Ag Leader® Technology
2202 South Riverside Drive, P.O. Box 2348, Ames, IA 50010
Phone: 515-232-5363 Fax:232-3595 Internet: http://www.agleader.com

# Hydraulic Seed Control Module Quick Reference Sheet

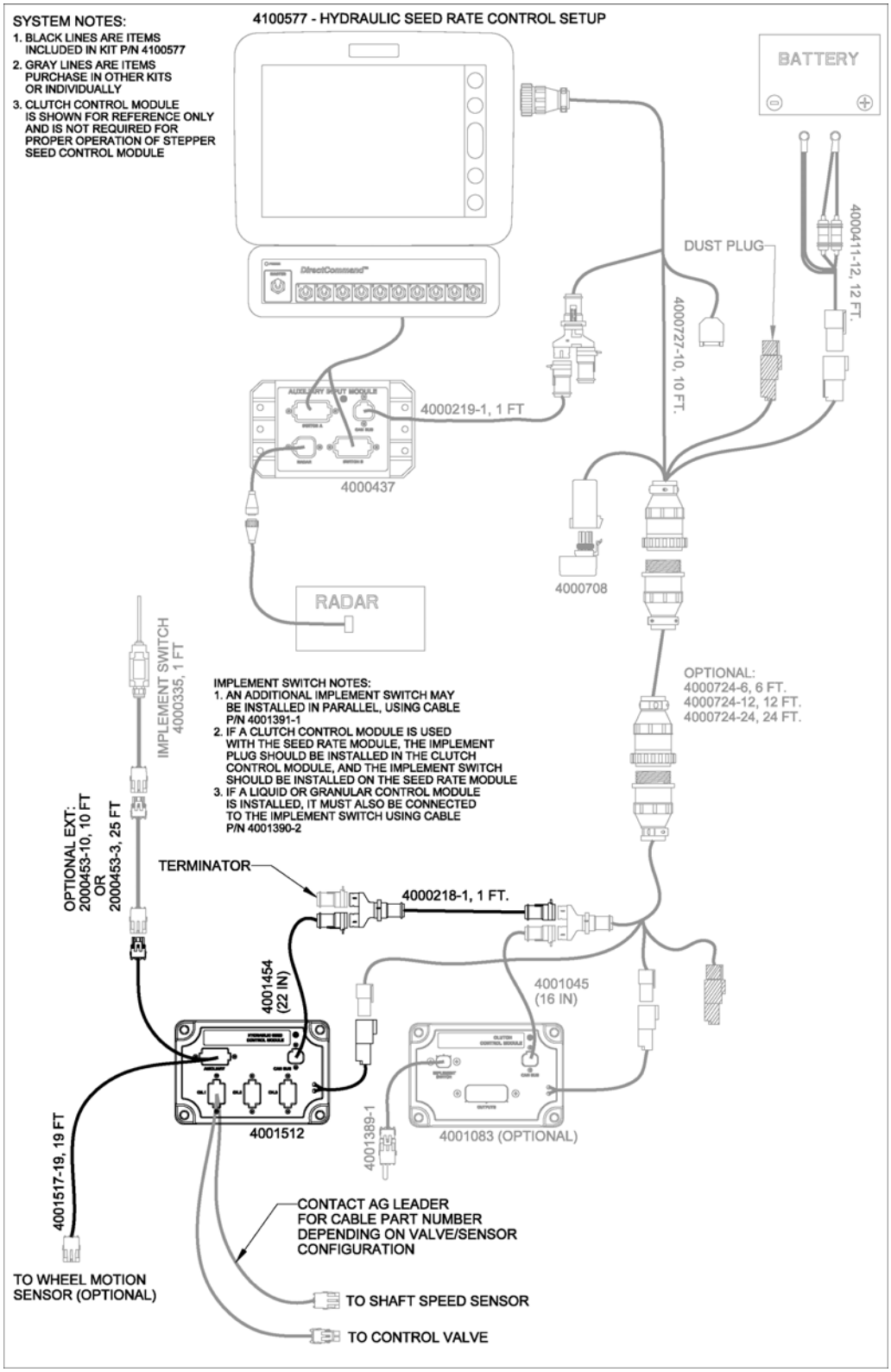
The Hydraulic Seed Control Module is an Ag Leader® SeedCommand™ product that allows users to control up to three hydraulic motor drives via the Ag Leader InSight™ display. Configure the Hydraulic Seed Rate Control module in the following order.

# Section 1: Hydraulic Seed Rate Control Checklist

| Hydraulic Seed Rate Control Checklist | | | |
|---|---|---|---|
| **STEPS** | | **ACTION** | **SEE SECTION AND PAGE** |
| **1** | | **Configure Hydraulic Seed Rate Control module**. | **Section 3**, p.3-4. |
| **2** | | **Enter Controller Settings**, including the Max Meter Speed, Gear Ratio and Minimum Allowable Ground Speed. | **Section 7**, p.8-9. For more information on calculating Gear Ratios, see **Section 8,** pp. 10-11. |
| **3** | | **Prime the Hydraulic Seed Meter**. This fills the seed meter with seed, and thus allows you to avoid skips in your field. | **Section 11**, p.16. |
| **4** | **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. | **Section 12**, p.17-18; see also explanation in **Section 10**, p.14. |
| **4** | **b** | **Perform a Seed Meter Calibration**. A new calibration should be performed if your as-applied seed rate does not match the population found in the ground. | **Section 12**, pp. 15-16. |

Ag Leader Technology
2202 South Riverside Drive, P.O. Box 2348, Ames, IA 50010
Phone: 515-232-5363 Fax:232-3595 Internet: http://www.agleader.com

# Section 2: Hydraulic Seed Control Setup



Ag Leader Technology
2202 South Riverside Drive, P.O. Box 2348, Ames, IA 50010
Phone: 515-232-5363 Fax:232-3595 Internet: http://www.agleader.com

# Section 3: Planting Configuration Procedure

The following procedure describes the complete process of configuring a Hydraulic Seed Control Monitor. To begin, press the Setup button and go to the Configuration Tab. Here you can select the equipment configuration type.

***Note:*** In order for you to use this configuration at the Run Screen, you must also configure a vehicle, implement, controller and product(s). For more information on how to configure these, consult the InSight™ User Manual.

| Planting Configuration | | |
|---|---|---|
| **STEPS** | | **ACTION** |
| **1** | | **Select Vehicle**<br>At the Configuration Tab, press the **Add** button and the Operating Configuration Wizard appears. Select an existing Vehicle from the drop-down menu, or press the **Add** button and create a new vehicle with the Vehicle Setup Wizard. Press **Next** to continue. |
| **2** | | **Select Implement**<br>Using the drop-down box, select the implement you would like to use in this configuration. If there are no implements in the list, press the **New** button. Press **Next** to continue. |
| **3** | | **Select Planter/Seeder Type**<br>From the top drop-down menu, select **Planter**. Then use the bottom drop-down menu to select either **Rear Drawbar** or **Rear 3-Point Hitch**. Press **Next** to continue. |
| **4** | | **Select Implement Options**<br>Select the following options, depending upon your desired configuration. (For Interplant planters, you will need to create separate configurations for Interplant and non-Interplant operations).<br>▪ **Planter Monitor Module** – Use the drop-down menu to select this option to enable a Planter Monitor.<br>▪ **Seed Monitor Module** – Use the drop-down menu to select this option to enable a Seed Tube Monitor Module.<br>▪ **Split Rows Enabled** – Check this box to enable monitoring and logging data from the planter's "pusher" units.<br>▪ **Planter Section Clutch Control** – Check this box to enable the planter clutch control.<br>Press **Next** to continue. |
| **5** | | **Enter the Number of Rows and Spacing**<br>Use the up and down arrows to enter the number of rows and spacing, then press **Next**. |

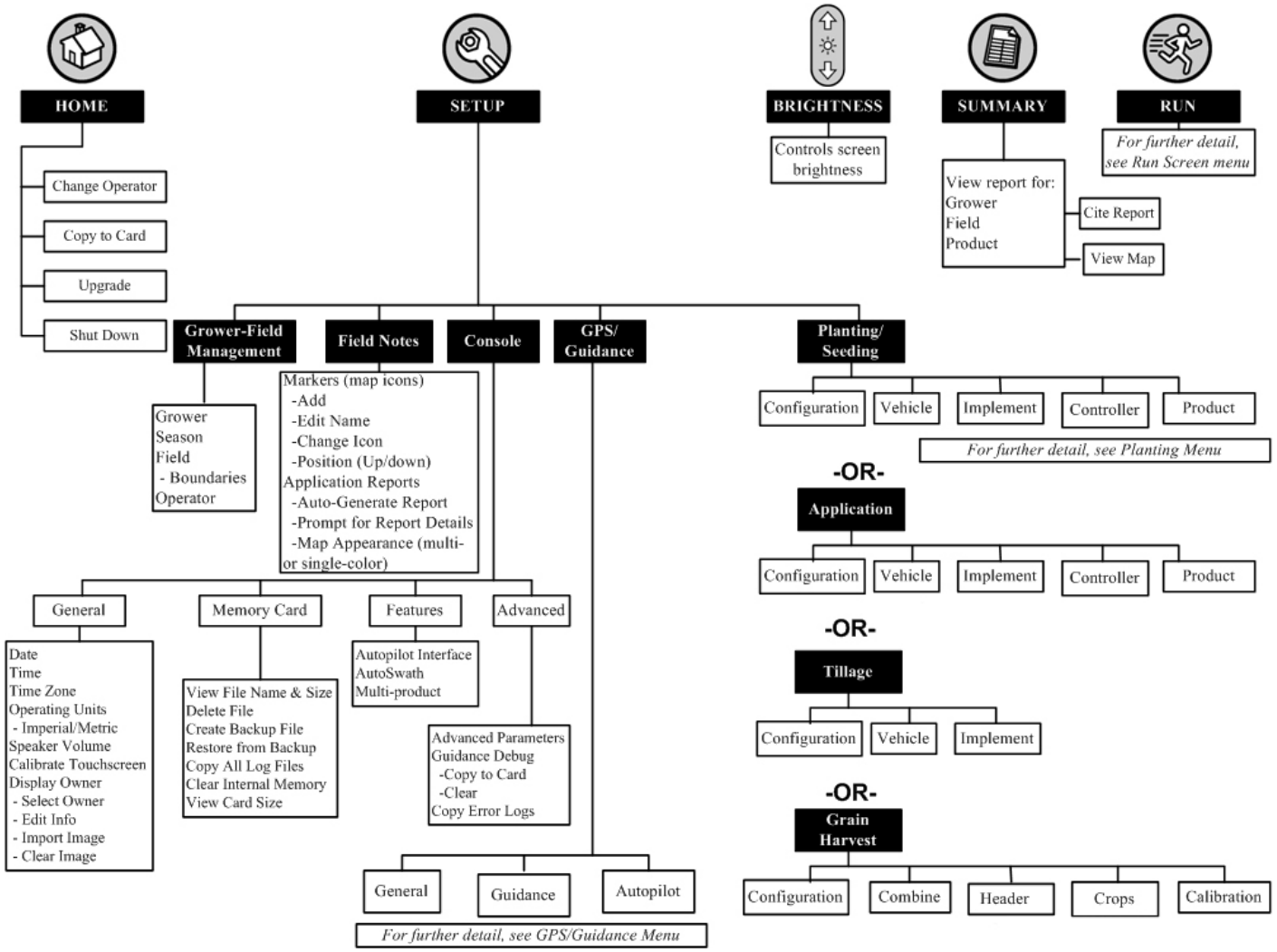
Ag Leader Technology
2202 South Riverside Drive, P.O. Box 2348, Ames, IA 50010
Phone: 515-232-5363 Fax:232-3595 Internet: http://www.agleader.com

# Planting Configuration (continued)

| STEPS | | ACTION |
|---|---|---|
| 6 | | **Enter the Number of Implement Section(s)**<br>Use the up and down arrow to enter the number of implement sections, and press **Next**.<br>***Note:*** Do not enter the number of individual rows. Enter the number of swath sections that can be independently turned on and off. |
| 7 | | **Enter Distance from Hitch to Application Point (front to back)**<br>Use the numeric keypad to enter the distance from the implement hitch to the application point (from front to back). When finished, press **Next**. |
| 8 | | **Enter Implement Name**<br>Use the keyboard button to enter an Implement Name, then press **Finish**. |
| 9 | | **Select Operation Type**<br>Select Rate Logging/Control and press **Next**. |
| 10 | | **Select Controller or Flow Meter (for Rate Logging/Control)**<br>Select an existing Controller from the drop-down menu, or press the **New** button and use the Controller Setup Wizard to create a controller. Use the top drop-down menu to select **Seed Command**. Use the bottom drop-down menu to select **Hydraulic Seed Control**. Press **Next** to continue. |
| 11 | | **Enter Number of Drives**<br>Use the up and down arrows to enter in the number of hydraulic drives on your planter. |
| 12 | | **Enter Suggested Controller Name**<br>A suggested controller name appears. If necessary, use the on-screen keyboard to edit the name of the controller. |
| 13 | | **Select Planting Method**<br>The Operating Configuration Wizard reappears. Here you must select either Single Variety or a split-planter configuration, based upon the number of drives that you entered in Step 11. Press **Next** to continue.<br>***Note*:** Single Variety records one variety (and one target rate) for the entire planter/seeder. Split Planting shows two or three varieties (each with its own individual target rate) to be recorded and mapped simultaneously. |
| 14 | | **Add Additional Application Equipment (optional)**<br>If you plan to use additional application equipment, press the **Add** button and use the Equipment Configuration Wizard to add equipment. Press **Next** to continue. |
| 15 | | **Select Ground Speed Source**<br>Select a Primary and Backup Ground Speed Source, (such as GPS, Wheels, Track or Radar). Press **Next** to continue. |
| 16 | | **Enter Suggested Name for Configuration**<br>Use the keyboard button to enter a name for the configuration. Press **Finish** when complete. |

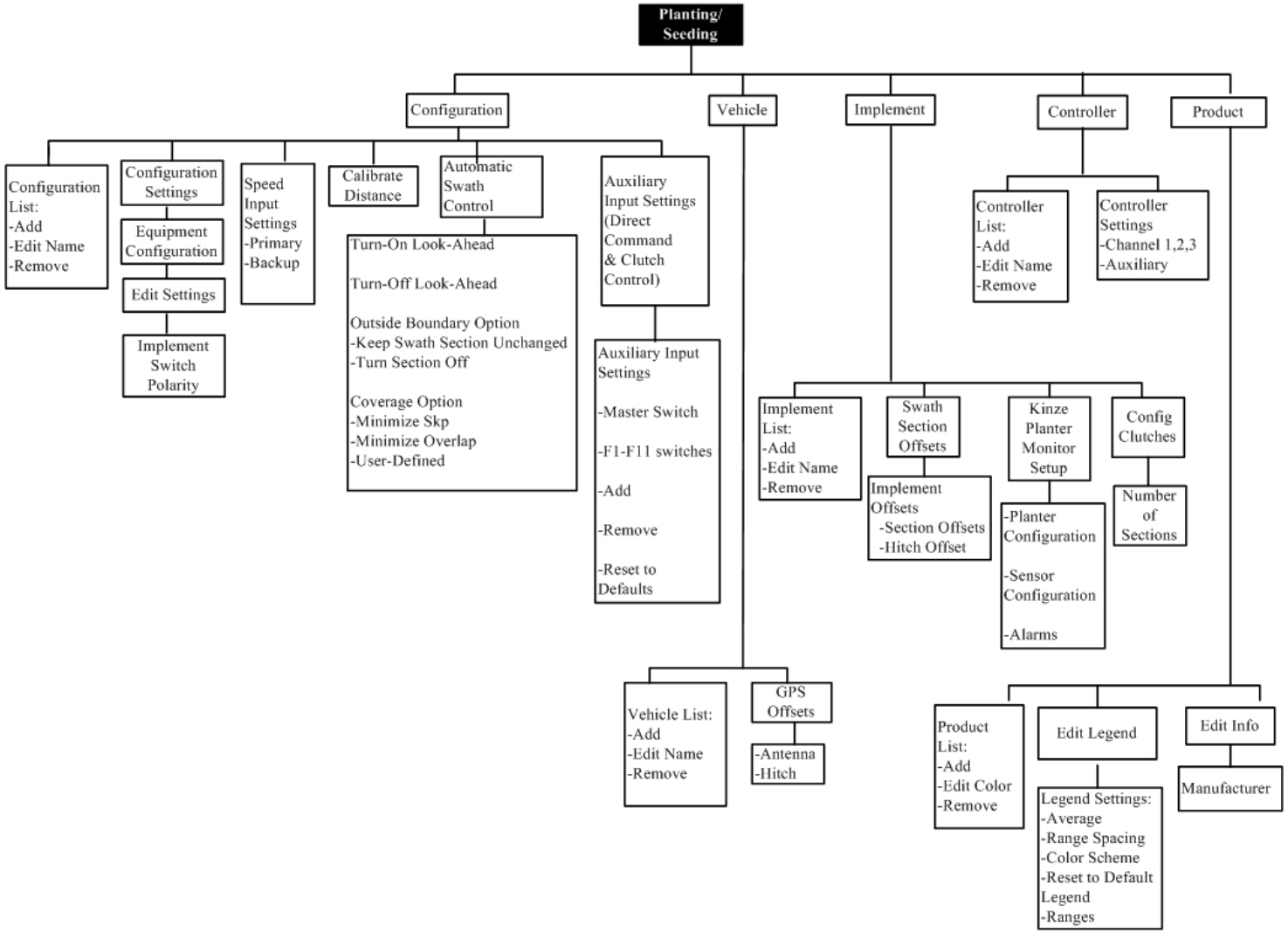
Ag Leader Technology
2202 South Riverside Drive, P.O. Box 2348, Ames, IA 50010
Phone: 515-232-5363 Fax:232-3595 Internet: http://www.agleader.com

# Section 4: General Setup Menu



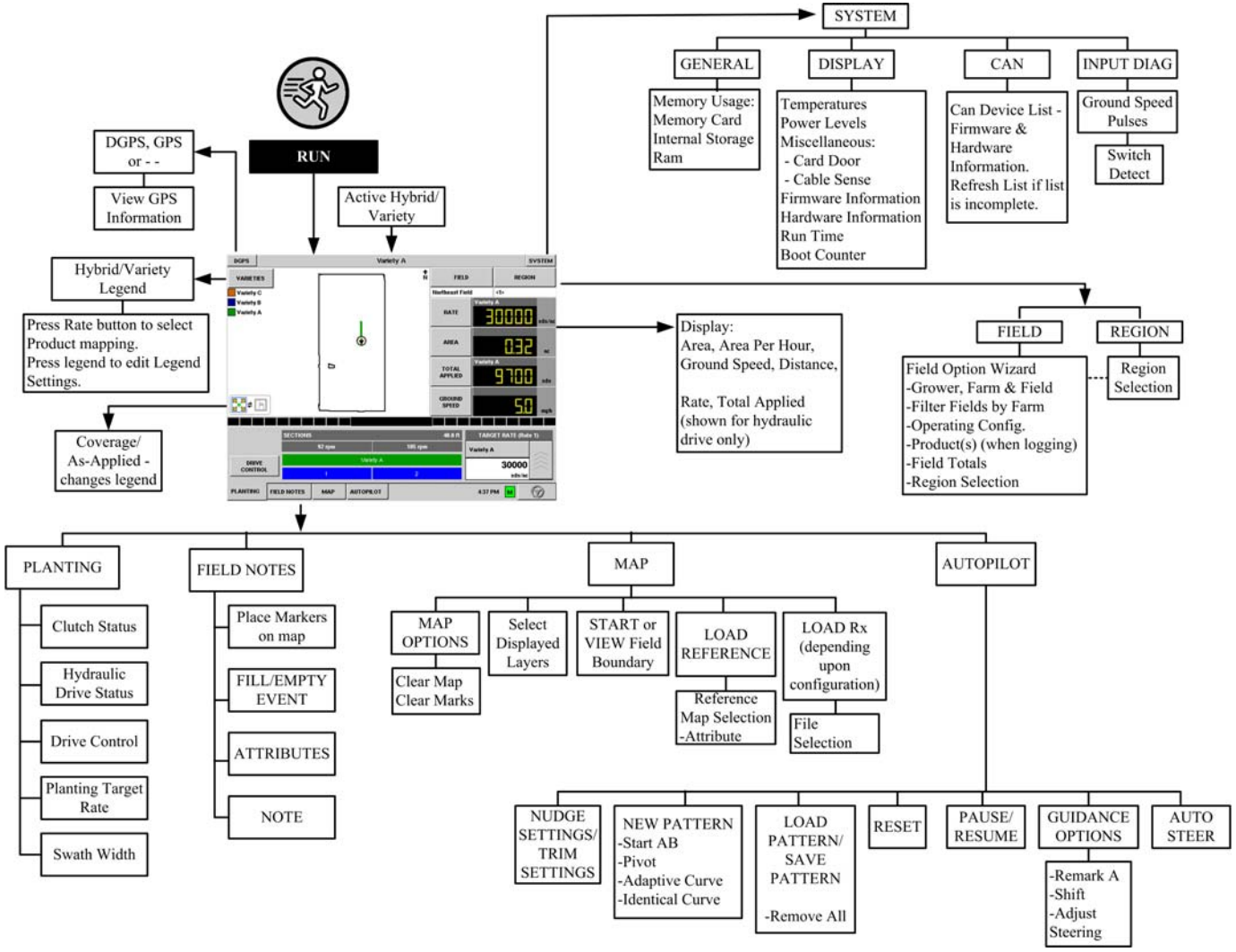
Ag Leader Technology
2202 South Riverside Drive, P.O. Box 2348, Ames, IA 50010
Phone: 515-232-5363 Fax:232-3595 Internet: http://www.agleader.com

# Section 5: Planting/Seeding Menu Tree



Ag Leader Technology
2202 South Riverside Drive, P.O. Box 2348, Ames, IA 50010
Phone: 515-232-5363 Fax:232-3595 Internet: http://www.agleader.com

# Section 6: Hydraulic Seed Control Run Screen



# Section 7: Controller Settings

The **Controller Settings** button, found on the **Controller** Tab, allows the user to view the Controller Settings window, which shows valve settings for hydraulic flow and pulses per revolution. These settings are shown in the table below.

| Controller Settings - Channel Tab(s) | |
|---|---|
| **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. |
| **Control Valve Configuration** | Setting specifies the type of control valve being used for the hydraulic motor. Choices include **Servo** or **PWM**. |
| **Response Threshold** | Determines the system responsiveness to rate change. |
| **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. |
| **Allowable Error** | Determines the percent of error that is allowed prior to the product control system making any flow rate changes. |
| **Gear Ratio** | Ratio of the revolutions of the hydraulic drive as compared to one revolution of the seed meter. For more information, see **Section 9** on page 12. |
| **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. See the PWM valve manufacturer's information for recommended settings. |
| **Controller Settings - Auxiliary Tab** | |
| **Minimum Ground Speed** | The Minimum Ground Speed performs two functions: It determines the speed at which the motion detection sensor disengages; and also determines the target speed meter RPM when the motion detection sensor is active. |
| **Rate 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. |

## *Controller Settings for Specific Planters*

| Hydraulic Controller Settings – John Deere Planters | |
|---|---|
| **Control Valve Configuration** | **PWM** |
| **PWM Frequency** | **175** |
| **PWM Gain** | **110** |
| **Zero Flow Offset** | **40** |
| **Gear Ratio**<br>(chain drive)<br>(ProShaft) | <br>**2.374**<br>**2.417** |
| **Pulses/Rev** | **360** |
| | |
| **Hydraulic Controller Settings – White Planters** | |
| **Control Valve Configuration** | **PWM** |
| **PWM Frequency** | **200** |
| **PWM Gain** | **90** |
| **Zero Flow Offset** | **30** |
| **Gear Ratio** | **5.5** |
| **Pulses/Rev** | **360** |
| | |
| **Hydraulic Controller Settings –Case IH Planters** | |
| **Control Valve Configuration** | **PWM** |
| **PWM Frequency** | **100** |
| **PWM Gain** | **95** |
| **Zero Flow Offset** | **40** |
| **Gear Ratio** | **6.803** |
| **Pulses/Rev** | **360** |

***Note:*** If you are encountering a problem with skips in the field or if the hydraulic drive is not shutting off properly, you may need to adjust the Zero Flow Offset settings. For more information, see the Troubleshooting Guide in the Planting section of the display's User Manual.

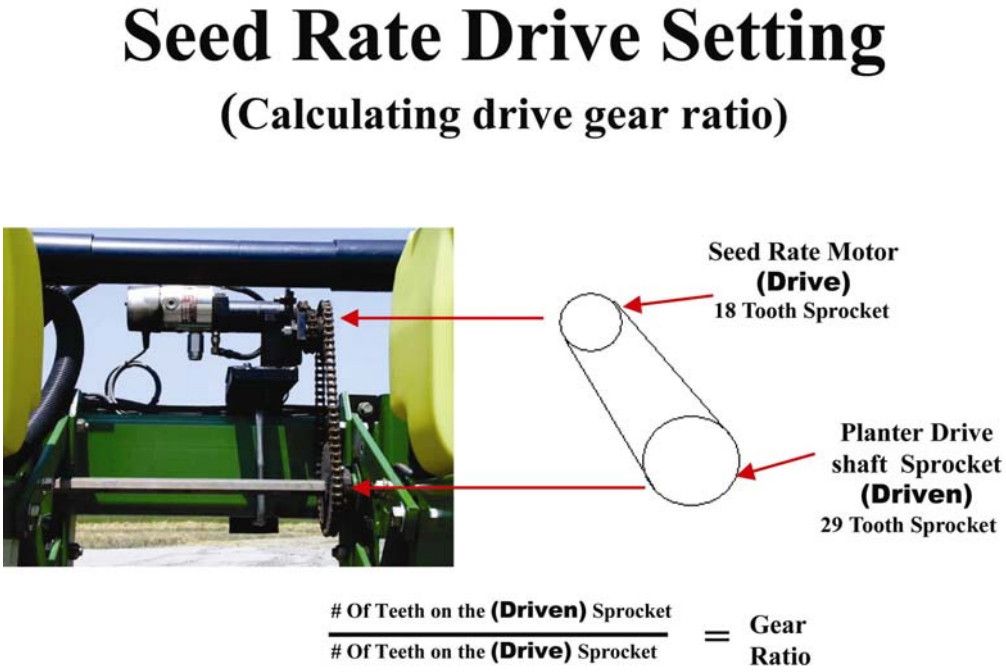
# Section 8: Gear Ratio Calculations for Hydraulic Seed Rate Motors

The Gear Ratio is a setting that appears on the Controller Tab. 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 Hydraulic Seed Rate Motor should operate to achieve the proper RPM of the seed meter during planting operations.

Users who are required to manually enter in a Gear Ratio in the Controller Settings window should calculate this Gear Ratio based on information provided below and on the following page. The Gear Ratio number is calculated by multiplying all the gear ratio combinations, from the Seed Rate Drive Motor to the Seed Meter.

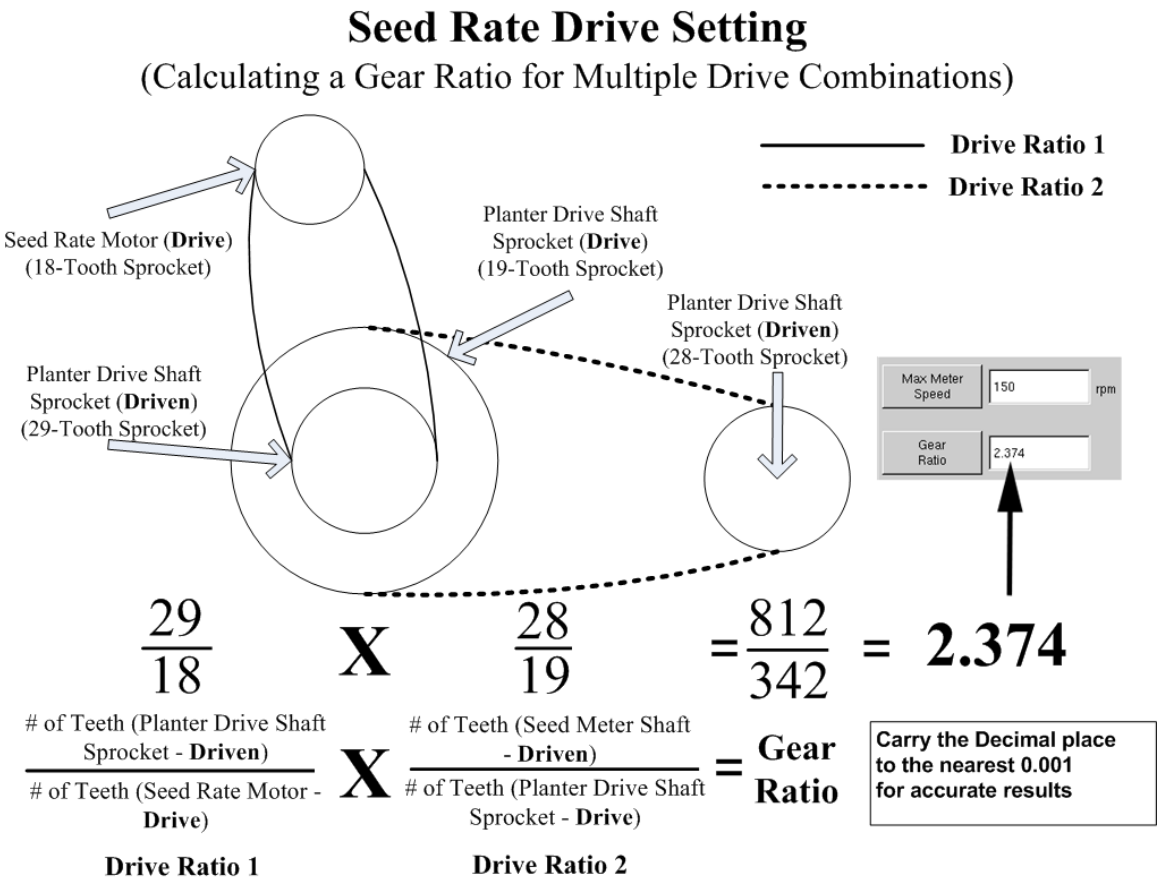
***Note:*** The Gear Ratio number is the number of revolutions of the motor to turn the seed meter one revolution.

### Gear Ratio drawing for single motor drive



Ag Leader Technology
2202 South Riverside Drive, P.O. Box 2348, Ames, IA 50010
Phone: 515-232-5363 Fax:232-3595 Internet: http://www.agleader.com

## Gear Ratio Drawing – for Multiple Drive Combinations




## Seed Ratio Calculation Example Procedure

The example outlined below assumes that you have a single planter drive motor. Step 5 notes that this process has multiple steps if you have more than one Hydraulic Seed Motor Drives.

**Step 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.

**Step 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.

**Step 3:** Repeat the process for each sprocket combination in the drive system back to the meter.

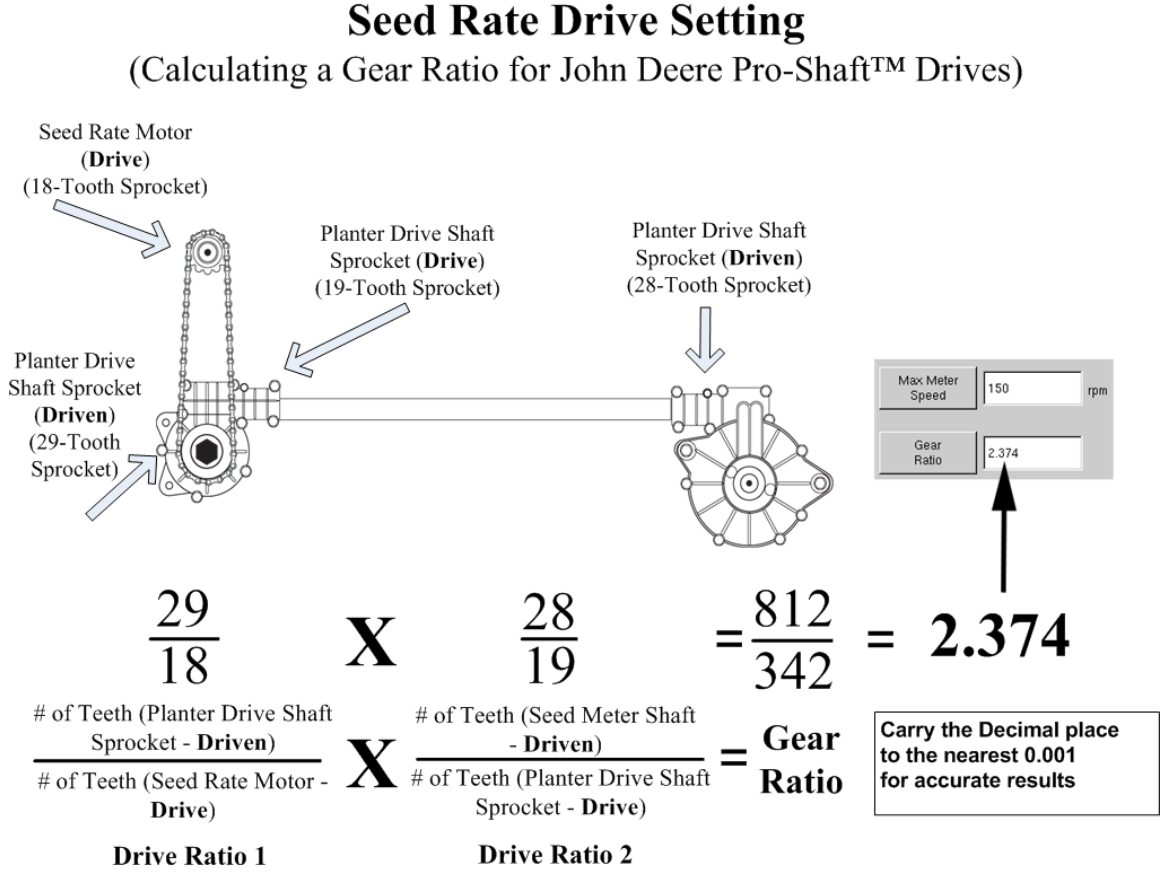
**Step 4:** Take the ratio of the Seed Rate Motor and multiply it by the ratio of the other sprocket combinations.

**Step 5:** Repeat this process if you have multiple drives. Enter the gear ratio for each motor under the appropriate tab on the InSight display.

***Note:*** If you have additional motor drives on the planter and these motor drives have the same total gear ratio, enter that number into the other channels.

Ag Leader Technology
2202 South Riverside Drive, P.O. Box 2348, Ames, IA 50010
Phone: 515-232-5363 Fax:232-3595 Internet: http://www.agleader.com

## Gear Ratio Drawing – for John Deere Pro-Shaft™ Drives




## Seed Ratio Calculation Example Procedure – for Pro-Shaft™ Drives

The example outlined below assumes that you have a John Deere planter using a Pro-Shaft Cable Drive. Step 5 notes that this process has multiple steps if you have more than one Hydraulic Seed Motor Drive.

**Step 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.

**Step 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.

**Step 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**.

**Step 4:** Take the ratio of the Seed Rate Motor and multiply it by the ratio of the other sprocket combinations.

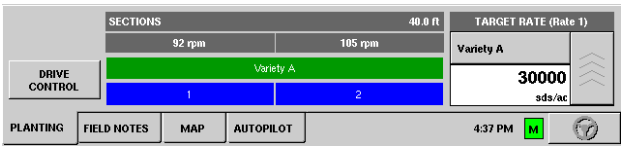
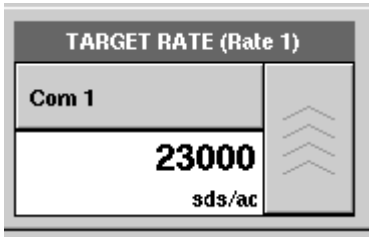
**Step 5:** Repeat this process if you have multiple hydraulic drives. Enter the gear ratio for each motor under the appropriate tab on the InSight display.

***Note:*** If you have additional motor drives on the planter and these motor drives have the same total gear ratio, enter that number into the other channels.

Ag Leader Technology
2202 South Riverside Drive, P.O. Box 2348, Ames, IA 50010
Phone: 515-232-5363 Fax:232-3595 Internet: http://www.agleader.com

# Section 9: Run Screen Functionality and Display Items

The Run Screen provides control of all field operations and the data logging associated with Planting. Display items specific to the Hydraulic Drive operations are explained below.

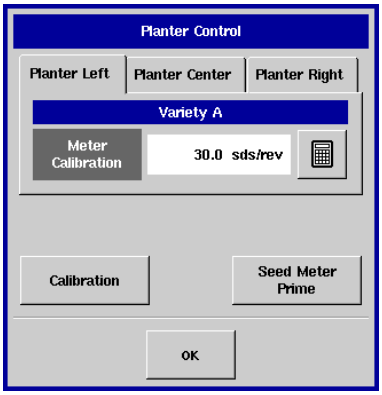
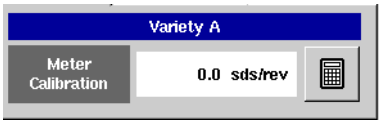
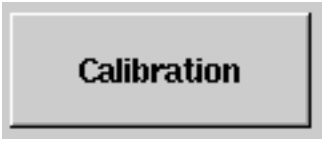
| Run Screen Functionality and Display Items | |
|---|---|
|  | The Hydraulic Drive status is displayed on the bottom left-hand side of the Run Screen's Planting Tab population. The blue bar at the bottom shows the number of sections on the planter. The green bar in the middle displays the Variety name, and changes to a grey color when the drive is off. The blue bar at the top displays the speed of the seed meter, and changes to a grey color when the drive is off. |
|  | The **Drive Control** button summons the Planter Control window, where you can view or edit the seed meter calibration number, perform a seed meter calibration, or use the Seed Meter Prime. For more information, see **Section 10** on page 14. |
|  | On configurations where the Hydraulic Drive is active, the Planting Target Rate population is displayed at the bottom right-hand side of the Run Screen's Planting Tab. This rate display is similar in appearance to the Application Target Rate display shown for some Application functions. |
|  | The Master Switch Indicator shows if the master switch is on (green) or off (red). |

Ag Leader Technology
2202 South Riverside Drive, P.O. Box 2348, Ames, IA 50010
Phone: 515-232-5363 Fax:232-3595 Internet: http://www.agleader.com

# Section 10: Planter Control Settings

The Planter Control window is where you can view or edit the meter calibration number, perform Seed Meter calibrations and prime the Seed Meter. To summon the Planter Control window, press the **Drive Control** button on the Run Screen.

## Planter Control Settings

| | |
|---|---|
|  | The calibration settings for each individual Hydraulic Seed Rate motor are shown underneath its own tab, which is named according to the Implement name. Underneath the tab header is the name of that particular section. The example at left shows three different eight-row sections, comprising a total of 24 rows. |
|  | The Meter Calibration setting displays the seed meter calibration number, in seeds per revolution. Enter a number based on the number of seeds dropped per one revolution of the seed meter.<br>***Notes:***<br>▪ To optimize the Hydraulic Seed Control correctly, perform a seed meter calibration as explained in **Section 12** on pp. 17-18.<br>▪ Prior to a Hydraulic Seed Meter calibration, the number appearing in the meter calibration setting should be appropriate for the type of planter seed meter being used. For more information, see the table named “Seed Meter Calibration Numbers”, found on the following page. |
|  | A new calibration should be performed if your as-applied seed rate does not match the actual population planted. To begin calibrating the Seed Meter, press the **Calibration** button. For more information, see **Section 12**, pp. 17-18. |
|  | Press the **Seed Meter Prime** button to turn the Seed Meter one revolution. For more information, see **Section 11**, p. 16. |

## *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, then your seed meter may be working incorrectly, or you may have set the Gear Ratio incorrectly. In these cases, contact Ag Leader Technical Support for further assistance.

***Note:*** Check your 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** | | | | |
| 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 |

# Section 11: Prime the Hydraulic Seed Meter

The Seed Meter Prime is used to charge the Seed Meter when filling with seed, or after turning on the vacuum for vacuum planters. To begin, press the **Drive Control** button on the Run screen. The Planter Control window appears, where you can begin the priming process.

| Priming procedure for Hydraulic Seed Rate Meter | | |
|---|---|---|
| **STEPS** | | **ACTION** |
| **1** | | **Press Seed Meter Prime**<br>Press the **Seed Meter Prime** button. |
| **2** | | **Seed Meter Prime in Progress**<br>A message displays, stating “Seed Meter Prime in Progress.” While this message displays, the seed meter will turn one (and only one) revolution. When complete, you will return to the Planter Control window. |

# Section 12: Calibrating the Hydraulic Seed Rate Meter

The Meter Calibration number allows the seed meter to communicate the correct seed population to the InSight 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. You should also recalibrate if the as-applied seed rate does not match the population shown on the planter monitor.

- The hydraulic 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, you should not need to recalibrate when switching varieties within the same crop type.
- Before beginning a calibration, make sure that you have primed the seed meter (see above)

| Calibration procedure for Hydraulic Seed Rate Meter | | |
|---|---|---|
| **STEP** | | **ACTION** |
| **1** | | **Press the Drive Control button**<br>Press the **Drive Control** button, and the Planter Control window appears. |
| **2** | | **Press the Calibration button**<br>Press the **Calibration** button. |
| **3** | | **Acknowledge the Warning**<br>A warning appears, stating the following: “Maintain a safe distance from the planter during the calibration routine. The planter should be lowered near the ground with the seed meter fully charged with seed and all necessary fans and/or auxiliary metering devices on.” Acknowledge this warning by pressing **OK**. |
| **4** | | **Select Drive to Calibrate**<br>Select the drive that you wish to calibrate. Press **Next** to continue. |
| **5** | | **Enter Simulated Ground Speed**<br>Enter the target planting ground speed for the calibration procedure. Press **Next** to continue. |
| **6** | | **Enter Simulated Target Rate**<br>Enter the average planting target rate of the calibration procedure. Press **Next** to continue. |
| **7** | | **Press Start**<br>Press the green-colored **Start** button to begin dispensing the seed. |

## Calibration procedure for Hydraulic Seed Rate Meter (continued)

| Step | | Action |
|---|---|---|
| **8** | | **Dispensing Seed**<br>The seed meter turns for five revolutions. As the seed meter dispenses seed, the button will change its color to red, and a message informs you that the seed dispension is in process. |
| **9** | | **Seed Dispensing Complete**<br>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 **Next** to continue. |
| **10** | | **Enter Number of Dispensed Seeds**<br>Use the numeric keypad to enter the number of dispensed seeds that you counted in Step 8. Press **Next** to continue.<br>***Note:*** The meter calibration will be calculated from the actual seed amount dispensed. |
| **11** | | **Calibration Complete**<br>The calibration is complete. The meter calibration number appears, shown in seeds per revolution. From this point, you can either:<br>▪ Repeat the calibration, or<br>▪ Press **Finish** to complete the calibration. |
| **12** | | **Auxiliary Step: Apply Number to All Planter Drives**<br>As an optional step, you can apply the seed meter calibration number to all of the planter drives. Press either **Yes** or **No** and the calibration is now complete. |