Guidance Options and Guidance Settings. This tab changes its appearance after you create or load a pattern.



**Note:** Guidance pattern will default to the one last used.

Guidance patterns can be set to widths up to 2000 ft (609 m).

---



## GUIDANCE TAB - BEFORE ANY PATTERNS CREATED OR LOADED

Before you create any patterns, the map screen's Guidance Tab appears as shown.

- **New Pattern**

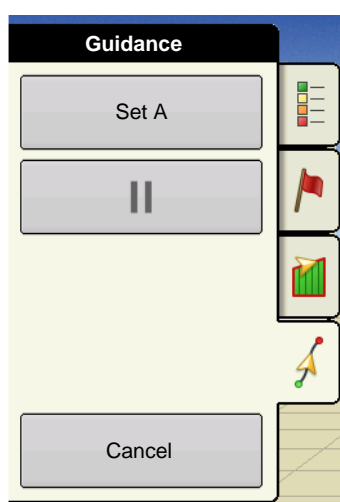
For more information, see [“New AB Pattern” on page 85](#). Also, see [“About Guidance Patterns” on page 95](#).

- **Load Pattern**

For more information, see [“Load Pattern” on page 90](#).

- **Manage Pattern**

For more information, see [“Manage Patterns” on page 92](#).



## GUIDANCE TAB - NEW A-B PATTERN

After you have pressed New Pattern, the Guidance Tab's appearance changes to that shown.

- **Set A**

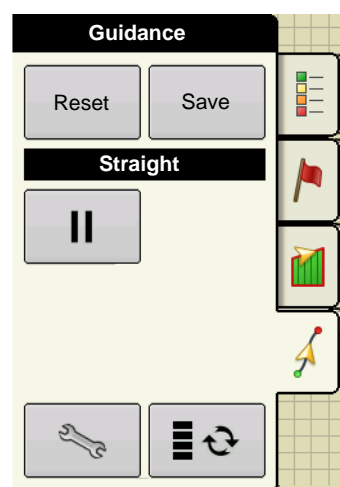
Press the Set A button to begin the creation of a pattern.

-  **Pause/Resume**

Press the Pause/Resume button, appears as two parallel lines, if you wish to interrupt the creation of a pattern. For more information, see [“Pause” on page 93](#).

- **Cancel**

Press to discontinue the creation of a pattern.



## GUIDANCE TAB- AFTER AB LINE CREATED OR LOADED

Once an AB line has been created, the Guidance Tab changes its appearance to that shown.

- **Reset**

Press to discontinue the current pattern and begin creating another pattern. For more information, see [“Reset Pattern” on page 94](#).

- **Save**

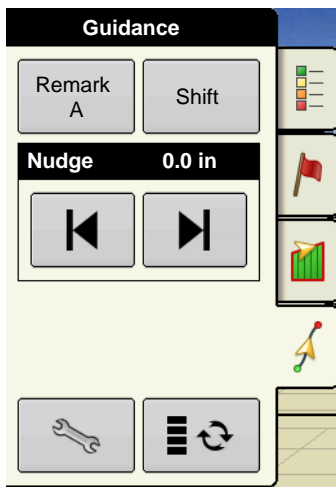
Press to save the pattern. For more information, see [“Save Pattern” on page 89](#).

-  **Guidance Options**

Press to adjust Nudge and SmartPath settings. For more information, see [“Nudge” on page 94](#) and also [“SmartPath Guidance Options” on page 89](#).

-  **Menu Toggle**

Press to toggle between pattern settings and Nudge settings.



## GUIDANCE TAB - NUDGE MENU

If you have specified a Nudge increment at the Guidance Options screen, then you can access Nudge settings by pressing the Menu Toggle button.

- **Remark A**

The Remark A button "re-marks" the A point by moving it to the current position while maintaining the same heading. For more information, see ["Remark A" on page 94](#).

- **Shift**

The Shift button moves all of the swaths by a specified distance to the left or right, (including the AB line). The swaths can be shifted by a distance or number of rows. For more information, see ["Load Pattern" on page 90](#).

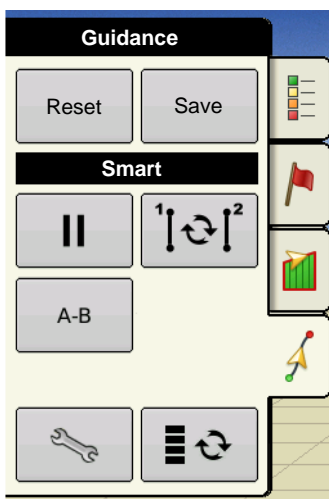
-   **Nudge Settings**

The left and right arrow buttons adjusts the swaths by a specified distance while leaving the AB line in its original spot. This distance then appears in the black bar above the arrows. For information on how to adjust Nudge Settings, see ["Nudge" on page 94](#).

## GUIDANCE TAB - AFTER SMARTPATH CREATED OR LOADED



**Note:** For more information on SmartPath, see ["SmartPath" on page 87](#).



If you specify SmartPath at the New Pattern screen, then the Guidance Tab will appear as shown.

- **Reset button**

For more information, see ["Reset Pattern" on page 94](#).

- **Save Pattern**

For more information, see ["Save Pattern" on page 89](#).

-  **Active Line Cycle button**

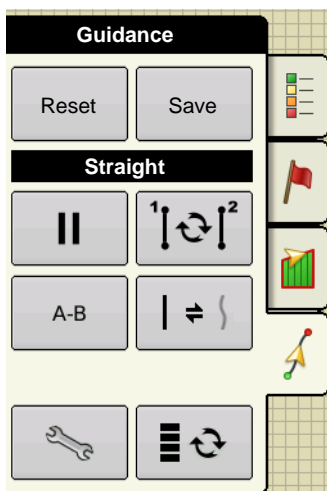
Press to cycle between different pattern lines. For more information, see ["Select a Previous SmartPath Pass" on page 88](#).

-  **A-B Line button**

Begins the creation of an A-B line within a SmartPath pattern. For more information, see ["Create AB Line Within a SmartPath Pass" on page 88](#). and also ["Choose Existing AB Lines Within SmartPath" on page 89](#).



## GUIDANCE TAB - AFTER A-B LINE CREATED WITHIN SMARTPATH



If you have created an A-B line within a SmartPath pattern, then the Guidance Tab will appear as shown.

-  **A-B/SmartPath Toggle**

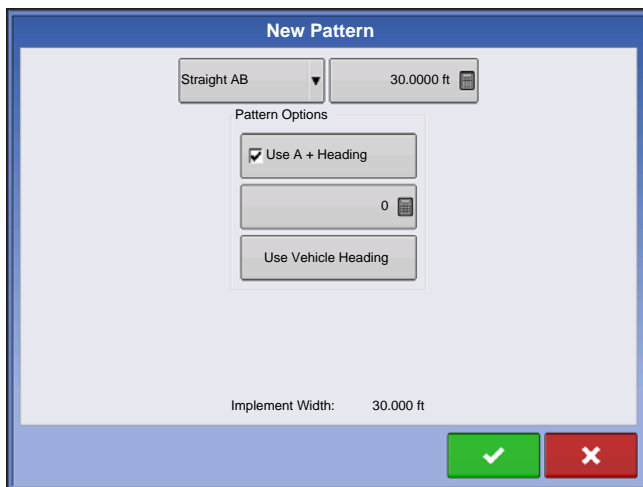
Press to cycle between AB lines and SmartPath patterns. For more information, see [“Create AB Line Within a SmartPath Pass” on page 88.](#)

## NEW AB PATTERN

Use the following procedure to create a new pattern. The following example explains how to create an AB line.



**Note:** Pattern options other than Straight AB are explained in full detail on [“About Guidance Patterns” on page 95.](#)



### 1. Press New Pattern

Press the New Pattern button on the Guidance Tab of the Mapping Toolbox.

### 2. Select Pattern

The New Pattern screen appears.

### 3. Select from the following available guidance patterns:

- **SmartPath**

For more information, see [“SmartPath” on page 87.](#)

- **Straight AB**

- **Pivot**

For more information, see [“Pivot” on page 96.](#)

- **Adaptive Curve**

For more information, see [“Adaptive Curve” on page 98.](#)

#### • Identical Curve

For more information, see “*Identical Curve*” on page 98.

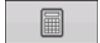


---

**Note:** If you would like to use an A+ Heading pattern option, check the **Use A+ Heading** check box and use the number pad to enter in the heading (in degrees). For more information, see “*A+ Pattern*” on page 96.

---

#### 4. Change Guidance Width (optional)

In addition to these Guidance Options, a Default Guidance Width is shown on the upper right-hand side of the New Pattern screen. This Guidance Width is based on the Implement Width that you specified in Implement Configuration. If you wish to change this Guidance Width, enter the new number using  .

Press  when finished.



---

**Note:** Guidance Width allows you to use guidance lines independent of implement width. Guidance width can be increased to a maximum of 2000 ft (609 m).

---

#### 5. Mark the A Point

The Map screen changes its appearance to Perspective View and Set A button appears at the bottom of the Mapping Toolbox. Press Set A button when you wish to mark your A point.

#### 6. Drive distance of AB Line

The place where you marked your A point now appears with a green ball, and the Set B button appears. The Set B button is greyed out until you drive a minimum of 100 feet (30 meters).



---

**Note:** If you are creating a Pivot pattern, you must drive a minimum of 160 feet (49 meters) before marking the B point.

---

#### 7. Mark B Point

Once you have driven a minimum of 100 feet (30 meters), the Set B button appears as a solid text and operator can mark B point by pressing the Set B button.

#### 8. AB Line appears

When you have marked the B point, the AB line appears on the Map screen. The end of the AB line is marked with a red point. At the center of the lightbar, the distance is shown from the current guidance line.

#### 9. Create next pass

Turn left or right for the next swath. The next pass is automatically generated. Steer the vehicle so that you center the green lights on the lightbar as you drive forward along the swath.

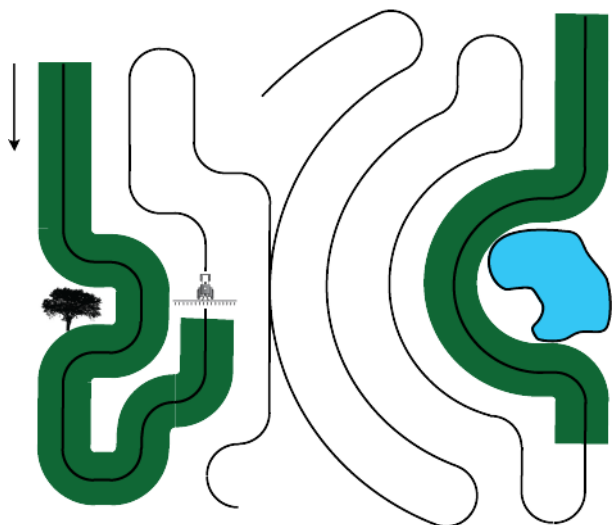


---

**Note:** On straight AB lines, if you complete a swath that is longer than the previous one, the display automatically extends the guidance path for the following swaths.

---

## SMARTPATH



The SmartPath™ pattern is designed to give guidance from any previously-driven pass. This is used in irregular-shaped and terraced fields where you cannot run all passes parallel to the previous pass. Instead, the SmartPath guidance allows you to move to a different area of the field, and then resume a previous guidance pattern later. Moreover, you can use SmartPath to create straight AB patterns within the SmartPath pattern and cycle between any available pattern within SmartPath to choose the appropriate one.

### Creating a SmartPath Pattern

#### 1. Press New Pattern

Press the New Pattern button on the Guidance Tab of the Mapping Toolbox.

#### 2. Select Pattern



The New Pattern screen appears.



#### 3. Select SmartPath

Select SmartPath from the drop-down list of available guidance patterns.

#### 4. Change Guidance Width (optional)

In addition to these Guidance Options, a Default Guidance Width is shown on the upper right-hand side of the New Pattern screen. This Guidance Width is based on the Implement Width that you specified in Implement Configuration. If you wish to change this Guidance Width, enter the new number using . Press  when finished.



**Note:** Guidance Width allows you to use guidance lines independent of implement width.

#### 5. Drive the SmartPath

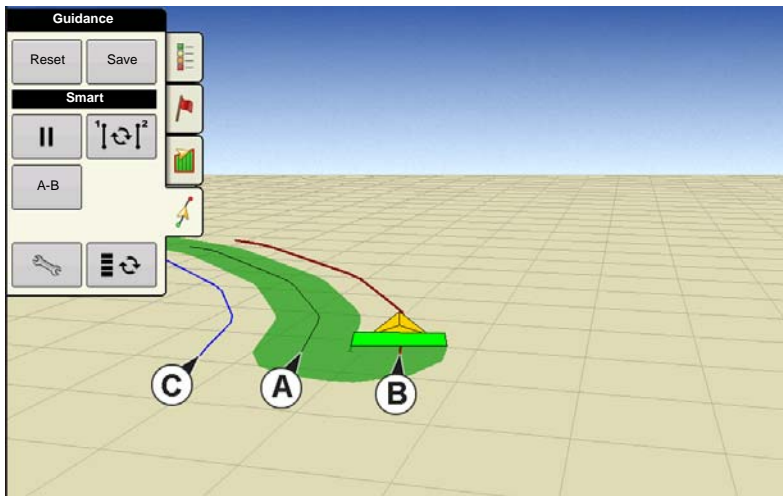
The Map screen changes its appearance to Perspective View, and SmartPath settings are shown in the mapping toolbox. Drive along the path that you wish to create.



**Note:** The display will not create an A point with SmartPath, unless you are mapping a Straight AB line within it. (For more information, see [“Create AB Line Within a SmartPath Pass” on page 88](#)).

#### 6. Turn Around

After you turn around on your first pass, the system guidance will follow a maroon-colored line parallel to your previously-driven pass.



As you continue using the SmartPath, the map screen will display three lines:

• **(A) The Base Path**

Appears as a black line, is the initial SmartPath that you created on the first pass.

• **(B) The Followed Path**

Appears as a maroon-colored line, is the path that your vehicle is currently using.

• **(C) The Projected Path**

Appears as a blue-colored line on the opposite side of the Base Path, is an alternate path parallel to the Base Path.

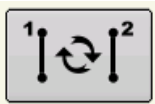
The system guidance created this path when you created the Base Path. This is the path that your vehicle would have taken if you had turned it in the opposite direction.

• **SmartPath Notes:**

- The Projected Path and Base Path both remain in display memory, unless you press the Reset button without saving the SmartPath pattern.
- Pressing the Save button saves all the SmartPath passes within the display's memory for future use.
- If you drive your vehicle onto the Projected Path, the system guidance uses this as the Followed Path.

## Select a Previous SmartPath Pass

If you have specified SmartPath as your desired pattern, but you are not following an active guidance pattern, the Guidance System automatically begins searching for SmartPath patterns for your use.



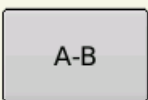
If you wish to use a previously-created SmartPath pattern, you can do so by pressing on the Active Line Cycle button. This button allows you to cycle between available SmartPath patterns.

• **Notes:**

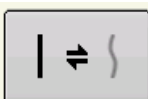
- When the guidance system looks for other available SmartPath patterns, it first displays the nearest-available pass.
- You can adjust the available area in which the Guidance System searches for previously-created SmartPath passes. To do this, adjust the Heading Threshold settings on the Smart Tab of the Guidance Option screen. For more information, see *"SmartPath Guidance Options" on page 89.*

## Create AB Line Within a SmartPath Pass

In addition to creating irregular curved passes within SmartPath, you can also create straight AB lines to be used in conjunction with the curved passes. By doing this, you can switch back and forth between a SmartPath and Straight AB pattern.



As you are using a SmartPath pattern, press the AB button. Follow the instructions on creating an AB line as explained in *"New AB Pattern" on page 85.*



Once the AB line is created, you can switch between the AB line and SmartPath patterns by pressing the AB/SmartPath toggle.

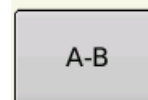
After the Guidance System has switched over to a different path, the name of the currently-followed pattern is shown within a black box on the Map screen.

### Choose Existing AB Lines Within SmartPath

You can create up to 10 different AB lines within SmartPath.



Select the desired AB Line by pressing the AB button. The AB Manager screen appears, which shows all AB lines created within a particular field.



- Highlight the desired AB line, then press the Back button to close the screen.

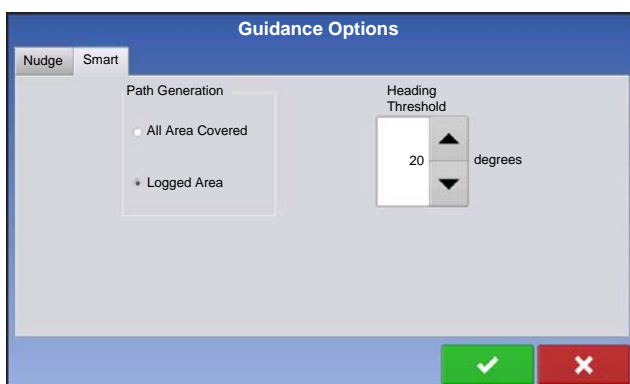
- Press  to add an AB line.

- Press the Load button to load an AB line.
- Press the Edit button to edit the name of an AB line.
- Press the Delete button to delete an AB line.

### SmartPath Guidance Options



SmartPath only creates a SmartPath pass when you are logging data in the field. However, you have the option of using it to create SmartPath passes continually during all field operations.

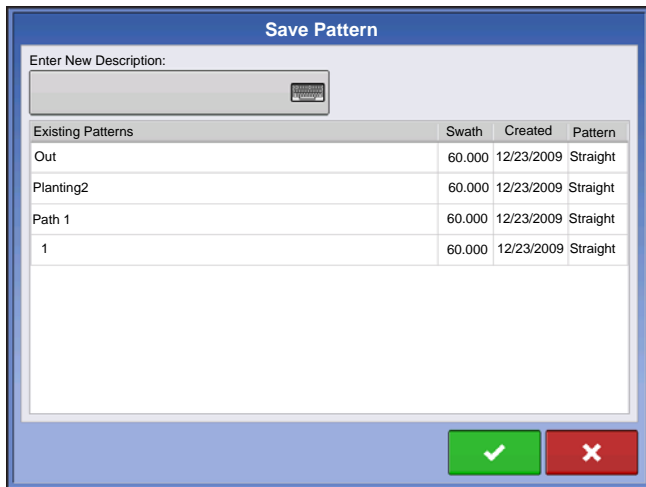


To adjust this setting, press the Guidance Options button on the Guidance Tab. The Guidance Options screen appears. Press the Smart Tab.

- The default setting is **Logged Area**. This setting only creates passes while you are logging field data.
- By selecting **All Area Covered**, you can create SmartPath passes even when not logging field data.
- The **Heading Threshold** setting is the available area that the Guidance System uses to search for previously-created SmartPath passes. The default setting is 20 degrees.

## SAVE PATTERN

You can save a pattern (.AGSETUP file) to the display's internal memory to the current field by using the following procedure.



## 1. Press Save Pattern

The Save Pattern screen appears.




**Note:** The Save Pattern button will appear when there is an active pattern.

## 2. Name the pattern

Press  and enter a unique pattern name. When finished, press .

### • Notes:

- To verify that the pattern is saved, you can open the Save Pattern screen again by pressing the Save Pattern button. Your newly-saved or named pattern should now appear in the Save Pattern screen.
- You may remove all of the patterns by pressing the Remove All button. A warning appears, stating “All guidance patterns will be permanently erased from memory.” If you wish to do this, press  to continue.


## LOAD PATTERN

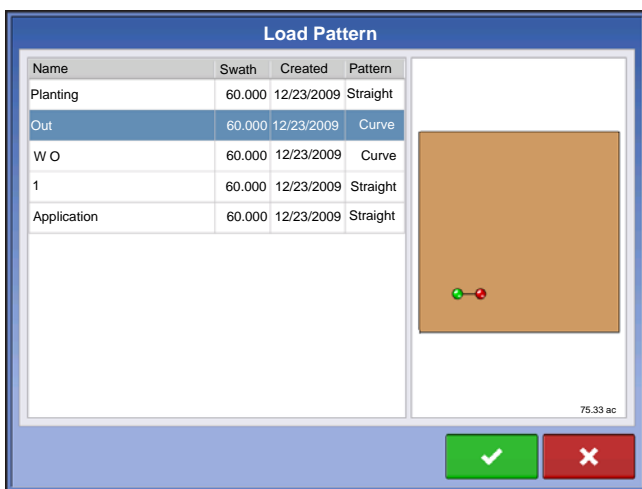
You can load a pattern from the display's internal memory to the current field by using the following procedure.

### 1. Press Load Pattern

Press the Load Pattern button on the Guidance screen.

### 2. Select a Pattern

The Load Pattern screen appears. Select and highlight the desired pattern. If the pattern you selected was an AB Line, that pattern now appears on the Map Preview. Press  to continue.



### 3. Select Guidance Method (optional)



If you have chosen to load a curved pattern, the Autosteer screen appears. Select either Identical Curve or Adaptive Curve.

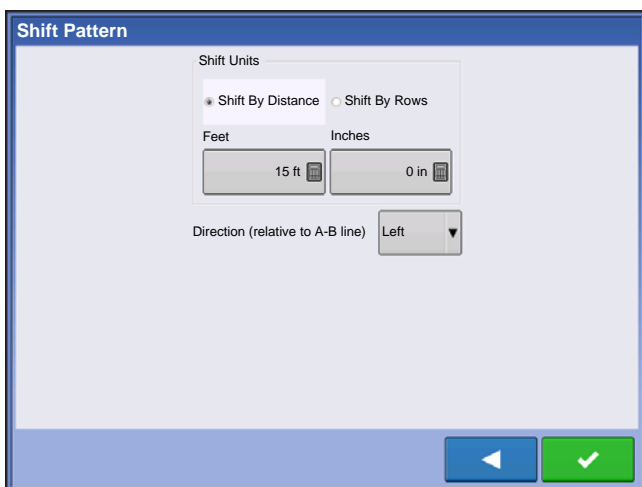
- (A) Map Preview



**Note:** For more information on Adaptive Curve, see “Adaptive Curve” on page 98.


### 4. Enter Guidance Width (optional)


The Shift Pattern screen appears. The Default Guidance Width is shown, based on the Implement Width that you specified in Implement Configuration. If you wish to change this Guidance Width, enter the new number using . Press  to continue.






### 5. Select Shift Pattern

The Shift Pattern screen appears.

- If you have chosen the **Shift by Distance** option, use  to select the distance, in feet and inches, that you wish to shift the pattern. Use the bottom drop-down menu to enter the direction, (either left or right), which you wish to shift the pattern relative to the AB Line.

When finished, press .

- If you have chosen the **Shift by Rows** option, use the first  to select the number of rows you wish to shift. Next, use the second  to select the row spacing in inches that you wish to shift the pattern. Use

the bottom drop-down menu to enter the direction, (either left or right), which you wish to shift the pattern relative to the AB Line. When finished, press .



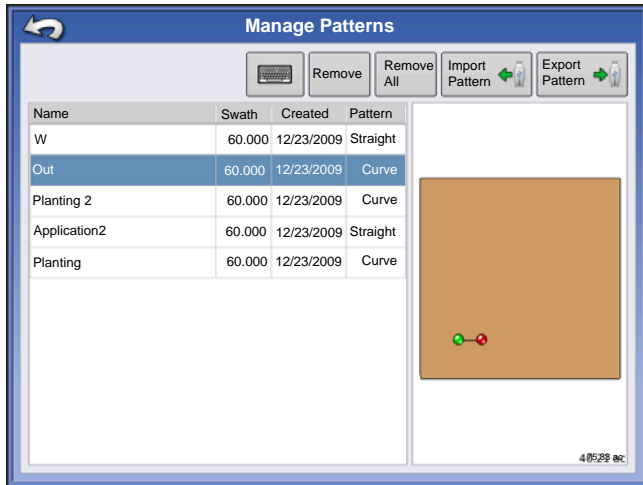
**Note:** For an illustration of the **Shift by Rows** option, see “Pivot” on page 96.

# MANAGE PATTERNS

The Manage Pattern button, located on the Guidance Tab of the Mapping Toolbox, opens the Manage Patterns screen. You can use the Manage Patterns screen to import pattern files, export pattern files, remove pattern files, or edit pattern names.



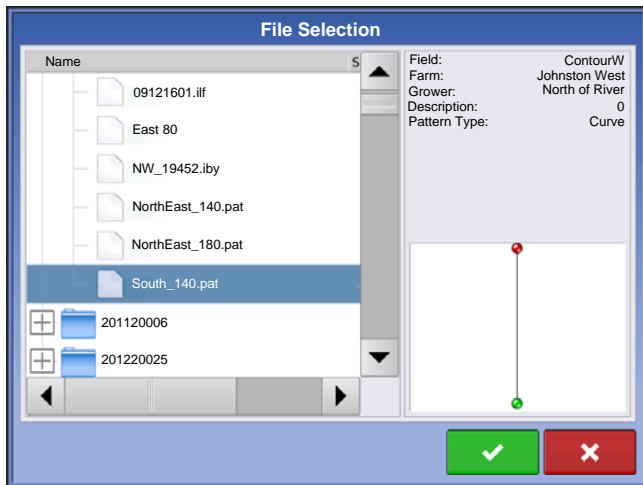
**Note:** You can also import and export patterns at the External Storage Operations button on the Home screen. For more information, see “External Storage Operations” on page 49. If you import or export patterns from the External Storage Operations screen, you will be asked to specify a Grower, Farm and Field.



The Manage Pattern button can be accessed when you are not actively using a guidance pattern.

Press the **Manage Patterns** button, and the Manage Patterns screen appears.

## Import Pattern



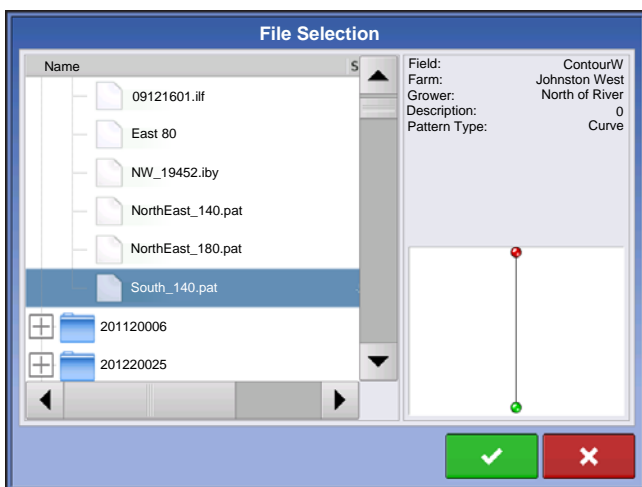
To import a pattern (.AGSETUP) file from the USB Flash Drive, use the following steps:


### 1. Press Manage Pattern

Press the Manage Pattern button, and the Manage Patterns screen appears.

### 2. Press Import Pattern






Press the Import Pattern button, and the File Selection screen appears. Highlight the correct file on the USB Flash Drive. Use the scroll bar to locate the appropriate file folder. Press  when finished.

## Export Pattern

To export a pattern to the USB Flash Drive, first press the Manage Patterns button on the Guidance Tab of the Mapping Toolbox. At the Manage Patterns screen, press the Export Pattern button. The Copy to Card screen notifies you that a pattern is being copied. When this process is complete, the Copy Log Files screen informs you that the file has been successfully copied.

## Edit Pattern

If you wish to rename a pattern, first press the Manage Patterns button on the Guidance Tab of the Mapping Toolbox. Press  to enter a name for the pattern. The new pattern name now appears in the pattern list of the Manage Patterns screen.


## Remove Pattern/Remove All Patterns

To remove a pattern from the display memory, first press the Manage Patterns button on the Guidance Tab of the Mapping Toolbox. At the Manage Patterns screen, press either:

- the **Remove** button if you wish to delete one pattern file; or
- the **Remove All** button if you wish to delete all of them for the current field.


## PAUSE

The Pause button allows your display to stop logging points along an AB Line. Once this button is pressed, a Resume button will take its place at the Guidance Options screen until you press this button and Pause reappears.

 **Note:** If you are using the display to follow a set AB Line and wish to temporarily deviate from this line, you can use the **Pause** button to pause the display's guidance logging activity. This feature could be used, for example, by a vehicle operator who must refill a sprayer. When paused, the display will continue to give the distance back to the original pause point position.

- **Press Pause button.**

Press the Pause button on the Guidance screen. When you do so, the place where you paused appears on the Map screen as a yellow ball.

 **Note:** You can pause a pattern even if you have not set the "B" point yet. If you do so, the message in the lightbar will read "Need B." If you pause the pattern after you have set your AB Line, then the lightbar will indicate the distance your vehicle must travel to return to the pause point.

- **Press Resume button.**

To resume your pattern, press the Resume button to resume logging on your AB Line.



**Note:** If you press the Resume button before you have returned to the original AB Line, your display will select the closest AB Line to your vehicle.

---


## RESET PATTERN

If you have been using an already-saved pattern, and wish to switch over to a different pattern in the same field, you can use the Reset Pattern feature by following the steps below.

### 1. Press Reset

Press the Reset button on the Guidance screen.

### 2. Confirm Reset

The Guidance screen appears, asking you to reset the current guidance pattern. Press  to continue.

### 3. Create new pattern (optional)

The pattern is now reset. You may now create a new pattern, if desired.

## REMARK A

If you chose Straight AB or A+ Heading as your pattern option at the New Pattern screen, the Remark A button appears on the Guidance Options screen. The Remark A button "re-marks" the A point by moving it to the current position while maintaining the same heading. A brief message appears in the on-screen lightbar, stating "Point A Remarked."

## SHIFT

For an explanation of the Shift Pattern feature, see ["Load Pattern" on page 90](#).

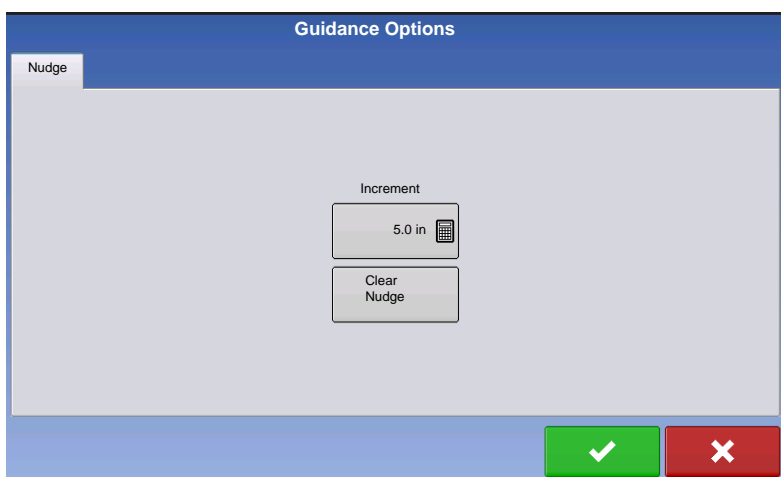
## NUDGE




Nudge settings allow you to adjust the swaths by a specified distance while leaving the AB line in its original location. You can view the Nudge left and right arrows on the Map screen's Guidance Tab by pressing the Menu Toggle button. The Menu Toggle button allows you to switch between pattern settings and Nudge settings.



The Nudge screen is where you can make adjustments to Nudge settings. To go to the Nudge screen, press the Guidance Options button on the Guidance Tab.



The Nudge screen appears.

- Press  to enter an increment distance that the swaths will move with each successive press of the left or right arrows buttons on the Guidance Tab.
- To clear out the adjustment and go to the original position, press **Clear Nudge**.



**Note:** The Nudge setting is only available with SmartPath, AB, A+ and Pivot patterns.

## ADAPTIVE CURVE

If you chose Adaptive Curve as your pattern option at the New Pattern screen (see [“New AB Pattern” on page 85](#), and also [“Adaptive Curve” on page 98](#)) then the Adaptive Curve button appears on the Guidance Options screen. This button opens the Adaptive Pattern Options screen. At this screen, you can choose pattern options that tell the system where to log a new pass. These options include:

- **New Pass**

This sets the conditions for the display to log a new pass. Select either Area Count or Heading Change.

- Area Count generates the next pass, based on coverage area of the previous pass. The display must be logging coverage data in order to generate the next pass.
- Heading Change logs the next pass when the vehicle turns past the heading threshold.

- **Heading Threshold**

Enter in the degree of turning angle that your vehicle will need to make before creating another pass.



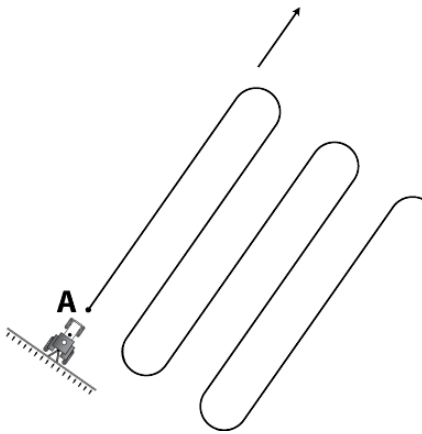
**Note:** You should always set the Heading Threshold number past 90 degrees. The default number is 110 degrees.

## ABOUT GUIDANCE PATTERNS


The following pages define available guidance pattern other than a SmartPath or a Straight AB Line.

- For a description of a Straight AB line, see [“New AB Pattern” on page 85](#).
- For a description of SmartPath, see [“SmartPath” on page 87](#).

## A+ Pattern



Similar to an AB line, an A+ line is also a straight line. It is defined by a single point on the line (the A point) and the heading of the line. Use this pattern when you wish to make a straight line based on a compass heading. The A+ line extends 1 mile (1.6 km) before and after the A point.

1. At the Guidance screen, press the New Pattern button. Choose Straight AB, and enter a swath width. Press the Use A+ Heading check mark box and enter in a degree number. Press  when finished. You will automatically return to the Map screen.

2. To map the start of the first swath, map Point A. The heading of the AB line equals either the previous AB heading of the manually-entered heading (if the current vehicle is within plus or minus 90 degrees of the AB heading). Otherwise, the A+ heading is in the

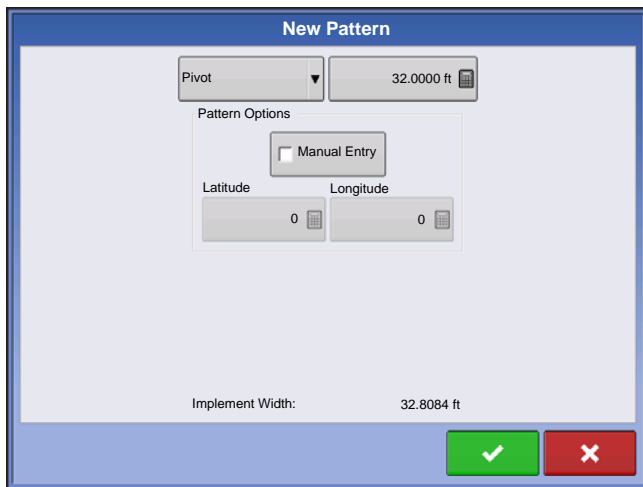
opposite direction.

3. Follow the AB line for guidance down the first swath.

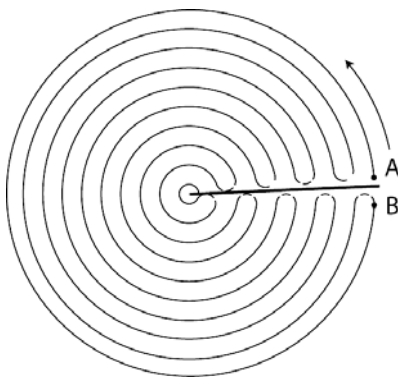
4. Turn left or right for the next swath. The next swath is automatically selected.

5. Steer the vehicle so that you center the green lights in the lightbar as you drive forward along the swath.

## Pivot



Use the Center-pivot pattern for a field that is irrigated using a center-pivot. With this pattern, you can drive concentric circles around the center-pivot. The display will calculate the center point based on where you have driven. Otherwise, you can enter in the latitude and longitude of the center point, if known.

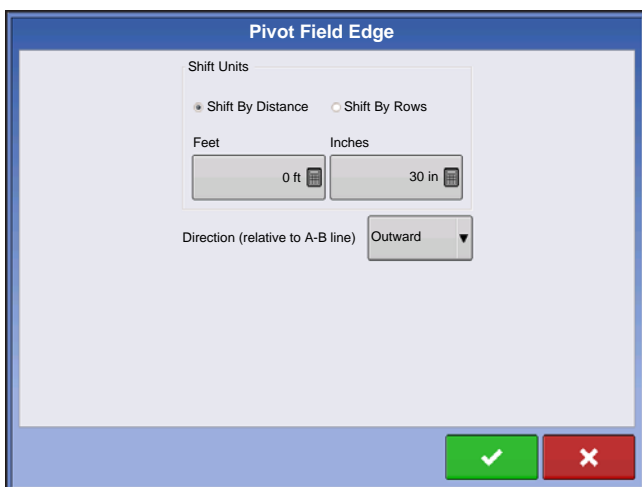


1. Position one wheel of the vehicle in a pivot wheel rut, with the rear of the vehicle to the pivot arm.

2. To start the pivot, set Point A.

3. Drive around the field. Keep the vehicle wheel in the rut. The lightbar does not yet provide guidance.

4. When you are almost back to the pivot arm or the edge of the field, set Point B.



5. Next, you must set the Field Edge. You may do this when the Pivot Field Edge window appears on your display.

From here, you may choose one of three options:

- **Shift By Distance**



This sets the field edge as the distance and direction in relation to the AB Line created. In the Pivot Field Edge Distance portion of the window, enter the distance in feet and inches.

- **Shift By Rows**

This sets the field edge as the number of crop rows multiplied by the number of spacing. In the Pivot Field Edge Distance portion of the window, enter the Number of Rows and Row Spacing.

- **Cancel**

The vehicle uses the driven pass as the AB Line.

6. If you chose **Shift by Rows** in the previous step, use  to enter the **Number of Rows** and **Row Spacing**. Choose the direction relative to the AB Line (either Outward or Inward), and press  to continue.

7. Turn left or right for the next swath. The next swath is automatically selected.

8. Steer the vehicle so that you center the green lights in the lightbar as you drive forward along the path.

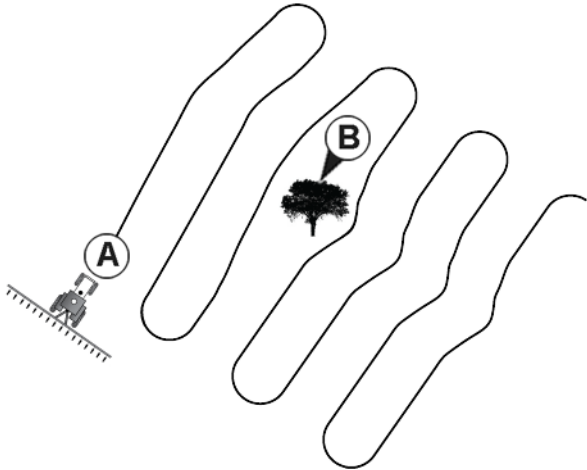


**Note:** To work from the center of the field outwards, the initial pivot must have:


- A radius of at least two swath widths.
- An arc length of at least two swath widths.

9. Press **Engage**.

## Adaptive Curve




Use the Adaptive Curve pattern to follow gentle contours in the field, or when you need to avoid **obstacles (B)**. This pattern provides guidance based on the last curve driven.

1. At the Guidance screen, press the **New Pattern** button. Choose **Adaptive Curve**, and enter a swath width. Press  when finished. You will automatically return to the Map screen.
2. At the start of the first swath, **map Point (A)**.
3. Drive the initial curve. At the other end of the first swath.
4. Turn left or right for the next swath. The next swath

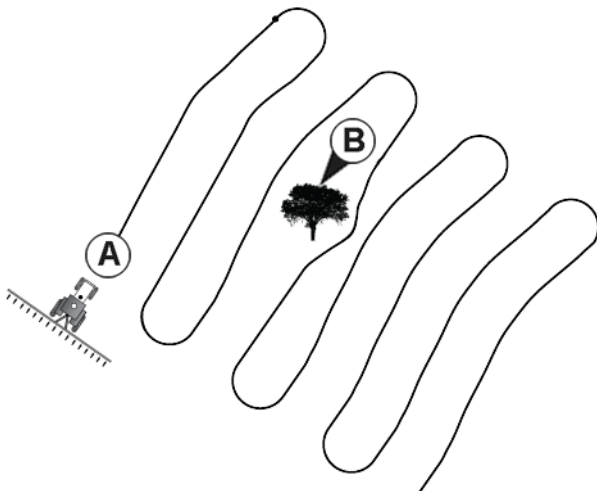
is automatically selected.


5. Steer the vehicle so that you center the green lights in the lightbar as you drive forward along the swath.

### Notes:

- Guidance extends beyond the end of curved swaths. This makes it possible to get LED guidance back onto the swath if the vehicle drives past the end of a swath. The extended swath lines do not appear on screen.
- You can adjust the degree heading at which the system generates the next pass by doing the following: Go to the Guidance screen and press the **Options** button. The Guidance Options screen appears; press the **Adaptive Curve** button. At the New Pass drop-down menu, select **Heading Change**, then use  to enter in the degree number of your Heading Threshold.

## Identical Curve



1. At the Guidance screen, press the **New Pattern** button. Choose **Identical Curve**, and enter a swath width. Press  when finished. You will automatically return to the Map screen.

2. At the start of the first swath, **map Point (A)**.

3. Drive the initial curve. At the other end of the first swath, map Point B.

4. Turn left or right for the next swath. The next swath is automatically selected.

5. Steer the vehicle so that you center the green lights in the lightbar as you drive forward along the swath.

### • (B) Obstacle



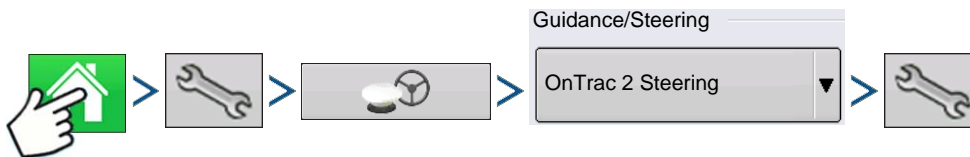
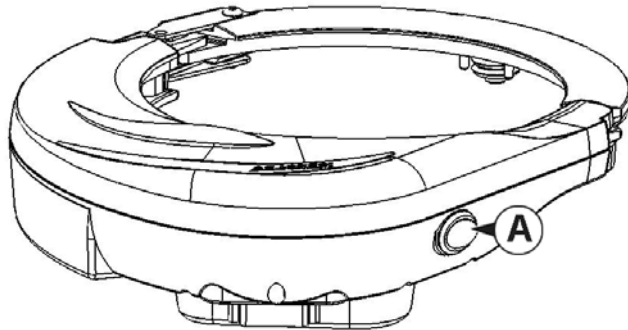
**Note:** Guidance extends beyond the end of curved swaths. This makes it possible to get LED guidance back onto the swath if the vehicle drives past the end of a swath. The extended swath lines do not appear on screen.

# ONTRAC2+

To ensure proper AutoSteer Operation make sure your GPS source is setup properly.

Complete the following steps to access AutoSteer setup screen:

1. Start the Display.
2. Turn on the Mechanical Drive Unit (MDU) with On/Off switch (A).



3. Press: Home button > Setup (wrench) button > GPS Guidance button > OnTrac2 Steering drop-down > Setup (wrench) button

## AUTOSTEER SETUP SCREEN



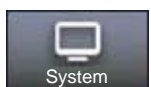
All instructions for the calibration and setup of the OnTrac2+ start from the AutoSteer Setup screen.

**<<<Instructions start from this screen**

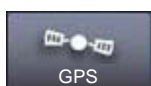
The AutoSteer Setup screen gives you access to the following functions:



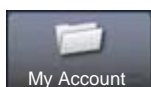
configure a vehicle, set up a new vehicle, manage existing vehicles, perform the auto calibration of a vehicle, perform the steering adjustments, and manage steering components.



configure and monitor system parameters.



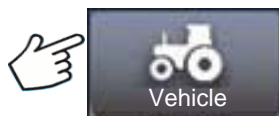
status of your GPS corrections. For more information, refer to the Display or GPS operators manual.



configure and monitor account parameters.

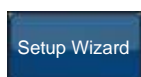
To return to the previous screen, press the Back icon. Press the Back icon from the AutoSteer Setup screen to return to your Display menus.

## VEHICLE



Press: Vehicle button

Select the desired vehicle configuration procedure button:



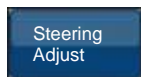
create and calibrate a new vehicle



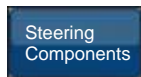
manage or change selected vehicle



calibrate to achieve optimal AutoSteering.

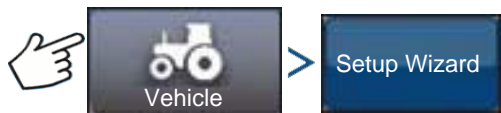


adjust steering performance









adjust parameters of steering components, such as the manual steering override kickout limit, and view diagnostic information for the system components.

## SETUP WIZARD



Press: Vehicle button > Setup Wizard button

The Setup Wizard is used to create, calibrate, and tune your vehicles with the AutoSteer system. It ensures that all required steps are performed. To achieve the best possible steering accuracy, you must setup, calibrate, and tune the system for your specific vehicle.


1. Select vehicle type. Press .
2. Select vehicle make. If your vehicle make is not listed choose Generic. Press .
3. Select vehicle model. Press .
4. Select vehicle controller type. Press .
5. Enter a vehicle name. Press .
6. Enter a Wheel Base value. Press .
7. Enter Antenna Fore/Aft offset and press either Fore or Aft button.
  - Fore indicates the antenna is located in front of the vehicle's control point.
  - Aft indicates the antenna is located behind the vehicle's control point.




The Control Point of a vehicle is defined as:

- Standard Wheeled Vehicle (MFWD, Floater, Sprayer) - Rear Axle
- Track Vehicle - Center of tracks
- Articulated Tractor - Pivot point of vehicle
- Combine/Swather - Front Axle

Press .

8. Enter Antenna Lateral Offset. Select Left or Right. Press .

---

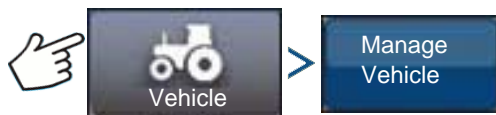
 **Note:** The Antenna Lateral Offset value is tested and adjusted (if necessary) after vehicle creation and calibration is complete. Use left or right buttons to indicate if antenna is left or right of the vehicle's center. If the antenna is perfectly centered, it does not matter which button is pressed as long as the measurement is zero.

---

9. Enter Antenna Height, and then press the checkmark button.


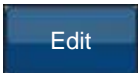
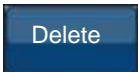

The Wizard now takes you to the Manual Steering Override kickout limit setting procedure. When the Manual Steering Override calibration is complete, the Setup Wizard starts the Auto Calibrate procedure.

## MANAGE VEHICLE



Press: Vehicle button > Manage Vehicle button

The Manage Vehicle screen enables you to:

-  select the active vehicle
-  change vehicle parameters
-  delete vehicle
-  import and export vehicle profiles

## SELECT



Press: Vehicle button > Manage Vehicle button > Select Vehicle > Select button

To make a vehicle profile the Active Vehicle, select vehicle from list and press the Select button. The confirmation box will appear. Press the checkmark button and then Back icon to return to the AutoSteer Setup menu.

## EDIT



Press: Vehicle button > Manage Vehicle button > Select Vehicle > Edit button

Select the vehicle from the list and press the Edit button. The wizard will ask for the following items:

- **Wheel Base**
- **Antenna Fore/Aft Offset**
  - Fore indicates the antenna is located in front of the vehicle's control point.
  - Aft indicates the antenna is located behind the vehicle's control point.

The Control Point of a vehicle is defined as:

  - Standard Wheeled Vehicle (MFWD, Floater, Sprayer) - Rear Axle
  - Track Vehicle - Center of tracks
  - Articulated Tractor - Pivot point of vehicle
  - Combine/Swather - Front Axle
- **Antenna Lateral Offset**
  - Use left or right buttons to indicate if antenna is left or right of the vehicle's center. If the antenna is perfectly centered, it does not matter which button is pressed as long as the measurement is zero.
- **Antenna Height**

If you are satisfied with the changes, press the checkmark button. If you are not satisfied with the changes, press the X button and return to the Edit Vehicle Wizard.

## DELETE



Press: Vehicle button > Manage Vehicle button > Select Vehicle > Delete button

The Delete button enables you to delete a vehicle. You can not delete the active vehicle. Select the vehicle from the list, and press the Delete button. Press the checkmark in the Delete Vehicle dialog box. Press checkmark in the confirmation box and you will return to the Manage Vehicles screen.

## EXPORT/IMPORT



Press: Vehicle button > Manage Vehicle button > Select Vehicle > Export button

The Export/Import button enables you to move vehicle profiles from one AutoSteer system to another.



**Note:** All AutoSteer systems must be running the same version of firmware to move vehicle profiles from one system to another. For best results always upgrade all AutoSteer systems to the latest firmware version prior to importing and exporting vehicles.

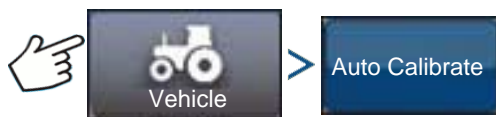
### Export profile to a USB drive

1. Insert a USB drive into the display.
2. Select the vehicle you want to export, and press Export/Import button.
3. Press the Export to Display USB button.
4. Press the Export button.
  - A progress bar appears while the vehicle profile is being exported.
5. When complete, press the checkmark button.

### Import profile to a USB drive

1. Insert a USB drive into the display.
2. Press the Export/Import button.
3. Press the Import from Display USB button.
4. Press the Choose File button.
5. Select the vehicle profile you want to import, and press the checkmark button.
6. Press the Import button.
7. When complete, press the checkmark button.
8. The system returns to the Export Vehicle to Display screen. Press the Back icon to return to the previous menu.

## AUTO CALIBRATE



Press: Vehicle button > AutoCalibrate button

The Auto Calibrate procedure takes the vehicle through a series of calibration steps to achieve optimal AutoSteering. You can pause the calibration at any point during the process.



**Note:** The Auto Calibrate procedure takes a significant amount of space for your vehicle to operate within. Depending upon your vehicle size you may need a 100 x 100 yard (91 x 91 meter) area to complete the Auto Calibrate procedure.

- The vehicle will execute a series of maneuvers during the calibration process including turning left and right.

Each step of the Calibration Wizard provides specific instructions for area, speed, and RPM. The calibration steps and time vary according to vehicle type and equipment installed. Follow the onscreen instructions to perform the auto calibration procedure. The main steps of the calibration procedure are:

- **OnTrac2 ECU Orientation:** The ECU can only be physically mounted in only four directions for OnTrac2. It must be flat with the cable connectors facing the front, back, left, or right. This step tells the AutoSteer system which way the ECU is physically facing in the cab so the internal sensors can orient themselves.

- **OnTrac2 ECU Tilt Zero Measurements 1 and 2:** The ECU has a tilt sensor in it to help take into account side hills and bumps while the vehicle is AutoSteering. While the vehicle is sitting still on a flat location, the sensor averages its readings to get an idea of what “level” is. The driver then drives the tractor and turns it so it is facing the opposite direction at the same location and lets it average itself again. These two steps allow the system to correct any tilt differences.
- **OnTrac2 Minimum Output:** This step determines the minimum power needed for the MDU to turn the steering wheel. This value is critical to ensure proper AutoSteering performance.



**Note:** All steps of the Auto Calibrate procedure must be completed and the changes saved before any attempt is made to AutoSteer the vehicle.

- You can press Pause and Resume (or manually turn the steering wheel) at any time during the Auto Calibrate procedure if needed.
- The correct vehicle must be selected in the Manage Vehicle section prior to calibrating the vehicle. Verify that the correct vehicle has been selected.
- Your vehicle should be moving at normal operating speed before you begin the Calibration Verification process.
- The vehicle will execute a series of maneuvers during the Calibration Verification process including driving in a straight line and slight left and right turns.
- You can press Pause and Resume (or manually turn the steering wheel) at any time during the Calibration Verification procedure if needed to ensure safe vehicle operation. However, the timer for the current step is reset each time you press the Pause button.

1. Press the Auto Calibrate button.
2. Press the Right Arrow button.
3. Select the orientation that matches your installation, and then press the Next button.
4. Follow the on-screen prompts for OnTrac2 Tilt Zero Measurements 1 and 2.
5. Follow the on-screen prompts for the OnTrac2 Minimum Output screens.
6. Press the checkmark button to save the calibration data.
7. Drive the vehicle to a location where it can be driven in a straight line for a long distance. Set the speed of the vehicle within the speed range indicated, and then press the Resume button to begin the Calibration Verification process. Follow the on-screen prompts to complete the calibration.
8. When the Calibration Verification procedure is complete, press the checkmark button to return to the Vehicle screen.
9. After the vehicle has been calibrated and verified, you must confirm the accuracy of the lateral offset.

## Adjust Lateral Offset

After the vehicle has been calibrated, perform the following procedure. This procedure will detect and eliminate skips and overlaps due to an incorrect lateral offset.

1. Set an AB line, engage AutoSteering, and AutoSteer for at least 50 yards (46 meters).
2. Stop your vehicle, place it in park, and turn off the AutoSteer system. Use a plumb bob to place a flag in the ground directly beneath the center of the draw bar.
3. Return to the vehicle, start the AutoSteer system, and engage AutoSteer for at least 50 yards (46 meters) on the same AB line.
4. Disengage AutoSteer, turn the vehicle around, and begin AutoSteering back down the same AB line in the opposite direction.

5. When the vehicle's draw bar reaches the flag, stop the vehicle, place it in park, turn off the AutoSteer system, and exit the vehicle.
6. Check to see if the center of the draw bar is over the flag.
7. If the flag is exactly beneath the center of the draw bar, no adjustment is needed.
8. If not, use a plumb bob to mark the spot directly beneath the draw bar, and then measure the distance between that spot and the flag.
9. Calculate the Offset Error by dividing the measured distance by 2. (The measurement is divided by two because taking the measurements driving in opposite directions doubles any error.)
10. Observe the offset of the error from the rear of the vehicle. Take note of whether the 2nd point is to the left or right of the original flag. If the error is to the right of the original point, the existing Antenna Lateral Offset must be adjusted to the left by the calculated Offset Error (and vice versa).
11. Go to the Edit Vehicle > Antenna Lateral Offset screen and edit the Antenna Lateral Offset value by adjusting the existing value and/or changing the offset from Left to Right.



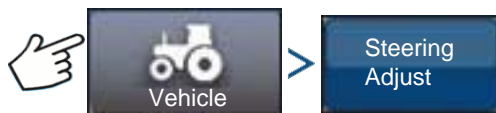
**Note:** This adjustment may require you to select a different left/right offset direction.

12. Repeat the procedure to ensure that the lateral offset is now correct. If the offset is consistently within 1 to 2 inches (2 to 5 cm) it is correct.

Example:

- a. The calculated Offset Error is 2 inches (5 cm) [4 inches (10 cm) / 2 = 2 inches (5cm)].
- b. The offset direction is to the right.
- c. We need to move the point to the left and the original offset was to the right, so we subtract. [5 inches (13 cm) - 2 inches (5 cm) = 3 inches (8 cm)].
- d. Enter 3 inches (8 cm) as the Antenna Lateral Offset.
- e. The offset direction (Left or Right) does not need to be changed in this case.

## STEERING ADJUST



Press: Vehicle button > Steering Adjust button

You can change the response of the following items by using the slider bar.

**Steering Response** — controls the oscillations of the vehicle when it is on the desired path.

**Cross-Track Error** — adjusts how aggressively the vehicle reacts to changes in cross-track error.

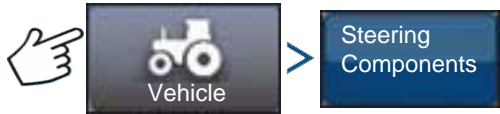
**Line Acquisition** — determines how aggressively the system steers onto the desired steering path. The ideal setting allows the system to take the shortest route without excessively sharp or sudden movements of the vehicle.

**Minimum Motor Output** — defines the minimum power needed for the MDU to turn the steering wheel.

The Steering Adjust screen enables you to improve your vehicle AutoSteering performance. You can change the response rate of the selected item with the screen slide bar:

- The turtle icon indicates slower (smooth) response.
- The rabbit icon indicates faster (aggressive) response.

# STEERING COMPONENTS



Press: Vehicle button > Steering Components

This screen enables you to adjust steering components. The list of components displayed varies depending on your individual installation.

## OnTrac2 ECU

The OnTrac2 ECU is the box that connects the AutoSteer controller to all AutoSteer sensors and actuators. The OnTrac2 ECU screen provides indicators showing the ECU firmware version, engaged status, MDU power status, and communication status.

## Manual Steering Override

This setting determines how much force is required to disengage AutoSteering by manually turning the steering wheel. Try the factory default limit first. If the Manual Steering Override limit is set too low, the system disengages AutoSteering under normal AutoSteering conditions. If it is set too high, the wheel requires excessive force before the system disengages.

To adjust the Manual Steering Override:

1. Press the START button and attempt to turn the steering wheel left or right with the factory default Manual Steering Override value. If the default value works satisfactorily, proceed to Step 3. If you need to set a new value, proceed to Step 2.
2. If the system does not disengage, press the minus button to lower the Manual Steering Override limit. If the system disengages too easily, press the plus button to raise the Manual Steering Override limit. Turn the steering wheel left or right with the new setting until the system disengages properly.
3. Once you are satisfied with the setting, press the Save Limit button to save the Manual Steering Override limit. The successful save dialog box appears. Press the checkmark button, and then press the Back button.

## Remote Engage Switch

The Remote Engage screen provides an indicator showing whether or not the Remote Engage Switch (if installed) is working properly. To test the Remote Engage Switch, press the remote engage switch once. The indicator light should turn green.

## MDU

The MDU screen provides a diagnostic test to verify that your MDU (Mechanical Drive Unit) is operating correctly.



**WARNING:** Before performing this test, ensure people and objects are clear of the vehicle. When pressing the command buttons, the wheels move quickly from side to side. Press the STOP button to halt the wheels.

To test the MDU:

1. From the Steering Components screen, select MDU.
2. Read the warning carefully, and then press the Continue button.

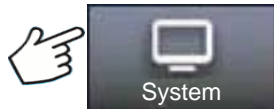
3. Use the Steering Command buttons to send the various commands to the MDU. Observe that the steering wheel behaves according to the specified command.



**Note:** The command buttons control the rate at which the wheels turn left/right.

- **Hard Left button** — turns wheel left at 100%
- **Percent Left button** — turns wheels left at amount specified in slider bar
- **Zero Percent button** — stops wheels from turning
- **Percent Right button** — turns wheels right the amount specified in the slider bar
- **Hard Right button** — turns the wheel right at 100%
- **Stop button** — terminates the Steering Diagnostics procedure
- **Steering Left/Right Percentage** — changes turning speed (the higher percentage turning faster)

## SYSTEM MENU



Press: System button

The system menu features the following functions:



monitor system parameters and performance



save, delete, or reset information in system database and log files



activate or deactivate optional sensors



password protected for use by qualified service technicians only.



upgrade system with the latest software available.

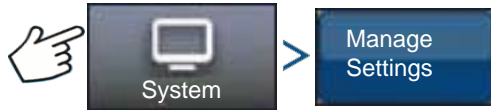
## SYSTEM HEALTH



Press: System button > System Health button

The System Health screen provides diagnostic and status information for various aspects of steering system. The overview screen displays the status of the components. Select an item for which you want a detailed status.

## MANAGE SETTINGS



Press: System button > Manage Settings button

The Manage Settings screen enables you to:

- Save or delete the current log files.
- Save the current database or import a database.
- Reset all the current settings to the default factory settings.

### Log Files

The log files contain system data that can be used for diagnostic and troubleshooting purposes.

#### **To copy log files:**

1. Insert USB drive into display.
2. Press Manage Settings button.
3. Select Log Files.
4. Press Copy to Display USB button.

The log files are saved to the USB drive.

#### **To delete log files:**

1. Press the Manage Settings button.
2. Select Log Files.
3. Press Delete button.
4. Press checkmark button on the Delete Log Files confirmation prompt.

Log files are deleted.



## Database

The database contains all the vehicle and system parameter data required for system operation. A backup of the database can be used to restore existing settings or copy them to a new system.



**Note:** Backup and restore of the database should not be used to copy vehicle profiles from one unit to another.

### To back up database:

1. Insert USB drive into display.
2. Press Manage Settings button.
3. Select database.
4. Press Backup to Display USB button.

The database is saved to the USB drive.

### To restore database:



**Note:** Restoring the database from a USB drive will overwrite the existing database in the AutoSteer system, replacing all existing information.

1. Insert a USB drive (containing the database you want to restore) into display.
2. Press Manage Settings button.
3. Select Database
4. Press Restore from Display USB button.
5. Select database to restore and press checkmark button.

The database is restored on the system.

## Reset Factory Default



**Note:** If this option is selected, all settings will be reset and you will need to create, calibrate, and tune a new vehicle. Before resetting to defaults, performing a database backup is strongly recommended.

Reset Factory Default enables you to reset settings and profiles back to the default factory settings except for the Feature Codes. To reset the settings:

1. Press the Manage Settings button.
2. Select Reset Factory Default.
3. Press the Reset button.
4. Press the checkmark button.

Current settings set to the default factory settings.

## ACCESSORIES



Press: System button > Accessories button

The Accessories menu is used to activate or deactivate optional sensors. Currently only the remote engaged switch is available. These options are always displayed when available. Once activated, the system is aware that the sensor is installed and functional. When options are functional diagnostic information is gathered and any malfunction of the sensor is reported through the diagnostic manager. If the sensor is removed warnings and errors are reported until the sensor is deactivated in the system.



**Note:** The Remote Engage Switch is an optional device that allows AutoSteer to be engaged from a device such as a foot switch or push button instead of pushing the Engage button on the display. A Remote Engage Switch must be activated in the Accessories menu.

## Remote Engage Switch

Press the Enable button to activate the Remote Engage Switch. The Remote Engage Switch enabled screen appears. To disable the Remote Engage Switch at a later time, return to the screen and press the Disable button.

## TECHNICIAN



Press: System button > Technician button

The Technician screen is password protected for use by qualified service technicians only.

## SOFTWARE UPGRADE



Press: System button > Software Upgrade button

The Software Upgrade screen enables you to upgrade your system with the latest application software:

1. Insert a USB drive (containing software upgrade) into Display.
2. Press Software Upgrade button.
3. Press Choose File button.
4. Select the desired software from list and press checkmark.

The upgrade process goes through a series of steps and reboots the AutoSteer system after a successful upgrade.

5. Press checkmark button after the upgrade is complete.

The AutoSteer system is now ready for normal operation.

## GPS DIAGNOSTICS



Press: GPS button > GPS Diagnostics button

The GPS Diagnostics screen displays the following operational parameters:

- **GPS Mode parameter** — current GPS mode of the receiver.
- **PDOP (Positional Dilution of Precision)** — measure of the strength of the satellite configuration. When visible GPS satellites are close together in the sky, the geometry is weak and the DOP value is high; when far apart, the geometry is strong and the DOP value is low. Thus a low DOP value represents a better GPS positional accuracy.
- **Heading** — heading of the vehicle in degrees
- **Height** — vehicle's altitude above sea level
- **# of satellites** — number of satellites being tracked by the receiver
- **Vehicle Position** — latitude and longitude of the vehicle

## DETAILS

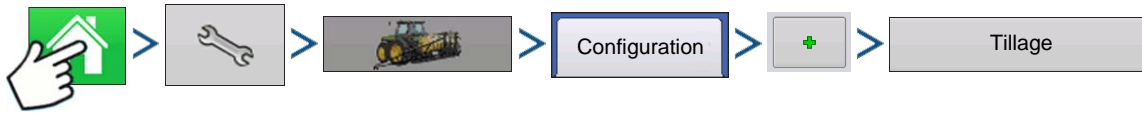


Press: My Account button > Details button

The Details button gives access to information about components installed on the system. Select the item for which you want to view details and the information about the selected item appears.



# CREATE TILLAGE CONFIGURATION



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > Add (+) button > Tillage button

## 1. Select Vehicle

Use drop-down menu to choose a vehicle, or press to enter a new vehicle. Press to continue.

## 2. Select Implement

Select an implement from the drop-down list menu, or press to create a new implement. Press to continue.

## 3. Select Speed Source

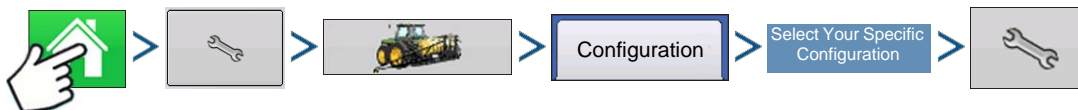
Use drop-down menu to select Primary Source, set Backup Source, and Auxiliary Channel. Press Calibrate Speed Sensor to launch the Speed Sensor Calibration Wizard.

## 4. Enter Configuration Name

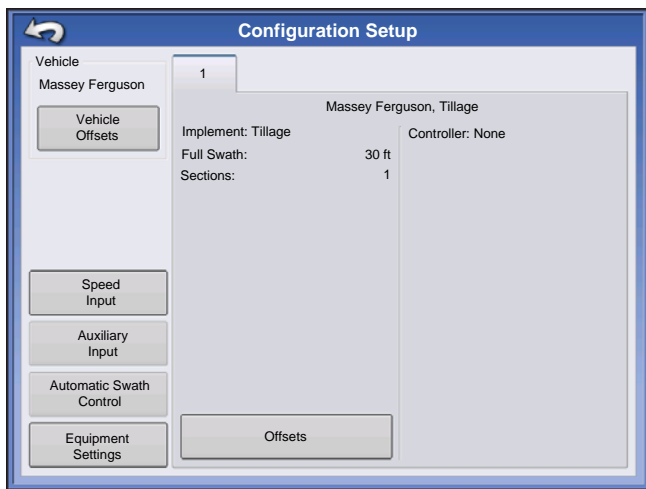
A suggested name for the configuration appears. If desired, press to enter a different name for your configuration. Press when complete.

Your Operating Configuration will then be viewable when you start a new Field Operation with the Field Operation Wizard.

## CONFIGURATION SETUP



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > select your specific configuration > Setup (wrench) button



The Configuration Setup screen appears. The appearance of this screen will vary depending upon your particular operating configuration.

Depending upon your particular configuration, this process may include the following tasks:

### 1. Equipment Settings

Adjust Implement Switch Settings (if using an implement switch). For more information, see [“Implement Switch Settings \(for Area Logging\)” on page 38.](#)

### 2. Speed Input Setup

For more information, see [“Speed Input Settings” on page 55.](#)

### 3. Calibrate Distance

For more information, see [“Calibrate Distance” on page 56.](#)

### 4. AutoSwath settings (if using AutoSwath)

For more information, see [“AutoSwath” on page 58.](#)

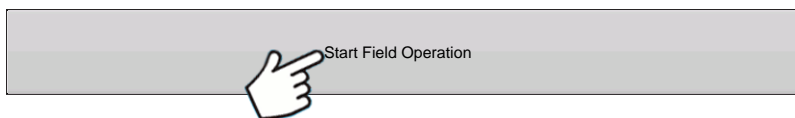
### 5. GPS Offsets

For more information, see [“Vehicle Offsets” on page 59.](#)

### 6. Swath Section Offsets

For more information, see [“Swath Section Offsets” on page 60.](#)

## LOAD CONFIGURATION



Press: Start Field Operation button

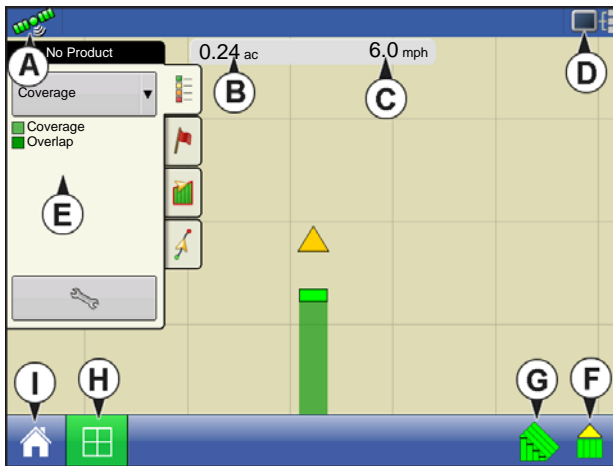
Select a Season, Grower, Farm and Field at the Start Field Operation portion of the Home screen.

For more information, see [“Setup Field Operation” on page 33.](#)

## RUN CONFIGURATION



Once a configuration has been completed, the Map View button appears at the bottom of the Home screen. Press the Map View button to see the Map screen.



- (A) GPS Status
- (B) Total Field Acres
- (C) Ground Speed
- (D) Diagnostics button
- (E) Map Legend
- (F) Logging Status button
- (G) AutoSwath
- (H) Map View button
- (I) Home button

Once a configuration has been completed, the Map View button appears at the bottom of the Home screen. Press the Map View button, and the map screen appears.



**Note:** Pressing the Map View button will cycle between the available map screen views, and the appearance of the Map View button changes. For additional information on Map screen items, see “Run screens” on page 39.



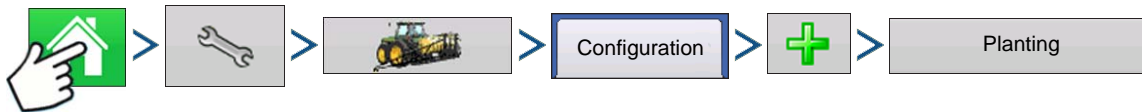


# CREATE PLANTING CONFIGURATION

Most of the functionality of the display is not available until the basic setup process is completed. You must complete these initial configuration steps for the Map screen to be active:

1. **Create and Setup an Equipment Configuration**
2. **Product setup**
3. **Grower, Farm, and Field management**
4. **Start Field Operation**



## CREATE EQUIPMENT CONFIGURATION



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > Add (+) button > Planting button

A wizard will then guide you through the process of creating a configuration using the following steps:


### 1. Select Vehicle

Select an existing Vehicle from the drop-down menu, or press  and create a new vehicle with the Vehicle Setup Wizard. Press  to continue.

### 2. Select Implement

Press  to create a new implement.

### 3. Select Implement Type

From the top drop-down menu, select the Planter/Seeder Type setting. Press  to continue.

### 4. Enter Make and Model

Press  to enter implement make and model.

### 5. Select Attachment Type

Choose Rear Drawbar or Rear Lift Arms from drop-down menu.

### 6. Enter Distance from Hitch to Application Point

Press  to enter the distance from the implement hitch to the application point (from front to back).

When finished, press  to continue.

## 7. Select Implement Options



### • Split Rows Enabled

Check this box to enable the display to log data from the planter's Split Row units. (For split row-enabled planters, you will need to create separate implement configurations for Split Row and non-Split Row operations).

### • Planter Section Row Shutoff

Check the Planter Section Row Shutoff check box if you are using Row Shutoff module.

## 8. Rate Controller

Select an existing rate controller from the drop-down menu, or press  and create a new controller with the Controller Setup Wizard. Press  to continue.

Controller Wizard:

Select Device: Seed Command





Select Device Type:

- Hydraulic Controller
- Stepper Controller
- Granular Strip Till Controller

Enter Number of drives

Enter Controller Name

## 9. Enter Number of Rows and Spacing.

Use  /  to enter the number of rows. Press  and enter spacing. Press  to continue.

## 10. (AutoSwath Only) Number of Implement Sections

Enter the number of swath sections that can be independently turned on and off.



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

**Note:** The Clutch Module Configuration must match the actual number of row sections on the planter. Otherwise, if you try to load a Field Operation at the Field Operation Wizard, you will see a message stating that "The number of detected module outputs does not equal the number of planter sections."

---

## 11. (AutoSwath Only) Enter Section Widths from Left to Right

Enter how many rows are in each swath section from left to right screen appears. This screen shows the number of sections and number of rows in your configuration. From here you can:

- Press  to continue., or

- Highlight the section number, and use  to change the section row numbers; then press  to continue.



---

**Note:** The implement is divided up into equal section sizes by default. To modify the sections, press the keypad button for each section that needs to be changed.

---

## 12. Add Liquid or Granular Application

## 13. Enter Implement Name

Press  to enter an Implement Name, Press  to complete Implement Wizard.

You will now to returned to the Operation Configuration Wizard.



**14. Select Implement**

Select Implement from drop-down menu.

**15. Select Speed Source**

Use drop-down menu to select Primary Source, set Backup Source, and configure Auxiliary Channel. Press Calibrate Speed Sensor to launch the Speed Sensor Calibration Wizard.

**16. Enter Configuration Name**

A suggested name for the configuration appears. If desired, Press  to enter a different name for your configuration. Press  when complete.

The complete configuration should now appear on the Configuration Setup screen and is now able to be selected when starting a new Field Operation



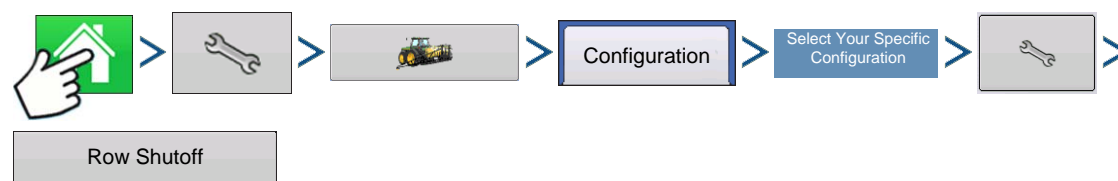
# AUTOSWATH

## ROW SHUTOFF

Create an Implement configuration with Row Shutoff by following the procedure in *“Create Planting Configuration” on page 117*. By configuring your display with Row Shutoff, you can start and stop seed flow and control planter sections row-by-row, allowing AutoSwath Control to automatically turn planter row units on and off based on your planting map.

### CONFIGURATION SETUP

Once the configuration is created and it appears on the Configuration Setup screen, AutoSwath should be configured correctly. However, if you cannot the configuration to load on the Field Operation Wizard, or if your vehicle does not appear on the Map screen, you may wish to check if the row clutches have been correctly set up in Implement Setup. Use the following procedure to enable Seed Row Shutoff and/or configure the Clutch Module.



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Row Shutoff button

The Row Shutoff Module Configuration screen appears. This screen shows the number of Row Shutoff Modules and the sections that each module controls.

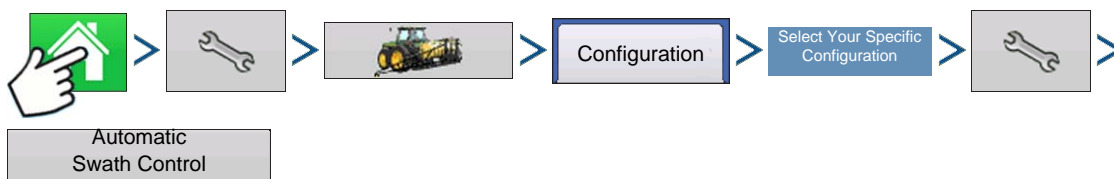
### ROW SHUTOFF LOOK-AHEAD NUMBERS

This table references the Turn-On Look-Ahead and Turn-Off Look-Ahead numbers for both Electric Clutch and Air Row Shutoff Modules.

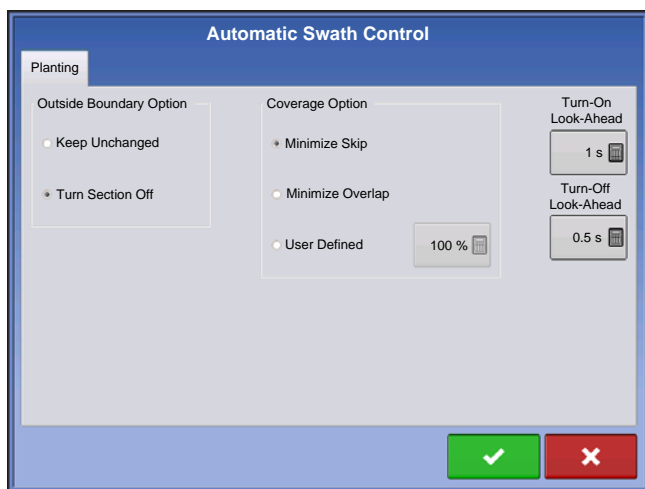
Planter Unit Seed Meter Type	On/Off	Electric Clutch	Air Clutch
Finger Units	Turn On	0.9	1.1
	Turn Off	0.3	0.3
Vacuum	Turn On	0.9	1.1
	Turn Off	0.4	0.4

**Note:** Using the above settings should produce good field results. However, always take the time to check for proper seed placement in the field and make system setting adjustments as needed. Do not rely solely upon the appearance of the On-Screen map. The on screen map will not show gaps and overlaps caused by incorrect GPS Offsets or AutoSwath Look-Ahead settings.

# AUTOMATIC AUTOSWATH CONTROL



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > select your specific configuration > Setup (wrench) button > Automatic Swath Control button



The Automatic Swath Control feature turns sections off and on automatically based upon the following conditions:

- Entering and exiting internal and outer field boundaries.
- Entering and exiting previously-applied areas within a field.

At the Configuration Setup screen, press the AutoSwath button. Assuming you are performing a Tillage, Application or Planting operation, the Automatic Swath Control screen appears.



**Note:** If you are performing a Harvest operation, see “AutoSwath Sensitivity Settings” on page 226.

## • Outside Boundary Option

Select one of the two options to determine system behavior when a section exits a field boundary.

## • Coverage Option

In the Coverage Option area, you must choose between three options:

- The Minimize Skip option turns off the implement section after the entire section is fully inside your coverage area. This prevents the possibility of skips.
- The Minimize Overlap option turns off the implement section when that section first enters your coverage area. This prevents the possibility of overlaps.
- The User Defined option allows you to choose what percentage of the implement section is within the coverage area before that section turns off. For example, if you choose 50%, then the section will switch off when half of it is within your coverage area.

## • Turn-On Look Ahead

This setting determines how far ahead the system looks to turn the sections back on. This setting compensates for delay in the planting control system when the implement sections are turned on.

### • Turn-Off Look Ahead

This setting determines how far ahead the system looks to turn the sections off. This setting compensates for delay in the product control system when the sections are turned off.



**Note:** To use AutoSwath for planting operations, you are required to use a 5 Hz or higher GPS output rate. AutoSwath control will not allow sections to be turned on until the master and planting section switches are on. If you have less than a 5 Hz GPS output rate and you select AutoSwath, a warning appears, telling you that AutoSwath Control is not available at less than 5 Hz.

## CHECKING AUTOSWATH PERFORMANCE FOR ROW SHUTOFF

The settings given in the above AutoSwath look-ahead table shown previously have been tested with each clutch and seed meter combination to work for your planter. However, always take the time to check for proper seed placement in the field and make system setting adjustments as needed. Do not rely solely upon the appearance of the On-Screen map. The on screen map will not show gaps and overlaps caused by incorrect GPS Offsets or AutoSwath Look-Ahead settings. Verify settings with the following procedure:

1. Stop the planter within 20 feet of the planted headland.
2. Select one row unit from each planter swath section to observe.
3. Remove the down pressure from the closing wheel of each selected row unit.
4. Hold the closing wheels off the ground by attaching a chain or strap from the hopper support panel to the closing wheel arm. (This prevents the closing wheels from closing the seed trench).  
Securing these closing wheels up allows you to observe the planted seed in the trench so that you can observe when the AutoSwath is turned off and on during the seed application.
5. Resume planting in your normal fashion, then stop when you are 20 feet out of the headland of the next pass.
6. Stop the planter and observe the AutoSwath shutting off and turning on to see if the results are acceptable.
  - If the results are correct, then return the closing wheels to their previous operational state. Close the seed trench on the observed rows and return to planting.
  - If you suspect the results are incorrect, then adjust the appropriate look-ahead setting one-tenth (.1) second per trial. When making changes to the look-ahead settings, make sure to adjust these settings only one-tenth (.1) second per trial. Larger adjustments can cause unintentional large changes in the AutoSwath's performance. When adjusting the look-ahead numbers from the suggested settings, it is recommended that you observe multiple trials to confirm the operations' accuracy.
  - If you encounter overplanting or underplanting problems, see ["Fixing Overplanting and Underplanting in AutoSwath" on page 123.](#)

## FIXING OVERPLANTING AND UNDERPLANTING IN AUTOSWATH

### AutoSwath Function — Turn Off Look Ahead

#### Problem — Overplanting

Recommended Action — Increase look-ahead number

Result — The AutoSwath anticipates headlands sooner and turns the planter off sooner.

#### Problem — Underplanting

Recommended Action — Decrease look-ahead number

Result — The AutoSwath anticipates headlands later and turns the planter off later.

## AutoSwath Function — Turn On Look Ahead

Problem — Overplanting

Recommended Action — Decrease look-ahead number

Result — The AutoSwath anticipates headlands later and turns the planter on later.

Problem — Underplanting

Recommended Action — Increase look-ahead number

Result — The AutoSwath anticipates headlands sooner and turns the planter on sooner.



# RATE CONTROL

## HYDRAULIC SEED RATE CONTROL

The Hydraulic Seed Control Module allows operators to control up to three hydraulic motor drives with the display. Configure the Hydraulic Seed Rate Control module in the following order.

### 1. Configure Hydraulic Seed Rate Control module

See *“Create Planting Configuration” on page 117.*

### 2. Enter Controller Settings

Include the Max Meter Speed, Gear Ratio and Minimum Allowable Ground Speed. See *“Controller Settings for Hydraulic Seed Rate Motor Drives” on page 125.*

### 3. Prime the Hydraulic Seed Meter

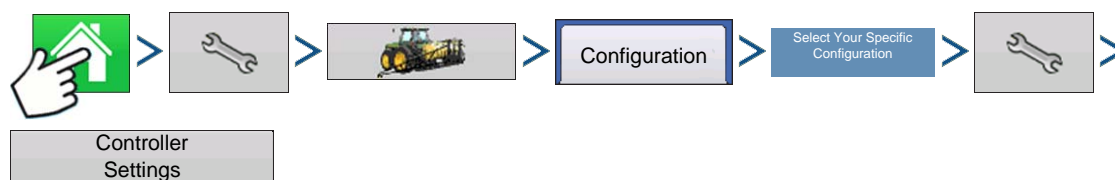
Fill seed meter with seed to avoid skips. See *“Priming Seed Rate Meters” on page 134*

### 4. Meter Calibration

- a. Enter Meter Calibration Number. This number, representing seeds per revolution, is set according to the number of seed dropped per one revolution of the seed meter. For more information, *“Calibrating Seed Rate Meters” on page 134*
- b. Perform a Seed Meter Calibration. A new calibration should be performed if as-applied seed rate does not match actual population planted. See, *“Calibrating Seed Rate Meters” on page 134*

## CONTROLLER SETTINGS FOR HYDRAULIC SEED RATE MOTOR DRIVES

After creating an Operating Configuration for the Hydraulic Seed Meter Controller, make settings changes in the Controller Settings screen, which shows valve settings for hydraulic flow and pulses per revolution.



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Controller Settings button

The Controller Settings screen consists of at least two tabs: the Channel Tabs, shown for each channel being controlled; and the Auxiliary Tab.

## Channel Tab settings

Channel 1 Auxiliary

Shaft Speed Cal. 360 pls/rev

Gear Ratio 1.533

Allowable Error 2%

Max Meter Speed 150 rpm

Control Valve Settings

- **Shaft Speed Cal**

Calibration number representing the pulses that equal one revolution of the hydraulic motor.

- **Max Meter Speed**

Setting determines the maximum RPM of the seed meter.

- **Gear Ratio**

Ratio of the revolutions of the hydraulic drive as compared to one revolution of the seed meter.

- **Allowable Error**

Determines the percent of error that is allowed prior to the product control system making any flow rate

changes.

- **Control Valve Settings**

This button summons the Control Valve Settings screen. The appearance of the Control Valve Settings screen varies, depending upon whether planter's control valves are PWM Valves or Servo Valves.

## Control Valve Settings - PWM

Controller Valve Settings

Control Valve PWM

PWM Frequency 200

PWM Gain 130

Zero Flow Offset 33

- **PWM Frequency**

The frequency that the PWM control valve is pulsed at. Settings can be found from the manufacturer of the valve.

- **PWM Gain**

Determines how aggressively the control valve responds when making rate change adjustments. The higher the value the more aggressive the system response is.

- **Zero Flow Offset**

Represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a **Zero Flow Offset**

value can cause the product control system to not properly control flow rates at low rates. See the PWM valve manufacturer's information for recommended settings.

## Control Valve Settings - Servo

**Controller Valve Settings**

Control Valve: Servo

Valve Response 1: 40%

Valve Response 2: 8%

Response Threshold: 15

- **Valve Response 1**

Determines the speed of the servo valve when product control error exceeds the Response Threshold setting.

- **Valve Response 2**

Determines the speed of the servo valve when product control error is less than the Response Threshold setting.

- **Response Threshold**

Determines the system responsiveness to rate change.

## Auxiliary Tab settings

**Controller Settings**

Channel 1 | Auxiliary

Minimum Ground Speed: 2 mph

Rate Not Responding Time: 4 s

Rate Not Responding Threshold: 30%

- **Minimum Ground Speed**

The display will simulate this specific ground speed when either the jump start switch is pressed or the motion detection sensor disengages. This fixed ground speed setting compensates for delays in acquiring an initial ground speed when starting from a stand still. The setting determines the target seed meter RPM when the setting is active.

- **Rate Not Responding Threshold**

The percentage of seed rate error that triggers the alarms.

- **Rate Not Responding Time**

The amount of time that the error occurs before the alarm sounds.

## HYDRAULIC SEED CONTROLLER SETTINGS FOR SPECIFIC PLANTERS



**Note:** The settings, provided below, should be a good starting point for controller settings. However, always take the time to calibrate the seed meters, check for proper seed placement in the field, and make system setting adjustments as needed. Do not rely solely upon the appearance of the On-Screen map. The on screen map will not show gaps and overlaps caused by incorrect GPS Offsets or AutoSwath Look-Ahead settings.

Planter brand	Control Valve Configuration	PWM Frequency	PWM Gain	Zero Flow Offset	Gear Ratio	Pulses/Rev.
John Deere Planters	PWM	175	110	40	2.374 (chain) 2.417 (ProShaft)	360
White Planters	PWM	200	90	30	5.5	360
Case IH Planters	PWM	100	90	40	6.803	360

## HYDRAULIC SEED METER CALIBRATION NUMBERS

Prior to calibrating the Hydraulic Seed Meter, the numbers that appear in the Meter Calibration box in the Planter Control window should be similar to the numbers that appear below. If they are not, the seed meter may be working incorrectly, or the Gear Ratio may be incorrect. Contact Technical Support for further assistance.



**Note:** Check the operator's manual for more specific information on other seed disk options.

Planter brand and type	Corn	Soybeans	Cotton Standard Rate	Sorghum
John Deere				
Vacuum: Standard	30	108	64	45
Vacuum: ProMAX™	40			
Vacuum: Precision Planting eSet®	30			
Vacuum: VenHuizen AccuVac Kit	40			
Mechanical: Finger	12			
Mechanical: Brush Meter		56		
Case IH				

Planter brand and type	Corn	Soybeans	Cotton Standard Rate	Sorghum
Vacuum	48	130	80	80
Cyclo®	36	240		
KINZE				
EdgeVac®	39	60	54	60
Mechanical: Finger	12	56	48	60
White				
	30	60		
Great Plains				
Mechanical: Standard	12	110	120	102
Mechanical: Twin Row	6	100		135

## STEPPER SEED RATE CONTROL

The Stepper Seed Control module allows Rawson ACCU-RATE Variable Rate Controller to control up to three hydraulic motor drives via the display. Configure the Stepper Seed Rate Control module in the following order.

### 1. Configure Stepper Seed Rate Control module

See *“Create Planting Configuration” on page 117.*

### 2. Enter Controller Settings

Included the Max Meter Speed, Gear Ratio and Minimum Allowable Ground Speed.

See *“Controller Settings for Stepper Seed Rate Motor Drives” on page 129.*

### 3. Prime the Stepper Seed Meter

This fills the seed meter with seed to avoid skips.

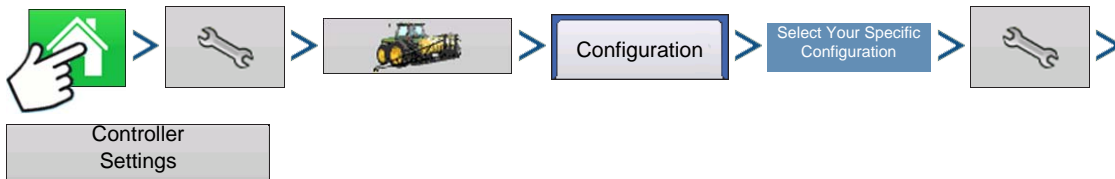
See *“Priming Seed Rate Meters” on page 134.*

### 4. Meter Calibration

- a. Enter Meter Calibration Number. This number, representing seeds per revolution, is set according to the number of seeds dropped per one revolution of the seed meter. See *“Calibrating Seed Rate Meters” on page 134.*
- b. Perform a Seed Meter Calibration. A new calibration should be performed if the as-applied seed rate does not match the actual population planted. See *“Calibrating Seed Rate Meters” on page 134.*

## CONTROLLER SETTINGS FOR STEPPER SEED RATE MOTOR DRIVES

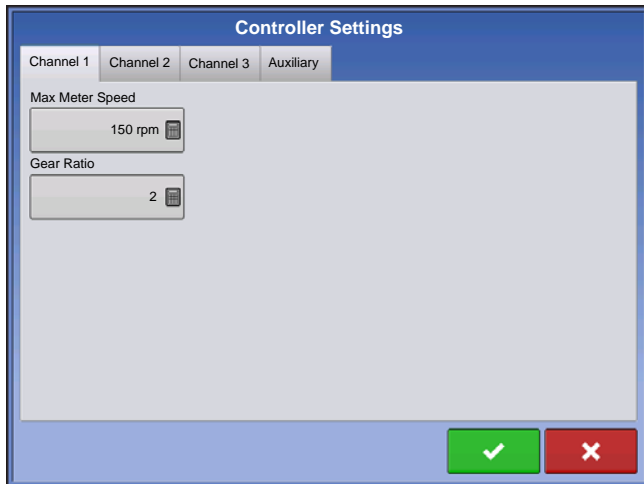
Stepper Controller Settings should be set before entering a meter calibration number or performing field operations.



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Controller Settings button

Each channel is displayed with its own tab. Auxiliary Tab allows adjustment of the Minimum Allowable Ground Speed.

## Channel Tabs



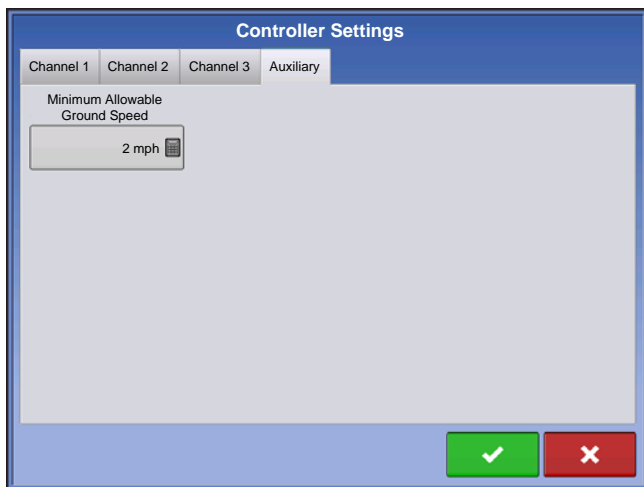
- **Max Meter Speed**

This number represents the maximum recommended RPM of the seed meter, and is specified by the manufacturer. A warning appears if this threshold is exceeded.

- **Gear Ratio**

The ratio of the revolutions of the hydraulic drive to turn the seed meter one revolution.

## Auxiliary Tab



- **Minimum Allowable Ground Speed**

The display will simulate this specific ground speed when either the jump start switch is pressed or the motion detection sensor disengages. This fixed ground speed setting compensates for delays in acquiring an initial ground speed when starting from a stand still. The setting determines the target seed meter RPM when the setting is active.

## GEAR RATIO CALCULATIONS FOR SEED RATE MOTORS

The Gear Ratio is a setting that appears on the Controller Tab for the Stepper Seed Meter Motor Drive. It is the ratio of the revolutions of the hydraulic drive as compared to one revolution of the seed meter. This setting is used to determine how fast the Stepper Seed Rate Motor should operate to achieve the proper RPM of the seed meter during planting operations.

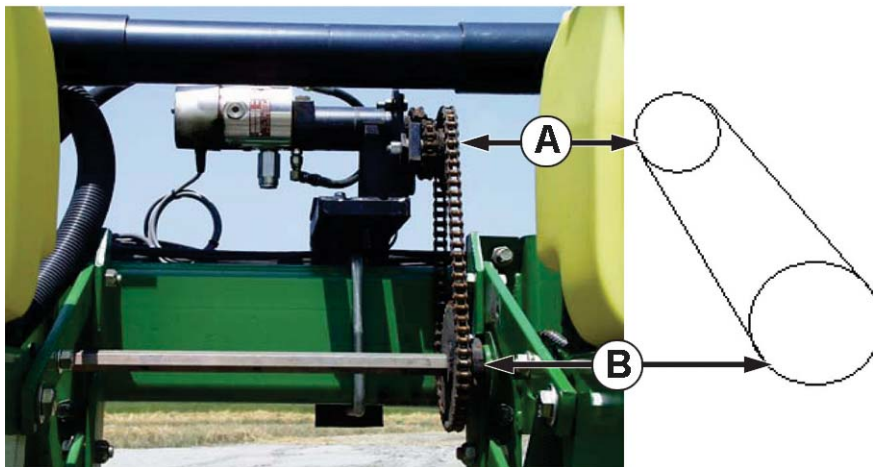
To manually enter a Gear Ratio in the Controller Settings window, calculate the Gear Ratio based on information provided below and on the following pages. The Gear Ratio number is calculated by multiplying all the gear ratio combinations, from the Seed Rate Drive Motor to the Seed Meter.



**Note:** Gear Ratio number is the number of revolutions of the motor to turn the seed meter one revolution.

### Gear Ratio Drawing - For Single Motor Drive

Seed Rate Drive Setting (Calculating drive gear ratio)



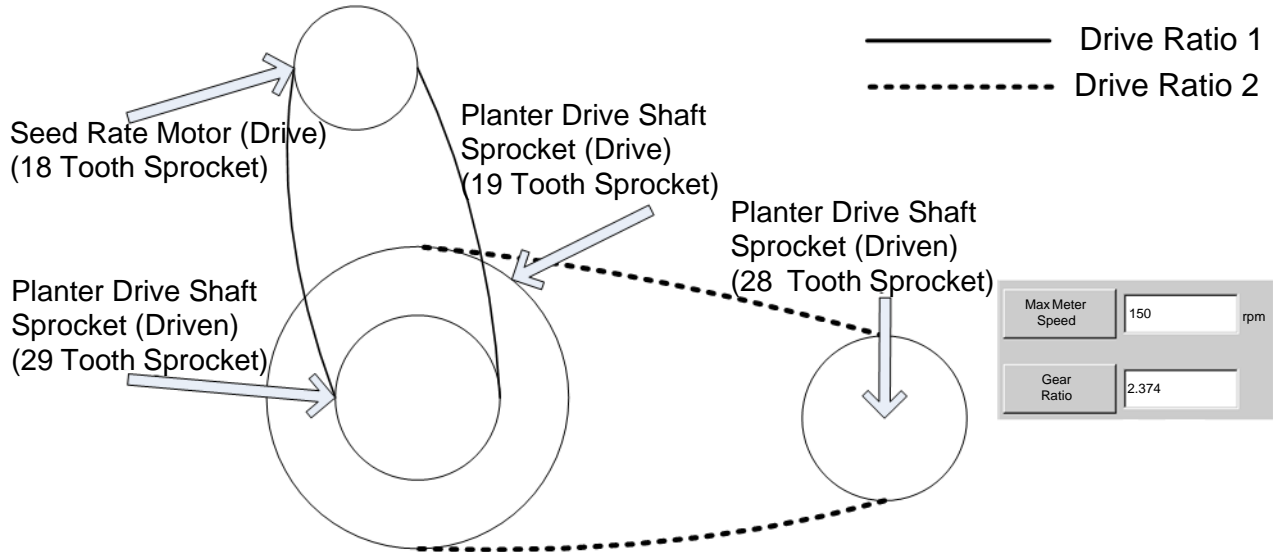
- (A) Seed Rate Motor (Drive) 18 Tooth Sprocket
- (B) Planter Drive Shaft Sprocket (Driven) 29 Tooth Sprocket

$$\frac{\text{\# of Teeth on the Driven Sprocket}}{\text{\# of Teeth on the Drive Sprocket}} = \text{Gear Ratio}$$

\*Each drive combination (Driven/Drive) from Seed Rate Motor Drive to Seed Meter shaft sprocket needs to be factored for the Total Gear Ratio.

## Gear Ratio Drawing - For Multiple Drive Combinations

Seed Rate Drive Setting (Calculating a Gear Ratio for Multiple Drive Combinations)



$$\frac{29}{18} \times \frac{28}{19} = \frac{812}{342} = 2.4$$

Driven/Drive 1 X Driven/Drive 2 = Gear Ratio

$$\frac{\text{Planter Drive Sprocket}}{\text{Seed Rate Motor}} \times \frac{\text{Seed Meter Shaft}}{\text{Planter Drive Shaft}} = \text{Gear Ratio}$$

Driven/Drive 1 X Driven/Drive 2

Carry the Decimal place to the nearest 0.001 for accurate results.

### Seed Ratio Calculation Example Procedure

The example outlined below assumes a single planter drive motor. Step 5 notes that this process has multiple steps for more than one Stepper Seed Motor Drives.

1. Beginning with the Seed Rate Motor, count the number of teeth on the drive sprocket. Then count the number of teeth on the driven sprocket.
2. Divide the number of teeth on the driven sprocket by the number of teeth on the drive sprocket. This is the ratio of the Seed Rate motor.
3. Repeat the process for each sprocket combination in the drive system back to the meter.
4. Take the ratio of the Seed Rate Motor and multiply it by the ratio of the other sprocket combinations.
5. Repeat this process for multiple hydraulic drives. Enter the gear ratio for each motor under the appropriate tab.

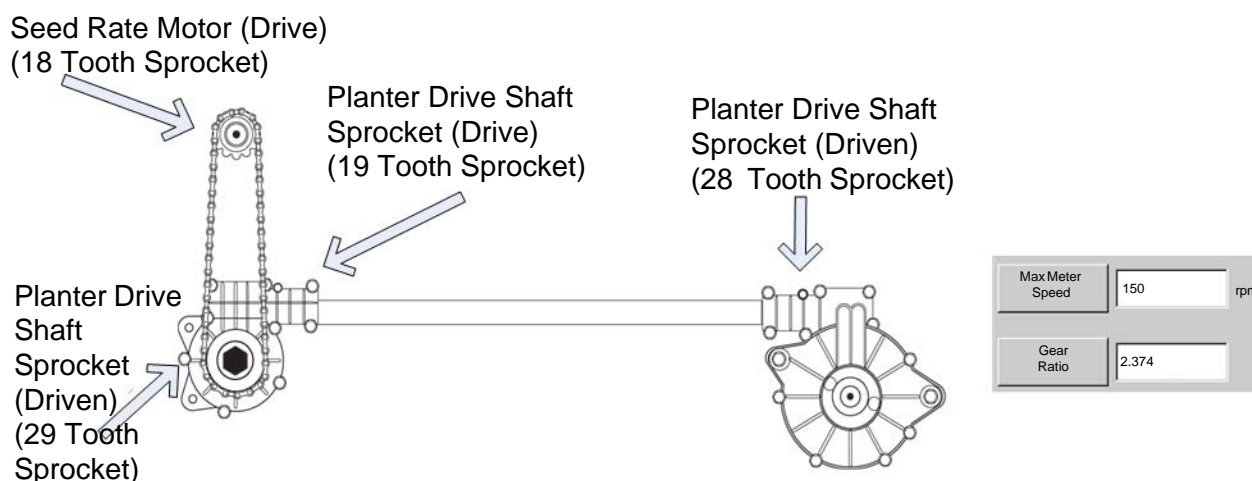


**Note:** Enter the number into the other channels for additional motor drives if they have the same total gear ratio.



## Gear Ratio Drawing - For John Deere Pro-Shaft™ Drives

Seed Rate Drive Setting (Calculating a Gear Ration for John Deere Pro-Shaft Drives)



$$\frac{29}{18} \times \frac{28}{19} = \frac{812}{342} = 2.4$$

Driven/Drive 1 X Driven/Drive 2 = Gear Ratio

$$\frac{\text{Planter Drive Sprocket}}{\text{Seed Rate Motor}} \times \frac{\text{Seed Meter Shaft}}{\text{Planter Drive Shaft}} = \text{Gear Ratio}$$

Driven/Drive 1 X Driven/Drive 2

Carry the Decimal place to the nearest 0.001 for accurate results.

### Seed Ratio Calculation Example Procedure - for Pro-Shaft™ Drives

This example assumes a single drive motor. Step 5 notes that this process has multiple steps for more than one Stepper Seed Motor Drives.

1. Beginning with the Seed Rate Motor, count the number of teeth on the drive sprocket. Then count the number of teeth on the driven sprocket.
2. Divide the number of teeth on the driven sprocket by the number of teeth on the drive sprocket. This is the ratio of the Seed Rate motor.
3. Repeat the process for each sprocket combination in the drive system back to the meter. On the Pro-Shaft Drive, the number of teeth on the driven sprocket is always **28**, and the number of teeth on the drive sprocket is always **19**.
4. Take the ratio of the Seed Rate Motor and multiply it by the ratio of the other sprocket combinations.

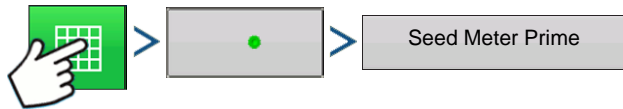
5. Repeat this process for multiple hydraulic drives. Enter gear ratio for each motor under the appropriate tab.



**Note:** Enter the number into the other channels for additional motor drives if they have the same total gear ratio.

## PRIMING SEED RATE METERS

The Seed Meter Prime is used to charge the seed meter when filling with seed.



Press: Map button > Meter RPM button > Seed Meter Prime button

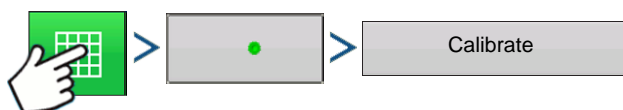
A message displays, stating “Seed Meter Prime in Progress.” While this message displays, the seed meter will turn one (and only one) revolution automatically. When complete, return to the Seed Rate Planter Control screen.

## CALIBRATING SEED RATE METERS

The Meter Calibration number allows the seed meter to communicate the correct seed population to the display. Assuming the Controller Settings are correct for the seed rate, this Meter Calibration number, which is based on the number of cells on the seed meter, should not need to be adjusted. However, you may wish to recalibrate before changing seed types and treatments.

Notes:

- The stepper seed rate meter calibration does not recalibrate any previously-logged planting data.
- This recalibration number applies to a specific crop type, i.e., corn. Normally, there is no need to recalibrate when switching varieties within the same crop type.
- Make sure seed meter is primed. For more information, See [“Priming Seed Rate Meters”](#) above.




Press: Map button > Meter RPM button > Calibrate button

### 1. Acknowledge the Warning

Acknowledge this warning by pressing .

### 2. Select Drive to Calibrate

The Meter Calibration Wizard appears. Select the drive to calibrate. Press  to continue.

### 3. Enter Simulated Ground Speed

Enter the simulated ground speed for the calibration procedure. Press  to continue.

### 4. Enter Simulated Target Rate

Enter the simulated target rate of the calibration procedure. Press  to continue.


**5. Press Start**

Press the green-colored Start button to begin dispensing the seed.



**6. Dispensing Seed**

The seed meter turns for five revolutions. As the seed meter dispenses seed, the button will change its color to red, and a message displays that the seed dispensation is in process.

**7. Seed Dispensing Complete**

When the meter is finished dispensing seed, the button will change back to its original green color, and will once again display the word Start. Press  to continue.

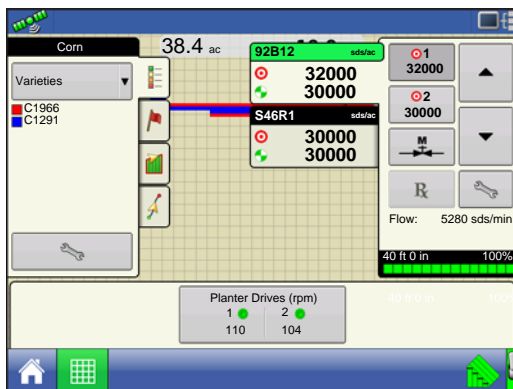
**8. Enter Number of Dispensed Seeds**

Press  to enter the number of dispensed seeds counted in Step 8. Press  to continue.



**Note:** The meter calibration will be calculated from the actual seed amount dispensed.

## RATE CONTROL: MAP SCREEN

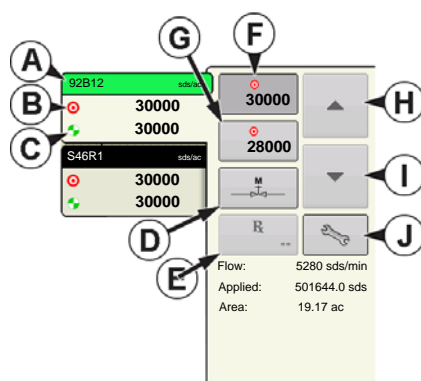




The map screen displays a two-section SeedCommand configuration running a Variable Rate Control configuration that includes two Hydraulic Seed Meters, and also Row Shutoff with AutoSwath. Because the configuration is for a split-planting operation with two varieties, these two varieties are shown with different colors on the map.



**Note:** The Rate buttons in the Product Control Toolbox at top right are explained in “Product Control Toolbox” on page 135.

## PRODUCT CONTROL TOOLBOX



During SeedCommand Run Time operations, the Product Tabs are shown in the upper right-hand side of the Map screen. Press the Product Tabs, and an extended view shows the Rate buttons, Manual Valve Control button, Prescription button, Rate increase and decrease arrows  / , and the Rate Setup button, all of which are described below.

• **(A) Variety**

The Product Control Toolbox can show rates for multiple varieties, depending upon the particular planting configuration. Press the area of the box that shows a particular variety, and a green bar highlights that variety. The Rate 1 and Rate 2 are then shown on the Rate buttons.

- (B) Target Rate
- (C) Actual Rate

Two items, Target Rate and Actual Rate, appear on each Product Tab shown in the Product Control Toolbox. The **Target Rate** is the desired planting rate. The **Actual Rate** is communicated by the shaft rotation sensor.

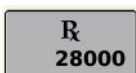


**Note:** In some conditions, the Actual Rate may increment slower than the Target Rate, or its numeric values may vary before matching the Target Rate.



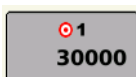
- (D) Manual Valve Control

The Manual Valve Control button allows operators to specify the position of the control valve. Operators use this option to clean out equipment at the end of the day.



- (E) Prescription button

For more information, see [“Loading Prescriptions” on page 137](#).





- (F) Rate 1 button
- (G) Rate 2 button

These only appear on Hydraulic Drive or Stepper Seed Meter configurations. The Rate 1 and Rate 2 settings represent preset planting rates that allow operators to quickly change between desired planting rates for each individual product. The active rate button appears with a gray background behind it. In the example above, Rate 1 is active.

- (H) Rate Increase arrow 

- (I) Rate Decrease arrow 

Pressing once on  /  increments the rate according to the user-defined amount on the Rate Control Settings screen.



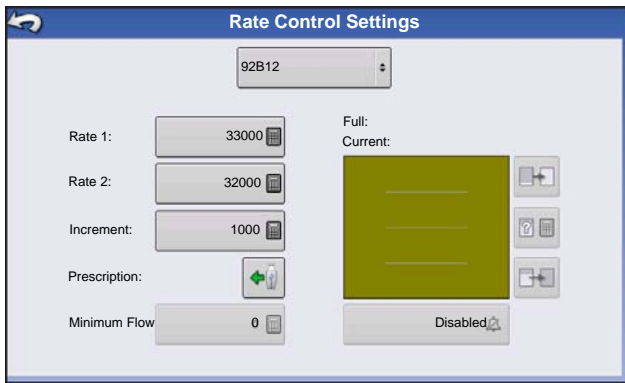
- (J) Rate Setup button

The Rate Setup button opens the Rate Control Settings screen, described at [“Rate Control Settings” on page 136](#).

## RATE CONTROL SETTINGS



Press to adjust the Rate 1 and Rate 2 settings shown at the Product Control Toolbox on the Map screen, as well as import planting prescriptions. To access the Rate Control Settings screen, press the Rate Setup button on the Product Control Toolbox.






The Rate Control Settings screen appears.

- The top drop-down menu selects a specific variety for rate control. This drop-down menu shows all of the varieties that entered in Product Setup. For more information, see *“Product tab” on page 21*.

- The **Rate 1** and **Rate 2** settings represent preset application rates that allow operators to quickly change between desired target rates for each individual product.

Press  to enter the desired amount.

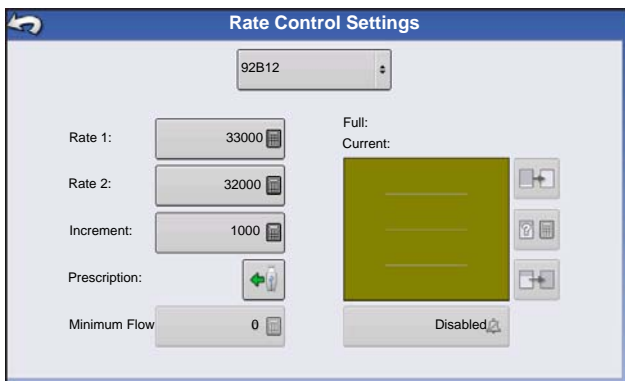
- The **Increment** button allows operators to specify the increase or decrease amounts for a specified rate when using  /  on the Product Control Toolbox. Press  to enter the desired increment.

- To load a map-based prescription file, press the **Prescription** button.

## LOADING PRESCRIPTIONS



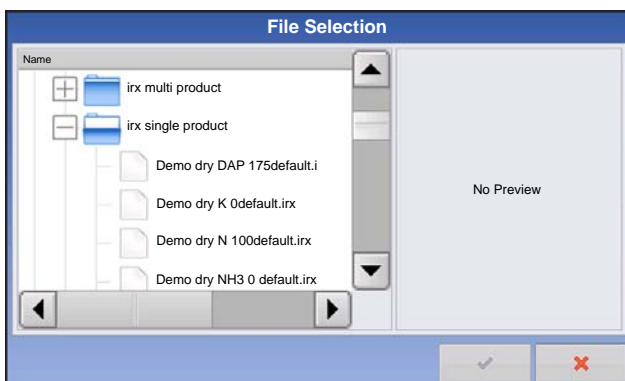
To load a map-based prescription file, press the Rate Setup button on the Product Control Toolbox.



The Rate Control Settings screen appears.

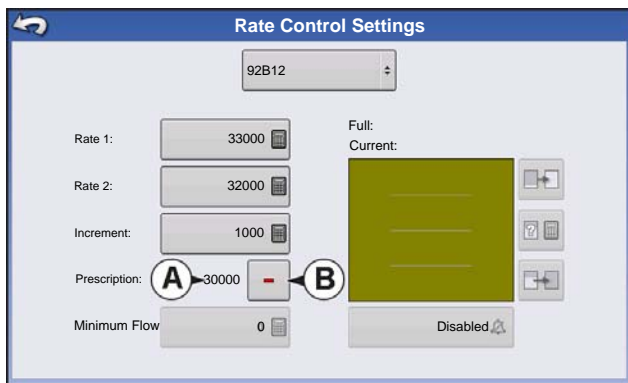


1. Press the Load Prescription button.



2. The File Selection screen appears.

3. Highlight the correct .AGSETUP (prescription) or .shp (shape) file and press .

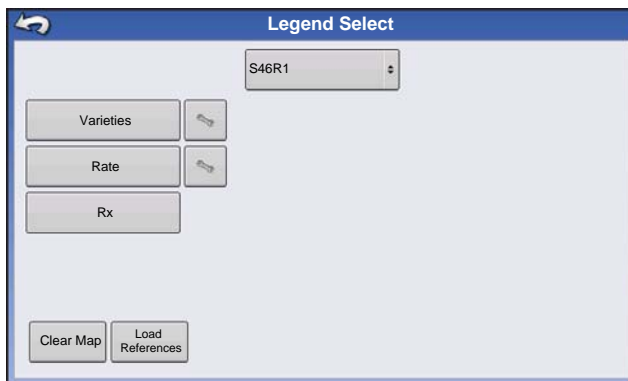


4. Return to the Rate Control Settings screen, the **Prescription rate (A)** is now shown on the screen. The Load Prescription button has disappeared and in its place is the **Remove Prescription button (B)**, which resembles a minus sign. Press the Remove Prescription button to remove the prescription from the field.

## SHOWING PRESCRIPTIONS ON THE MAP SCREEN



On the Map screen's Mapping Toolbox, press the Legend Setup (wrench) tool and the Legend Select screen appears. Notice that the Rx (prescription) button appears at this screen.



1. Press the **Rx** button to show a legend of the prescription rate.

2. After pressing the **Rx** button, the prescription rate appears on the Legend. This legend is not editable.

## TROUBLESHOOTING

The Troubleshooting Section consists of the following pages:

- [“Fixing Overplanting and Underplanting in AutoSwath” on page 123.](#)
- [“Hydraulic Seed Control: Zero Flow Offset Variation” on page 138.](#)
- [“Stepper Seed Control Meter Alarms” on page 139.](#)
- [“Alarms on KINZE Planter Monitor” on page 169.](#)

## HYDRAULIC SEED CONTROL: ZERO FLOW OFFSET VARIATION

Zero flow offset is an operator-entered setting. Zero Flow Offset represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero Flow Offset value can cause the product control system to not properly control low rates. Zero flow offset may vary somewhat by system and by operating conditions. On the tables on the following pages, problems and causes relating to Zero Flow Offset are listed. Use the Confirmation Techniques to determine if this is a problem; and then follow the appropriate solution.

**Error Message:** Drive is slow to begin turning.

**Possible Cause:** Zero Flow Offset is set too low.

**Conformation Technique:**

- Turn the Master Switch off. Enter a manual ground speed and enter a new region.
- From the Run screen, open the product application rate window, and highlight the appropriate product. Select Manual control mode.
- Switch the Master Switch on.
- Press the up button one time. Now press the down button one time. If the drive is not turning, the Zero Flow Offset is likely to be too low.

**Solution:**

- Turn the Master Switch off. Enter a manual ground speed and create a new region.
- Increase Zero Flow Offset by 2.
- From the Run screen, open the product application rate window, and highlight the appropriate product. Select Manual control mode.
- Switch the Master Switch on.
- Press the up button one time. Now press the down button one time. The drive should be turning. If not, repeat this procedure starting with Step 2.

## HYDRAULIC SEED CONTROL: ZERO FLOW OFFSET VARIATION

**Error Message:** Hydraulic drive not shutting off properly, or minimum controllable speed is greater than specified.

**Possible Cause:** Zero Flow Offset is set too high.

**Conformation Technique:**

- Turn the Master Switch off. Enter a manual ground speed and create a new region.
- From the Run screen, open the product application rate window, and highlight the appropriate product. Select Manual control mode.
- Switch the Master Switch on.
- Press the up button one time. Now press the down button three times. If the drive is still turning, the zero flow offset is likely to be too high.

**Solution:**

- Turn the Master Switch off. Enter a manual ground speed and enter a new region.
- Reduce Zero Flow Offset by 2.
- From the Run screen, open the product application rate window, and highlight the appropriate product. Select Manual control mode.
- Switch the Master Switch on.
- Press the up button one time. Now press the down button three times. The drive should not be turning. If it is, repeat this procedure, starting with step 2.



**Note:** Zero Flow Offset should never be less than 25. If 25 still seems as if this number is too high, there must be some other problem. Contact Technical Support for further assistance.

## STEPPER SEED CONTROL METER ALARMS

**Error Message:** “Drive Out of Synch Error Drive #”

**Possible Cause:** Not enough hydraulic fluid is flowing to the seed meter.

**Solution:** Examine the stepper seed drive’s hydraulic components for restrictions. Make sure the tractor’s hydraulic outlet is turned on. Make sure the hydraulic flow settings are correct.

**Error Message:** “Drive Stalled Drive #”

**Possible Cause:** The hydraulic drive motor has stopped rotating.

**Solution:** Check the stepper seed motor to see if it is restricted from turning, and that the hydraulic drive is working.

**Error Message:** "Meter Not Moving - Drive #"

**Possible Cause:** Either the Seed Meter Calibration failed, or the Seed Meter Prime failed

**Solution:** Make sure that the tractor's hydraulic outlet is turned on.

**Error Message:** "Seed Drive at Maximum RPM Drive #"

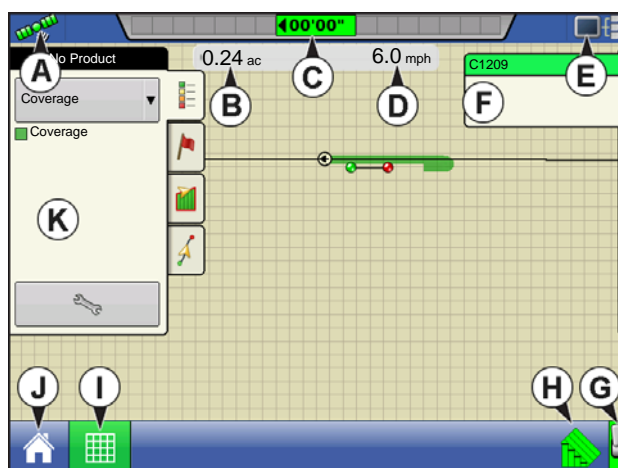
**Possible Cause:** Starting the priming routine when the hydraulic motor is not on

**Solution:** - Slow the planter unit's ground speed. - Reduce the Planting Target Rate.



- Select Your Specific Configuration
- Select Your Specific Configuration
- Select Your Specific Configuration
- Select Your Specific Configuration

## PLANTING MAP SCREEN - ZOOM TO EXTENT



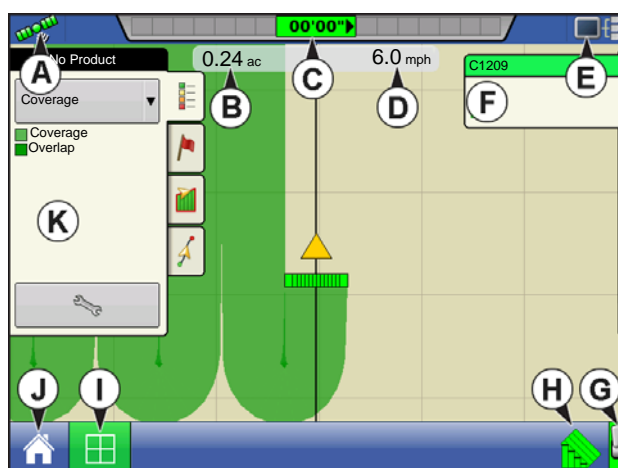
- (A) GPS Status
- (B) Total Field Acres
- (C) On-screen Lightbar
- (D) Ground Speed
- (E) Diagnostics button
- (F) Productivity tab (Variety)
- (G) Master Switch indicator
- (H) AutoSwath
- (I) Map View button
- (J) Home button

- (K) Map Legend (Varieties)

### Notes:

- Pressing the Map View button will cycle between the available map screen views, and the appearance of the Map View button changes.
- At the Zoom to Extent map view, the Map Legend shows varieties.

## PLANTING MAP SCREEN - ZOOM DETAIL



- (A) GPS Status
- (B) Total Field Acres
- (C) On-screen Lightbar
- (D) Ground Speed
- (E) Diagnostics button
- (F) Productivity tab (Variety)
- (G) Logging Status button
- (H) AutoSwath
- (I) Map View button
- (J) Home button

- (K) Map Legend (Coverage)

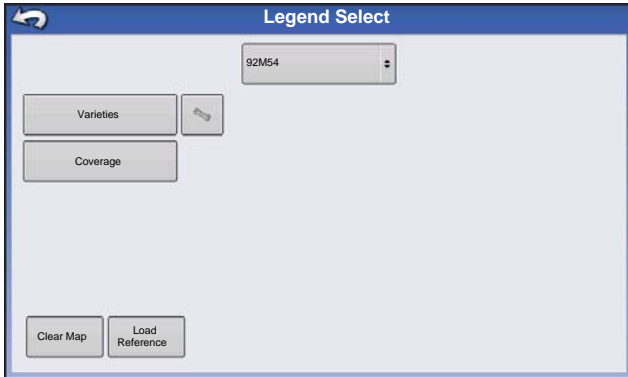
When the Map screen is shown in Zoom Detail, the Vehicle Icon appears as a gold triangle, rather than an arrow.

# LEGEND SELECT

During Planting operations, the Map screen displays two types of items in the Legend: Coverage and Varieties. The Variety Legend is only accessible in the Zoom to Extent view.



The Legend Setup button on the Map Legend Tab of the Mapping Toolbox opens the Legend Select screen.

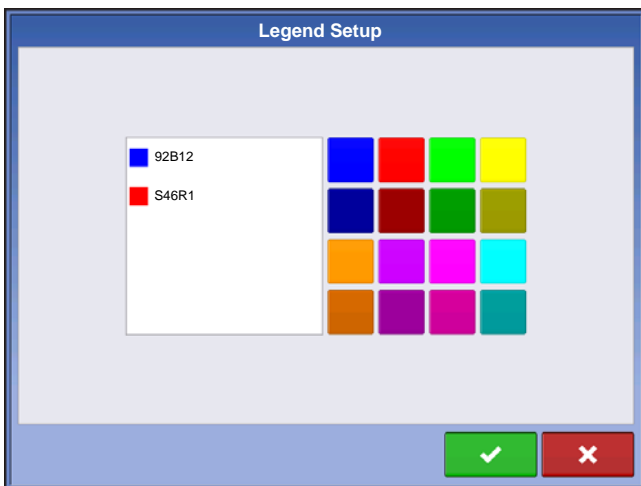



Use the drop-down menu at the top to select product. Choose from the following items:

- Press **Coverage** to show the area already planted.
- For SeedCommand (rate control) configuration, press **Rate** to show the Rate Legend in the Mapping Toolbox. The rate map displays the actual rate being applied. This legend is editable. For more information, see [“Legend Settings” on page 44.](#)
- Press **Clear Map** to permanently remove all logged data from the active field operation

- Press **Load Reference** to load a list of maps of previous operations performed in that field.

## Legend Setup

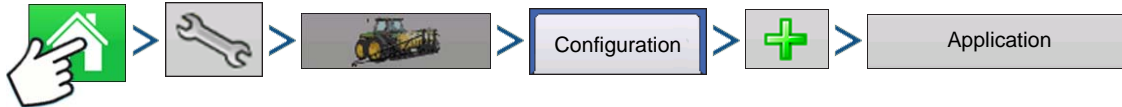


To change the colors of the varieties that appear on the Run screen map, press the Varieties button on the Legend Select screen and the Legend Setup screen appears. A list of the varieties shown on the Run screen map appears on the left-hand side of the Legend Setup screen. To change the color of one of these varieties, highlight that variety and then press a color on the color palette at right. Press  when finished.

# LIQUID RATE CONTROL

DirectCommand allows the variable rate application of single or multiple liquid products. Follow the procedure below to create an operating configuration.

## CREATE CONFIGURATION



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > Add (+) button > Application button



### 1. Select Vehicle

Use drop-down menu to choose a vehicle, or press  to enter a new vehicle. Press  to continue.



**Note:** If selecting Self-Propelled Sprayer from the drop-down menu skip steps 2 and 4.


### 2. Select Implement

Select an implement from the drop-down list menu, or press  to create a new implement. Press  to continue.

### 3. Enter Implement Make and Model

Press  to enter Make and Model name. Press  to continue.



### 4. Select Implement Attachment Type

Use the drop-down list to select an implement attachment method. Press  to continue.

### 5. Add Sprayer Functionality

Press the Liquid Application button to add sprayer functionality to the implement.



### 6. Select Controller

Use the drop-down menu to select a controller or press  to add a controller. Press  to continue.

### 7. Assign Container Name

Container names default to Main Tank. Press  to enter a new name if desired.

### 8. Assign Container Capacity


Press  to enter the container capacity. Press  to accept.

### 9. Enter Container Units

Use the drop-down menu to select the container units.

Once container has been configured press  to continue.


### 10. Enter Swath Width

Press  to enter swath width.

### 11. Enter Number of Boom Sections

Press  /  to enter number of boom sections.

### 12. Enter Boom Section Widths

Highlight specific boom section and press  to enter boom width. The total width of all boom sections must equal swath width.

### 13. Enter Application Point Offset

Press  to enter distance from hitch to application point (front to back). Press  to continue.




---

**Note:** If setting up a Self-Propelled Applicator, enter the distance from rear axle to application point. Use drop-down menu to select distance Behind or In Front.

---



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**Note:** At this point additional functionality can be added to the implement, such as direct injection. If no additional functionality is being added, press  to continue.

---



### 14. Add Additional Devices (optional)

Press Norac UC5 button to add boom control functionality.

### 15. Enter Hitch Point Offsets

Press check box if implement provides a hitch point. Press  to enter distance and drop-down menu to enter “to the left” or “to the right”. Press  to enter distance Forward or Backward. Press  to continue.


### 16. Enter Implement Name

Press  to enter a name for the implement. Press  to continue.

### 17. Select Implement.

Press  to continue.


### 18. Select Second Implement.

Use drop-down menu to select Implement or press  to add second implement.

### 19. Select Speed Source

Use drop-down menu to select Primary Source, set Backup Source, and configure Auxiliary Channel. Press Calibrate Speed Sensor to launch the Speed Sensor Calibration Wizard.

### 20. Enter Configuration Name

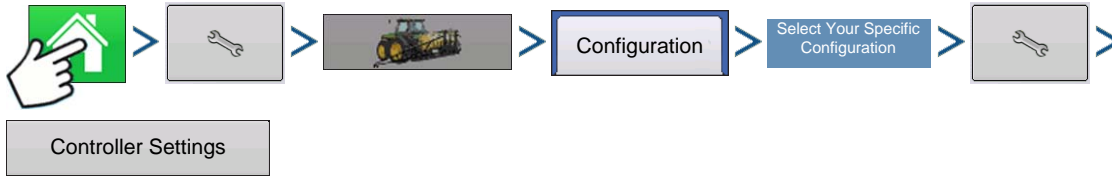
A suggested name for the configuration appears. If desired, Press  to enter a different name.

Press  when complete.

The complete configuration should now appear under the Application heading located on the Configuration tab of the Configuration Setup screen.

The Operating Configuration is now able to be selected when starting a new Field Operation with the Field Operation Wizard. For more information, see *“Setup Field Operation” on page 33.*

## CONTROLLER SETTINGS



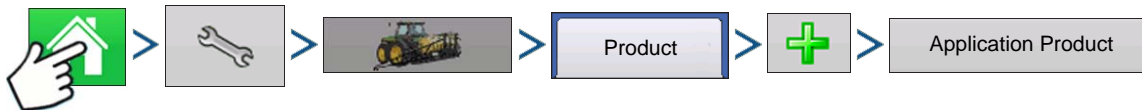
Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Controller Settings button

Controller Settings screen appears, with each channel's settings shown on its own tab.



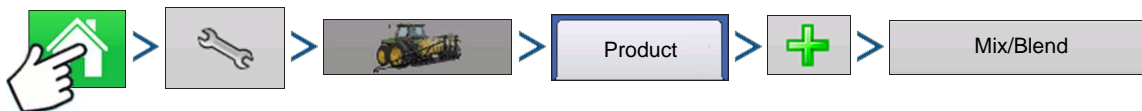
**Note:** Use the **Manage Equipment** button to view a list of specific vehicles and implements.

## Add a Product



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Product tab > Add (+) button > Application Product button


## Add a Mix



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Product tab > Add (+) button > Mix/Blend button



## Tank Mix Setup

A tank mix can contain up to seven individual components.

1. Select **Tank Mix** from the list box and press  to continue.
2. Enter a Base Amount and Units.



**Note:** The Base Amount is the total volume of all the components of the tank mix. The Base Amount does not need to match the actual volume of product that will be sprayed, but is used only to establish the ratio of all products to the total volume.

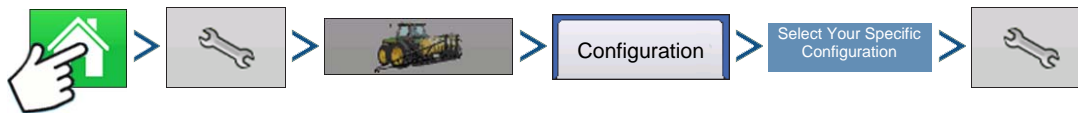
3. Press  to start the process of adding components to the tank mix. Select a desired mix component from the list box (or press  to set up the product). Enter the Amount of the mix component.
4. Repeat this process for the second mix component, if necessary.

5. Add a product carrier and an amount for that carrier by following the steps shown in the wizard.

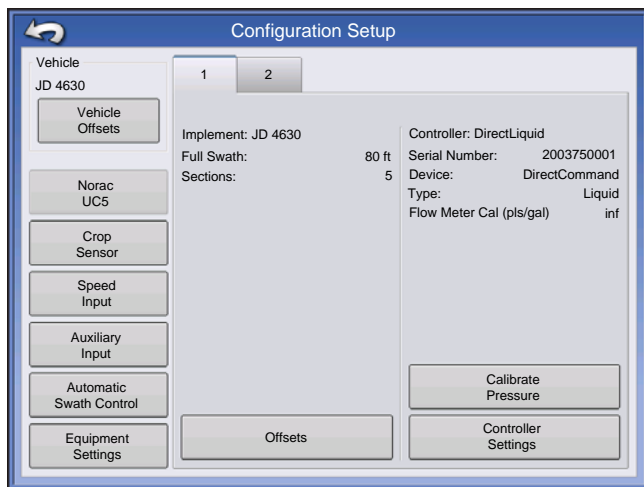


6. Last, enter a unique name for the tank mix. The new mix will appear in the Product List. The mix name will appear next to a blue and cream-colored “Tao” symbol (a circle with a curved line through it).

## CONFIGURATION SETUP



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button



The Configuration Setup screen appears. Screen will vary depending on configuration. Process may include the following tasks:

Configuration Settings:

- **Adjust Implement Switch Settings (for area logging)**

If using an implement switch in a area logging planting operation, adjust the Implement Switch Settings. For more information, see [“Implement Switch Settings \(for Area Logging\)” on page 38](#).

- **Adjust Equipment Settings (for Rate Control)**

DirectCommand configurations should adjust settings at the Equipment Configuration Settings screen. For more information, see [“Equipment Configuration Settings for Rate Control” on page 39](#).

- **Speed Input Setup**

For more information, see [“Speed Input Settings” on page 55](#).

- **Calibrate Distance**

For more information, see [“Calibrate Distance” on page 56](#).

- **AutoSwath settings (if using AutoSwath)**

For more information, see [“AutoSwath” on page 58](#).

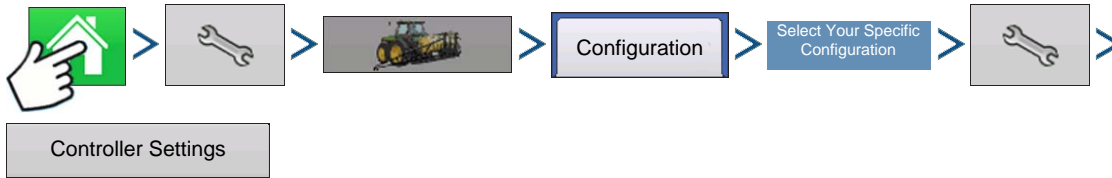
- **GPS Offsets**

Adjust GPS offsets for the Antenna Tab and the Hitch Tab. For more information, see [“Vehicle Offsets” on page 59](#).

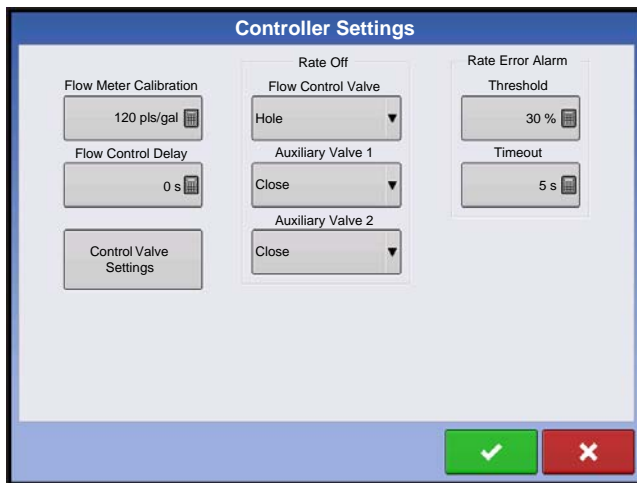
- **Swath Section Offsets**

For more information, see [“Swath Section Offsets” on page 60](#).

## LIQUID APPLICATION CONTROLLER SETTINGS



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Controller Settings button



The Controller Settings screen appears.

Make the following adjustments:

- **Flow Meter Calibration**

Calibration value representing the number of pulses that equal one-gallon of product flow through the controlling system.

- **Flow Control Delay**

Setting that specifies a period of time from master switch on and the start of product application to the first flow control correction. This setting can be used to eliminate unwanted correction of flow control at the start of each pass. Typical setting values are 1 –2 seconds for liquid application control.

- **Control Valve Settings**

Opens the Control Valve Settings screen, which displays control valve settings for PWM, Servo, Calibrated Reflow and Ramsey Valve Controls. For more information, see below or for more settings see [“Control Valve Settings - Servo, Calibrated Reflow and Ramsey Valve” on page 149.](#)

- **Close Flow Control Valve When Rate Off**

When this is selected, the controlling system shuts down when there is either a zero rate in the field or when entering an already-applied area. When unchecked, the controlling system remains in the last known state when the sections are shut off.

- **Auxiliary Valve 1 & 2**

When all boom sections are off, this setting closes or opens an auxiliary valve. Choose settings for up to two auxiliary valves.

- **Allowable Error**

Determines the percent of error that is allowed prior to the product control system making any flow rate changes.

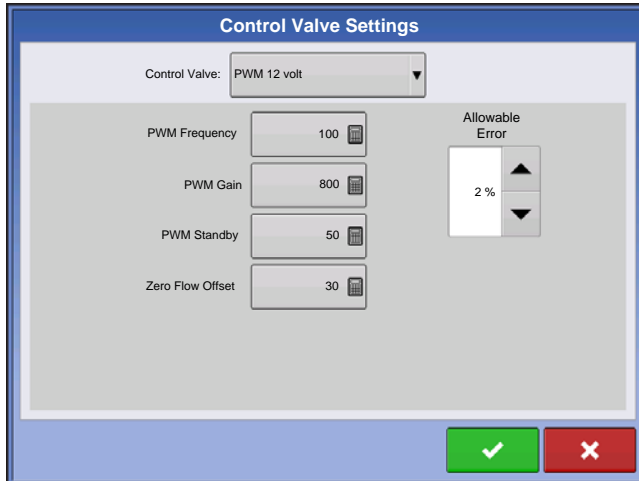
- **Threshold**

The user-defined percentage of actual rate error allowed before an alarm sounds.

- **Timeout**

The number of seconds that an actual rate falls out of the error threshold before an alarm sounds.

## Control Valve Settings - PWM



- **PWM Frequency**

The frequency that the PWM control valve is pulsed at. Settings can be found from the manufacturer of the valve. Typical settings range from 100-125 Hz.



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**Note:** See PWM valve manufacturer information for recommended settings.

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- **PWM Gain**

Determines how aggressively the control valve responds when making rate change adjustments. The higher the value the more aggressive the system response is.

- **Zero Flow Offset**

Represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero Flow Offset value can cause the product control system to not properly control low rates. See the PWM valve manufacturer information for recommended settings.

- **PWM Standby**

This is a user-defined setting that determines the percent duty cycle the system uses when the booms are all off. The setting must be greater than the Zero Flow Offset.



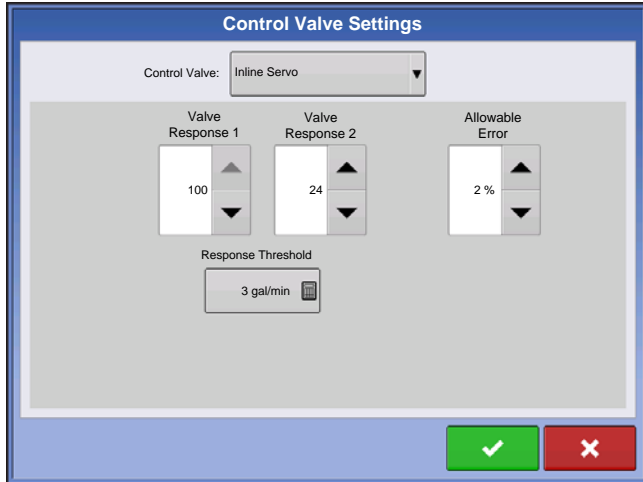
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**Note:** The current PWM Duty Cycle can be viewed at the Liquid Diagnostics screen. For more information, see “Liquid Application Diagnostics” on page 158

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## Control Valve Settings - Servo, Calibrated Reflow and Ramsey Valve



### • Valve Response 1

Determines the speed of the servo valve when product control error exceeds the Response Threshold setting. The default for this setting is 100%. Decreasing the value will cause the servo valve to run slower. Valve Response 1 represents the fast speed of the servo valve.

### • Valve Response 2

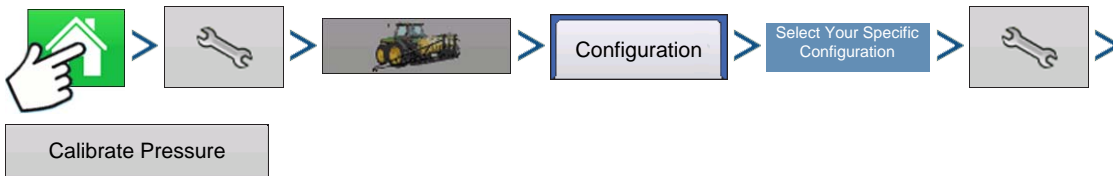
Determines the speed of the servo valve when product control error is less than the Response Threshold setting. The default for this setting is 24%. Decreasing the value will cause the servo valve to run slower. Valve Response 2 represents the slow speed of the servo valve.

### • Response Threshold

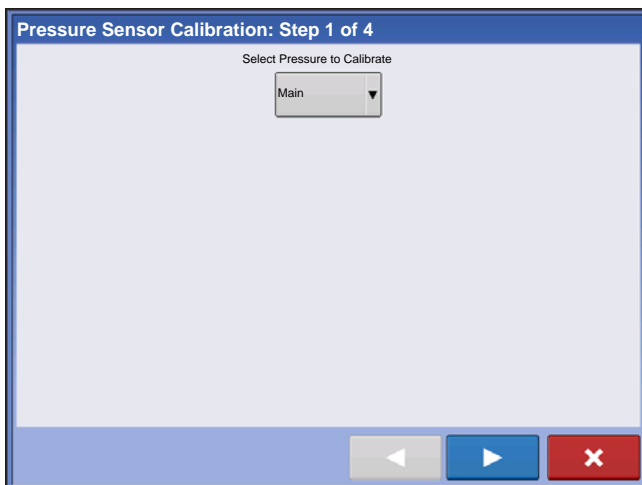
Determines where the control channel switches between using Valve Response 1 and Valve Response 2 speed settings. The default setting is 3. Leaving all other valve control settings at the default value and making a small adjustment to this setting is usually all that is required to fine-tune system performance.

- Decreasing this value will have the overall effect of speeding up servo valve response.
- Increasing this value will have the overall effect of slowing servo valve response.

## Calibrate Pressure



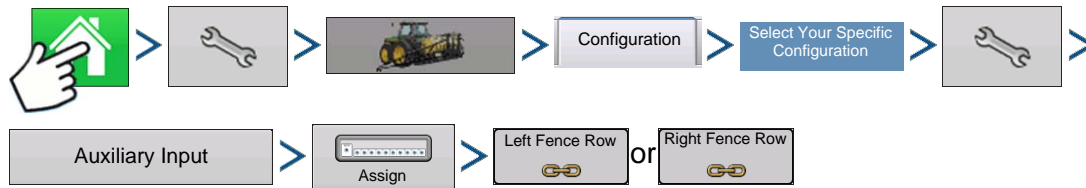
Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > select your specific configuration > Setup (wrench) button > Calibrate Pressure button



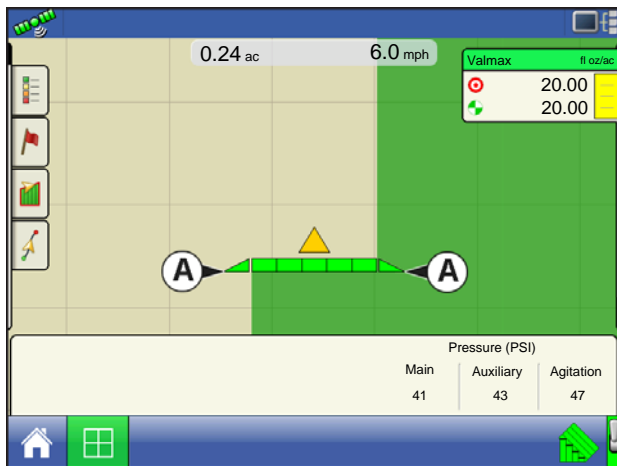
Pressure Sensor Calibration screen appears. Choices for Calibration include Main, Agitation or Aux. Choose which pressure sensor to calibrate and press . A wizard walks you through the calibration process.

## FENCE ROW NOZZLE INDICATORS

Control fence row nozzles through the DirectCommand system by mapping the switches in Auxiliary Input Settings. Fence row nozzles can be mapped to any switch.



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > select your specific configuration > Setup (wrench) button > Auxiliary Input button > Assign button > Left Fence Row or Right Fence Row. For more information on Auxiliary Input Settings, see [“Auxiliary Input” on page 56](#).



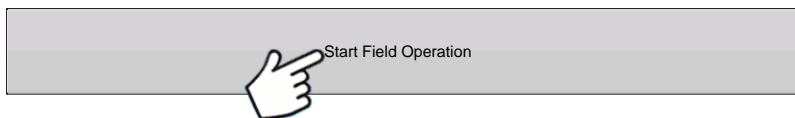
After specifying Fence Row Nozzle settings at the Auxiliary Input Assignment screen, the **Fence Row Nozzle Indicators (A)**, which are shaped like triangles, appear on either side of the sections behind the vehicle icon.

Notes:

If a switch is selected as a Left or Right Fence Row Nozzle, the system sends power out of Boom Pin 11 for the left fence row, and Boom Pin 12 for the right fence row.

The boom sections next to the fence row nozzles must be turned on before the fence row nozzle can be turned on.

## LOAD CONFIGURATION



Press: Start Field Operation button

Select a Season, Grower, Farm and Field at the Start Field Operation portion of the Home screen.

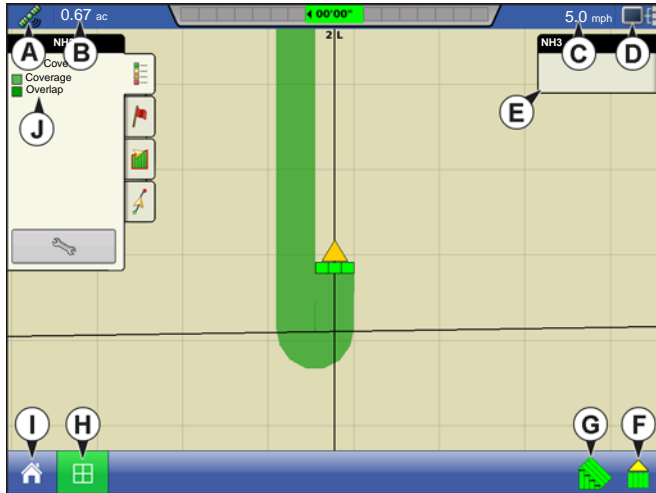
For more information, see [“Setup Field Operation” on page 33](#).

## RUN CONFIGURATION



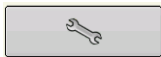
Once a configuration has been completed, the Map View button appears at the bottom of the Home screen. Press the Map View button to see the Map screen. The map below is displayed in Zoom to Detail view.

## APPLICATION MAP SCREEN - ZOOM TO DETAIL

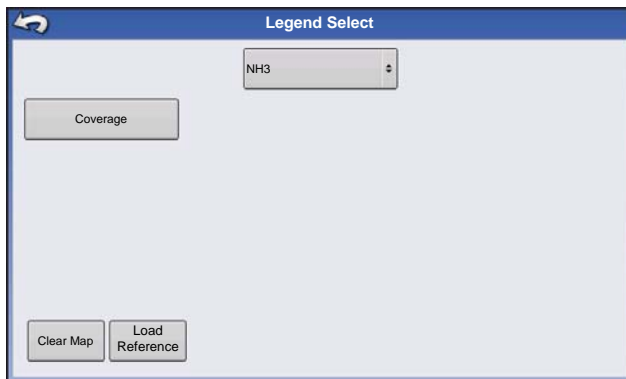


- (A) GPS Status
- (B) Ground Covered
- (C) Ground Speed
- (D) Diagnostics button
- (E) Product tab
- (F) Logging Status button
- (G) AutoSwath
- (H) Map View button
- (I) Home button
- (J) Display Legend

## LEGEND SELECT



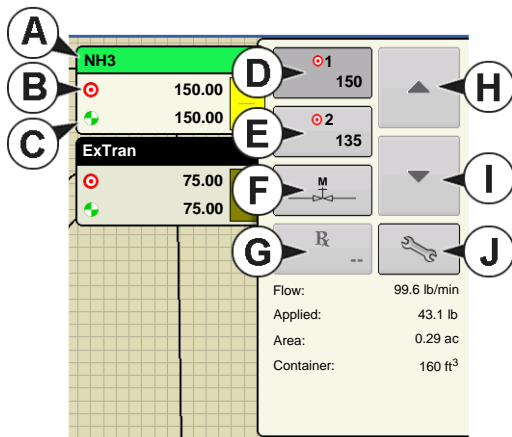
During Area Logging Application operations, the Map screen displays coverage in the Legend. The Legend Setup button on the Map Legend Tab of the Mapping Toolbox opens the Legend Select screen.





Use the drop-down menu at the top to select your product. Other items at this screen include:

- Press **Coverage** to show the area where you have already applied a product.
- If using a DirectCommand or rate logging configuration, press **Rate** to show the Rate Legend in the Mapping Toolbox. The rate map displays the actual rate being applied. This legend is editable. For more information, see *"Legend Settings" on page 44*.
- Press **Clear Map** to permanently remove all map data from the active field operation
- Press **Load Reference** to load a map from a previous operation performed in that field to view as a background map.

# RATE CONTROL: PRODUCT CONTROL TOOLBOX



During DirectCommand Run Time operations, the Product Tabs are shown in the upper right-hand side of the Map screen. Press the Product Tabs, and an extended view shows the Rate buttons, Manual Valve Control button, Prescription button, Rate

Increase and Rate Decrease arrows  / , and the Rate Setup button, all of which are described below.

- (A) Product
- (B) Target Rate
- (C) Actual Rate
- (D) Rate 1 button
- (E) Rate 2 button

- (F) Manual Valve Control
- (G) Prescription button
- (H) Rate Increase arrow
- (I) Rate Decrease arrow
- (J) Rate Setup button

## • Target Rate

The Target Rate is desired application rate.



**Note:** In some conditions, the Target Rate may increment more quickly than the Actual Rate.

## • Actual Rate

The Flow Sensor returns the actual rate being applied.



**Note:** In some conditions, the Actual Rate may increment slower than the Target Rate, or its numeric values may vary before matching the Target Rate.

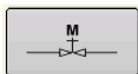
## • Container Level

The Container Level shows the amount of product in the container. For more information, see [“Rate Control: Container Level” on page 154.](#)



### • Rate 1 and Rate 2 buttons



The Rate 1 and Rate 2 settings represent preset application rates that allow operators to quickly change between desired target rates for each individual product.

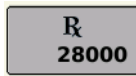


### • Manual Valve Control button

The Manual Valve Control button allows operators to specify the position of the control valve. Operators use this option to prime the system before application or clean out the equipment at the end of the day.

- **Rate Increase and Decrease Arrows**

 /  allow Product Application Rate to be changed according to the Target Rate Increment. In using manual valve control, the increase and decrease buttons allow the position of the control valve to be defined by the operator.



- **Prescription button**

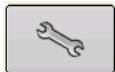
For more information, see [“Loading Prescriptions” on page 155.](#)



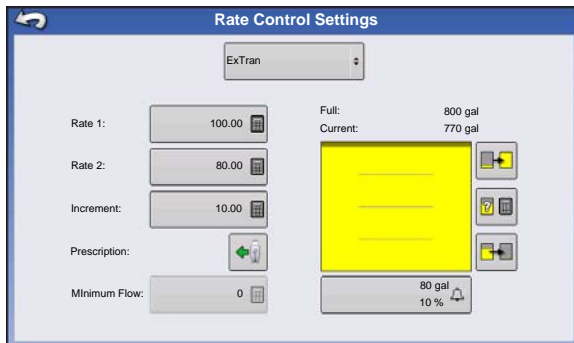
- **Rate Setup button**

For more information, see [“Rate Control Settings” on page 153.](#)

## RATE CONTROL SETTINGS




Adjust the Rate 1 and Rate 2 settings shown at the Product Control Toolbox on the Map screen, as well as import application product prescriptions. To access the Rate Control Settings screen, press the Rate Setup button on the Product Control Toolbox. The Rate Control Settings screen appears.






- **Available Products**

The top drop-down menu allows you to select one of the available products to be applied for your rate control field operation. This menu shows all of the application products entered in Product Setup.

- **Rate 1 and Rate 2**

The Rate 1 and Rate 2 settings represent preset application rates that allow operators to quickly change between desired target rates for each individual product. Press  to enter the desired amount.


- **Increment**

The Increment button allows operators to specify the increase or decrease amounts for a specified rate by using  /  on the Product Control Toolbox. Press  to enter the desired increment.

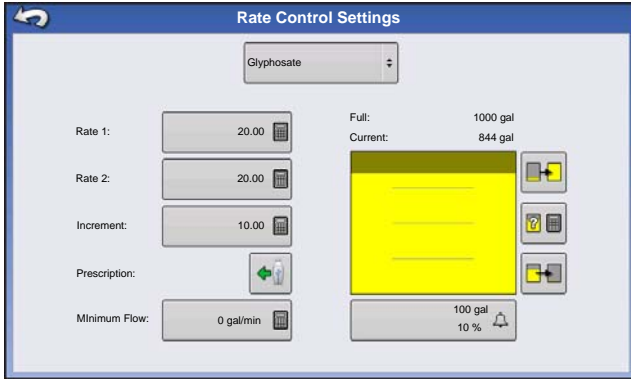
- **Prescription**

To load a map-based prescription file, press the Prescription button. For more information, see [“Loading Prescriptions” on page 155.](#)

- **Minimum Flow**

(Used for DirectCommand Liquid Applications only). This setting is used to maintain a consistent spray pattern. The display will not allow flow to drop below the entered setting. Set to flow at the lowest operating pressure for the selected spray tips with all sections on. When spraying with one or more boom sections off, the system automatically reduces the minimum flow setting according to the reduced spray width. To adjust this setting, press  and enter the desired numeric value.

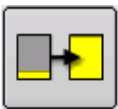
# RATE CONTROL: CONTAINER LEVEL



When filling or emptying container, use the Container Level portion of the Rate Control Settings screen to update the amount of product in the containers.

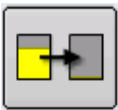
Container Level screen - (Partially Full)

## Tank Fill



The Tank Fill button increases the container level logged in the display to the user-defined maximum volume (specified in the Container Setup Wizard).

## Tank Empty



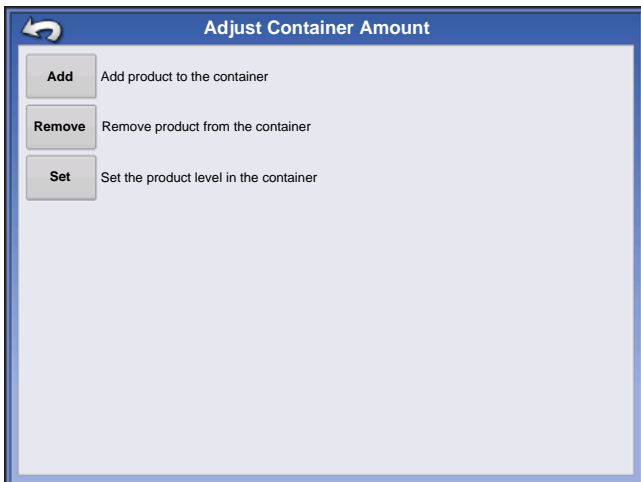
The Tank Empty button decreases the container level logged in the display to zero.

## Tank Partial Fill



The Tank Partial Fill button increases the container level logged in the display to specific amount that you specify by pressing . Pressing the Partial Fill button summons the Adjust Container Amount screen.

## Adjust Container Amount



### • Add

Adds product to the container. Press to enter the amount.

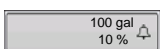
### • Remove

Removes product from the container. Press to enter the amount.

### • Set

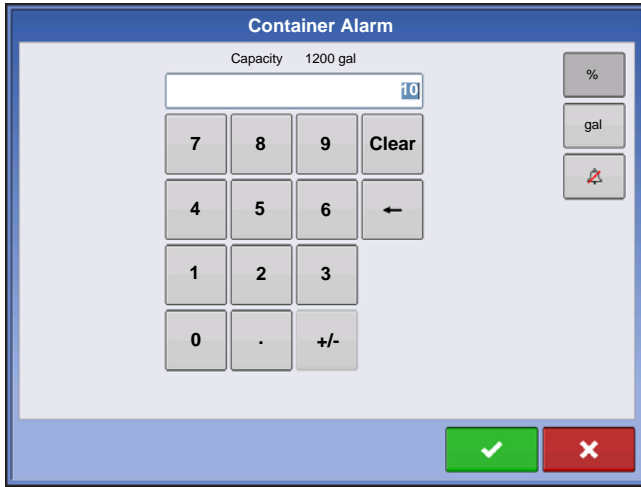
Sets the product level in the container. This button summons the , where you can set a certain amount. Choose an amount that is below your maximum container level.

## Tank Alarms



The Container Alarm button, which appears at the bottom of the Container Level portion of the Rate screen, displays the capacity of your tank as well as the percentage at which the

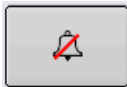
Low Container Level warning will sound. To adjust these settings, press the button and the Container Alarm screen appears.



If you wish to adjust your container level warnings, use the following buttons on the right-hand side of the Container Alarm screen to make these adjustments.

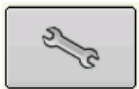
- The percentage (%) button sets the warning threshold according to the percentage of solution left in the tank. In the example above, the threshold is set at 10 percent.

- The units of measurement icon sets the warning threshold according to the amount of solution left in the tank. This icon is named according to the container's units of measurement you specified during the Controller configuration procedure.

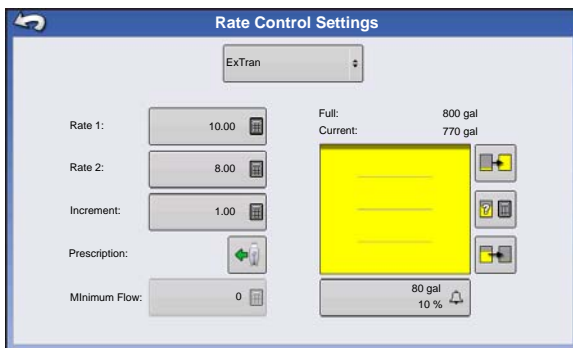


- The Disable Low Container Level button, which appears as a bell with a red slash across it, disables the Low Container Level warning.

## LOADING PRESCRIPTIONS



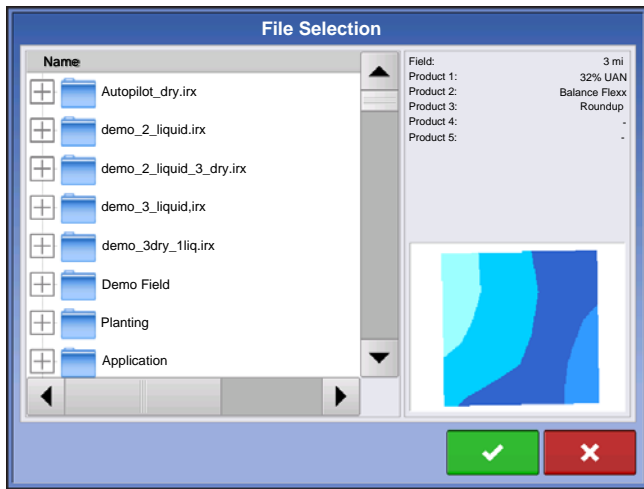
To load a map-based prescription file, press the Rate Setup button on the Product Control Toolbox.




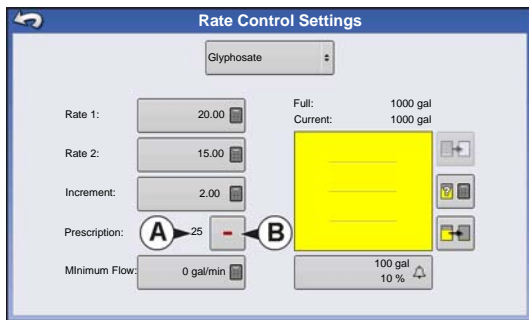
The Rate Control Settings screen appears.



1. Press the Load Prescription button.



2. The File Selection screen appears.
3. Highlight the correct .AGSETUP (prescription) or .shp (shape) file and press .

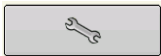


4. When you return to the Rate Control Settings screen, the prescription rate is now shown on the screen. The Load Prescription button has disappeared and in its place is the Remove Prescription button, which resembles a minus sign. Press the Remove Prescription button if you wish to remove the prescription from the field.

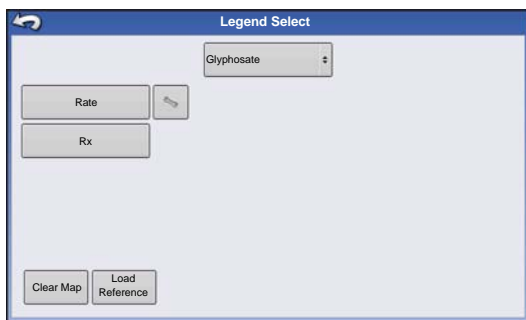
- (A) Default Prescription Rate
- (B) Remove Prescription button

5. When you return to the Map screen, the prescription is now shown on the map, as illustrated in [“Showing Prescriptions on the Map Screen” on page 156](#)

## SHOWING PRESCRIPTIONS ON THE MAP SCREEN



On the Map screen’s Mapping Toolbox, press the Legend Setup (wrench) tool and the Legend Select screen appears. Notice that the Rx (prescription) button appears at this screen.



1. Press the **Rx** button to show a legend of the prescription rate.

2. After pressing the Rx button, when you return to the Map screen, the prescription rate appears on the **Prescription Rate Legend**. This legend is not editable.

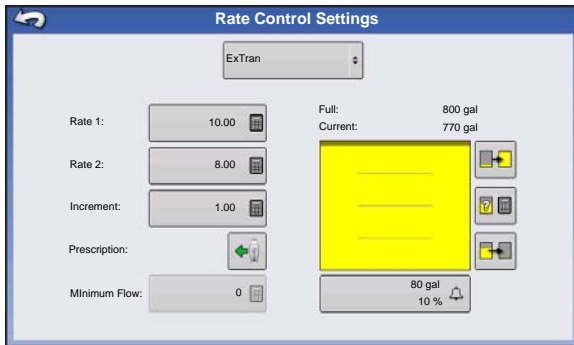
## SHAPE FILE CONVERSION

What is commonly called a shape file is actually a collection of three different files. All three of the files are required and must be present on the USB drive for the system to use shape file groups for variable rate product application. A single "shape file" can contain recommendation rates for multiple products.





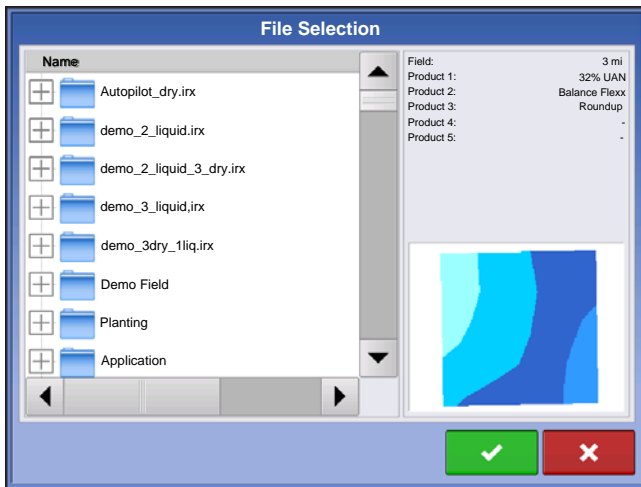
To begin, press the Rate Setup button on the Product Control Toolbox.




The Rate Control Settings screen appears.



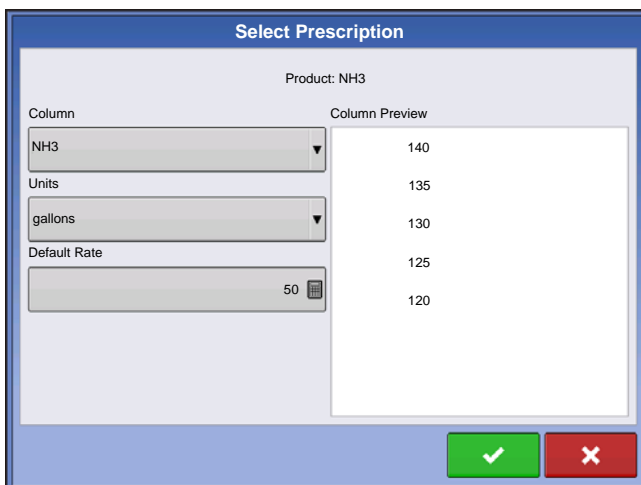
**1. Open File Selection screen.**  
Press the Load Prescription button.



2. The File Selection screen appears. Highlight your desired .shp file and press .



**Note:** Select the product and units that the shape file prescription was made for.



**3. Select Data From Shape File**

Select the column that contains the product recommendation rate. The list on the right side of the dialog shows sample data from the selected column.

**4. Select Units**

Select the controlling units for product application.

**5. Default Rate Setting**

The system assigns a default rate. Use the on-screen keypad to edit the value if desired.



**CAUTION:** Selection of the wrong data column or unit will result in misapplication of product.



**Note:** The only time the default rate is used by the system during product application is if the Rate Outside of Field selection is set to "Rx default". This setting is located in the equipment configuration settings portion of configuration setup. If the Rate Outside of Field selection is set to "Rx default", the default target rate will be used for product application when the vehicle exits a mapped field area.

## LIQUID APPLICATION DIAGNOSTICS



To go to the Liquid Diagnostics screen, press on the Device Information button. At the Devices screen, highlight the item marked DC Liquid then press the Diagnostics button.

Liquid Diagnostics	
Controller Name	DirectLiquid
Serial Number	2003750001
Main Pressure (kPa)	738
Agitation Pressure (kPa)	662
Auxiliary Pressure (kPa)	655
PWM Duty Cycle (%)	2.55
Flow Meter Signal Frequency (Hz)	0
Flow Meter Pulse Count	0

The Liquid Diagnostics screen includes the Active Controller Name and the Serial Number of the module. Other information provided includes the Main Pressure, Agitation Pressure, and Auxiliary Pressure. These raw sensor readings are shown in kilopascals (kPa).



**Note:** If you selected PWM as the Control Valve then the current PWM Duty Cycle is shown as a percentage number, in the **PWM Duty Cycle (%)** item on the Liquid Diagnostic screen.

### • Flow Meter Signal Frequency (Hz)

View the frequency generated by the flow meter during product application. Use this to make sure the flow meter is providing continuous feedback.

### • Flow Meter Pulse Count

provides a rolling count of pulses generated from the flow meter during product application. This diagnostic item can be used to easily check that the flow meter is providing feedback to the system and also provides a way to check flow meter cabling without changing settings within the system setup.

## TROUBLESHOOTING DIRECTCOMMAND LIQUID APPLICATIONS

**Problem:** Boom indicators on the run screen of the display do not turn blue.

### **Solution:**

1. Make sure ground speed is registering a value greater than zero on the display.
2. Verify a target rate greater than zero is entered into the display.
3. Check the switch status found on the Run screen under System and Input Diagnostics. As the boom switches are turned on and off, the Input Diagnostics window should change from black to green (if they do not, then refer to the installation instructions to verify boom switch connections).
4. Check high current connection into the Liquid Control Module.

5. Make sure the implement cable is plugged in. If plugged in, then test for 12 volts on pins A and B.

**Problem:** Boom indicators on the Run screen of the display turn blue, but the booms do not open.

**Solution:**

1. Check wiring connections for all of the boom valves.
2. Verify that the cabling is providing 12 volts to the boom valve on the signal pin



**Note:** You can also check for 12 volts on pins 1-10 on the boom connection of the liquid module.

**Problem:** Boom valves pause up to 5 seconds before turning on by manual control.

**Solution:**

1. Verify that the display and Liquid Control Module are both updated to the latest available firmware.
2. The boom switch cable may be wired incorrectly. For details, refer to the installation instructions.



**Note:** This issue should only occur on John Deere sprayers. Make sure the black wires in the switch cable are connected.

**Problem:** Booms will not turn on when the foot pedal is on.

**Solution:** Make sure the Master Switch Input is set to “External 2” under the Auxiliary Input Settings.

**Problem:** AutoSwath turns on the boom too fast or too slow.

**Solution:**

1. Check GPS offsets in the vehicle setup to verify all the measurements are correct.
2. Verify the boom offsets are appropriate for the sprayer.



**Note:** Boom offsets are measured from the center of the vehicle to the center of the boom section.

3. Adjust the turn on look-ahead and turn off look-ahead to fine-tune Automatic Swath Control performance.
4. Verify the boom offsets are appropriate for the sprayer.

**Problem:** No “As Applied” rate

**Solution:**

1. Check cabling from the channel connection of the Liquid Control Module to the flow meter.
2. Check flow meter for product buildup and proper operation.

**Problem:** Rate is erratic

**Solution:**

1. Verify that the rate display smoothing option is check marked in the setup of the configuration.
2. Check the controller settings of the active configuration. Verify that the valve setting for your particular type of control valve agree with the settings given in the Quick Reference Guide.
3. Use manual valve control to see if the rate stays constant.

**Problem:** Erratic behavior from the flow meter and boom valves.

**Solution:** Verify that the display firmware and module firmware are both current.

**Problem:** No boom pressure at the start of the field.

**Solution:** Before product application begins, use manual valve control to build boom pressure. Select either Rate 1 or Rate 2 once pressure is set to desired level. Enter the pass and allow automatic control to take over once the sections are turned on.

**Problem:** AutoSwath checked on, but booms will not turn on.

**Solution:**

1. Make sure the ground speed is registering a value greater than zero on the display and not in the covered area.
2. Make sure there is a target rate greater than 0.
3. Make sure the applicator is inside of the field boundary.

**Problem:** Booms turn on in the middle of the pass.

**Solution:**

1. Check the display firmware and module firmware to see if they are the latest version released.
2. Make sure the ground speed does not go to 0.
3. Make sure the GPS is not losing the differential source.

**Problem:** Rate not responding (error flashing)

**Solution:**

1. Make sure the flow meter calibration number matches the tag on the flow meter.



**Note:** For Raven flow meters, divide the calibration number by 10.

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2. Make sure the pump is not maxed out for the flow being applied.
3. Use manual valve control to see if the control valve will open or close.
4. Check the tip manufacturer's charts to make sure they are in the operating range of the application.
5. Check for any product buildup in the flow meter.
6. Check product filter for debris.

**Problem:** Booms turn on when outside of the boundary.

**Solution:**

1. Make sure the Rate Outside of Field option is set to zero under the active configuration settings.
2. Make sure the Outside Boundary Option is set to Turn Section Off under the Automatic Swath Control options.
3. Make sure there is not a gap between the boundary and the first pass of the headlands.



**Note:** For best results, run a new boundary when spraying the first pass of the headlands.

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**Problem:** Booms turn on for a split second in the headlands

**Solution:**

1. Make sure that the turn on look-ahead is greater than the turn off look-ahead.
2. Make sure GPS offsets are correct.
3. Make sure look aheads are less than three seconds each.

# JOHN DEERE SPECIFIC INSTRUCTIONS

Here are some tips to remember when operating the display in conjunction with a Spray Star control system. Refer to the quick reference sheet and other sections of the operators manual for specific setup and operation instructions.

## Master Switch Input

After setting up a configuration in the display make sure to change the master switch input setting from standard to optional. This will tell the display to read the foot pedal for the master switch input status.

## Master Switch Usage

When manually shutting off all boom sections in the field, use the foot pedal switch. Leave the OEM master switch on the hydro handle ON during field use. Using the hydro handle switch may lead to improper field coverage, poor AutoSwath performance, and inaccurate spray records. Only use the John Deere master switch when completely shutting down the sprayer to transport or service the machine.

## Target Rate

The display must have a non-zero target rate entered in the display before the boom valves will open for product application. Ensure that the target rate entered into the display and Spray Star match to avoid any unwarranted alarms or warnings on the display.

## Data Collection

The display will create a coverage map of all product application while logging actual application rate from the product control system flow meter.

## AutoSwath Boom Section Control

The display will automatically control the boom section on/off status based upon previously applied area, field boundary, and any mapped internal field boundaries.

## SprayStar Application Rate

The display will not control the rate based upon the target rate value entered into the system. Application rate is controlled exclusively by the Spray Star display.

## SprayStar Rinse Cycle

When using the rinse cycle feature on the Spray Star, the display must have the boom sections on to allow the Spray Star to properly run the rinse routine. To ensure that boom sections are on:

1. Enter a target rate into the display
2. Turn the foot pedal master switch on
3. Turn all boom switches on
4. Boom indicators on the Run screen must be blue showing that boom valves are on

# CONTROL VALVE SETTINGS

## Liquid Product Control Valve Configuration Options

- **Inline Servo**

Rate control is achieved through actuating a butterfly or ball valve found in the solution hose that goes to the booms. When the valve opens, the flow increases and when the valve closes, the flow decreases.

- **Bypass Servo**

Rate control is achieved through actuating a butterfly or ball valve found in the return line to the solution tank. When the valve opens, the flow decreases and when the valve closes the flow increases.

- **PWM 12 volt**

Rate control is achieved through speed changes to the solution pump. The PWM 12 Volt setting is programmed to pulse the power to an electric solenoid valve used to adjust the hydraulic flow to the solution pump.

- **Pump Servo**

Rate control is achieved through speed changes to the solution pump. The pump servo setting is programmed to control an electric motor used to actuate a hydraulic valve to adjust the hydraulic flow to the solution pump.

- **PWM Ground**

Rate control is achieved through speed changes to the solution pump. The PWM Ground setting is programmed to pulse the ground to an electric solenoid valve used to adjust the hydraulic flow to the solution pump.

- **Calibrated Reflow**

Three-way boom valves are used to return product back to the tank in the off state. The returned flow is calibrated with adjustment at each valve. Calibration is required any time the nozzles are changed.

- **Ramsey Valve**

A pneumatically-operated bypass valve. When air is supplied to the valve the rate increases; when air is released from the valve the rate decreases.

## SERVO CONTROL VALVE SETTINGS (BY MANUFACTURER)

Flow Control Valve	Control Valve Configuration	Valve Response 1	Valve Response 2	Response Threshold
Raven Accu-Flow, 20 GPM Single Valve System (Fast Close Valve)	In-line servo	40%	10%	5
Raven Accu-Flow, 10 GPM Dual Valve System (Standard Valve)	In-line servo	100%	24%	5
Raven Accu-Flow, 30 GPM Single Valve System (Fast Close Valve)	In-line servo	40%	10%	5
Raven Accu-Flow, 30 GPM Dual Valve System (Standard Valve)	In-line servo	100%	24%	5
Raven Flow Control Valve, 3/4" (Standard Valve)	In-line or Bypass Servo	100%	24%	1
Raven Flow Control Valve, 3/4" (Fast)	In-line or Bypass Servo	40%	10%	5
Raven Flow Control Valve, 1" (Standard)	In-line or Bypass Servo	100%	24%	2
Raven Flow Control Valve, 1" (Fast)	In-line or Bypass Servo	40%	10%	5
Raven Flow Control Valve, 1 1/2" (Standard)	In-line or Bypass Servo	100%	24%	3
Raven Flow Control Valve, 2" (Standard)	In-line or Bypass Servo	100%	24%	8
Raven Flow Control Valve, 2" (Fast)	In-line or Bypass Servo	40%	10%	15
Raven Flow Control Valve, 3" (Standard)	In-line or Bypass Servo	100%	24%	15
Mid-Tech, 3/4"	In-line or Bypass Servo	40%	10%	5
Mid-Tech, 1"	In-line or Bypass Servo	40%	10%	8
Mid-Tech, 1 1/2"	In-line or Bypass Servo	40%	10%	11
Mid-Tech, 2"	In-line or Bypass Servo	40%	10%	15

Flow Control Valve	Control Valve Configuration	Valve Response 1	Valve Response 2	Response Threshold
Dickey-john NH3 Heat Exchanger	In-line Servo	40%	10%	8

Flow Control Valve or Sprayer Model (and year if applicable)	Control System	PWM Frequency	Typical Gain Range	Zero Offset	Allowable Error	Valve Response 1	Valve Response 2	Response Threshold
Apache 510/710/1010/1210 (2006 and up)	In-line Servo				2%	100%	24%	Use a starting value of 5. See note below.
All Case IH sprayers when using AIM Command	AIM Command In-line servo				2%	100%	24%	3
Case IH Surveyor with A-post	Non-AIM Command Mode PWM 12-volt	122	**700-900	35	2%			
Case IH 3320	Non-AIM Command Mode PWM 12-volt	122	**700-900	35	2%			
Case IH 4420 with A-post	Non-AIM Command Mode PWM 12-volt	122	**700-900	35	2%			
Case IH 3200 (KZKCO Valve)	Non-AIM Command Mode By-Pass Servo				2%	40%	10%	5
Case IH 4260 with Raven valve	Non-AIM Command Mode By-Pass Servo				2%	100%	24%	3



Flow Control Valve or Sprayer Model (and year if applicable)	Control System	PWM Frequency	Typical Gain Range	Zero Offset	Allowable Error	Valve Response <sub>1</sub>	Valve Response <sub>2</sub>	Response Threshold
Case IH 4260 with KZKCO valve	Non-AIM Command Mode By-Pass Servo				2%	40%	10%	5
Case IH 3150 with Raven valve	Non-AIM Command Mode In-Line Servo				2%	100%	24%	3
Case 3185 with Raven valve	Non-AIM Command Mode In-Line Servo				2%	100%	24%	3
Case IH 3310	Non-AIM Command Mode PWM 12-Volt	122	**700-900	30	2%			
Case IH 4410	Non-AIM Command PWM 12-Volt	122	**700-900	30	2%			
GVM Prowler (2007)	Pump Servo				2%	100	24	10
GVM Predator	Servo				2%	100%	24%	**See note below
Hagie 284, 284XP, DTS-8	Pump Servo				2%	100%	24%	3
Hagie 2100, 2101, DTS-10	Pump Servo				2%	100%	24%	3
Hagie STS 10, 12, (2000 to 2005)	Pump Servo				2%	100%	24%	20
Hagie STS 10, 12, 14, 16 (2006 and up)	PWM 12-volt	122	**350-600	20	2%			
Hagie 39-pin Spray II switch box (2006 and 2007)	Calibrated Reflow				2%	100%	40%	2
John Deere 4700, 47X0, 49X0	No rate control provided							
Miller Nitro N1 and N2	Pump Servo				2%	100%	24%	20

Flow Control Valve or Sprayer Model (and year if applicable)	Control System	PWM Frequency	Typical Gain Range	Zero Offset	Allowable Error	Valve Response <sub>1</sub>	Valve Response <sub>2</sub>	Response Threshold
Miller Nitro N4	Pump Servo				2%	100%	24%	12
Montana Paruda	Calibrated Reflow				2%	100%	40%	2 (Imperial) or 11.4 (Metric)
RoGator 864, 874, 1064, 1074	PWM Ground	122	**500-700	30	2%			
RoGator 1054	Pump Servo				2%	100%	24%	3
RoGator 1254	Pump Servo				2%	100%	24%	3
RoGator 1264, 1274 (up to 2006)	PWM Ground	122	**500-700	30	2%			
RoGator 1274, 1286, and SS Series (2007 and up)	PWM Ground	122	**500-700	30	2%			
Spra-Coupe 3X40, 3X50, 4X40, 4X50	In-Line Servo				2%	100%	24%	3
Spra-Coupe 7000 with factory pump switch	PWM Ground	122	**500-700	30	2%			
Spra-Coupe without factory pump switch	PWM Ground	122	**500-700	30	2%			
TerraGator XX03, XX04, XX44	In-Line Servo				2%	40%	10%	15
Tyler Patriot, Patriot II, XL, 150, 150XL and WT	Check for In-Line Servo or By-Pass Servo Control				2%	100%	24%	3
Walker	Pump Servo				2%	100%	24%	3

\*Adjust this number to fit your particular configuration.

\*\*If you are using a PWM control valve, some adjustment may need to be made to achieve optimal pump response to the PWM gain value. Increase the Gain value to make the system more responsive; decrease the Gain value to smooth the system response.

## LIQUID SERVO SETTINGS DESCRIPTION

### • Valve Response 1

Default Value: 100%

Determines the speed of the servo valve when product control error exceeds the Response Threshold setting.

Decreasing the value will cause the servo valve to run slower.

### • Valve Response 2

Default Value: 24%

Determines the speed of the servo valve when product control error is less than the Response Threshold setting.

Decreasing the value will cause the servo valve to run slower.

### • Allowable Error

Default Value: 2%

Determines the percent of error that is allowed prior to the product control system making any flow rate corrections.

2% - 3% is the normal dead band setting range.

- Too low of a setting value can cause the product control system to continually hunt for the target application rate.
- Too high of a setting will cause excessive product application error.

### • Response Threshold

Default Value: 3

Determines where the control system switches between using Valve Response 1 or Valve Response 2 speed setting.

Leaving all other valve control settings at the default value and making a small adjustment to this setting is usually all that is required to fine tune system performance.

- Decreasing this value will have the overall effect of speeding up servo valve response.
- Increasing this value will have the overall effect of slowing servo valve response.

## LIQUID PWM CONTROL VALVE SETTINGS DESCRIPTION

### • PWM Frequency

Default Value: 100

The frequency that the PWM control valve is pulsed at. Typical settings range from 100 - 125. See PWM valve manufacturer information for recommended settings.

### • Gain

Default Value: 800

This setting determines how aggressively the control valve responds when making rate change adjustments. The higher the value the more aggressive the system response is.

### • Zero Offset

Default Value: 30

This setting represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero Offset value can cause the product control system to not properly shut off. See PWM valve manufacturer information for recommended settings.

• **Allowable Error**

Default Value: 2%

2% - 3% is the normal dead band setting range.

- Too low of a setting value can cause the product control system to continually hunt for the target application rate.
- Too high of a setting will cause excessive product application error.

## DICKEY-JOHN NH3 CONVERSIONS

### Conversion Formulas

The following formulas can be used to convert the Dickey John flow sensor constant to a value that represents pulses/gallon of anhydrous ammonia for use by the display.

Conversion Formula
Formula for flow meter calibration for Dickey John reading pounds of anhydrous $\frac{\text{Flow sensor constant (pulses/in}^3\text{)} \times 1728 \text{ (in}^3\text{/ft}^3\text{)} \times 5.11 \text{ (lbs of anhydrous/gal)}}{\text{Solution: Density (lbs. of anhydrous/ft}^3\text{)}}$
Formula for flow meter calibration for Dickey John reading pounds of Nitrogen $\frac{\text{Flow sensor constant (pulses/in}^3\text{)} \times 1728 \text{ (in}^3\text{/ft}^3\text{)} \times 4.22 \text{ (lbs of N/gal)}}{\text{Density (lbs. of N/ft}^3\text{)}}$



**Note:** The flow sensor constant is tagged on the Dickey-John flow meter. The density setting comes from a chart in the Dickey-John documentation and is not provided in this manual.

## TROUBLESHOOTING SERIAL CONTROL APPLICATIONS

**Problem:** Rate changes on the display, but not on the controlled console.

**Solution:**

1. Verify the current firmware is running on the display and Application Rate module.
2. Check the settings specific to your controlled console. (For more information, refer to the Quick Reference Guide).
3. Check cabling and all connections.
4. Disconnect the serial connection and determine if the controller is functioning properly without the display.

**Problem:** The display rate and serial-controlled rate do not match.

**Solution:**

1. Verify the current firmware is running on the display and the Application Rate Module.
2. Check the percent rate change. (Refer to the Quick Reference Guide for more information). controlled console.

# MISCELLANEOUS

## GLOSSARY OF APPLICATION SETTINGS

### Configuration Settings


- **Rate Outside of Field**

Rate that will be used outside of the field boundary. **Zero** stops product application. **Last Good** uses the previous rate before exiting the boundary. **Rx Default** uses the default rate written in the prescription file loaded.

- **Rate Display Smoothing**

Determines how the feedback from the control channel's rate sensor will be displayed on the run screen. When checked, the system will display the target rate when the application rate is within 10% of the target rate setting. When unchecked the system will display the raw feedback from the rate sensor.

- **Minimum Flow**

This setting is used to maintain a consistent spray pattern. The display will not allow flow to drop below the entered setting. Set to flow at the lowest operating pressure for the selected spray tips with all sections on. When spraying with one or more boom sections off, the system automatically reduces the minimum flow setting according to the reduced spray width. To adjust this setting, Press  and enter the desired numeric value.

- **Controller Time Delay**

Compensates for any delay in the control system when changing between different product flow rates during variable rate application.

### Speed Input Settings

- **Primary Speed Source**

Main speed input source used by the display.

- **Backup Speed Source**

If the primary speed source fails, the display will use the backup if one is available.

- **Manual Speed**

If both of the speed input sources are unavailable, manual speed can be used in order for the control channel to provide application. Manual speed setting is for use during static machine testing or by the control system in the absence of primary and backup speed signals.

### Automatic Swath Control Settings

- **Turn-On Look-Ahead**

Determines how far ahead the system looks to turn the swath sections back on. This setting compensates for any delay in the product control system when the sections are turned on.

- **Turn-Off Look-Ahead**

Determines how far ahead the system looks to turn the swath sections off. This setting compensates for delay in the product control system when the boom sections are turned off.

- **Outside Boundary Option**

Determines the behavior of the sections when exiting the field boundary or prescription-mapped area.

- **Coverage Option**

Based on the coverage option selected, this setting determines the behavior of the swath section when entering/exiting an already applied area or field boundary. Options available include: Minimize Skip, Minimize Overlap, and User Defined Percentage.

## Auxiliary Input Settings

- **Master Switch**

Switch that performs global master control of all rate control channels.

- **F1-F11**

Settings determine the switch(es) that will operate the controlling channel specified from the configuration setup. Single switches can be used to control multiple channels and swath sections.

## Controller Settings

- **Flow Meter Cal**

Calibration value representing the number of pulses that equal one-gallon of product flow through the controlling system.

- **Control Valve Configuration**

Setting specifies the type of control valve being used for the rate control functions of the controlling system.

- **Response Threshold**

Determines where the control channel switches between using Valve Response 1 and Valve Response 2 speed setting.

- **Valve Response 1**

Determines the speed of the servo valve when product control error exceeds the Response Threshold setting. Valve Response 1 represents the fast speed of the servo valve.

- **Valve Response 2**

Determines the speed of the servo valve when product control error is less than the Response Threshold setting. Valve Response 2 represents the slow speed of the servo valve.

- **Allowable Error**

Determines the percent of error that is allowed prior to the product control system making any flow rate changes.

- **Flow Control Delay**

Setting for period of time from master switch on and the start of product application to the first flow control correction. This setting can be used to eliminate unwanted correction of flow control at the start of each pass. Typical setting values are zero for granular and 1 –2 seconds for liquid application control.

- **Close Flow Control Valve When Rate Off**

When selected the controlling system will shut down when there is either a zero rate in the field or entering an already applied area. When unchecked the controlling system will stay in the last known state when the sections are shut off.

- **PWM Frequency**

The frequency that the PWM control valve is pulsed at. Settings can be found from the manufacturer of the valve. Typical settings range from 100-125 Hz.

- **PWM Gain**

Determines how aggressively the control valve responds when making rate change adjustments. The higher the value the more aggressive the system response is.

- **Zero Flow Offset**

Represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero Flow Offset value can cause the product control system to not properly control low rates. See the PWM valve manufacturer information for recommended settings.

- **Shaft Speed Cal**

Calibration number representing the pulses that equal one revolution of the rate control metering system.

- **Max Conveyor Speed**

Setting determines the maximum RPM of the conveyor that controls product distribution to the application point. This setting is used when controlling a spinner spreader applicator.

- **Fan Speed Cal**

Number of pulses that are generated by the sensor during one revolution of the blower fan shaft.

- **Max Metering Speed**

Setting determines the maximum RPM of the metering shaft that controls product distribution to the application point. This setting is used when controlling a granular strip-till toolbar.

- **Min Speed**

Setting represents the desired minimum speed of the blower fan. An alarm will sound if the blower fan speed falls below this value.

- **Max Speed**

Setting represents the desired maximum speed of the blower fan. An alarm will sound if the blower fan speed exceeds this value.

- **Low Fan Speed Shutoff**

When selected, granular product application of a strip-till toolbar will be shut off if fan speed drops below the Min Speed setting.

- **Rate Threshold**

Percentage difference between the Actual Rate and the Target Rate when the Rate Not Responding Message is displayed on the Run screen.

## FERTILIZER DEFAULT PRODUCT SETTINGS

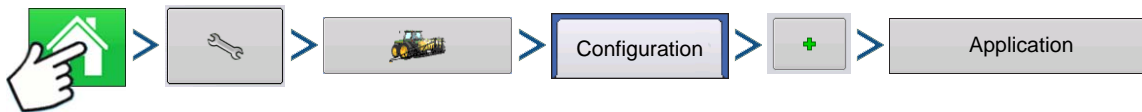
Material	Type	Abbreviated name for display and predefined name for SMS	Percentage (in terms of lbs.100 lbs.)			Density
			N	P (P <sub>2</sub> O <sub>5</sub> )	K (K <sub>2</sub> O)	
Anhydrous Ammonia	Liquid under pressure	NH <sub>3</sub>	82	0	0	5.14 lbs./gal. (at 60°F)
28% UAN	Liquid	28% UAN	28	0	0	10.67
30% UAN	Liquid	30% UAN	30	0	0	10.86 lbs./gal.
32% UAN	Liquid	32% UAN	32	0	0	11.06 lbs./gal.
Ammonium polyphosphate (starter)	Liquid	Ammonium polyphosphate	10	34	0	11.73 lbs./gal.



# INJECTION

DirectCommand interfaces with the Raven SCS Sidekick™ for complete control over chemical injection applications. The display can support up to four Raven SCS Sidekick™ injection pumps plus a liquid carrier.

## CREATE CONFIGURATION

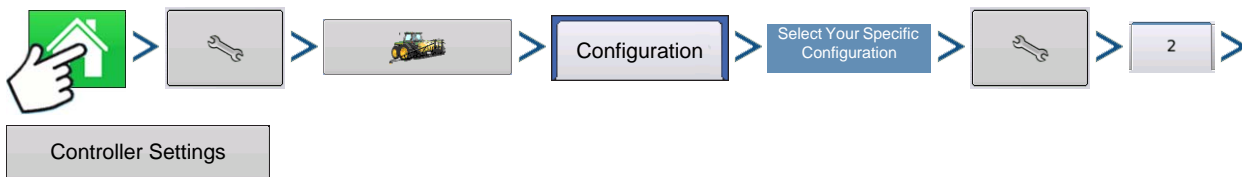


Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > Add (+) button > Application button

A wizard will guide you through the process of selecting or creating a vehicle, implement and controllers.

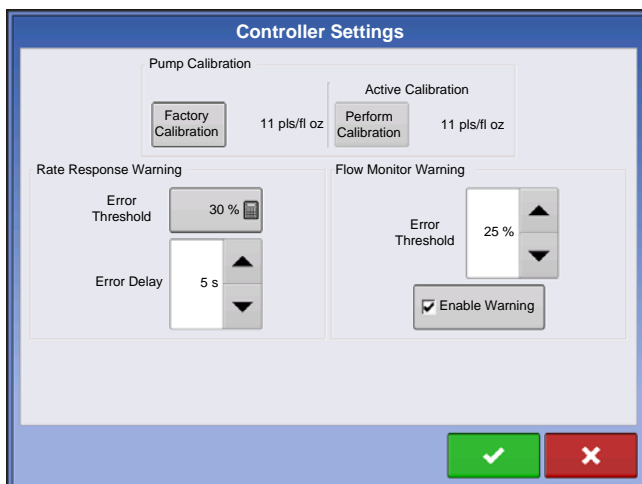
Your Operating Configuration will then be viewable when you start a new Field Operation with the Field Operation Wizard. For more information: [See “Create Configuration” on page 143.](#)

## SETUP CONFIGURATION



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > 2 tab > Controller Settings button

The Controller Settings screen appears.



### Pump Calibration

#### • Factory Calibration

This number is found on the tag of the Digital Pump Speed Sensor. This tag number represents pulses per 10 fluid ounces. Divide the tag number by 10 and enter this number. Once entered, this number should not be changed.

#### • Perform Calibration

Press the Perform Calibration button to begin the calibration procedure for the Direct Injection pump. The pump will not run until this calibration has been performed. For more information, see [“Calibrating an Injection Pump” on page 174.](#)

### Rate Response Warning

#### • Error Threshold

The user-defined percentage of actual rate error allowed before an alarm sounds.

- **Error Delay**

The number of seconds that the actual rate falls out of the error threshold before an alarm sounds.

### Flow Monitor Warning

- **Error Threshold**

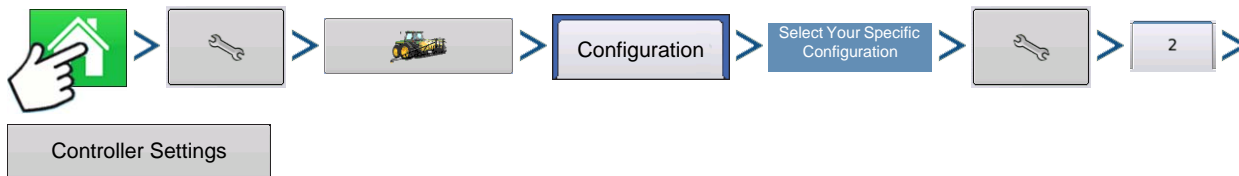
The percentage of perceived application error, based on the discharge flow sensor.

- **Enable Warning**

The Enable Warning check box allows you the option of displaying the Flow Monitor Warning.

## Calibrating an Injection Pump

Calibrate the injection pump at the beginning of each season and any time repairs are made.



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > 2 tab > Controller Settings button


### 1. Enter Factory Calibration

Before entering a Direct Injection Calibration, a Factory Calibration must be entered. If you have not already done so, enter the Factory Calibration Number by pressing the Factory Calibration button. This number is found on the tag of the Digital Pump Speed Sensor. This tag number represents pulses per 10 fluid ounces. Divide the tag number by 10 and enter this number. Once entered, this number should not be changed.

### 2. Press Perform Calibration

Underneath Pump Calibration, press the Perform Calibration button.

### 3. Prime the Direct Injection Pump

The Pump Calibration Wizard appears. Before beginning this calibration procedure, it is recommended that you first prime the Direct Injection pump. Press the Prime button and continue along with the priming procedure as described in *“Priming an Injection Pump”*, beginning with Step 3 on [page 175](#). After the priming procedure is finished, you will return to this Pump Calibration Wizard window. Press  to continue.


### 4. Enter the Dispense Amount

Enter the amount that you want dispensed. Press  to continue.

### 5. Acknowledge the Warning

Prepare to catch any product dispensed in an appropriate container. Press  to continue.


### 6. Start Calibration

Press the green-colored START button to begin the calibration procedure. The Pump Calibration Wizard automatically counts up to the amount that you specified in Step 4. The button will turn red and displays STOP while the product is being dispensed. When the procedure is finished, the button will again turn green. Press  to continue.




**Note:** You may press the **Reset** button if you wish to start the calibration procedure over.

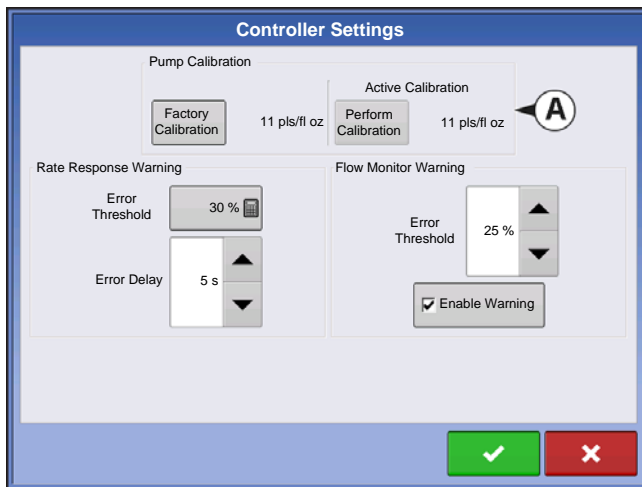
## 7. Enter Actual Dispense Amount

Enter in the actual amount of the product that was dispensed. Press  to continue.

## 8. Calibration Complete

The Pump Calibration number appears. The New Injection Pump Calibration Number now appears in the Pump Calibration screen. From this point, you may either:

- Repeat the calibration by pressing the **Repeat Calibration** button.
- Press  to complete the calibration and exit the Pump Calibration Wizard.



## 9. Calibration Displayed on Controller Settings screen.

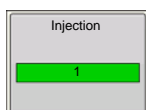
The new Injection **Pump Calibration Number (A)** now appears in the Pump Calibration screen.

## Priming an Injection Pump

If you are using a Direct Injection configuration, you must prime the Injection Pump each time you flush or refill a tank, or change products. This ensures that air is not in the product lines.



**CAUTION:** Failure to perform this priming procedure before beginning a Direct Injection application could result in skips at the start of field operations.




### 1. Press Injection Control button

To prime the Injection Pump, first go to the Map screen. Press the Injection button. The Injection button is located at the left-hand side of the Equipment Tab. The Injection Controls screen appears.




### 2. Press the Prime button

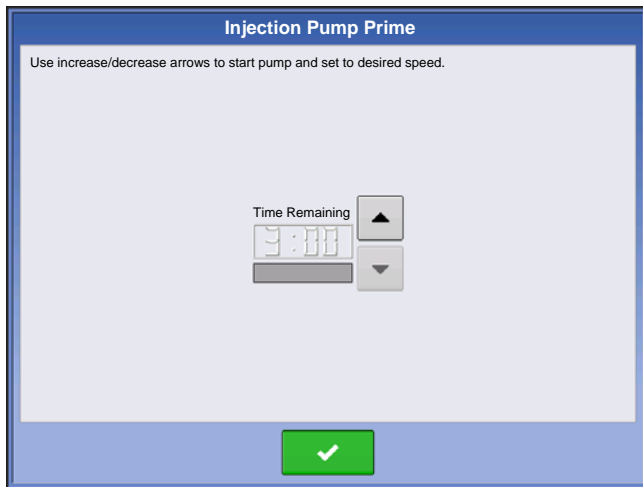
At the Injection Controls screen, press the Prime button.

- You may agitate the Direct Injection tank by pressing the **Agitate** button. Once pressed, this Agitate setting will continue even after the Priming process is finished, until you press  a second time. To determine if a product should be agitated, check the product specifications.
- In order for a Direct Injection tank to agitate the product, you must set the agitator motor switch on **Run** (which agitates the product continuously) or **Pulse** (which agitates the product intermittently).

### 3. Acknowledge the Warning



A warning appears, stating that you must circulate the product back to the Direct Injection tank.

Acknowledge the warning by pressing .





### 4. Start Pump and Set Desired Speed


The Injection Pump Prime screen appears. The countdown time remaining is shown in the black box.

The bar underneath turns green when the pump is operating. Use  /  to manually increase or decrease the pump speed.

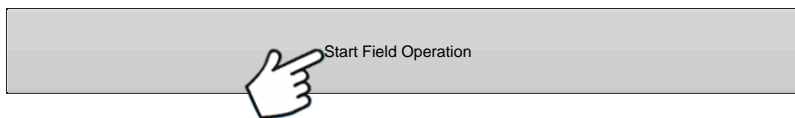
---

 **Note:** The recommended priming time is three minutes (3:00), but the routine can be ended at any time by pressing .

---

5. **Acknowledge the Warning.** A warning appears, stating that you must return chemical injection plumbing to a field-ready state. Acknowledge the warning by pressing .

## LOAD CONFIGURATION



Press: Start Field Operation button

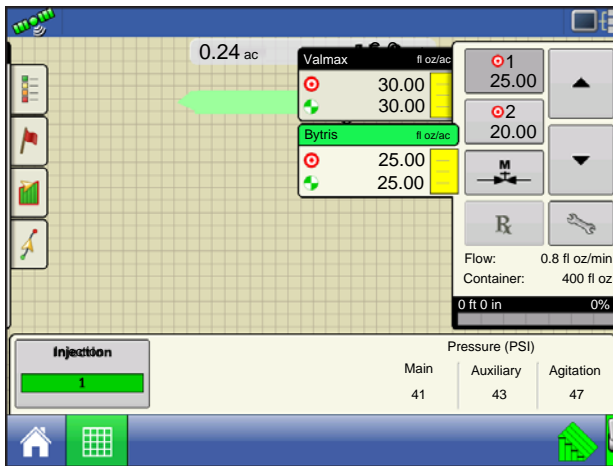
Select a Season, Grower, Farm and Field at the Start Field Operation portion of the Home screen.

For more information, see [“Setup Field Operation” on page 33.](#)

## RUN CONFIGURATION



Once a configuration has been completed, the Map View button appears at the bottom of the Home screen. Press the Map View button to see the Map screen. The map below is displayed in Zoom to Detail view.



- (A) Mapping Toolbox
- (B) Product Control Toolbox
- (C) Injection Controls button
- (D) NORAC UC5 Boom Height Control Options button
- (E) Section Indicators
- (F) NORAC UC5 Engage button
- (G) AutoSwath
- (H) Master Switch Status (on)

### • Injection Controls button (C)

The number of direct injection controllers appear within the Injection Control button. This button displays green for each injection module when detecting flow. Press the Injection Controls button to Prime or Agitate the Injection pump.

## INJECTION DIAGNOSTICS



The Injection Diagnostics screen provides raw values from sensors verifying that the pump's output is working. To go to the Injection Diagnostics screen, press on the Device Information button. At the Devices screen, highlight the item marked AL Direct Inject then press the Diagnostics button. The Injection Diagnostics screen appears. In addition to the Controller's Name and Serial Number, it provides the following information:

Injection Diagnostics	
Controller Name	Di
Serial Number	2008850060
Digital Pump Speed (Hz)	67.0
Analog Pump Speed (V)	7.2
Discharge Flow Monitor (Hz)	9.9
Flow/Speed Sensor Ratio	0.0

### • Digital Pump Speed

Displays volume information, shown in Hz.

### • Analog Pump Speed

Displays varying voltage as pump speed is increased or decreased.

### • Discharge Flow Monitor

Displays information showing that flow is being discharged for every piston stroke.

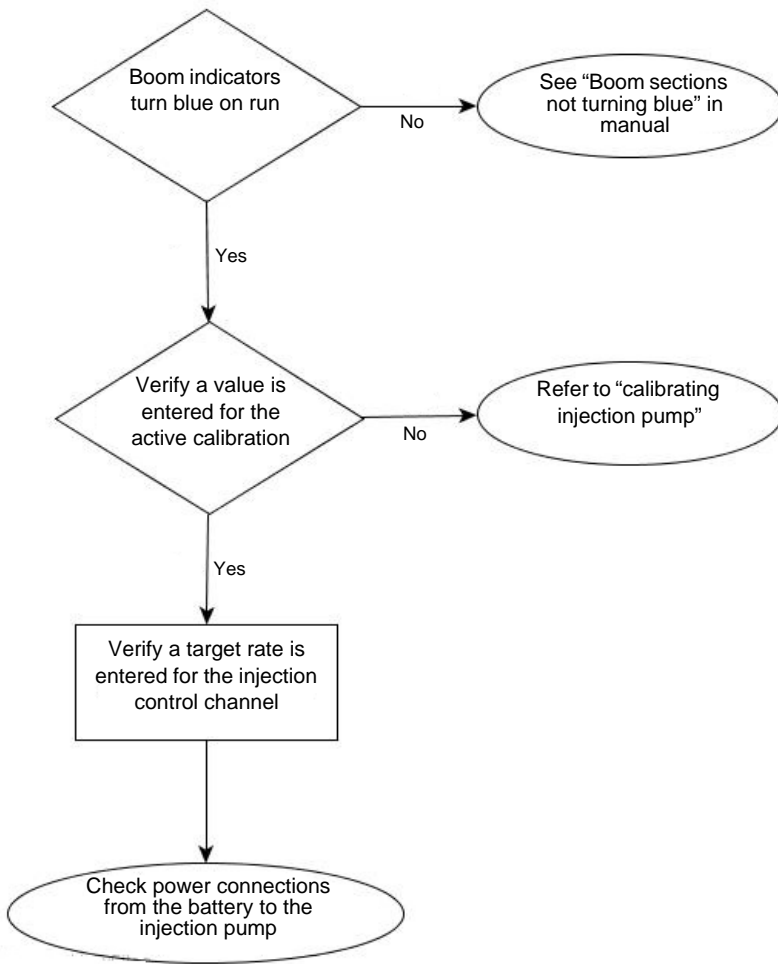
### • Flow/Speed Sensor Ratio

The ratio that the system derived for calibration.

## TROUBLESHOOTING DIRECT INJECTION CONFIGURATIONS

When controlling a chemical injection pump using the Injection Module PN: 4000896, the configuration requires the use of a Liquid Module PN: 4000394. The injection control is based off of the vehicle that has been configured for the liquid DirectCommand control channel. Once configured, the Injection pump uses the same switch inputs and ground speed input that has been configured for the liquid system.

## Direct Injection: Pump Doesn't Run

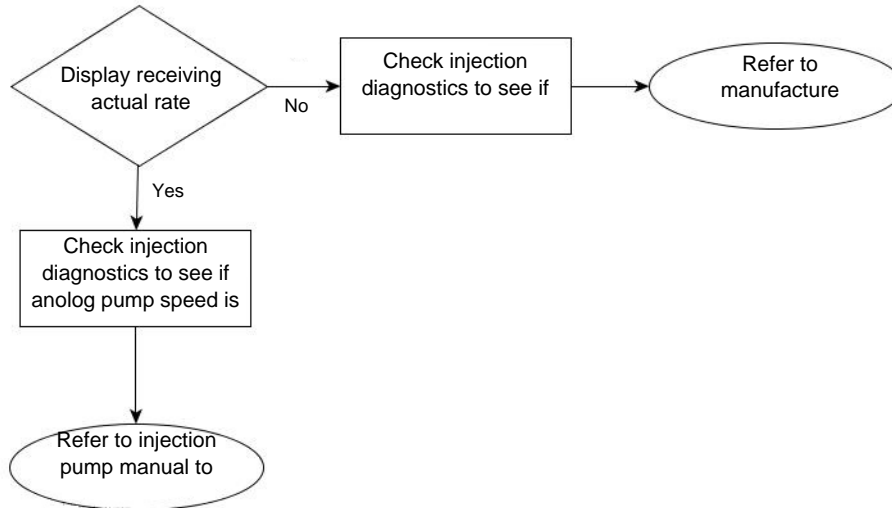


Power can be checked at multiple locations. First is the connection at the Injection module where the battery power cable plugs in. The second location is the output connection found on the injection module. The third is found at the 2 pin weather-pak tower found on the injection cable PN: 4000851-3. See table below.

# BATTERY POWER PIN OUTS

	2 Pin Deutsch Plug	2 Pin Deutsch Receptacle	2 Pin WP Tower
Power 12V	1	1	A
Ground	2	2	B

## Direct Injection: Pump Runs Full Speed



**Digital Pump Speed Sensor** - The injection pump's digital pump speed sensor is used to provide actual rate feedback to the display. If the display is not receiving an actual rate the pump will run full speed and provide a "Rate Not Responding" warning message. See Digital Pump Speed Pin out table below for pin locations. With the section valves on the cabling can be tested by pulsing the signal and ground pins to verify the total applied increases, it is always best to pulse the pins

at least 10 times to make sure the total applied will increase by a noticeable amount.

# DIGITAL PUMP SPEED PIN OUTS

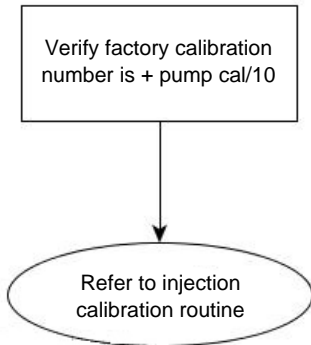
	Module Auxiliary Connection 12-Pin Socket	3-Pin Conxall
Power (5V)	12	2
Signal (5V)	3	3
Ground	6	1

**Analog Pump Speed Sensor** – The injection pump's analog speed sensor is used in conjunction with the digital pump speed sensor to provide accurate rate feedback. The sensor is a generator that produces a varying voltage dependent on the speed of the pump. The injection module will only get feedback from this sensor when the pump is rotating. If the analog sensor is not providing a feedback to the module, the pump will run full speed and will not change speeds manually.

# ANALOG SPEED PIN OUTS

	Module Auxiliary Connection 12-Pin Socket	3-Pin Conxall
Signal	A	>9V at max pump speed
Ground	B	

## Direct Injection: Application Error

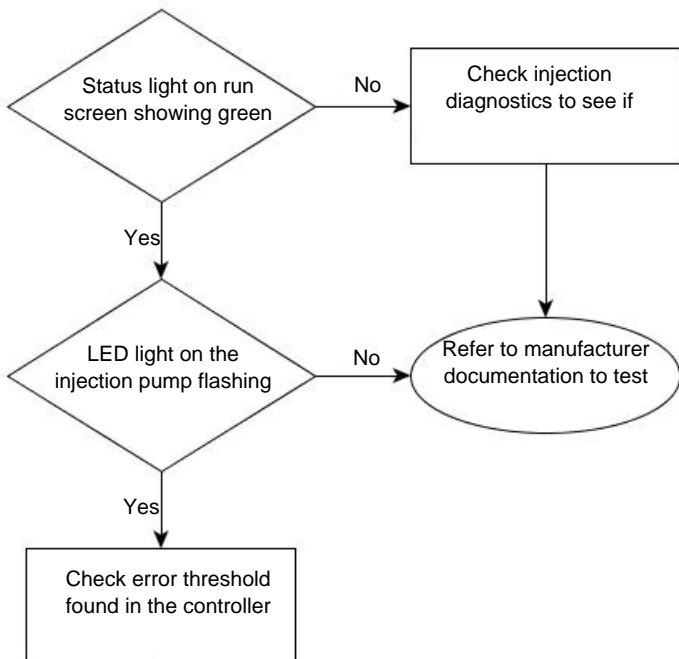


The injection module requires that a pump calibration be performed before actual application can occur. The calibration number found on the tag of the injection pump's digital speed sensor needs to be divided by a factor of 10 before entering it as the factory calibration number. If the factory cal number is entered wrong, the pump calibration routine will not finish due to a high application error.

**Notes:**

- The pump calibration will fail if error is >10% from the factory calibration number.
- If the calibration fails check pump and plumbing for physical damage or excess wear.

## Direct Injection: Discharge Flow Sensor Error



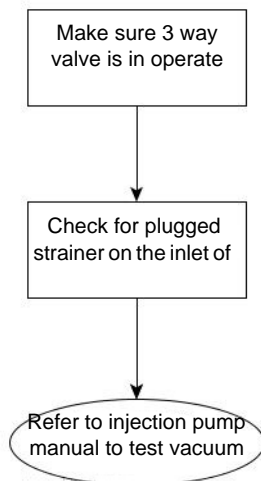
The discharge flow sensor is used as a system check to see if product is actually exiting the output of the pump. The sensor is a shuttle valve that allows feedback for every stroke of the pump. If Flow Monitor Warning is enabled, the display will provide a message if the discharge flow sensor falls out of its calibrated value. See table below for pin locations.



# DISCHARGE FLOW SENSOR PIN OUTS

	Module Auxiliary Connection 12-Pin Socket	3-Pin WP Shroud
Power (12V)	11	A
Signal	9	B
Ground	8	C

## Direct Injection: Inlet Restriction



The injection pump has a vacuum switch that is used to warn operators of any restriction at the inlet of the pump. The sensor is a normally closed switch that opens if a restriction is encountered in the injection system. A warning will be displayed for the operator if the vacuum switch opens due to restriction. See table below for pin locations. The operator can test the system by unplugging the sensor, which will trigger the warning. If the operator jumps pins A and C, the warning will end.

# VACUUM SWITCH PIN OUTS

	Module Auxiliary Connection 12-Pin Socket	3-Pin WP Shroud
Power (12V)	2	C
Signal	10	A

## Controller Settings: Direct Injection Pump Calibration

### Pump Calibration Setting

- **Factory Calibration**

The Factory Calibration Number is found on the tag of the Digital Pump Speed Sensor. This tag number represents pulses per 10 fluid ounces. Divide the tag number by 10 and enter this number. Once entered, this number should not be changed.

- **Perform Calibration**

Press the Perform Calibration button to begin the calibration procedure for the Direct Injection pump. The pump will not run until this calibration has been performed.

## Rate Response Warning

- **Error Threshold**

The user-defined percentage of actual rate error allowed before an alarm sounds.

- **Error Delay**

The number of seconds that an actual rate falls out of the error threshold before an alarm sounds.

## Flow Monitor Warning

- **Error Threshold**

The percentage of perceived application error based on the discharge flow sensor.

- **Enable Warning**

The Enable Warning check box allows you the option of displaying the Flow Monitor Warning.

## Field Notes

### Setting Name and Description

- **Auto Generate Report**

When checked, this option will automatically generate the Smart Report each time product application is completed and the Field button is selected.

- **Prompt for Report Details**

When checked, this option will automatically launch the region summary data collection dialog each time a new region is created at the Run screen during application rate control.

- **Report Map Appearance**

- Multi-Color Rate – Select this option to have the Smart Report display the application maps using the rate legend as displayed on the run screen.
- Single Color Coverage – Select this option to have the Smart Report display single color product coverage maps.

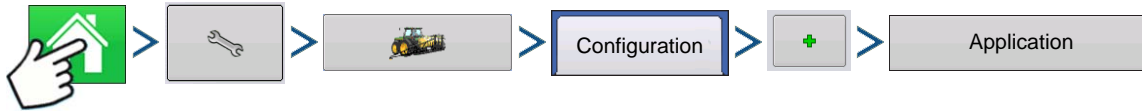
## Run Screen

- **AutoSwath**

Use to enable/disable automatic control of boom section on/off state based upon field boundaries, prescription files, and previously applied areas.

# NORAC UC5

## CREATE CONFIGURATION

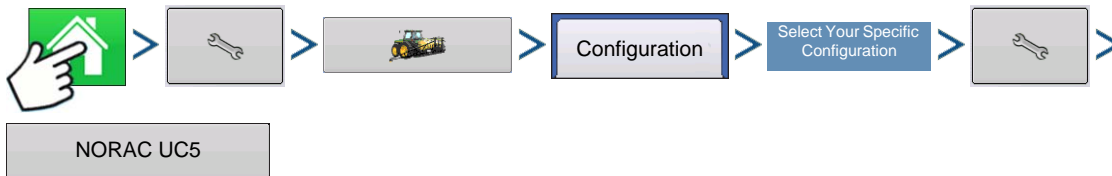


Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > Add (+) button > Application button

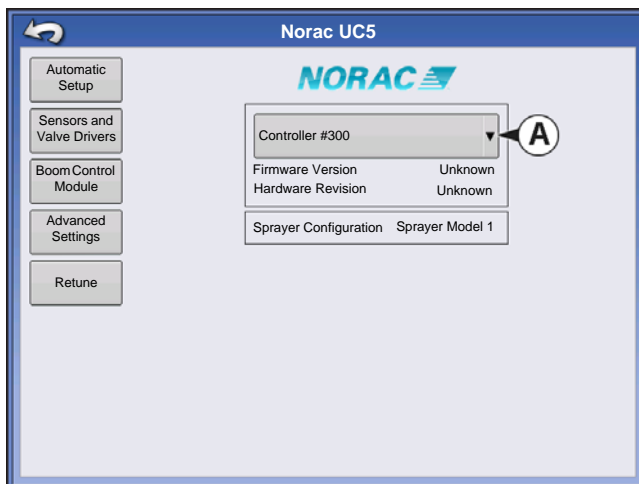
A wizard will guide you through the process of selecting or creating a vehicle, implement and controllers.

Your Operating Configuration will then be viewable when you start a new Field Operation with the Field Operation Wizard. For more information: [See "Create Configuration" on page 143.](#)

## SETUP CONFIGURATION



Press: Home > Setup (wrench) button > Configuration (tractor) button > Configuration tab > (*your particular Operating Configuration*) > Setup (wrench) button > NORAC UC5 button



The NORAC UC5 Setup screen appears.

### • (A) Norac Devices drop-down menu

The drop down menu shows the devices communicating on the NORAC UC5 CAN Bus along with the serial number of each device. The Firmware Version and Hardware Revisions of your NORAC UC5 devices are shown underneath.

### • Automatic Setup

Automatic Setup walks through a series of steps that configures the NORAC UC5 electronics to the sprayer hydraulic functions. You must perform an Automatic Setup routine after the NORAC UC5 system is installed. The following items are configured during an Automatic Setup routine:

- Sprayer Make and Model
- Input module wiring and configuration
- Number of sensors and location
- Sensor zero point

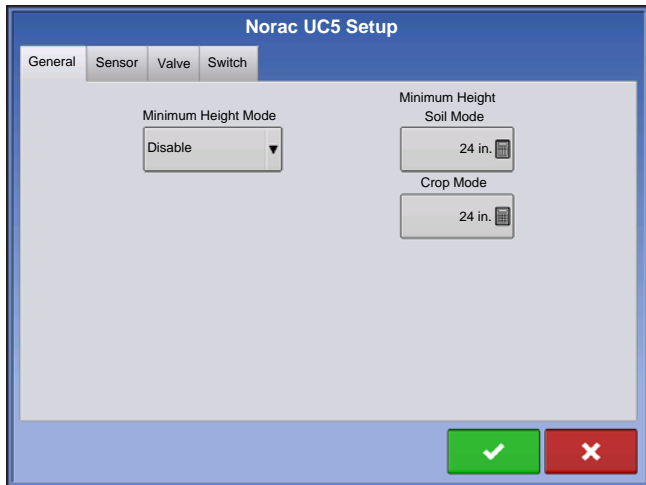
- Valve deadzone and gain values.



**Note:** For detailed Automatic Setup information, see the NORAC UC5 manual.

## • Sensors and Valve Drivers

Opens the Sensor and Valve Driver Settings screen.



The following settings appear on the General Tab.

Minimum Height Mode includes three selections:

### • Absolute

no sensors are allowed to move closer to the target than the minimum height setting.

### • Relative

no sensors are allowed to move closer to the target than the distance of the target height minus the minimum height setting.

### • Disabled

Disables the minimum height mode.



**Note:** "Target" refers to the ground in Soil Mode, and the crop canopy in Crop Mode.

- Minimum Height. If desired, press  to adjust the following settings.

- **Soil Mode** - The minimum height setting when operating in Soil Mode.

**Crop Mode** - The minimum height setting when operating in Crop Mode. Also, consult the NORAC UC5 manual for more information.

### • Advanced Settings

NORAC non-user menu.

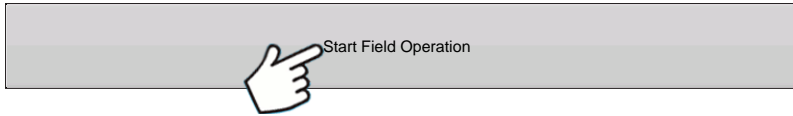
### • Retune

From time to time it may be necessary to recalibrate (Retune) the UC5 electronics to your sprayer's hydraulics. Examples of such times are:

- When a hydraulic solenoid valve is changed.
- When the hydraulic pump is changed or adjusted.
- When the normal working temperature of the hydraulic oil has shifted significantly from when the system was previously calibrated.

If you are running a pull type sprayer and use different tractors to operate the sprayer, you should run the Retune procedure each time the tractor is changed. If you have a flow control for the boom hydraulics, set it prior to tuning. If you change the flow setting by more than 20 percent, you should Retune.

## LOAD CONFIGURATION



Press: Start Field Operation button

Select a Season, Grower, Farm and Field at the Start Field Operation portion of the Home screen.

For more information, see [“Setup Field Operation” on page 33.](#)

## RUN CONFIGURATION



Once a configuration has been completed, the Map View button appears at the bottom of the Home screen. Press the Map View button to see the Map screen.

### Engage button

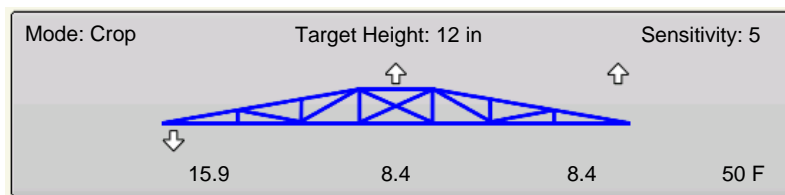


If the NORAC UC5 Boom Height Control is included in your Operating Configuration, then the NORAC Engage button appears on the display's Task Bar. The Engage button enables boom height control. This button is green when the NORAC UC5 system is engaged; and grey when disengaged. Press on this button to engage and disengage the NORAC UC5 Boom Height Control.

This button can be used to toggle back and forth between Automatic Mode and Manual Mode.

- When you enable **Automatic Mode**, this button turns green and the display beeps three times.
- When you disable **Automatic Mode** on any part of the boom and the display switches to **Manual Mode**, this button turns white and the display beeps twice. If less than the full boom remains in Manual Mode, the display will continue beeping twice every three seconds.

### Boom Height Control Options Button



At the center of the Map screen's Equipment Tab, the Boom Height Control Options button displays data on NORAC UC5 Run Time performance.

- The Boom Icon appears as blue when in Automatic Mode; and black when in Manual Mode. The right, left and center sections appear independently on this icon. Press the Boom Height Control Options button to open the Boom Height Control Options screen. For more information, see [“Boom Height Control Options Screen” on page 186.](#)
- The white arrows indicate the direction that the boom section is being commanded to move. The arrows shown around the boom appear either 1) In **Automatic Mode**, or 2) When the boom is in **Manual Mode** and the boom is moved by the operator.

#### • Mode

Indicates whether the Boom is in **Crop Mode** or **Soil Mode**. For further explanation, see [“Boom Height Control Options Screen” on page 186.](#)

#### • Target Height

The desired boom height above the ground (for **Soil Mode**), or the crop canopy (for **Crop Mode**).

- **Sensitivity**

Adjusts the boom response. Higher values make the height control more responsive.

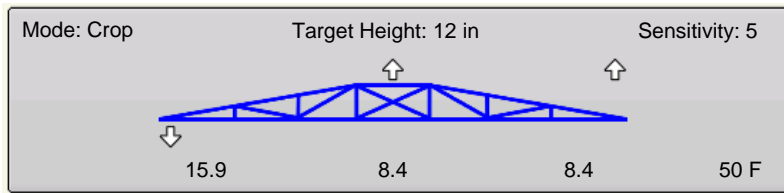
- **Distance Between Boom and Target**

The numbers that appear below the Boom Icon show the distance between the boom section and the target.

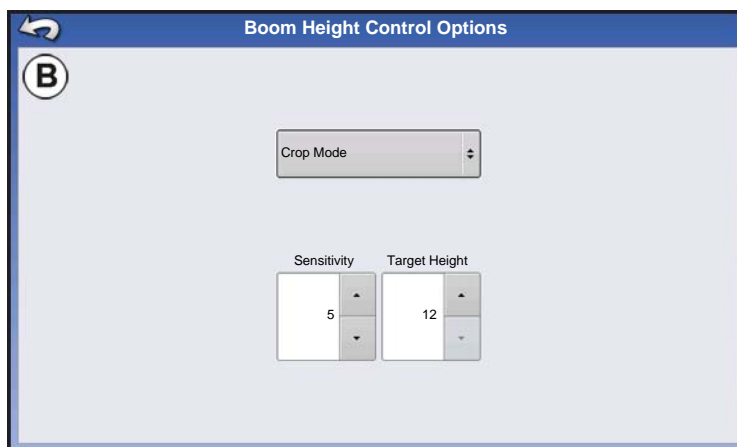
- **Temperature**

Shows the measurement of the outside ambient air temperature.

## Boom Height Control Options Screen



Pressing the **Boom Height Control Options button (A)** opens the **Boom Height Control Options screen (B)**. At this screen, you can adjust the boom's Mode, Sensitivity and Target Height.



- **Mode**

The drop-down menu is where you can choose one of two modes:

- In **Soil Mode**, the UC5 controls boom height relative to the distance from the soil.
- In **Crop Mode**, the UC5 controls boom height relative to distance from the crop canopy.

- **Sensitivity**

Adjusts the boom response. Higher values make the height control more responsive; settings range from 0-10.

- **Target Height**

User-defined boom height in relation to the selected control mode.

## BOOM HEIGHT DIAGNOSTICS

The Boom Height Diagnostics screen shows all data for individual sensors, including Height, Roll and Temperature.



To go to the Boom Height Diagnostics screen, press on the Device Information button. At the Devices screen, highlight the item marked NORAC UC5 then press the Diagnostics button.

The NORAC UC5 Diagnostics screen appears.

	Location	Serial	Height / Roll	Temperature
1	Left Outer	100	91 cm	21.1 C
2	Left Inner	103	89 cm	21.1 C
3	Main Lift	101	102 cm	21.1 C
4	Right Inner	104	84 cm	21.1 C
5	Right Outer	102	81 cm	21.1 C
6	Boom Frame	105	8.0	N/A

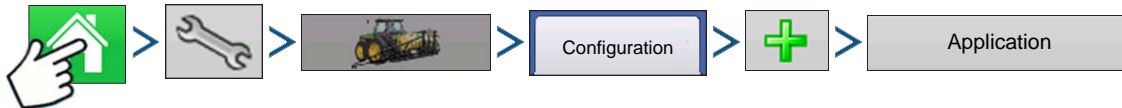




# SPREADER

DirectCommand for spinner spreaders is capable of controlling the product conveyor, spinner speed, monitoring bin level, and providing multiple prescription rate control for up to three granular products. The control modules support PWM, motorized servo, Mark IV.2, Mark IV.4, and Mark V hydraulic control valves. DirectCommand granular application system also supports application control of multiple bin spreaders.

## CREATE CONFIGURATION



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > Add (+) button > Application button



### 1. Select Vehicle

Use drop-down menu to choose a vehicle, or press  to enter a new vehicle. Press  to continue.




**Note:** If selecting Self-Propelled Applicator from the drop-down menu skip steps 2 and 3.

### 2. Select Implement

Select an implement from the drop-down list menu, or press  to create a new implement. Press  to continue.

### 3. Select Implement Attachment Type

Use the drop-down list to select an implement attachment method. Press  to continue.



### 4. Select Application Type from Implement Wizard:Application Channels screen

Press the Granular Application button.


### 5. Add Granular Functionality

Press the Spinner Spreader button to add Spinner Spreader functionality to the implement.

### 6. Select Controller

Use the drop-down menu to select a controller or press  to add a controller. Press  to continue.

### 7. Select Controller Device

Select DirectCommand from the Device drop-down menu. Select either, Spinner Spreader Control 3CH, 5CH, or Stepper Spreader Control from the Direct Type drop-down menu. Press  to continue.

## 8. Enter Controller Name

Controller name defaults to DirectSpreader. Press  to accept, or press  to enter a new name if desired. Press  to continue.


## 9. Container Setup (Equipment Setup Wizard:Container screen)

Press the desired channel button to enable or disable controller channel. A check mark will appear in the box when the container is ready to be configured.





**Note:** System supports a maximum of three active product channels.

## 10. Assign Container Name


Container names default to “Bin 1-5” depending on which granular control module is being used. Press  to enter a new name if desired.

## 11. Assign Container Capacity

Press  to enter the container capacity. Press  to accept.

## 12. Enter Container Units

Use the drop-down menu to select the container units.

Once container has been configured press  to continue.



**Note:** Follow steps 9-12 for each control channel.


## 13. Enter Application Point Offset

Press  to enter distance from hitch to application point (front to back). Press  to continue.





**Note:** If setting up a Self-Propelled Applicator, enter the distance from rear axle to application point. Use drop-down menu to select distance Behind or In Front.



**Note:** At this point additional functionality can be added to the implement. If no additional functionality is being added, press  to continue.


## 14. Enter Implement Name

Press  to enter a name for the implement. Press  to continue.

## 15. Select Implement.

Press  to continue.



## 16. Select Second Implement.

Use drop-down menu to select Implement or press  to add second implement.

## 17. Select Speed Source

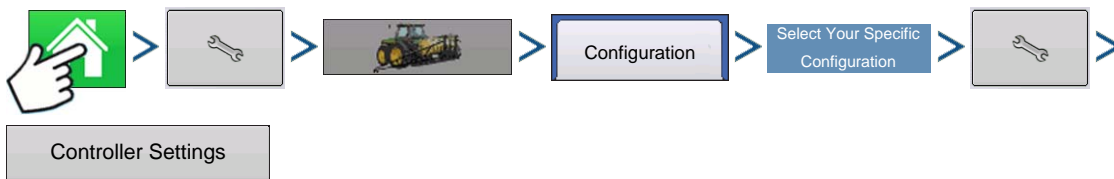
Use drop-down menu to select Primary Source, set Backup Source, and configure Auxiliary Channel. Press Calibrate Speed Sensor to launch the Speed Sensor Calibration Wizard.

## 18. Enter Configuration Name

A suggested name for the configuration appears. If desired, Press  to enter a different name for your configuration. Press  when complete.

The completed configuration should now appear under the Application heading located on the Configuration tab of the Configuration Setup screen.

## CONTROLLER SETTINGS



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > select your specific configuration > Setup (wrench) button > Controller Settings button

Controller Settings screen appears, with each channel's settings shown on its own tab.

The settings shown at this screen vary, depending upon whether your spreader uses a PWM Control Valve or a Servo Control Valve. Use the Control Valve Configuration drop-down menu to choose the appropriate configuration for your machine.

Settings for a PWM Control Valve are described below.

Settings for a Servo Valve are described at [“Spreader Control: Servo Control Valve” on page 192.](#)

The Spinner Tab appears behind the channel tabs. The Spinner Tab is where Fan Speed settings are shown. The Spinner Tab and Fan Speed settings are described at [“Spreader Control: Spinner Tab” on page 193.](#)

## Spreader Control: PWM Control Valve

### • PWM Frequency

The frequency that the PWM control valve is pulsed at. Settings can be found from the manufacturer of the valve. Typical settings range from 100-125 Hz. The default setting is 100.

### • PWM Gain

Determines how aggressively the control valve responds when making rate adjustments. The higher the value the more aggressive the system response is. The default setting is 100.

- **Zero Flow Offset**

Represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero RPM Offset value can cause the conveyor to not properly shut off. See the PWM valve manufacturer information for recommended settings. The default setting is 30.

- **Allowable Error**

Determines the percent of error that is allowed prior to the product control system making any flow rate changes. **2% - 3%** is the normal dead band setting range.

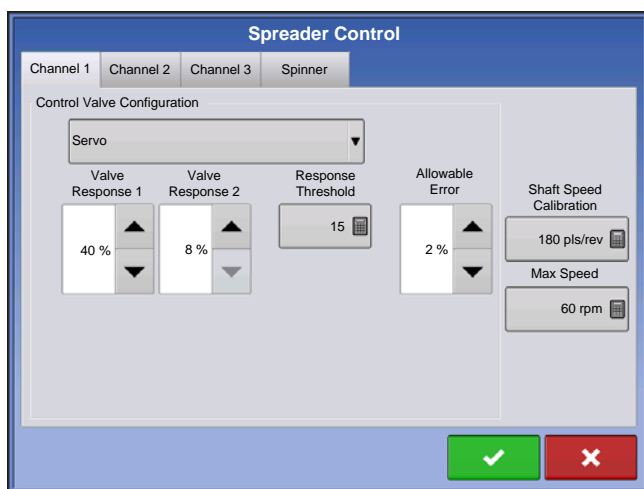
- Too low of a setting value can cause the product control system to continually hunt for the target application rate.
- Too high of a setting will cause excessive product application error.

- **Shaft Speed Calibration**

Calibration number representing the pulses that equal one revolution of the rate control metering system.

- **Max Speed**

The Maximum Conveyor Speed Setting determines the maximum RPM of the conveyor that controls product distribution to the application point.



## Spreader Control: Servo Control Valve

- **Valve Response 1**

Determines the speed of the servo valve when product control error exceeds the Response Threshold setting. Represents the fast speed of the servo valve. Decreasing the value will cause the servo valve to run slower. The default setting is 40%.

- **Valve Response 2**

Determines the speed of the servo valve when product control error is less than the Response Threshold setting. Represents the slow speed of the servo valve. Decreasing the value will cause the servo valve to run slower. The default setting is 8%.

- **Response Threshold**

Determines where the control channel switches between using Valve Response 1 and Valve Response 2 speed setting. Leaving all other valve control settings at the default value and making a small adjustment to this setting is usually all that is required to fine-tune system performance. The default setting is 15.

- Decreasing this value will have the overall effect of speeding up servo valve response.
- Increasing this value will have the overall effect of slowing servo valve response.

- **Allowable Error**

Determines the percent of error that is allowed prior to the product control system making any flow rate changes. **2% - 3%** is the normal dead band setting range.

- Too low of a setting value can cause the product control system to continually hunt for the target application rate.
- Too high of a setting will cause excessive product application error.

- **Shaft Speed Calibration**

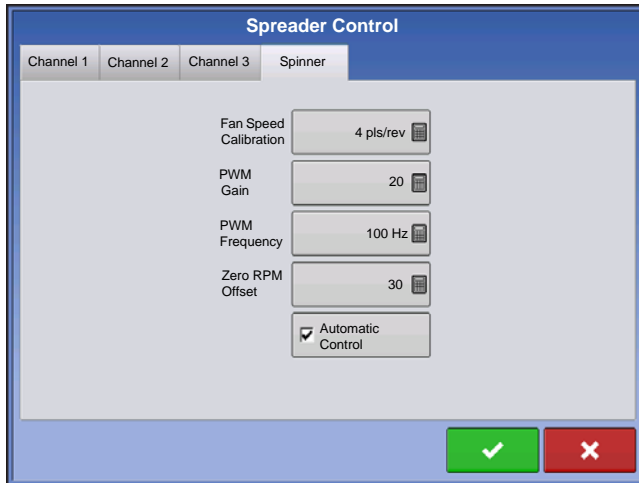
Calibration number representing the pulses that equal one revolution of the rate control metering system.

- **Max Speed**

The Maximum Conveyor Speed setting determines the maximum RPM of the conveyor that controls product distribution to the application point.

## Spreader Control: Spinner Tab

To view Fan Speed Calibration settings, press the Spinner Tab. Operators with Spinner Spreaders that use PWM valves will see additional active settings.



- **Fan Speed Calibration**

The number of pulses that are generated by the sensor during one revolution of the spinner dish. The default setting is 4.

- **PWM Gain**

Determines how aggressively the control valve responds when making spinner speed adjustments. The higher the value the more aggressive the system response is. The default setting is 20.

- **PWM Frequency**

The frequency that the PWM control valve is pulsed at. Settings can be found from the manufacturer of the valve. Typical settings range from 100-125 Hz. The

default setting is 100.

- **Zero RPM Offset**

Represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero RPM Offset value can cause the spinner system to not properly shut off. The default setting is 30.



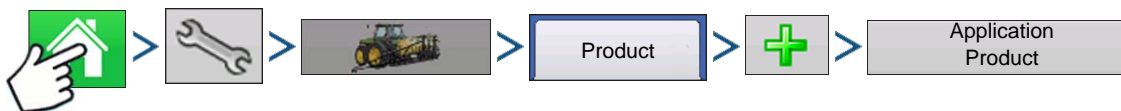
**Note:** See the PWM valve manufacturer information for recommended settings.

- **Automatic Control**

Checking the Automatic Control check box allows you to control the spinner speed. The default setting is unchecked.

## CREATING PRODUCTS

Creating application products including dry fertilizer blends can be completed upon initial setup or from the Product Selection screen of the Field Operation Wizard when starting a field operation.




Press: Home button > Setup (wrench) button > Configuration (tractor) button > Product tab > Add (+) button > Application Product button


## CREATING SINGLE PRODUCTS

1. From the Product tab of the Configuration Setup screen press .



## 2. Add Product

Press  to create a single product to be added to a tank mix or to be applied by itself.

## 3. Select Product Type (Product Setup Wizard: Step 1 of 3)


Use drop-down menu to select Product Type. Next select Product from predefined list of products. Press  to continue.

## 4. Enter Fertilizer Name

Default product name appears. Press  to enter a new name, or press  to continue.

Created product should now appear under the Application heading located on the Product tab of the Configuration Setup screen.

## CREATING DRY FERTILIZER BLENDS

Dry fertilizer blends are set up by using the on-screen Dry Fertilizer Blend wizard described in the following steps. A dry blend can contain up to seven individual components. To create a Dry Fertilizer Blend, go to the Setup Product tab, and press .




At the Choose Product Type screen, press Add Product Mix. The Product Mix Setup Wizard appears.

1. Select **Dry Blend** from the list box and press  to continue.
2. Enter a Base Amount of product and the controlling Units for the dry product blend. Press  to continue.






**Note:** The Base Amount is the total weight of product for the fertilizer blend. The Base Amount does not need to match the actual volume of product that will be applied, but is used only to establish the ratio of all products to the total volume.

3. Press  to start the process of adding components to the fertilizer blend.



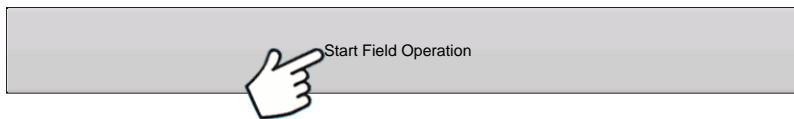
**Note:** Any liquid herbicides set up within the system can be added to create an impregnated blend product.

4. Select the desired component from the list box. New components can be set up at this time if required.
5. Enter the amount of the first component.

6. Press  to start adding an additional component. (A dry mix can contain up to seven individual components.)
7. The remaining Base Amount that is available after adding product components is shown at the bottom of the on-screen list box.
8. Enter Manufacturer name if applicable. Press  to enter a unique name for the blend.
9. Press  to complete the process of setting up the dry blend. The new Dry Blend now appears in the Product List.

The Operating Configuration is now able to be selected when starting a new Field Operation with the Field Operation Wizard.

## LOAD CONFIGURATION



Press: Start Field Operation button

Select a Season, Grower, Farm and Field at the Start Field Operation portion of the Home screen.

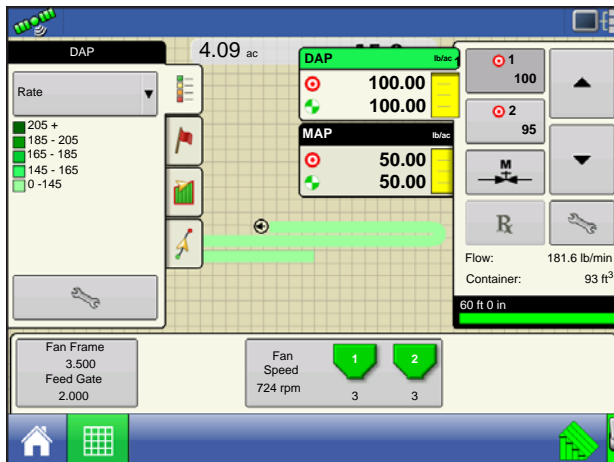
For more information, see [“Setup Field Operation” on page 33.](#)

## RUN CONFIGURATION



Once a configuration has been completed, the Map View button appears at the bottom of the Home screen. Press the Map View button to see the Map screen. The map below is displayed in Zoom to Extent view.

Below is an example of a Spinner Spreader Granular Product Control applying two products.



- (A) Mapping Toolbox
- (B) Product Control Toolbox
- (C) Conveyor Indicator
- (D) Spreader Control button
- (E) AutoSwath
- (F) Master Switch Status (on)

# SPINNER SPREADER, WITH TWO-BIN CONFIGURATION

## • Spreader Control button

Displays the status of the product control channel. The Conveyor Speed (in RPM) is shown underneath the bin icon; the Spinner Speed (also in RPM) is shown at bottom. Press the Spreader Control button to display the Spreader Control screen and settings. These settings include Spread Width, Spinner Speed (if enabled), Product Density, Feed Gate Opening, and Conveyor Rate. For more information, see section beginning at [“Spreader Control screen” on page 196](#).

## • Conveyor Indicator

The Conveyor Indicator is shown at the bottom of the Product Control toolbox when the Map screen is shown in Zoom to Extent. When the Map screen is shown in the Zoom to Details view or Perspective View, the conveyor indicator is shown as a bar that appears behind the vehicle icon.

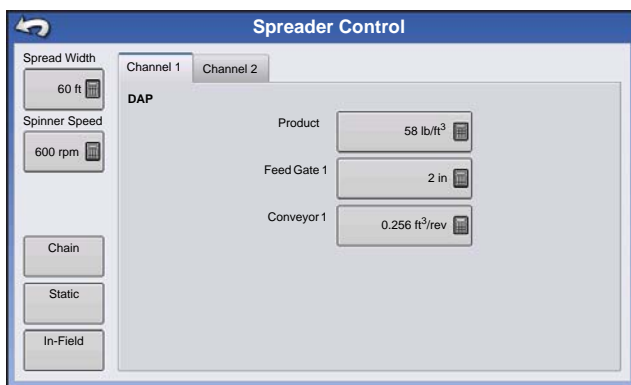
## RUN TIME OPERATIONS



During Run Time Operations, Spinner Spreader operators can press the Spreader Control button to open the Spreader Control screen. At this screen, you can adjust Spread Width, Spinner Speed, Product Density and other settings.

- Each of these settings described below must be set for each individual Product Channel (bin).
- Changed settings do not take effect until verified. However, if your machine is equipped with Fan Frame & Feed Gate Actuators, and you have also purchased a New Leader Linear Actuator unlock code, the settings on the spinner bed will change automatically.
- The **Spread Width, Spinner Speed, Product Density, Feed Gate 1 Opening** and the **Conveyor 1 Rate** are all stored with each combination of product and control channel.

## Spreader Control screen



### • Spread Width

Press  to edit the value.


### • Spinner Speed

The spinner speed required for accurate product placement in relation to the spread width setting.

- The spinner speed is controlled automatically based upon this setting when the system uses an optional PWM spinner speed control valve.
- To accurately determine Spinner Speed settings you should perform a spread pattern catch test. See [“Spreader](#)

[Control: Static Calibration” on page 199](#).

### • Product Density

This density value (shown in pounds per cubic foot, or lb./ft.3), is stored with each product. Press  to edit if needed.





**Note:** For proper machine performance and accuracy, you should check the Product Density daily.

### • Feed Gate 1 Opening

Represents the Feed Gate opening for Conveyor 1. Measure the depth of product on the conveyor to ensure accurate feed gate setting value.

### • Conveyor 1 Rate

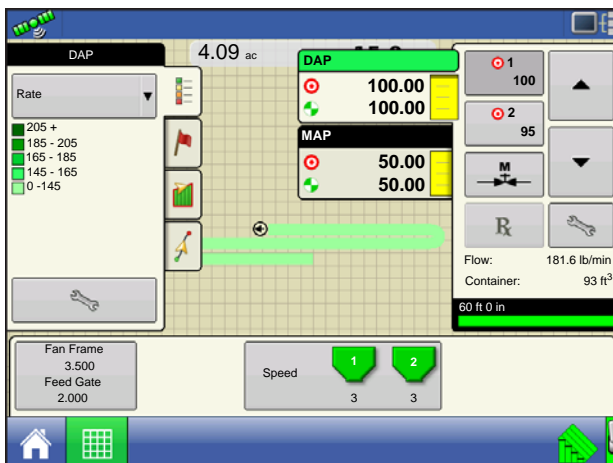
This setting represents the volume of product dispensed by one revolution of the conveyor drive shaft (cubic foot per revolution, or  $\text{ft}^3/\text{rev}$ .) This number is shown with the assumption that the conveyor shaft has a 1-inch gate opening. This conveyor rate remains constant, regardless of the height of the feed gate opening.



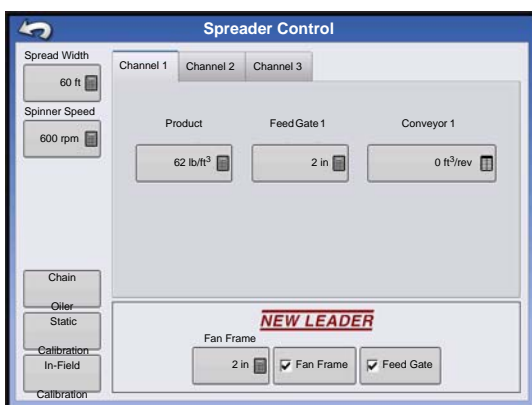
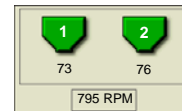
**CAUTION:** You must either manually enter conveyor rate value or perform a CFR calibration routine for each product and channel combination, otherwise misapplication will occur.

## Conveyor Rate Look-Up

A pop-up screen will display a warning when a product is assigned to a container or bin for the first time and has not been calibrated. The warning prompts the operator to review product density and conveyor rate settings.



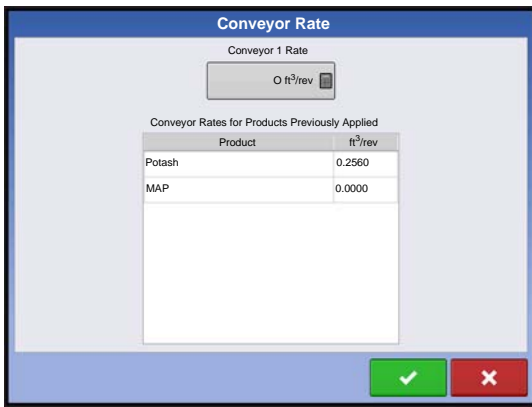
Conveyor rates for previously applied products can be found by first pressing the Spreader Control button which opens the Spreader Control screen.




The Spreader Control screen has a tab for each control channel/product being applied. Select the desired channel and press the **Conveyor Rate** button.




**CAUTION:** For proper machine performance and accuracy, Product Density should be measured for every application load.



The **Conveyor Rate** button opens a setup screen where the conveyor rate can be inputted and a table of previously applied products and conveyor rates is shown.


Press the conveyor rate button and press  to input desired conveyor rate.

Press  to accept the new conveyor rate and return to the Spreader Control window.

## Fan Frame & Feed Gate Actuator Settings

These are optional settings used by operators using a New Leader Linear Actuator module.

- **Fan Frame**

Checking the Fan Frame check box enables the Fan Frame Actuator. Displays the distance between the spinner bed and the spinner assembly. Press  to edit this value.

- **Feed Gate**

Checking the Feed Gate check box enables the Feed Gate Actuator.

## Spreader Control: Routine Operations

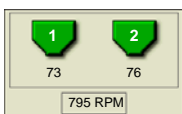
The Spreader Control screen has three buttons, Chain Oiler, Static Calibration and In-Field Calibration, which are described below and on the following pages.

### Spreader Control: Chain Oiler

If you are using a Chain Oiler, you can automatically perform a chain oiling routine by pressing the Chain Oiler button on the Spreader Control screen and following the steps below.



**Note:** Perform a chain oiling routine daily.



#### 1. Press Spreader Control button

To begin, press the Spreader Control button to open the Spreader Control screen. At the Spreader Control screen, press the Chain Oiler button.


#### 2. Acknowledge the first warning

Manually disable or shut off the spinner hydraulic circuit.

#### 3. Enter a Routine Duration

Enter the routine time that it takes to turn the conveyor one revolution.

#### 4. Press Start

Press the Start button, and when the routine is finished press .

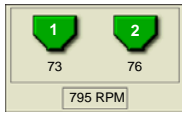
#### 5. Acknowledge the second warning.

Return the spinner hydraulic control to a field-ready condition.

## Spreader Control: Static Calibration

You must perform a conveyor discharge calibration for each granular product control channel (bin) for the equipment configuration. This process is outlined below and on the following page. The static calibration procedure is performed before applying in field conditions.

### 1. Press Spreader Control button




To begin, press the Spreader Control button on the Map screen. The Spreader Control screen opens.

### 2. Start Calibrate Conveyor routine

Press the Static Calibration button to start the Static Conveyor Rate calibration routine.

### 3. Disable Spinner Hydraulic Circuit

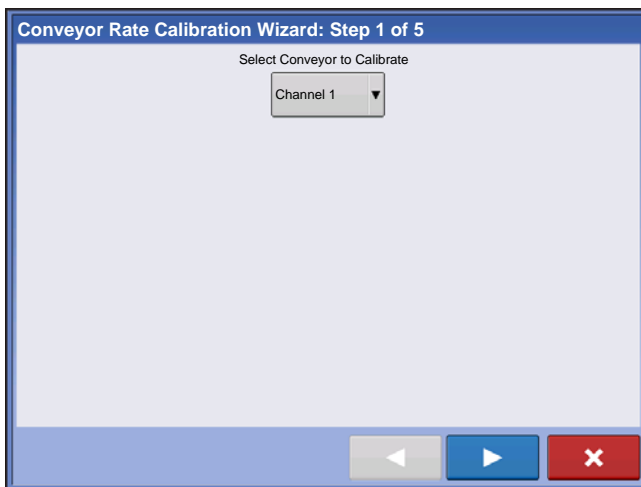
The system will present a warning to disable the spinner hydraulic circuit. Press  after the hydraulic circuit is disabled.




**WARNING:** Manually disable or shut off the spinner hydraulic circuit. If the spinner runs unexpectedly, injury could occur.

### 4. Select Conveyor to Calibrate

Press  to continue.



### 5. Enter Dispense Amount

Enter the desired target amount of product to dispense (the recommended amount is 500 pounds or 250 kilograms). Press  to continue.

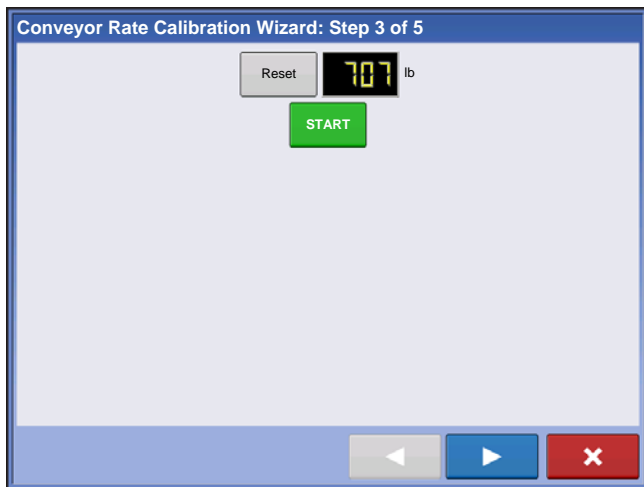
### 6. Start Dispensing Product

Press the Start button to begin dispensing the product.




### 7. Product Dispensing

The conveyor will stop when the system perceives the target amount of product has been dispensed. The Stop button can be pressed at any time to manually shut off the conveyor.




## 8. Product Dispensing Stops

On the screen shown after dispensing the display's target amount, value can be reset and the process started again for a larger sample size, if desired. Press



 to continue.

## 9. Enter Actual Dispense Amount

Enter the actual weight of the product dispensed. Press  to continue.

## 10. Finish Calibration

A screen displays, stating Calibration Complete and underneath is shown the newly-calibrated conveyor rate.

- Press  to exit the calibration without saving the value.
- Press **Repeat Calibration** to begin the process again.
- Press  to save the value and exit the calibration routine.

## 11. Restart spinner hydraulic circuit

Restart the spinner hydraulic circuit.

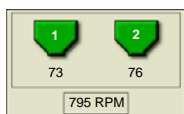


**WARNING:** Make sure the spinner is free of material before restarting the spinner hydraulic circuit.

12. A warning will appear when exiting the calibration wizard, instructing you to return the spinner control hydraulic circuit to a field-ready condition.

## Spreader Control: In-Field Calibration


The In-Field Conveyor Calibration procedure performs an automated routine to adjust the calibration number for the selected spinner bin. This calibration is performed if there is a difference between the amount of product logged as compared to what was actually applied.





### 1. Press Spreader Control button

To begin, press the Spreader Control button on the Map screen. The Spreader Control screen opens. Press the In-Field Calibration button on the Spreader Control screen. The In-Field Conveyor Rate Calibration Wizard appears.


### 2. Select Conveyor to Calibrate

Select the channel to calibrate, and press  to continue.

### 3. Enter Actual Weight

The Accumulated Weight is shown in the top portion of the window. Press  to enter the Actual Weight, and press  to continue.

#### 4. Calibration Complete

A message appears, stating that your calibration is complete, and showing the CFR amount in cubic feet per revolution. Press  to finish.

## TROUBLESHOOTING DIRECTCOMMAND GRANULAR APPLICATIONS

**Problem:** Run screen Granular channel(s) green light spreader indicator will not turn on.

**Solution:**

1. Make sure ground speed is registered a value greater than zero on the display.
2. Verify a target rate greater than zero is entered into the display.
3. Check the switch status found on the Run screen under System and Input Diagnostics. As the master switch is turned on and off, the Input Diagnostics window should change from black to green (if they do not, then refer to the installation instructions to verify switch connections).
4. Check high current connection into the Granular Control Module.

**Problem:** Master switch will not turn on when the foot pedal is on.

**Solution:** Make sure the Master Switch Input is set to “External 2” under the Auxiliary Input Settings.

**Problem:** AutoSwath turns on the booms too fast or too slow.

**Solution:** Check GPS offsets in the vehicle setup to verify all of the measurements are correct.

**Problem:** AutoSwath feature is not shown.

**Solution:** The display must have the AutoSwath feature password-unlocked before the feature is available to the operator.

**Problem:** AutoSwath is checked on, but the spreader will not turn on.

1. Make sure the ground speed is registering a value greater than zero on the display.
2. Make sure the applicator is inside of the field boundary.

**Problem:** Conveyor turns off in the middle of the pass.

**Solution:** Check the display firmware and module firmware to see if they are running the latest version.

**Problem:** Total Applied does not match Actual Weight Applied.

**Solution:**

1. Make sure the shaft speed pls/rev are set correctly in the controller settings.
2. Make sure the controlling product is set to the correct units.

**Problem:** Rate not responding.

**Solution:**

1. Make sure there is a ground speed registering on the display.
2. Make sure the shaft speed pls/rev are set correctly in the controller settings.  
(You must make sure to account for sprocket ratios if chain driven).

$$\frac{\text{Driven Teeth}}{\text{Drive Teeth}} \times \text{Rate Sensor Pulses} = \text{True Pulses}$$

3. Check the user-defined value found under the controller settings for Strip-Till.
4. The CFR number may need to be adjusted.

# TROUBLESHOOTING SERIAL CONTROL APPLICATIONS

**Problem:** Rate changes on the display, but not on the controlled console.

**Solution:**

1. Verify the current firmware is running on the display and Application Rate module.
2. Check the settings specific to your controlled console. (For more information, refer to the Quick Reference Guide).
3. Check cabling and all connections.
4. Disconnect the serial connection and determine if the controller is functioning properly without the display.

**Problem:** The display rate and serial-controlled rate do not match.

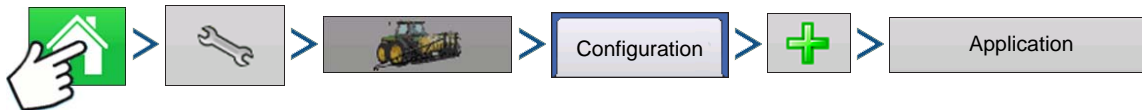
**Solution:**

1. Verify the current firmware is running on the display and Application Rate Module.
2. Check to make sure the nominal rate in the display matches the nominal rate in the serial-controlled console.

# STRIP TILL

DirectCommand for Strip-Till applicators monitors bin level and fan speed sensors, maintains an accurate application rate and supports multiple product prescription rate control for up to three granular products. The Strip Till module supports PWM and Motorized Servo valves as well as Linear Actuator Product Control. System can be configured for Strip Till fertilizer application or Air Seeder (Planting) control. To create an Air Seeder (Planting) configuration continue to [“Create Air Seeder Configuration” on page 205.](#)

## CREATE STRIP TILL FERTILIZER CONFIGURATION



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > Add (+) button > Application button

A wizard will guide you through the process of selecting or creating a vehicle, implement and controller.



### 1. Select Vehicle

Use drop-down menu to choose a vehicle, or press  to enter a new vehicle. Press  to continue.




**Note:** It is recommended that Vehicle Offset Information be entered before continuing with the configuration process.

### 2. Select Implement

Select an implement from the drop-down list menu, or press  to create a new implement. Press  to continue.

### 3. Select Implement Attachment Type

Use the drop-down list to select an implement attachment method. Press  to continue.



### 4. Select Application Type from the Implement Wizard:Application Channels screen

Press the Granular Application button.


### 5. Add Granular Functionality to the Implement

Press the Strip Till button to add Strip Till functionality to the implement.

### 6. Select Controller

Use the drop-down menu to select controller or press  to add a controller. Press  to continue.

### 7. Select Controller Device

Select DirectCommand from the Device drop-down menu. Select Granular Strip-Till Control from the Device Type drop-down menu. Press  to continue.

## 8. Enter Controller Name

Controller name defaults to DirectStrip Till. Press  to accept, or press  to enter a new name if desired. Press  to continue. Press  again to continue.



## 9. Container Setup (Equipment Setup Wizard: Container screen)

Press the desired channel button to enable or disable controller channel. A check mark will appear in the box when the container is ready to be configured.


## 10. Assign Container Name

Container name defaults to “Bin 1, 2, or 3”. Press  to enter a new name if desired.


## 11. Assign Container Capacity

Use  to enter the container capacity. Press  to accept.

## 12. Enter Container Units



Use the drop-down menu to select the container units. Once container has been configured press  to continue.

---

 **Note:** Follow steps 9-12 for each control channel.

---



## 13. Enter Full Swath Width

Full Swath width defaults to a value of 30 ft. Use  to enter the full swath width of the implement. Press  to continue.

## 14. Enter Application Point Offset




Use  to enter distance from hitch to application point (front to back). Press  to accept.

---

 **Note:** At this point additional functionality can be added to the implement. If no additional functionality is being added, press  to continue.

---

## 15. Hitch Point Configuration

Press the Implement Provides a Hitch Point button to enter Hitch Point information. Use  to enter Left or Right distance. Use drop-down menu to indicate distance to the left or right. Use  to enter Forward or Backward distance. Press  to continue.

## 16. Enter Implement Name



A suggested name for the implement appears. Press  to accept or press  to enter a name for the implement. Press  to continue.

## 17. Select Implement


Press  to continue.





**18. Select Second Implement**

Use drop-down menu to select Implement or press  to add second implement. If no second implement is desired, press  to continue.

**19. Select Speed Source**

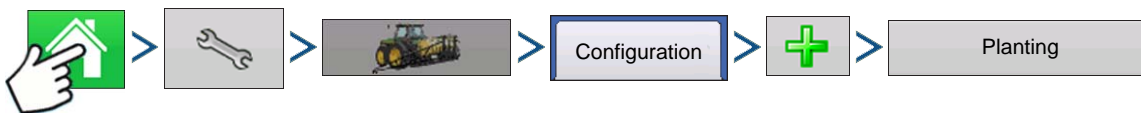
Use drop-down menu to select Primary Source, set Backup Source, and configure Auxiliary Channel. Press Calibrate Speed Sensor to launch the Speed Sensor Calibration Wizard. Press  to continue.

**20. Enter Configuration Name**

A suggested name for the configuration appears. If desired, press  to enter a different name for configuration. Press  when complete.

The completed configuration should now appear under the Application heading located on the Configuration tab of the Configuration Setup screen.

The Operating Configuration will now be able to be selected when starting a new Field Operation with the Field Operation Wizard.

**CREATE AIR SEEDER CONFIGURATION**

Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > Add (+) button > Planting button to create a new planting operation configuration, which may also include application equipment

A wizard will guide you through the process of selecting or creating a vehicle, implement and controller.



**1. Select Vehicle**

Use drop-down menu to choose a vehicle, or press  to enter a new vehicle. Press  to continue.



**Note:** It is recommended that Vehicle Offset Information be entered before continuing with the configuration process.



**2. Select Implement**

Select an implement from the drop-down list menu, or press  to create a new implement. Press  to continue.


**3. Select Planter/Seeder Type**

Use drop-down menu and select Air Seeder from the list. Press  to continue.

**4. Enter Implement Information**

Press  and enter implement Make and Model. Press  to continue.



## 5. Select Implement Attachment Type

Use the drop-down list to select an implement attachment method. Press  to continue.


## 6. Enter Distance Application Point Offset

Use  to enter distance from hitch to application point (Front to Back). Press  to continue.


## 7. Select Controller

Use the drop-down menu to select controller or press  to add a controller. Press  to continue.



## 8. Select Controller Device and Device Type

Select DirectCommand from the Device drop-down menu. Select Granular Strip-Till Control from the Device Type drop-down menu. Press  to continue.

## 9. Enter Controller Name

Controller name defaults to DirectStrip Till. Press  to accept, or press  to enter a new name if desired. Press  to continue.

## 10. Enter Full Swath Width

Full Swath width defaults to a value of 30 ft. Use  to enter the full swath width of the implement. Press  to continue.

## 11. Select Application Type from the Implement Wizard:Application Channels screen.

Press the Granular Application button.

## 12. Select Controller

Use the drop-down menu to select same controller as above. Press  to continue.

## 13. Container Setup (Equipment Setup Wizard: Container screen)

Press the desired channel button in order to enable or disable the controller channel. A check mark will appear in the box when the container is ready to be configured.





**Note:** Channel 1 is automatically assigned as a seeding channel and is intentionally hidden from view. Proceed with configuration of containers for channels 2 and 3.

---

## 14. Assign Container Name


Container name defaults to "Bin 2, or 3". Press  to enter a new name if desired.

## 15. Assign Container Capacity

Use  to enter the container capacity. Press  to accept.

**16. Enter Container Units**

Use the drop-down menu to select the container units. Once container has been configured press

 to continue.



**Note:** Follow steps 13-16 for each control channel.

**17. Enter Full Swath Width**


Full Swath width defaults to a value of 30 ft. Press  to enter the full swath width of the implement.

Press  to continue.

**18. Enter Application Point Offset**

Use  to enter distance from hitch to application point (front to back). Press  to accept.



**Note:** At this point additional functionality can be added to the implement. If no additional functionality is being added, press  to continue.

**19. Enter Implement Name**


A suggested name for the implement appears. Press  to accept or press  to enter a name for the implement. Press  to continue.

**20. Select Implement**



Press  to continue.

**21. Select Speed Source**

Use drop-down menu to select Primary Source, set Backup Source, and configure Auxiliary Channel.

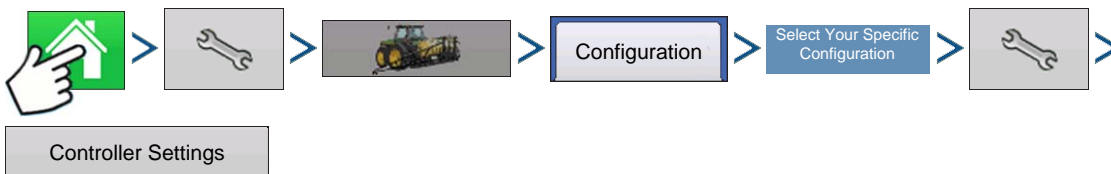
Press Calibrate Speed Sensor to launch the Speed Sensor Calibration Wizard. Press  to continue.

**22. Enter Configuration Name**

A suggested name for the configuration appears. If desired, press  to enter a different name for configuration. Press  when complete.

The complete configuration should now appear under the Planting heading located on the Configuration tab of the Configuration Setup screen.

The Operating Configuration will now be able to be selected when starting a new Field Operation with the Field Operation Wizard.

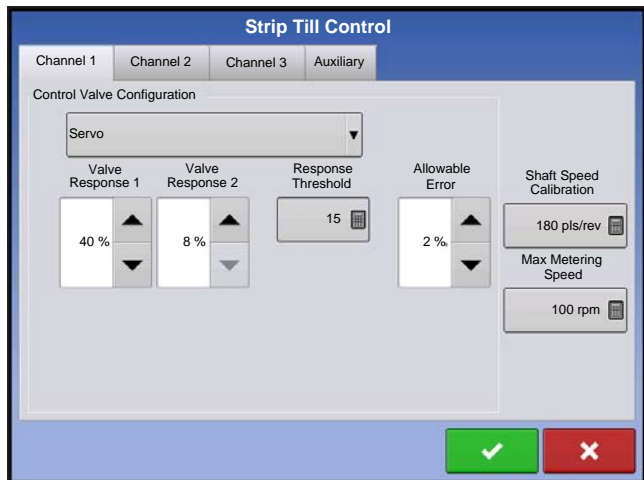
**CONTROLLER SETTINGS**

Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > select your specific configuration > Setup (wrench) button > Controller Settings button

Controller Settings screen appears, with each channel's settings shown on its own tab.

Controller settings viewed at the Strip Till Control window vary depending on Control Valve Configuration type selected including PWM Control Valve, a Servo Control Valve, or a Linear Actuator configuration. Use the Control Valve Configuration drop-down menu to choose the appropriate configuration for your machine. Control valve configuration settings are described in the following section. The Auxiliary Tab allows for adjusting fan settings described at *"Strip Till Control: Auxiliary Tab" on page 218*.

## Strip Till Control: Servo Control Valve



### • Valve Response 1

Determines the speed of the servo valve when product control error exceeds the Response Threshold setting. Represents the fast speed of the servo valve. Decreasing the value will cause the servo valve to run slower. The default setting is 40%.

### • Valve Response 2

Determines the speed of the servo valve when product control error is less than the Response Threshold setting. Represents the slow speed of the servo valve. Decreasing the value will cause the servo valve to run slower. The default setting is 8%.

### • Response Threshold

Determines where the control channel switches between using Valve Response 1 and Valve Response 2 speed setting. Leaving all other valve control settings at the default value and making a small adjustment to this setting is usually all that is required to fine tune system performance. The default setting is 15.

- Decreasing this value will have the overall effect of speeding up servo valve response.
- Increasing this value will have the overall effect of slowing servo valve response.

### • Allowable Error

Determines the percent of error that is allowed prior to the product control system making any flow rate changes. 2% - 3% is the normal dead band setting range.

- Too low of a setting value can cause the product control system to continually hunt for the target application rate.
- Too high of a setting will cause excessive product application error.

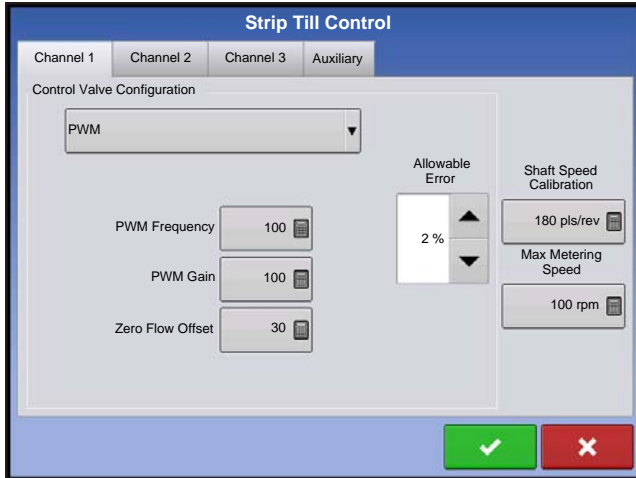
### • Shaft Speed Calibration

Calibration number representing the pulses that equal one revolution of the rate control metering system.

### • Max Metering Speed

Setting determines the maximum RPM of the metering shaft that controls product distribution to the application point. This setting is used when controlling a granular strip-till toolbar.

## Strip Till Control: PWM Control Valve



- **PWM Frequency**

The frequency that the PWM control valve is pulsed at. Settings can be found from the manufacturer of the valve. Typical settings range from 100-125 Hz. The default setting is 100.

- **PWM Gain**

Determines how aggressively the control valve responds when making rate changes. The higher the value the more aggressive the system response is. The default setting is 100.

- **Zero Flow Offset**

Represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from

the PWM valve. Using too high of a Zero RPM Offset value can cause the conveyor to not properly shut off. See the PWM valve manufacturer information for recommended settings. The default setting is 30.

- **Allowable Error**

Determines the percent of error that is allowed prior to the product control system making any flow rate changes. 2% - 3% is the normal dead band setting range.

- Too low of a setting value can cause the product control system to continually hunt for the target application rate.
- Too high of a setting will cause excessive product application error.

- **Shaft Speed Calibration**

Calibration number representing the pulses that equal one revolution of the rate control metering system.

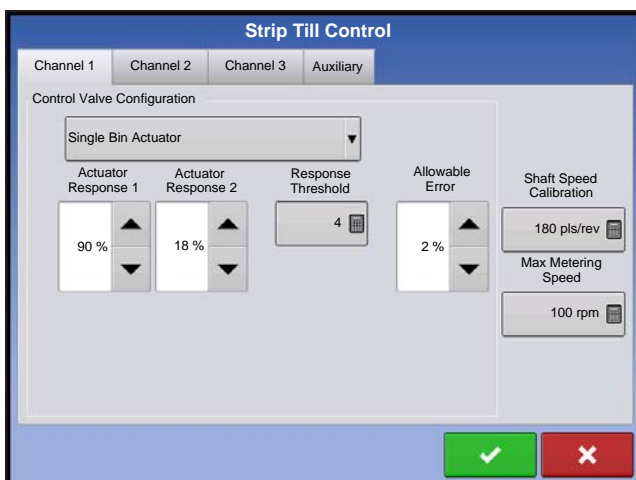
- **Max Metering Speed**

Setting determines the maximum RPM of the metering shaft that controls product distribution to the application point. This setting is used when controlling a granular strip-till toolbar.

## Linear Actuator/Clutch Settings



**Note:** When using Linear Actuator Control, the system requires the Control Valve Configuration on all three channels to be set the same.

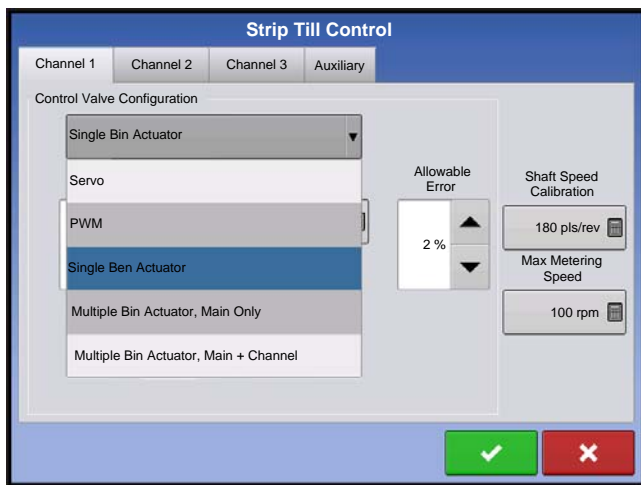


- **Actuator Response 1**

Determines the speed of the actuator when product control error exceeds the Response Threshold setting. Represents the fast speed of the actuator. Decreasing the value will cause the actuator to run slower. The default setting is 90%.

- **Actuator Response 2**

Determines the speed of the actuator when product control error is less than the Response Threshold setting. Represents the slow speed of the actuator. Decreasing the value will cause the actuator to run slower. The default setting is 18%.



### • Response Threshold

Determines where the control channel switches between using Actuator Response 1 and Actuator Response 2 speed settings. Leaving all other actuator control settings at the default value and making a small adjustment to this setting is usually all that is required to fine-tune system performance. The default setting is 4.

- Decreasing this value will have the overall effect of speeding up actuator response.
- Increasing this value will have the overall effect of slowing actuator response.

### • Allowable Error

Determines the percent of error that is allowed prior to the product control system making any flow rate changes. 2% - 3% is the normal dead band setting range.

- Too low of a setting value can cause the product control system to continually hunt for the target application rate.
- Too high of a setting will cause excessive product application error.

### • Shaft Speed Cal

Calibration number representing the pulses that equal one revolution of the rate control metering system.

### • Max Conveyor Speed

Setting determines the maximum RPM of the conveyor that controls product distribution to the application point.

### • Actuator/Clutch Configuration


Selecting one of the three available actuator/clutch settings: [Single Bin Actuator], [Multiple Bin Actuator, Main Only], [Multiple Bin Actuator, Main + Channel] from the Control Valve Configuration drop-down menu (above) determines specific behavior of the actuators/clutches on zero rate.

## Actuator/Clutch Logic

Determines Actuator/Clutch Behavior on Zero Rate



Control Valve Configuration	Control Component State	
	Control Channel RPM Commanded to Zero Other than by Master Switch Off	Master Switch Off
Single Bin Actuator	Main Clutch Output = Off Channel Clutch Output = Off Linear Actuator = Hold	Main Clutch Output = Off Channel Clutch Output = Off Linear Actuator = Hold
Multiple Bin Actuator, Main Only	Main Clutch Output = On Channel Clutch Output = Off Linear Actuator = Close	Main Clutch Output = Off Channel Clutch Output = Off Linear Actuator = Hold
Multiple Bin Actuator, Main + Channel	Main Clutch Output = On Channel Clutch Output = Off Linear Actuator = Hold	Main Clutch Output = Off Channel Clutch Output = Off Linear Actuator = Hold

## Fertilizer Blend Setup

Dry fertilizer blends are set up by using the on-screen Dry Fertilizer Blend wizard described in the following steps. A dry blend can contain up to seven individual components. To create a Dry Fertilizer Blend, go to the Setup Product Tab, and press .




At the Choose Product Type screen, press the Mix/Blend button. The Product Mix Setup Wizard appears.

1. Use the drop-down menu to select Dry Blend.
2. Press  to continue.
3. Enter a Base Amount of product and the controlling Units for the dry product blend.
4. Press  to continue.



**Note:** The Base Amount is the total weight of product for the fertilizer blend. The Base Amount does not need to match the actual volume of product that will be applied, but is used only to establish the ratio of all products to the total volume.


5. Press  to start the process of adding components to the fertilizer blend.




**Note:** Any liquid herbicides set up within the system can be added to create an impregnated blend product.


6. Select the desired component from the list box. New components can be set up at this time if required.

7. Enter the amount of the first component.

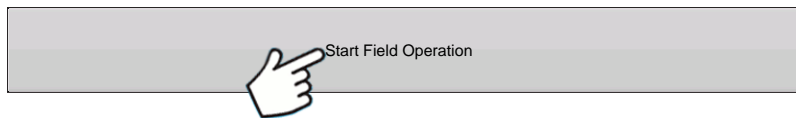
8. Press  to start adding an additional component. (A dry mix can contain up to seven individual components.)

9. The remaining Base Amount that is available after adding product components is shown at the bottom of the on-screen list box.

10. Enter Manufacturer name if applicable. Press  to enter a unique name for the blend.

11. Press  to complete the process of setting up the dry blend. The new Dry Blend now appears in the Product List.

## LOAD CONFIGURATION



Press: Start Field Operation button

Select a Season, Grower, Farm and Field at the Start Field Operation portion of the Home screen.

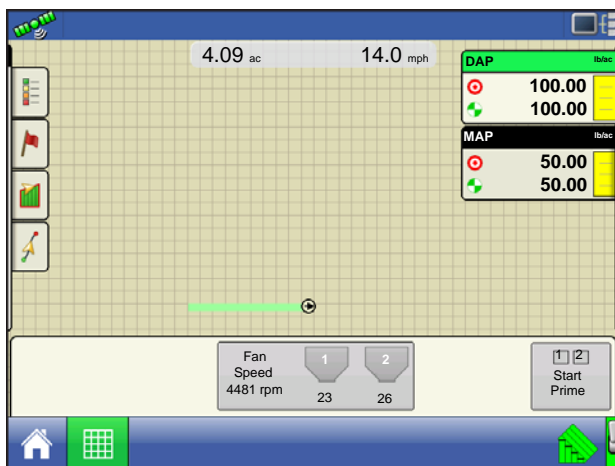
For more information, see [“Setup Field Operation” on page 33.](#)

## RUN CONFIGURATION



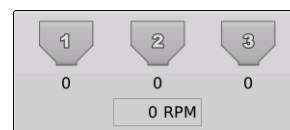
Once a configuration has been completed, the Map View button appears at the bottom of the Home screen. Press the Map View button to see the Map screen. The map below is displayed in Zoom to Detail view.

### Meter Prime



Meter Prime is for Hydraulic Drives ONLY.

Press the **Strip Till Control button (A)**.



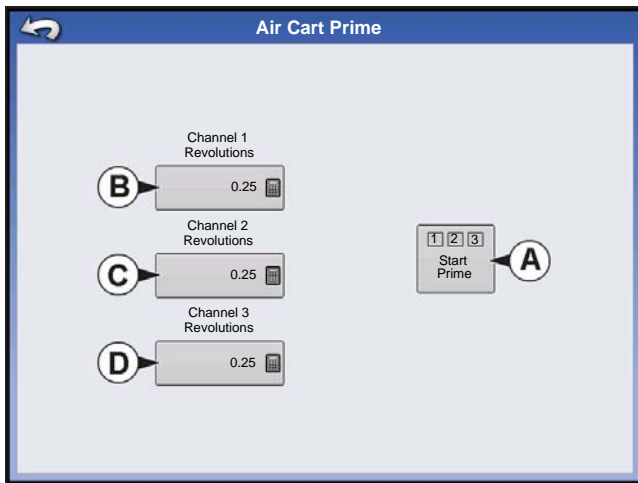
Strip Till Control button






The Strip Till Control screen appears.

Press the **Prime** button to access the **Air Cart Prime** screen.

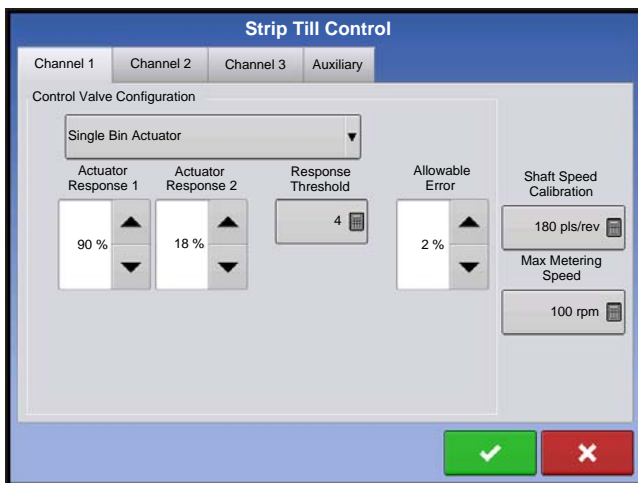


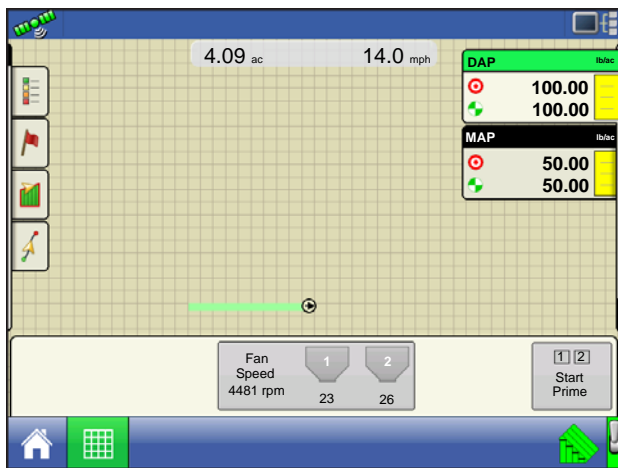
The **Air Cart Prime** screen appears with input buttons for each channel used. The setting determines the revolutions necessary to prime the meter shaft. Settings are independent by channel, and can be entered using .

- (A) Start Prime
- (B) Channel 1 Revolutions
- (C) Channel 2 Revolutions
- (D) Channel 3 Revolutions



**Note:** Meter Prime routine is not available and remains hidden for ground driven metering configurations.





The **Start Prime button (A)** begins the meter prime routine and each meter shaft will rotate the number of revolutions as defined on the Air Cart Prime Screen.

## RUN TIME OPERATIONS



During Run Time Operations, Strip Till operators can press the Strip Till Control button to open the Strip Till Control screen. At this screen, you can adjust Product Density, Conveyor Rate and other settings.

- Each of these settings described below must be set for each individual Product Channel (bin).
- The **Product Density**, and the **Conveyor 1 Rate** are all stored with each combination of product and control channel.

## STRIP-TILL (THREE-BIN CONFIGURATION)

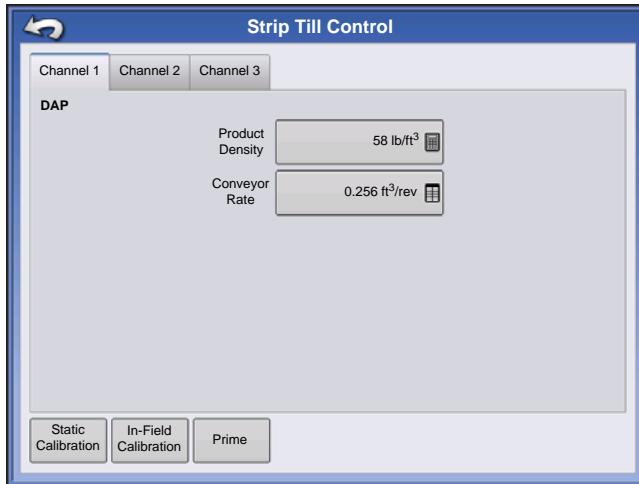
### • Strip Till Control button

Displays the status of the product control channel. The Meter Shaft Speed (in RPM) is shown underneath the bin icon; the Fan Speed (also in RPM) is shown at bottom. When the fertilizer bin is grey no product application is taking place. When product is being applied, the fertilizer bin icon changes color to green. Press the Strip-Till Control button to display the Strip-Till Control screen and settings. These settings include Product Density and Conveyor 1 Rate. For more information, see section beginning at [“Strip Till Control Screen” on page 215.](#)


### • Metering Indicator

The Metering Indicator is shown at the bottom of the Product Control Toolbox when the Map screen is shown in Zoom to Extent. When the Map screen is shown in the Zoom Details view or Perspective View, the metering indicator is shown as a bar that appears behind the vehicle icon.

## Strip Till Control Screen



- **Product Density**

This density value (shown in pounds per cubic foot, or lb./ft.3), is stored with each product. Press  to edit value.



**Note:** For proper machine performance and accuracy. Product Density should be measured for every application load.

- **Conveyor 1 Rate**

This setting represents the volume of product dispensed by one revolution of the conveyor drive shaft (cubic foot per revolution, or ft.3 /rev.) This number is shown with the assumption that the conveyor shaft has a 1-inch gate opening.



**CAUTION:** You must either manually enter conveyor rate value or perform a CFR calibration routine for each product and channel combination, otherwise misapplication will occur.

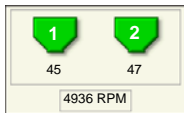
- **Static Calibration**

Press the **Static Calibration** button to perform an automated routine to calibrate each metering circuit. This calibration is performed before applying in field conditions. For more information, see [“Static CFR Calibration Procedure” on page 215.](#)

- **In-Field Calibration**


Press the **In-Field Calibration** button to perform an automated routine to adjust the calibration number for the selected metering circuit. This calibration is performed if there is a difference between the amount of product logged as compared to what was actually applied. For more information, see [“In-Field Calibration Procedure \(Strip Till\)” on page 217.](#)

## Static CFR Calibration Procedure




The Static CFR Calibration Procedure performs an automated routine to calibrate each metering circuit. This calibration is performed before applying in field conditions. To perform the Static CFR Calibration, press the Strip Till Control button to open the Strip Till Control screen. At the Strip Till Control screen, the Static Calibration button.



1. **Read Static Calibration warning**

A warning appears, advising to disable the blower fan circuit and prepare to catch any product dispensed in an appropriate container. Press  to continue.


2. **Select Metering Circuit to Calibrate**

The CFR Calibration Wizard appears. Use the drop-down menu to choose the desired channel to calibrate. Press  to continue.

### 3. Enter Dispense Amount


Press  to enter the amount of product to be dispensed into the container, and press  to continue.

### 4. Enter Simulated Target Rate

Press  to enter a simulated target rate, shown in pounds per acres. Press  to continue.



### 5. Start Target Rate Countdown

Press the Start button to begin the target rate countdown. As the countdown is started, the button will turn red and state Stop. When the countdown is complete, press  to continue.

### 6. Enter Actual Dispense Amount



Enter the actual dispense amount, in pounds.



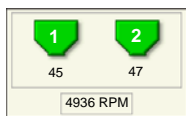
**Note:** The CFR will be calculated from the actual product amount dispensed.

### 7. Calibration Complete

A message appears, stating that your calibration is complete, and showing the CFR amount, in cubic feet per revolution. Either:


- Press  to exit the calibration without saving the value.
- Press **Repeat Calibration** to begin the process again.
- Press  to save the value and exit the calibration routine.

## Static CFR Calibration Procedure for Ground Drive Systems



The Static CFR Calibration Procedure performs an automated routine to calibrate each metering circuit. This calibration is performed before applying in field conditions. To perform the Static CFR Calibration, press the Strip Till Control button to open the Strip Till Control screen. At the Strip Till Control screen, the Static Calibration button.

### 1. Read Static Calibration warning

A warning appears, advising to disable the blower fan circuit and prepare to catch any product dispensed in an appropriate container. Press  to continue.

### 2. Select Metering Circuit to Calibrate

The CFR Calibration Wizard appears. Use the drop-down menu to choose the desired channel to calibrate.

Press  to continue.



### 3. Start Target Rate Countdown

Press the Start button and turn drive shaft. The system counts revolutions of the shaft encoder.

Press Stop button in display.

Press  to continue.

### 4. Enter Actual Dispense Amount



Enter the actual dispense amount, in pounds.



**Note:** The CFR will be calculated from the actual product amount dispensed.

### 5. Calibration Complete

A message appears, stating that your calibration is complete, and showing the CFR amount, in cubic feet per revolution. Either:

- Press  to exit the calibration without saving the value.
- Press **Repeat Calibration** to begin the process again.
- Press  to save the value and exit the calibration routine.



### In-Field Calibration Procedure (Strip Till)

The In-Field CFR Calibration procedure performs an automated routine to adjust the calibration number for the selected metering circuit. This calibration is performed if there is a difference between the amount of product logged as compared to what was actually applied. To do an In-Field Calibration procedure, press the In-Field Calibration button on the Strip-Till Control screen, and the In-Field CFR Calibration Wizard appears.


#### 1. Select Metering Circuit to Calibrate

Use the drop-down menu to select the channel to calibrate, and press  to continue.

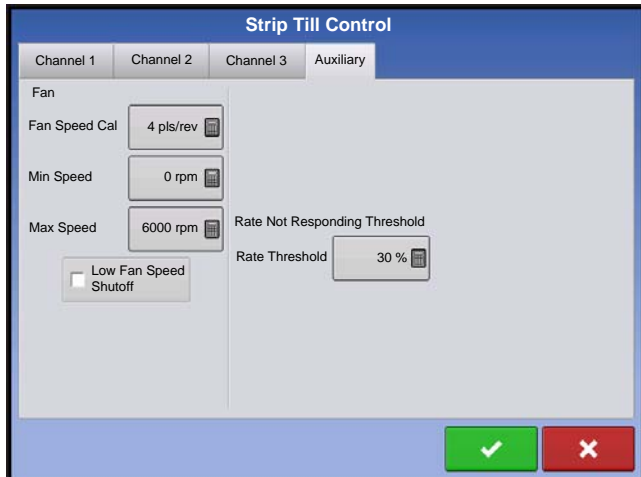
#### 2. Enter Actual Weight

The Accumulated Weight is shown in the top portion of the screen. Press  to enter the Actual Weight, and press  to continue.

#### 3. Calibration Complete

A message appears, stating that your calibration is complete, and showing the CFR amount, in cubic feet per revolution. Press  to finish the calibration.

## Strip Till Control: Auxiliary Tab



### • Fan Speed Cal

Number of pulses that are generated by the sensor during one revolution of the blower fan shaft.

### • Min Speed

Setting represents the desired minimum speed of the blower fan. An alarm will sound if the blower fan speed falls below this value.

### • Max Speed

Setting represents the desired maximum speed of the blower fan. An alarm will sound if the blower fan speed exceeds this value.

### • Rate Threshold

Percentage difference between the Actual Rate and the Target Rate when the Rate Not Responding Message is displayed on the Run screen.

### • Low Fan Speed Shutoff

When selected, granular product application of a strip-till toolbar will be shut off if fan speed drops below the Min Speed setting.

## TROUBLESHOOTING DIRECTCOMMAND GRANULAR APPLICATIONS

**Problem:** Run screen Granular channel(s) green light spreader indicator will not turn on

**Solution:**

1. Make sure ground speed is registered a value greater than zero on the display.
2. Verify a target rate greater than zero is entered into the display.
3. Check the switch status found on the Run screen under System and Input Diagnostics. As the master switch is turned on and off, the Input Diagnostics window should change from black to green (if they do not, then refer to the installation instructions to verify switch connections).
4. Check high current connection into the Granular Control Module.

**Problem:** Master switch will not turn on when the foot pedal is on.

**Solution:** Make sure the Master Switch Input is set to "External 2" under the Auxiliary Input Settings.

**Problem:** AutoSwath turns on the booms too fast or too slow.

**Solution:** Check GPS offsets in the vehicle setup to verify all of the measurements are correct.

**Problem:** AutoSwath feature is not shown

**Solution:** The display must have the AutoSwath feature password-unlocked before the feature is available to the operator.

**Problem:** AutoSwath is checked on, but the spreader will not turn on.

1. Make sure the ground speed is registering a value greater than zero on the display.
2. Make sure the applicator is inside of the field boundary.

**Problem:** Conveyor turns off in the middle of the pass

**Solution:** Check the display firmware and module firmware to see if they are running the latest version.

**Problem:** Total Applied does not match Actual Weight Applied

**Solution:**

1. Make sure the shaft speed pls/rev are set correctly in the controller settings.
2. Make sure the controlling product is set to the correct units.

**Problem:** Rate not responding

**Solution:**

1. Make sure there is a ground speed registering on the display.
2. Make sure the shaft speed pls/rev are set correctly in the controller settings.  
(You must make sure to account for sprocket ratios if chain driven)

$$\frac{\text{Driven Teeth}}{\text{Drive Teeth}} \times \text{Rate Sensor Pulses} = \text{True Pulses}$$

3. Check the user-defined value found under the controller settings for Strip-Till.
4. The CFR number may need to be adjusted.

## TROUBLESHOOTING SERIAL CONTROL APPLICATIONS

**Problem:** Rate changes on the display, but not on the controlled console.

**Solution:**

1. Verify the current firmware is running on the display and Application Rate module.
2. Check the settings specific to your controlled console. (For more information, refer to the Quick Reference Guide).
3. Check cabling and all connections.
4. Disconnect the serial connection and determine if the controller is functioning properly without the display.

**Problem:** The display rate and serial-controlled rate do not match

**Solution:**

1. Verify the current firmware is running on the display and Application Rate Module.
2. Check to make sure the nominal rate in the display matches the nominal rate in the serial-controlled console.

## FERTILIZER DEFAULT PRODUCT SETTINGS

Material	Type	Abbreviated name for display and predefined name for SMS	Percentage (in terms of lbs.100 lbs.)			Density
			N	P (P <sub>2</sub> O <sub>5</sub> )	K (K <sub>2</sub> O)	
Ammonium nitrate	Dry	Ammonium nitrate	34	0	0	N/A
Ammonium phosphate	Dry	Ammonium phosphate	10	34	0	N/A
DAP	Dry	DAP	18	46	0	N/A
MAP	Dry	MAP	11	52	0	N/A
Ammonium sulfate	Dry	Ammonium sulfate	21	0	0	N/A
Urea	Dry	Urea	46	0	0	N/A
Potash	Dry	Potash	0	0	60	N/A
Triple superphosphate	Dry	Triple superphosphate	0	46	0	N/A
Ordinary superphosphate	Dry	Superphosphate	0	20	0	N/A
Potassium nitrate	Dry	Potassium nitrate	13	0	44	N/A



# HARVEST MONITORING/MAPPING

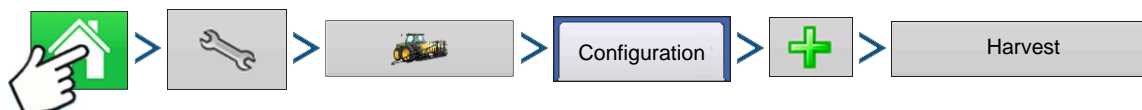
## DISPLAY PREPARATION

- Create a backup of your spring information. Go to the Setup/Display menu to create a backup. Select Copy All Files to save the spring data to the USB Flash Drive.
- Make sure your display firmware and all connected modules are up to date.
- If you have purchased a new combine or new heads, create new configurations for any setup that is different from last fall. Remove all old configurations.

## VEHICLE INSPECTION

- Check to make sure all cables are properly attached and in good condition.
- Remove flow sensor and inspect for damage.
- Check the elevator deflector and impact plate for wear. Verify you have the proper clearance at the top of the clean grain elevator. Clearance should be between 3/8" and 5/8" (0.95 cm to 1.59 cm).

## CREATE CONFIGURATION



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > Add (+) button > Harvest button

A wizard will guide you through the process of selecting or creating a configuration that includes Combine, Header and Crops settings.

Your Operating Configuration will then be viewable when you start a new Field Operation with the Field Operation Wizard. For more information on Field Operation Configurations, see [“Setup Field Operation” on page 33](#).



**Note:** You can also use the **Manage Equipment** button to create or edit specific vehicles and implements.

## CONFIGURATION SETUP

### Calibration Sequence

Perform Harvest Calibrations in the following order:

#### 1. Distance (Speed Sensor) Calibration

This calibrates the Ground Speed Sensor connected to the display. (calibrate a backup sensor even when using GPS speed as the primary speed sensor). For more information, see [“Calibrate Distance” on page 56](#).

#### 2. Calibrate Header Sensor

This sets the height when the display stops recording area as the header is raised at the end of the pass. Stop height calibration is required for each grain type.

### 3. Input Header Offset

For combines with offset headers, this compensates for the distance between the center of the vehicle, and the center of the header's swath.

### 4. Perform a Vibration Calibration

The vibration calibration is used to compensate for the amount of force that is measured by the flow sensor with no grain flow. For more information, see [“Vibration Calibration” on page 223.](#)

### 5. Calibrate Temperature

This sets the temperature offset to provide a correct moisture reading. For more information, see [“Temperature Calibration” on page 224.](#)

### 6. Calibrate Moisture

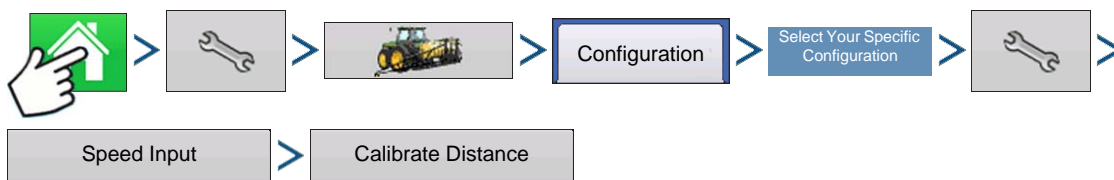
This sets the moisture offset to help provide accurate moisture and yield readings. For more information, see [“Moisture Calibration” on page 224.](#)

### 7. Calibrate Grain Weight

A correct Grain Weight Calibration provides accurate readings across all grain flow ranges. Calibration is required each year and for each grain type. For more information, see [“Grain Weight Calibration” on page 225.](#)

## CALIBRATE DISTANCE


If you are not using GPS for ground speed, then after you have created a configuration you must calibrate the ground speed input for accurate speed and area calculations. If you are using GPS, it is recommended to calibrate distance in the event of GPS loss. Use the following procedure to calibrate distance:



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Speed Input button > Calibrate Distance

Follow the instructions shown on the screen.

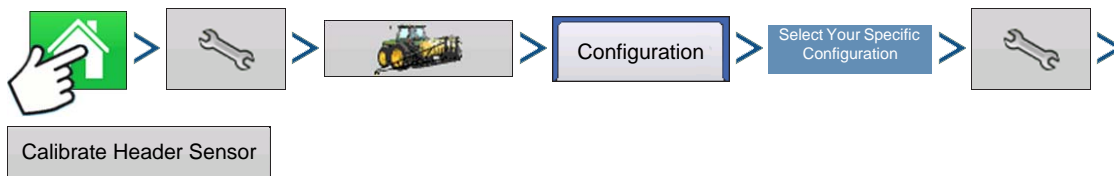
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 **Note:** Calibration settings can be manually adjusted if desired by pressing button above **Pulses/100 ft** and making small changes to the setting.

---

## Calibrate Header Sensor

Prior to logging harvest data, you must calibrate the header sensor. Crops must be set up within the system to proceed with the calibration routine.



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Calibrate Header Sensor button

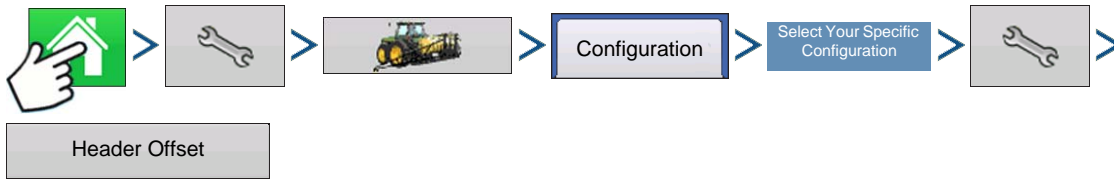
Follow the instructions shown on the screen.



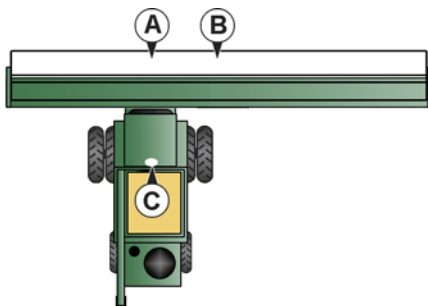
**CAUTION:** If **Reset All** is pressed the sensor will have to be calibrated for all headers!

## Input Header Offset

If the header of your vehicle is mounted offset to the vehicle's center, this can affect the accuracy of the GPS data you are receiving. By entering a Header Offset, you can compensate for the distance between the center of the vehicle, and the center of the header's swath.



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Header Offset button



### 1. Measure distance

First, measure the distance between the GPS antenna (2) and the center of the header's swath (1).

- (A) Center of Vehicle
- (B) Center of Swath
- (C) GPS Antenna

### 2. Enter the distance amount

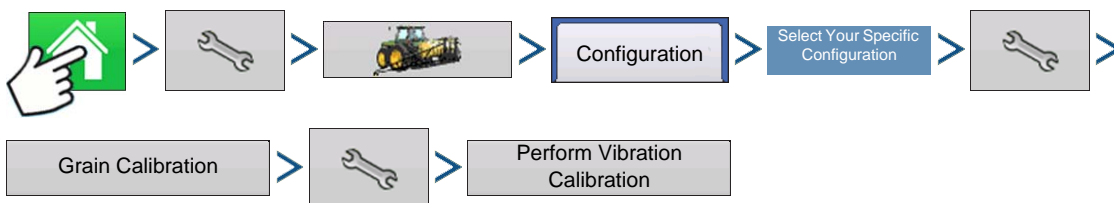
The Header Offset screen appears. Enter the distance amount by using .

Select to the left or to the right from drop-down menu.

Press  when finished.

## VIBRATION CALIBRATION

The vibration calibration must be performed with the correct head on the combine, and repeated for each crop harvested.



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Grain Calibration button > Setup (wrench) button > Perform Vibration Calibration button



**Note:** This is prompted at the Home screen the first time a crop time is harvested.

## 1. Run Separator

Start the separator and feeder house with the proper header attached. Run at full speed.




**CAUTION:** Do not harvest a crop during the Vibration Calibration process.

## 2. Press Start

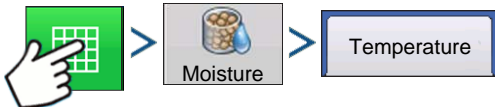
With the combine separator running at full operating speed with the header engaged, press the Start button. The display counts down 60 seconds.

## 3. Calibration Number Displayed

When the vibration calibration is complete, a message appears underneath the Start button stating “Calibration Complete.” Next to this, the vibration calibration number is displayed. Press  to return to the Calibration Tab. You may now turn off the separator

# TEMPERATURE CALIBRATION

A Temperature Calibration only needs to be performed once per season. Changing this calibration will affect harvested data collected after the calibration.



Press: Map button > Moisture button > Temperature tab



**CAUTION:** Only calibrate the temperature before harvesting begins.



## 1. Place Combine in Shady Spot


Leave the combine parked in a shaded area or a shed for a few hours. The temperature calibration should not be performed if the sensor has been in direct sunlight or is sitting next to grain.

## 2. Take Air Temperature Reading

Take an accurate air temperature reading using a thermometer in the same shaded area.

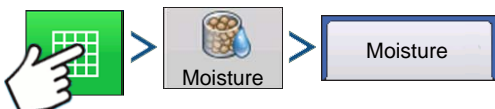
## 3. Enter Outside Air Temperature.

Use  /  to enter the known outside air temperature. Make the proper adjustments until the Calibrated Temperature shown at the top of this screen reflects the correct air temperature.

When finished, press .

# MOISTURE CALIBRATION

A moisture calibration only needs to be done once per crop, per season. Changing this calibration will affect harvested data collected after the calibration.




Press: Map button > Moisture button > Temperature tab

### 1. Measure Moisture on Grain Samples

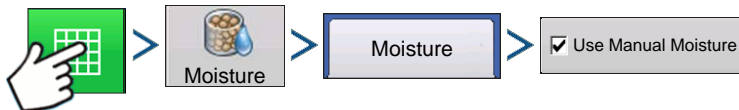
Randomly sample grain harvested into an active region, then measure moisture using an accurate moisture tester.

### 2. Adjust Moisture

On the Moisture Calibration screen, use  /  to adjust the moisture so that it matches the known moisture of the sample.




When finished, press .

### Manual Moisture Setting




Press: Map button > Moisture button > Moisture tab > Use Manual Moisture check box

If you wish to adjust moisture settings for a specific region, you can use the **Use Manual Moisture** setting. Unlike the Moisture Calibration, which affects all previously-harvested data, a Manual Moisture setting only affects data within a specified Region.

1. Check the **Use Manual Moisture** check box.
2. Use  /  to adjust the moisture to the desired value.
3. When finished, press .

## GRAIN WEIGHT CALIBRATION

Before the display can accurately measure harvested bushels, you must calibrate the display by entering in actual load weights into the display for each grain type. You must obtain these actual load weights by weighing the grain from a load on accurate scales. To obtain accurate results, you must obtain between four and six calibration loads. You can complete a weight calibration at any time during the season; however it is recommended that you calibrate grain weight at the beginning of the season.

 **Note:** Start the calibration procedure with the combine stopped, the combine grain tank empty, and a hauling vehicle empty.

### 1. Start New Load



Press: Map button > Weight button > New Load button

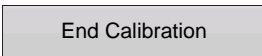
### 2. Calibration Load warning

Read warning, press  when finished.

### 3. Harvest Calibration Load

Harvest a load - ideal load weights are between 3,000 and 6,000 pounds (1,361 to 2,721 kilograms).


### 4. End Load

Press: 

## 5. Calibration Load warning

Read warning, press  when finished.


## 6. Name Load

Display will give load a default name of time and date. Use  to change the load name.

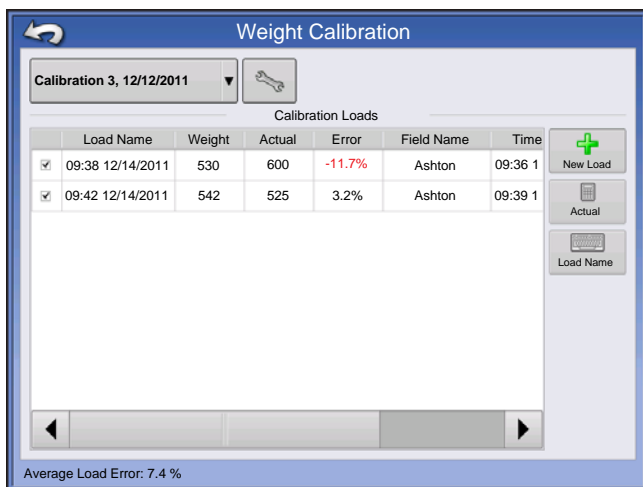
## 7. Empty Grain and Weigh Load




Empty the grain tank completely onto a truck or wagon, and weigh it with an accurate scale. Record each individual load weight to be entered into the display. (No grain from any other combine should be unloaded into this hauling vehicle).

## 8. Weigh and Record Load Weight

Weigh the grain on the hauling vehicle and record the actual load weight by pressing  on the Weight Calibration screen.

- If you are using a weigh wagon to weigh the grain, make sure the wagon has been calibrated properly.
- Only use one scale during this calibration process.
- Use the same vehicle for all calibration loads.
- Do not use a semi truck, as this vehicle's capacity is too large for a calibration load.



	Load Name	Weight	Actual	Error	Field Name	Time	
<input checked="" type="checkbox"/>	09:38 12/14/2011	530	600	-11.7%	Ashton	09:36 1	
<input checked="" type="checkbox"/>	09:42 12/14/2011	542	525	3.2%	Ashton	09:39 1	
							

Average Load Error: 7.4 %

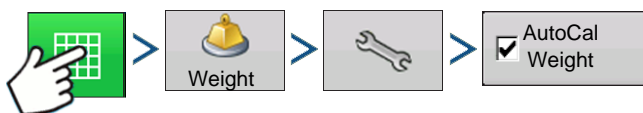
## 9. Uncheck Loads With Excessive Error Percentages

At the Grain Calibration screen, take note of any calibration loads that have excessive error percentages. In the example at left, a load has an error percentage of 11.7 percent.

You should be able to calibrate the display for grain weight to an average error of 1% to 3%. If the average error is more than 3%, uncheck the load with the maximum error.

Any load that is checked is automatically included in the calibration.

## TURN ON/OFF AUTO CALIBRATION



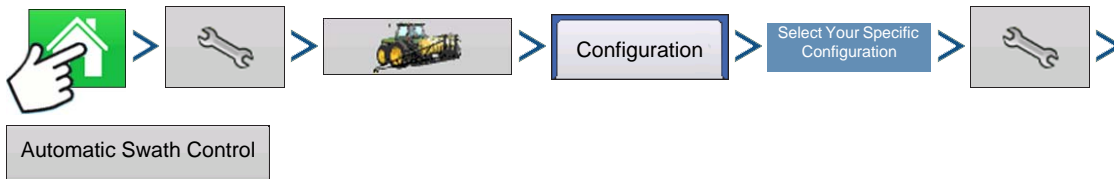
Press: Map button > Weight button > Setup (wrench) button > AutoCal Weight check box

The display defaults to AutoCal Weigh checked. AutoCal Weigh can be turned off by unchecking the check box.

## AUTOSWATH SENSITIVITY SETTINGS

AutoSwath adjusts the swath width when crossing field boundaries and already-harvested areas. The display changes the swath width being harvested, even though no mechanical change takes place. AutoSwath is useful when harvesting point rows or where harvesting a full head width is not possible.

When performing a Harvest operation, the AutoSwath feature includes sensitivity levels, which compensate for varying levels of GPS accuracy.



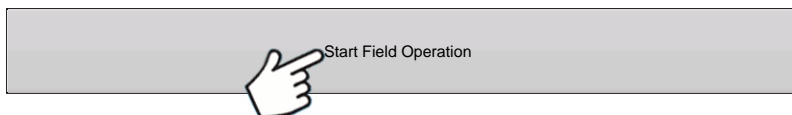
Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Automatic Swath Control button

The Automatic Swath Control screen appears.

If swath adjustments are performing inaccurately, adjust the sensitivity accordingly. Sensitivity 3 is the default setting. Other settings include:

- **Sensitivity 5**  
Use with RTK or DGPS sub-meter, terrain compensated GPS.
- **Sensitivity 4**  
Use with RTK or DGPS sub-meter GPS. Terrain compensation recommended.
- **Sensitivity 3**  
Use with sub-meter accurate GPS.
- **Sensitivity 2**  
Use with 1+ meter accurate GPS.
- **Sensitivity 1**  
Swath sections are all on or all off. Use with 1+ meter accurate GPS.

## LOAD CONFIGURATION



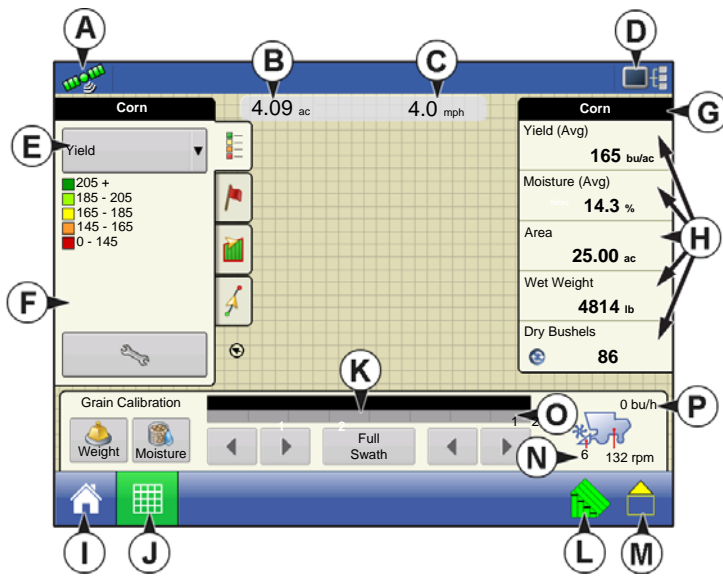
Press: Start Field Operation button  
Select a Season, Grower, Farm and Field at the Start Field Operation portion of the Home screen.

For more information, see [“Setup Field Operation” on page 33.](#)

## RUN CONFIGURATION



Once a configuration has been completed, the Map View button appears at the bottom of the Home screen. Press the Map View button to see the Map screen.



- (A) GPS Status
- (B) Total Field Area
- (C) Ground Speed
- (D) Diagnostics button
- (E) Map Legend (varieties)
- (F) Legend Select
- (G) Crop
- (H) Status Items
- (I) Home button
- (J) Map View button
- (K) Swath Width
- (L) AutoSwath

- (M) Logging Status button
- (N) Header Height %
- (O) Swath Width
- (P) Bushels Per Hour
- (Q) Elevator Speed



**Note:** Pressing the Map View button will cycle between the available Map screen views, and the appearance of the Map View button changes.

## HARVEST STATUS ITEMS

Corn	
Yield	145.6 bu/ac
Moisture	16.5 %
Area	12.28 ac
Wet Weight	274089 lb
Wet Bushels	4894 bu

- **Yield**

Displays the instantaneous yield while there is grain flow and the average yield when grain flow is not present.

- **Moisture**

Displays the instantaneous moisture when there is grain flow and the average when there is no grain flow.

- **Area**

Shows the area harvested for the current region.

- **Wet Weight**

Shows the actual weight that has been harvested for the region.

- **Wet Bushels**

Shows the actual bushels that have been harvested for the current region.

- **Dry Bushels**

Displays the actual number of bushels at the specified dry moisture percentage.

- If the actual moisture is below the set dry moisture percentage and "Expand Bushels for All Grains Below Dry %" is not checked, it will show actual bushels.



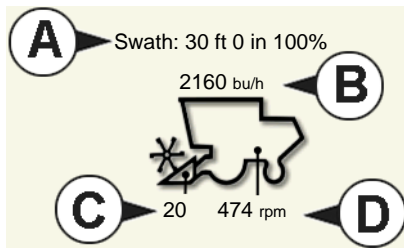
- If the actual moisture is below the set dry moisture percentage and "Expand Bushels for All Grains Below Dry %" is checked, it will display bushels as if the moisture of the grain is at the specified dry percentage.



**Note:** The *Wet Bushels* and *Dry Bushels* Status Items do not appear if you are using metric system measurements.

## HARVEST DIAGNOSTIC BUTTON ON MAP SCREEN

The Harvest Diagnostic button appears at the bottom right-hand portion of the Harvest Map screen. Pressing this button summons the Harvest Diagnostic screen; for more information see *"Grain Harvest Diagnostics"* on page 230. Other data that appears by the Harvest Diagnostic button is described below.



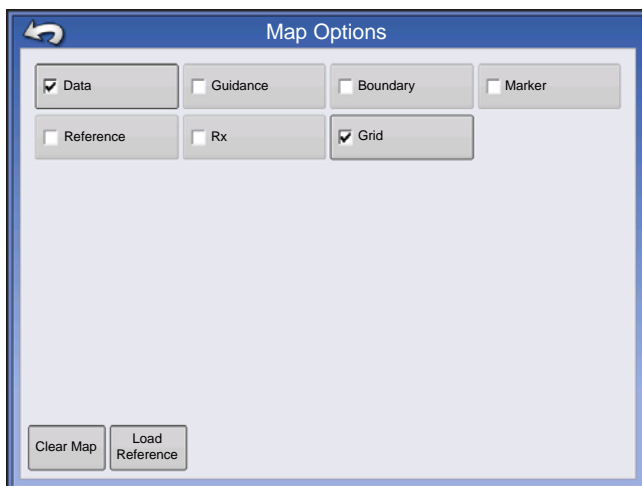
- **(A) Swath Width**  
Displays current swath width that is being harvested.
- **(B) Bushels Per Hour**  
Displays the bushels harvested per hour (bu/hr).
- **(C) Header Height**  
Displays percentage of header height.

- **(D) Elevator Speed**  
Shown in Revolutions Per Minute (RPM).

## MAP OPTIONS



Press: Map button > Legend tab > Setup (wrench) button

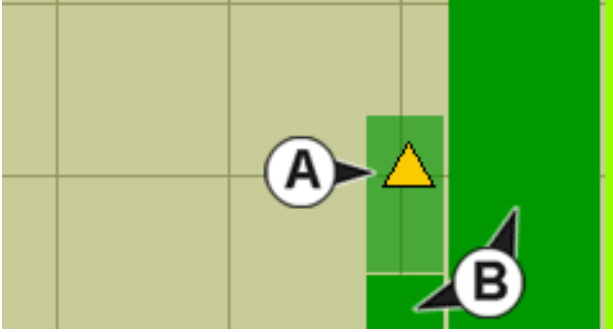


During Harvest operations, the Map screen displays two types of items in the Legend: Yield and Moisture.

The Legend Setup button on the Map Legend Tab of the Mapping Toolbox opens the Map Options screen.

- Press Data, Guidance, Boundary, Marker, Reference, Rx and Grid to show or remove those items on the Map screen.
- Press Clear Map to permanently remove all map data from the active field operation
- Press Load Reference to load a map from a previous operation performed in that field to view as a background map.

## MAP SCREEN: FLOW DELAY



When the Map screen is running in a Zoom Detail view, **instantaneous coverage (A)** is shown automatically. However, there is a time lag between when grain enters the combine through the Header and is logged by the Flow Sensor in the Clean Grain Elevator. Because of this time lag, the instantaneous coverage is shown on the Map screen as a lighter color than **coverage that has been logged (B)** by the display.

## GRAIN HARVEST DIAGNOSTICS



When performing a Harvest operation, you can also access the Harvest Diagnostic screen by pressing the Display Information button. Technical support may request that you look at this screen for help in diagnosing a problem. When the Devices screen opens, press and highlight the Moisture Module listing in the CAN Device list, then press the Diagnostics button. The Grain Harvest Diagnostics screen appears.

Grain Harvest Diagnostics			
Region Distance		18257 ft	
Flow Rate	5.12	Moisture Raw	3.21
Flow Max	216	Temperature	-3.8
Flow Mn	172	Temperature Raw	2.69
Flow Offset	350	Proximity Status	ON
Sensor Force	9.95	Relay Status	ON
Header Raw	296	Motor Current	0.9
Speed Pulse	103		

The Grain Harvest Diagnostics screen includes the following information:

- **Flow Rate**

Grain flow rate, shown in kilograms per second.

- **Flow Max, Flow Min and Flow Offset**

Raw flow values used for diagnostic purposes.

- **Sensor Force**

Force of grain flow, shown in Newtons.

- **Header Raw**

Raw value of header sensor.

- **Speed Pulses**

Shows the number of ground speed pulses from the combine.

- **Moisture Raw**

Raw value of moisture sensor.

- **Temperature**

Air temperature, shown in Celsius.

- **Temperature Raw**

Raw value of temperature sensor.

- **Proximity Sensor**

Shows if Elevator Mount Unit sensor is covered with grain.

- **Relay Status**

Shows on or off.

- **Motor Current**

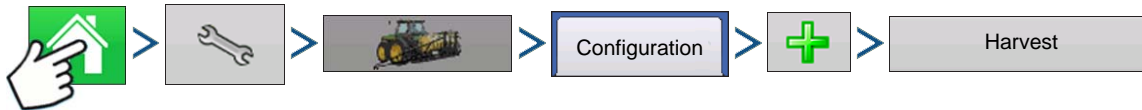
Measure of Elevator Mount Unit (EMU) current, shown in amps.








# CLAAS QUANTIMETER



The CLAAS Quantimeter Optical Sensing System includes the option of interfacing with the display. This option is available for LEXION combines of the 670 model and above. The display communicates with a Bridge Module. This Bridge Module receives data from the combine via the CEBIS (CLAAS Electronic On-Board Information System) monitor which is then relayed to the display. The Bridge module can also interface with the ParaDyme Automated Steering system.

## CREATE CONFIGURATION

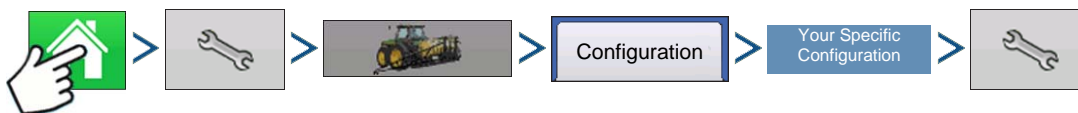


Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > Add (+) button > Harvest button

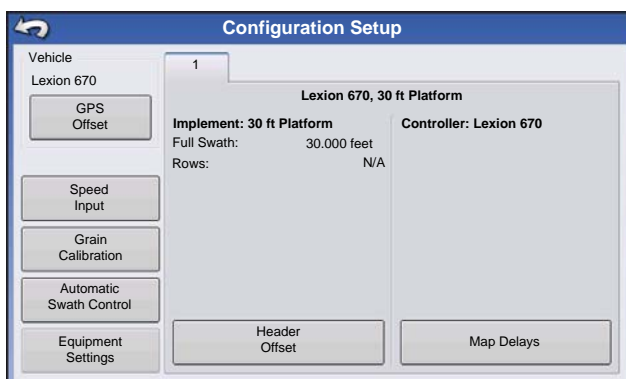
1. Use drop-down menu to select make and model of Lexion.
2. Press  to enter offsets. Press  to continue.
3. Select Header from the drop-down menu or press  to add a header. Press  to continue.
4. Select Speed Sources and Calibrate Speed Sensor. Press  to continue.
5. Enter Configuration Name

A suggested name for the configuration appears. If desired, press  to enter a different name for your configuration. Press  when complete.

## CONFIGURATION SETUP



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button



The Configuration Setup screen appears. Screen's appearance differs if using a CLAAS Quantimeter configuration.



**Note:** Adjustment of Combine Settings and the Header Sensor Calibration is performed through the CLAAS CEBIS monitor.

- **Vehicle Offsets**

For more information, see [“Vehicle Offsets” on page 59.](#)

- **Speed Input**

The ground speed source can be changed by pressing the Speed Input button. This opens the Speed Input screen, where you can choose a primary speed source of GPS, Wheels or Radar. For more information, see [“Speed Input Settings” on page 55.](#)



**Note:** If you are using a CLAAS Quantimeter, you do not choose a secondary speed source.

- **Grain Calibration**

For more information, see [“Calibration Information” on page 234.](#)

- **Automatic Swath Control**

For more information on AutoSwath, see [“AutoSwath Sensitivity Settings” on page 226.](#)

- **Header Offset**

For more information, see [“Input Header Offset” on page 223.](#)

- **Map Delays**

Press to change the Map Delay settings.




**CAUTION:** Do not change settings from the default value of 4 without specific instruction from Technical Support!

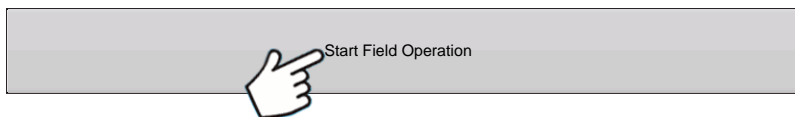
## CALIBRATION INFORMATION

Most calibration information used in a CLAAS Quantimeter configuration is calculated in the CEBIS monitor and then relayed to the display. For CLAAS Quantimeter configurations, the CEBIS monitor performs calibrations for the Header Sensor, Yield Monitor, Moisture and Temperature.



**Note:** The calibration created in the CLAAS Quantimeter is a linear calibration.

When a new calibration is started in the CEBIS monitor, a warning appears on the display, stating “A new grain calibration has been detected. Select an operating configuration to continue.” At the same time, the display unloads the Field Operating Configuration that was collecting data with the old calibration. Acknowledge the New Grain Calibration warning by pressing .



At the Home screen, press the Start Field Operation button and create a new Field Operation Configuration.

After you have completed the grain weight calibration and a new calibration factor has been calculated in the CEBIS monitor, this new calibration is then sent to the display. The display then uses the new calibration to update all data

collected since the time it detected the start of the new calibration. No further messages appear in the display.



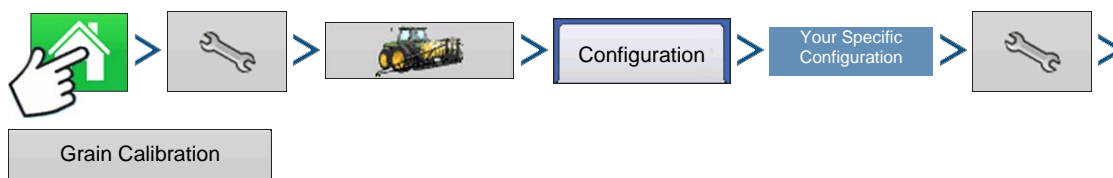
**Note:** The New Grain Calibration warning does not appear for the first calibration performed during the season. It only appears for calibrations performed thereafter.



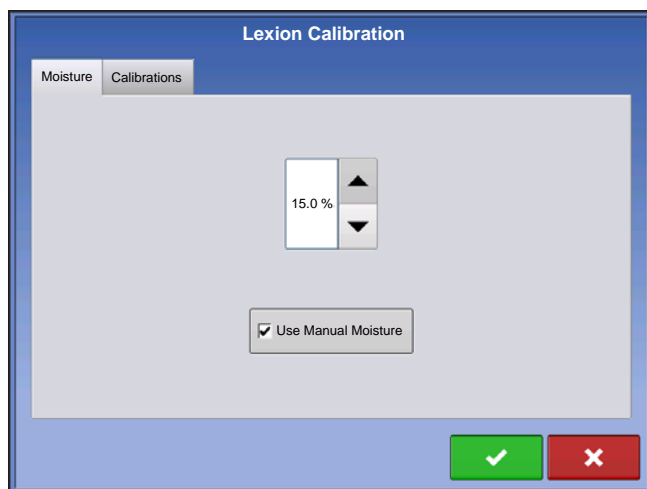
**Note:** The display does not update any previously-collected data collected prior to the time it detected the start of the new calibration.

## Manual Moisture Setting

As with other calibration information, the Moisture Calibration is calculated in the CEBIS monitor and then relayed to the display. However, you can adjust moisture settings for a specific region with the display's Use Manual Moisture setting. The manual moisture setting will only be applied to the specified region.



Press: Home button > Setup (wrench) button > Configuration (tractor) button > Configuration tab > your specific configuration > Setup (wrench) button > Grain Calibration button



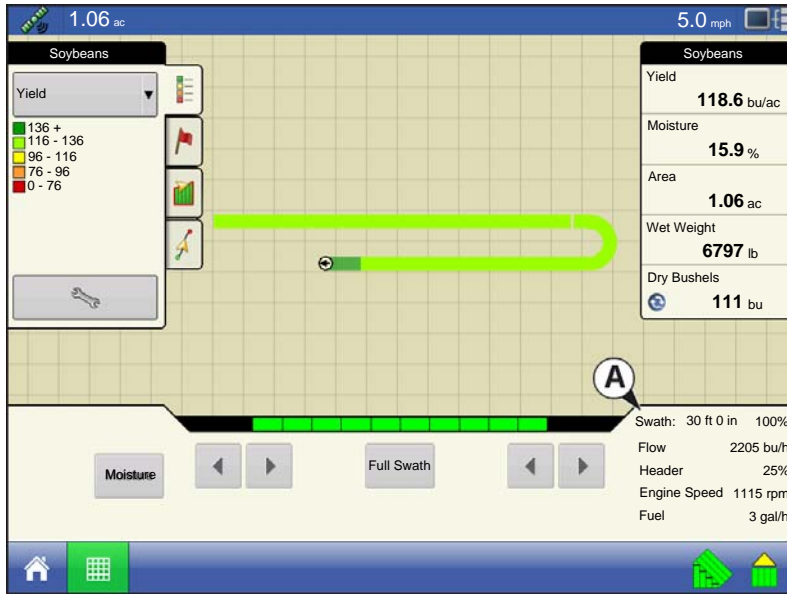
The CLAAS Calibration screen appears.

1. Check  Use Manual Moisture .
2. Use  /  to adjust the Manual Moisture to the desired value. Press  when finished.



**Note:** The list shown in the CLAAS Calibration screen only shows loads harvested during the current season.

# MAP SCREEN FOR CLAAS QUANTIMETER



Once an operating configuration is created for a CLAAS Quantimeter harvest configuration, and a field operation configuration is created at the Home screen, you can view map screen data.

For the most part, this map screen is similar in appearance to the map screen used in other Harvest configurations. However, the Harvest Diagnostic button, shown at the bottom right-hand side of the **Equipment Tab (A)**, differs in appearance from that shown on other Harvest configuration map screens. This Harvest Diagnostic button does not display a picture of a combine.

The top of the Harvest Diagnostic button displays the following information:

- For configurations using a Platform Head or Pickup Head - Swath Width, shown both in units of measurement and as a percentage total.
- For configurations using a Row Head - Number of active rows.

The Harvest Diagnostic button also displays this information for all CLAAS configurations:

- Grain Flow
- Header Height - shown as a percentage
- Engine Speed - shown in revolutions per minute
- Fuel - fuel consumption of the combine



**Note:** Elevator Speed information is not shown for CLAAS Quantimeter configurations.

## DIAGNOSTICS FOR CLAAS QUANTIMETER

### Diagnostics Screen for CLAAS Quantimeter



When performing a Harvest operation, you can access the Grain Harvest Diagnostics screen by pressing the Display Information button. Technical support may request that you look at this screen for help in diagnosing a problem. When the Devices screen opens, press and highlight the AL Bridge listing in the CAN Device list, then press the Diagnostics button. The Grain Harvest Diagnostics screen appears.



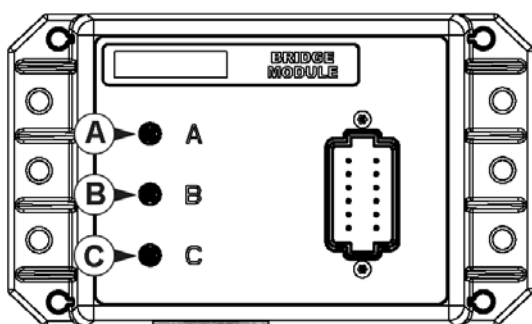
Grain Harvest Diagnostics					
Cal Factor	1.35	Engine Hours	1395.6	Header Segments	10
Moisture	18.6 %	Threshing Status	OFF	Total Distance	182168.6 ft
Temperature	73.4 F	Separator Hours	1250.5	Distance (Field)	164042 ft
Header	Down	Chopper Hours	1248.2	Distance (Road)	18126.6 ft
Ground Speed	5.5 mph	Total Fuel	290.6 gal	Total Yield	1090.7 T
Density	60 lb/bu	Total Fuel (Field)	178.3 gal	Total Yield (Dry)	1019.9 T
Header Width	29.9 ft	Total Fuel (Road)	112.3 gal	Fuel Rate	2.6 gal/h
Active Width	29.9 ft	Active Segments	10	Calibration Flow	2058.4 bu/h
Grain Type	3	Engine Speed	1112 rpm	Header Pos	25 %

Notes:

• The Grain Harvest Diagnostics screen displays different information than the Diagnostics screen that appears for other Harvest configurations. This information is relayed from the CEBIS monitor.

For specific information regarding settings shown on this screen, contact Technical Support.

### Bridge Module



The Bridge Module routes communication between

- (A) CAN-Bus
- (B) ParaDyme CAN-Bus
- (C) CLAAS CAN-Bus

Three indicator lights verify communication received from these systems. A green light indicates good communication; an amber light indicates no communication.

Devices	
DISPLAY	Firmware: 1.0.15
	Firmware ID: AL BRIDGE
	Hardware ID: 4001826
207 AL BRIDGE	Serial Number: 2009010001
	Revision: 1.255.255.255
	Run Time: 34209
	Boot Counter: 212

Diagnostics

When the Bridge Module is communicating with the display, it should appear on the display's Devices list. (For more information on Device Information, see *"Device Information" on page 53*).

## TROUBLESHOOTING CLAAS QUANTIMETER CONFIGURATIONS

During the operation of a CLAAS Quantimeter field operation configuration, you may see the following error messages. Below is a table describing the cause and solution of the error messages that could appear.

**Error Message:** Warning: "Full header width doesn't match Quantimeter full header width"

**Possible Cause:** The full header width that was specified in the display's Header Setup Wizard does not match the header width in the CEBIS monitor.

**Solution:** Set the swath width in the CEBIS monitor to match the swath width of the operating configuration in the display.

**Error Message:** Crop Type Changed: "The current configuration is no longer valid"

**Possible Cause:** The display has detected that the crop type specified in the CEBIS monitor has changed to a crop type that is different than what is specified in the display's field operation configuration.

Either:


**Solution:** 1. Change the crop type specified in the CEBIS monitor back to what is specified in the display. Then reload the display's field operation configuration.

Or

**Solution:** 2. Create a new field operation configuration that includes the new crop type. If necessary, create a new Harvest Product in Product Setup with the Harvest Crop Wizard. For more information, see ["Grain Harvest Settings" on page 22](#).

**Error Message:** Grain Calibration: "A new grain calibration has been detected. Select an operating configuration to continue."

**Possible Cause:** When a new calibration is started in the CEBIS monitor, the warning at left appears on the display. At the same time, the display unloads the Field Operating Configuration that was collecting data with the old calibration.

**Solution:** Acknowledge the warning by pressing . At the Home screen, press the **Start Field Operation** button. Use the Field Operation Wizard to create a new field operation configuration. After receiving the new calibration from the CEBIS monitor, the display will calculate that field operation configuration's harvest data by using this new calibration that was sent from CEBIS. (Also discussed in ["Calibration Information" on page 234](#)).

**Error Message:** CLAAS Communication Error: "Cannot communicate with CLAAS bridge module."

**Possible Cause:** No communication between Bridge Module and CLAAS CAN-Bus. (Shown as Indicator Light **C** on Bridge Module in ["Bridge Module" on page 237](#)).

**Solution:** Check cabling between Module and CLAAS Can-Bus.

**Error Message:** CAN Node Lost: "AL Bridge Node has stopped communicating."

**Possible Cause:** No communication between Bridge Module and display. (Shown as Indicator Light **A** on Bridge Module in ["Bridge Module" on page 237](#)).

**Solution:** Check cabling between Bridge Module and display.

# APPENDIX

## SYSTEM DIAGRAMS REFERENCE

To view detailed system diagrams for various machine configurations, go to the Support tab of the Ag Leader Web site, which can be referenced via the following URL:

<http://www.agleader.com/customer-support/product-manuals/>



**Note:** To view and/or print the System diagrams, you will need the Adobe Acrobat or Adobe Reader .pdf file format. The Adobe Reader software comes pre-installed on most personal computers. If Adobe Reader is not installed on your computer the program is available for download at no charge. A link to the Adobe download site is located at the Ag Leader Web site.

## CURRENT FILE FORMATS

### .AGSETUP

Use to transfer setup information from display to display or from SMS and display

- Replaces MSF, IBY, PAT, IRX, REF
- Allows full synchronization of the following items:
  - Management Data (Growers, Farms, Fields, Seasons, Operators)
  - Products and Product Mixes
  - Boundaries
  - Guidance Patterns
  - Marker Sets and Markers



**Note:** Do not use the IBK to “clone” a display anymore. Use AGSETUP.

### .AGDATA

- Includes all the necessary data to fully archive in SMS
- Includes recorded operation data
- Equipment Used
- Products Used
- Marks Logged
- Boundaries
- Guidance Patterns
- Flexible export options
- Will be able to export by Grower

# LEGACY FILE FORMATS

## PRESCRIPTION MAP FILE TYPES

- **.irx**

The .irx file supports multiple product recommendations in a single file.

- **.shp, .shx, .dbf (shape file group)**

What is commonly called a shape file is actually a collection of three different files. All three of the files are required and must be present on the USB drive for the system to use shape file groups for variable rate product application. A single "shape file" can contain recommendation rates for multiple products.



**Note:** Legacy Prescription file (.irx) is supported and enhanced. Shape file (.shp, .shx, .dbf) continues to be supported for prescription control.

---

## BOUNDARY AND GUIDELINE FILE TYPES

- **.iby**

Boundary file format. Boundary files are created at the Boundary tab, found on the Mapping Toolbox of the Map screen; or imported to the system from the Import Files button at the External Storage Operations screen. The External Storage Operations screen can be accessed by pressing the External Storage Operations button on the Home screen.

- **.pat**

Pattern guideline file. Pattern files are created at the Guidance tab, found on the Mapping Toolbox of the Map screen; or imported to the system from the External Storage Operations button on the Home screen. The External Storage Operations screen can be accessed by pressing the External Storage Operations button on the Home screen.



**Note:** Legacy boundary file (.iby) and legacy pattern file (.pat) import and export will be supported for compatibility with Insight and Edge displays

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## IMAGE FILE TYPES

- **.png and .bmp**

Supported file formats for the Display Owner Image. File size is limited to a maximum of 200 pixels wide by 100 pixels tall. Import the file from the Import Image button on the Display screen's General tab.

## SYSTEM FILE TYPES

- **.ibk**

System backup file. Backup files are written to the USB drive by pressing the Create Backup button on the Display Setup screen's Advanced tab.

- **.ilf**

System log file. Created with the Copy Data button on the External Storage Operations screen or pressing the Export Data Files button of the Display screen's Advanced tab.

- **.fw2**

Firmware upgrade file for the display and control modules. Install firmware updates from the USB drive by pressing the Upgrade Firmware button on the External Storage Operations screen. The External Storage Operations screen can be accessed by pressing the External Storage Operations button on the Home screen.

- **.msf**

The .msf (Management Setup File) file format allows the display to import Grower and Field information from SMS software via the USB drive.

- **.ref**

Variety reference map file. SMS software uses planting data to create a variety reference map which is saved as a .ref file. This .ref file can then be exported to the display for use with the Automatic Variety Tracking and Automatic Region Changing features.



**Note:** Legacy Reference files (.ref) will not be supported in 3.0.

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**Note:** IBK, MSF are not supported in 3.0. Use the new .IBK2 format for backups in 3.0. IBK2 will continue to be specific to a particular display model. Version 3.0 will not restore from an "IBK" from previous releases.

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## MODULE LED DIAGNOSTIC STATES

- **Off**

No power

- **Flashing 1 Hz green**

Normal operation

- **Flashing 1 Hz orange**

CAN bus errors detected (error active/passive state)

- **Steady orange**

CAN bus off

- **Steady red**

Hardware or initialization failure

- **Flashing 1 Hz red**

Firmware download in progress

- **Flashing fast red**

Firmware download error

## COMPANY WARRANTY STATEMENT

### WARRANTY

Ag Leader Technology will repair or replace at no charge any component of the display that fails during normal service, while being used in an approved application, within two years of the warranty start date. Warranty is not provided for damage resulting from abuse, neglect, accidents, vandalism, acts of nature, or any causes that are outside of the normal intended use of the display. Ag Leader Technology shall not be liable for indirect, incidental, or consequential damages to the dealer, end user, or third parties arising from the sale, installation, or use of any Ag Leader Technology product.

# PROPRIETARY TECHNOLOGY NOTICE

Ag Leader Technology's display has patents on its design and operational features. Copying features of this system relating to measurement and calculation of grain flow and weight, organization of field and load data may result in patent infringement.

## COPYRIGHT NOTICE

Ag Leader Technology has copyrighted (© 2012) the contents of this manual and the operating program for the display. No reproductions may be made without first obtaining the consent of Ag Leader Technology.

## SERVICE AND SUPPORT

Your display was designed with simplicity and ease of use in mind. This manual has been provided to help familiarize yourself with the display and its basic functionality. Setup wizards are implemented where appropriate within the system to further simplify configuration and use.

If you have additional questions or feel that you may be having a problem with your system, call your local Ag Leader Technology dealer or call us directly at the phone number below. If we determine you have a hardware failure, we will ship replacement hardware immediately.

Our Technical Support Department can be reached by phone at 515-232-5363 extension #1 or through email at [support@agleader.com](mailto:support@agleader.com).

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