

RowFlow[®]

RowFlow Operators Manual

Precision Planting[®]

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Precision Planting Warranty & Liability Policy (Revision effective 7-1-10)

Warranties, Disclaimers, and Limitation of Remedies:

These terms and conditions represent the entire agreement between the parties hereto and there are no collateral, oral, or other agreements or understandings, unless expressly stipulated.

Precision Planting warrants that all Precision Planting products, equipment and merchandise are free from defects in material and workmanship. The term of the express warranty recited herein shall be limited to one (1) year from the date of sale by Precision Planting. This warranty shall only extend to the dealer if this warranty is properly presented to Customer. With respect to 20/20 SeedSense, AirForce and RowFlow, the express warranty recited herein shall only apply if such products are properly registered by the Customer.

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The express warranty recited herein does not extend to any costs or damages other than one of the following, which Precision Planting shall elect at its sole discretion: replacement, repair, or refund of the purchase price. Precision Planting makes no other warranty of any kind whatsoever, express or implied.

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Precision Planting is NOT LIABLE FOR CONSEQUENTIAL DAMAGES of any nature whatsoever, including without limitation lost yield, replanting cost, supplies or other expenses. Precision Planting is NOT LIABLE FOR INCIDENTAL DAMAGES of any nature whatsoever, including without limitation diagnostic and installation expenses, travel expenses, and shipping expenses. The limitations of remedy recited herein apply to any action by the Customer whether or not such action is based in warranty.

Some states or jurisdictions do not allow the exclusion or limitation of implied warranties, incidental damages or consequential damages; so the above limitations or exclusions may not apply to you.

Liability:

Customer assumes all liability for damages from accidents caused by or incurred in the use of transportation of said equipment. Customer agrees to indemnify and hold harmless the said Precision Planting, its officers, agents, and employees from any and all damages and/or liability to any person whomsoever arising out of or resulting from the use, storage, or transportation of said equipment by the Customer or anyone else while the equipment is in the custody of the Customer. The Customer acknowledges receipt of the equipment in good working condition and repair. In the event of any accident involving said equipment, Customer shall promptly furnish to Precision Planting a complete report in writing, with names and addresses of witnesses and parties involved and Customer shall make all reports required by law. Customer agrees to review and follow any published safety instructions in the product manual.

Notice of Non-Waiver:

The failure by Precision Planting, at any one or more time, to insist upon the strict performance by the Customer of the covenants, conditions and/or terms of this agreement, shall not be construed as a waiver of Precision Planting's right to demand strict compliance with and performance of all covenants, conditions and/or terms hereof. Notice of demand for strict compliance is hereby waived by the Customer, and time is expressly made of the essence of this agreement.

Choice of Law:

Any dispute or claim arising from or related to this Policy, or related to a product governed by this Policy, shall be governed by the laws of the State of Illinois.

Safety Information



Always wash your hands after working on or around agricultural equipment prior to eating, drinking, smoking, chewing, etc...



Always use the proper Personal Protective Equipment (PPE) for any task.

Examples include: Gloves when handling sharp or abrasive materials
Eye protection when handling contents or systems under pressure (ie. Hydraulic, Pneumatic, Water)
Welding helmet, Welding gloves, and welders clothing when welding/torching



Prior to working under or at ground level of any equipment secure the machinery from movement; accidental user operation or simple rolling of equipment. This should involve Lock-Out tags at the battery, removal of the Ignition key, "Do Not Operate" signs placed at key locations, as well as wheel chocks as necessary.



When working on a vehicle or implement's hydraulic system, suspended components may suddenly drop. If you are working on or around the implement at this time serious injury could result. If possible lower the implement or attachment to the ground before beginning any work. Alternatively; use mechanical lock-up devices to secure any components in their lifted positions.



Agricultural equipment may have been exposed to many types of chemicals. Any chemicals or residues should be removed from the planter prior to beginning work. Obey all existing (new & original) warning signs and caution labels on all equipment.



When working on or around equipment that has been or is running many components may get extremely hot. To avoid injury &/or serious burns allow all equipment components to properly cool before working on or around them.



Avoid wearing loose or ragged clothing or jewelry around equipment, with special attention to avoid moving parts.



Route and secure all wires and connections to avoid crimping or damaging. This may result in unexpected shortages and shocks.



Use extreme caution when working on pressurized systems (Air, Water, Oil). Relieve all pressure from a system before disconnecting lines, fittings, etc... Use a cloth or other obstruction to divert possible spray when disconnecting hose connections, fittings, fill caps, breathers, etc. Always use gloves, NEVER use bare hands. To locate or check for leaks use cardboard, never your hand.



Electrical components and devices may contain high voltages and should be kept dry and closed. There are no serviceable components in this unit. Do not open this display unit, the AirForce Module, Row Flow Module, or the Smart Connector. Opening of the covers should be done by, or with guidance from trained personnel.

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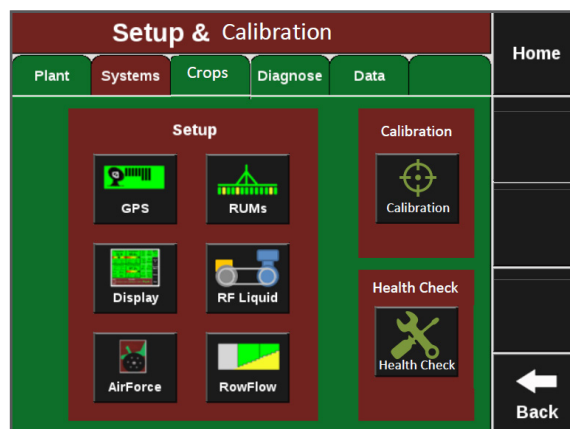
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GPS Setup

In order for 20/20 RowFlow to properly control row clutches, drive line disconnects, and hydraulic motors, it is necessary to enter a variety of GPS measurements. If you have not already entered these measurements in the course of setting up your SeedSense display, please do so now.

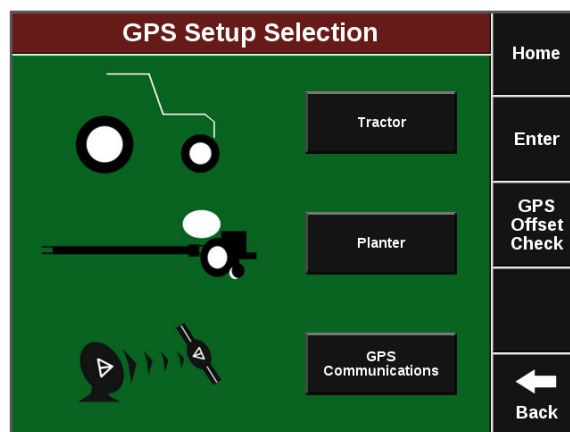
Step 1: GPS

To begin entering your *GPS* measurements, press SETUP on the dashboard screen, then select the SYSTEMS tab, and then press the GPS button.



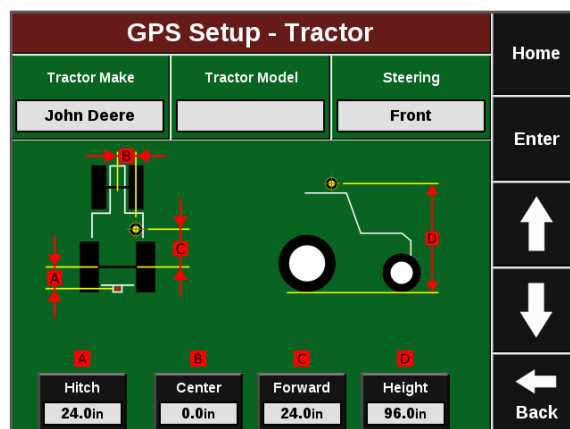
Step 2: GPS Selection

From this screen, you will access the tractor and planter GPS setup screens as well as the GPS Communication page that provides information about the GPS signal being received.



Step 3: GPS Setup – Tractor

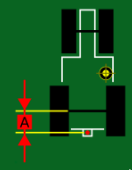
Press the TRACTOR button. This screen allows you to enter measurements on your tractor so that the SeedSense can more accurately display your coverage map. Entering your TRACTOR MAKE and TRACTOR MODEL provide useful troubleshooting information. Press each button to enter the information.



GPS Setup (Continued)

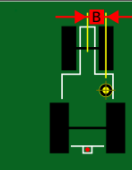
Step 4: Hitch Offset

Press the HITCH button. Measure the distance from the rear axle of the tractor to the hitch point. Enter the distance in inches (or centimeters if the display is set to Metric units). Press ENTER.

GPS Setup - Tractor				Home
Tractor Make	Tractor Model	Steering		
John Deere		Front		
			7 8 9 4 5 6 1 2 3 0 . C	
Hitch Offset (in) 24.0			Enter ↑ ↓ ← Back	

Step 5: Center Offset

Press the CENTER button. Measure the distance to the right or left of the center line of the tractor from your GPS antenna and enter it. Use the flip button to change the orientation of the measurement from right to left. If the antenna is exactly on the center, enter "0". Press ENTER.

GPS Setup - Tractor				Home
Tractor Make	Tractor Model	Steering		
John Deere		Front		
			7 8 9 4 5 6 1 2 3 0 . C	
Flip Center Offset (in) 0.0			Enter ↑ ↓ ← Back	

Step 6: Forward Offset

Press the FORWARD button. Measure the distance from the rear axle of the tractor to the location of the GPS antenna and enter it. Press ENTER.

GPS Setup - Tractor				Home
Tractor Make	Tractor Model	Steering		
John Deere		Front		
			7 8 9 4 5 6 1 2 3 0 . C	
Flip Forward Offset (in) 24.0			Enter ↑ ↓ ← Back	

GPS Setup (Continued)

Step 7: Height Offset

Press the HEIGHT button. Measure the distance from the ground to the GPS antenna and enter it. Press ENTER to return to the Tractor setup screen, verify your entries, and then press ENTER to return to the GPS Setup Selection screen.

GPS Setup - Tractor										Home
Tractor Make			Tractor Model			Steering			Enter	↑
John Deere						Front				
7	8	9	Height Offset (in)			0			↓	
4	5	6								
1	2	3								
0	.	C								
										Back

Step 8: GPS Setup - Planter

Press the PLANTER button. This screen allows you to enter measurements on your planter so that the SeedSense can more accurately display your coverage map.

GPS Setup - Planter										Home
Frame Type					Hitch Style					Enter
Single					Drawn					
										Custom Table Setup
Wheel Distance: 204.0 in Seed Exit 1: 216.0 in All										
										RowFlow Setup
										Back

Step 9: Frame Type

Press the FRAME TYPE button in the top left corner. Select the frame type that best fits your planter.

GPS Setup - Planter										Home
Select Planter Frame Type										Enter
Single										
Dual-Front										
Center Trailing										
Dual-Rear										Back

Step 10: Hitch Style

Press the HITCH STYLE button in the top right corner. Select the hitch style that best fits your planter.

GPS Setup - Planter										Home
Select Planter Hitch Type										Enter
Drawn										
2 - Point Pivot										
3 - Point										
										Back

GPS Setup (Continued)

Step 11: Planter – with “Dual Rear” frame type

Now you will measure and enter measurement values for your planter. Depending on the frame type selected, there may be as few as two measurements to enter or as many as five.

The screen displays the 'GPS Setup - Planter' interface. At the top, there are two buttons: 'Frame Type' and 'Hitch Style'. Below them, 'Dual - Rear' is selected for Frame Type and 'Drawn' is selected for Hitch Style. A diagram of a planter frame is shown with measurement points A, B, C, D, and E. At the bottom, there are five input fields: 'Wheel Distance' (204.0 in), 'Seed Exit 1' (216.0 in, Even), 'Seed Exit 2' (-0.0 in, Odd), 'Off Center Distance 1' (0.0 in), and 'Off Center Distance 2' (0.0 in). On the right side, there are navigation buttons: Home, Enter, Custom Table Setup, RowFlow Setup, and Back.

Step 12: Wheel Distance

Press the WHEEL DISTANCE button. With the planter lowered, measure the distance from the pivot point to the lift wheels. Enter the value. Press ENTER.

The screen displays the 'GPS Setup - Planter' interface. On the left, there is a numeric keypad with digits 0-9 and a decimal point. On the right, there is a diagram of a planter frame with a measurement point A. Below the diagram, the text 'Wheel (in)' is displayed above a numeric input field showing '0'. Below the input field, there is a prompt: 'Enter the distance from the pivot point to the lift wheels when the planter is lowered'. On the right side, there are navigation buttons: Home, Enter, Up, Down, and Back.

Step 13: Seed Exit 1

Press the SEED EXIT 1 button. Measure the distance from the hitch pivot point to the seed tube exit for all rows (if frame type is “Single”) or for the forward most set of rows (for all other frame types. Enter the value and press ENTER.

The screen displays the 'GPS Setup - Planter' interface. On the left, there is a numeric keypad with digits 0-9 and a decimal point. On the right, there is a diagram of a planter frame with a measurement point B. Below the diagram, the text 'Seed Exit 1 (in)' is displayed above a numeric input field showing '0'. Below the input field, there is a prompt: 'Enter the distance from the pivot point to center of the lowered seed exit point'. On the right side, there are navigation buttons: Home, Enter, Up, Down, and Back.

Step 14: Seed Exit 1 Rows

For all planter frames other than “Single” you will need to define which planter rows correspond to this measurement. Select from the options available or press LIST to choose specific rows manually.

The screen displays the 'GPS Setup - Planter' interface. At the top, the text 'Seed Exit 1 Rows' is displayed. Below it, there are six buttons: 'All', 'Odd', 'Even', 'Left', 'Right', and 'List'. On the right side, there are navigation buttons: Home, Enter, Up, Down, and Back.

GPS Setup (Continued)

Step 15: Seed Exit 2 & Seed Exit 2 Rows

For all planter frames other than “Single” you will be prompted to enter measurements for the other rows on your planter the same way as Seed Exit 1.

Step 16: Off Center Distance 1 (Measurement D)

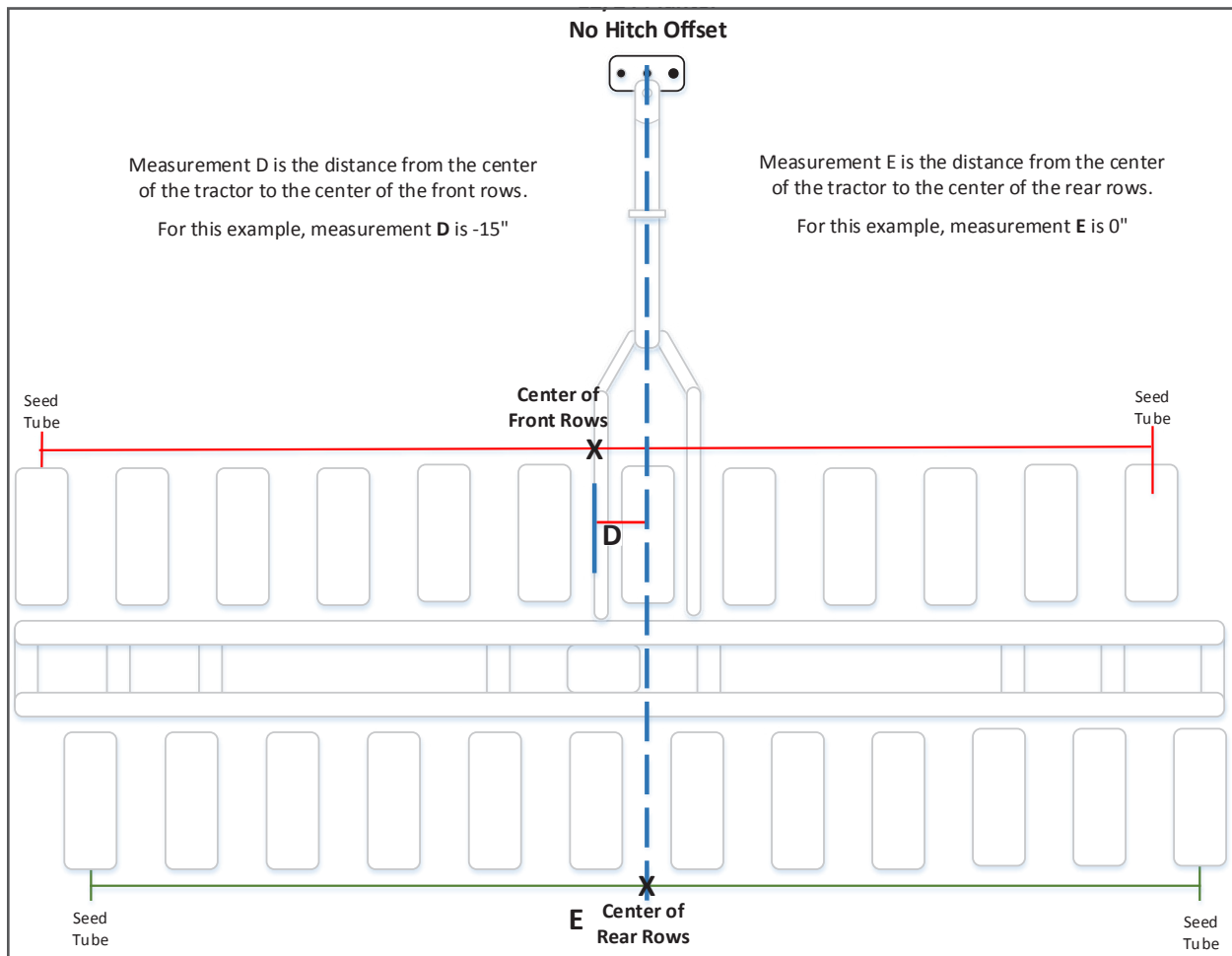
For “Dual Front” and “Dual Rear” frame types, you will now enter the off center distance of each bar. For Off Center Distance 1, measure the distance from the tractor center line to the center of the rows on the front set of rows. In order to find the center of the rows, measure the distance from the outside row to outside row and determine where the center point is in relation to the tractor center line. Input the offset between the center line of the planter rows and center line of the tractor, this is the offset distance.

Repeat the measurement for the rear set of rows under Off Center Distance 2 (measurement E).

Note: If the center point of the planter rows is left of the tractor center line, the entered value will be negative. If the center point of the planter rows is on the right side of the tractor center line, the entered value will be a positive number. Refer to the next image for an example of measurement D and E.

GPS Setup (Continued)

Example: Offset Measurement "D" and "E"



NOTE:

If your planter does not conform to the available frame types, you may use the [CUSTOM TABLE SETUP](#) button on the right side of the screen to enter the location of each row on your planter.

**Custom
Table
Setup**

GPS Setup Notes

RFM Direction Setup

RFM Direction Setup

Before setting up the drive, please select the RFM direction, which is under SETUP/SYSTEMS/ROWFLOW SETUP/RFM DIRECTION. This will allow the system to properly use the accelerometers contained in the RFM. Improper selection can cause issues with Motor Drive starting and stopping time. The direction referenced is the direction of the connectors on the RFM.

RowFlow Module Orientation				Home
Choose connector direction when standing behind the planter facing the tractor				Enter
Lying Horizontal, Label Up		Lying Horizontal, Label Down		
Left Facing	Right Facing	Left Facing	Right Facing	RFM Orientation Health Check
Front Facing	Rear Facing	Front Facing	Rear Facing	
Standing Vertical - Connectors must be out the bottom				Back
Forward Facing Label	Rear Facing Label	Left Facing Label	Right Facing Label	

Drive Motor Setup

The 20/20 RowFlow system can, with one RowFlow Module (RFM), control three PWM hydraulic motors. To control more than three motors, a second RFM will be needed. To configure your PWM hydraulic motors, go to the RowFlow setup page. From the dashboard screen, press SETUP, then select the SYSTEMS tab, and then press the ROWFLOW button. At the top of the RowFlow Setup screen, press the MOTOR CONFIGURATION button.

PWM Drive Motor Setup

The Drive Motor Setup screen includes all of the information related to configuring your drive motors. Up to three PWM Drive Motors per RFM (total max of six) can be configured OR two serial drive motors can be configured. For information on configuring serial drive motors, see page 15. From the dashboard screen, press SETUP, then select the SYSTEMS tab, and then press the ROWFLOW button on the control side of the page. At the top of the RowFlow Setup screen, press the MOTOR CONFIGURATION button.

Step 1: Control State

To begin drive motor setup, press the black DRIVE MOTOR 1 button and select SEEDING.

Drive Motor 1 Setup		Home
Control State		Enter
Disabled	Seeding	
Liquid	Granular	Return to Motor Setup
		Back

Step 2: Select Rows Driven by Motor

Next, select which planter rows will be driven by Motor 1. This may be All, Odd, Even, Left, Right, or List. When selecting List, you will define which rows are not controlled by this motor by touching those row numbers so that they have an "X" over them. When done selecting rows, press ENTER.

Drive Motor 1 Setup			Home
Select Rows Driven by Motor			Enter
All	Odd	Even	
Left	Right	None	Return to Motor Setup
List			Back

Drive Motor Setup (Continued)

Step 3: Select Motor Brand

Now select the brand of the hydraulic motor being controlled by pressing the appropriate button.

Drive Motor 1 Setup			Home
Select Motor Brand			Enter
Precision Planting (100 pulses, 150 Hz)	John Deere (360 pulses, 175 Hz)	Kinze (360 pulses, 150 Hz)	
CNH (360 pulses, 150 Hz)	Great Plains (360 pulses, 150 Hz)	Dickey John (360 pulses, 150 Hz)	Return to Motor Setup
Agco (360 pulses, 150 Hz)	vDrive	Custom	Back

Note: Steps 4 and 5 are located under the **CROPS** setup. This can be found under **SETUP/CROPS**. These settings are saved in the monitor on a per crop basis.

Step 4: Select Seeds per Meter Revolution

On this screen, select the number of seeds planted per revolution of the meter. If your metering system has a different number than any of the listed choices, press **CUSTOM** and enter the appropriate number. For instance, if using a six finger meter, enter "6" under Custom.

Drive Motor 1 Setup			Home
Select Seeds per Meter Revolution			Enter
30 eSet Corn, JD std	40 Sweet Corn Disk	108 JD Soybean Disk	
12 Standard Finger Meter	24 CNH Disk	60 eSet Soybean	Return to Motor Setup
27 vSet Corn	80 vSet Soybean	Custom	Back

Step 5: Default Population

Finally, enter your default population. This is the population that the motors will plant when operating in an area without a prescribed population.

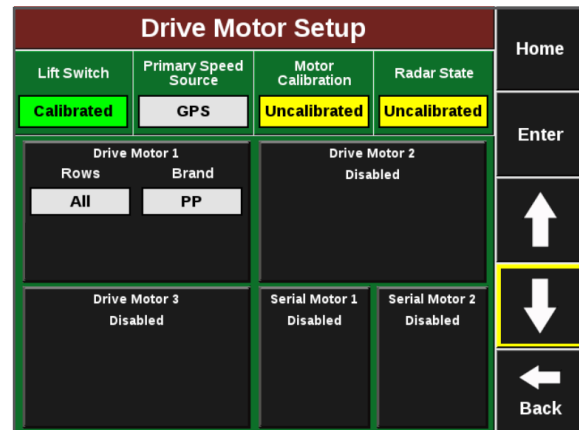
Drive Motor 1 Setup				Home
Default Population				
32000				Enter
7	8	9	Back	Out of RX
4	5	6	-	Default
1	2	3	00	Return to Motor Setup
0	.	000		Back

Drive Motor Setup (Continued)

Step 6: Confirm Configuration

Now confirm the configuration of Drive Motor 1 by reviewing the settings displayed on the Drive Motor 1 button.

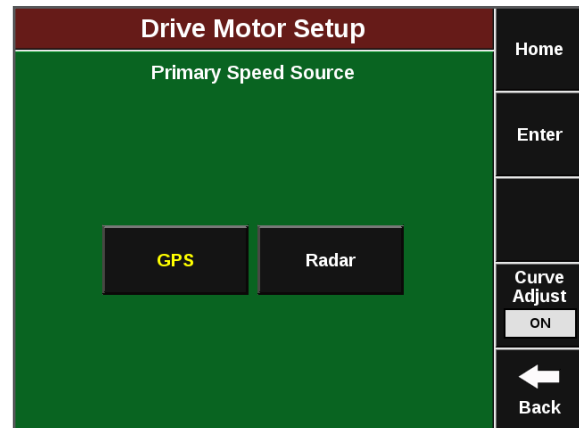
Note: Repeat Steps 1 – 6 for any additional motors.



Primary Speed Source

Primary Speed Source

The second button at the top of the Drive Motor Setup page designates your primary speed source. This should be set to GPS. If it is not, press the button and select GPS.

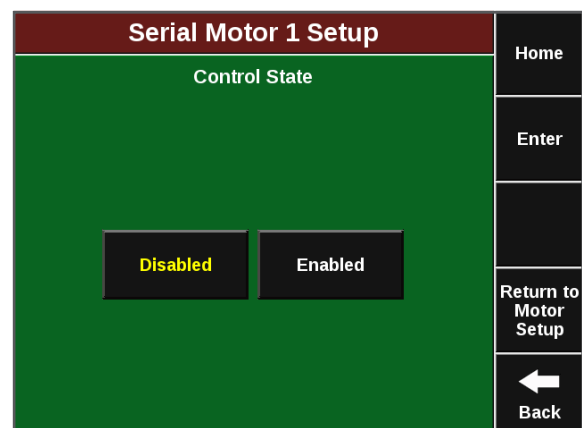


Serial Drive Motor Setup

The Drive Motor Setup screen includes all of the information related to configuring your drive motors. Up to three PWM Drive Motors can be configured OR two serial drive motors can be configured per RFM. For information on configuring PWM drive motors, see page 13. Only serial drive motors with a Rawson AccuRate controller can be used.

Step 1: Control State

To begin drive motor setup, press the black SERIAL MOTOR 1 button and select ENABLED.



Drive Motor Setup (Continued)

Step 2: Select Rows Driven by Motor

Next, select which planter rows will be driven by Serial Motor 1. This may be All, Odd, Even, Left, Right, or List. When selecting List, you will define which rows are not controlled by this motor by touching those row numbers so that they have an "X" over them. When done selecting rows, press ENTER.

Serial Motor 1 Setup			Home
Select Rows Driven by Motor			Enter
All	Odd	Even	
Left	Right	List	Return to Motor Setup
			Back

Note: Steps 3 and 4 are located under the ADVANCED CROP ADJUSTMENTS setup. This can be found under SETUP/CROPS/ADVANCED ADJUSTMENTS. These settings are saved in the monitor on a per crop basis.

Step 3: Enter Base Population

Now, enter the base population that you selected on your Rawson AccuRate controller.

Serial Motor 1 Setup			Home
Enter Base Population			
32000			Enter
7	8	9	Back
4	5	6	-
1	2	3	00
0	.	000	
			Out of RX Default
			Return to Motor Setup
			Back

Step 4: Select Incremental Change

Enter the incremental change that has been entered into your AccuRate controller – 2%, 4%, or 6.67%.

Serial Motor 1 Setup			Home
Select Incremental Change			Enter
2%	4%	6.67%	
			Return to Motor Setup
			Back

Step 5: Confirm Configuration

Now confirm the configuration of Serial Motor 1 by reviewing the settings displayed on the Serial Motor 1 button.

Note: Repeat Steps 1 – 5 for any additional motors.

Drive Motor Setup				Home
Lift Switch	Primary Speed Source	Motor Calibration	Radar State	Enter
Uncalibrated	GPS	Uncalibrated	Uncalibrated	
Drive Motor 1 Disabled	Drive Motor 2 Disabled			↑
Drive Motor 3 Disabled	Serial Motor 1 Rows	Serial Motor 2 Disabled		↓
	All			
	Base			
	32,000			Back

Swath Configuration

The 20/20 RowFlow system can, with one RowFlow Module (RFM), control up to twenty-four (24) swath outputs. These outputs can control individual rows or combinations of rows depending on the type of clutches and other operational considerations. To control more than twenty-four swath outputs, a second RFM will be needed. To configure your swath sections, go to the RowFlow setup page. From the dashboard screen, press SETUP, then select the SYSTEMS tab, and then press the ROWFLOW button. At the top of the RowFlow Setup screen, press the SWATH CONFIGURATION button.

Step 1: Control Style

To begin configuring your swath sections, you will need to select your control style. Press the CONTROL STYLE button in the top left corner of the Swath Section Setup Screen.

Swath Section Setup			
Control Style	Number of Sections	Calibration State	Coverage Pattern
Disabled			

Home

Enter

↑

↓

← Back

Step 2: Swath Control Style

Now select the control style for your swath system. Choose from DISABLED if you want no swath control, ROW CLUTCHES if you have a clutch on each row, DRIVELINE DISCONNECTS if you have a half-width or other width disconnect on the driveline, or HYDRAULIC DRIVE SHUT-OFF if you will use your hydraulic drives for swath control. If you choose hydraulic drive shut-offs you will need to configure your drive motors before continuing to configure your swath control.

Swath Control Style	
Swath Control Style	
Disabled	Row Clutches
Driveline Disconnects	Hydraulic Drive Shut-off

Home

Enter

↑

↓

← Back

Step 3a: Swath Clutch Style

If you select Row Clutches, you will need to select the type of clutch that will be controlled. Choose AIR CLUTCHES for Tru-Count Pneumatic clutches. Choose one of the electric clutch options depending on the harness used. For harnesses from Precision Planting or John Deere as well as AgLeader harnesses which provide single row control, select the ELECTRIC CLUTCHES button under the Air Clutches button. If using a Clutch Merger Harness (Precision Planting part number 727176) select the button with that label. An AgLeader Dual Row Harness refers to a harness that controls pairs of rows across the planter. An AgLeader Dual Ends Harness refers to a harness that controls the two rows on each end of the planter as pairs but controls the other rows in between individually. If application does not fit within the above options, use Electric Clutches Custom Setup.

Swath Control Style	
Air Clutches Tru-Count Pneumatic	
Electric Clutches Ag Leader Dual Row Harness	
Electric Clutches John Deere Harness Precision Planting Harness Ag Leader Single Row Harness	Electric Clutches Ag Leader Dual Ends Harness
Electric Clutches Merger Harness (727176)	Electric Clutches Custom Setup

Home

Enter

↑

↓

← Back

Note: It is critical that the correct Swath Control Style is selected. If the wrong style is selected, the entire system will not clutch correctly.

Swath Configuration (Continued)

Step 3b: Swath Disconnect Style

If you select Driveline Disconnects, you will need to select which type of harness you are using to control those disconnects. Determine whether you are using the 3 Output Harness (Precision Planting part number 727103) or the Relay Module Harness (Precision Planting part number 727115) and select the appropriate button.

Swath Control Style		Home
Swath Disconnect Style		Enter
3 Output Harness (#727103) Relay Module Harness (#727115)		↑ ↓ ←
		Back

Step 4: Number of Sections

Now press the NUMBER OF SECTIONS button in the top row. Select the number of swath sections that you will be controlling. If you selected Hydraulic Drive Shutoffs as your control style, the number of sections will default to the number of configured drive motors and cannot be changed.

Swath Section Setup			Home
Number of Sections			Enter
2	3	4	↑
6	8	12	↓
16	24	32	←
36	Other		Back

Step 5: Assigning Rows to Sections

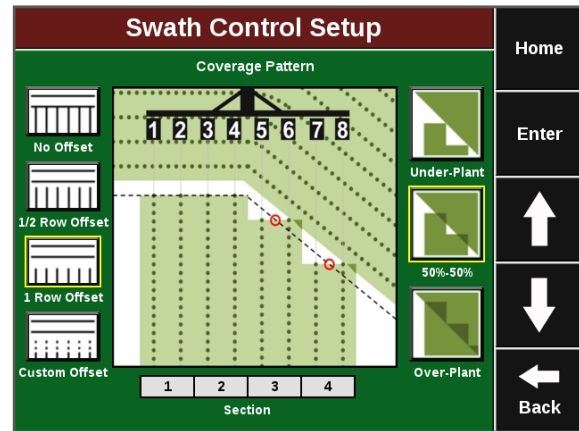
Now you will need to assign rows to sections. You may use the arrow to the left or right of number of rows to set the number of rows in that section. This will also begin to auto-fill row numbers in the "Rows in Section" column. If the row numbers assigned to the section are not correct, you may press the black box with the row numbers in it. This will bring up a list of all rows and you can select which rows are in this section by touching any rows not in the section so that they appear with an "X" over them.

Swath Section Setup				Home
Control Style	Number of Sections	Calibration State	Coverage Pattern	Enter
Elec-Std	8	Auto - Off	Custom Split	↑
Section Number	Number of Rows	Rows in Section		↓
1	< 2 >	1-2		← Back
2	< 2 >	3-4		
3	< 2 >	5-6		
4	< 2 >	7-8		
5	< 2 >	9-10		

Swath Configuration (Continued)

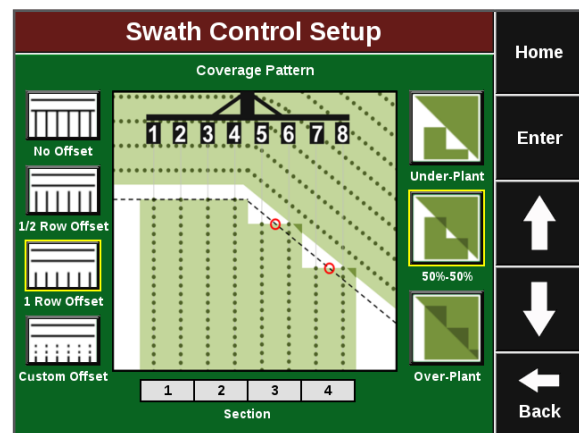
Step 6: Coverage Pattern - Offset

Finally, you will need to define your coverage pattern. This defines how you want the clutches to operate when entering and leaving already-planted areas. All Swath Control methods setups will require you to choose an offset from the left side of the screen. Choosing NO OFFSET directs the swath control to plant right up to the line of seeds previously planted. 1/2 ROW OFFSET will control clutches to plant to within a one-half row-width of the previously planted seeds. If you are using a 30" row planter, this will leave a 15" gap. Selecting 1 ROW OFFSET will leave a full row-width gap and selecting CUSTOM OFFSET allows you to select a custom offset amount.



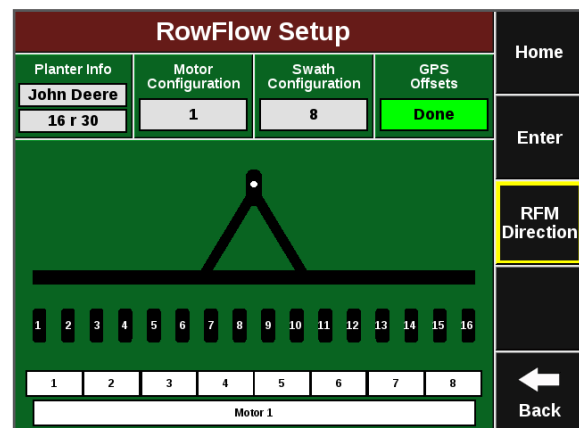
Step 7: Coverage Pattern – Under/Over Plant

If you are controlling individual rows, the selections on the right side will not be available. If, however, you are using individual row clutches but controlling them in multiple row sections, you will have to select one of the options on the right side of the screen. This determines when the multiple row section shuts off when it comes to the offset point chosen at left while at an angle. Choosing UNDERPLANT means that the section will shut off when the first row in the section hits the offset point. Choosing OVERPLANT will shut off the section when the last row in the section hits the offset point. Choosing 50%-50% means that the section will shut off when the middle of the section hits the offset point. Press ENTER when you are done.



Step 8: Confirm Setup

Your Swath Sections are now configured. Press ENTER again to return to the RowFlow Setup screen. A diagram on this screen will show your planter as configured including which rows are controlled by which motors and swath sections. Verify that your setup is correct.



Calibrations

To access the Calibrations menu, press SETUP on the dashboard screen, then select the SYSTEMS tab, and then press the CALIBRATION button.

Calibration				Home
Plant	Systems	Crops	Diagnose	Data
Lift Switch Calibrated	Swath Calibration Auto - Off	Motor Calibration Calibrated	Radar State Calibrated	Enter
Row Unit Load Sensor	RFM Position Calibration	Curve Adjust ON		
				← Back

Lift Switch Calibration

Step 1: Lift Switch Calibration - Lowered

To begin calibrating your lift switch, press the LIFT SWITCH button in the top left corner of the Drive Motor Setup page. Make sure that your planter is lowered completely. Press the large black button in the middle of the screen to calculate your Lowered Percent.

Lift Switch Calibration			Home
Press with the Planter Lowered Completely			Abort Calibration
Lowered Percent	Lifted Percent	Planting Percent	Manual Value Entry
			← Back

Step 2: Lift Switch Calibration – Lifted

Now lift your planter completely. Press the large black button in the middle of the page to calculate your Lifted Percent.

Lift Switch Calibration			Home
Press with the Planter Lifted Completely			Abort Calibration
Lowered Percent	Lifted Percent	Planting Percent	Manual Value Entry
0.0			← Back

Step 3: Lift Switch Calibration – Planting

Lastly, lower your planter to drive engagement height. Press the large black button in the middle of the page to calculate your Planting Percent. Press ENTER when calibration is complete.

Lift Switch Calibration			Home
Press with the Planter at Drive Engagement Height			Abort Calibration
Lowered Percent	Lifted Percent	Planting Percent	Manual Value Entry
0.0	0.0		← Back

Calibrations (Continued)

Lift Switch Calibration - Rawson Drives

When controlling Rawson drives through an AccuRate controller, a lift switch is not needed in the RowFlow system. The lift switch in the Rawson system continues to provide information to the AccuRate controller for lift state.

Drive Motor Setup				Home
Lift Switch Uncalibrated	Primary Speed Source GPS	Motor Calibration Uncalibrated	Radar State Uncalibrated	Enter
Drive Motor 1 Disabled		Drive Motor 2 Disabled		↑
Drive Motor 3 Disabled		Serial Motor 1 Rows All	Serial Motor 2 Disabled	↓
		Base 32,000		← Back

PWM Motor Calibration

Step 1: Motor Calibration

To determine the gear ratio of your drive motors, press the MOTOR CALIBRATION button at the top of the Drive Motor Setup screen. This screen will list the motors that you have configured as well as a default gear ratio and stop delay. To calibrate your motors, press the RUN CAL button on the right side of the screen.

Motor Calibration				Home
Motor 1	Motor 2	Motor 3		Enter
Gear Ratio 3.000	Gear Ratio --	Gear Ratio --		Seed Run Cal
Stop Delay 0.500	Stop Delay --	Stop Delay --		Motor Start Value
			More	← Back

Step 2: Prepare to Plant

In order to run the motor calibration to determine your gear ratio, you will need to ensure that you have hydraulic pressure to your motor(s), seed (at least 200) in at least four rows for each motor (for example, if you have two motors, you will need seed in a total of eight rows, four rows for each motor), and vacuum on, if applicable. It is important to note that calibration must be done with a singulated crop, like corn. Results will be inaccurate with a non-singulated crop such as soybeans.

Note: If you are using WaveVision seed tube sensors, the sensors will first calibrate before starting the motor calibration, and you will need seed on ALL rows of each motor.

Motor Calibration		Home
Prepare to Plant		
- Hydraulic Pressure to Motor - Seed (200 seeds) in at least four (4) rows of each motor - Vacuum On (if applicable)		
Press to Continue		
NOTE: Calibration MUST be done with a Singulated crop (Corn) Results will be inaccurate with a non-Singulated crop (Soybeans)		← Back

Step 3: Calibrating Motors

Before proceeding, ensure that the driveline is clear and that no one is working near the motors, driveline, or meters. To calibrate, lift and hold the Auto-Load switches as shown on the screen to start the process.

Motor Calibration		Home
WARNING: Motor will Turn!		
Ensure that the Driveline is Clear		
		Cancel
Continue Holding Auto-Load Switches 0% Complete		
		← Back

Calibrations (Continued)

Step 4: Calibration Complete

Once calibration is complete, you will be shown the calibration values for each motor that is configured and the bottom of the screen will indicate that Calibration is Complete. If you have more than three motors (using a second RowFlow Module), press the MORE MOTORS button on the right side of the screen and repeat the process with those motors. Press ENTER when finished to return to the Drive Motor Setup screen.

Motor Calibration			Home
Motor 1	Motor 2	Motor 3	Enter
Gear Ratio 3.000	Gear Ratio --	Gear Ratio --	Seed Run Cal
Stop Delay 0.500	Stop Delay --	Stop Delay --	Motor Start Value
More			Back

Radar Calibration

Step 1: Radar Calibration

To calibrate your radar, press the RADAR STATE button in the top right hand corner of the Drive Motor Setup screen. To calibrate the radar, you will need to be able to drive the tractor straight forward at a speed of 4 mph or greater for up to 300 feet. You will need good GPS reception during the entire calibration. When ready, begin driving and press the black BEGIN CALIBRATION button in the middle of the screen.

Radar Calibration	Home
To calibrate the radar, the tractor must be driving straight forward at a constant speed of 4 mph or greater for about 300 ft. Good GPS Reception is required!	
Press to Begin Calibration	Run Cal
Pulses per Foot 0.00	Manual Value Entry
	Back

Step 2: Calibrating

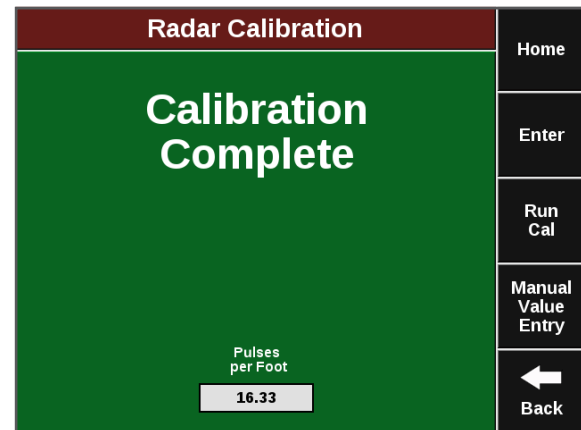
While calibration is in process, you will be updated on your distance traveled at the bottom of the screen. If you need to cancel the calibration and start over, press the CANCEL button.

Radar Calibration	Home
Calibrating Touch to Cancel	
Distance Traveled 48.5 ft	Back

Calibrations (Continued)

Step 3: Calibration Complete

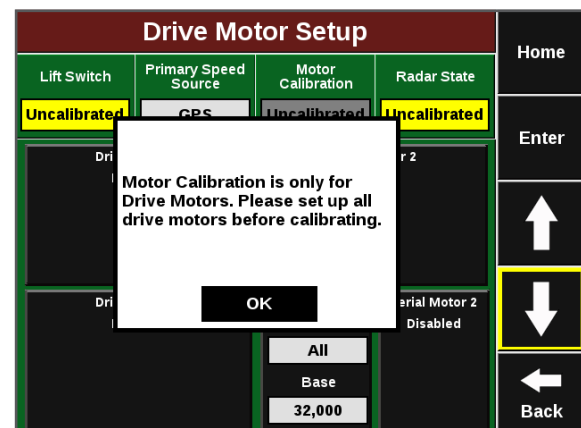
When calibration is complete, your radar calibration, in pulses per foot, will be displayed. Press ENTER to return to the Drive Motor Setup screen. Your drive motors are now configured, calibrated, and ready for use.



Serial Motor Calibration

Serial Motor Calibration

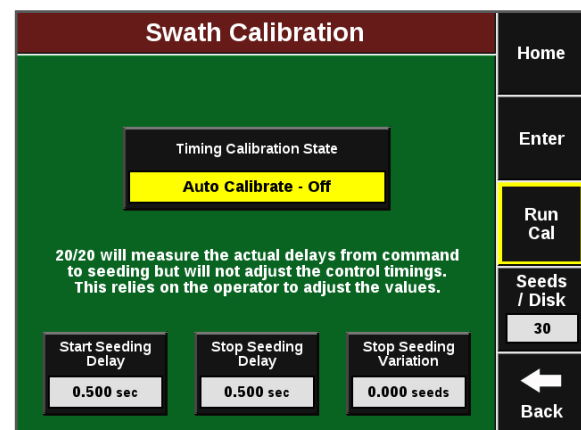
When controlling Rawson drives through an AccuRate controller, calibration is done through the AccuRate.



Swath Calibration

Step 1a: Swath Calibration for Ground Drive Planters

You will need to calibrate your swath control timing. Press the CALIBRATION STATE button at the top of the Swath Section Setup page. For ground drive planters, have the Auto Calibrate feature ON as you begin planting. This will get your delays close to accurate. After making a few passes, check the accuracy of the start and stop delays by digging seed where you enter and exit headlands. If you are satisfied, turn Auto Calibrate OFF and continue planting. If adjustments are needed, turn Auto Calibrate OFF and manually adjust the delays.



Calibrations (Continued)

Step 1b: Swath Calibration for Hydraulic Drive Planters

Next, you will need to calibrate your swath control timing. Press the CALIBRATION STATE button at the top of the Swath Section Setup page. For hydraulic drive planters, make sure the Auto Calibrate is set to OFF and proceed to step 2 to run the Calibration tool.

Swath Calibration		Home
Timing Calibration State Auto Calibrate - Off 20/20 will measure the actual delays from command to seeding but will not adjust the control timings. This relies on the operator to adjust the values. Start Seeding Delay 0.500 sec Stop Seeding Delay 0.500 sec Stop Seeding Variation 0.000 seeds		Enter
		Run Cal
		Seeds / Disk 30
		Back

Step 2: Swath Calibration

To perform the initial calibration, press the RUN CAL button on the right side of the Swath Calibration screen. To calibrate, you will need to be planting: hex shaft turning and 300 seeds in at least four hoppers plus vacuum on and air tank for clutches filled if applicable. Press the PRESS TO CONTINUE button.

Swath Calibration		Home
Prepare to Plant - Hydraulic Pressure to Motor - Seeds (300 seeds) in at least four (4) hoppers - Vacuum (if applicable) - Air Tank Filled (if applicable) Press to Continue		Cal Speed 6.0mph
		Back

Step 3: Swath Calibration

Before proceeding, ensure that the driveline is clear and that no one is working near the motors, driveline, or meters. To calibrate, lift and hold the Auto-Load switches as shown on the screen to start the process.

Swath Calibration		Home
WARNING: Motor will Turn! Ensure that the Driveline is Clear  Lift and Hold Auto-Load Switches to Start Process		Cancel
		Back

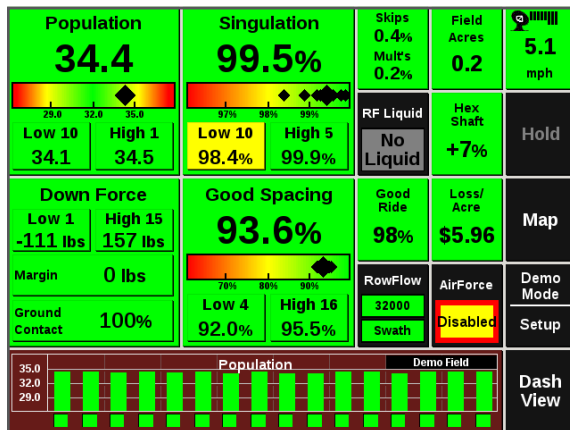
Step 4: Calibration Complete

Once the calibration is complete, note the start and stop delays as well as the delay variation. Press ENTER when you are finished. Press ENTER again to return to the Swath Section Setup screen.

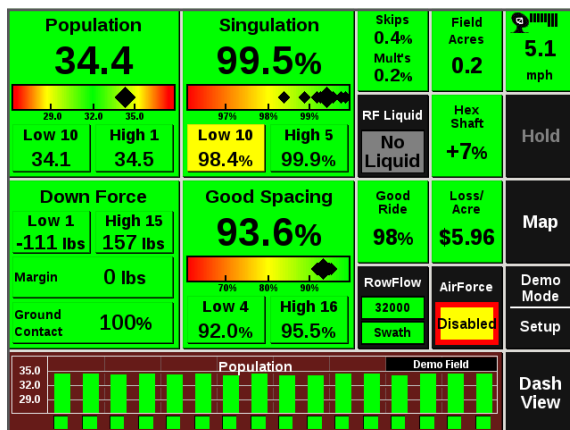
Swath Calibration		Home
Calibration Complete Press to Recalibrate Start Delay 0.500 seconds Stop Delay 0.500 seconds Stop Delay Variation 0.000 seeds		Enter
		Seeds / Disk 30
		Back

RowFlow Operations

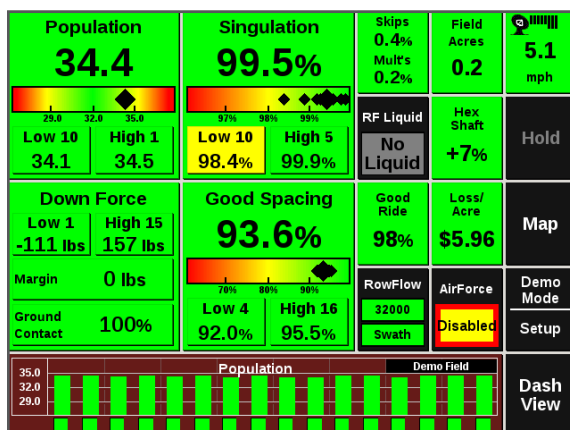
Dashboard Screen



The Variable Rate Seeding and Swath Control functions of 20/20 RowFlow are controlled through the 20/20 SeedSense monitor. When a RowFlow module is detected, a RowFlow button is automatically added to the dashboard screen to the left of the Setup button.



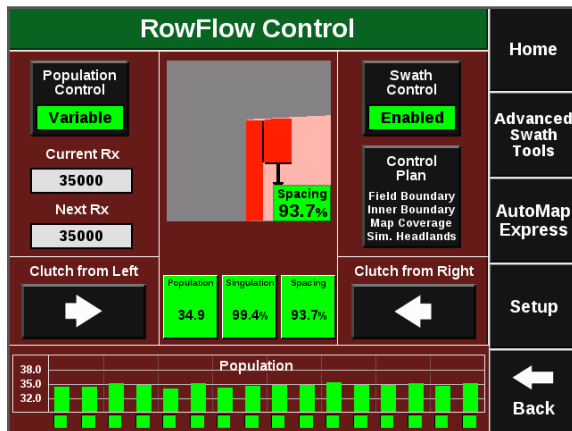
The RowFlow button displays the status of the two functions of RowFlow, Variable Rate and Swath Control. A green box indicates that the feature is detected and configured. A yellow box indicates that the feature is detected but not configured. A grey box indicates that the function is not detected. In addition to displaying status, pressing the ROWFLOW button takes you to the RowFlow control screen.



When the Swath Control function is active, the dashboard mini chart (DMC) shows which rows are tied together in common swath sections with a series of boxes below the population bars on the Population DMC. In this case, a 16 row planter is setup with 16 individual row sections.

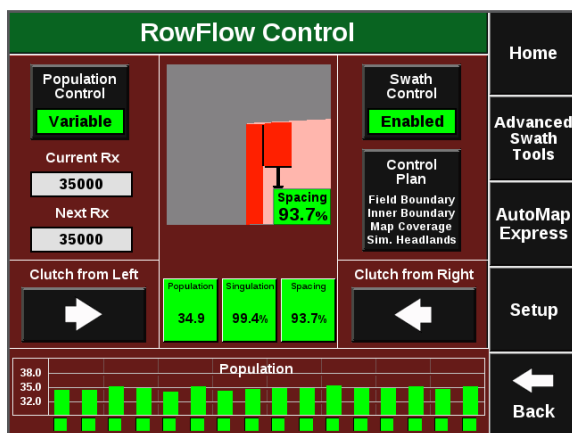
RowFlow Operations (Continued)

RowFlow Control Screen



The RowFlow Control screen is the central location for all variable rate and swath control features in the SeedSense monitor display. The center of the screen displays a coverage map with current population, singulation, and spacing values displayed below the map. The Population dashboard mini chart is displayed at the bottom of the screen for reference in both variable rate and swath control operations.

Variable Rate Control



Variable Rate control is located on the left side of the screen. The status button at the top indicates whether Variable Rate control is “Enabled” or “Manual”. Pressing this button enables and disables Variable Rate control. Below the status button, the current population is displayed along with the next population in the prescription.

Cab Control Module

Master Plant Control Switch

Single switch to turn on or off hydraulic drives, this can also be done within the SeedSense Monitor.

Master Swath Control Switch

Single switch to turn on or off Swath Control functionality, this can also be done within the SeedSense Monitor.



Section Plant Control Switches

Individual switches to control hydraulic drive motors. These are separated to three momentary switches; Left, Center, and Right.

RowFlow Operations (Continued)

CCM Auto Load

The Auto Load functionality on the Cab Control Module will allow the user to initiate the hydraulic drives in one of two modes. This will be accomplished by pushing up on the Left and Right switches simultaneously. Both of these modes will require the tractor to be running, hydraulic flow supplied to the motors, and the vacuum (or pressure) blowers on—if applicable.

Mode 1: Meter Load

By pushing up on the switches and immediately releasing, RowFlow will initiate the hydraulic motors and spin them for 1.5 meter revolutions or until 3 seeds are seen from each meter (whichever comes first). If clutches are installed, RowFlow will clutch individual rows out as they reach 3 seeds and continue to spin the remaining meters for the full 1.5 revolutions.

Mode 2: Meter Spin

By pushing up on the switches and holding them, RowFlow will spin the meters continuously until the switches are released.

RowFlow Control				Home
Population Control Manual	Pop Setpoints	Single	Swath Control Enabled	Advanced Swath Tools
+500 Adjust 32000 -500 Adjust	29000	35000	Control Plan Field Boundary Inner Boundary Map Coverage Sim. Headlands	AutoMap Express
Clutch from Left ➡	0	0	Clutch from Right ⬅	Setup
35.0 32.0 29.0 Population 35.0 32.0 29.0				

Pressing the POPULATION CONTROL button toggles between variable control and manual control. When switched to manual control, the prescription is ignored and continues to plant at the population being planted at the time the system disables. To control population again based on the variable rate prescription, press the VARIABLE RATE button. This returns the variable rate status to “Enabled”.

RowFlow Control				Home
Population Control Manual	Pop Setpoints	Single	Swath Control Enabled	Advanced Swath Tools
+500 Adjust 32000 -500 Adjust	29000	35000	Control Plan Field Boundary Inner Boundary Map Coverage Sim. Headlands	AutoMap Express
Clutch from Left ➡	0	0	Clutch from Right ⬅	Setup
35.0 32.0 29.0 Population 35.0 32.0 29.0				

When population control is switched to “Manual”, the planter continues to plant at the population being planted when variable rate was disabled. To change populations manually, you can either select one of up to eight preset populations (set on the “Population” screen under the “Plant” tab) or you can adjust the population up or down in 500 seed increments using the arrows on the left side of the screen. Also, by toggling the Single/Multi button, you can either select one rate across the entire planter, or you can select a manual rate for each drive motor.

Crop Setup				Home
Plant	Systems	Crops	Diagnose	Data
Corn (Active)				Change Crop
Seeds / Disk 30	Motor Default Pop 32,000	Active Rows All	Coverage Pattern 0 Split	Edit Crop Name
Quick Adjust Pop 500	Spacing Limit 90.0%	Offset Distance D --	Offset Distance E --	Restore Defaults
Economic Adjustments	Limit Adjustments	Liquid Alerts	Advanced Adjustments	Back

To adjust the incremental change value in the population adjust button to a number different than +/- 500, go to the CROPS tab under the SETUP button. Press the QUICK ADJUST button and select a new value.

RowFlow Operations (Continued)

Loading a Prescription

Variable Rate Seeding Prescriptions for 20/20 RowFlow can be generated in many computer programs including AutoMap from Precision Planting, MapShots EasiSuite, FarmWorks, AgLeader SMS, APEX, and other programs that can export a prescription as a shape file. Many prescriptions may be stored in the memory of the Display Unit. Each field can have one active prescription at a time. Prescriptions may also be created using AutoMap Express in the SeedSense display. Instructions for using AutoMap Express begin on page 30 of this manual. For instructions on how to import prescriptions through FieldView, please reference the FieldView Operations manual.

Data Import				Home
Plant	Systems	Crops	Diagnose	Data
Planting Config Read Planter, Field, Crop, and Seed Configurations		System Config Read Display, Sound, and Down Force Settings		Enter
Field Map Data Read Planting Field Map Data for use in Harvest Replay		Prescrip/Boundary Read Prescriptions and Boundary Files		↑
Swath Coverage Map Read Swath Coverage Map from another 20/20 System.		Crop Config Read Field, Crop, and Seed Configurations		↓
				← Back

To Import prescription files into the SeedSense display unit, load the files onto a USB flash drive and insert the drive into the display unit. From the dashboard screen select SETUP, then the DATA tab, and then IMPORT. On the Data Import screen, press PRESCRIP/BOUNDARY. This will import both prescription and boundary files into the display unit.

Field Setup			Home
Client / Farm Demo Client Demo Farm	Field Name Demo Field	Entrance 0.00000 0.00000	Make Active
Field Number	Tillage	Field Acres 0.0	
		Prescription RowFlow Demo Pop	Delete Field
		1 Population	Delete Coverage Map
		→	
		→	
		Boundary File RowFlow Demo Bound	← Back

To load a prescription file for a particular field, go to the Field Setup screen for that field. To get to the Field Setup screen from the dashboard, press SETUP, then the FIELD button, and then select the appropriate field. Press the PRESCRIPTION button near the bottom right of the screen.

RowFlow Operations (Continued)

Field Setup	
Select Prescription File	Home
** None ** (No Prescription Map)	Enter
Demo_Field_AME.xml	
Demo_Field_B00	↑
Demo_Field_B01	
Headland Pop	↓
RowFlow Demo Boundary	
RowFlow Demo Pop	←
	Back

Select the prescription that you would like to load for this field from the list. You may need to use the up and down arrows on the right side of the screen to scroll through the list to find the desired prescription, and press ENTER.

Field Setup	
Select Seeding Prescription Attribute	Home
** None **	Enter
Population	
	↑
	↓
	←
Single Attribute	Back
Specific Attribute per Motor	

Next, select SINGLE ATTRIBUTE or SPECIFIC ATTRIBUTE PER MOTOR at the bottom of the screen, select the desired attribute, and press ENTER. Repeat if applying specific attributes per motor.

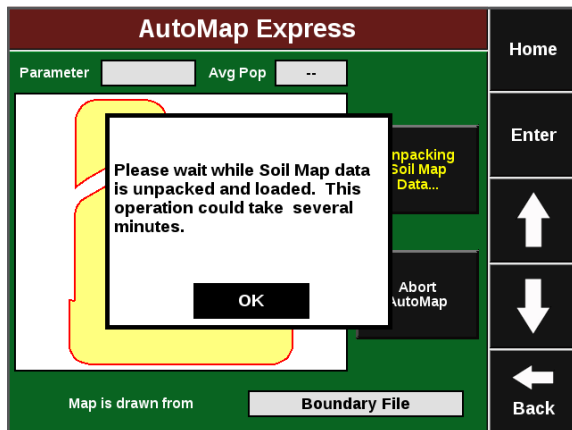
Field Setup		
Client / Farm	Field Name	Entrance
Demo Client	Demo Field	0.00000
Demo Farm		0.00000
Field Number	Tillage	Field Acres
		0.0
		Prescription
		RowFlow Demo Pop
		1 Population
		--
		--
		Boundary File
		RowFlow Demo Bound
		Back
		Make Active
		Delete Field
		Delete Coverage Map

Once you have selected the prescription, verify on the Field Setup screen that the correct prescription is loaded. Look at both the PRESCRIPTION button and the picture of the field.

RowFlow Operations (Continued)

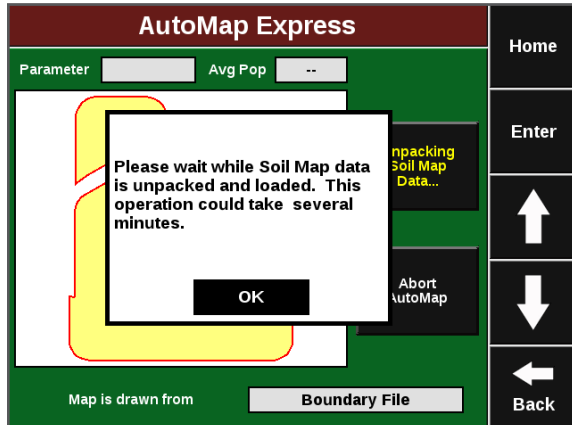
AutoMap Express

AutoMap Express is a feature within the 20/20 display that allows you to generate variable rate seeding prescriptions while in the field. To use AutoMap Express, you will need to plant around the outside edge of your field, record a boundary by driving the border of the field with a tractor or ATV immediately before creating the prescription, or import an RTK-quality boundary. Any of these methods will allow AutoMap Express to load the USDA soil data for the field and generate a soil zone-based prescription map.



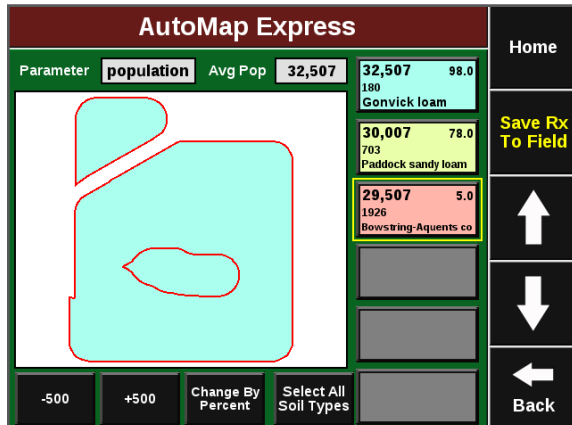
Step 1:

Once you have loaded a boundary for the field or planted a pass around your field, you may use AutoMap Express. Press the **ROWFLOW** button on the home screen and then press the **AUTOMAP EXPRESS** button on the right side of the screen. Insert a USB drive with USDA soil data for your county and press **GET USDA SOIL MAP FOR FIELD**.



Step 2:

You may also choose to get the "USDA Soil Map for Field" before you have closed coverage. If you do, it will generate a map based on the farthest extents of the area you have planted.



Step 3:

Once the soil map loads (this process may take up to two minutes), you will be able to see the different soil types both on the map and on the corresponding colored buttons on the right. The name of the soil type will be displayed below the population on each soil type button. The number displayed is the Corn Yield Index, if available. If that is not available, Crop Productivity Index is used. If neither value is available, then N/A is displayed.

RowFlow Operations (Continued)

AutoMap Express

Parameter **population** Avg Pop **32,507**

32,507 98.0
180
Gonvick loam

30,007 78.0
703
Paddock sandy loam

29,507 5.0
1926
Bowstring-Aquents co

-500 +500 Change By Percent Select All Soil Types

Home

Save Rx To Field

↑

↓

← Back

Step 4:

To set a population for a particular soil type, press the soil type button and it will be highlighted in yellow. Adjust the population up or down from the base population in 500 seed increments using the arrows at the bottom left hand side of the screen. As you adjust the population of a soil type, the average population value at the top of the screen increases or decreases to reflect the changes.

AutoMap Express

Parameter **population** Avg Pop **32,507**

32,507 98.0
180
Gonvick loam

30,007 78.0
703
Paddock sandy loam

29,507 5.0
1926
Bowstring-Aquents co

-500 +500 Change By Percent Select All Soil Types

Home

Save Rx To Field

↑

↓

← Back

Step 5:

To adjust the target population of all soil types together, press the "Select All Soil Types" button. All soil types will now be highlighted. You can now adjust the target populations of all soil types at the same time using the arrows at the bottom left of the screen.

Crop Setup

Plant Systems **Crops** Diagnose Data

Corn (Active)

Seeds / Disk Motor Default Pop Active Rows Coverage Pattern

30 32,000 All 0 | Split

Quick Adjust Pop Spacing Limit Offset Distance D Offset Distance E

500 90.0% -- --

Economic Adjustments Limit Adjustments Liquid Alerts Advanced Adjustments

Home

Change Crop

Edit Crop Name

Restore Defaults

← Back

To adjust the incremental change value in the population adjust button to a number different than +/- 500, go to the CROPS tab under the SETUP button. Press the QUICK ADJUST button and select a new value.

AutoMap Express

Parameter **population** Avg Pop **32,507**

32,507 98.0
180
Gonvick loam

30,007 78.0
703
Paddock sandy loam

29,507 5.0
1926
Bowstring-Aquents co

-500 +500 Change By Percent Select All Soil Types

Home

Save Rx To Field

↑

↓

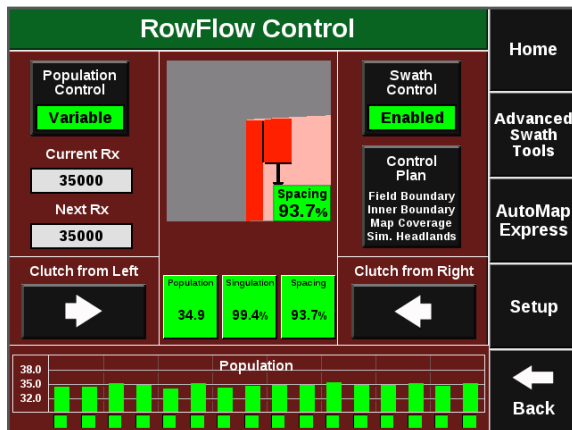
← Back

Step 6:

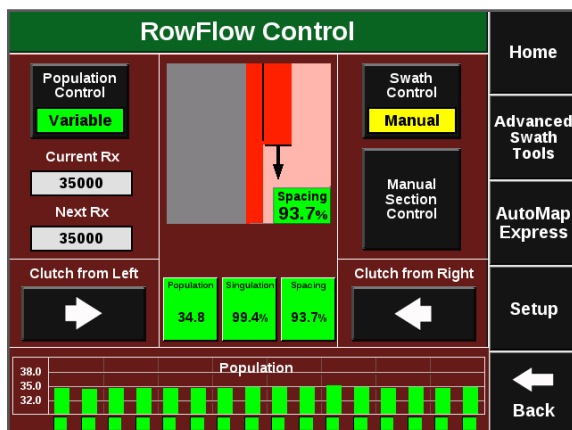
Once you have set the populations of each soil type, press the "Save Rx to Field" button on the right side of the screen. This saves the prescription to the active field and takes you to the Field Setup screen. You are now ready to continue planting the field.

RowFlow Operations (Continued)

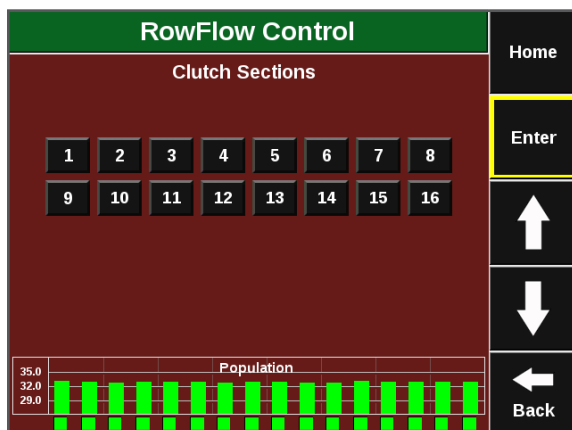
Swath Control



Swath Control is located on the right side and lower part of the screen. The status button at the top indicates whether Swath Control is “Enabled” or “Manual”. Pressing this button enables and disables Swath Control. Swath Control switches to manual when you press the status button or when you press one of the arrow buttons at the bottom of the screen.

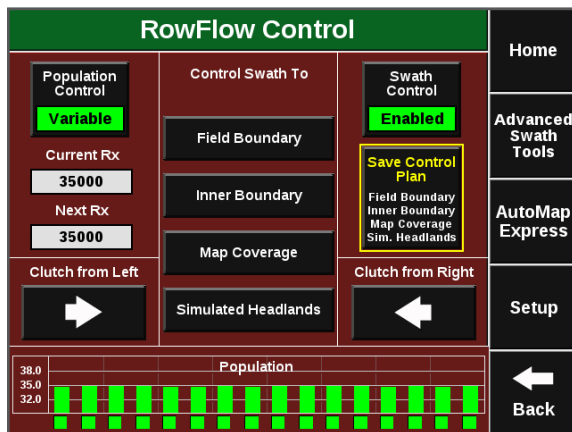


Once Swath Control is in manual mode, you now have two methods for manual control. If you want to shut off sections beginning on one end of the planter and moving across, press the arrow under either “Clutch from Right” or “Clutch from Left”. Each time you press an arrow it will shut off or turn on one section. You may also select “Manual Section Control”.

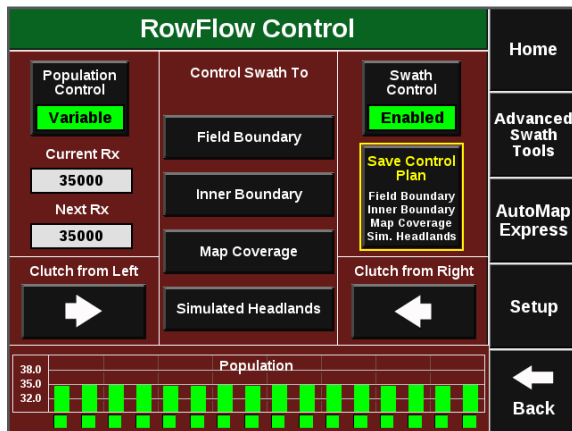


When you press MANUAL SECTION CONTROL, a new screen will display with your clutch sections. Press a section to shut it off. The text on the button will turn grey with an X on it to indicate that it is shut off. Press the down arrow to get to other sections.

RowFlow Operations (Continued)

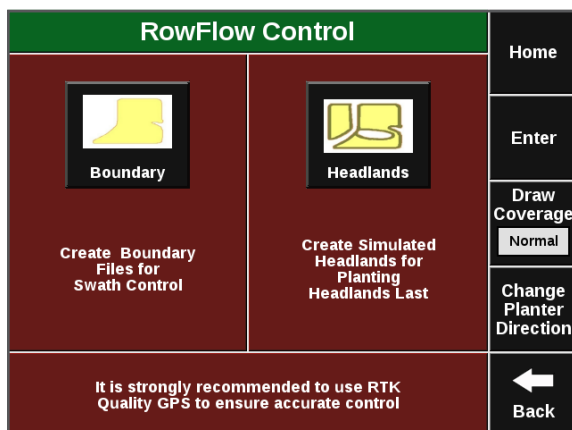


The “Control Plan” button allows you to define the features to which your clutches respond. There are four options. You can control to all four, to only one, or to any combination of the four. Pressing one of the options in the center of the screen will disable it as a control feature. The title will turn grey with a line through it. Once you have selected your control plan, press the “Save Control Plan” button.



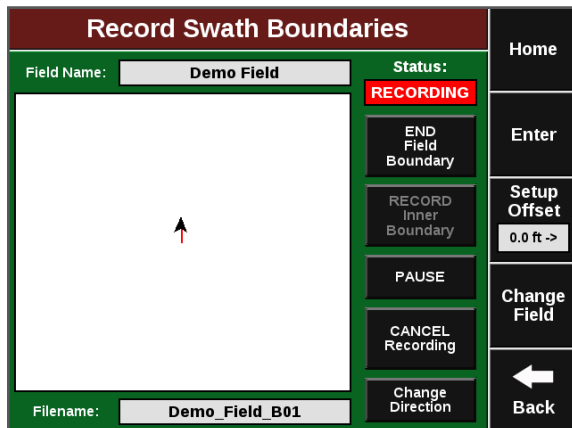
There are four features to which Swath Control will respond. Selecting “Field Boundary” or “Inner Boundary” indicates that you want your sections to shut off when outside of the field boundary or inside an inner boundary. Selecting “Map Coverage” indicates that you want the clutches to shut off when crossing into an already planted area. Selecting “Simulated Headlands” controls clutches to an offset from your field boundaries to enable headlands to be planted last.

Boundaries and Simulated Headlands



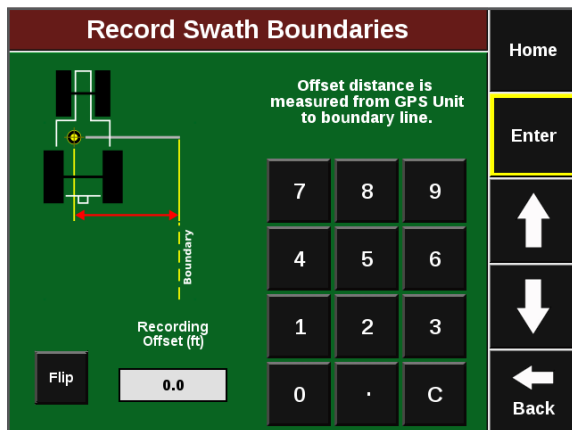
Pressing the “Advanced Swath Control” button on the RowFlow Control screen gives access to two Advanced Swath Tools. These tools should only be used with RTK quality GPS to ensure accurate performance. Using poorer quality GPS can result in drifting boundaries and inaccurate clutch control.

RowFlow Operations (Continued)



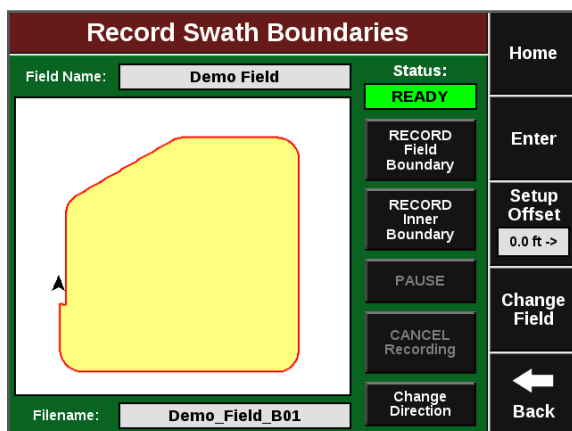
Step 1:

Pressing the BOUNDARY button takes you to the Record Swath Boundaries screen. Boundaries recorded are for Swath Control only. They do not play a role in variable rate seeding except that they can be used in AutoMap Express to generate a soil map.



Step 2:

Before recording a boundary, you will need to enter a Recording Offset Point. Press the SETUP OFFSET button on the Record Swath Boundaries page (see above). Now, enter the distance from the GPS unit to where you would like the boundary line to be recorded. If you are recording to the opposite side of the vehicle, press the FLIP button. When done, press ENTER to return to the recording screen.



Step 3:

To begin recording, press the RECORD FIELD BOUNDARY button (see above). As you drive the boundary, it will be displayed on the screen. Press the PAUSE button to pause recording (such as when turning a corner) and CANCEL to cancel the recording. If you are planting while recording, you may press HOME to see the dashboard screen.

RowFlow Operations (Continued)

	Population 0.0 Not Planting	0.0 mph
	Singulation 100% Low 5 High 5	PAUSE Recording Boundary
	Spacing 100% Low 5 High 5	Home
	Setup	
35.0 32.0 29.0	Population Demo Field	Dash View

Step 4:

If planting while recording a boundary, the black button below the speed indicator will indicate your recording status. Pressing this button will return you to the Record Swath Boundaries screen.

Record Swath Boundaries		Home
Field Name: Demo Field	Status: RECORDING	Enter Setup Offset 0.0 ft -> Change Field Back
	END Field Boundary	
	RECORD Inner Boundary	
	PAUSE	
	CANCEL Recording	
Filename: Demo_Field_B01	Change Direction	

Step 5:

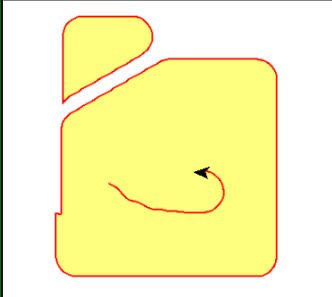
Once your boundary comes within one offset-width of the starting point, you will be prompted to either close the boundary or continue recording. This completes the recording of the field boundary.

Record Swath Boundaries		Home
Field Name: Demo Field	Status: READY	Enter Setup Offset 0.0 ft -> Change Field Back
	RECORD Field Boundary	
	RECORD Inner Boundary	
	PAUSE	
	CANCEL Recording	
Filename: Demo_Field_B01	Change Direction	

Step 6:

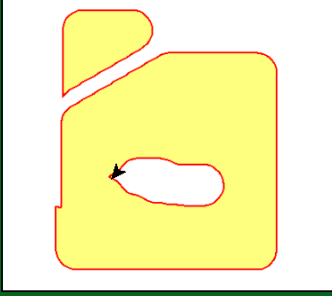
You may now choose to record an additional Field Boundary using the same process. This must be a boundary applying to the same field.

RowFlow Operations (Continued)

Record Swath Boundaries		Home
Field Name: Demo Field	Status: RECORDING	Enter
	RECORD Field Boundary	Setup Offset 0.0 ft ->
	END Inner Boundary	Change Field
	PAUSE	Back
	CANCEL Recording	
	Change Direction	
Filename: Demo_Field_B01		

Step 7:

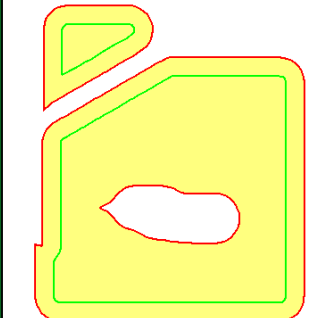
Once a Field Boundary is complete, you may record inner boundaries within the field to designate no-plant areas. Press the RECORD INNER BOUNDARY button to begin and END INNER BOUNDARY to complete the boundary. You may pause or cancel this recording if needed. When you press PAUSE that button will become RESUME.

Record Swath Boundaries		Home
Field Name: Demo Field	Status: READY	Enter
	RECORD Field Boundary	Setup Offset 0.0 ft ->
	RECORD Inner Boundary	Change Field
	PAUSE	Back
	CANCEL Recording	
	Change Direction	
Filename: Demo_Field_B01		

Step 8:

As you record the boundary, it is automatically recorded in the list of boundary files unless you press CANCEL RECORDING before it is complete. When you have finished a set of boundaries for a field, you may press HOME or BACK to leave this page.

Creating Simulated Headlands

Simulated Headlands		Home
Field Name: Demo Field		Enter
	Headland Width 20.0 ft	
	REMOVE Field Boundary Headland	
	CREATE Inner Boundary Headland	Back

Pressing the HEADLANDS button on the Advanced Swath Tools page brings you to the Simulated Headlands screen. If you wish to plant your headlands last, you can use this feature to offset your field boundary, generating simulated headlands where your clutches will turn off as though you had already planted there.

RowFlow Operations (Continued)

Simulated Headlands	
Field Name: Demo Field	Home
	Enter
Headland Width 20.0 ft	
REMOVE Field Boundary Headland	
CREATE Inner Boundary Headland	Back

To create a simulated headland, you first need to designate the width of the headland you would like to create. Press the HEADLAND WIDTH button and enter the desired width, in feet. Now, you can press the CREATE FIELD BOUNDARY HEADLAND and/or the CREATE INNER BOUNDARY HEADLAND buttons to create a simulated headlands. To remove the simulated headlands, press the buttons which are now labeled REMOVE.

Loading a Field Boundary

Swath boundaries for 20/20 RowFlow can be generated in many computer programs including MapShots EasiSuite, FarmWorks, AgLeader SMS, APEX, and other programs that can export a boundary as a shape file. Many boundary files may be stored in the memory of the Display Unit. Each field can have only one active boundary at a time. Boundaries may also be created using the Record Boundary feature in the SeedSense display unit as described in the preceding pages.

Data Import					
Plant	Systems	Crops	Diagnose	Data	Home
Planting Config Read Planter, Field, Crop, and Seed Configurations		System Config Read Display, Sound, and Down Force Settings		Enter	
Field Map Data Read Planting Field Map Data for use in Harvest Replay		Prescrip/Boundary Read Prescriptions and Boundary Files		↑	
Swath Coverage Map Read Swath Coverage Map from another 20/20 System.		Crop Config Read Field, Crop, and Seed Configurations		↓	
				Back	

To Import boundary files into the SeedSense display unit, load the files onto a USB flash drive and insert the drive into the display unit. From the dashboard screen select SETUP, then the DATA tab, and then IMPORT. On the Data Import screen, press PRESCRIP/BOUNDARY. This will import both prescription and boundary files into the display unit.

Field Setup			
Client / Farm	Field Name	Entrance	Home
Demo Client	Demo Field	0.00000	Make Active
Demo Farm		0.00000	
Field Number	Tillage	Field Acres	
		0.0	
		Prescription	Delete Field
		RowFlow Demo Pop	
		1 Population	Delete Coverage Map
		Boundary File	Back
		RowFlow Demo Bound	

To load a boundary file for a particular field, go to the Field Setup screen for that field. To get to the Field Setup screen from the dashboard, press SETUP, then the FIELD button, and then select the appropriate field. Press the BOUNDARY FILE button near the bottom right of the screen.

RowFlow Operations (Continued)

Field Setup	
Select Boundary File	
** None ** (No Boundary File)	
Demo_Field_B00	Home Enter ↑ ↓ ← Back
Demo_Field_B01	

Select the boundary that you would like to load for this field from the list. You may need to use the up and down arrows on the right side of the screen to scroll through the list to find the desired boundary.

Field Setup			Home
Client / Farm	Field Name	Entrance	Make Active
Demo Client	Demo Field	0.00000	
Demo Farm		0.00000	
Field Number	Tillage	Field Acres	Delete Field Delete Coverage Map
		0.0	
		Prescription	← Back
		RowFlow Demo Pop	
		1 Population	
		Boundary File	
		RowFlow Demo Bound	

Once you have selected a boundary, verify on the Field Setup screen that the correct boundary is loaded.

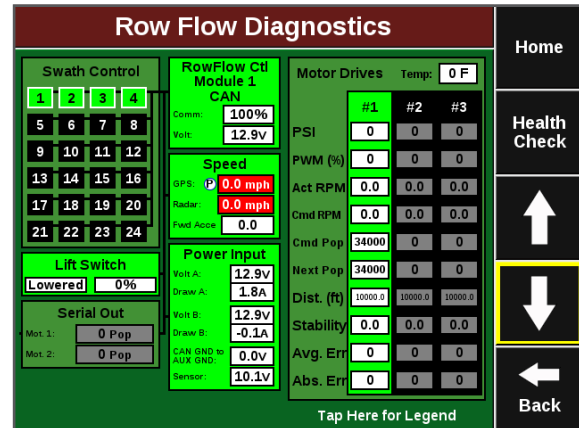
RowFlow Diagnostics & Health Checks

Diagnostics

Once you have installed, setup, and calibrated your Rowflow system, it is recommended to review the RowFlow Diagnose page and run any Health Check that pertains to the components installed. The Diagnose page can be found under SETUP/DIAGNOSE/ROWFLOW. The second RFM, which includes clutch outputs 25-48 and hydraulic drives 4-6 can be found by hitting the down arrow. The Health Checks can be found under SETUP/SYSTEM/HEALTH CHECK or it can be found under SETUP/SYSTEM/DIAGNOSE/ROWFLOW/HEALTH CHECK.

The first section is the **Rowflow Control Module CAN** communication and voltage. Acceptable range for communication is >90%, and >11V.

The next section is the **Swath Control** section of the Diagnose page. Each box number represents its respective clutch output. Below is a table referencing acceptable voltages and what color you will see on the diagnose page.

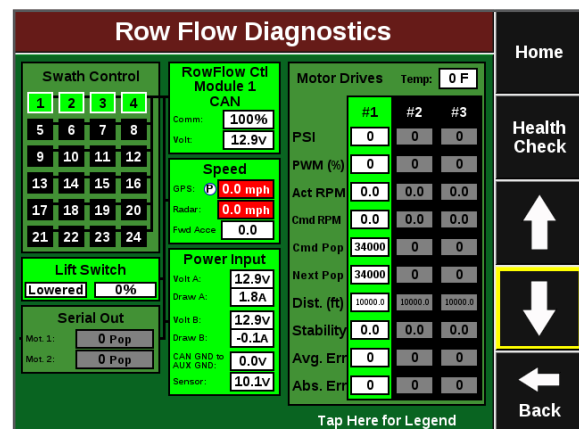


Swath Box Color	Swath Output Status	RFM Output Voltage
Green	Complete Circuit; Good	1.7 volts
Green, White Box	Complete Circuit; Good; Clutch Activated	12 volts
Red	Incomplete Circuit; Clutch not detected	4.7 volts
Black	Clutch output not configured	0 volts

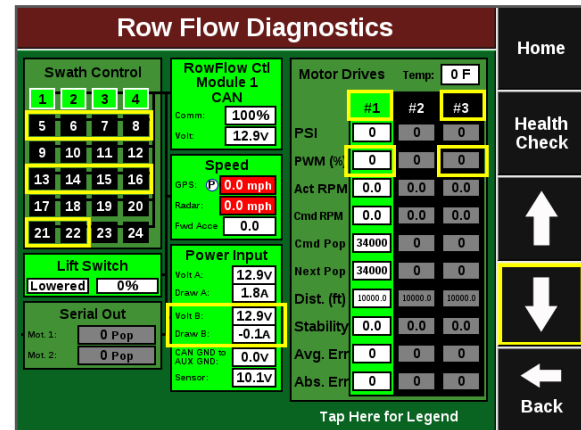
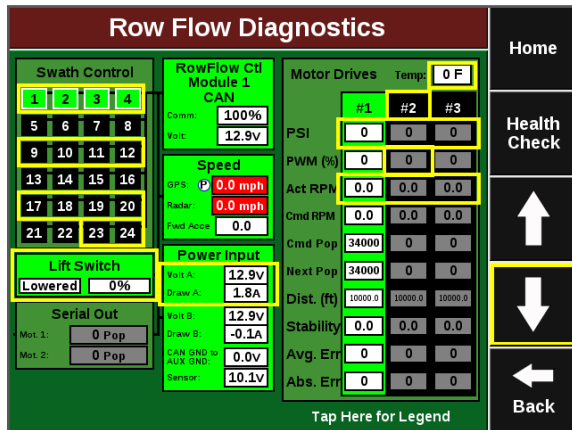
Below the Swath Control box is the **Lift Switch**. This box will show the current position of the switch based upon the initial calibration, as well as the percentage of sensor voltage the switch is allowing through. This box turns red/green based upon initial calibration, instead of a completed circuit. Green equals Calibrated, Red equals Uncalibrated.

The **Serial Out** box applies only to Rawson Drives. It will show the commanded population going to the serial drive.

In the center of the page we have the **Speed** box. This box shows the GPS, and Radar speed, as well as the Forward Acceleration of the RFM. Also, the 'P' indicates which speed source is primary. The GPS and radar speed should be within +/- .5 mph of each other if they are both installed and calibrated. The Fwd Accel. Box should show a positive value when accelerating, and a negative value when decelerating. When driving at a constant speed, it will show a value of approximately zero.



RowFlow Diagnostics & Health Checks (Cont.)



At the bottom of the page is the **Power Input** box. This is showing the voltage supplied and amps pulled by the devices plugged into the RFM. If you press the Volt A or Volt B, it will draw a yellow box around what devices each is supplying. Acceptable voltage range is from 11-14V, a table is shown below for how many amps each system should be showing at full draw. The CAN GND to AUX GND is comparing the voltage variation between the CAN power input and the Auxiliary power input. This value should be less than 2V. The Sensor voltage is the voltage supplied by the RFM to the various sensor wires in the system (Lift Switch, Pressure Sensor, and Speed Sensor). This value should be between 9.5V and 10.5V.

Device	Approximate Max Amp Draw
Clutch	.5 Amp
Tru-Count	2 Amp
Hydraulic Drive	2.5 Amp

The box on the right side of the screen is for the hydraulic **Motor Drives**. At the top of the box is the temperature value, which is taken from motor drive one. Below are individual columns for each drive. Each drive will turn red/white/green based upon a completed circuit on the PWM valve. The top value under each column is the PSI. This is measuring the hydraulic pressure of that drive. The acceptable range of this value is dependent upon where the pressure sensor is installed. Below is a table giving acceptable ranges for pressure.

Install Position	Min (static)	Max (static)	Min (running)	Max (running)
PP motor	0	0	200	1000
JD motor	0	50	50	300
Before Block	2200	3000	2200	3000
After Block	0	0	50	200

RowFlow Diagnostics & Health Checks (Cont.)

Row Flow Diagnostics

Swath Control

RowFlow Ctl Module 1
CAN
Comm: 100%
Volt: 12.9V
Speed

Motor Drives Temp: 0 F

PSI #1 #2 #3
0 0 0

PWM (%) #1 #2 #3
0 0 0

Act RPM #1 #2 #3
0.0 0.0 0.0

Cmd RPM #1 #2 #3
0.0 0.0 0.0

Cmd Pop #1 #2 #3
34000 0 0

Next Pop #1 #2 #3
34000 0 0

Dist. (ft) #1 #2 #3
10000.0 10000.0 10000.0

Stability #1 #2 #3
0.0 0.0 0.0

Avg. Err #1 #2 #3
0 0 0

Abs. Err #1 #2 #3
0 0 0

Tap Here for Legend

Home
Health Check
↑
↓
←
Back

Below the pressure is the PWM(%), which is the percentage of voltage we are sending to the drive. The possible range is from 15-90%. Next is the Command/Actual RPM, which is the speed we are commanding the drive to turn at as well as the speed the encoder is reading on the drive. The next three values are Command/Next Population and Distance (ft). The commanded population is determined by either your static rate on the Rowflow control page, or the prescription that is assigned to the field. The Next Population is the next population that we see in front of the direction you're heading in the prescription, as well as the Distance before we hit that prescription change. The next three values are the stability, average error, and absolute error. The stability is referencing the consistency of the encoder of the motor drive, while the average and absolute error are referencing the value difference between the commanded and actual RPM. The acceptable ranges for these values can be found by touching that section of the Motor Drive box.

Health Checks

RowFlow Health Check

Setup / Wiring
Hydraulic Drives ONLY
Matches Seed Data to Clutches and Motors

Manual Swath
No Seed Required
Audible Checks
User Confirms Pass / Fail

RFM Orientation
Hydraulic Drives ONLY
Confirms the set up RFM Orientation

Voltage / Current
All RowFlow Systems
Tests for Electrical Shorts and High Currents

Motor Stability
Hydraulic Drives ONLY
Motor Speed Control Tracking

Hydraulic Motor Purge
Hydraulic Drives ONLY
Cycles RowFlow motors to purge the valves

Home
Enter
Previous Results
←
Back

At least once per year, we recommend running Health Checks to verify the health of your RowFlow system. Below is a summary of what each health check will complete for you and what systems are required to run that health check. An overview of previous health checks and the result of the last set of health checks can be found by touching 'Previous Results'

RowFlow Diagnostics & Health Checks (Cont.)

Setup/Wiring: This health check requires seed in all hoppers and hydraulic drives to run. When running this health check, our system will verify that the system has been setup and installed correctly by matching seed data to each hydraulic motor and clutch section. This is only available when we are controlling hydraulic drives.

Step 1 of 2 - Swath Sections

Swath Control								Swath Control							
1	2	3	4	5	6	7	8	25	26	27	28	29	30	31	32
9	10	11	12	13	14	15	16	33	34	35	36	37	38	39	40
17	18	19	20	21	22	23	24	41	42	43	44	45	46	47	48

SC 1

A

B

SC 2

A

B

☐ Seeds Present, but not Expected
☐ No Seeds Present, but Expected
☐ No Seeds Present, and Not Expected
☐ Seeds Present, and Expected

Home

Cancel

← Back

Manual Swath: When running the Manual Swath health check, the system will send cycle voltage to each clutch to verify that the clutches have been setup and installed correctly. This health check does not require seed, and is an audible check by walking behind the planter, listening for each clutch to fire.

Manual Swath - Prepare

Once "Start Routine" is pressed, the 20/20 will wait ten (10) sec., then cycle all swath outputs twice (2x). After this, it will start at the LEFT-most swath section and toggle it (1 sec. ON, 1 sec. OFF). After toggling each swath section individually, 20/20 will end by cycling ALL swath sections twice (2x).

To check operation, view / listen to confirm correct swath order.

Home

Start Routine

Cancel

← Back

RFM Orientation: The RFM Orientation health check will verify that the RFM direction has been entered correctly in the monitor as well as physically installed on the planter. It will also assess the health of the accelerometers within the RFM.

RFM Orientation - Prepare

Prepare to Test

- Tractor Running
- Planter Unfolded (If Applicable)
- Planter Lowered
- Clear Path to Drive Forward (200 ft/60 m)
- No Seed, Hydraulics, or Vacuum Required

Press to Continue

During this test, 20/20 will determine if the set up RFM orientation is correct. It will also assess the required accelerations to trigger the low speed start.

Home

Cancel

← Back

RowFlow Diagnostics & Health Checks (Cont.)

Voltage/Current: The Voltage/Current health check will verify the health of the electrical system in RowFlow at zero and full draw, as well as each individual device plugged into the RFM.

Voltage / Current - Summary				Home
Health Check Passed			14:49:56 10/24/2014	Enter ↑ ↓ ← Back
	Acceptable	RFM #1	RFM #2	
Voltage A	12.0 v	13.4 v	--	
Current A	0.2 A	0.0 A	--	
Voltage B	12.0 v	13.4 v	--	
Current B	0.2 A	-0.1 A	--	
Sensor Power	0.0 v	0.0 v	--	
CAN Power	12.0 v	13.2 v	--	
Ground Diff	2.0 v	0.0 v	--	
No Load: Measurements taken when all outputs from the RFM(s) are inactive				

Motor Stability: This health check will run your hydraulic drives at three and seven MPH at default population with clutches engaged and disengaged to determine the capability of the drives to consistently achieve the target RPM. This health check does not require seed.

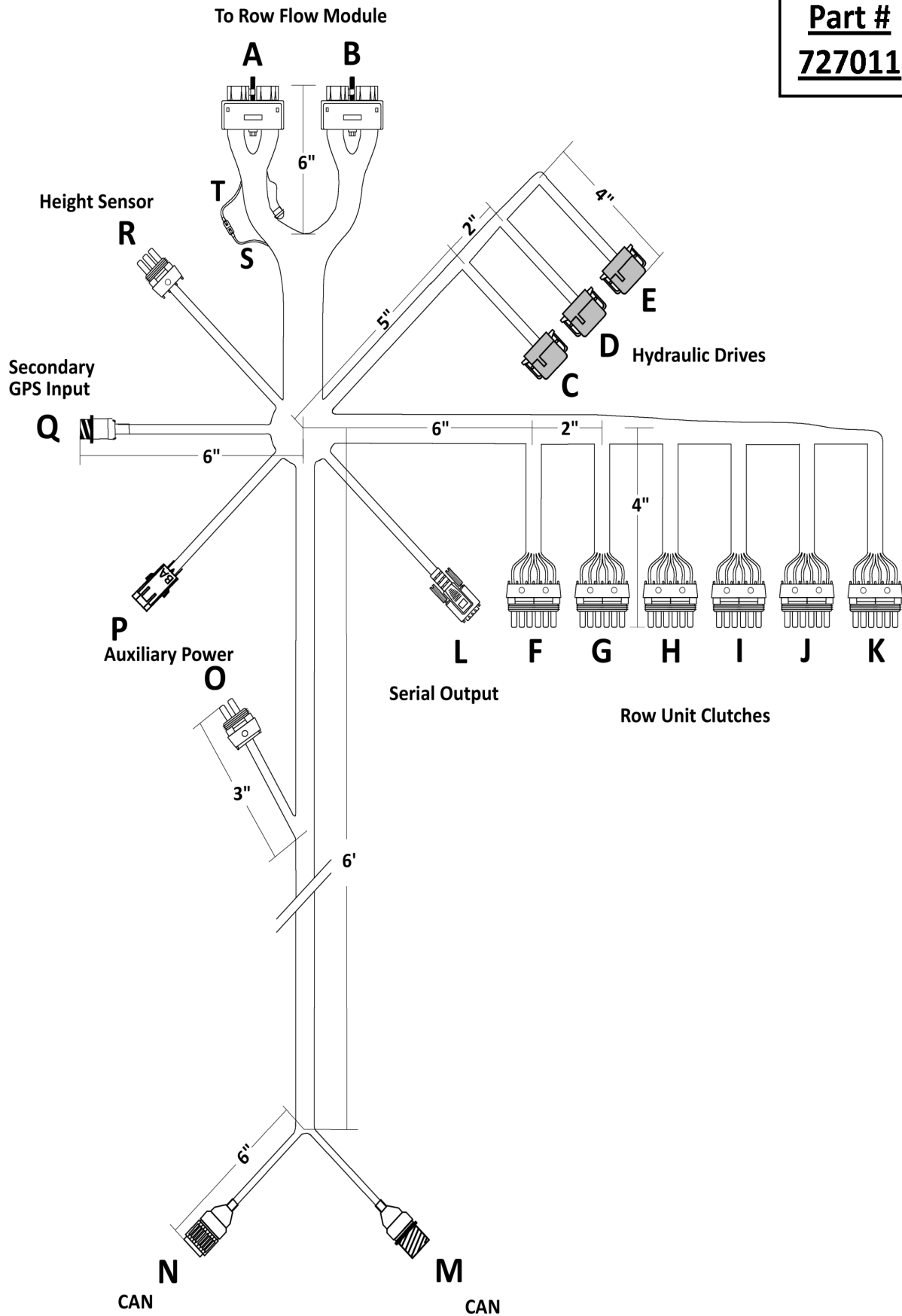
Motor Stability - Prepare		Home
Prepare to Drive Motors		Cancel ← Back
- Hydraulic Pressure to Motor - NO Seed Required - NO Vacuum Required		
Press to Continue		
During this test, 20/20 will drive the motors at planting speeds of 3 MPH and 7 MPH, and assess the stability of the drives at full load (clutches disengaged) and no load (clutches engaged).		

Hydraulic Motor Purge: This health check cycles the hydraulic motors by applying current to the PWM solenoid for 1 second. This purge should remove any contaminants out of the valve in the event the valve is stuck open or closed.

Hydraulic Motor Purge		Home
Prepare to Purge		Back
- Hydraulic Pressure to Motor - Disengage all meters or remove the motor drive chain		
Press to Purge Motors		
During this test, 20/20 will drive the motors to purge any contamination that may be lodged in the valve. The purge will last for 1 second.		

Row Flow Base Harness

Part #
727011



Row Flow Base Harness Continued

Part #
727011

A - Cinch Plug

From	Function	To
(A) L1	Power +5V	LED (+),Q4
(A) L2	LED	LED (-)
(A) L3	Power +12V	M7,M9,N7,N9,OA
(A) M1	Not Used Plug	--
(A) M2	Not Used Plug	--
(A) M3	Analog Ground	C4,D4,E4,R2
(A) N1	RX from GPS	Q2
(A) N2	TX to Rawson	(L) L2
(A) N3	RX from Rawson	(L) L3
(A) P1	TX to GPS	Q3
(A) P2	CAN A HI	M6,N6
(A) P3	CAN A LO	M2,N2
(A) R1	CAN B HI	M8,N8
(A) R2	CAN B LO	M4,N4
(A) R3	CAN SHIELD	M5,N5
(A) S1	Height Signal	R1
(A) S2	Not Used Plug	--
(A) S3	Not Used Plug	--
(A) T1	Not Used Plug	--
(A) T2	Battery Ground	C7,D7,E7,FA,GA,HA,IA
(A) T3	Not Used Plug	--
(A) W1	Speed Signal 2	D3
(A) W2	Speed Signal 1	C3
(A) W3	Speed Signal 3	E3
(A) X1	Pressure Signal 3	E5
(A) X2	Pressure Signal 1	C5
(A) X3	Harness ID	T
(A) Y1	Pressure Signal 2	D5
(A) Y2	Temperature Signal	C6
(A) Y3	Ground	L5,M1,M3,N1,N3,OB,

B - Cinch Plug

From	Function	To
(B) A1	Battery +12V	PA
(B) A2	Swath 16	IE
(B) A3	VRD 3	E2
B1	Swath 06	GC
B2	Swath 22	KC
B3	Swath 13	IB
(B) C1	VRD 1	C2
(B) C2	Swath 15	ID
(B) C3	Swath 21	KB
(B) D1	Swath 08	GE
(B) D2	Swath 05	GB
(B) D3	Swath 20	JE
(B) E1	Swath 24	KE
(B) E2	Swath 14	IC
(B) E3	Swath 07	GD
(B) F1	Swath 04	FE
(B) F2	Swath 12	HE
(B) F3	Protected +12V	C1,D1,E1,R3
(B) G1	Swath 19	JD
(B) G2	Swath 11	HD
(B) G3	Swath 03	FD
(B) H1	VRD 2	D2
(B) H2	Swath 18	JC
(B) H3	Swath 10	HC
(B) J1	Swath 02	FC
(B) J2	Swath 23	KD
(B) J3	Swath 01	FB
(B) K1	Battery +12V	PA
(B) K2	Swath 17	JB
(B) K3	Swath 09	HB

C - Deutsch 8 pin Receptacle

From	Function	To
C1	Sensor Power +12V	(B) F3, D1, E1
C2	Valve Power +12V	(B) C1
C3	Speed Sensor Signal	(A) W2
C4*	Sensor Ground	(A) M3,D4,E4,R2
C5	Pressure Signal	(A) X2
C6	Temperature Signal	(A) Y2
C7	Valve Ground	(A) T2, D7,E7,FA,GA,HA,IA,JA,KA,PB
C8	Not Used Plug	--

Row Flow Base Harness Continued

Part #
727011

D - Deutsch 8 pin Receptacle

From	Function	To
D1	Sensor Power +12V	(B) F3, C1, E1
D2	Valve Power +12V	(B) H1
D3	Speed Sensor Signal	(A) W1
D4*	Sensor Ground	(A) M3, C4,E4,R2
D5	Pressure Signal	(A) Y1
D6	Temperature Signal	
D7	Valve Ground	(A) T2, C7,E7,FA,GA,HA,I
D8	Not Used Plug	--

E - Deutsch 8 pin Receptacle

From	Function	To
E1	Sensor Power +12V	(B) F3, C1, D1
E2	Valve Power +12V	(B) A3
E3	Speed Sensor Signal	(A) W3
E4*	Sensor Ground	(A) M3, C4,D4,R2
E5	Pressure Signal	(A) X1
E6	Temperature Signal	
E7	Valve Ground	(A) T2, C7,D7,FA,GA,HA,I
E8	Not Used Plug	--

F - Weatherpack 6 pin Plug

From	Function	To
FA	Ground	(A) T2, C7,D7,E7,GA,HA,IA,
FB	Output 1	(B) J3
FC	Output 2	(B) J1
FD	Output 3	(B) G3
FE	Output 4	(B) F1
FF	Not Used Plug	--

G - Weatherpack 6 pin Plug

From	Function	To
GA	Ground	(A) T2, C7,D7,E7,FA,HA,I
GB	Output 1	(B) D2
GC	Output 2	(B) B1
GD	Output 3	(B) E3
GE	Output 4	(B) D1
GF	Not Used Plug	--

H - Weatherpack 6 pin Plug

From	Function	To
HA	Ground	(A) T2, C7,D7,E7,FA,GA,IA,J
HB	Output 1	(B) K3
HC	Output 2	(B) H3
HD	Output 3	(B) G2
HE	Output 4	(B) F2
HF	Not Used Plug	--

I - Weatherpack 6 pin Plug

From	Function	To
IA	Ground	(A) T2, C7,D7,E7,FA,GA,
IB	Output 1	(B) B3
IC	Output 2	(B) E2
ID	Output 3	(B) C2
IE	Output 4	(B) A2
IF	Not Used Plug	--

J - Weatherpack 6 pin Plug

From	Function	To
JA	Ground	(A) T2, C7,D7,E7,FA,GA,HA, IA,KA,PB
JB	Output 1	(B) K2
JC	Output 2	(B) H2
JD	Output 3	(B) G1
JE	Output 4	(B) D3
JF	Not Used Plug	--

K - Weatherpack 6 pin Plug

From	Function	To
KA	Ground	(A) T2, C7,D7,E7,FA,GA,
KB	Output 1	(B) C3
KC	Output 2	(B) B2
KD	Output 3	(B) J2
KE	Output 4	(B) E1
KF	Not Used Plug	--

Row Flow Base Harness Continued

**Part #
727011**

L - DSUB 9 pin Female

From	Function	To
1	Not Used	--
2	TX	(A) N2
3	RX	(A) N3
4	Not Used	--
5*	Ground	(A) Y3,M1,M3, N1,N3,OB,Q1,S
6	Not Used	--
7	Not Used	--
8	Not Used	--
9	Not Used	--

M - Amp 9 pin Receptacle

From	Function	To
1	Ground	(A) Y3, L5,M3,N1, N3,OB,Q1,S
2	CAN A LO	(A) P3, N2
3	Ground	(A) Y3, L5,M1,N1, N3,OB,Q1,S
4	CAN B LO	(A) R2, N4
5	CAN Shield	(A) R3, N5
6	CAN A HI	(A) P2, N6
7	Power +12V	(A) L3, M9,N7,N9,OA
8	CAN B HI	(A) R1, N8
9	Power +12V	(A) L3,M7,N7,N9OA

N - Amp 9 pin Plug

From	Function	To
1	Ground	(A) Y3,L5,M1,
2	CAN A LO	(A) P3, M2
3	Ground	(A) Y3,L5,M1,
4	CAN B LO	(A) R2, M4
5	CAN Shield	(A) R3, N5
6	CAN A HI	(A) P2, M6
7	Power +12V	(A) L3, M7,M9,N9,OA
8	CAN B HI	(A) R1, N8
9	Power +12V	(A) L3, M7,M9,N7,OA

O - Weatherpack 2 pin Plug

From	Function	To
OA	Power +12V	(A) L3, M7,M9,N7,N9
OB	Ground	(A) Y3, L5,M1,M3,N1,N3,Q1,S

P - Weatherpack 2 pin Plug

From	Function	To
PA	Power +12V	(B) K1, (B) A1
PB	Ground	(A) T2,C7,D7,E7,

Q - Amp 4 pin Receptacle

From	Function	To
1*	Ground	(A) Y3,L5,M1, M3,N1,N3,OB,S
2	RX from GPS	(A) N1
3	TX to GPS	(A) P1
4	Power +5V	(A) L1, LED(+)

R - Weatherpack 3 pin Plug

From	Function	To
1	Signal	(A)S1
2*	Ground	(A)M3, C4,D4,E4
3	Power +12V	(B)F3, C1,D1,E1

S - Panduit Female Disconnect

From	Function	To
S	Signal	(A) Y3,L5,M1, M3,N1,N3,OB,Q1

T - Panduit Male Disconnect

From	Function	To
T	Signal	(A) X3

Hemisphere GPS Adapter Harness Cable

Part #
727027

A - DEUTSCH - 12 pin Plug

Pin No.	Function	To
1	Not Used	--
2	TX B	D2
3	RX B	D3
4	Not Used	--
5	Signal Ground	B1, D5
6	TX A	B2
7	Not Used	--
8	RX A	B3
9	Not Used	--
10	12V Power	CA
11	12V Ground	CB
12	Speed Out	--

D - DSUB - 9 pin Female (Serial)

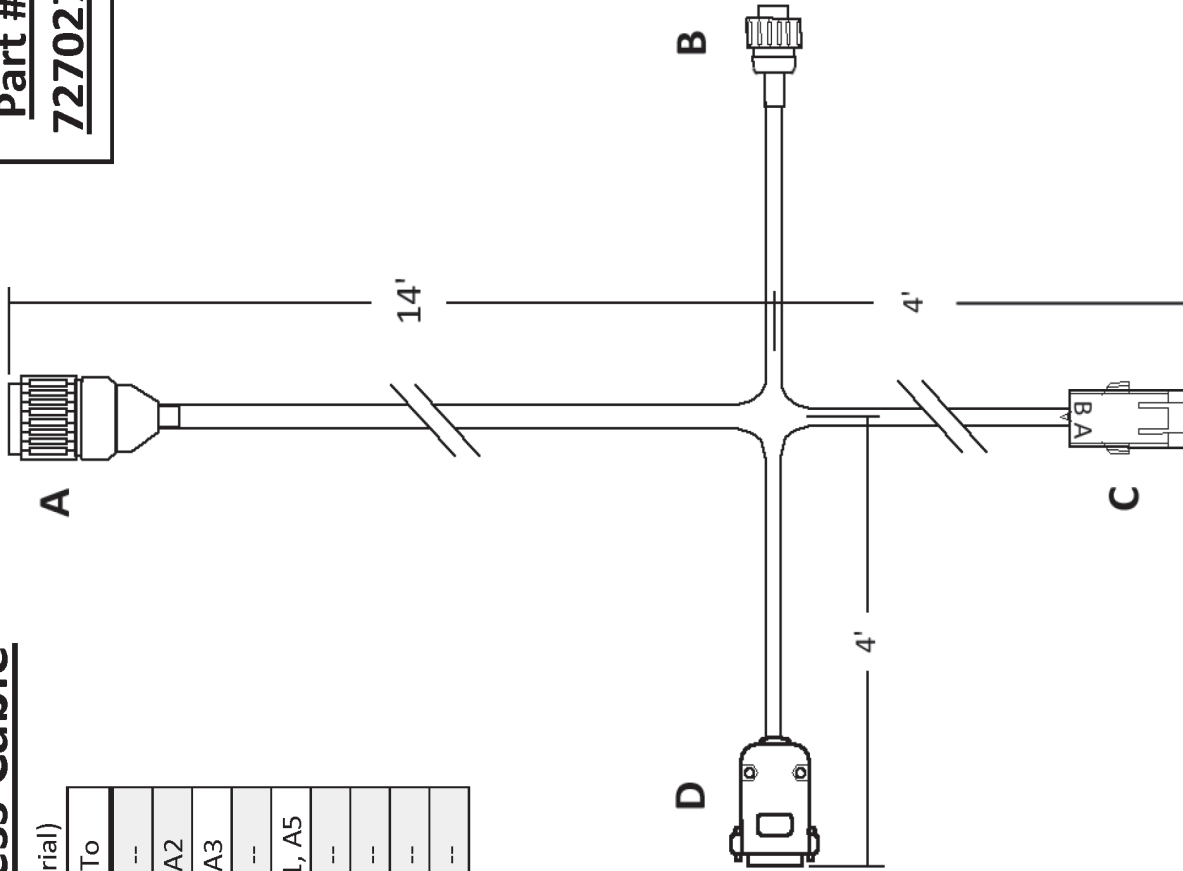
Pin No.	Function	To
1	Not Used	--
2	TX B	A2
3	RX B	A3
4	Not Used	--
5	Signal Ground	B1, A5
6	Not Used	--
7	Not Used	--
8	Not Used	--
9	Not Used	--

B - AMP - 4 pin Plug

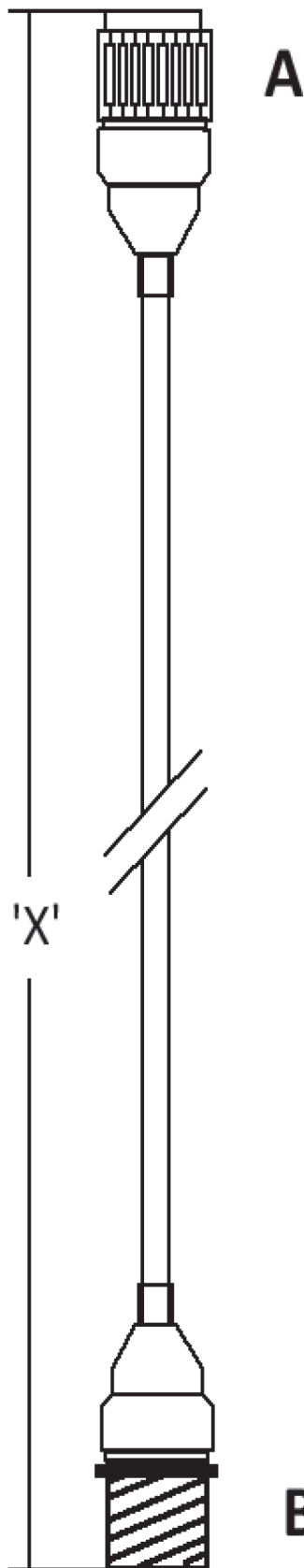
Pin No.	Function	To
1	Signal Ground	D5, A5
2	TX A	A6
3	RX A	A8
4	Not Used	--

C - WEATHERPACK - 2 pin Receptacle

Pin No.	Function	To
A	12 Power	A10
B	12V Ground	A11



CAN Extension Cables



Part Number	Length (X)
727104	45'
727107	24'
727108	35'
727109	60

A - Amp - 9 pin Plug

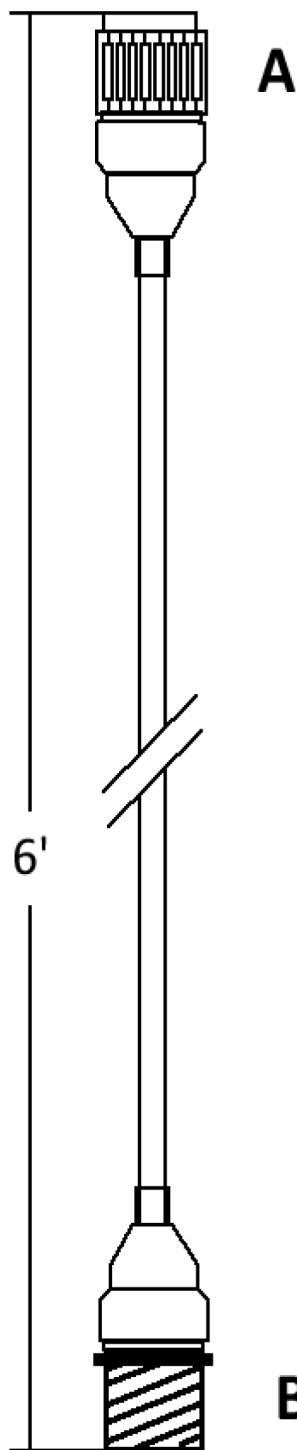
Pin No.	Function	To
1	Signal Ground	B1
2	CAN A LO	B2
3	Not Used	--
4	Not Used	--
5	Can Shield	B5
6	CAN A HI	B6
7	Not Used	--
8	Not Used	--
9	Power +12V	B9

B - AMP - 9 pin Receptacle

Pin No.	Function	To
1	Signal Ground	A1
2	CAN A LO	A2
3	Not Used	--
4	Not Used	--
5	Can Shield	A5
6	CAN A HI	A6
7	Not Used	--
8	Not Used	--
9	Power +12V	A9

Cab Control Module Harness Extension

Part #
727106



A - Amp 16 pin Receptacle

Pin No.	Function	To
1	Main Ground	B1
2	Not Used	--
3	485 Shield	B3
4	Not Used	--
5	Not Used	--
6	12 Volt Battery	B6
7	485 (-) Channel A	B7
8	485 (+) Channel A	B8
9	485 (-) Channel B	B9
10	485 (+) Channel B	B10
11	Not Used	--
12	GPS Ground/Shield	B12
13	RX from GPS	B13
14	TX to GPS	B14
15	GPS 5 Volt	B15
16	12 Volt Ignition	B16

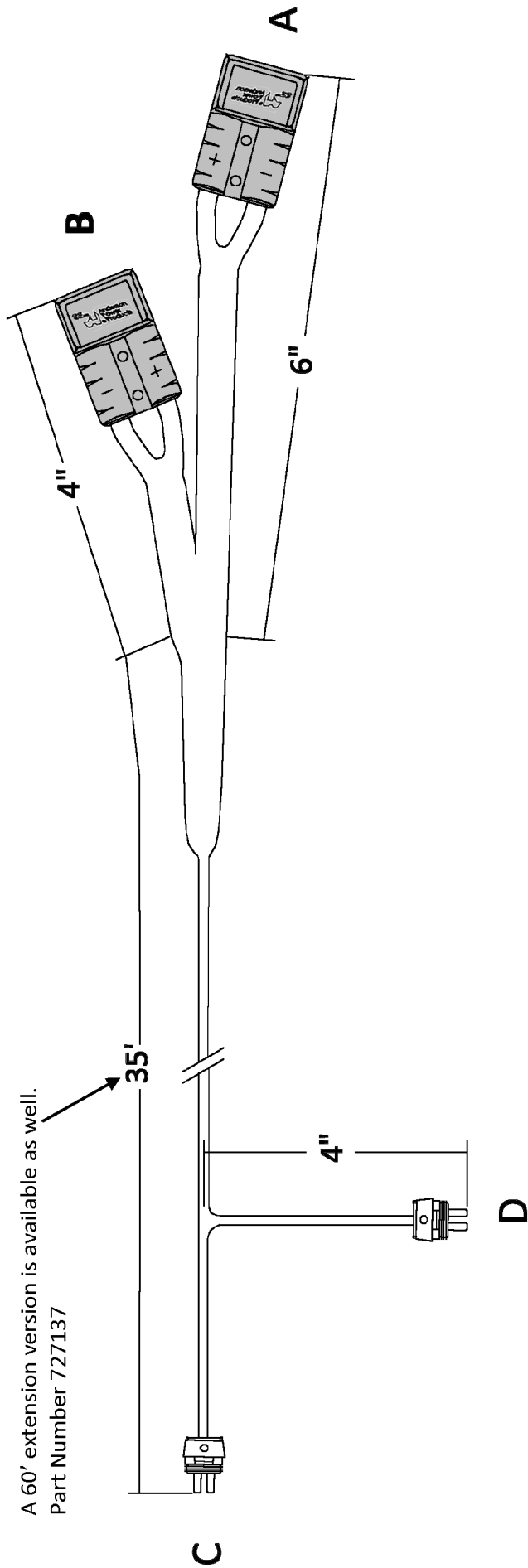
B - Amp 16 pin Plug

Pin No.	Function	To
1	Main Ground	A1
2	Not Used	--
3	485 Shield	A3
4	Not Used	--
5	Not Used	--
6	12 Volt Battery	A6
7	485 (-) Channel A	A7
8	485 (+) Channel A	A8
9	485 (-) Channel B	A9
10	485 (+) Channel B	A10
11	Not Used	--
12	GPS Ground/Shield	A12
13	RX from GPS	A13
14	TX to GPS	A14
15	GPS 5 Volt	A15
16	12 Volt Ignition	A16

Auxiliary Power Extension Harness

Part #

727114



A 60' extension version is available as well.
Part Number 727137

A - Anderson 992

Pin No.	Function	To
A +	Power +12V	B+, CA, DA
A -	Ground	B-, CB, DB

C - Weatherpack 2 pin Plug

Pin No.	Function	To
CA	Power +12V	A+, B+, DA
CB	Ground	A-, B-, DB

B - Anderson 992

Pin No.	Function	To
B +	Power +12V	A+, CA, DA
B -	Ground	A-, CB, DB

D - Weatherpack 2 pin Plug

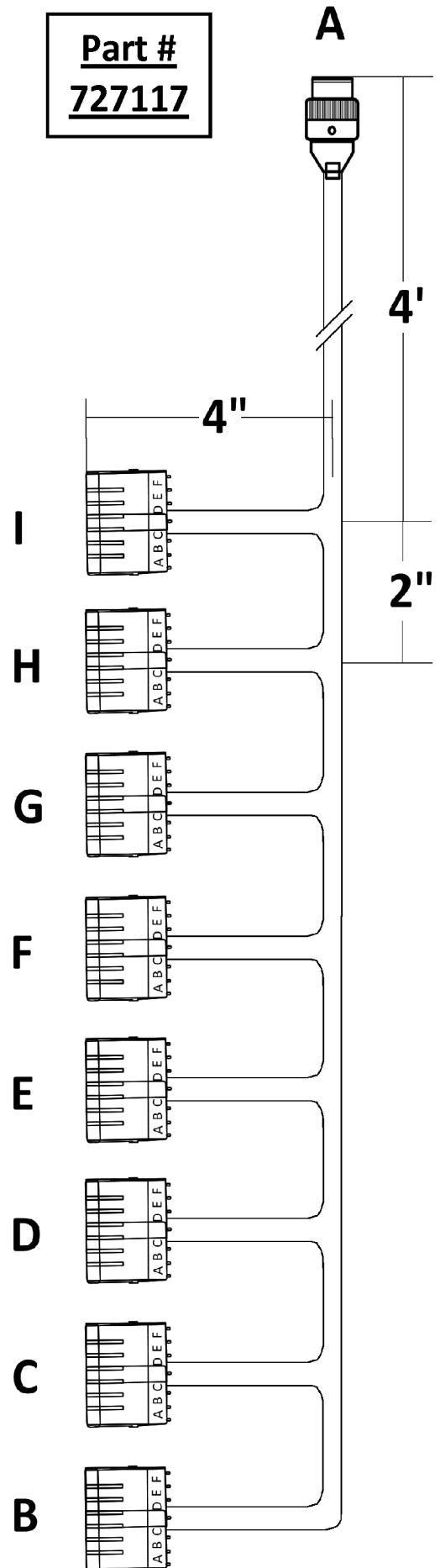
Pin No.	Function	To
DA	Power +12V	A+, B+, CA
DB	Ground	A-, B-, CB

John Deere Row Command Adapter Harness

A - Deutsch 35 pin Plug

From	Function	To
1	Row 1 Clutch Power	BB
2	Row 2 Clutch Power	BC
3	Row 3 Clutch Power	BD
4	Row 4 Clutch Power	BE
5	Row 5 Clutch Power	CB
6	Row 6 Clutch Power	CC
7	Ground	(B-I) A
8	Row 7 Clutch Power	CD
9	Row 8 Clutch Power	CE
10	Row 9 Clutch Power	DB
11	Ground	(B-I) A
12	Row 10 Clutch Power	DC
13	Row 11 Clutch Power	DD
14	Ground	(B-I) A
15	Row 12 Clutch Power	DE
16	Row 13 Clutch Power	EB
17	Row 14 Clutch Power	EC
18	Row 15 Clutch Power	ED
19	Row 16 Clutch Power	EE
20	Row 17 Clutch Power	FB
21	Row 18 Clutch Power	FC
22	Row 19 Clutch Power	FD
23	Row 20 Clutch Power	FE
24	Row 21 Clutch Power	GB
25	Row 22 Clutch Power	GC
26	Row 23 Clutch Power	GD
27	Row 24 Clutch Power	GE
28	Row 25 Clutch Power	HB
29	Row 26 Clutch Power	HC
30	Row 27 Clutch Power	HD
31	Row 28 Clutch Power	HE
32	Row 29 Clutch Power	IB
33	Row 30 Clutch Power	IC
34	Row 31 Clutch Power	ID
35	Row 32 Clutch Power	IE

Part #
727117



John Deere Row Command Adapter

Harness Continued

Part #
727117

B - Weatherpack 6 pin Receptacle

From	Function	To
BA	Ground	A7, A14, (C-I)A
BB	Row 1 Clutch Power	A1
BC	Row 2 Clutch Power	A2
BD	Row 3 Clutch Power	A3
BE	Row 4 Clutch Power	A4
BF	Not Used - Plug	--

C - Weatherpack 6 pin Receptacle

From	Function	To
CA	Ground	A7, A14, BA, (D-I)A
CB	Row 5 Clutch Power	A5
CC	Row 6 Clutch Power	A6
CD	Row 7 Clutch Power	A8
CE	Row 8 Clutch Power	A9
CF	Not Used - Plug	--

D - Weatherpack 6 pin Receptacle

From	Function	To
DA	Ground	A7, A14, BA, CA, (E-I)A
DB	Row 9 Clutch Power	A10
DC	Row 10 Clutch Power	A12
DD	Row 11 Clutch Power	A13
DE	Row 12 Clutch Power	A15
DF	Not Used - Plug	--

E - Weatherpack 6 pin Receptacle

From	Function	To
EA	Ground	A7, A14, BA, CA, DA, FA, GA, HA, IA
EB	Row 13 Clutch Power	A16
EC	Row 14 Clutch Power	A17
ED	Row 15 Clutch Power	A18
EE	Row 16 Clutch Power	A19
EF	Not Used - Plug	--

F - Weatherpack 6 pin Receptacle

From	Function	To
FA	Ground	A7, A14, BA, CA, DA, EA, GA, HA, IA
FB	Row 17 Clutch Power	A20
FC	Row 18 Clutch Power	A21
FD	Row 19 Clutch Power	A22
FE	Row 20 Clutch Power	A23
FF	Not Used - Plug	--

G - Weatherpack 6 pin Receptacle

From	Function	To
GA	Ground	A7, A14, (B-F)A, HA, IA
GB	Row 21 Clutch Power	A24
GC	Row 22 Clutch Power	A25
GD	Row 23 Clutch Power	A26
GE	Row 24 Clutch Power	A27
GF	Not Used - Plug	--

H - Weatherpack 6 pin Receptacle

From	Function	To
HA	Ground	A7, A14, (B-G)A, IA
HB	Row 25 Clutch Power	A28
HC	Row 26 Clutch Power	A29
HD	Row 27 Clutch Power	A30
HE	Row 28 Clutch Power	A31
HF	Not Used - Plug	--

I - Weatherpack 6 pin Receptacle

From	Function	To
IA	Ground	A7, A14, (B-H)A
IB	Row 29 Clutch Power	A32
IC	Row 30 Clutch Power	A33
ID	Row 31 Clutch Power	A34
IE	Row 32 Clutch Power	A35
IF	Not Used - Plug	--

AgLeader SureStop Adapter Harness

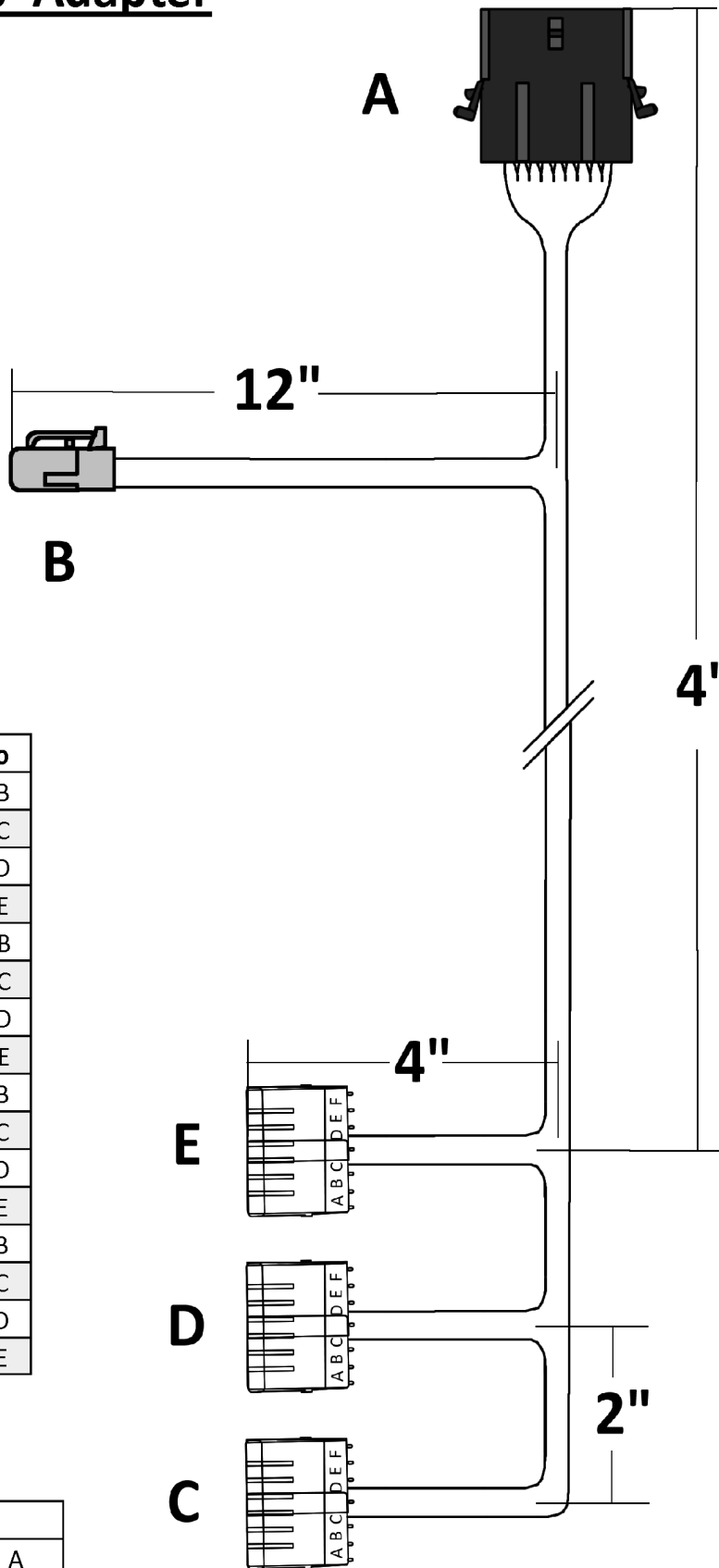
Part #
727118

A - Molex 16 pin Plug

Pin No.	Function	To
1	Row 1 Clutch Power	CB
2	Row 2 Clutch Power	CC
3	Row 3 Clutch Power	CD
4	Row 4 Clutch Power	CE
5	Row 5 Clutch Power	DB
6	Row 6 Clutch Power	DC
7	Row 7 Clutch Power	DD
8	Row 8 Clutch Power	DE
9	Row 9 Clutch Power	EB
10	Row 10 Clutch Power	EC
11	Row 11 Clutch Power	ED
12	Row 12 Clutch Power	EE
13	Row 13 Clutch Power	FB
14	Row 14 Clutch Power	FC
15	Row 15 Clutch Power	FD
16	Row 16 Clutch Power	FE

B - Deutsch 2 pin Plug

Pin No.	Function	To
1	Ground	(C-F) A
2	Not Used - Plug	--



AgLeader SureStop Adapter Harness

Continued

Part #
727118

C - Weatherpack 6 pin Receptacle

Pin No.	Function	To
CA	Ground	B1
CB	Row 1 Clutch Power	A1
CC	Row 2 Clutch Power	A2
CD	Row 3 Clutch Power	A3
CE	Row 4 Clutch Power	A4
CF	Not Used	--

D - Weatherpack 6 pin Receptacle

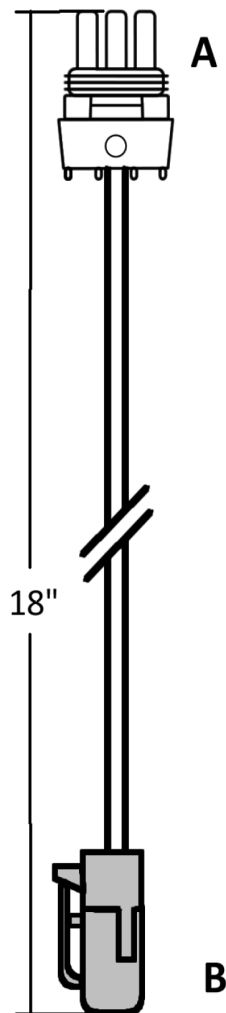
Pin No.	Function	To
DA	Ground	B1
DB	Row 5 Clutch Power	A5
DC	Row 6 Clutch Power	A6
DD	Row 7 Clutch Power	A7
DE	Row 8 Clutch Power	A8
DF	Not Used	--

E - Weatherpack 6 pin Receptacle

Pin No.	Function	To
EA	Ground	B1
EB	Row 9 Clutch Power	A9
EC	Row 10 Clutch Power	A10
ED	Row 11 Clutch Power	A11
EE	Row 12 Clutch Power	A12
EF	Not Used	--

Adapter Harnesses

Part #
727120



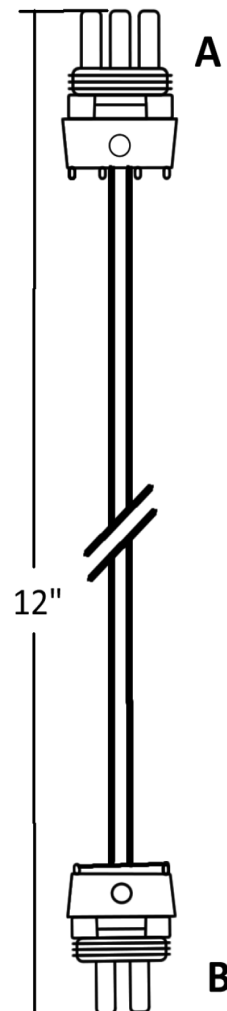
A - Weatherpack 2 pin Plug

Pin No.	Function	To
AA	Clutch Power	B1
AB	Clutch Ground	B2
AC	Clutch Ground	B2

B - Deutsch 2 pin Plug

Pin No.	Function	To
B1	Clutch Power	AA
B2	Clutch Ground	AB, AC

Part #
727121



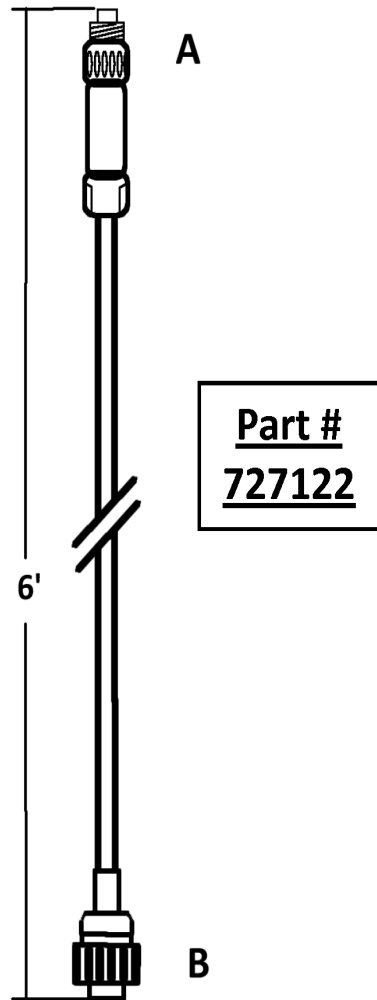
A - Weatherpack 3 pin Plug

Pin No.	Function	To
AA	Clutch Power	BA
AB	Clutch Ground	BB
AC	Clutch Ground	BB

B - Weatherpack 2 pin Plug

Pin No.	Function	To
BA	Clutch Power	AA
BB	Clutch Ground	AB

Radar Adapter Harness John Deere 30 series Tractors



A - Amphenol Ecomate 6+PE Male

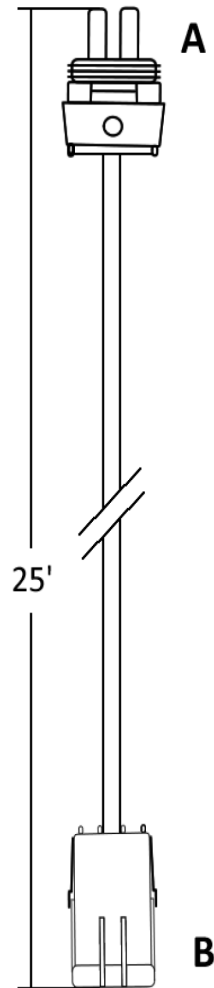
Pin No.	Function	To
1	Radar Signal	B2
2	Not Used	--
3	Not Used	--
4	Not Used	--
5	Not Used	--
6	Not Used	--
7	Ground	B1

B - Amp 4 pin Plug

Pin No.	Function	To
1	Ground	A7
2	Radar Signal	A1
3	Power Jumper	B4
4	Power Jumper	B3

Auxiliary Power Extension Cable

Part #
727126



A - Weatherpack 2 pin Receptacle

Pin No.	Function	To
AA	Power +12V	BA
AB	Ground	BB

B - Weatherpack 2 pin Plug

Pin No.	Function	To
BA	Power +12V	AA
BB	Ground	AB

Radar Adapter Cable Case MX & STX series

Part #
727139



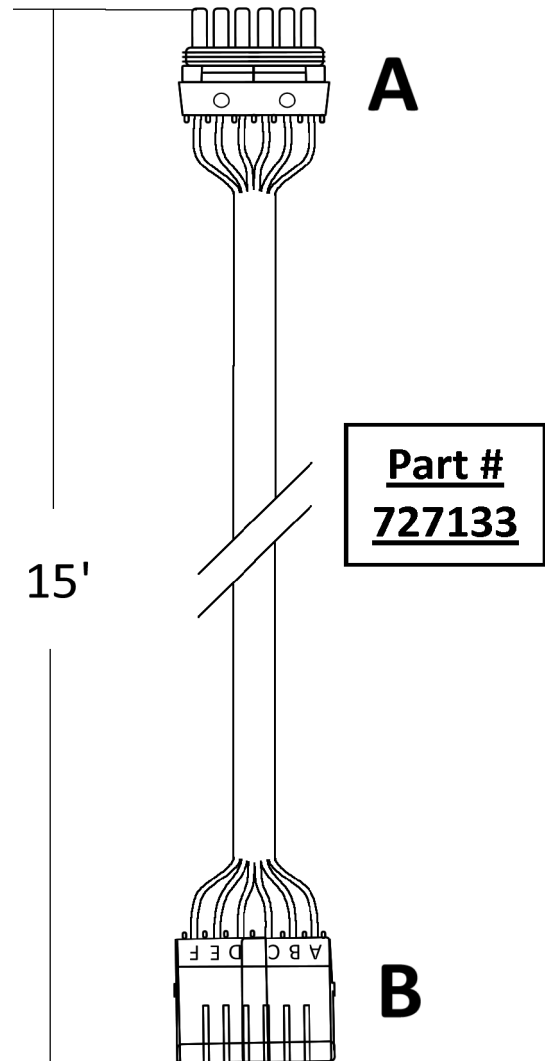
A - Britax Universal 2 Pole

From	Function	To
A_Outside	Ground	B1
A_Center	Signal	B2

B - Amp 4 pin Plug

Pin No.	Function	To
B1	Ground	A_Outside
B2	Signal	A_Center
B3	Power Jumper	B4

Clutch Harness Extension Cable



Part #
727133

A - Weatherpack 6 pin Plug

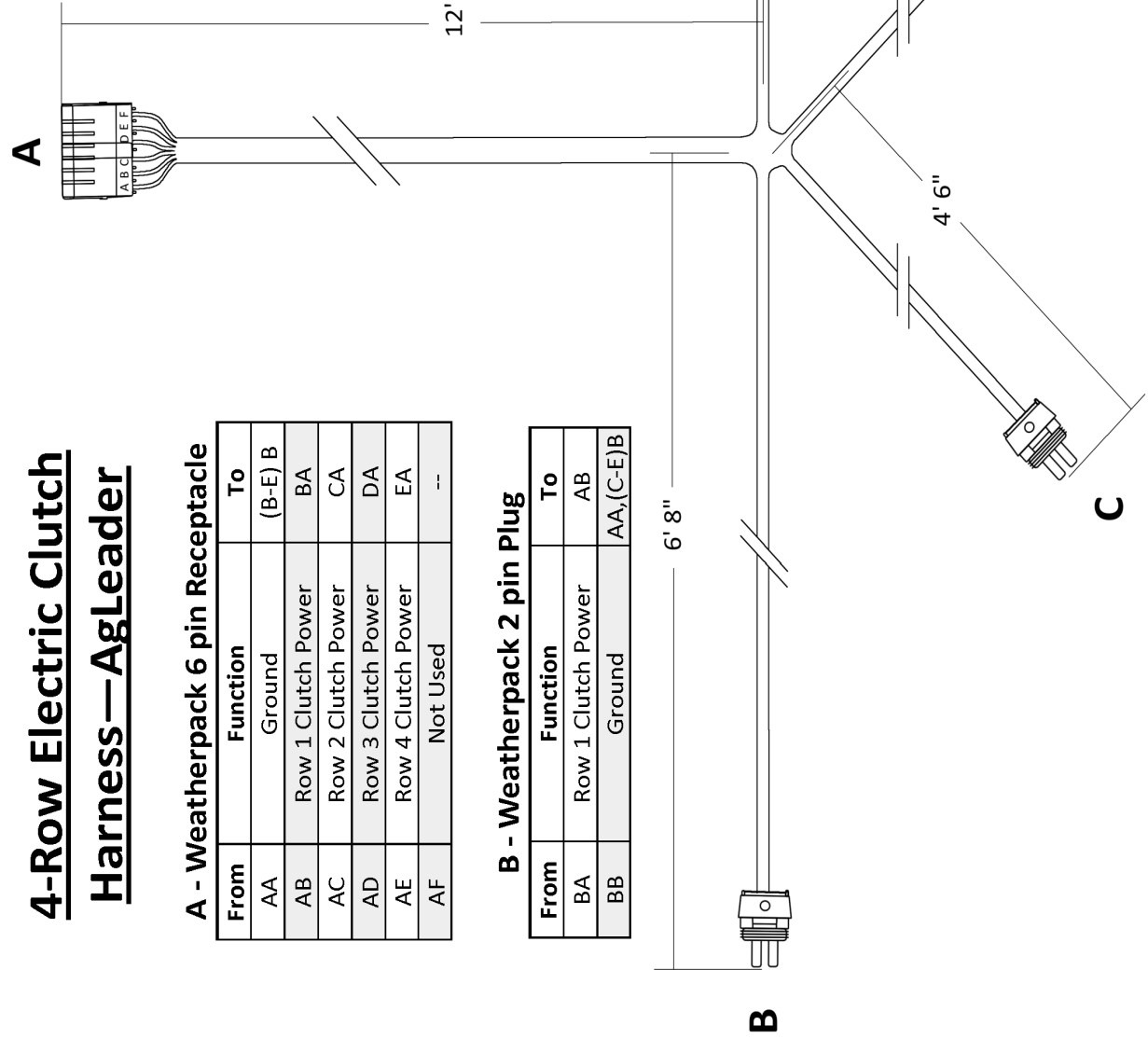
From	Function	To
AA	Ground	BA
AB	Row 1 Clutch Power	BB
AC	Row 2 Clutch Power	BC
AD	Row 3 Clutch Power	BD
AE	Row 4 Clutch Power	BE
AF	Not Used	--

B - Weatherpack 6 pin Receptacle

From	Function	To
BA	Ground	AA
BB	Row 1 Clutch Power	AB
BC	Row 2 Clutch Power	AC
BD	Row 3 Clutch Power	AD
BE	Row 4 Clutch Power	AE
BF	Not Used - Plug	--

**4-Row Electric Clutch
Harness—AgLeader**

**Part #
727135**



A - Weatherpack 6 pin Receptacle

From	Function	To
AA	Ground	(B-E) B
AB	Row 1 Clutch Power	BA
AC	Row 2 Clutch Power	CA
AD	Row 3 Clutch Power	DA
AE	Row 4 Clutch Power	EA
AF	Not Used	--

B - Weatherpack 2 pin Plug

From	Function	To
BA	Row 1 Clutch Power	AB
BB	Ground	AA,(C-E)B

C - Weatherpack 2 pin Plug

From	Function	To
CA	Row 2 Clutch Power	AC
CB	Ground	AA,BB,DB,EB

D - Weatherpack 2 pin Plug

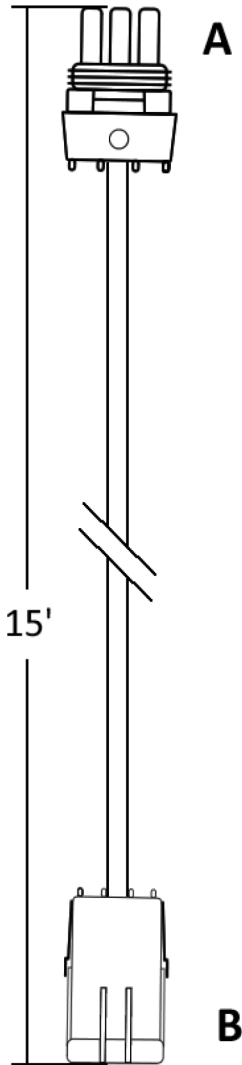
From	Function	To
DA	Row 3 Clutch Power	AD
DB	Ground	AA,BB,CB,EB

E - Weatherpack 2 pin Plug

From	Function	To
EA	Row 4 Clutch Power	AD
EB	Ground	AA,(B-D)B

Height Sensor Extension Harness

Part #
727116



A - Weatherpack 3 pin Plug

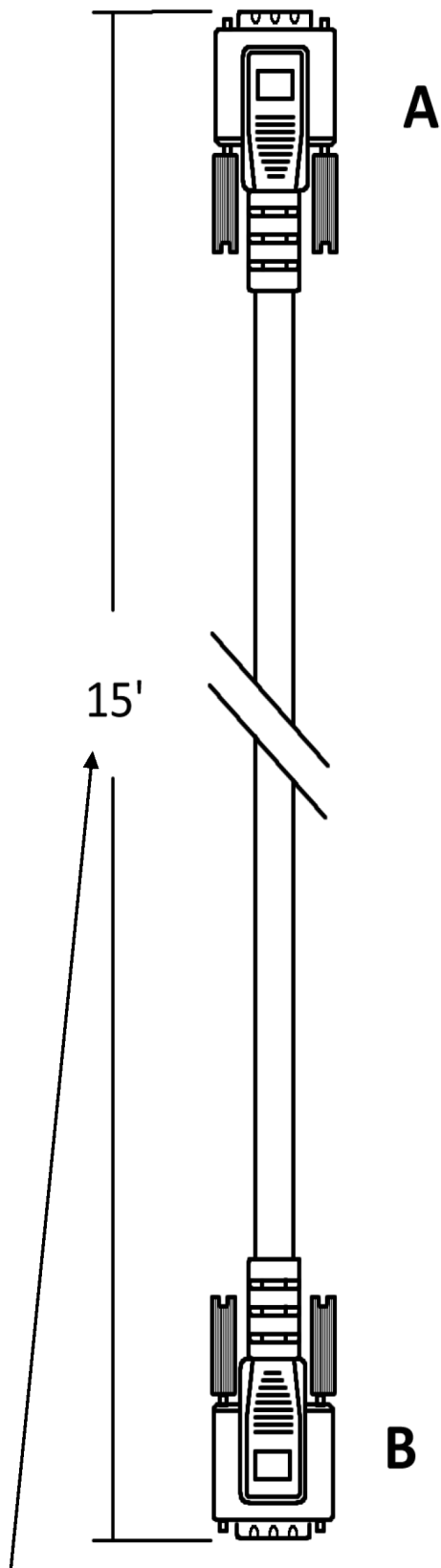
Pin No.	Function	To
AA	Height Signal	BA
AB	Sensor Ground	BB
AA	Sensor Power	BC

B - Weatherpack 3 pin Receptacle

Pin No.	Function	To
BA	Height Signal	AA
BB	Sensor Ground	AB
BC	Sensor Power	AC

DB9 Serial Extension Cable

Part #
727140



A 6' extension version is available as well.
Part Number 727140.

A - Male DB9

Pin No.	Function	To
1	Not Used	B1
2	TX B	B2
3	RX B	B3
4	Not Used	B4
5	Signal Ground	B5
6	Not Used	B6
7	Not Used	B7
8	Not Used	B8
9	Not Used	B9

B - Female DB9

Pin No.	Function	To
1	Not Used	A1
2	TX B	A2
3	RX B	A3
4	Not Used	A4
5	Signal Ground	A5
6	Not Used	A6
7	Not Used	A7
8	Not Used	A8
9	Not Used	A9