Ag Leader Technology
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SeedCommand™ Stepper Seed Control Module Quick Reference Sheet

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

Section 1: Stepper Seed Rate Control Checklist

Checklist			
STEPS		**ACTION**	**SEE SECTION AND PAGE**
1		**Configure Stepper Seed Rate Control module**.	**Section 3**, p.3
2		**Enter Controller Settings**, including the Max Meter Speed, Gear Ratio and Minimum Allowable Ground Speed.	**Section 6**, p.7. For more information on calculating Gear Ratios, see **Section 7**, pp. 8-9.
3		**Prime the Stepper Seed Meter**. This fills the seed meter with seed, and thus allows you to avoid skips in your field.	**Section 10**, p.13.
4	**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.	**Section 8**, p.11; see also explanation in **Section 11**, p.13.
4	**b**	**Perform a Seed Meter Calibration.** A new calibration should be performed if your as-applied seed rate does not match the actual population planted.	**Section 11**, pp. 13-14.

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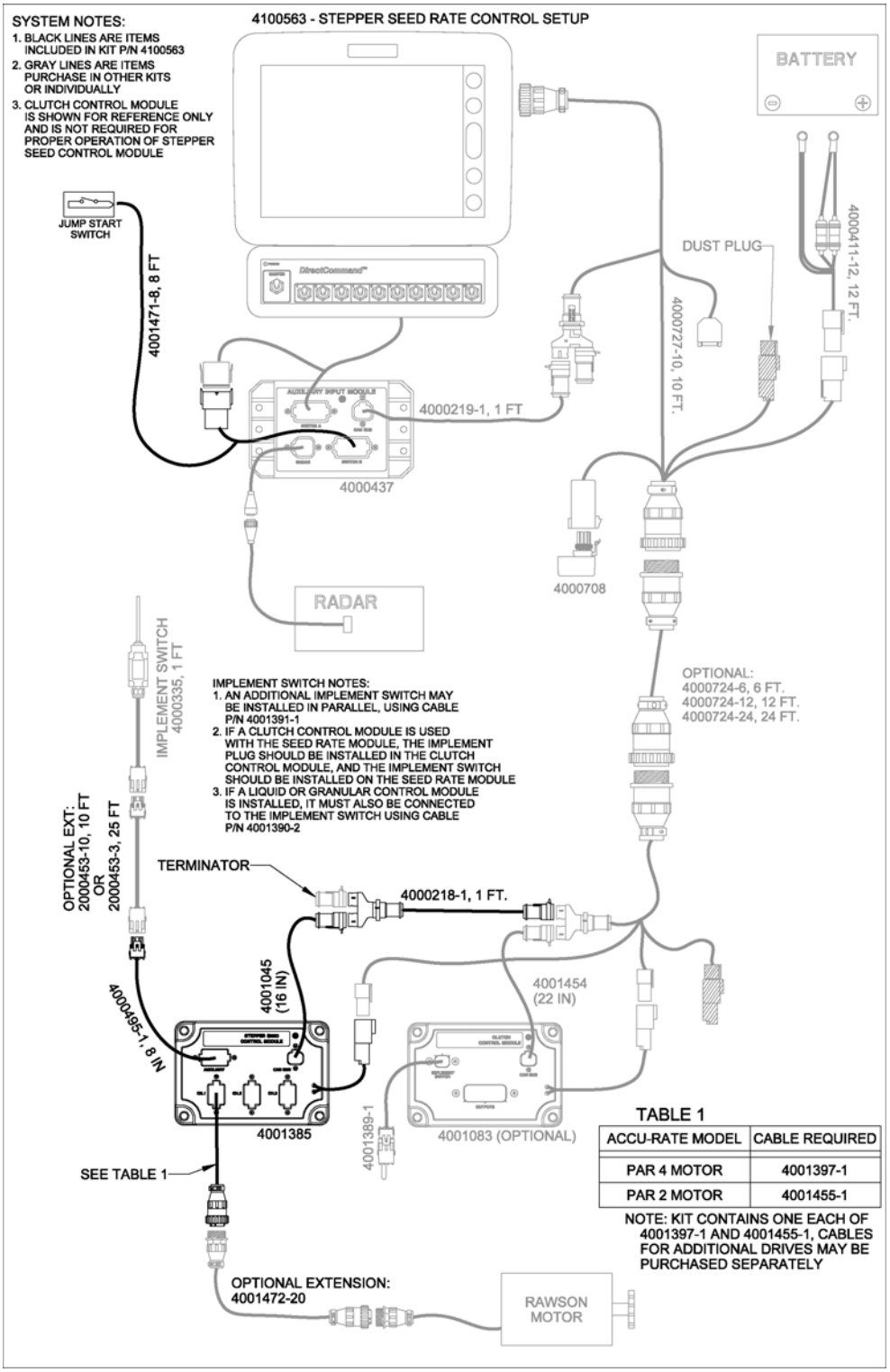
Section 2: Stepper Seed Control Hardware Setup



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Section 3: Configuration Procedure

The following setup procedure describes how to configure a Stepper Seed Control Module. To begin this procedure, press the Setup button, then press the Planting/Seeding button and the **Configuration** Tab opens. Press the **Add** button and the Operating Configuration Wizard appears.

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

Stepper Seed Rate Configuration		
STEPS		**ACTION**
1		**Select Vehicle** 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** 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 Rate Logging/Control** Select the Rate Logging/Control operation type. Press **Next** to continue.
4		**Select Controller or Flow Meter (for Rate Logging/Control)** The Select Controller window appears. Press the **New** button to create a new Stepper Seed Rate Controller.
5		**Select Stepper Seed Control** The Controller Setup Wizard appears, where you must select a controller. ▪ Underneath the **Device** drop-down menu, select **SeedCommand**. ▪ Underneath the **Device Type** drop-down menu, select **Stepper Seed Contro**l. Press **Next** to continue.

Stepper Seed Rate Configuration (continued)

STEPS		ACTION
6		**Select Number of Drives** Use the up and down arrows to enter in the number of stepper seed motor drives on your planter. Press **Next** to continue.
7		**Enter Suggested Controller Name** A suggested controller name appears. If necessary, use the on-screen keyboard to edit the name of the controller. Press **Finish** to exit the Controller Setup Wizard and continue the configuration.
8		**Select Planting Method** 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 6. Press **Next** to continue. ***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.
9		**Add Additional Application Equipment** (optional) This is an optional step. If you would like to apply another product with your selected implement, or add an additional implement for the application of another product, press the **Add** button. Otherwise, press **Next** to continue. ***Note*:** For help with adding or creating an additional equipment configuration, consult the InSight User Manual.
10		**Select Ground Speed Source** Select your ground speed source. If you will be using GPS as the primary, you will need to add a secondary source. Press **Next** to continue.
11		**Enter Suggested Name for Configuration** Use the keyboard button to edit the name of the configuration. Press **Finish** to complete the setup process.

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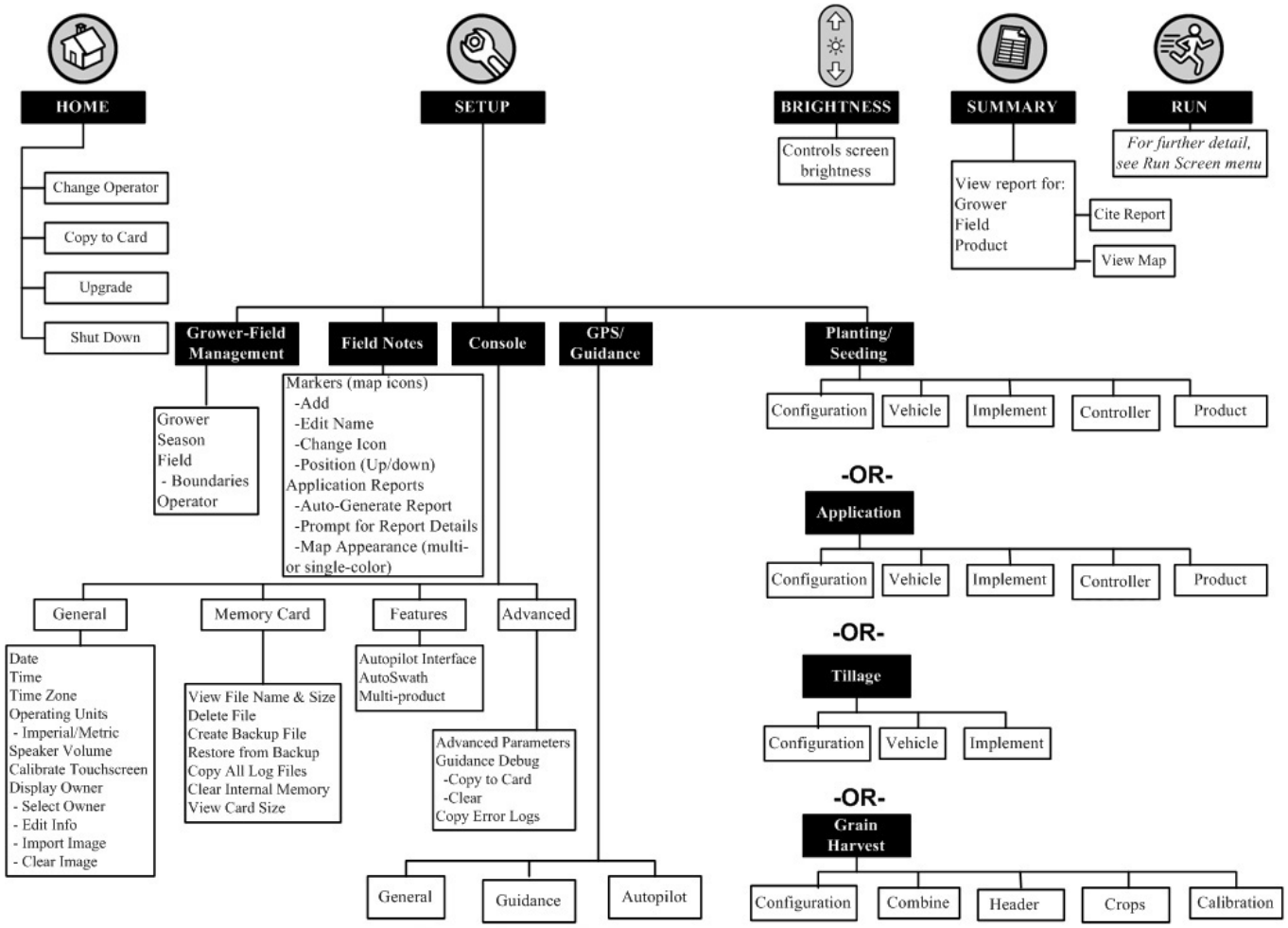
Section 4: General Setup Menu



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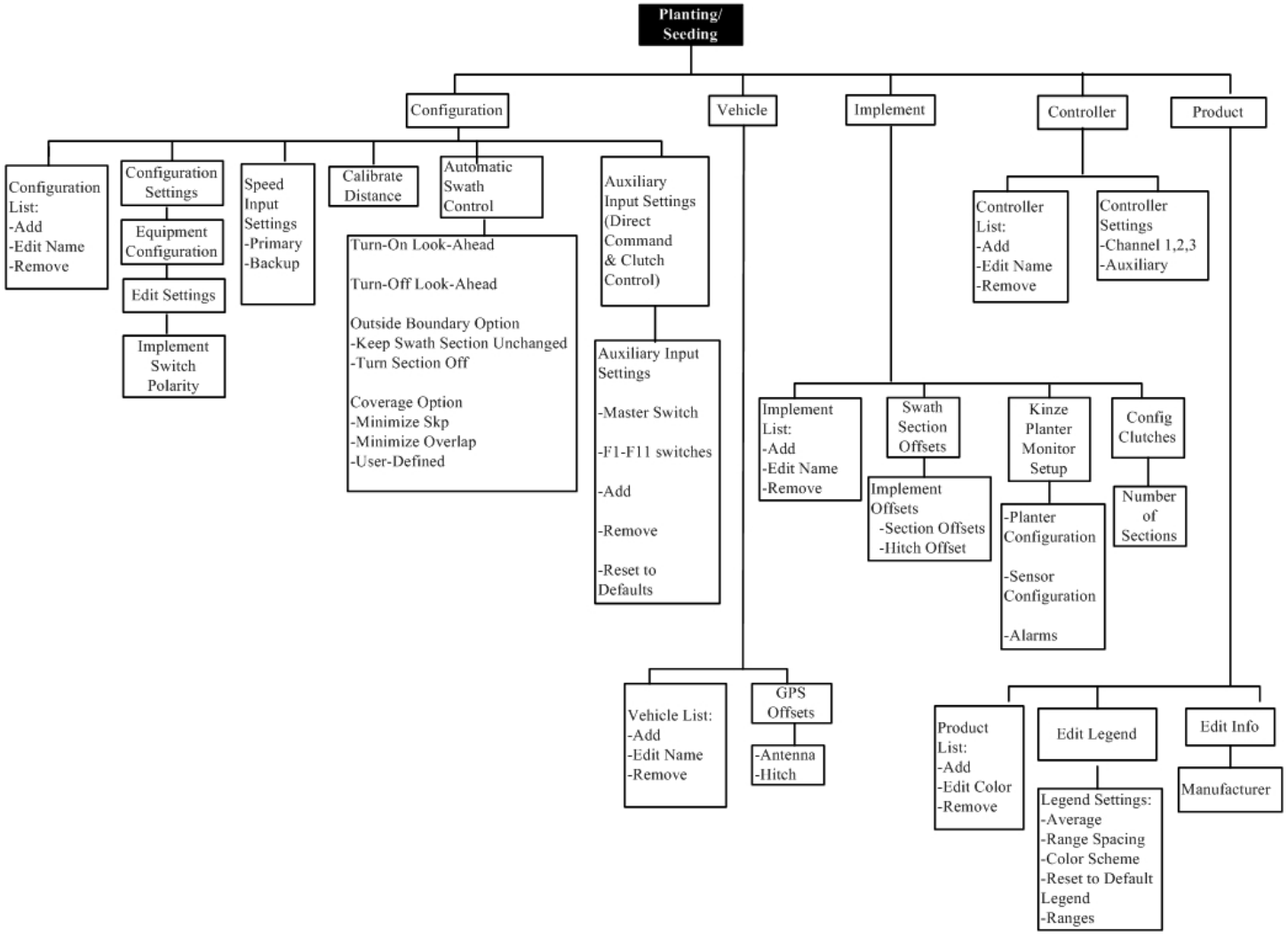
Section 5: Seed Command Menu Tree



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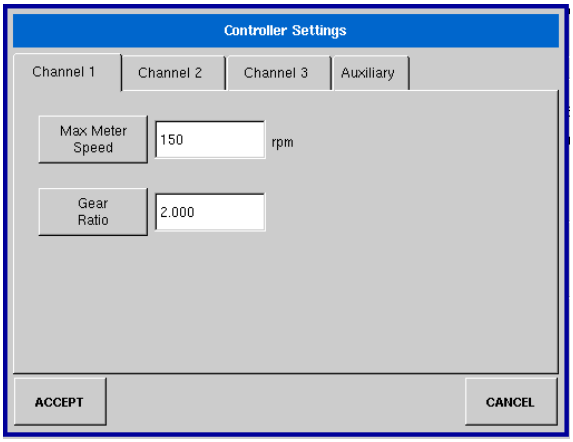
Section 6: Controller Settings for Stepper Seed Rate Motor Drives

The Controller Settings should be set before entering a meter calibration number or performing field operations. To begin, go to the Controller Tab and highlight your controller configuration underneath the Controller list. Press the Controller Settings button, and the Controller Settings window appears, as shown below. Each channel is displayed with its own tab, and the Auxiliary Tab is where you adjust the Minimum Allowable Ground Speed.

Channel Tabs

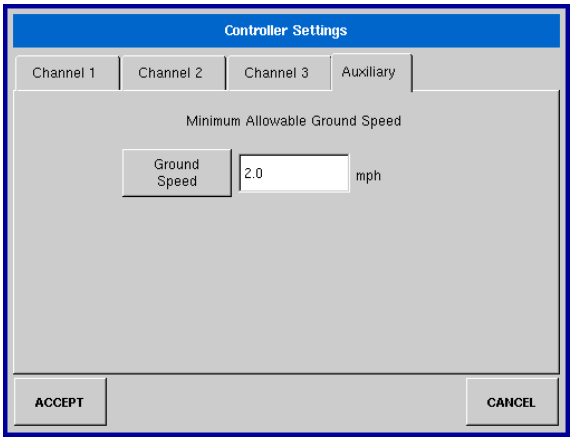


Max Meter Speed: This number represents the maximum recommended RPM of the seed meter, and is specified by the manufacturer. A warning informs you if this threshold is exceeded.

Gear Ratio: The ratio of the revolutions of the hydraulic drive to turn the seed meter one revolution.

Note: For more information regarding how to calculate the Gear Ratio, see **Section 7** on pp. 8-10.

Auxiliary Tab



Minimum Allowable Ground Speed: The InSight display will simulate this specified ground speed when you press the Jump Start switch. This fixed ground setting compensates for delays in acquiring an initial ground speed when starting from a standstill.

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Section 7: Gear Ratio Calculations for Stepper 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 Stepper Seed Rate Motor should operate to achieve the proper RPM of the seed meter during planting operations.

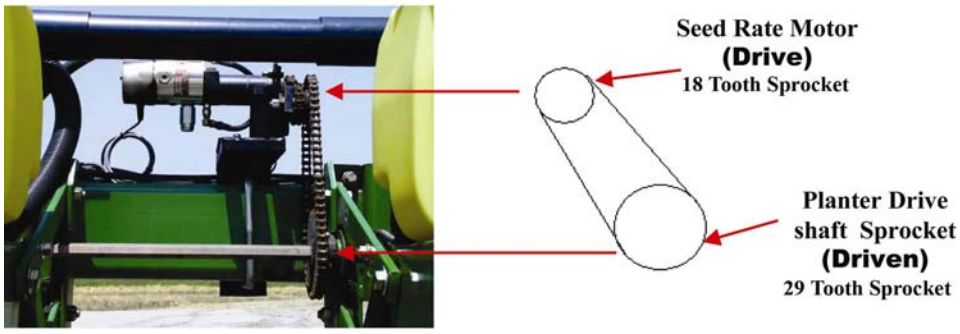
Users who are required to manually enter in a Gear Ratio in the Controller Settings window should calculate this Gear Ratio based on information provided below and on the following page. The Gear Ratio number is calculated by multiplying all the gear ratio combinations, from the Seed Rate Drive Motor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

Seed Rate Drive Setting

(Calculating drive gear ratio)



$$\frac{\text{\# Of Teeth on the (Driven) Sprocket}}{\text{\# Of Teeth on the (Drive) Sprocket}} = \text{Gear Ratio}$$

*** Each drive combination (Drive/Driven) from Seed Rate Motor Drive to Seed Meter shaft sprocket needs to be factored for the Total Gear Ratio.**

$$\frac{\text{\# Of Teeth (Driven)}}{\text{\# Of Teeth (Drive)}} \times \frac{\text{\# Of Teeth (Driven)}}{\text{\# Of Teeth (Drive)}} \times \frac{\text{\# Of Teeth (Driven)}}{\text{\# Of Teeth (Drive)}} = \text{Gear Ratio}$$

Drive/Driven 1 X Drive/Driven 2 X Drive/Driven .....= Gear Ratio

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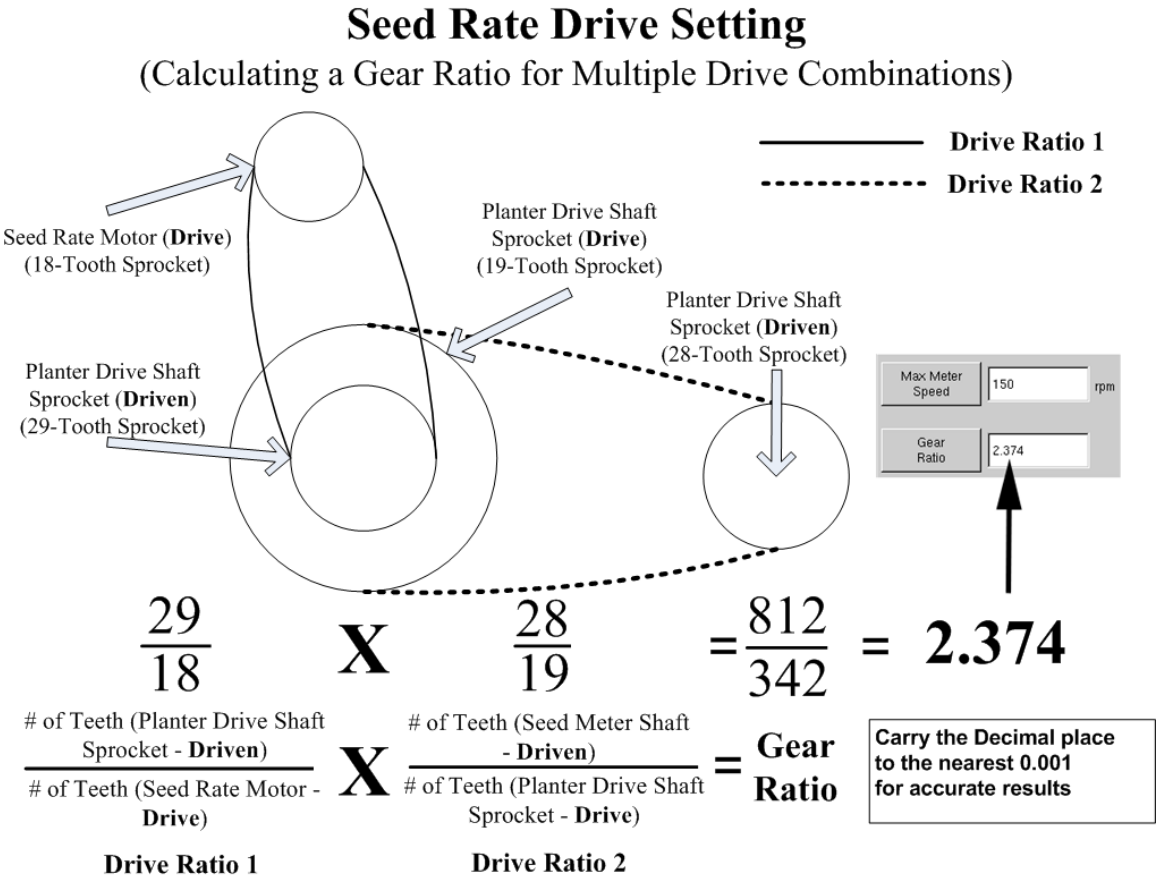
Gear Ratio Drawing – for Multiple Drive Combinations



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 Stepper 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.

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.

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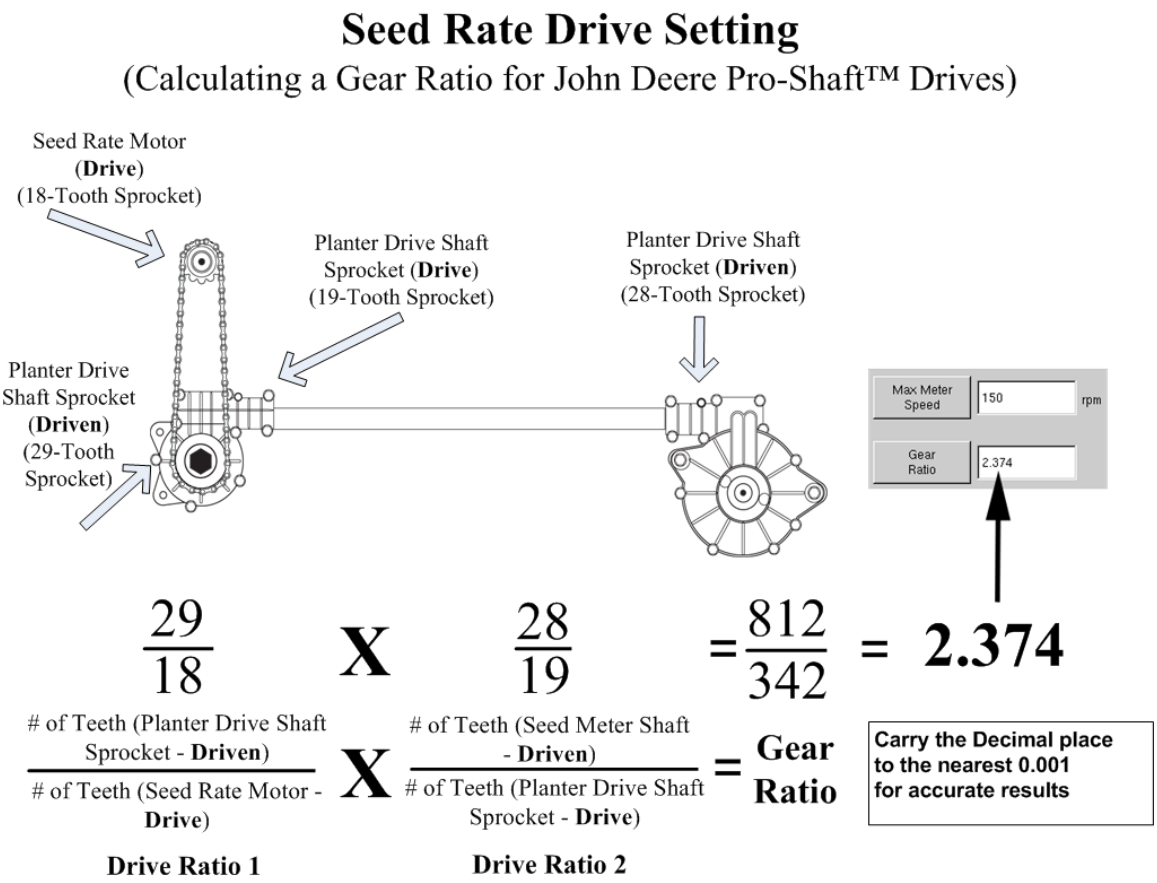
Gear Ratio Drawing – for John Deere Pro-Shaft™ Drives



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.

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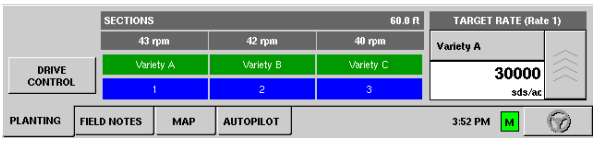
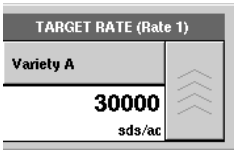
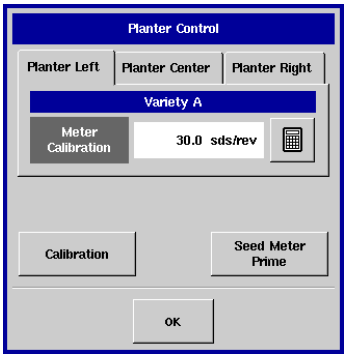
Section 8: Stepper Seed Rate Control In-Field Operations

Stepper Seed Control Run Screen Settings

	At left is the Run Screen's Planting Tab with three seed control drive motors. The top blue bar shows the speed of the Stepper Seed Meter, in RPM, and changes to a grey color when the drive is off. The green bar shows the names of the varieties planted and changes to a grey color when the drive is off. The bottom row shows the number of sections on the planter.
	The Drive Control button summons the Planter Control window, described below.
	The Target Rate button opens the Target Rate window, which lists the Product planted, Target Rate, Actual Rate and Flow Rate.
	The Master Switch Indicator shows if the master switch is on (green) or off (red).

Planter Control Window Settings

	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.
	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 11**, pp. 13-14.
	Press the Seed Meter Prime button to turn the seed Meter one revolution. For more information, see **Section 10**, p. 13.

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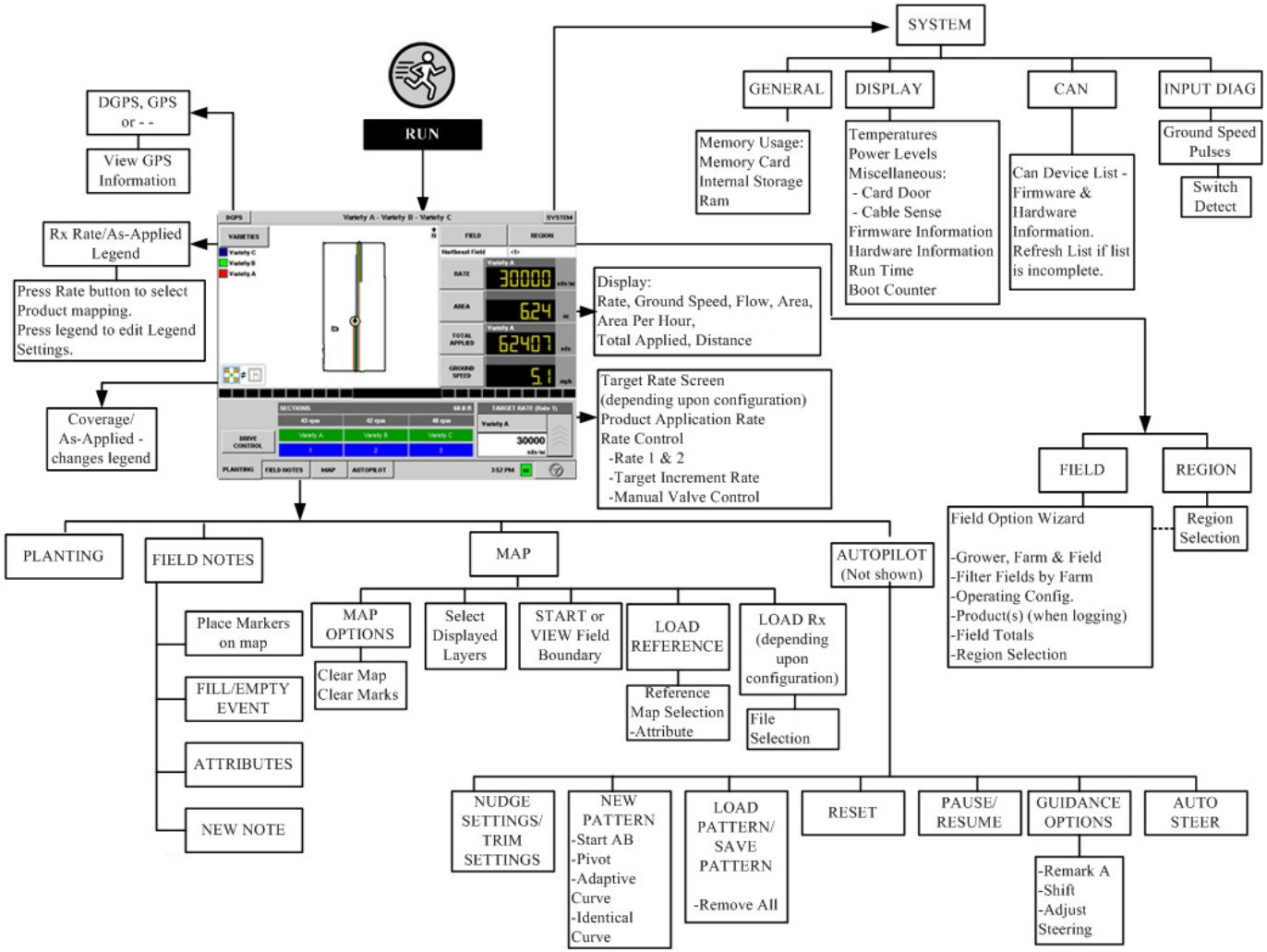
Section 9: Run Screen General Functionality



Section 10: Priming the Stepper Seed Rate 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 Stepper Seed Rate Meter		
STEPS		**ACTION**
1		**Press Seed Meter Prime** Press the **Seed Meter Prime** button.
2		**Seed Meter Prime in Progress** 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 11: Calibrating the Stepper 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 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, 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 Stepper Seed Rate Meter		
STEP		**ACTION**
1		**Press the Drive Control button** Press the **Drive Control** button, and the Planter Control window appears.
2		**Press the Calibration button** Press the **Calibration** button.

Stepper Seed Rate Meter calibration (continued)

STEP		ACTION
3		**Acknowledge the Warning** 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** Select the drive that you wish to calibrate. Press **Next** to continue.
5		**Enter Simulated Ground Speed** Enter the simulated ground speed for the calibration procedure. Press **Next** to continue.
6		**Enter Simulated Target Rate** Enter the simulated target rate of the calibration procedure. Press **Next** to continue.
7		**Press Start** Press the green-colored **Start** button to begin dispensing the seed.
8		**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 informs you that the seed dispension is in process.
9		**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 **Next** to continue.
10		**Enter Number of Dispensed Seeds** Use the numeric keypad to enter the number of dispensed seeds that you counted in Step 8. Press **Next** to continue. ***Note:*** The meter calibration will be calculated from the actual seed amount dispensed.
11		**Calibration Complete** The calibration is complete. The meter calibration number appears, shown in seeds per revolution. From this point, you can either: ▪ Repeat the calibration, or ▪ Press **Finish** to complete the calibration.
12		**Auxiliary Step: Apply Number to All Planter Drives** 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.