SOFTWARE OPERATING GUIDE

Software Version 4.2.0.0 (PCM ISO) with 4.2.0.0 (UCM Companion)

Early Riser® 2110
Early Riser® 2120
Early Riser® 2130
Early Riser® 2140
Early Riser® 2150
Early Riser® 2150S
Early Riser® 2160

ISOBUS Operation

Part number 92680263
1st edition English
March 2025

CASE

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1 - GENERAL

Manual scope

This manual covers operation of the **Early Riser®** 2000 series planters when connected to a supported **ISO 11783** (“ISOBUS”) display. The manual assumes that you have read and understood the contents of the display manual that is in use during planter operation.

Sections of this manual assume that your tractor’s Global Positioning System (GPS) receiver, if present, has been set up and is working properly.

From the universal terminal of the ISOBUS display, you can perform:

- Planter setup and calibrations
- Frame control
- Marker control
- All product-related control and reporting windows that are appropriate to your planter type

When used in combination with one another, the functions covered in this manual will satisfy the planting requirements of operators who want to minimize the time required to become productive as well as operators who want to maximize the accuracy of planting and data collection. Advanced functions are available, but they are not required to plant. Use the approach that best suits your planter configuration and operating conditions.

Some 2000–series planters are equipped with granular fertilizer application. The terminology in this manual and in the planter software refers to this system as “granular fertilizer” or “granular.” This feature is also referred to as “dry chemical” or “dry fertilizer.” The terminology is interchangeable.

Software compatibility

This manual only covers the software that controls the **Early Riser®** 2000 series planters on supported ISOBUS displays. Reference the applicable software operating guide for the 1200 series planters (12X0 and 12X5) or the 2000 series planters when operating with the Pro 700 display.

Introduction: ISOBUS implements

ISO 11783 (ISOBUS) compliant implements such as this planter use a common communication standard that allows use and operation on any compatible **ISO 11783** tractor.

The universal terminal serves as the user interface for ISOBUS implements.

NOTE: *See http://www.aef-online.org/ for more information about the **ISO 11783** standard.*

NHIL20PLM0662AA 1

The universal terminal runs in the **Pro 1200** or other compatible **ISO 11783** displays along with any other installed applications – e.g., the vehicle software, autoguidance, task controller, etc. This means that an operator only requires a single display for vehicle reporting, vehicle control, guidance, and planter operation.

Product control on the planter is accomplished through an ISOBUS task controller. **ISO 11783** tasks that are used by the task controller can be understood as assignments or work orders for **ISO 11783** implements. The details of the specific work to be accomplished originate primarily in farm management software rather than the display. Data about the work being performed is logged to the **ISO 11783** task for analysis at a later time.

NOTE: *It is possible to create and define parameters of an **ISO 11783** task within the task controller on the display, but a much greater degree of detail such as applying product with variable rate prescriptions can be accomplished with farm management software. Furthermore, you cannot create prescriptions directly on the display.*

NOTE: *The task controller cannot edit any data that is provided by the farm management software. It can, however, add data to an existing **ISO 11783** task before you start or resume the **ISO 11783** task.*

Use the universal terminal screens to change settings for the planter or to monitor work while using an ISOBUS task. The planter provides these screens.

The task controller allows you to:

- Use task data in the ISO Extensible Markup Language (ISO XML) format to communicate job information (e.g. grower/farm/field, crop setup, prescriptions, field boundaries) through the display to an **ISO 11783**-compliant (ISOBUS) implement
- Turn section clutches or nozzles OFF automatically based on field boundaries and previously worked areas
- Log ISOBUS Task data from the implement to the memory stick or the FieldOps portal

The task data can be created from either your preferred farm management software or the FieldOps portal. The data can then be transferred to the display via a USB memory stick, or you can use FieldOps to send the file set to the display with telematics and file transfer.

To access the FieldOps portal, create an account or login to your account at https://fieldops.caseih.com.

Planting with variable rate drive planters

Variable rate drive planters require different operating techniques than ground drive planters. Follow these guidelines for consistent seed spacing and population across the field, especially at the start and end of each pass.

Maintain consistent engine RPM

Engine RPM must remain high enough at all tractor speeds to provide sufficient flow to the hydraulic drives and fans and to provide constant PTO output to the PTO pump if equipped.

Avoid using the throttle to slow the tractor when approaching the headland; this also reduces engine RPM. Downshift to a lower gear to maintain engine RPM and decelerate the tractor.

If the throttle is used to slow a tractor with marginal hydraulic flow, vacuum fan pressure can drop so low when the planter is raised that the seeds fall off of the seed disk. A significant seed gap can occur if no seed is on the disk at the start of a new pass.

Avoid sudden changes in speed

The variable rate seed drives quickly compensate for speed changes (often within a second), but they cannot compensate quickly enough for sudden or drastic speed changes.

When shifting gears while planting, shift one gear at a time.

The spacing between seeds temporarily increases when speed is increased suddenly, and the spacing between seeds temporarily decreases when speed is decreased suddenly.

Starting to plant from a stationary position

Drive to the location where you intend to start planting. Lower the planter while slightly moving forward to prevent soil plugging in the tubes. Stop when the row units are fully lowered. Turn ON the fan or fans and prime the planter to fill the empty seed disk with seed if required. Press and hold the ON/OFF button in the “Jump Start” window in the universal terminal (page #2) until the countdown starts. After the countdown says, "Go," then accelerate to your intended planting speed. Shift one gear at a time to achieve planting speed. The planter will start to plant based on the value in the “Jump Start” window. When ground speed exceeds the jump start speed value, the “Jump Start” feature turns OFF and planting continues based on the ground speed.

If you do not use the “Jump Start” feature, your planter does not start planting until a ground speed of **1.6 km/h** (**1.0 mph**) is detected. This may require several meters/feet of travel before seeds are planted, depending on how rapidly the tractor accelerates.

Starting to plant while moving – turning on headlands

Drive to the location where you intend to start planting and lower the planter to planting position. Accelerate to planting speed by shifting one gear at a time.

If there is a gap between the start of the row and the location where the first seed is planted, or if seed drops on the ground prior to the start of the row, adjust the start plant position on the “Frame Calibration” screen.

The same guideline applies to the stop plant position.

Stopping the planter in the middle of a field

Press the “Product Master” button in the universal terminal to turn product application off before stopping the planter in planting position. Seed spacing is not affected since the seed drives are disengaged before any speed change occurs.

To resume planting at this location, raise and back up the planter to the spot where seed was last dropped. Then use the procedure from above to start planting from a stationary position. You can also continue planting by backing up **3.7 m** (**12.0 ft**) past the last planted ground. Then you lower the planter and resume planting. Overlap control will start the meters at the appropriate time. Some seeds may be displaced by running the row unit twice over the same ground.

Avoid pressing the inching pedal (clutch) and allowing the planter to roll to a stopped position. Seed spacing will rapidly decrease, creating an accordion effect on the stand.

Use the stop plant function by raising the planter before slowing to a stopped position. When the toolbar reaches the stop plant height, the product drives disengage. Since tractor deceleration occurs after the drives are disengaged, no seed bunching occurs.

2 - ICONS AND WINDOWS

UNIVERSAL TERMINAL (UT) WINDOWS

Home screen

Access the universal terminal on your **ISO 11783** display. On the **Pro 1200**, the universal terminal is available on the default page #7.

The universal terminal contains planter control windows **(1)** and navigation buttons **(2)**. The control windows will differ, based on the options available on your specific planter.

On any given page for the planter in the universal terminal, several buttons are available for selection.

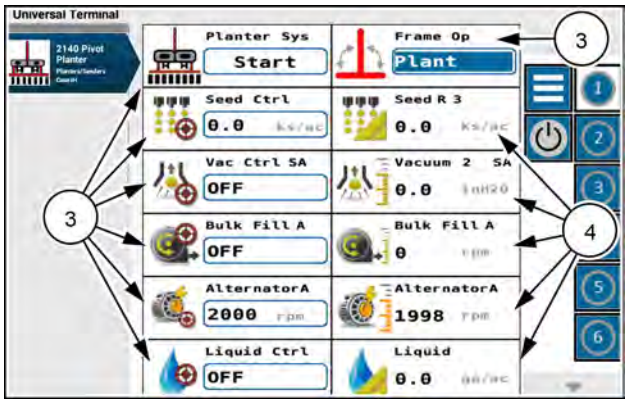
Press the “main menu” button to access options to setup and configure your planter.

Press the ”master” button (ON / OFF) to enable product application on the planter.

Press the numbered buttons to to access the various planter pages.

The planter control windows can be a configurable setting **(3)** or read only **(4)**. The configurable setting windows have a blue-framed button in them. A configurable window, such as application rate, can be pressed to access additional options.

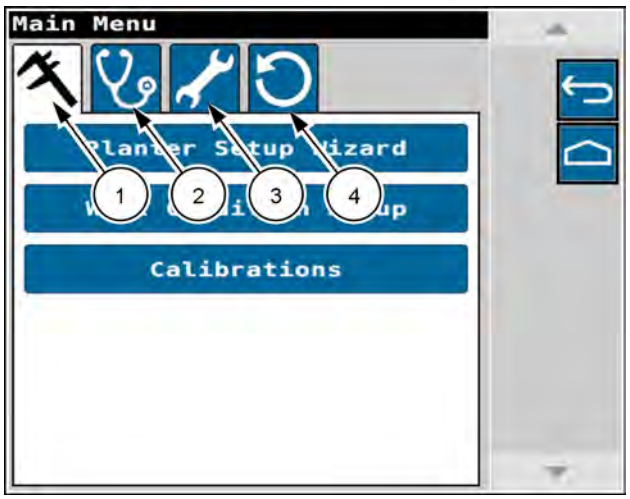
NHIL21PLM0149AA 1



NHIL21PLM0149AA 2

Main menu

Press the “main menu” button on the home screen to access the options available from the “Main Menu” screen.



RAPH23PLM1007BA 1

The “Main Menu” screen provides four tabs:

- Wizard **(1)**
- Diagnostics **(2)**
- Setup **(3)**
- Reset **(4)**

Press the tab to access the available options.

Press the “back” button to return to the previous screen.

Press the “home” button to return to the home screen.

	“Planter setup wizard” screen – See (**3-8**). "Work Condition Setup" screen – See (**3-80**). “Calibrations” screen – See (**3-41**).
	“Seed Meter / Seed Sense” screen – See (**5-1**). “Pneumatics / Steering” screen – See (**5-5**) and “Steering Diagnostics screen: 2160 mode front fold planters” (**5-8**). “Hydraulic Down Force” screen – See “Hydraulic Down Force screen (general diagnostics)” (**5-10**) and “Hydraulic Down Force screen (health checks)” (**5-13**). ***NOTE:*** *This option may not be present in all configurations.* “Signal Monitor” screen – See (**5-17**). “Faults / Alarms” screen – See (**5-21**). “System Information” screen – See (**5-63**).
	“Planter Configuration” screen – Select planter options and configure down force control. See (**Planter Configuration screen**). “Measurement Setup” screen – Set implement measurements such as center offset and bar distance. Some measurements may be locked. See (**3-17**). "Application Control” screen – Set section and drive configuration. See (**3-22**). "Customizable Settings” screen – Set jump start settings, alarm/beep settings, seed information thresholds, speed selection, and planter setup adjustments. See (**3-25**). “Gain Settings” screen – Set alternator gain and granular gain. See (**3-38**).
	“Reset ECU” screen – See (**5-65**). “Move to Next Display” screen – See (**5-66**). “Restore Factory Defaults” screen – See (**5-67**).

PRO 1200 WINDOWS

User-Defined Windows (UDW) on the Pro 1200 display

ISOBUS Planters operating with the **Pro 1200** display allow for additional User-Defined Window (UDW) selections directly on the customizable run screens.

Alternator Output

NHIL24PLM0063AA 1

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Area Alternator Output

The “Alternator Output” window displays the current planter alternator voltage.

Alternator RPM

NHIL24PLM0064AA 2

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Alternator RPM

The “Alternator RPM” window displays the current planter alternator speed.

For more information, see “Alternator speed monitoring” (**4-49**).

Area Counter

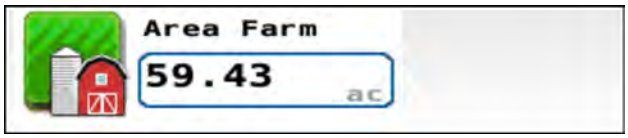
RAPH22PLM1644AA 3

Location: Run screen, Left-Hand Area
Layout menu: Precision Farming
Label: Area Counter

The “Area Counter” window shows the running sum of the area covered until it is reset by the user. It does not reset when you change the task.

Press the “Reset” button **(1)** to reset the value.

Area Farm



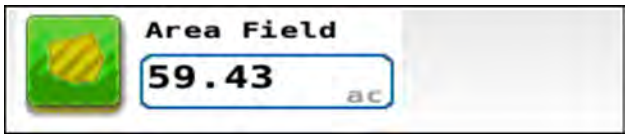
NHIL24PLM0101AA 4

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Area Farm

The “Area Farm” window reports the accumulated acres or hectares planted for the current “Farm” that is selected in the “Operations” screen.

For more information, see “Area monitoring” (**4-29**).

Area Field



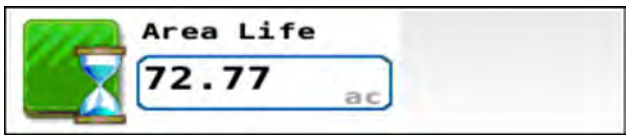
NHIL24PLM0102AA 5

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Area Field

The “Area Field” window reports the accumulated acres or hectares planted for the current “Field” that is selected in the “Operations” screen.

For more information, see “Area monitoring” (**4-29**).

Area Life



NHIL24PLM0103AA 6

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Area Life

The “Area Life” window reports the accumulated acres or hectares planted for the life of the planter. This value cannot be reset.

For more information, see “Area monitoring” (**4-29**).

Area Season

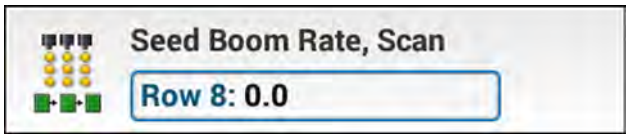
NHIL24PLM0104AA 7

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Area Season

The “Area Season” window reports the accumulated acres or hectares planted for the season, or since the last time you reset the value. Press the selection box to reset the value.

For more information, see “Area monitoring” (**4-29**).

Applied Rate, Scan Seed Boom

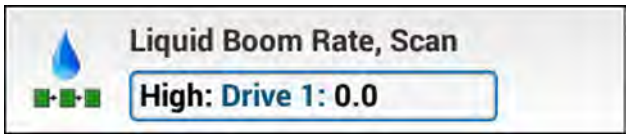


NHIL24PLM0065AA 8

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Applied Rate, Scan Seed Boom

The “Applied Rate, Scan” window cycles between the measured high rate, the measured low rate, the current rate, and the average rate of the seed that is being applied.

Applied Rate, Scan Liquid Boom



NHIL24PLM0066AA 9

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Applied Rate, Scan Liquid Boom

The “Applied Rate, Scan” window cycles between the measured high rate, the measured low rate, the current rate, and the average rate of the liquid product that is being applied.

Average Rate Seed Boom

NHIL24PLM0071AA 10

Location: Run screen, Left-Hand Area
Layout menu: Precision farming
Label: Average Rate Seed Boom

The “Average Rate Seed Boom” window shows the average rate of seed application in ksds/ha or ksds/ac. The °Ø° symbol Indicates that the sections may be controlled independently and possibly at different rates.

Average Rate Liquid Boom

NHIL24PLM0070AA 11

Location: Run screen, Left-Hand Area
Layout menu: Precision farming
Label: Average Rate Liquid Boom

The “Average Rate Liquid Boom” window shows the average rate of liquid application in gallons per minute. The °Ø° symbol Indicates that the sections may be controlled independently and possibly at different rates.

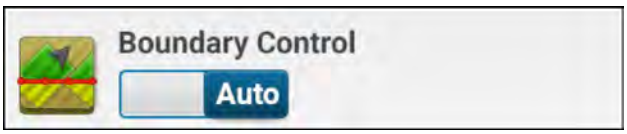
Battery

NHIL24PLM0067AA 12

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Area Counter

The “Battery” window displays current planter battery voltage.

Boundary Control



NHIL20PLM0073AA 13

Location: Run screen, Left-Hand Area
Layout menu: Precision Farming
Label: Boundary Control

The “Boundary Control” window allows you turn section control on and off when entering or exiting inner and outer boundaries.

Bulk Fill

NHIL24PLM0069AA 14

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Bulk Fill

The “Bulk Fill” window reports the current bulk fill fan speed.

For more information, see “Bulk fan speed monitoring” (**4-45**).

Bulk Fill Ctlr

NHIL24PLM0068AA 15

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Bulk Fill Ctlr

The “Bulk Fill Ctlr” window controls the target bulk fill fan speed. Press and hold the selection box to enter the setting.

For more information, see “Bulk fan control” (**4-42**).

BF (Bulk Fill) Light Ctl (Control)

NHIL24PLM0105AA 16

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: BF Light Ctl

The “BF Light Ctl” window allows you to toggle the bulk fill light state:

- On = Lights are on when in “Plant” mode
- Auto = When the frame position is “Plant” mode and the ground speed is less than **1.6 km/h** (**1 mph**), the lights will activate. The lights will always be off in the other frame modes.

Cleaner

NHIL24PLM0098AA 17

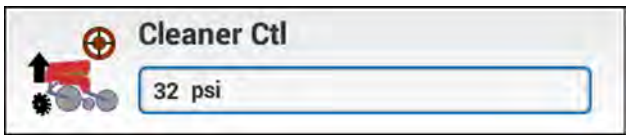
Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Cleaner

The “Cleaner” window displays current row cleaner system pressure, in psi or kPa.

Cleaner Ctl (Control)

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Cleaner Ctl

The “Cleaner Ctl” window allows you to control the cleaner pressure when the “Cleaner Mode” is set to “Lift” or “Down”.

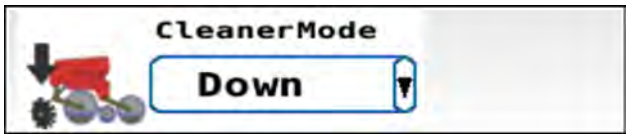


NHIL24PLM0099AA 18

Cleaner Mode

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: CleanerMode

The “Closer” window allows you to select the cleaner operating mode: “Float”, “Lift”, “Down”, or “Full Lift”.



NHIL24PLM0100AA 19

Closer

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Closer

The “Closer” window displays current closer system pressure, in psi or kPa.

NHIL24PLM0074AA 20

Closer Ctl (Control)

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Closer Ctl

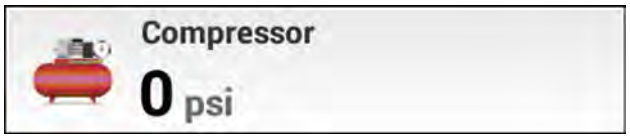
The “Closer Ctl” window allows you to control the closer pressure.

NHIL24PLM0075AA 21

Compressor (pressure)

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Compressor

The “Compressor” window displays current compressor pressure, in psi or kPa.



NHIL24PLM0072AA 22

Compressor Ctrl (Control)

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Comp. Ctrl

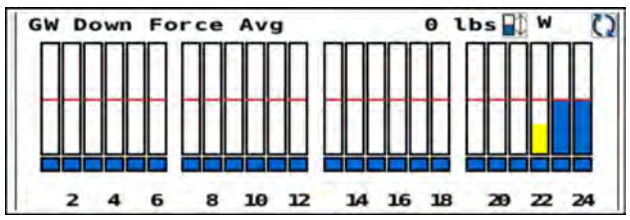
The “Comp. Ctrl” window allows you to toggle the compressor ON or OFF.

NHIL24PLM0073AA 23

Down Force Bar Graph

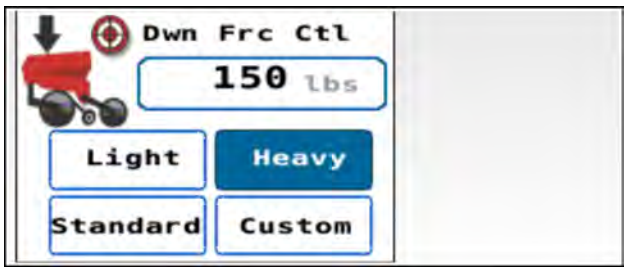
Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Down Force 2x2

The “Down Force 2x2” window cycles between values for Ground Contact Percentage, Net Applied, GW Force, and Good Ride Percentage. This window can be used to zoom in on individual rows.



NHIL24PLM0107AA 24

Dwn Frc (Down Force) Ctl (Control)



NHIL24PLM0110AA 25

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Dwn frc Ctll

The “Dwn frc Ctl” window allows you to set the gauge wheel down force target for the hydraulic down force system:

- Light = **22.7 kg** (**50 lb**)
- Standard = **45.4 kg** (**100 lb**)
- Heavy = **68.0 kg** (**150 lb**)
- Custom = Custom Value

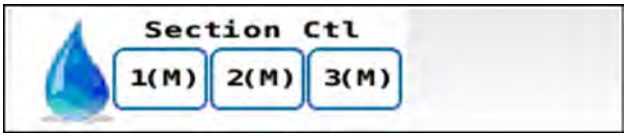
DF (Down Force) Summary

NHIL24PLM0106AA 26

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: DF Summary

The “DF Summary” window displays the Ground Contact Percentage, Net Applied, GW Force, and Good Ride Percentage, cycling between the values for “All-Rows”, the “High Row”, and the “Low Row”.

Drive Ctl (Control)



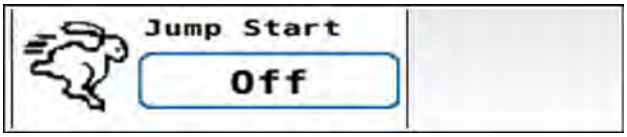
NHIL24PLM0109AA 27

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Drive Ctl

The “Drive Ctl” window allows you to control the state of the liquid sections:

- Blue (M) = On / Manual Section Control
- White (M) = Off / Manual Section Control
- Blue (A) = On / Automatic Section control

Jump Start



NHIL24PLM0108AA 28

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Jump Start

The “Jump Start” window allows the product drives to start applying product early. Use the “Jump Start” feature when the planter is starting from a dead stop – for example, after backing into a corner.

For more information, see “Jump start control” (**4-33**).

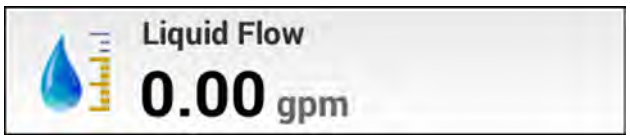
Liquid Boom Rate, Scan

NHIL24PLM0084AA 29

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Applied Rate, Scan Liquid Boom

The “Liquid Boom Rate, Scan” window scans all liquid sections and displays the average (all rows), high value (per row), low value (per row), and current value (each row) across all liquid sections.

Liquid Flow



NHIL24PLM0077AA 30

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Liquid Flow

The “Liquid Control” window displays the current liquid application rate, in gallons per minute.

Liquid Pres (Pressure)

NHIL24PLM0078AA 31

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Liquid Pres

The “Liquid Pres” window displays the current liquid system pressure.

Mltpls (Multiples)

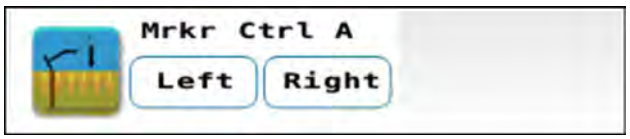
NHIL24PLM0111AA 32

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Mltpls

The ”Mltpls” window reports the percentage of multiples for the seed meter. Multiples are instances when the planter has dropped more than one seed in a location.

For more information, see “ ”Application monitoring: seed” (**4-8**).

Marker Ctrl (Control)



NHIL24PLM0112AA 33

Location: Run screen, Left-Hand Area
Layout menu: Precision Farming
Label: Marker Ctrl

The “Marker Ctrl” window you to control the left-hand and right-hand markers:

- (A) = Automatic Control
- (M) = Manual Control

The mode is defined in the “Frame Ctrl” area.

Obstacle

NHIL24PLM0113AA 34

Location: Run screen, Left-Hand Area
Layout menu: Precision Farming
Label: Obstacle

The “Obstacle” window “Avoid” setting controls marker operation when planting without moving the planter frame.

Overlap Control

NHIL20PLM0074AA 35

Location: Run screen, Left-Hand Area
Layout menu: Precision Farming
Label: Overlap Control

The “Overlap Control” window allows you turn section control on and off when entering or exiting already-applied areas.

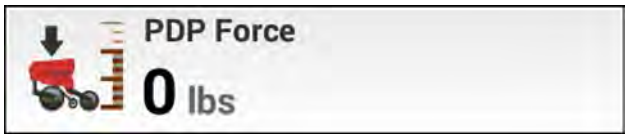
PDP Ctl (Control)

NHIL24PLM0081AA 36

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: PDP Ctl

The “PDP Ctl” (Pneumatic Downforce Pressure Control) window allows you to control the set point in pounds (force) for the row unit pneumatic down force system.

PDP Force

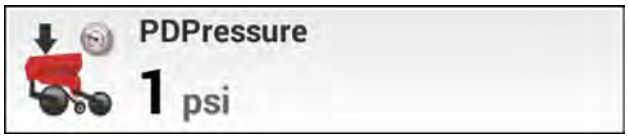


NHIL24PLM0080AA 37

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: PDP Force

The “PDP Ctl” (Pneumatic Downforce Pressure Force) window reports the system pneumatic down force in pounds-force currently being applied.

PDPressure

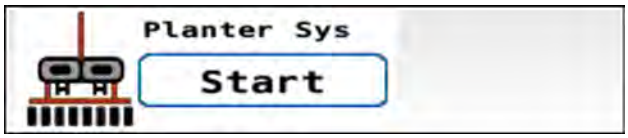


NHIL24PLM0079AA 38

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: PDPressure

The “PDPressure” (Pneumatic Downforce Pressure) window reports the system pneumatic down force, in psi or kPa.

Planter Sys (System)



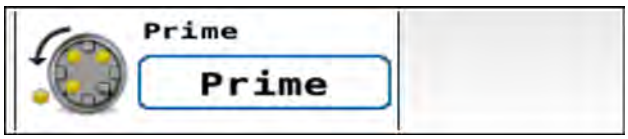
NHIL24PLM0114AA 39

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Planter Sys

The “Planter Sys” window, as part of a daily setup routine, allows you to control the state of the systems (such as, the bulk fan control, vacuum fan control, and prime control) on the planter.

For more information, see “Daily setup” (**4-1**).

Prime



NHIL24PLM0115AA 40

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Prime

The “Prime” window allows you to start the necessary planter sub-systems, such as the vacuum, bulk fill (if equipped), alternator, wing and sub-frame down force (if equipped), and compressor, plus primes the seed meters and liquid system, if enabled, prior to selecting “Start” from the “Planter Sys” window.

Press and hold the “Prime” button for three sections to prime the system.

For more information, see “Prime control” (**4-170**).

Section Switchbox

Location: Run screen
Layout menu: Implement/Boom
Label: Section Switchbox (1x3R, 2x3R, or 2x6)

The “Section Switchbox” window is available in in 1x3, 2x3, and 2x6 sizes. The 1x3 section switchbox provides only a preview (read-only) of the sections that are configured to the switchbox window for your implement.

Each section on the implement is represented by a row indicator. Row indicators are separated across drives into the number of sections controlled by the application controller.

In the lower section of the “Section Switchbox” window, the application controllers are shown. In the following example, the implement is operating with a Seed Boom and Liquid Boom controller.

- The Seed Boom can control 24 sections, each configured to a unique switch.
- The Liquid Boom can control three sections, with each section assigned to switch number 1, 11, and 15.

The full-size 2x6 section switchbox provides up to 24 switches that can be turned on and off from the run screen. The number of available switches depends on the configuration of the switchbox. If you do not assign all of the switches to sections, the unassigned switches appear disabled.

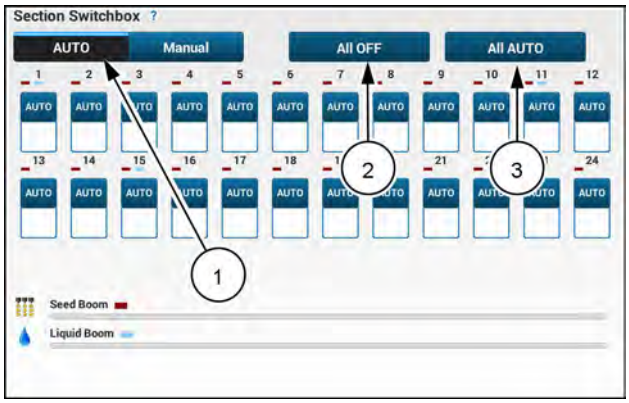
Automatic mode

When the section switchbox is set to “AUTO” **(1)**:

- You can enable each switch to the “AUTO” position or disable each switch to the OFF position. The default setting for all switches is the “AUTO” position.
- When a switch is in the “AUTO” position, the corresponding row in each section will operate automatically based on the settings configured for boundary and overlap control.

To turn all sections off, press the “All OFF” button **(2)**.

To set all sections to automatic, press the “All AUTO” button **(3)**.



NHIL22PLM0461AA 41

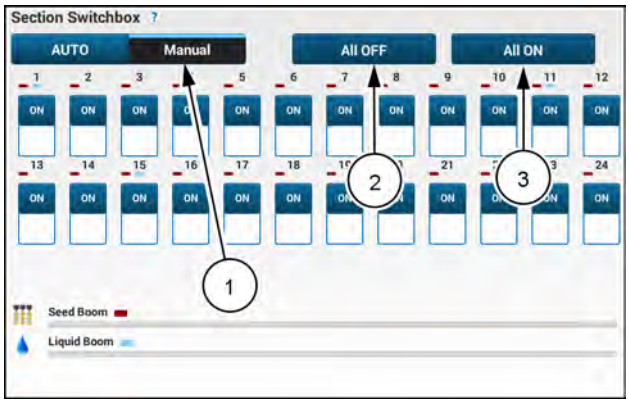
Manual mode

When the section switchbox is set to “Manual” **(1)**:

- You can enable each switch to the “ON” position or disable each switch to the OFF position. When a section switch is in the “ON” position, the implement applies product from that section, regardless of the settings configured for boundary and overlap control. The default setting for all switches is the “ON” position.
- When a switch is in the “OFF” position, the corresponding section will not apply product or generate a coverage map.

To turn all sections off, press the “All OFF” button **(2)**.

To turn all sections on, press the “All ON” button **(3)**.

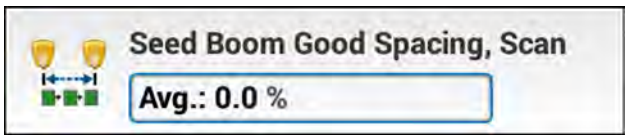


NHIL22PLM0462AA 42

Seed Boom Good Spacing, Scan

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Good Spacing, Seed Boom Scan

The “Seed Boom Good Spacing, Scan” window scans all rows, planter average, high row, and low row.

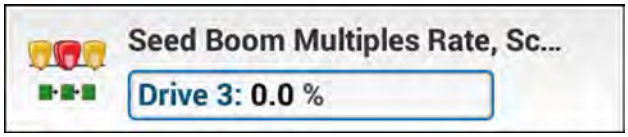


NHIL24PLM0082AA 43

Seed Boom Multiples Rate, Scan

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Multiples Rate Scan Seed Boom

The “Seed Boom Multiples Rate, Scan” window scans all rows, planter average, high row, and low row.

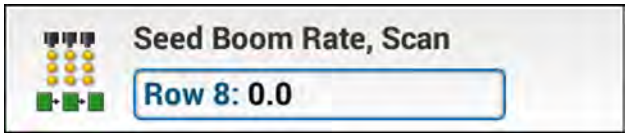


NHIL24PLM0117AA 44

Seed Boom Rate, Scan

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Applied Rate, Scan Seed Boom

The “Seed Boom Rate, Scan” window scans all rows and displays the average, high value, and low value across all rows.



NHIL24PLM0083AA 45

Seed Level

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Seed Level

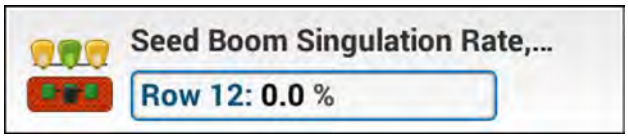
The “Seed Level” window allows you to see the tank seed level. For more information, see “Seed Level” (**4-35**).

NHIL24PLM0116AA 46

Seed Boom Singulation Rate, Scan

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Singulation Rate, Scan Seed Boom

The “Seed Boom Singulation Rate, Scan” window scans all rows, planter average, high row, and low row.

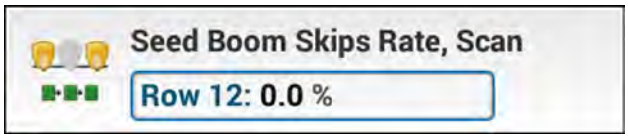


NHIL24PLM0087AA 47

Seed Boom Skips Rate, Scan

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Skips Rate, Scan Seed Boom

The "Seed Boom Skips Rate, Scan” window scans all rows, planter average, high row, and low row.

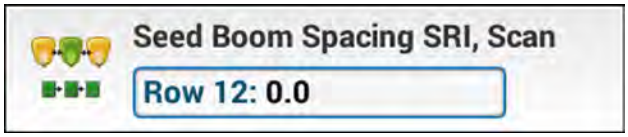


NHIL24PLM0085AA 48

Seed Boom Spacing SRI, Scan

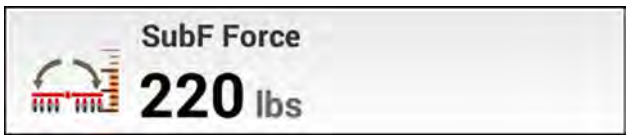
Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Seed Boom Spacing SRI

The “Seed Boom Spacing SRI, Scan” window scans all rows, planter average, high row, and low row.



NHIL24PLM0086AA 49

SubF Force



NHIL24PLM0088AA 50

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: SubF Force

Specific to the 2150S planter, the “SubF Force” (Sub Frame Force) window provides feedback on the amount of sub frame down force being applied. The range is **454 – 0.0 kg** (**1000 – 9000 lb**), depending on configuration.

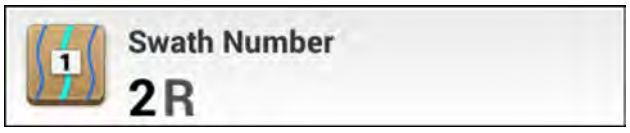
SubF Press (Pressure)

NHIL24PLM0090AA 51

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: SubF Press

Specific to the 2150S planter, the “SubF Press” (Sub Frame Pressure) window provides feedback on the amount of hydraulic pressure applied to the sub frame on the planter.

Swath Number



NHIL20PLM1779AA 52

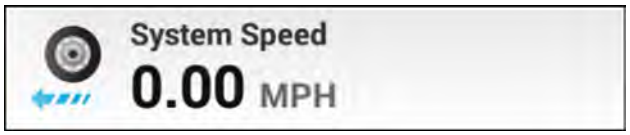
Location: Run screen, Left-Hand Area
Layout menu: GNSS and Guidance
Label: Swath Number

The “Swath Number” window reports the current swath that the vehicle is driving on relative to the recorded swath.

- If the swath is to the right of the recorded swath, the swath number is identified with an “R”.
- If the swath is to the left of the recorded swath, the swath number is identified with an “L”.

NOTE: *The direction (left or right) is always determined based on the heading of the original recorded swath.*

System Speed



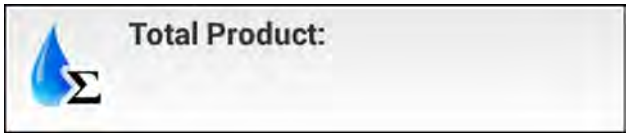
RAPH21PLM1010AA 53

Location: Run screen, Left-Hand Area
Layout menu: Precision Farming
Label: System Speed

The “System Speed” shows the speed received from the speed source that is configured in the “Vehicle/Implement Configuration” screen. The depicted icon changes based on the system speed source.

NOTE: *This window was formerly known as “Ground Speed.”*

Total product: Liquid Boom



NHIL24PLM0096AA 54

Location: Run screen, Left-Hand Area
Layout menu: Precision Farming
Label: Total Product: Section Group 1”

The “Total Product: Section Group 1” window shows the total amount of liquid product that was applied.

This is automatically saved to the current task, and reset with a new task.

Total product: Seed Boom

NHIL24PLM0097AA 55

Location: Run screen, Left-Hand Area
Layout menu: Precision Farming
Label: Total Product: Section Group 1”

The “Total Product: Section Group 1” window shows the total amount of seed that was applied.

This is automatically saved to the current task, and reset with a new task.

Vacuum

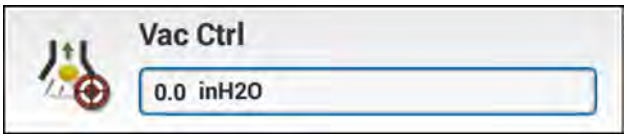
NHIL24PLM0091AA 56

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Vacuum

The “Vacuum” window displays current vacuum level.

For more information, see “Vacuum rate monitoring” (**4-41**).

Vac Ctrl (Control)



NHIL24PLM0092AA 57

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: Vac Ctrl

The “Vac Ctrl” (Vacuum Control) window provides control for the vacuum system. Press and hold the selection box to enter the target vacuum setting.

For more information, see “Vacuum fan control” (**4-38**).

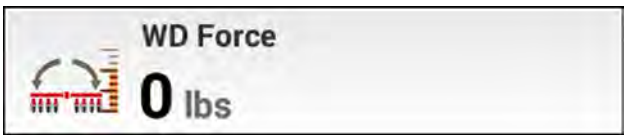
WD Force (Control)

NHIL24PLM0094AA 58

Location: Run screen, Left-Hand Area
Layout menu:Implement/Boom
Label: WD Force

The “WD Force” (Wing Down Force Control) window allows you to adjust the Wing Down Force, if equipped.

WD Force

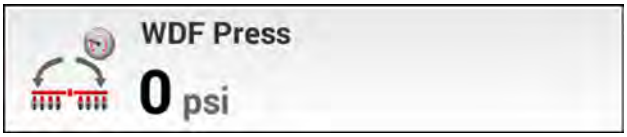


NHIL24PLM0093AA 59

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: WD Force

The “WD Force” (Wing Down Force) window displays current Wing Down Force target, in lbs.

WDF Press (Pressure)



NHIL24PLM0095AA 60

Location: Run screen, Left-Hand Area
Layout menu: Implement/Boom
Label: WDF Press

The “WDF Press” (Wing Down Force Pressure) window displays current Wing Down Force, in psi or kPa.

Rate Control

NOTE: *This example shows the 2x3 rate control window for a seed controller with a single drive. Rate control windows can be added to a run screen in 1x2, 2x3, and 2x6 window sizes for granular, seed, bulk seed, liquid, and anhydrous controllers. The 1x2 rate control windows contain read-only information. The 2x3 rate control windows do not include virtual tanks or illustrations that depict seed population.*

Each product drive displays the configured target rate **(1)**. Press the plus or minus buttons to adjust the target rate from the run screen. The applied rate **(2)** is shown in the drive area.

Press the “Rate 1” and “Rate 2” buttons to switch between the pre-configured target rates, or press the “RX” button to assign the prescription rate. If a “Rate 2” value is not pre-configured but you still press the “Rate 2” button, the default is zero. If there is no prescription assigned to the controller, then the “RX” button is inactive.

A “linked” icon depicts linked drives.

A green indicator bubble appears on the selected button if all of the drives have been assigned to that value. If you subsequently change a target rate for one of the available drives, the bubble appears half green and half black.

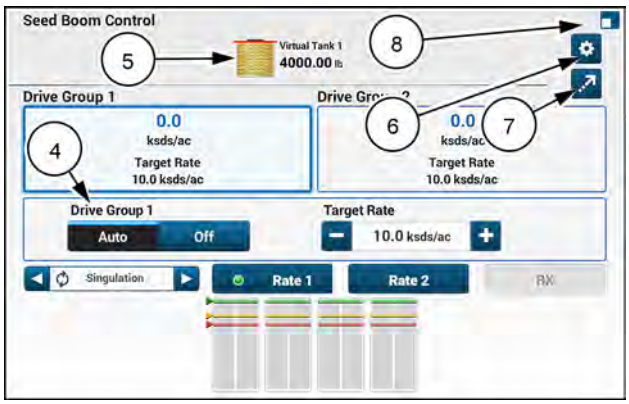
Dashes appear in an applied rate section in the event of a sensor malfunction while the drive is not placed in manual mode.

For 1x2 and 2x3 rate control windows, press the button **(3)** to expand the window to the 2x6 size.

Rate control (2x3)

RAPH23PLM0498AA 61

Rate control (2x6)



RAPH23PLM0499AA 62

The 2x6 rate control window provides additional functionality:

- The drives can be manually turned on and off with the buttons **(4)**. If a drive is turned off, then you cannot adjust the target rate from this window.
- The configured virtual tanks **(5)** are depicted in top of the window. Each tank has an indication of the remaining product. The settings button **(6)** opens a “Tank Display Settings” window. The “Tank Display Settings” window has controls for configuring the units of measure of remaining product. The virtual tank control button **(7)** opens the “Seed Boom / Virtual Tanks” window. For more information, see the “Virtual tanks” section in the **Pro 1200** display precision farming and guidance software operating guide.
- For seed controllers that provide population information, the 2x6 rate control window displays a seed bar graph with row indicators grouped together in their assigned drives. The row indicators display the row number and the status of the row.

Press the button **(8)** to collapse the window back to the original size if you expanded a smaller window.

Additional examples of rate control windows in the 1x2 size are shown below.

RAPH21PLM1274AA 63

RAPH21PLM1275AA 64

3 - SETUP

PLANTER SETUP

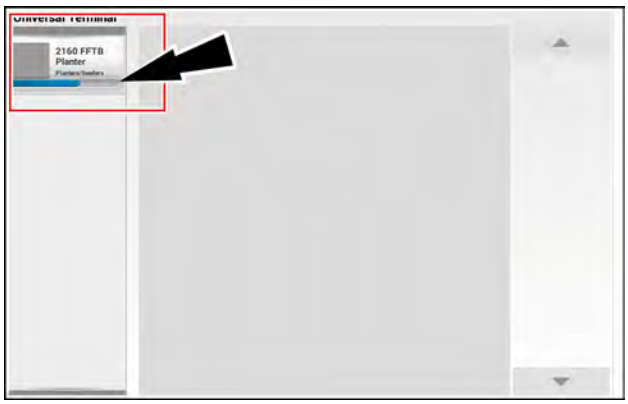
Open the planter software

Load the object pool

Select the run screen in the display that has the Universal Terminal (UT).

When you connect your planter to the tractor, the planter controller automatically uploads its software components to the display. A blue bar indicates its progress.

NOTE: *The object pool can take several minutes to load.*



NHPH24PLM1155AA 1

Initialize the planter UCM

A warning screen displays while the planter UCM is initializing. The “Wait” icon **(1)** will flash, indicating that the planter is not yet ready to be used.

1. “Do not exceed specified planter transport speed and load limits.”
2. “Do not operate planter near bystanders.”
3. “Refer to planter Operator’s and Software manuals for operating instructions.”

When all components are initialized, the icon will change to a blue “Accept” button **(2)**.

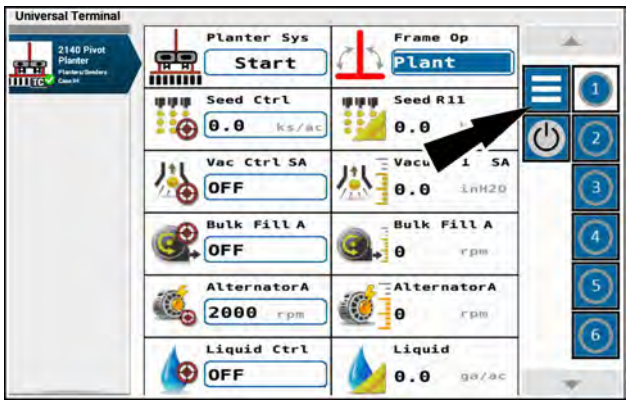
Press the “Accept” button **(2)** to proceed when the system is ready.

NHPH24PLM1156AA 2

NHPH24PLM1157AA 3

The first screen that appears is page 1 of the home screen.

To begin setting up your planter, press the “main menu” button to access the options available from the “Main Menu” screen.



RAPH23PLM0180AA 4

Planter Configuration screen

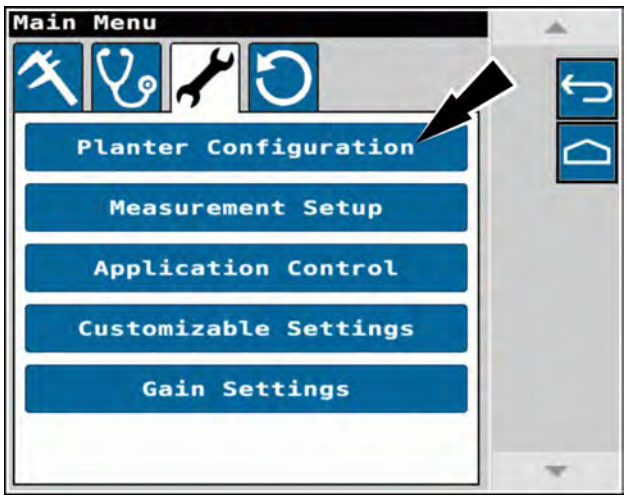
NOTE: *The planter must first be configured by your CASE IH dealer. It is not recommended to make changes in the "Planter Configuration" screen unless physical systems have been added or removed and should only be done under the guidance or direction of your CASE IH dealer.*

NOTE: *Planter setup should be performed in the "Planter Setup Wizard". For more information regarding planter setup, see* ***3-8****.*

NOTE: *Any changes made on the planter configuration screen do not go into effect until exiting this screen. Upon exiting, a popup will ask you to confirm or cancel the changes that you made.*

Press the "main menu" button on the home screen.

From the setup tab, select "Planter Configuration".



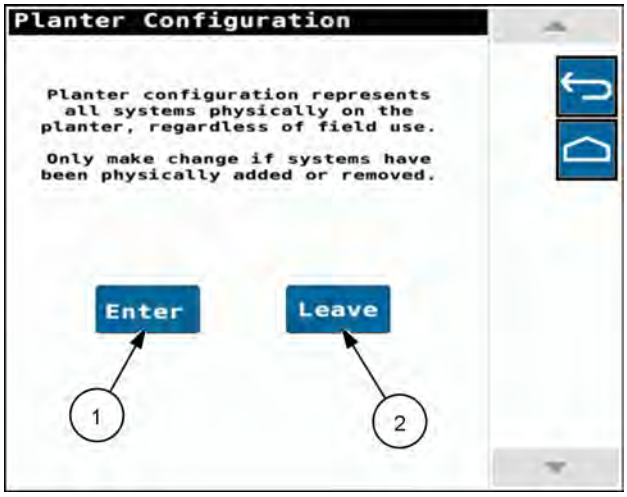
NHPH24PLM1158AA 1

"Planter configuration represents all systems physically on the planter, regardless of field use.

"Only make changes if systems have been physically added or removed"

Press the "Enter" button **(1)** to acknowledge this message.

Press the "Leave" button **(2)** to exit the configuration screen and return to the main menu.



NHPH24PLM1159AA 2

The "Planter Configuration" screen consists of five sections, as listed to the right.

Press the icons to navigate the "Planter Configuration" screen.

The following sections go into greater detail about each menu.

Frame 

Row 

Equipment 

Application 

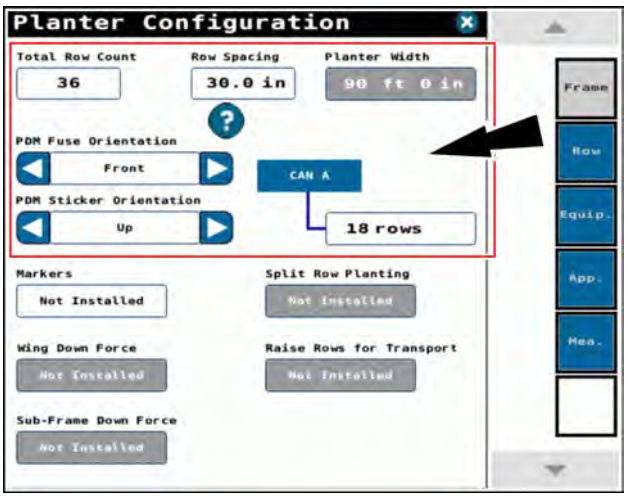
Measurements 

Frame

Frame options for the planter include:

- Row Count – Displays the total number of rows on the planter.
- Row Spacing – Displays the row spacing in inches.
- Planter Width – Displays the total row width of the planter.
- PDM Fuse Orientation– Indicates the orientation of the Power Distribution Module (PDM) fuse.
- PDM Sticker Orientation – Indicates the orientation of the PDM sticker.

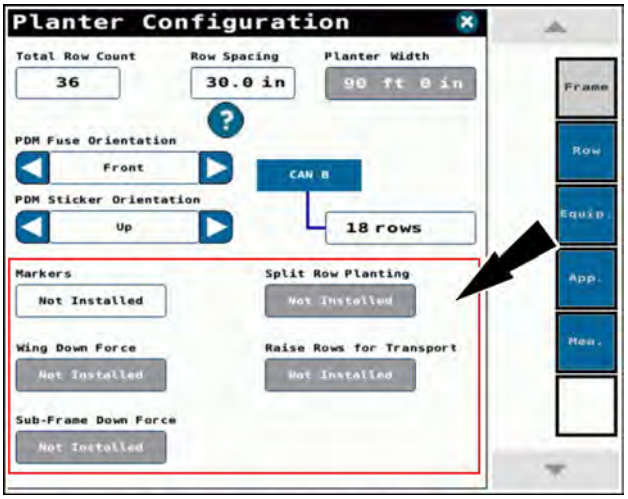
  NOTE: *PDM fuse and sticker orientations together indicate the orientation of the PDM to the planter system.*
- Each high speed CAN channel communicates with half of the total row count. Press “CAN A” (or “CAN B”) to switch between CAN channels for systems.



NHPH24PLM1161AA 3

Additional frame options include:

- Markers – Indicates if the planter is equipped with markers.
- Wing Down Force –Indicates if a wing down force option is installed to enable the wing down force system on 2130, 2140, 2150, 2150S planters.
- Sub-Frame Down Force –Indicates if a sub-frame down force option is installed on the planter.
- Split Row Planting – Indicates if the planter is equipped to enable split row planting.
- Raise Row – Indicates if the raise row option is installed on 2150 planters.



NHPH24PLM1160AA 4

Row

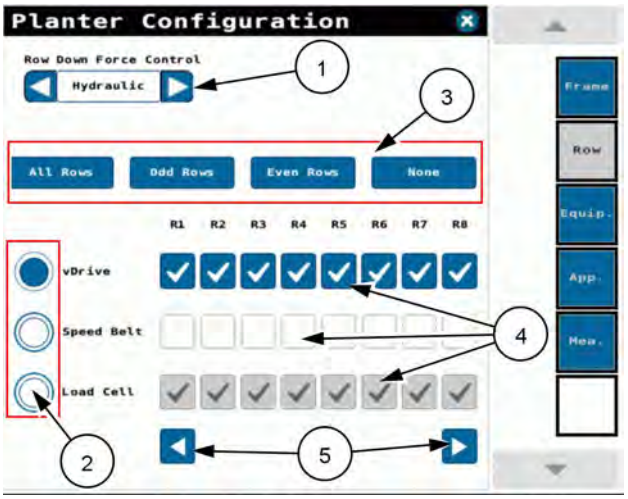
- “Down Force Control” – Indicates the type of down force control installed on the planter. Use the arrow keys **(1)** to change between hydraulic and pneumatic, if applicable.
- vDrive – Indicates the rows containing row nozzles controlled by a vDrive® module.
- Speed Belt – Indicates the rows that contain a speed belt sensor, if installed.
- Load Cell – Indicates the rows that contain a load cell.

Press the radial button **(2)** to select the option.

Press one of the row options **(3)** to turn the setting on or off on all, odd, even, or no rows.

Press an individual row **(4)** to add or remove the option from that row.

Press the arrow keys **(5)** to cycle between groups of eight rows.



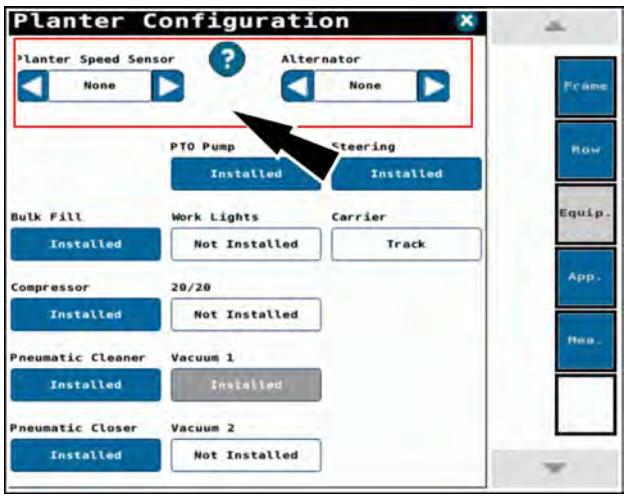
NHPH24PLM1163AA 5

Equipment

- Planter Speed Sensor – Indicates the type of speed sensor installed on the planter. Press the arrow keys to change the option, if installed.

  NOTE: *This option is not used to indicate the speed source used in planting. For more information about speed source, see* ***3-8****.*

- Alternator – Indicates the type of alternator installed on 2110, 2120, and 2160 models. Use the arrow keys to change the option, if installed.



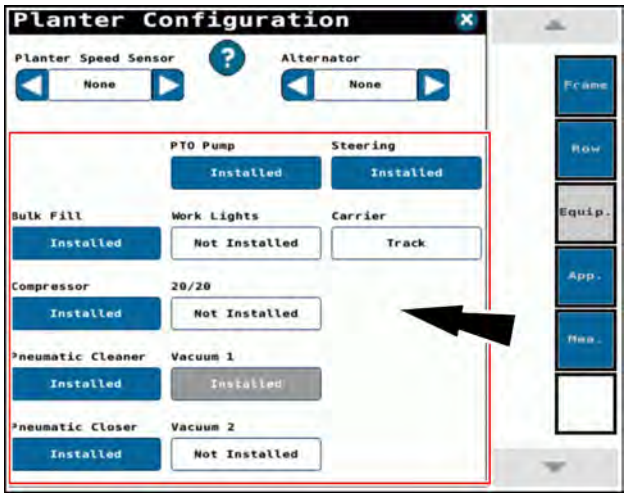
NHPH24PLM1164AA 6

Additional equipment options include:

- Bulk Fill – Enable the bulk fill option if the planter is equipped with a bulk seed hopper system. For the 2160 planter, the bulk fill option cannot be turned off.
- Compressor – Indicates if a compressor is installed on the planter.
- Pneumatic Cleaner – Indicates if the planter is equipped with a pneumatic cleaner system.
- Pneumatic Closer – Indicates if the planter is equipped with a pneumatic closer system.
- PTO Pump – Indicates if the planter is equipped with a PTO pump.
- Work Lights – Indicates If the planter is equipped with additional lights for working around the seed hoppers.
- 20/20 – Indicates if the planter is equipped with the optional **Precision Planting®20/20 SeedSense®** display.

  NOTE: *Installation of the* ***20/20 SeedSense®*** *display requires that you install the 20/20 connectivity kit for the necessary in-cab harnessing. See your CASE IH dealer for the kit and installation instructions for your planter:*

- Vacuum 1 / 2– Indicates if vacuum fans are installed on the planter.
- Steering – Indicates if there is a steering system installed on the planter.
- Carrier – Indicates if carrier cylinders are installed on the planter.



NHPH24PLM1164AA 7

Application

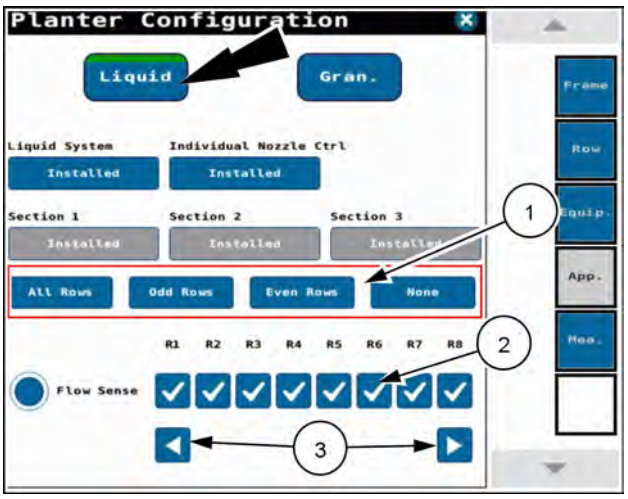
Liquid – Select the “Liquid” option to view options if the planter is equipped with a liquid system.

1. Liquid System – Indicates if there is a liquid system installed on the planter.
2. Individual Nozzle Ctrl – Indicates if the planter is equipped with individual nozzle control.
3. Section 1, 2, 3 – Indicates that liquid is installed in each section.
4. Flow Sense – Enable the Flow Sense option if the planter is equipped with individual row nozzles.

Press one of the row options **(1)** to turn Flow Sense on or off for all, odd, even, or no rows.

Press an individual row **(2)** to add or remove the option from that row.

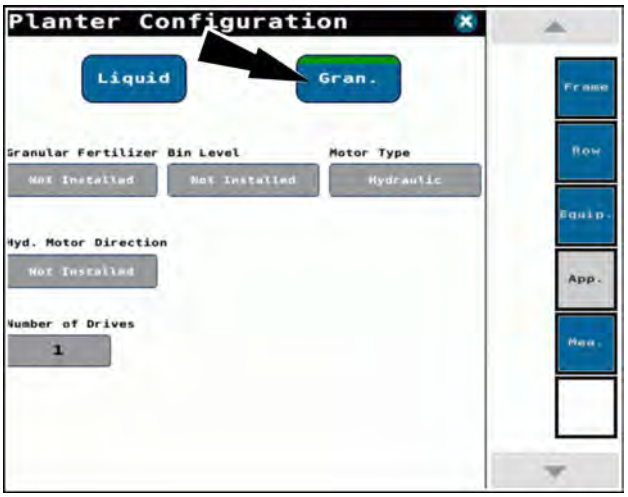
Press the arrow keys **(3)** to cycle between groups of eight rows.



NHPH24PLM1166AA 8

Granular – Select “Granular” to view options if the planter is equipped with a granular system.

1. Granular Fertilizer – Indicates if there is a granular system installed on the planter.
2. Bin level – Indicates if the planter is equipped with bin level sensors.
3. Motor Type – Displays the type of motor used for the granular system
4. Hyd. Motor Direction – Displays the direction of the hydraulic motor.
5. Drives – Displays the number of granular drives.



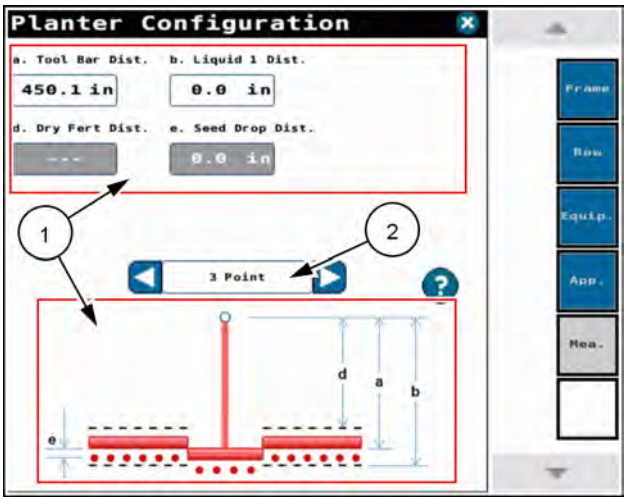
NHPH24PLM1165AA 9

Measurements

The measurements screen displays applicable measurements for your planter. The options will change based on the model and configuration of your planter. The diagram below corresponds with the measurements shown above **(1)**.

Use the arrow buttons to change the hitch type **(2)** of the planter.

NOTE: *Distances for liquid or dry fertilizer applicators are measured to the front most rows if odd or even row offset exists.*



NHPH24PLM1167AA 10

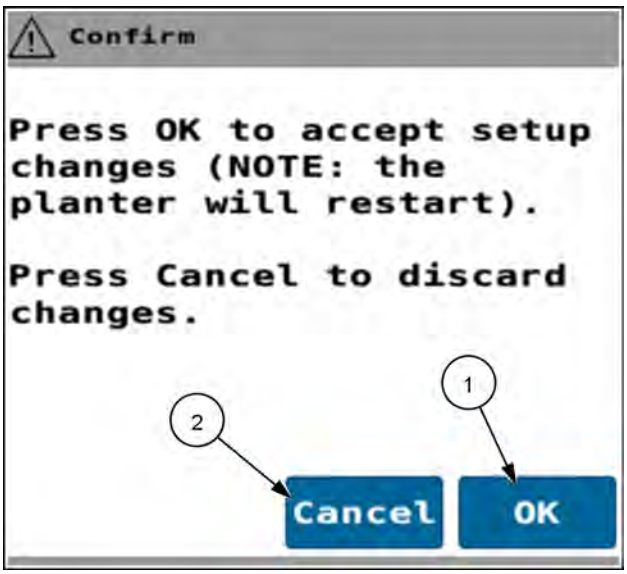
If you change any of the planter options on this screen, a pop-up window will appear upon exiting the screen.

The popup window states, “Press OK to accept setup changes (NOTE: The planter will restart). Press Cancel to discard changes.”

Press the “OK” button **(1)** to accept the setup changes.

Press the “Cancel” button **(2)** to discard your changes.

NOTE: *The planter restarts if you accept changes.*



RAPH22PLM0862BA 11

If you accept the changes, an additional pop-up window appears.

The popup window states, “Planter setup has been changed. The planter will restart in 10 seconds.”

Allow the planter to cycle power.

RAPH22PLM0863BA 12

Planter setup wizard

NOTE: *The "Vehicle Implement Configuration" screen in the display includes a configuration for the "Work Switch Source." Both "Work Switch Source" settings must be configured to "None." Any other setting can cause planting and mapping errors. Please refer to your display software operating guide for more information.*

This section is intended to provide overview instructions for using the "Setup Wizard" in the display. See the planter operating guide for instructions on setting up the physical apparatus of your planter.

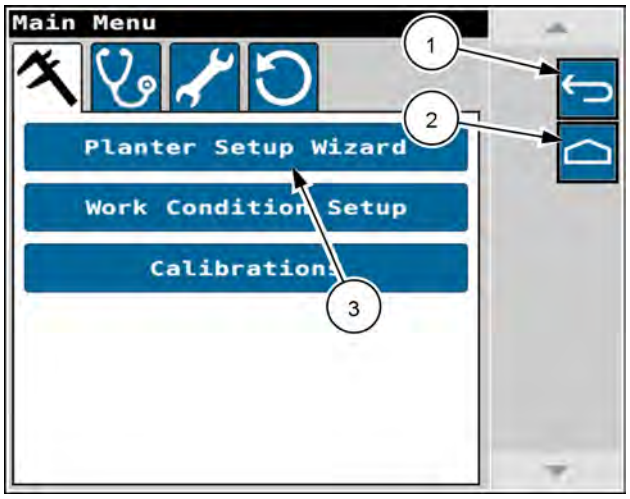
The setup wizard guides you through all of the necessary setup operations. This instruction guides you through the wizard, though the wizard is designed to give you an intuitive user interface that assists in performing the entire setup. This instruction refers you to other sections in this manual that provide further information about specific procedures.

Perform every step in the wizard when the following situations apply:

- When you set up a planter for the first time in a display.
- When you change the physical configuration of the planter, or replace any components that affect planter performance.
- When operational needs change, such as converting to a different seed.

Press the "main menu" button on the home screen.

From the wizard tab, select "Planter Setup Wizard".



RAPH23PLM1007BA 1

The "Planter Setup Wizard" screen is designed to guide you as you proceed through the setup options in a logical sequence.

The wizard is designed to only present screens that are relevant to the detected planter and operational requirements.

Navigation buttons in the right-hand pane allow you to navigate through the screens.

Press the back button **(1)** to return to the previous screen.

Press the home button **(2)** to return to the home screen.

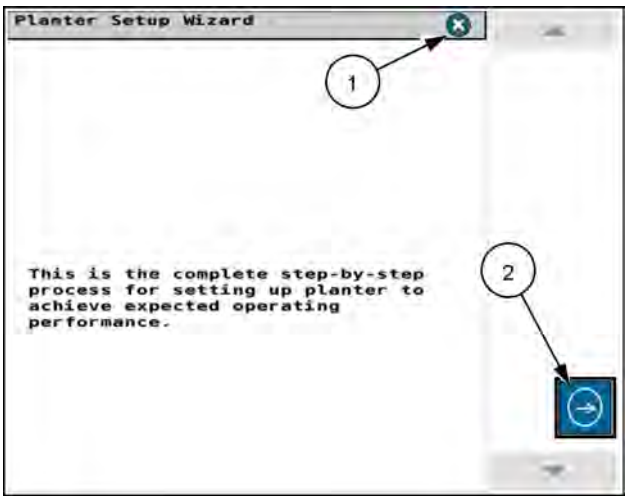
Press the "Planter Setup Wizard" button **(3)** .

An introductory screen appears.

The introductory screen states, “This is the complete step-by-step process for setting up the planter to achieve expected operating performance.”

In any wizard screen you can cancel the setup by pressing the exit button **(1)**.

Press the next button **(2)** to begin the setup.



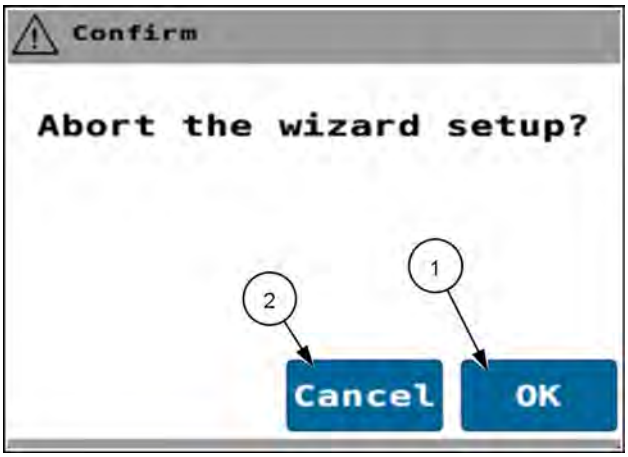
RAPH23PLM1008BA 2

If you pressed the exit button in the previous step, a confirmation screen appears.

Press the “OK” button **(1)** to cancel the setup.

Press the “Cancel” button **(2)** to close the confirmation window and continue the setup.

NOTE: *If you press the “OK” button to abort the setup, all changes are lost.*



RAPH23PLM1009BA 3

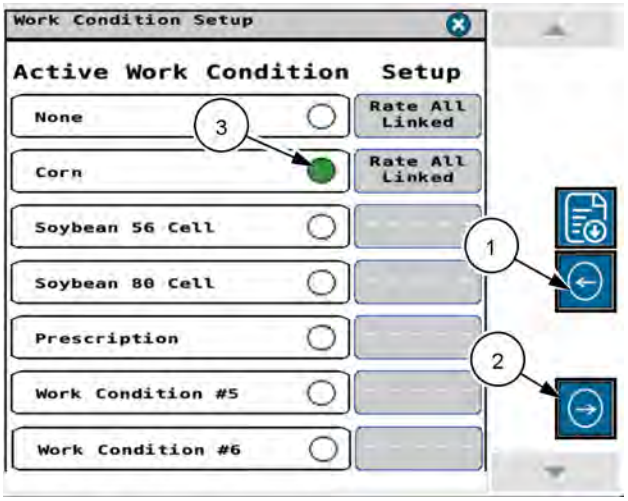
If you pressed the next button on the introductory screen, the “Active Work Condition” screen appears.

You can navigate through the setup wizard by using the next **(2)** or back **(1)** buttons.

Select the desired work condition. A green indicator **(3)** appears identifying the selected work condition.

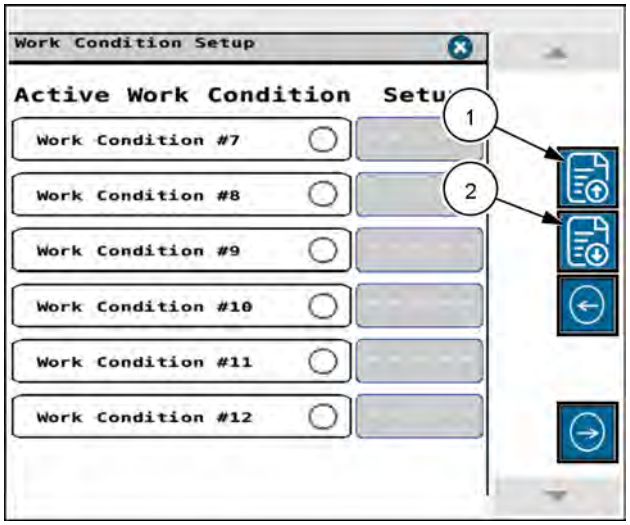
Press the next button **(2)** .

NOTE: *You can also use the dedicated “Work Condition Setup” screen. See “Work Condition Setup screen” (**3-80**) for instructions on performing the work condition setup.*



RAPH23PLM1011BA 4

You can navigate within some object pool screens using the up **(1)** and down **(2)** navigation buttons.



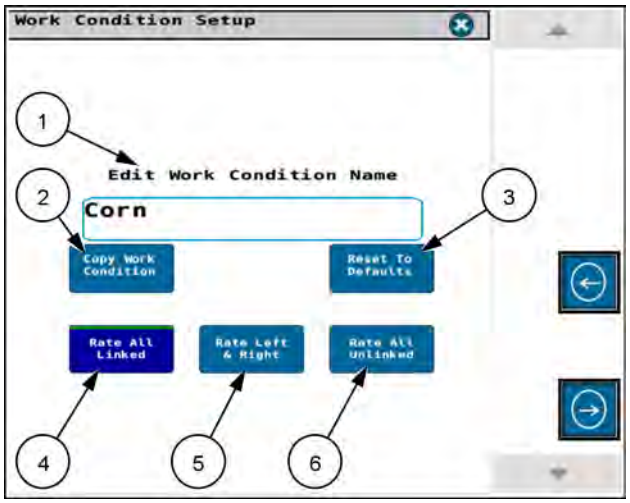
RAPH23PLM1012BA 5

If you pressed the next button in the “Active Work Condition Setup” screen, the “Edit Work Condition Name” screen appears.

See “Edit Work Condition Name” **(1)** in “Work Condition Setup screen” (**3-80**) for more information about editing the work condition name.

See “Work Condition Setup screen” (**3-80**) for more information on the following controls:

- “Copy Work Condition” **(2)** – Copy the work condition parameters for use in another work condition.
- “Reset To Defaults” **(3)** – Reset the parameters to the default settings.
- “Rate All Linked” **(4)** – Configure the rates for all of the planter drives.
- “Rate Left and Right” **(5)** – Select rates for each side of the planter.
- “Rate All Unlinked” **(6)** – Select rates for each drive of the planter.

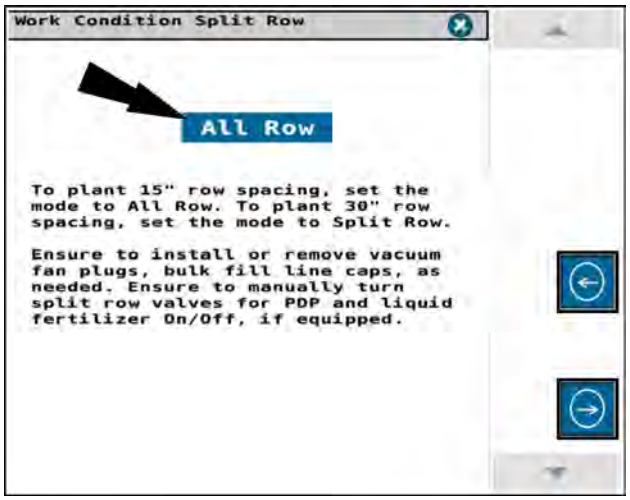


RAPH23PLM1013BA 6

If your planter supports split rows, the “Work Condition Split Row” screen appears.

Review the information in the “Work Condition Split Row” screen and follow the onscreen instructions.

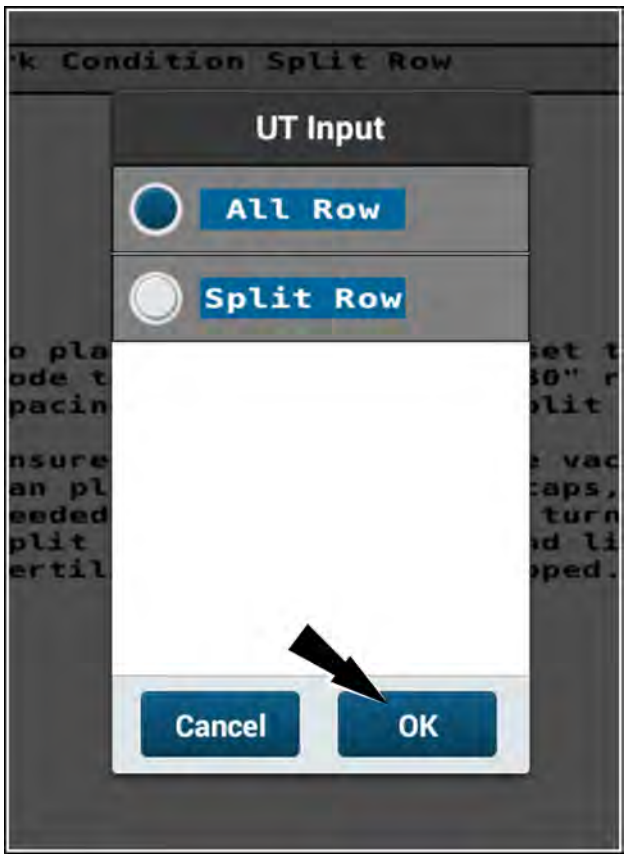
Press the selection button to configure the split row planter for all rows or split rows.



RAPH23PLM1014BA 7

In planters that support split row operation, select from the given options in the menu.

Press the next button in the “Work Condition Split Row” screen to advance to the next step in the wizard.



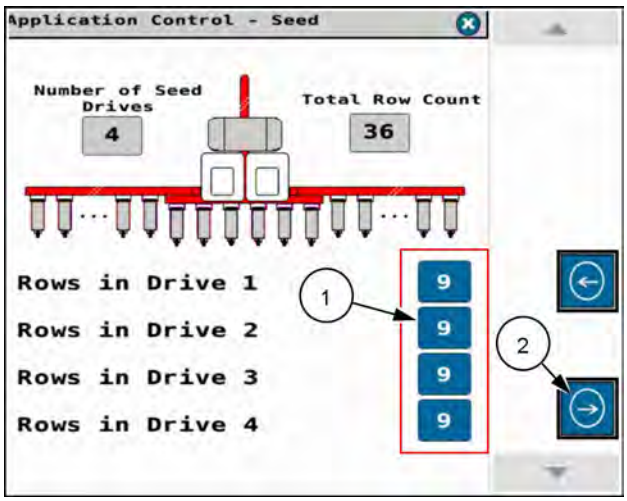
RAPH23PLM1015BA 8

Verify the information in the “Application Control - Seed” screen.

Press the buttons **(1)** to make changes as needed.

See “Application Control screen” (**3-22**) for more information on application control.

Press the next button **(2)** to continue.



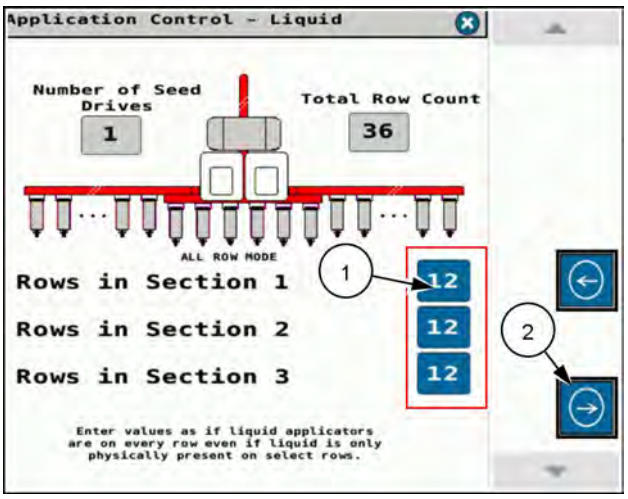
NHPH24PLM1143AA 9

If your planter is configured for liquid or granular application, verify the information in the “Application Control - Liquid” screen.

Press the buttons **(1)** to make changes as needed.

See “Application Control screen” (**3-22**) for more information on application control.

Press the next button **(2)** to continue.



NHPH25PLM0079AA 10

The “Measurement Setup” screen defaults to the measurements sent to the object pool by your planter.

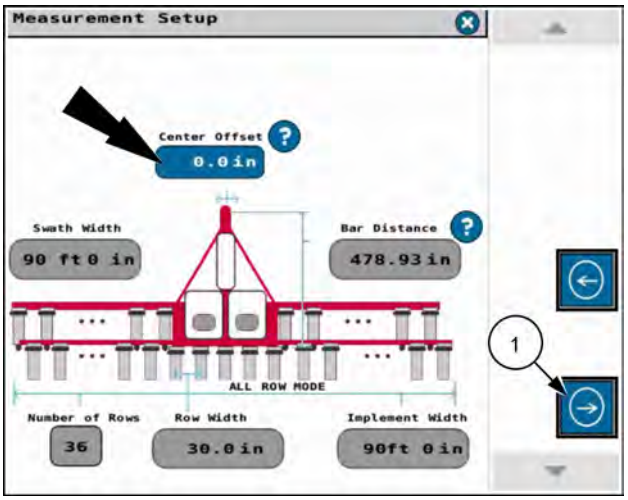
The “Center Offset” is the only measurement available to edit. Press the “Center Offset” window to make any changes.

NOTE: *The measurements are established based on frame type. Consult your CASE IH dealer before making any changes.*

NOTE: *Gray fields are locked and are unavailable to edit. Only options that are blue can be edited.*

See “Measurement Setup screen” (**3-17**) for more information on measurements.

Press the next button **(1)**.



NHPH24PLM1145AA 11

The “Work Condition Row Disable” screen gives the status of each row for the following parameters:

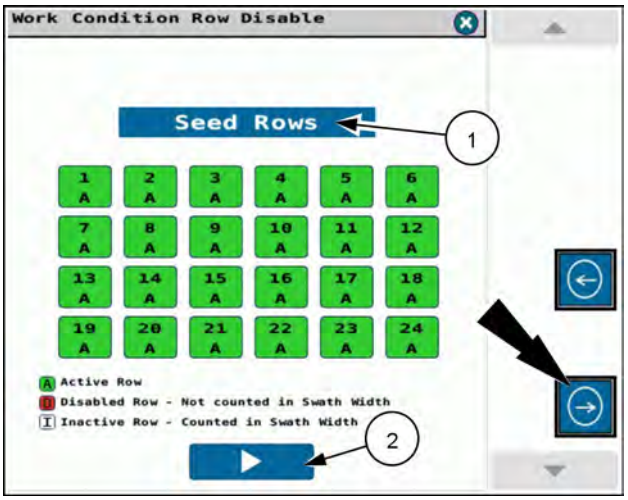
- Seed rows
- Down force rows
- Load cell rows

Press the button **(1)** to choose the desired parameter.

Press the arrow button **(2)** to view rows 25 through 48, if applicable.

See “Work condition row disable” in “Work Condition Setup screen” (**3-80**) for more information about disabling parameters in rows.

Press the next button to continue.



NHPH24PLM1146AA 12

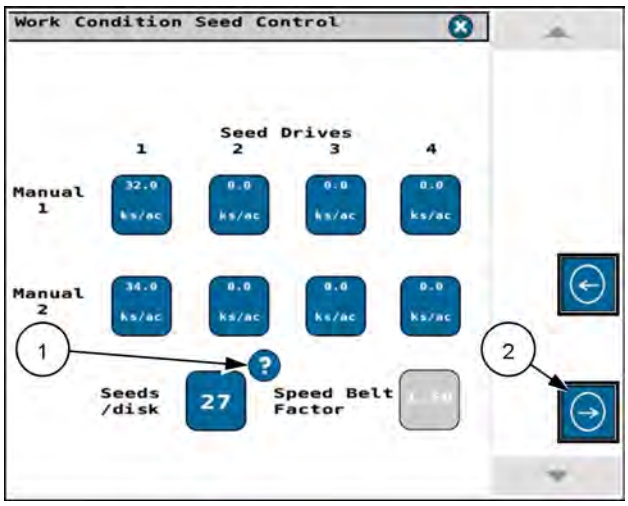
The seed drives screen provides controls for the following configurations listed here. See “Work Condition Setup screen” (**3-80**) in the following sections:

- Speed belt factor
- Target seed rate for the entire planter
- Seed rate per side
- Seed rate per drive
- Seeds per disk

This example shows the screen when seed rate per drive is configured. Drive 1 is already configured. Drives 2 through 4 still require configuration.

The help button **(1)** in the seed drives screen provides a disk selection guide for the “Seeds/disk” setting for common seed types. Specific operations may have different requirements.

Press the next button **(2)** to continue.

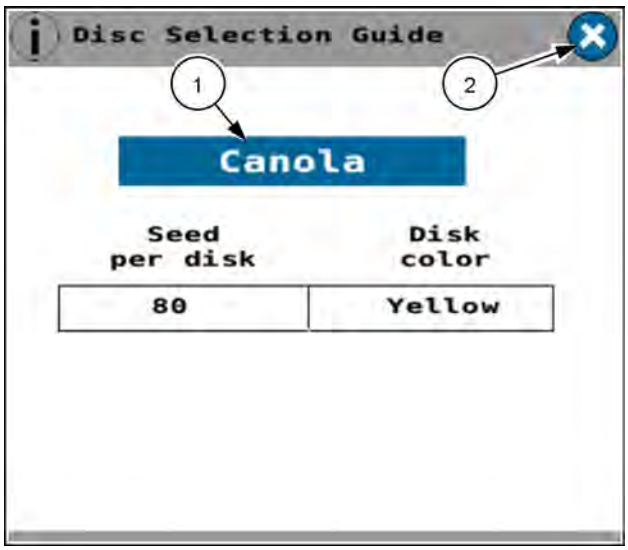


RAPH23PLM1019BA 13

If you pressed the help button in the “Seed Drives” screen, the “Disc Selection Guide” screen appears.

Press the seed type button **(1)** to see a menu from which you select your seed type to get the seeds/disk number.

Press the close button **(2)** to close the “Disc Selection Guide” screen.

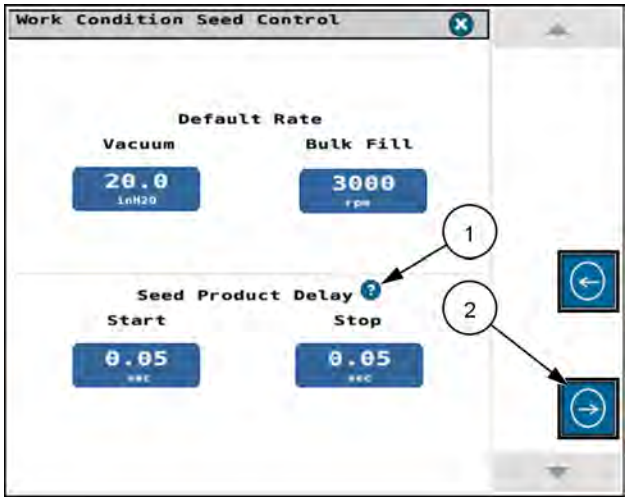


RAPH23PLM1020BA 14

The vacuum, bulk fill, and seed product delay screen appears. See the section, “Vacuum, bulk fill, and product delay” in “Work Condition Setup screen” (**3-80**) for more information about these controls.

Pressing the help button **(1)** provides help information that states that you should only use this screen to set up product delay

Press the next button **(2)** to continue.

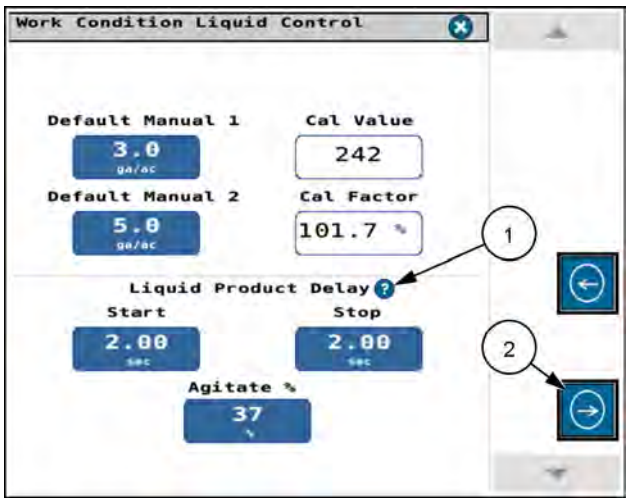


RAPH23PLM1021BA 15

If your planter is equipped with liquid application, the “Work Condition Liquid Control” screen appears. See the section, “Liquid control” in “Work Condition Setup screen” (**3-80**) for more information about these controls.

Pressing the help button **(1)** provides help information that states that you should only use this screen to set up product delay

Press the next button **(2)** to continue.



RAPH23PLM1022BA 16

If you pressed the help button in the “Work Condition – Seed (or Liquid) Control” screens, a help screen appears.

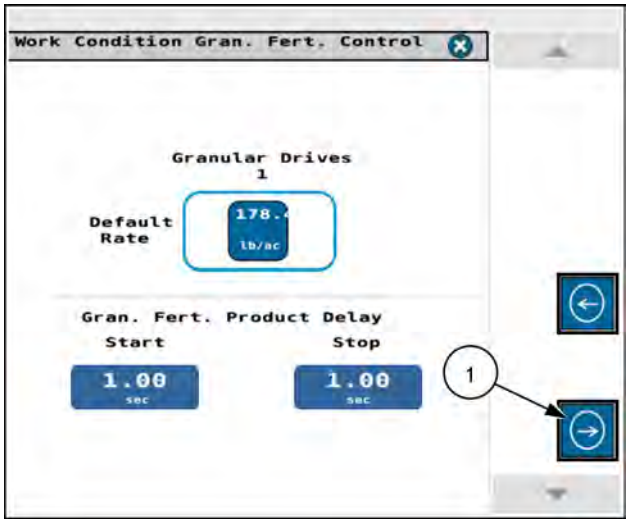
The help screen states, “Product delay should only be modified in this screen. Modification in the Task Controller will permanently override this value. To reset product delay to planter software control see your Task Controller software guide.”

Press the close button to close the help screen.

RAPH23PLM1029BA 17

If your planter is equipped with granular application, the “Work Condition Gran. Fert. Control” screen appears. See the section “Granular control” in “Work Condition Setup screen” (**3-80**) for more information about these controls.

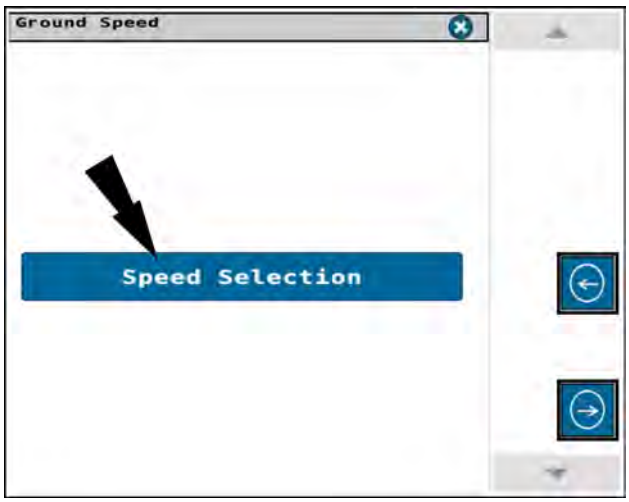
Press the next button **(1)** to continue.



RAPH23PLM1266BA 18

The “Ground Speed” screen appears.

Press the “Speed Selection” button to enter the ground speed source.

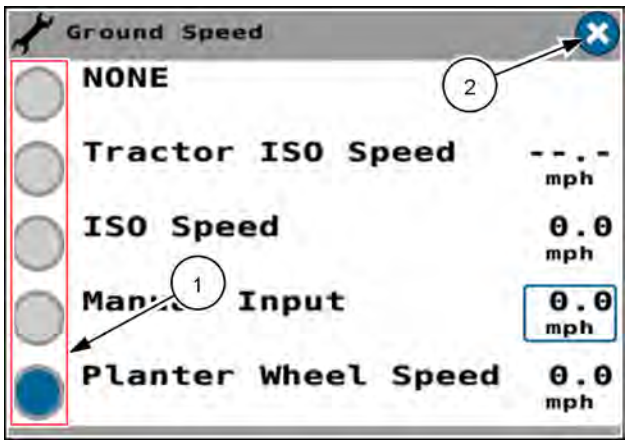


RAPH23PLM1023BA 19

Choose the desired speed source **(1)**. See “Speed selection” (**3-33**) for more information.

Press the close (X) button **(2)** to continue.

In the “Ground Speed” window of the wizard, press the next button to continue to the next step of the wizard.

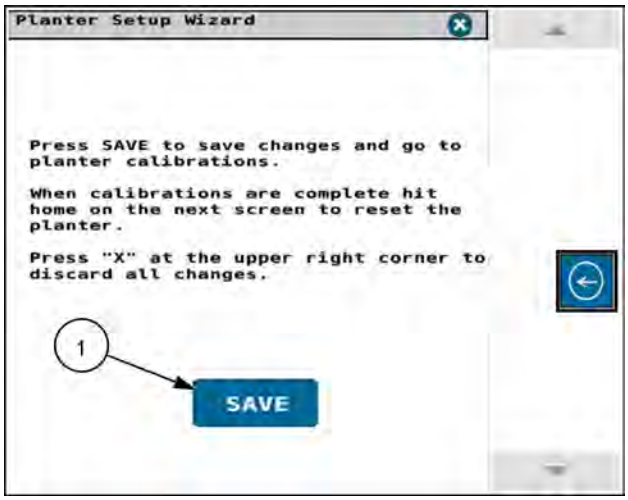


RAPH23PLM1024BA 20

The final screen of the work condition setup in the wizard provides a “Save” button **(1)** to confirm your planter setup and work condition configurations.

The “Save” screen states, “Press SAVE to save changes and go to planter calibrations. When calibrations are complete hit home on the next screen to reset the planter. Press X at the upper-right corner to discard all changes.”

Press the “Save” button **(1)** to confirm your planter setup and work condition configurations. This exits the work condition setup.



RAPH23PLM1025BA 21

The “Planter Calibrations” screen appears. Perform any needed calibrations. Calibrations vary depending upon planter model and configuration. See “Calibrations screen” (**3-41**) for information and instructions for each calibration.

The “Planter Calibrations” screen gives the last saved dates of each calibration. If you have never performed a calibration, the space reserved for the last saved date is blank. The calibration values for calibrations with no last saved date are a factory default for your planter model. CASE IH recommends performing calibrations that have no last saved date.

Perform the calibrations that appear in the screen. Follow the wizards built into the calibrations. If you have performed previous calibrations in the planter, you can proceed through them without changing anything.

CASE IH recommends performing calibrations at least seasonally, and after you have performed maintenance on the planter that could change the value of the calibrations.

- Liquid calibrations should be performed whenever a different liquid is to be applied.

  NOTE: *For more information, see chapter 4.6 “Liquid Calibration” (**3-101**).*

- Load cell calibrations should be performed as needed and can be monitored using the load cell calibration check.

  NOTE: *For more information, see “Load cell calibration” (**3-63**) and (**3-65***

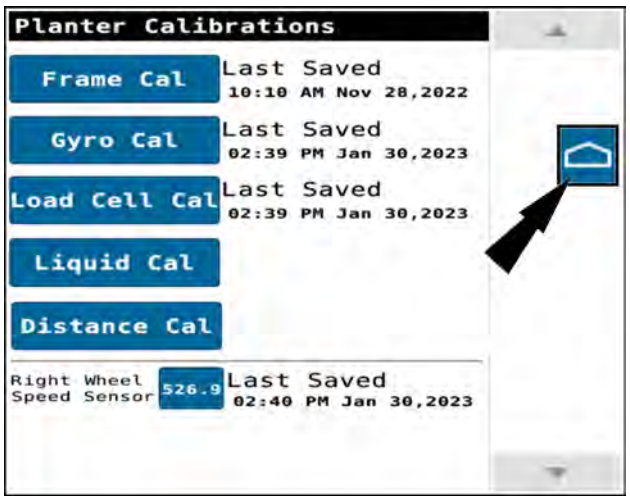
NOTE: *The next and previous navigation buttons seen previously in the wizard do not appear in the calibration screens. You can skip unneeded calibrations.*

Press the home button to exit calibrations.

If any work condition options or calibrations in the planter were changed, the planter restarts.

The popup message advising you of the restart states, “Planter setup has been changed. The planter will restart in 10 seconds.”

After the planter restarts, the home screen appears.



RAPH23PLM1027BA 22

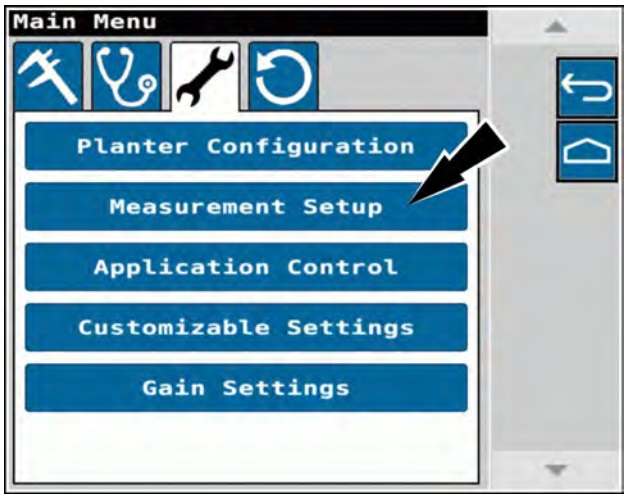
RAPH23PLM1028BA 23

MEASUREMENT SETUP

Measurement Setup screen

Press the “main menu” button on the home screen.

From the setup tab, select “Measurement Setup”



NHPH24PLM1158AA 1

The measurement setup screen indicates the connected planter measurements that will be sent to the task controller in the display. The measurements are shown on the planter diagram on this screen.

Use the measurements setup screen to view:

- Row width
- Swath width
- Number of rows
- Implement width (row width times the number of rows)
- Center offset
- Bar distance

The measurements are set in the planter controller and generally cannot be changed, with the exception of the center offset distance.

Most 2000-series planter have row widths that you cannot change because the row unit head brackets are welded directly to the frame. However 2110, 2120, and 2130 12R40 planters with U-bolted head brackets allow changing the row width. CASE IH does not recommend changing the default row width setting in the software if your physical planter does not support changing the actual row width.

The swath width provides clarity on custom configurations.

The bar distance is the measurement from the seed drop point to the planter hitch; adjust the bar distance if your tractor utilizes a hitch adapter. Avoid changing these values from the “Implement” card on the **Pro 1200** display, as they will override the values reported by the planter controller.

Default bar distance measurements – Early Riser® 2140, 2150, 2150S, and 2160 planters

Model	Configuration	Bar distance (default)	
		Drawbar mount	Hitch semi-mount
2160	24R22	**9245 mm (363.98 in)**	not applicable
	24R30	**9245 mm (363.98 in)**	not applicable
	32R30	**12165 mm (478.94 in)**	not applicable
	36R30	**12165 mm (478.94 in)**	not applicable
	36R20	**9245 mm (363.98 in)**	not applicable
	47R15	**9245 mm (363.98 in)**	not applicable
	48R20	**9245 mm (363.98 in)**	not applicable
	48R22	**9245 mm (363.98 in)**	not applicable

Model	Configuration	Bar distance (default)	
		Drawbar mount	Hitch semi-mount
2150S	12/23 split-row	**7298 mm** (**287.32 in**)	**6512 mm** (**256.38 in**)
	12/24 split-row	**7298 mm** (**287.32 in**)	**6512 mm** (**256.38 in**)
	16/31 split-row	**7298 mm** (**287.32 in**)	**6512 mm** (**256.38 in**)
	16/32 split-row	**7298 mm** (**287.32 in**)	**6512 mm** (**256.38 in**)
	24R20	**8576 mm** (**337.62 in**)	**7781 mm** (**306.32 in**)
2150	12R30	not applicable	**6035 mm** (**237.59 in**)
	16R30	**7402 mm** (**291.42 in**)	**6035 mm** (**237.59 in**)
	24R30	**8632 mm** (**339.84 in**)	**7845 mm** (**308.86 in**)
2140	12/23 split-row 12/24 split-row 16/31 split-row 16/32 split-row	**7655 mm** (**301.38 in**)	not applicable
	24R20	**8275 mm** (**325.79 in**)	not applicable
	24R22	**9245 mm** (**363.97 in**)	not applicable

Default bar distance measurement – Early Riser® 2110, 2120, and 2130 planters

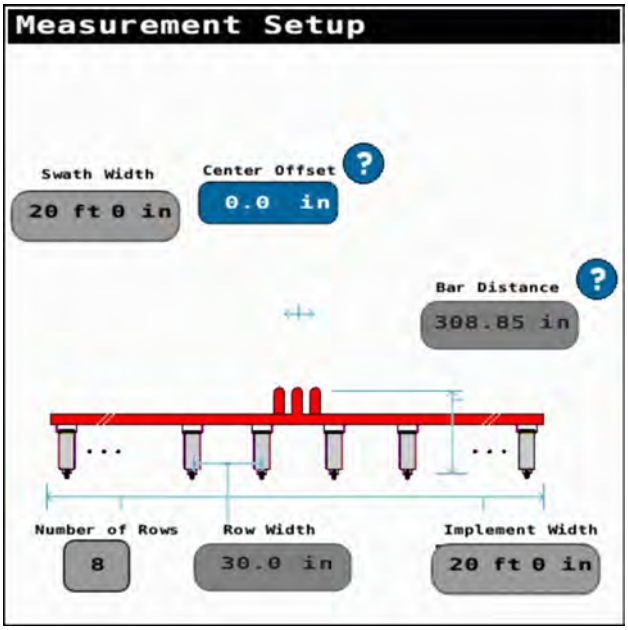
Model	Configuration	Bar distance (default)
		Three-point rigid mount
2130	18R30 16R30 12R30 12R36 12R38 12R40 12R1M	**1023 mm** (**40.28 in**)
2120	6R 8R 6/11R	**4665 mm** (**183.66 in**)
2110	6R30 8R30 6R38 8R38 6/11R 8/15R	**1023 mm** (**40.28 in**)

Default center offset measurements – Early Riser® 2140, 2150, 2150S, and 2160 planters

Model	Configuration	Center offset	
		Drawbar mount	Hitch semi-mount
2160	24R22	**0 mm** (**0 in**)	not applicable
	24R30	**0 mm** (**0 in**)	not applicable
	32R30	**0 mm** (**0 in**)	not applicable
	36R30	**0 mm** (**0 in**)	not applicable
	36R20	**0 mm** (**0 in**)	not applicable
	47R15	**0 mm** (**0 in**)	not applicable
	48R20	**0 mm** (**0 in**)	not applicable
	48R22	**0 mm** (**0 in**)	not applicable
2150S	12/23 split-row	**190.5 mm** (**7.5 in**)	**190.5 mm** (**7.5 in**)
	12/24 split-row	**190.5 mm** (**7.5 in**)	**190.5 mm** (**7.5 in**)
	16/31 split-row	**190.5 mm** (**7.5 in**)	**190.5 mm** (**7.5 in**)
	16/32 split-row	**190.5 mm** (**7.5 in**)	**190.5 mm** (**7.5 in**)
	24R20	**254.0 mm** (**10.0 in**)	**254.0 mm** (**10.0 in**)
2150	12R30	not applicable	**0 mm** (**0 in**)
	16R30	**0 mm** (**0 in**)	**0 mm** (**0 in**)
	24R30	**0 mm** (**0 in**)	**0 mm** (**0 in**)

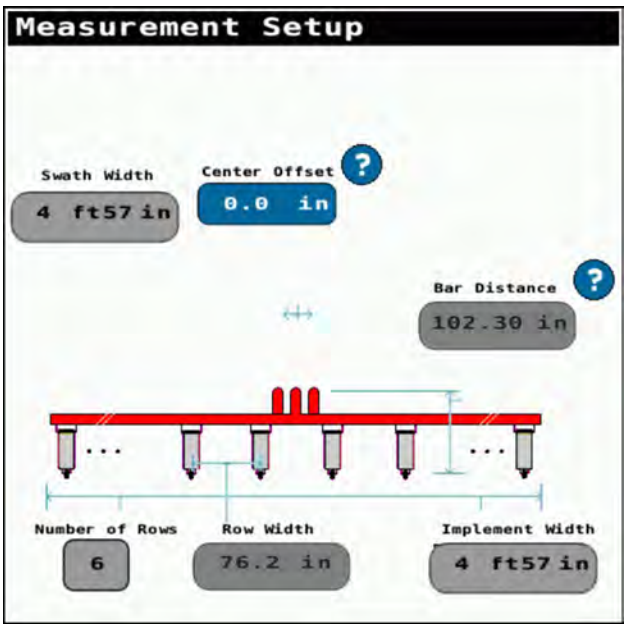
Model	Configuration	Center offset	
		Drawbar mount	Hitch semi-mount
2140	12/23 split-row 12/24 split-row 16/31 split-row 16/32 split-row	**190.5 mm** (**7.5 in**)	not applicable
	24R20	**0 mm** (**0 in**)	not applicable
	24R22	**0 mm** (**0 in**)	
2130	8R38 8R40 12R30 12R36 12R38 12R40 16R	**0 mm** (**0 in**)	
2120	6R 8R 6/11R	**0 mm** (**0 in**)	
2110	6R30 8R30 6R38 8R38 6/11R 8/15R	**0 mm** (**0 in**)	

2110 rigid planter



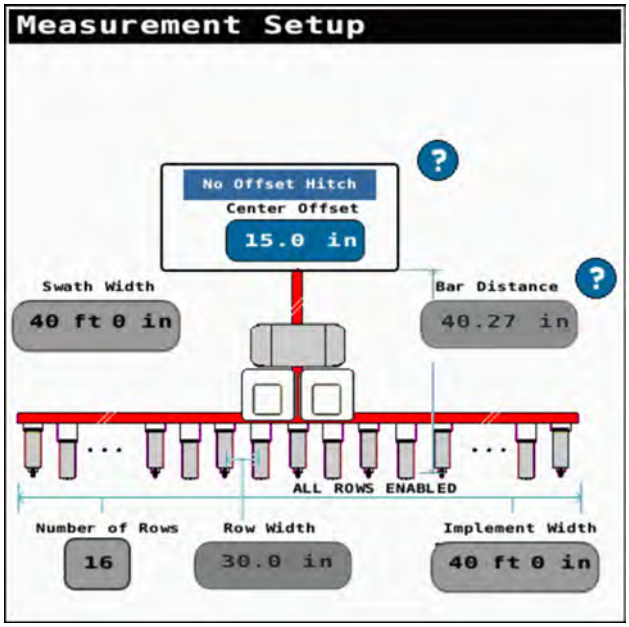
NHPH25PLM0553BA 2

2120 trailing planter



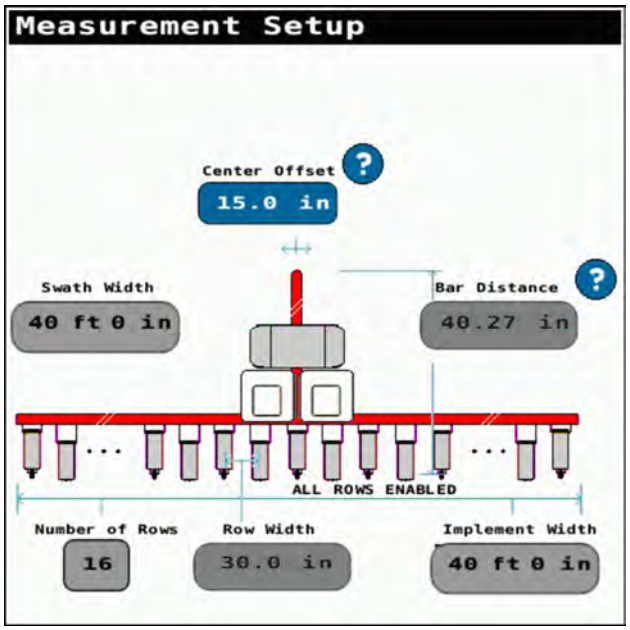
NHPH25PLM0554BA 3

2140 pivot transport split-row planter



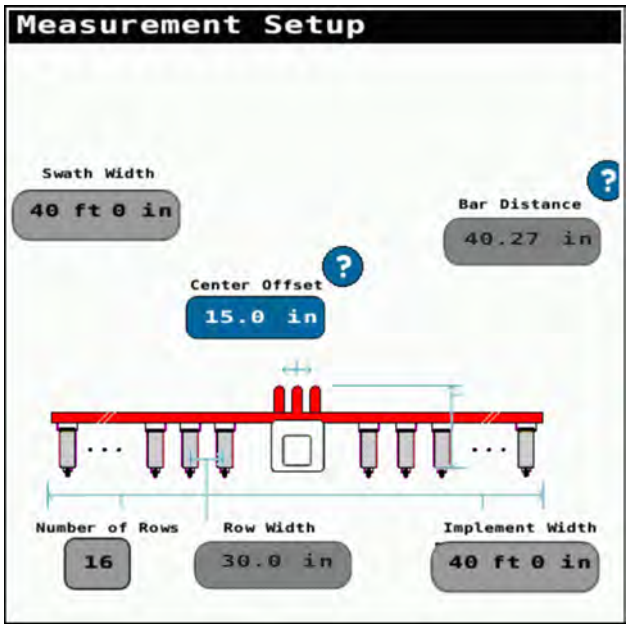
NHPH25PLM0555BA 4

2140 pivot transport planter



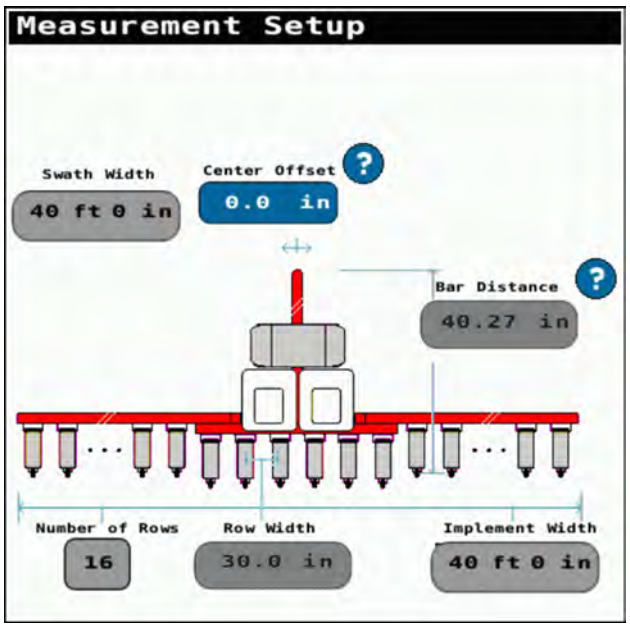
NHPH25PLM0556BA 5

2130 stacker planter



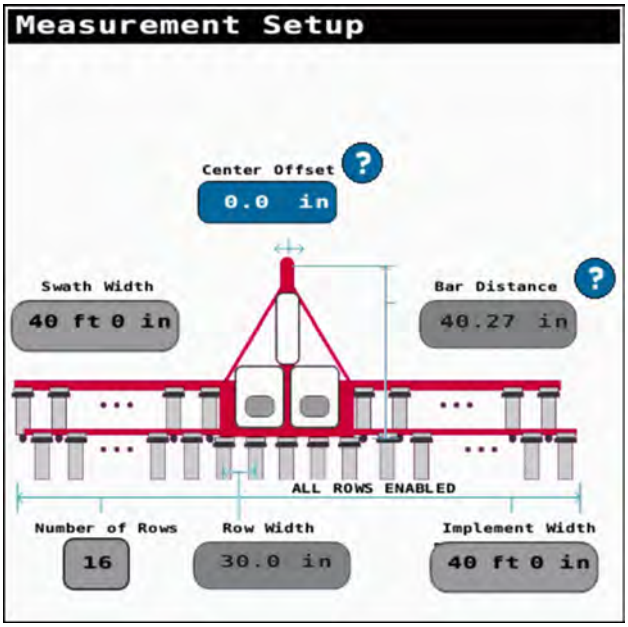
NHPH25PLM0557BA 6

2150 planter



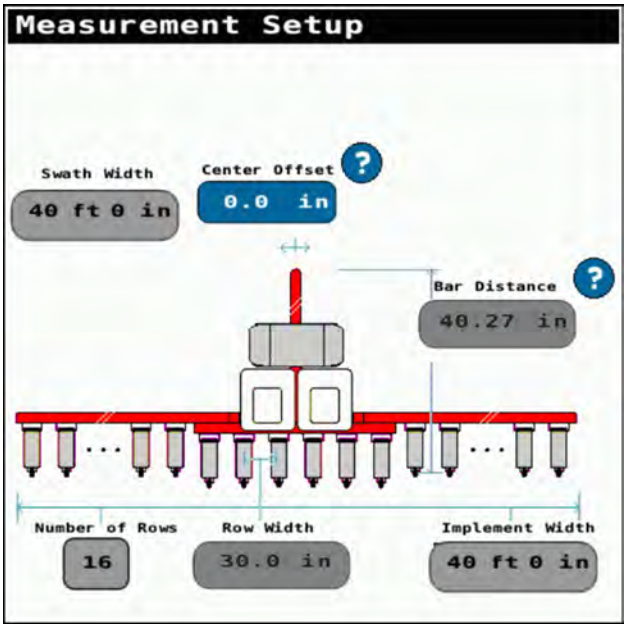
NHPH25PLM0558BA 7

2150S planter



NHPH25PLM0559BA 8

2160 planter



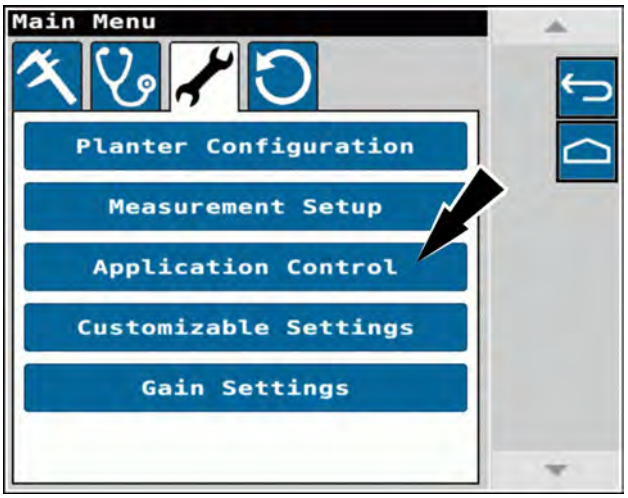
NHPH25PLM0560BA 9

APPLICATION CONTROL SETUP

Application Control screen

Press the “main menu” button on the home screen.

From the setup tab, select “Application Control”



NHPH24PLM1158AA 1

Seed application control

The application control screen indicates the product application controllers on the connected planter that are shared with the task controller in the display.

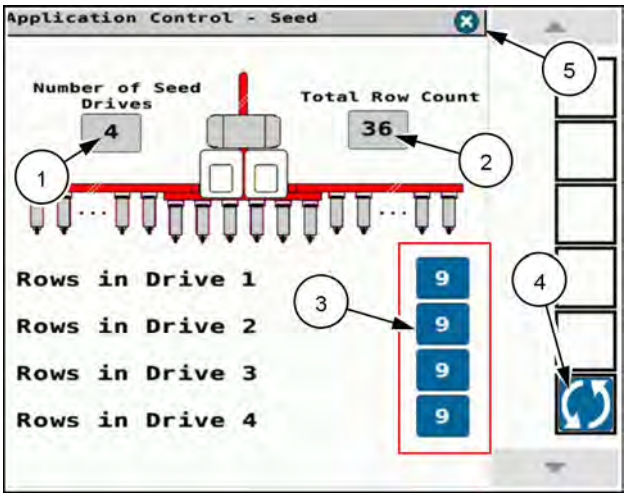
For the selected application controller the number of drive groups **(1)** and number of rows **(2)** appears.

Press a value box **(3)** to adjust the number of rows in each drive group.

If liquid application control is available, press the “Next” button **(4)** to continue to the configuration for liquid application control.

If granular application control is available, press the “Next” button **(4)** to continue to the configuration for granular application control.

Press the exit button **(5)** at any time to complete and exit setup.



NHPH24PLM1173AA 2

Liquid application control (if equipped)

The liquid application controller shows the number of rows **(1)** associated with the three main liquid section valves.

The number of sections defaults to the three main liquid section valves. If the individual row nozzle option is enabled, then the three main liquid section valves will remain ON and the row nozzle shut-off is controlled by an output from the **vDrive®** Module (VDM). The number of liquid sections and the number of individual row nozzles in each section mirrors that of the seed application controller.

Press the button **(2)** to change the number of rows in use. The total number of rows in use must equal the total row count **(1)**.

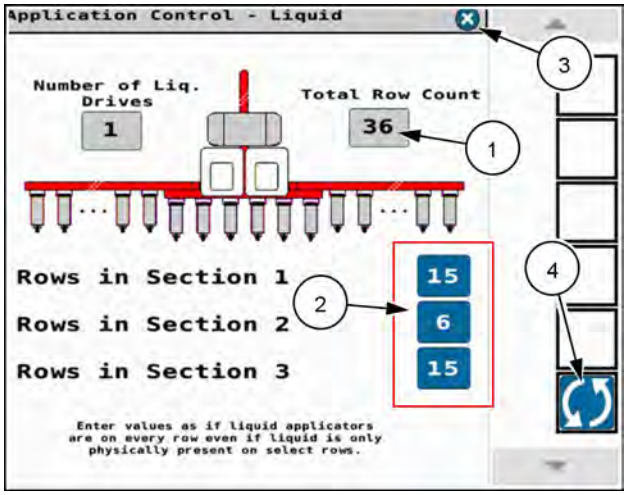
When individual row nozzles are enabled, the "Application Control – Liquid" screen states, ."

- "Liquid can not be set up in rows per section when individual row nozzle control is in use."
- "Liquid will be applied only on rows that are actively planting seed."

Press the exit button **(3)** at any time to complete and exit setup.

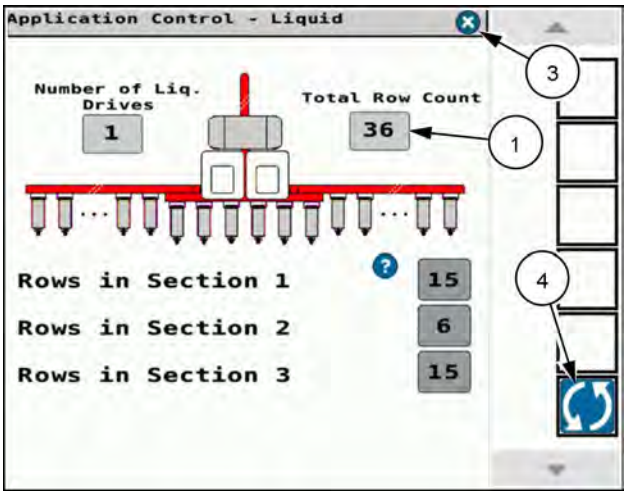
Press the next button **(4)** to return to seed application setup.

Individual row nozzles option disabled



NHPH24PLM1175AA 3

Individual row nozzles option enabled



NHPH24PLM1174AA 4

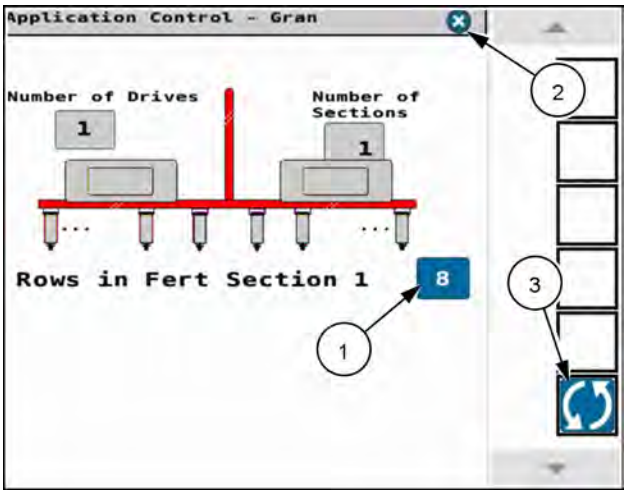
Granular application control (if equipped)

The granular application controller shows the number of rows **(1)** associated with the granular drive. Only one drive and section are available, covering the entire planter.

Press the button **(1)** to change the number of rows. The system calculates new rates based upon the number of rows you configure.

Press the exit button **(2)** at any time to complete and exit setup.

Press the next button **(3)** to return to seed application setup.



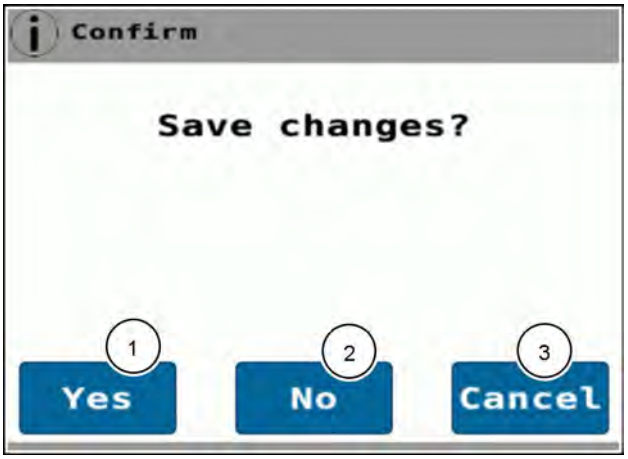
NHPH24PLM1176AA 5

When you push the exit button, a confirmation screen appears.

Press the “Yes” button **(1)** to save your changes and exit.

Press the “No” button **(2)** to exit without saving.

Press the “Cancel” button **(3)** to return to the application control screen.



NHPH24PLM1177AA 6

If you accept the changes, an additional pop-up window appears.

The popup window states, “Planter setup has been changed. The planter will restart in 10 seconds.”

Allow the planter to cycle power.

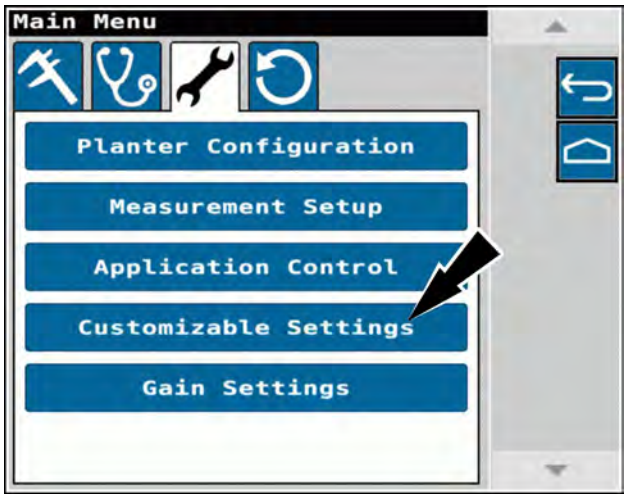
RAPH22PLM0863BA 7

CUSTOMIZABLE SETTINGS

Customizable Settings screen

Press the “main menu” button on the home screen.

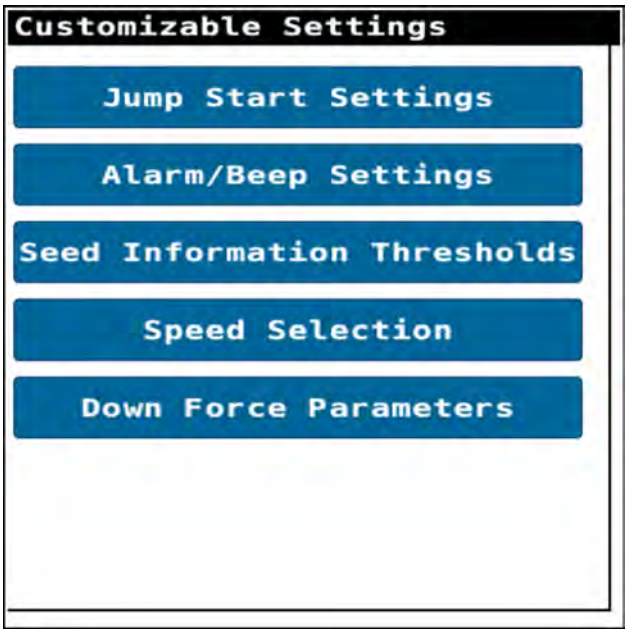
From the setup tab, select “Customizable Settings.”



NHPH24PLM1158AA 1

The customizable settings menu contains setup options for:

- Jump start settings – see **3-26**.
- Alarm/beep settings – see **3-27**.
- Advanced Seed Information (ASI) thresholds – see **3-30**.
- Speed selection – see **3-33**.
- Down force parameters – see **3-35**.



RAPH23PLM1138BA 2

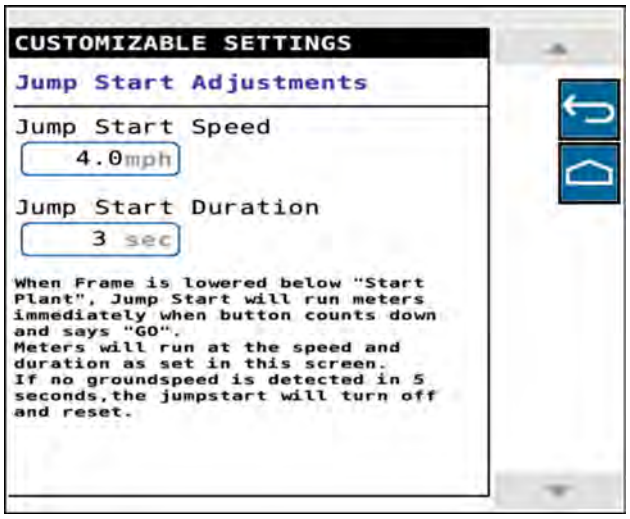
Jump start settings

The jump start feature allows the product drives to start applying product early. Use the jump start feature when the planter is starting from a dead stop or when you cannot reach adequate ground speed to achieve the desired application rate – for example, after backing the planter into a corner of the field.

To access the jump start settings, press the “main menu” button on the home screen.

From the setup tab, select “CUSTOMIZABLE SETTINGS”, and then select “Jump Start Settings”.

For more information, see “Jump start control” (**4-33**).



NHIL21PLM0150AA 1

Alarm/beep settings

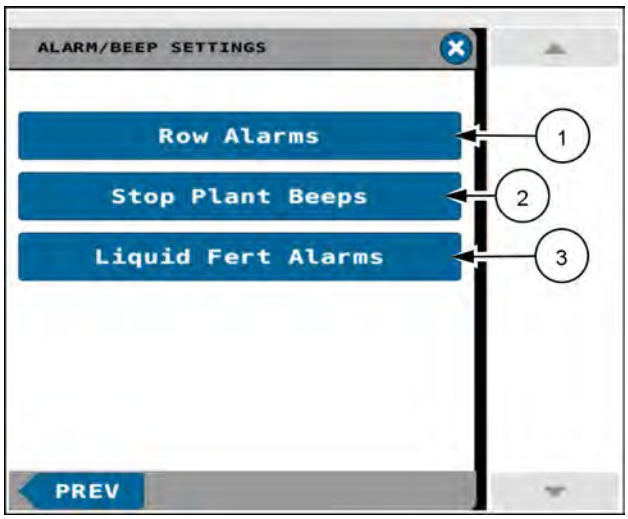
Press the “main menu” button on the home screen.

From the setup tab, select “Customizable Settings”, and then select “Alarm/Beep Settings”.

The “Alarm/Beep Settings” screen allows you to configure settings for three systems on the planter:

- Row Alarms **(1)**
- Stop Plant Beeps **(2)**
- Liquid Fertilizer Alarms **(3)**

Selected the desired option to configure alarm and beep settings.



NHIL21PLM0151AA 1

Row Alarms

Disabling a row alarm prevents error reporting from the selected row units: row blockage, low or high seed rates, seed sensor error, and seed sensor not found. This does not affect population or any of the area counters associated with area control.

NOTE: *Rows that you disable in a work condition automatically disable in the “Row Alarms Adjustment” screen. You cannot edit these disabled rows in this screen.*

You can also disable all alarms from a row, like solenoid alarms or load cell alarms.

Each row of the planter is shown inside a green (active alarm) or red (disabled alarm) box.

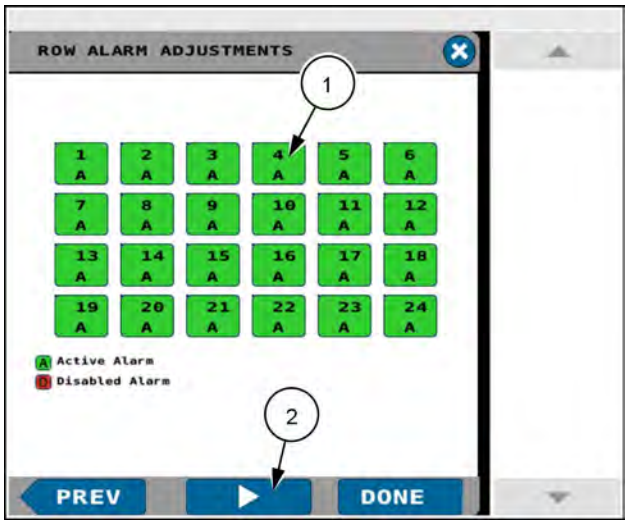
Indicates the alarm is active for the selected row.

Indicates the alarm is disabled for the selected row.

To toggle between active and disabled for each row, press the individual row box **(1)**.

If the planter contains more than 24 rows, press the arrow button **(2)** to access the remaining rows.

Press Done when the row alarm adjustment is complete.



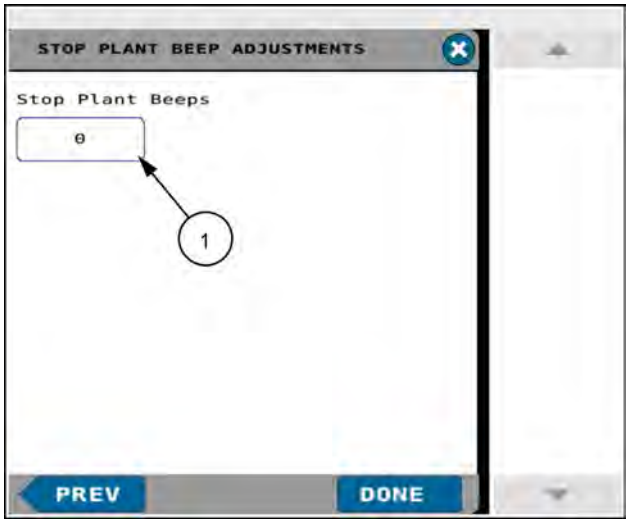
NHPH24PLM1169AA 2

Stop Plant Beeps

The display sounds an alarm whenever the toolbar reaches the stop plant height and all product application is stopped. The selection for “Stop Plant Beeps” **(1)** determines the number of beeps that sound for this alarm.

The stop plant beeps value range is 0 to 5.

Press Done when the stop plant beeps adjustment is complete.



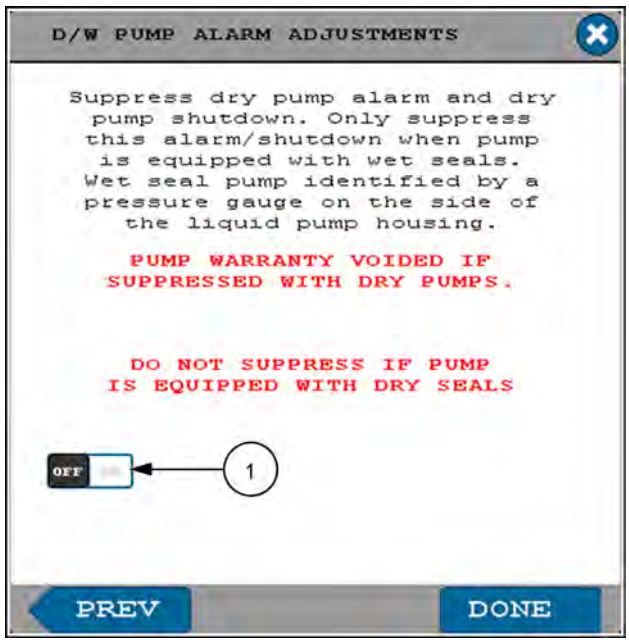
NHIL20PLM0688AA 3

Liquid Fertilizer Alarms

NOTICE: *DO NOT suppress low pressure liquid alarms if the pump is dry, or if the planter is equipped with a pump that uses dry seals. A message in red states, “Pump warranty voided if suppressed with dry pumps. Do not suppress if pump is equipped with dry seals.”*

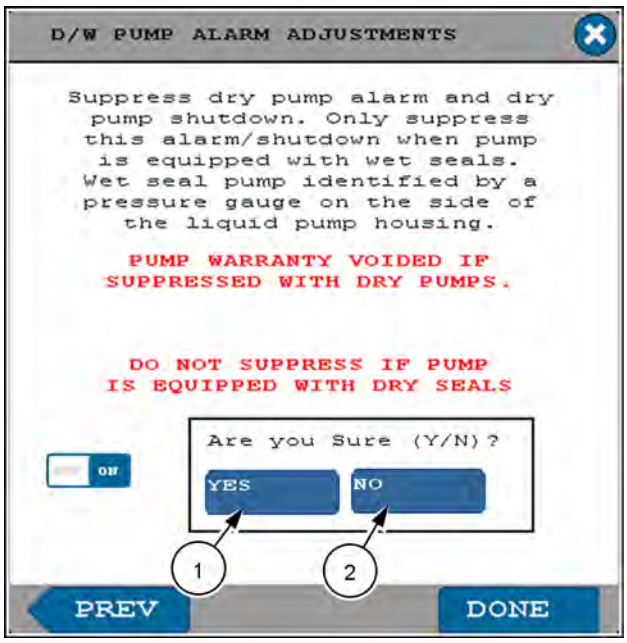
Use the “Liquid Fertilizer Alarms” screen to disable low pressure liquid alarms when the liquid pump on the planter is equipped with wet seals.

To disable low pressure liquid alarms, press the “ON/OFF” toggle button **(1)**. The toggle in the OFF position means that alarms will appear. The toggle in the ON position means that alarms are suppressed.



NHPH24PLM1168AA 4

A confirmation box appears. Press the “YES” button **(1)** to confirm the alarm suppression. Press the “NO” button **(2)** to cancel the selection, with the low pressure liquid alarms remaining active.



NHPH24PLM1170AA 5

Seed information thresholds

Press the “main menu” button on the home screen.

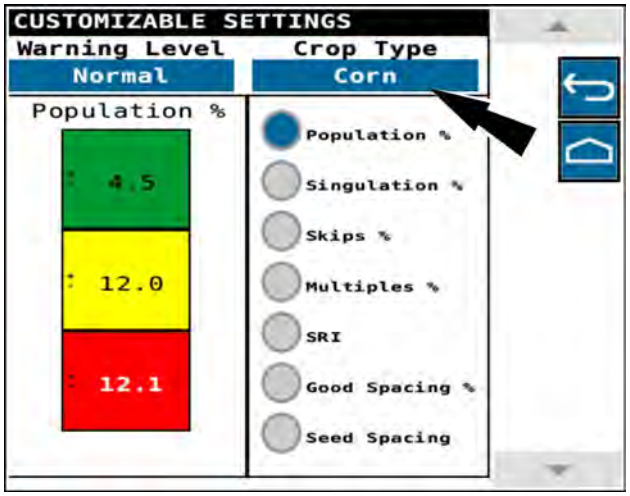
From the settings tab, select “CUSTOMIZABLE SETTINGS.”

Access the seed information thresholds settings from the “CUSTOMIZABLE SETTINGS” screen.

Your selections to the seed information thresholds change the behavior of the corresponding bar graph windows.

NOTE: *Advance seed information is not available for some crop types, or if the feature has not been activated for your planter. A message appears in the “Customizable Settings” window informing you of the condition.*

Choose the crop type by pressing the “Crop Type” button.

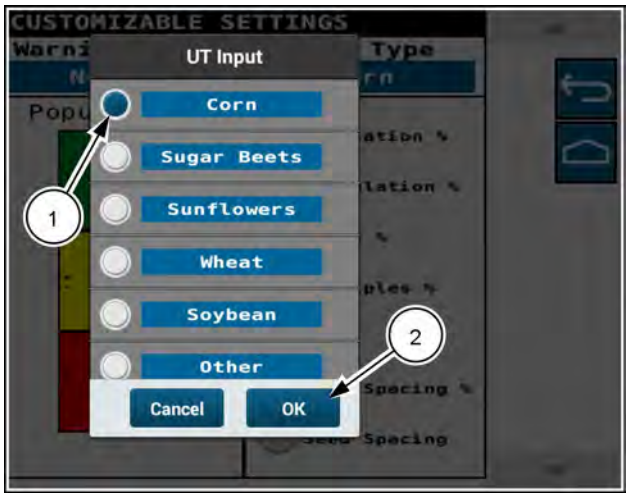


NHIL21PLM0154AA 1

The list of available crop types appears.

Press a radio button **(1)** to select the desired crop type.

Press the “OK” button **(2)** to accept your selection.



NHIL21PLM0155AA 2

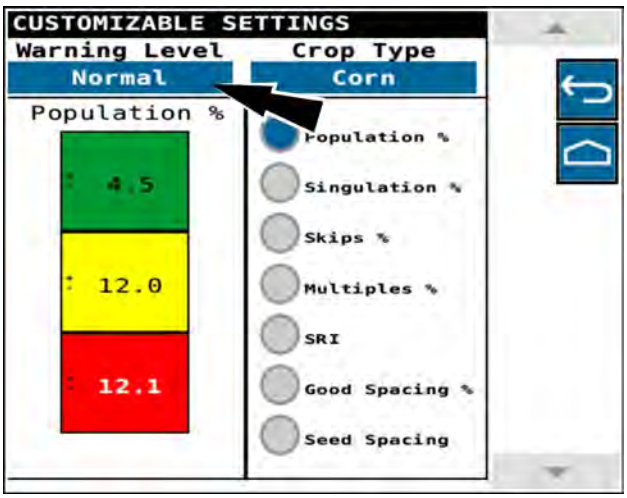
Choose the warning level for each parameter. You can choose from three predefined warning levels, or you can customize your warning levels.

The percentages at which the corresponding bar graph show green, yellow, or red appear in the window.

The four warning levels are:

- High
- Normal
- Low
- Custom

Press the “Warning Level” button



NHIL21PLM0154AA 3

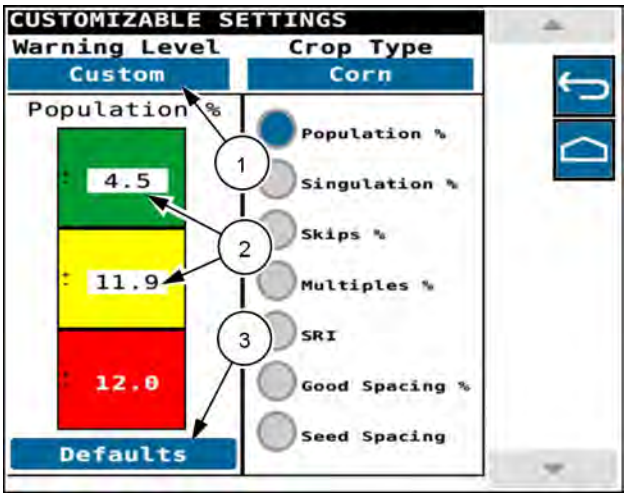
The warning level defines the degree of deviation from theoretically perfect performance required to escalate the conditions from green through yellow to red, with red being the most severe deviation. Higher warning levels trigger changes with less degree of deviation than lower warning levels.

If you select the “Custom” **(1)** warning level, you then enter values that define the lower and upper bounds for each color. Some bounds automatically adjust to your configured values in an adjacent level.

When you are configuring population percentage **(2)**, you configure the upper bound of the green and yellow areas. Then the red area automatically shows its lower bound.

You can press the “Defaults” button **(3)** to populate the fields with default values. You then adjust them as needed for your operation.

Adjust a field by pressing the value **(2)**. Then enter the desired value in the window that pops up.



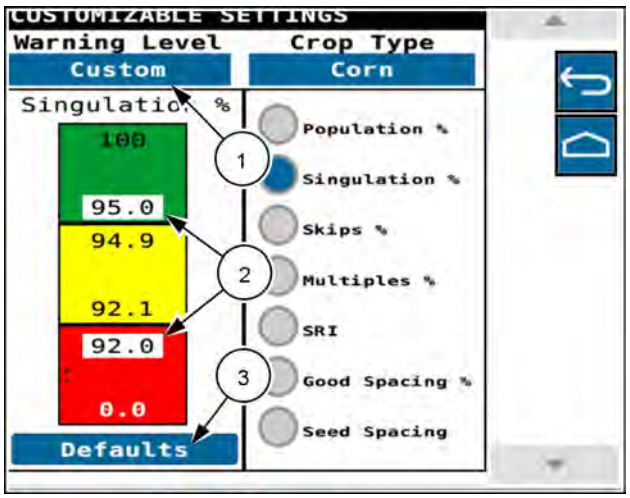
NHIL21PLM0159AA 4

In the “Custom” **(1)** warning level for the following values you enter the upper bound **(2)** of the green area and the lower bound of the red area. The yellow area then automatically populates:

- Singulation – the percentage of seeds that are properly singulated by the seed meters
- Skips – the percentage of misplaced seeds that are skips
- Multiples – the percentage of misplaced seeds that are multiples
- Seed Release Index (SRI) – a measure of the consistency of seed drop (a lower number represents more consistent seed drop)
- Good spacing – the percentage of seeds that are properly spaced according to the set parameters

  NOTE: *Good spacing excludes multiples in the calculation, but includes skips. Good spacing is calculated as (Good seeds %) / (Good seeds % + MP1 seeds % + MP2 seeds %). MP1 is less than* ***10.2 cm*** *(****4.0 in****) to the previous seed. MP2 is less than* ***6.4 cm*** *(****2.5 in****) to the previous seed.*

You can press the “Defaults” button **(3)** to populate the fields with default values. You then adjust them as needed for your operation.

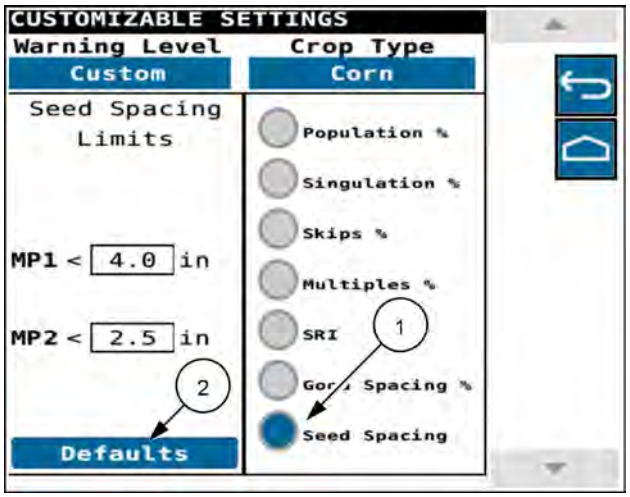


NHIL21PLM0157AA 5

In the “Seed Spacing” setting **(1)**, you configure the limits for misplaced seed 1 (MP1) and misplaced seed 2 (MP2). These are the seed-to-seed distances that define a seed as being misplaced. MP1 is the misplaced seed distance. MP2 defines the lower limit of what you consider a severely misplaced seed.

NOTE: *The MP1 parameter is always larger than the MP2 parameter.*

You can press the “Defaults” button **(2)** to populate the fields with default values. You then adjust them as needed for your operation.



NHIL21PLM0158AA 6

Speed selection

Press the “main menu” button on the home screen.

From the settings tab, select “CUSTOMIZABLE SETTINGS.”

Access the speed selection settings from the “CUSTOMIZABLE SETTINGS” screen.

There are four vehicle speed sources that can be utilized by the planter:

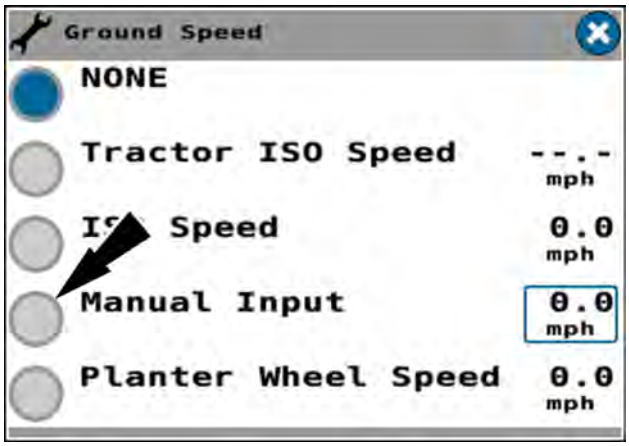
- Tractor ISO speed
- VT ISO speed
- Manual input
- Planter wheel speed

NOTE: *The “Tractor ISO Speed” selection requires ground speed and wheel speed to be present on the ISOBUS. You configure this in the display universal terminal (UT) configurations. See the display software guide for instructions.*

NOTE: *“VT ISO speed” is generated by the GNSS system.*

To set a fixed manual speed for the planter, press the “Manual Input” radio button.

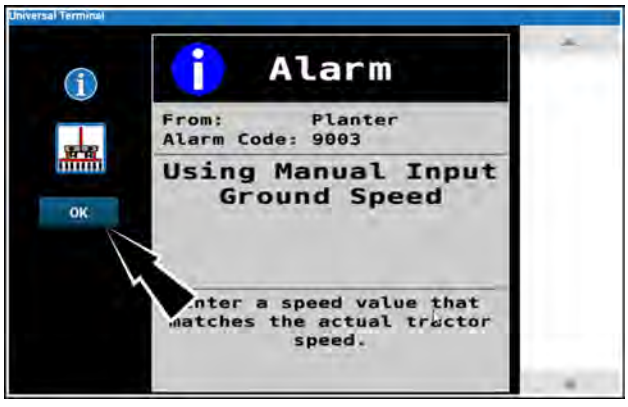
NOTE: *The “Planter Wheel Speed” information is generated by the planter rate ECU.*



RAPH22PLM0936BA 1

An alarm message appears. The alarm message states, “Using manual input ground speed. Enter a speed value that matches the actual tractor speed.”

Press the “OK” button to accept your selection.

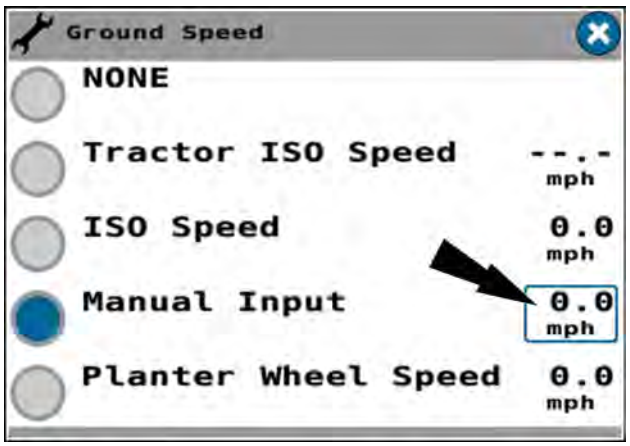


RAIL20PLM1514BA 2

The “Ground Speed” window reappears.

NOTE: *If you select the “Manual Input” selection, you can enter a fixed value for wheel speed. You can use this option for operating the planter systems while the machine is stationary for testing purposes. You can also use this option if a valid speed source is unavailable during planting operations.*

Press the speed figure in the “Manual Input” line entry. In the popup window that appears, enter the desired manual speed.



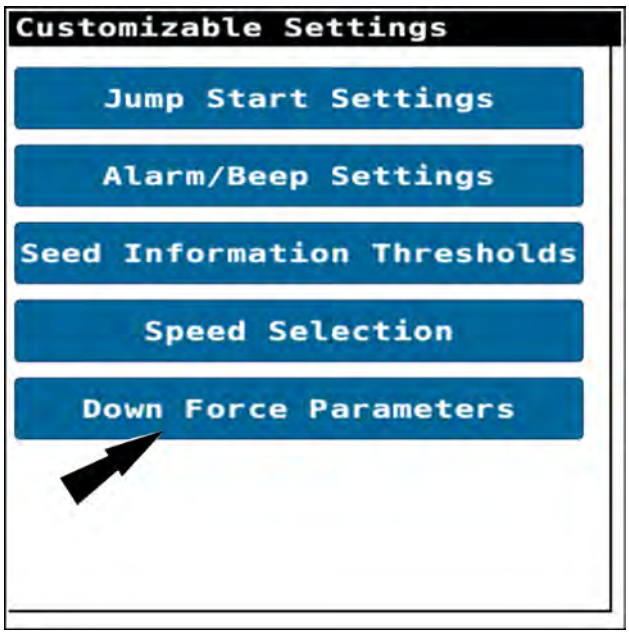
RAPH22PLM0937BA 3

Down force parameters

Press the “main menu” button on the home screen.

From the settings tab, select “Customizable Settings.”

Access the down force parameters settings from the “Customizable Settings” screen.



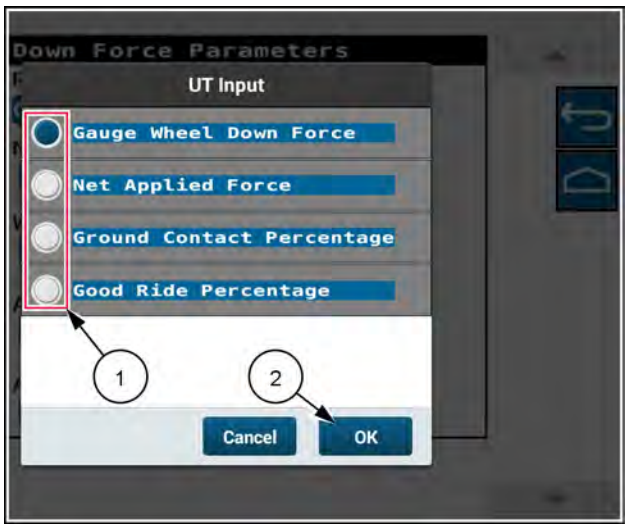
RAPH23PLM1138BA 1

There are four down force parameters:

- Gauge wheel down force
- Net applied force
- Ground contact percentage
- Good ride percentage

Select the desired parameter to highlight the applicable radio button **(1)**.

Press the “OK” button **(2)** to continue.



RAPH23PLM1139BA 2

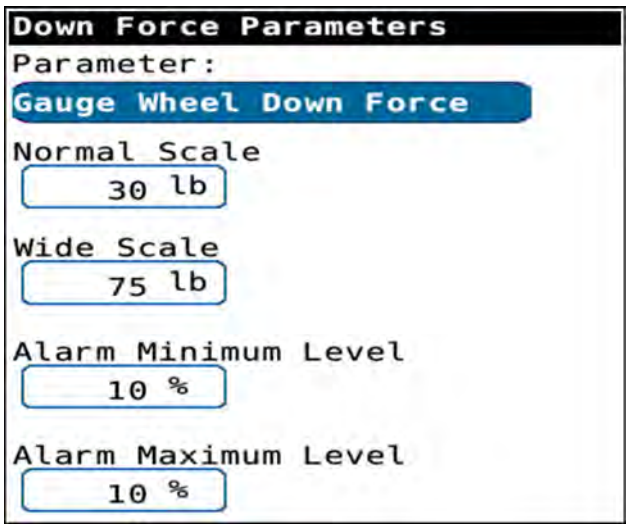
Gauge wheel down force

There are four gauge wheel down force parameters:

- Normal scale
- Wide scale
- Alarm minimum level
- Alarm maximum level

Press the field to change a parameter. Enter the desired value into the popup window that appears.

See “Hydraulic down force monitoring” (**4-149**) for detailed information.



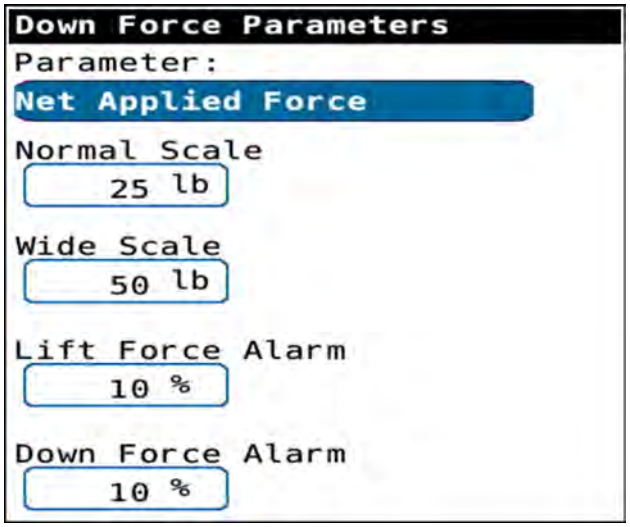
RAPH23PLM1140BA 3

Net applied force

There are four net applied force parameters:

- Normal scale
- Wide scale
- Lift force alarm
- Down force alarm

Press the field to change a parameter. Enter the desired value into the popup window that appears.



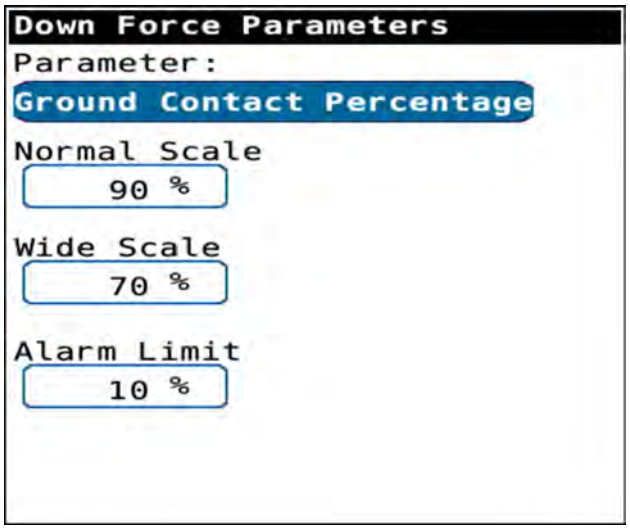
RAPH23PLM1141BA 4

Ground contact percentage

There are three ground contact percentage parameters:

- Normal scale
- Wide scale
- Alarm limit

Press the field to change a parameter. Enter the desired value into the popup window that appears.



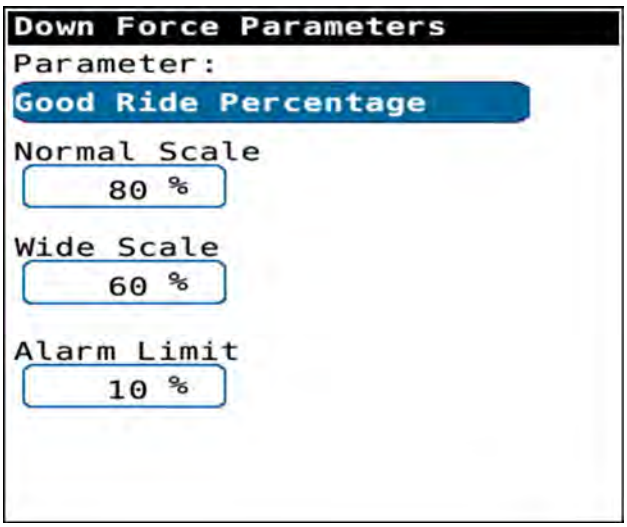
RAPH23PLM1142BA 5

Good ride percentage

There are three good ride percentage parameters:

- Normal scale
- Wide scale
- Alarm limit

Press the field to change a parameter. Enter the desired value into the popup window that appears.



RAPH23PLM1143BA 6

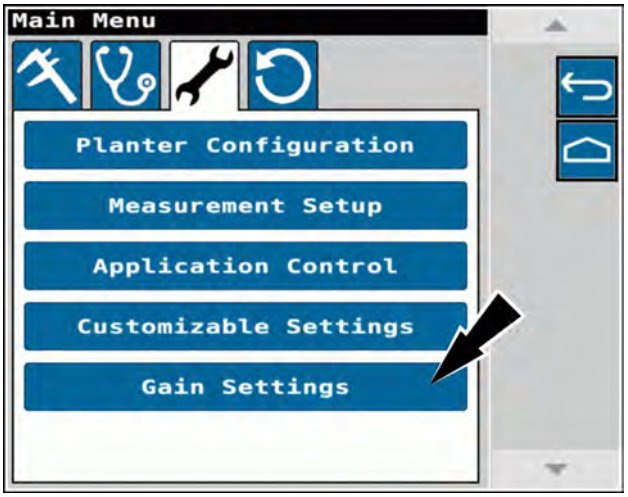
GAIN SETTINGS

Gain settings

NOTE: *Changes to the settings on this screen will impact planter performance. Only make adjustments to the gain settings if you are directed to do so by CASE IH service personnel.*

Press the “main menu” button on the home screen.

From the settings tab, select “Gain Settings”.



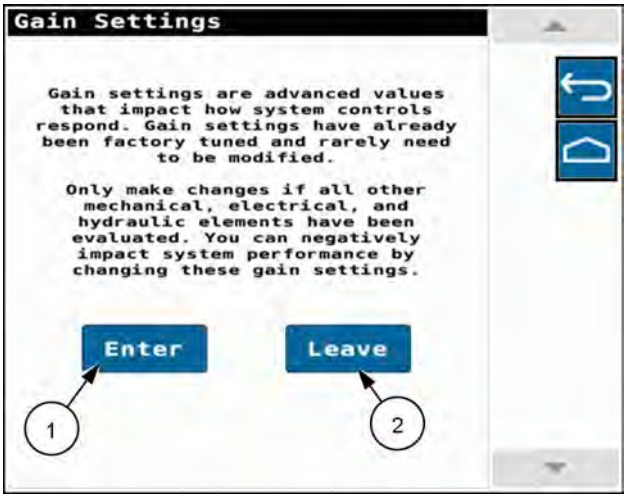
NHPH24PLM1158AA 1

“Gain settings are advanced values that impact how system controls respond. Gain settings have already been factory tuned and rarely need to be modified.”

“Only make changes if all other mechanical, electrical, and hydraulic elements have been evaluated. You can negatively impact system performance by changing these gain settings.”

Press the “Enter” button **(1)** to acknowledge this message.

Press the “Leave” button **(2)** to exit the settings screen and return to the main menu.



NHPH25PLM0078AA 2

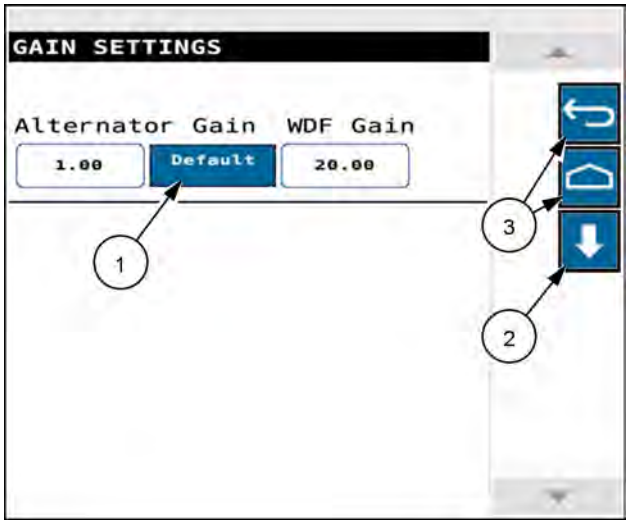
The “Alternator” and “WDF Gain” fields are available. Press the applicable field if instructed by your CASE IH service personnel. Use the keypad to enter the new gain value.

NOTE: *“WDF (Wing Down Force) Gain”*

If needed, press the “Default” button **(1)** to return all gain settings to their default values.

NOTE: *There is no confirmation screen when the “Default” button is pressed. Take note of any value changes in the event the “Default” button is pressed accidentally.*

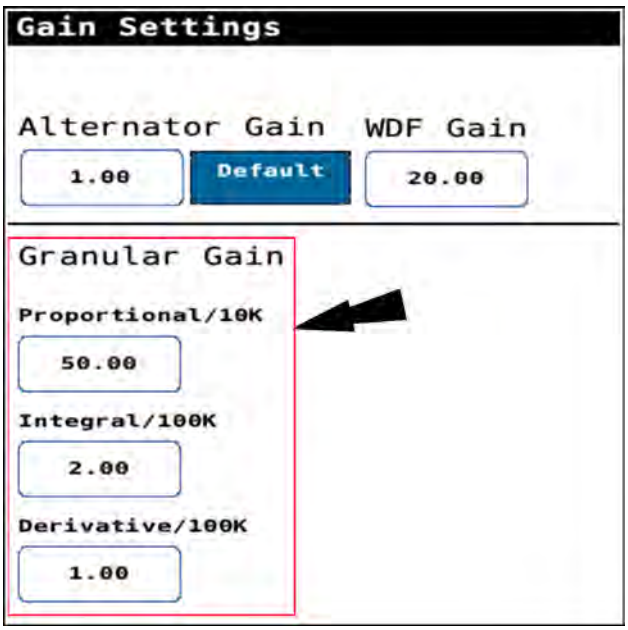
Press the down-arrow button **(2)** to view the second screen.



RAPH22PLM0886BA 3

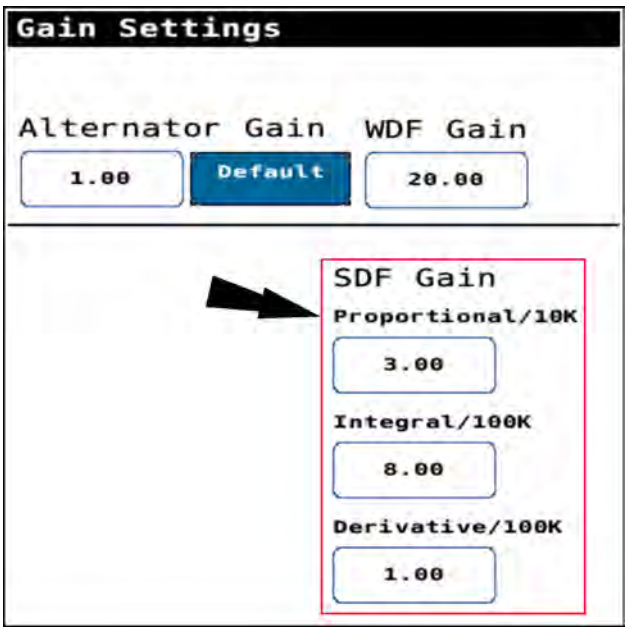
Press the back or home button **(3)** at any time to close this page.

If your planter has a granular fertilizer system, gain settings for the granular fertilizer system appear.



RAPH22PLM0938BA 4

On 2150S model planters, gain settings for the subframe down force system appear.



RAPH22PLM0939BA 5

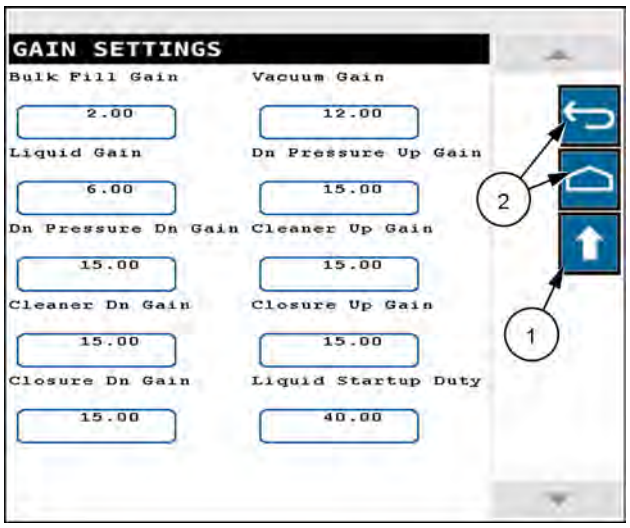
The second screen contains the remaining gain settings. Press the applicable field if instructed by your CASE IH service personnel. Use the keypad to entered the new gain value.

If needed, press the “Default” button on the previous “Gain Settings” screen to return all gain settings their default values.

NOTE: *There is no confirmation screen when the “Default” button is pressed. Take note of any value changes in the event the “Default” button is pressed accidentally.*

Press the up-arrow button **(1)** to return to the first screen.

Press the back or home button **(2)** at any time to close this page.



NHPH24PLM1171AA 6

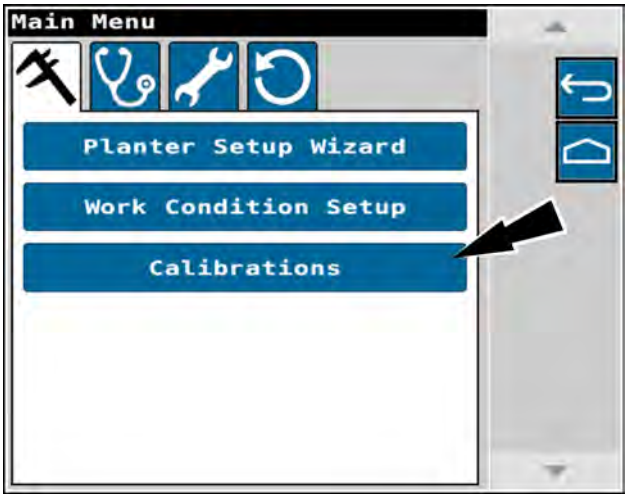
PLANTER SENSOR CALIBRATION (CALIBRATION SETTINGS)

"Calibrations" screen

NOTE: *Perform all calibrations before starting to plant for the season. Also perform a calibration after an affected sensor is replaced or erratic operation is experienced.*

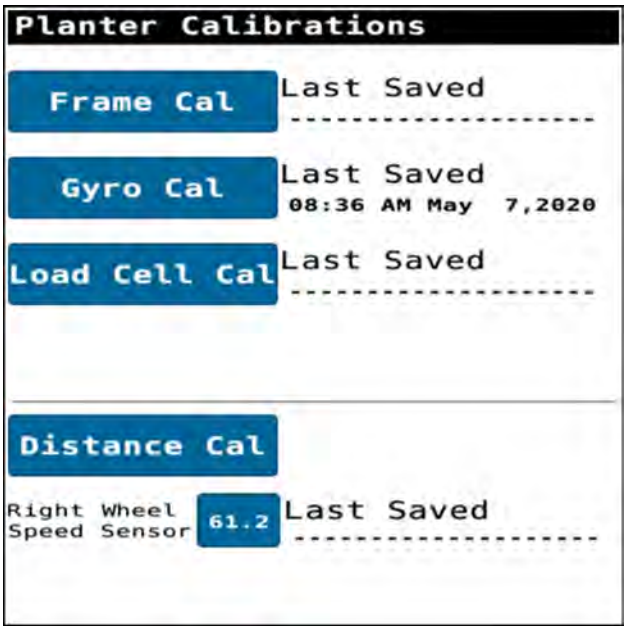
Press the “main menu” button on the home screen.

From the wizard tab, select “Calibrations”.



RAPH23PLM1007BA 1

The “Planter Calibrations” screen appears.



RAIL20PLM1520BA 2

Frame calibration overview

The following sections explain how to use the frame calibration screens in the Universal Terminal (UT) to set the “Stop Plant” height, the “Start Plant” height, and other toolbar height positions as required.

NOTE: *2110 rigid planters, 2120 trailing planters, and 2130 stacker planters do not have a frame calibration.*

Frame calibrations influence planter performance. The procedures must be performed with the planter attached and fully operational. Understand all procedures and operating instructions before proceeding.

These calibrations set two different heights which are common to applicable variable rate drive planters:

- Start plant – the toolbar height at which the product drives engage when starting a pass through the field
- Stop plant – the toolbar height at which the product drives disengage when finishing a pass

Follow these guidelines when calibrating the “Start Plant” height and the “Stop Plant” height:

- Use a consistent speed, which may or may not be the same as your planting speed, when you turn at the end of a pass. Downshifting to the same lower gear maintains tractor RPM for the planter fan(s) and provides a consistent speed when turning. After the turn, upshifting to your chosen planting speed will not vary seed population or spacing.
- Set these heights at the speed you will use to make the end of pass turn, which may or may not be the same as your planting speed. This is particularly necessary for the “Stop Plant” and “Start Plant” heights. With a little experimenting, you should fine tune these positions to the point where only one or two seeds are left exposed at the end of the current pass and at the beginning of a new pass.

  NOTE: *Do not set the “Stop Plant” height too low to the ground. Setting the “Stop Plant” height too low may result in the planter seed drives stopping unexpectedly when the planter encounters rough or uneven terrain.*

These calibrations also set toolbar heights that are unique to front fold planters: limited raise height and unfolding height. The informational text and “Help” pop-up on each wizard screen explain the meaning and purpose of each height that is being set.

Each screen of the frame calibration procedure that saves a calibrated frame height has four action buttons:

- “Prev” – Return to the previous screen. The display does not update the frame height for the current screen.
- “Set” – Save the current frame height and continue to the next screen.
- “Skip” – Skip the current step and retain the previously saved frame height.

  NOTE: *The “Skip” button is not available for the initial frame calibration.*
- “X” (Cancel) – Cancel the frame calibration procedure.

  NOTE: *The display retains any frame heights that you configured before pressing the “Cancel” button.*

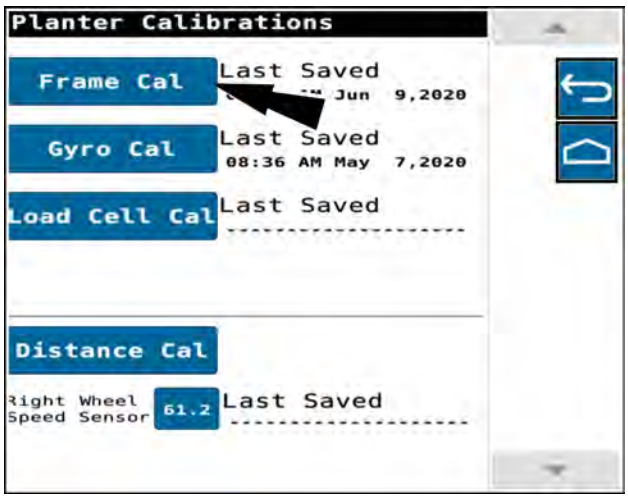
Frame calibration: 2140 model pivot transport planters

NOTICE: *Display software assumes an ascending order in height for the toolbar positions: start with the lowest position and transition to the highest position following the on-screen directions for the best performance.*

NOTE: *Perform a frame calibration before starting to plant for the season. Also perform a frame calibration after the sensor is replaced or erratic frame control is experienced.*

Unfold the planter. See “Frame control: 2140 model pivot transport planters” (**4-65**).

In the “Planter Calibrations” screen, press the “Frame Cal” button.

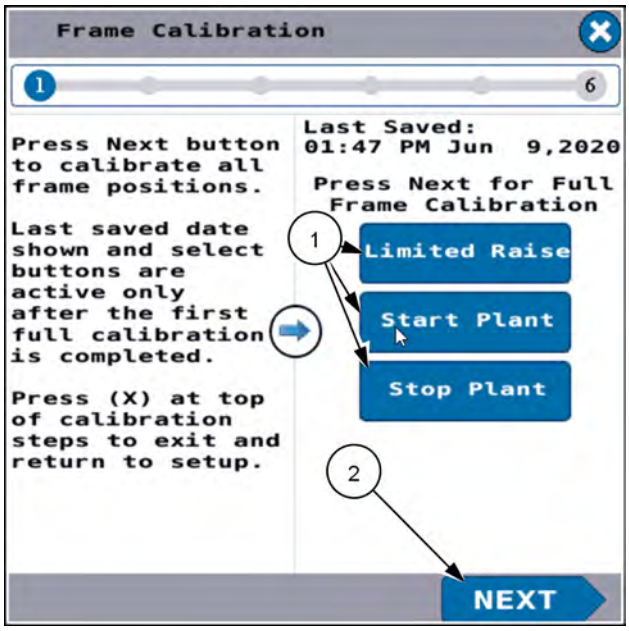


RAIL20PLM1522BA 1

The “Frame Calibration” screen appears.

The “Frame Calibration” screen states, “Press Next button to calibrate all frame positions. Last saved date shown and select buttons are active only after the first full calibration is completed. Press (X) at top of calibration steps to exit and return to setup.”

NOTE: *When performing the initial frame calibration, you must complete every step. After the initial frame calibration has been completed, you can set individual calibration values by using the buttons* ***(1)*** *in the “Frame Calibration” screen, or pressing the “Skip” button until the desired screen displays. The first time you perform a frame calibration in a tractor, the control buttons* ***(1)*** *in the “Frame Calibration” screen appear grayed out.*



RAIL20PLM1529BA 2

Press the “Next” button **(2)** to begin a sequence of all of the frame height calibrations. The “Frame Cal – Stop Plant” screen appears.

NOTE: *You can press any button to select one of the frame heights for calibration. If you select one of the frame heights the procedure skips to the selected height. When you press the “Next” button in the selected calibration, the next calibration in the sequence appears.*

NOTE: *The Full Raise calibration does not appear as a selection in the “Frame Calibration” screen. It becomes available in step five of the complete calibration.*

NOTE: *The frame height settings depicted in the images below are for illustrative purposes only. Calibrate frame heights as needed for your operation.*

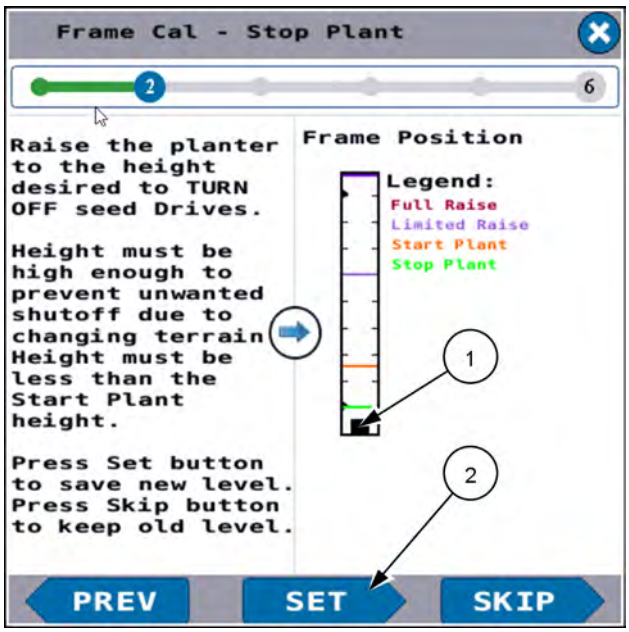
Stop plant

The “Frame Cal – Stop Plant” screen states, “Raise the planter to the height desired to TURN OFF seed drives. Height must be high enough to prevent unwanted shutoff due to changing terrain. Height must be less than the Start Plant height. Press Set button to save new level. Press Skip button to keep old level”

Adjust the frame height of the planter as instructed in the screen. The black level indicator **(1)** moves to represent the frame height.

NOTE: *The “Stop Plant” height must be equal to or less than the “Start Plant” height. It must also be high enough to prevent inadvertent shutoff due to changing terrain.*

Press the “Set” button **(2)** to configure the Stop Plant Height. The procedure continues to the next step.



RAIL20PLM1530BA 3

Start plant

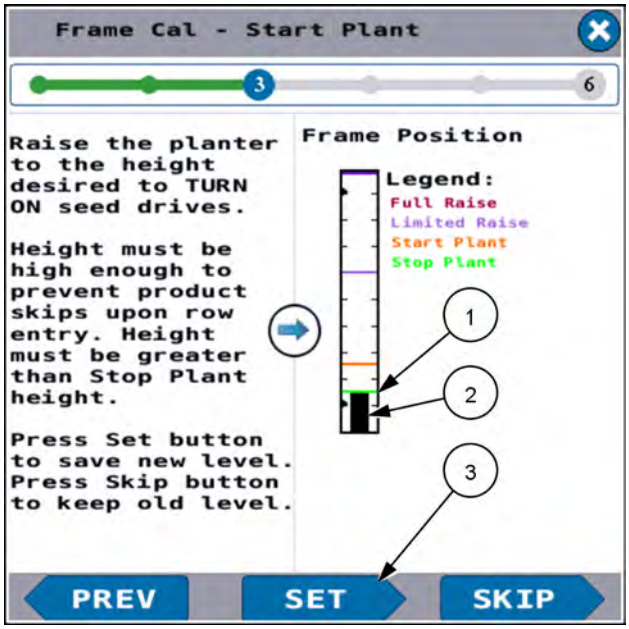
The “Frame Cal – Start Plant” screen appears. The green “Stop Plant” index **(1)** appears at the height of the black level bar.

The “Frame Cal – Start Plant” screen states, “Raise the planter to the height desired to TURN ON the seed drives. Height must be high enough to prevent product skips upon row entry. Height must be greater than Stop Plant height. Press Set button to save new level. Press Skip button to keep old level.”

Adjust the frame height as instructed in the screen. The black level indicator **(2)** moves to represent the frame height.

NOTE: *The “Start Plant” height must be equal to or greater than the “Stop Plant” height. It must also be high enough to prevent product skips upon row entry.*

Press the “Set” button **(3)** to configure the Start Plant Height. The procedure continues to the next step.



RAIL20PLM1531BA 4

Limited raise

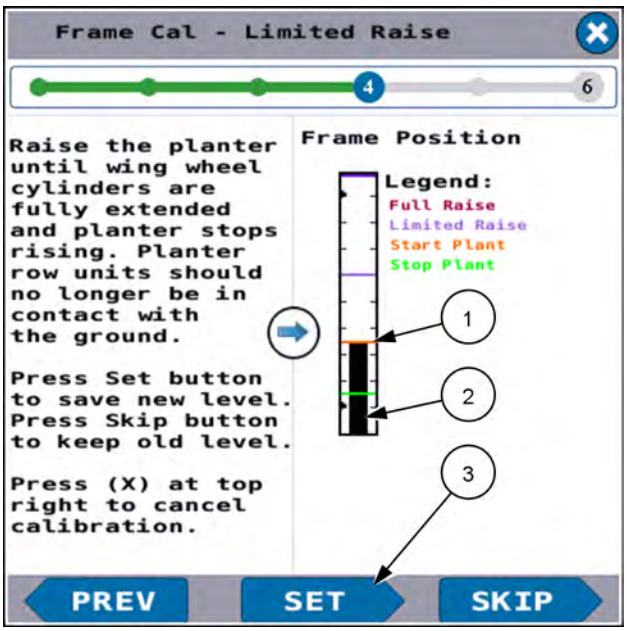
The “Frame Cal – Limited Raise” screen appears. The red “Start Plant” index **(1)** appears at the height of the black level bar.

The “Frame Cal – Limited Raise” screen states, “Raise the planter until wing wheel cylinders are fully extended and planter stops rising. Planter row units should no longer be in contact with the ground. Press Set button to save new level. Press Skip button to keep old level. Press (X) at top right to cancel calibration.”

Adjust the frame height as instructed in the screen. The black level indicator **(2)** moves to represent the frame height.

NOTE: *The “Limited Raise” height must be greater than the “Start Plant” height.*

Press the “Set” button **(3)** to configure the Limited Raise Height. The procedure continues to the next step.



RAIL20PLM1532BA 5

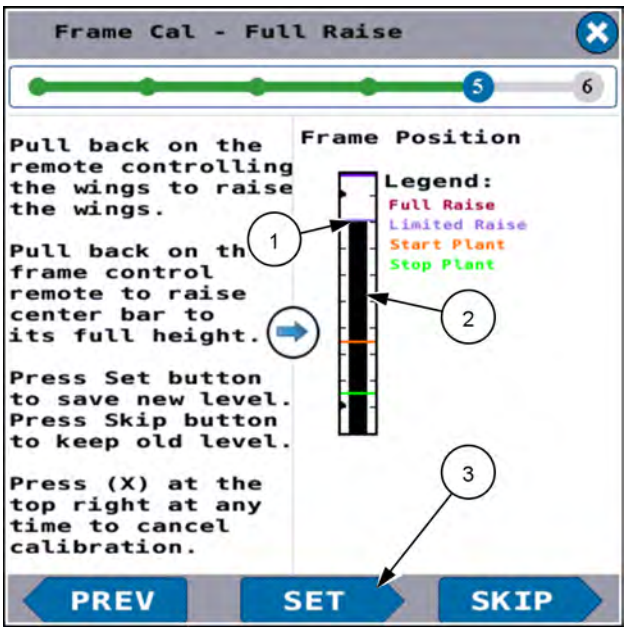
Full raise

The “Frame Cal – Full Raise” screen appears. The purple “Limited Raise” index **(1)** appears at the height of the black level bar.

The “Frame Cal – Full Raise” screen reads, “Pull back on the remote controlling the wings to raise the wings. Pull back on the frame control remote to raise center bar to its full height. Press Set button to save new level. Press Skip button to keep old level. Press (X) at the top right at any time to cancel calibration.”

Follow the instructions in the screen. The black level indicator **(2)** moves to represent the frame height.

Press the “Set” button **(3)** to configure the Full Raise settings. The procedure continues to the final step.

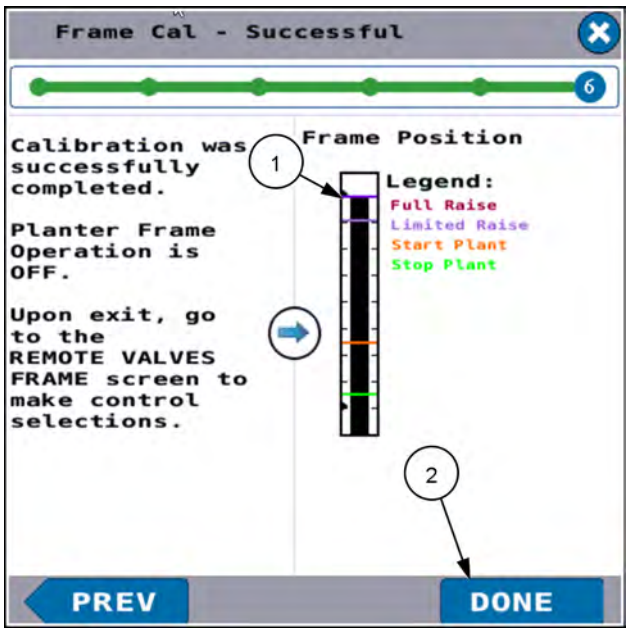


RAIL20PLM1533BA 6

End of procedure

The “Frame Cal – Successful” screen appears. The “Full Raise” index **(1)** appears at the height of the black level bar.

Press the “Done” button **(2)** to exit the frame calibration procedure.



RAIL20PLM1534BA 7

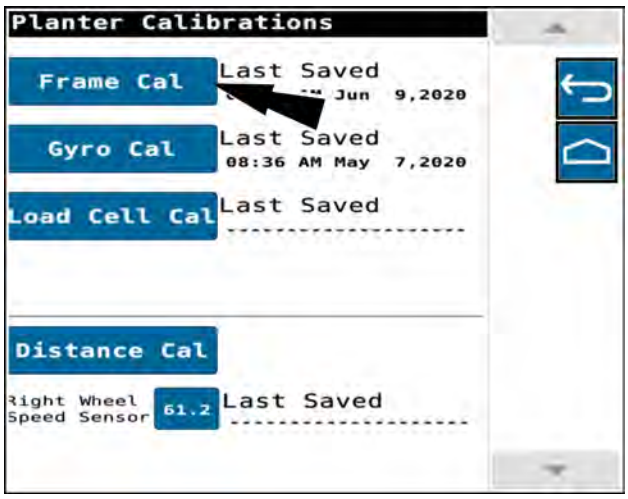
Frame calibration: 2150 and 2150S model front fold planters

NOTICE: *Display software assumes an ascending order in height for the toolbar positions: start with the lowest position and transition to the highest position following the on-screen directions for the best performance.*

NOTE: *Perform a frame calibration before starting to plant for the season. Also perform a frame calibration after the sensor is replaced or erratic frame control is experienced.*

Unfold the planter. See “Frame control: 2150 model front fold planters” (**4-86**).

In the “Planter Calibrations” screen, press the “Frame Cal” button.

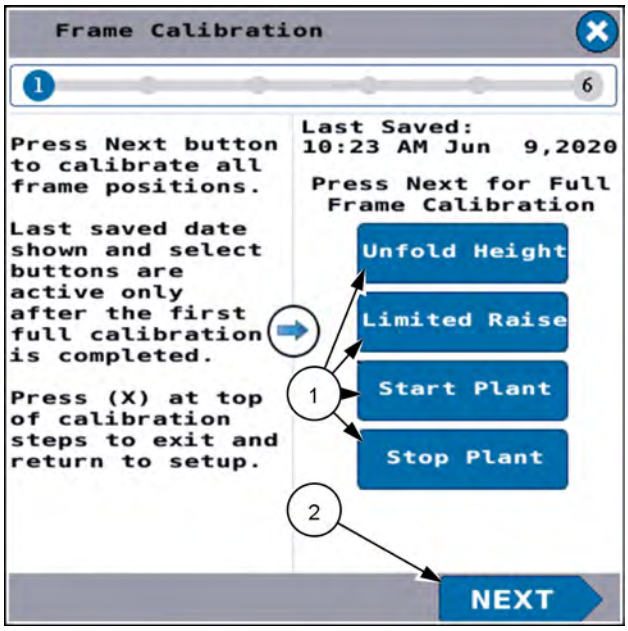


RAIL20PLM1522BA 1

The “Frame Calibration” screen appears.

The “Frame Calibration” screen states, “Press Next button to calibrate all frame positions. Last saved date shown and select buttons are active only after the first full calibration is completed. Press (X) at top of calibration steps to exit and return to setup.”

NOTE: *When performing the initial frame calibration, you must complete every step. After the initial frame calibration has been completed, you can set individual calibration values by using the buttons* ***(1)*** *in the “Frame Calibration” screen, or pressing the “Skip” button until the desired screen displays. The first time you perform a frame calibration in a tractor, the control buttons* ***(1)*** *in the “Frame Calibration” screen appear grayed out.*



RAIL20PLM1523BA 2

Press the “Next” button **(2)** to begin a sequence of all four frame height calibrations. The “Frame Cal – Stop Plant” screen appears.

NOTE: *You can press any button to select one of the frame heights for calibration. If you select one of the frame heights the procedure skips to the selected height. When you press the “Next” button in the selected calibration, the next calibration in the sequence appears.*

NOTE: *The frame height settings depicted in the images below are for illustrative purposes only. Calibrate frame heights as needed for your operation.*

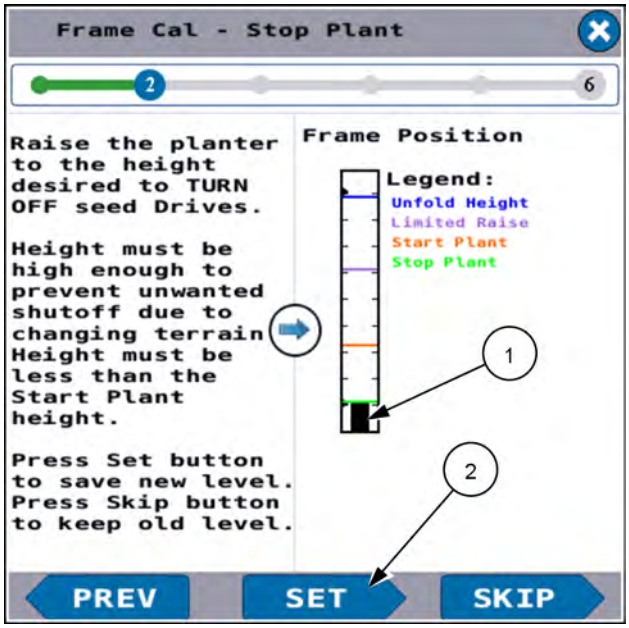
Stop plant

The “Frame Cal – Stop Plant” screen states, “Raise the planter to the height desired to TURN OFF seed drives. Height must be high enough to prevent unwanted shutoff due to changing terrain. Height must be less than the Start Plant height. Press Set button to save new level. Press Skip button to keep old level”

Adjust the frame height of the planter as instructed in the screen. The black level indicator **(1)** moves to represent the frame height.

NOTE: *The “Stop Plant” height must be equal to or less than the “Start Plant” height. It must also be high enough to prevent inadvertent shutoff due to changing terrain.*

Press the “Set” button **(2)** to configure the Stop Plant Height. The procedure continues to the next step.



RAIL20PLM1524BA 3

Start plant

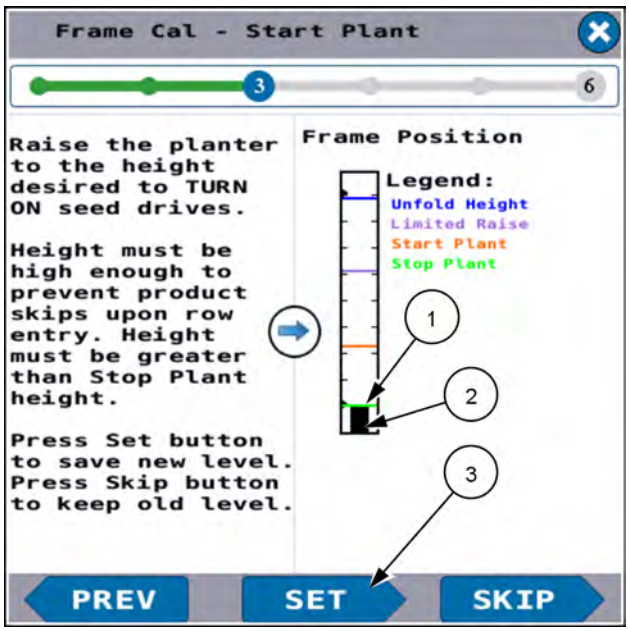
The “Frame Cal – Start Plant” screen appears. The green “Stop Plant” index **(1)** appears at the height of the black level bar.

The “Frame Cal – Start Plant” screen states, “Raise the planter to the height desired to TURN ON the seed drives. Height must be high enough to prevent product skips upon row entry. Height must be greater than Stop Plant height. Press Set button to save new level. Press Skip button to keep old level.”

Adjust the frame height as instructed in the screen. The black level indicator **(2)** moves to represent the frame height.

NOTE: *The “Start Plant” height must be equal to or greater than the “Stop Plant” height. It must also be high enough to prevent product skips upon row entry.*

Press the “Set” button **(3)** to configure the Start Plant Height. The procedure continues to the next step.



RAIL20PLM1525BA 4

Limited raise

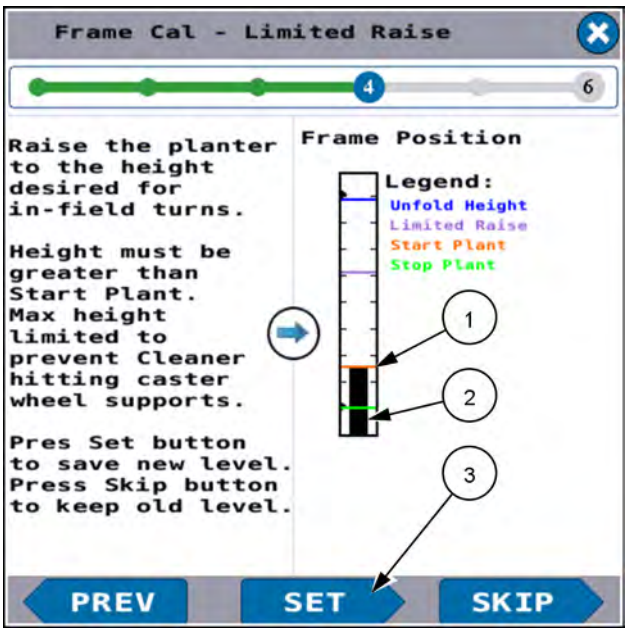
The “Frame Cal – Limited Raise” screen appears. The red “Start Plant” index **(1)** appears at the height of the black level bar.

The “Frame Cal – Limited Raise” screen states, “Raise the planter to the height desired for in-field turns. Height must be greater than Start Plant. Max height limited to prevent Cleaner hitting caster wheel supports. Press Set button to save new level. Press Skip button to keep old level.”

Adjust the frame height as instructed in the screen. The black level indicator **(2)** moves to represent the frame height.

NOTE: *The “Limited Raise” height must be greater than the “Start Plant” height.*

Press the “Set” button **(3)** to configure the Limited Raise Height. The procedure continues to the next step.



RAIL20PLM1526BA 5

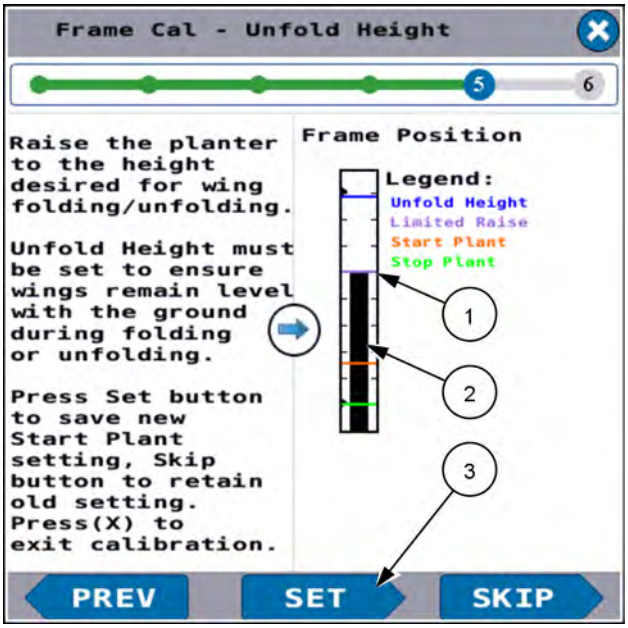
Unfold height

The “Frame Cal – Unfold Height” screen appears. The purple “Limited Raise” index **(1)** appears at the height of the black level bar.

The “Frame Cal – Unfold Height” screen reads, “Raise the planter to the height desired for wing folding/unfolding. Unfold Height must be set to ensure wings remain level with the ground during folding or unfolding. Press Set button to save new Start Plant setting, Skip button to retain old setting. Press (X) to exit calibration.”

Adjust the frame height as instructed in the screen. The black level indicator **(2)** moves to represent the frame height.

Press the “Set” button **(3)** to configure the Unfold Height. The procedure continues to the final step.

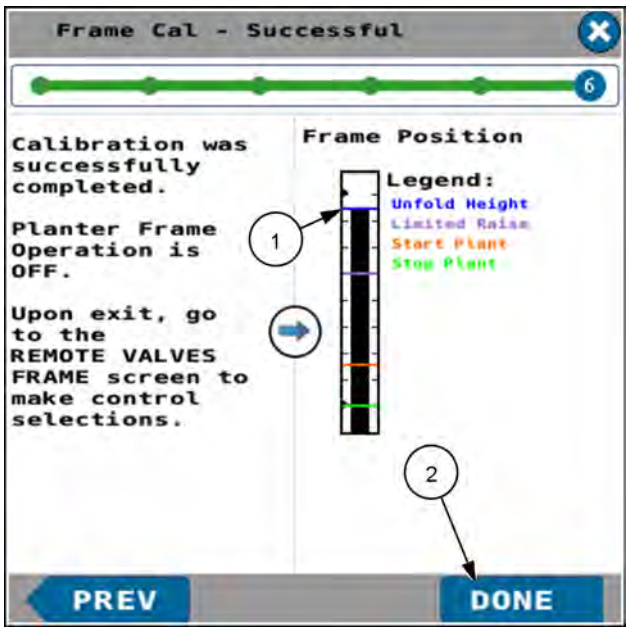


RAIL20PLM1527BA 6

End of procedure

The “Frame Cal – Successful” screen appears. The blue “Unfold Height” index **(1)** appears at the height of the black level bar.

Press the “Done” button **(2)** to exit the frame calibration procedure.



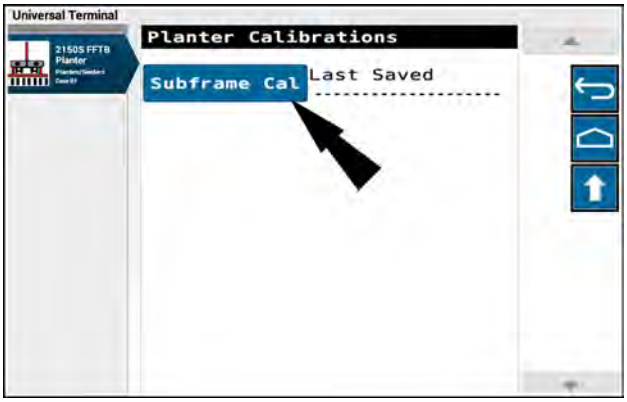
RAIL20PLM1528BA 7

Subframe calibration: 2150S model front fold planters

NOTE: *Perform a subframe calibration before starting to plant for the season. Also, perform a subframe calibration after the sensor is replaced or if you see erratic frame control.*

Unfold the planter. See “Frame control: 2150S model front fold planters” (**4-99**).

In the “Planter Calibrations” screen, press the “Subframe Cal” button.

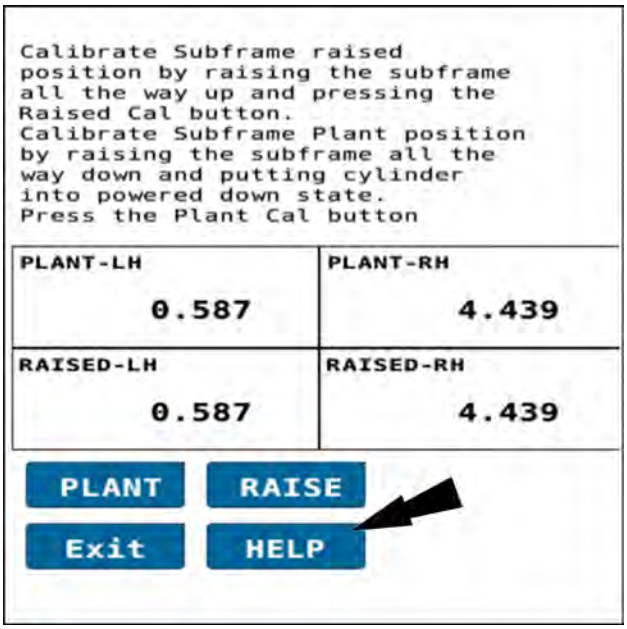


RAPH21PLM3092AA 1

The “Subframe Calibration” screen appears.

The “Subframe Calibration” screen states, “Calibrate Subframe raised position by raising the subframe all the way up and pressing the Raised Cal button. Calibrate Subframe Plant position by raising the subframe all the way down and putting cylinder into powered down state. Press the Plant Cal button.”

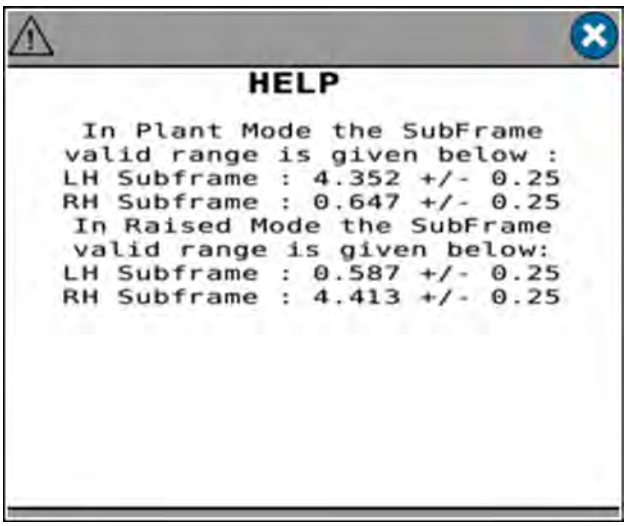
Press the “Help” button to review the calibration requirements.



RAPH21PLM2590BA 2

The “Help” screen gives the following calibration parameters:

Mode	Subframe	Valid range
Plant	LH Subframe	4.352 +/- 0.25
Plant	RH Subframe	0.647 +/- 0.25
Raised	LH Subframe	0.587 +/- 0.25
Raised	RH Subframe	4.413 +/- 0.25



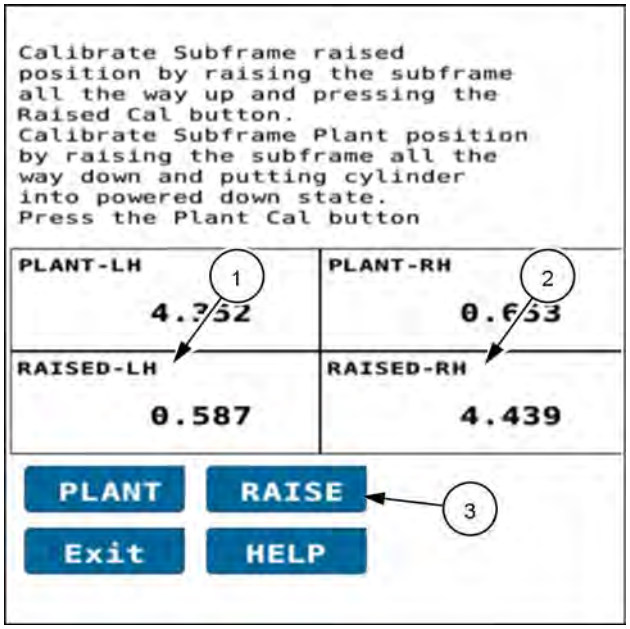
RAPH21PLM2591BA 3

Raised calibration

Raise the subframe all the way up.

The “Raised - LH” readout **(1)** must be between 0.587 +/- 0.25. The “Raised - RH” readout **(2)** must be between 4.413 +/- 0.25.

Press the “Raise” button **(3)** to record the calibration values.



RAPH21PLM2592BA 4

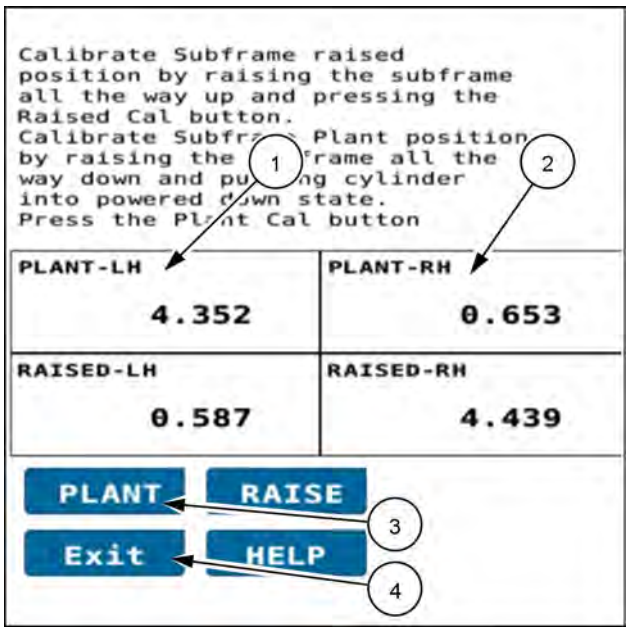
Plant calibration

Lower the subframe all the way down. Leave the hydraulic cylinder in the powered-down state.

The “Plant - LH” readout **(1)** must be between 4.352 +/- 0.25. The “Plant - RH” readout **(2)** must be between 0.647 +/- 0.25.

Press the “Plant” button **(3)** to record the calibration values.

Press the “Exit” button **(4)** to exit the subframe calibration and return to the “Planter Calibrations” screen.



RAPH21PLM2592BA 5

Frame calibration: 2160 model front fold planters

NOTICE: *Display software assumes an ascending order in height for the toolbar positions: start with the lowest position and transition to the highest position following the on-screen directions for the best performance.*

NOTE: *Perform a frame calibration before starting to plant for the season. Also perform a frame calibration after the sensor is replaced or erratic frame control is experienced.*

Unfold the planter up to and including the step, “Lower Planter to Headland Height.” Do not perform the final step, “Row Lift Down.” See “Frame control: 2160 model front fold planters” (**4-116**).

NOTICE: *During the frame calibration process, the row units at the wing wheels will pass through the wing wheel extensions. These row units must be in the raised position to clear the wing wheels. If row cleaners are installed on the wing wheel row units, unpin the row cleaners so that they can float.*

The operator has control of “Stop Plant”, “Start Plant”, and “Limited Raise” toolbar height settings at all times, even when planting. As field conditions change, any height can be changed to match the new conditions.

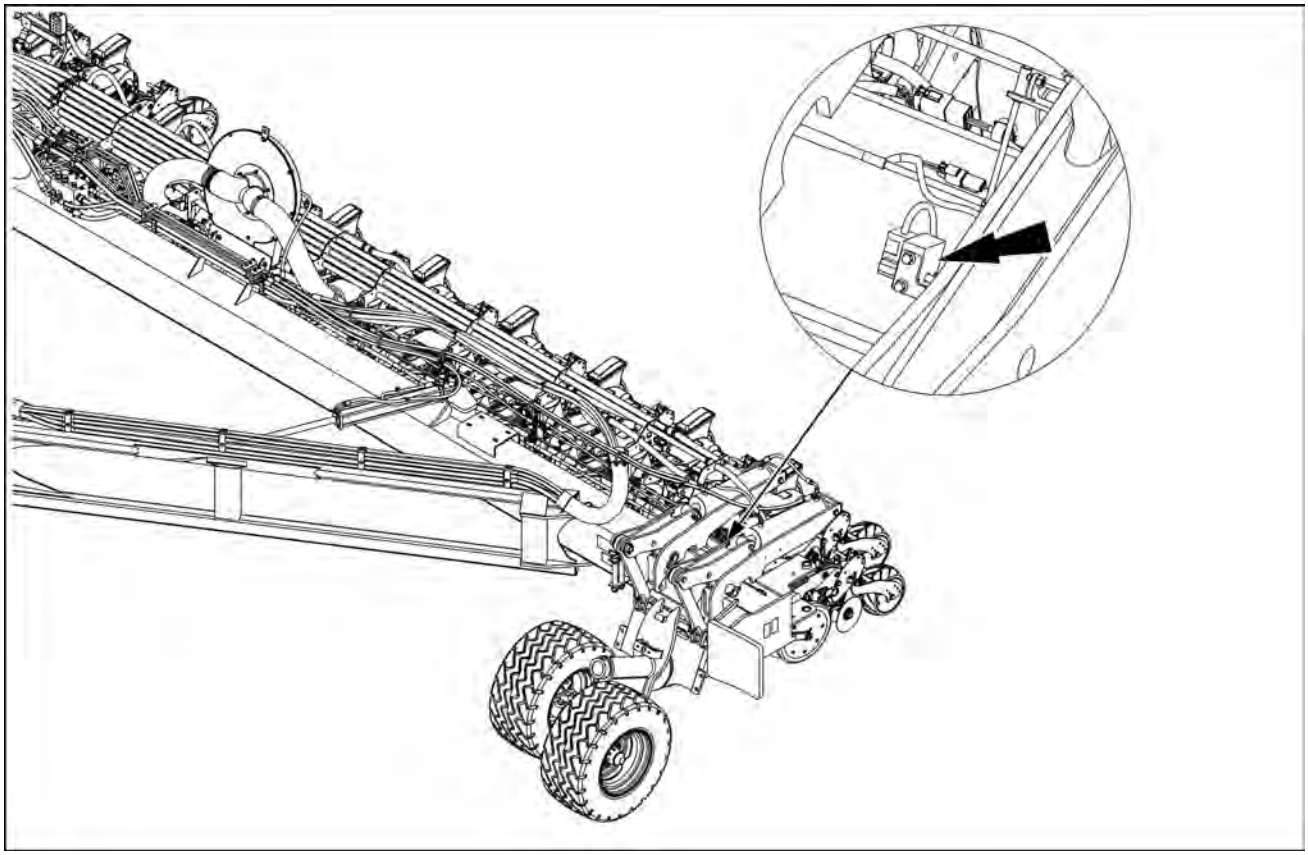
To change these control heights:

- The planter must be in planting position.
- The toolbar must be near the end of field turn height to ensure the caster wheels are locked in position.

Frame position sensor adjustment

In order for the frame controls to function properly, you must perform a test and any needed adjustment of the frame position sensor. The sensor is located on the wing wheel support frame on the left-hand side of the planter.

NOTE: *For 2160 24-row planters with **30 in** row spacing, 47-row planters with **15 in** row spacing, and 36-row planters with **20 in** or **22 in** row spacing the control sensor is located as shown in the image. For 36-row or 32-row planters with **30 in** row spacing the control sensor is mounted on the innermost left-hand wing wheel support frame.*

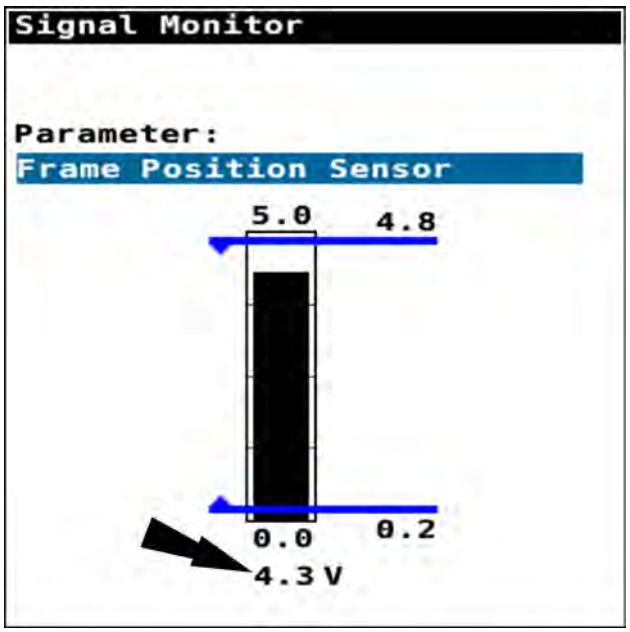


SAVM19PLA0391FA 1

Sensor arm adjustment

Fully lower the planter.

In the “Signal Monitor” screen, select the “Frame Position Sensor” option. See “Signal Monitor screen” (**5-17**) for more information.



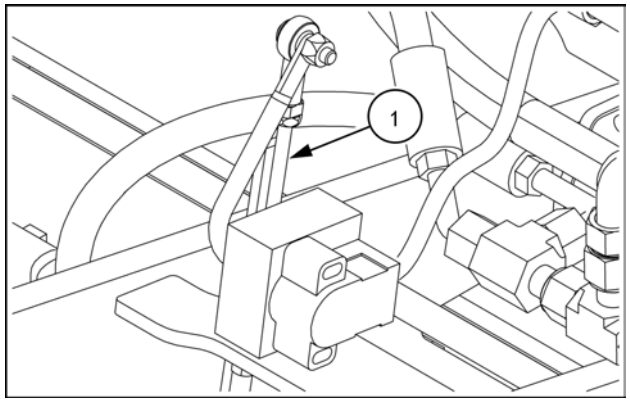
RAPH21PLM1544BA 2

Verify the sensor voltage value. The value must be equal to or less than **4.40 V** and greater than or equal to **4.30 V** when fully lowered.

A. If the voltage is greater than **4.40 V**, shorten the linkage arm **(1)** from the wing wheel to the potentiometer arm.

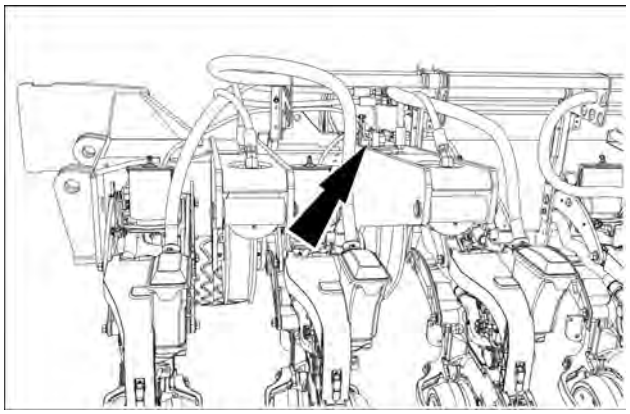
B. If the voltage is less than **4.30 V**, lengthen the linkage arm **(1)** from the wing wheel to the potentiometer arm.

NOTE: *For 2160 24-row planters with* ***30 in*** *row spacing, 47-row planters with* ***15 in*** *row spacing, and 36-row planters with* ***20 in*** *or* ***22 in*** *row spacing the voltage range is approximately* ***4.40 V*** *to* ***3.00 V****. For all other 2160 planters the voltage range is approximately* ***4.40 V*** *to* ***0.60 V****.*



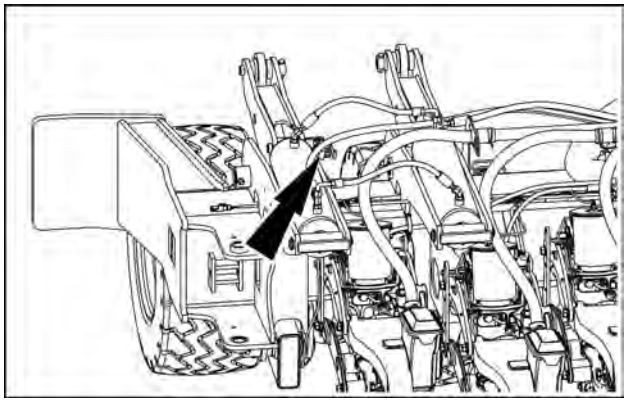
SAVM16PLA0716AA 3

Linkage arm location – 36-row or 32-row planters with **30 in** spacing:



SAVM16PLA0707FA 4

Linkage arm location – 47-row planters, 24-row planters, or 36-row planters with **20 in** or **22 in** spacing:

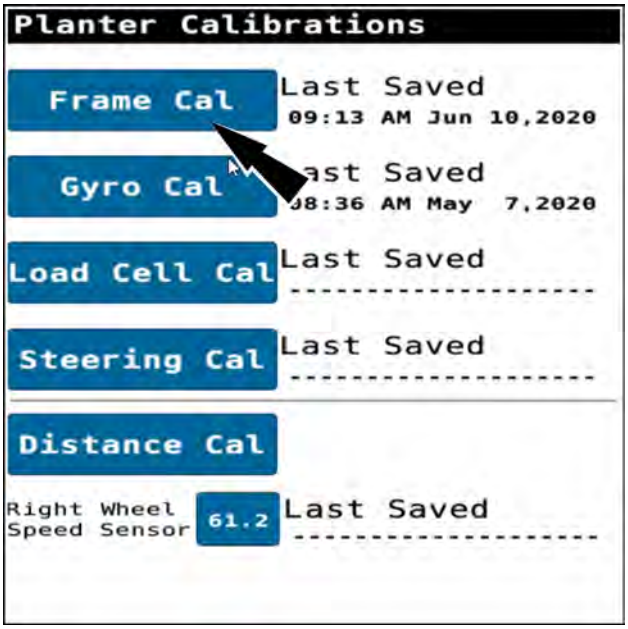


SAVM19PLA0523AA 5

Frame sensor calibration

Lower the toolbar to a height that is typical of in-field turns.

In the “Planter Calibrations” screen, press the “Frame Cal” button.



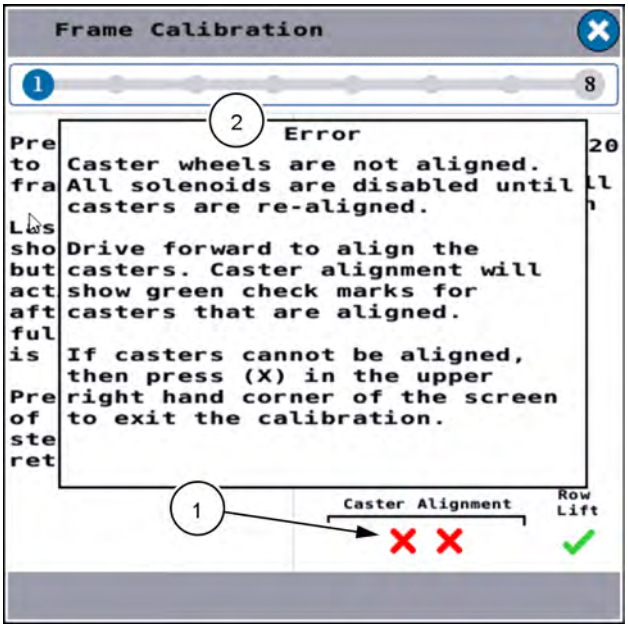
RAIL20PLM1537BA 6

Caster alignment

If the casters are not aligned, red “X” symbols **(1)** appear in the “Caster Alignment” area. An error message **(2)** appears.

The error message states, “Caster wheels are not aligned. All solenoids are disabled until casters are realigned. Drive forward to align the casters. Caster alignment will show green check marks for casters that are aligned. If casters cannot be aligned, then press (X) in the upper right hand corner or the screen to exit the calibration.”

Follow the instructions in the error message. When the casters are aligned, the error message will automatically clear.



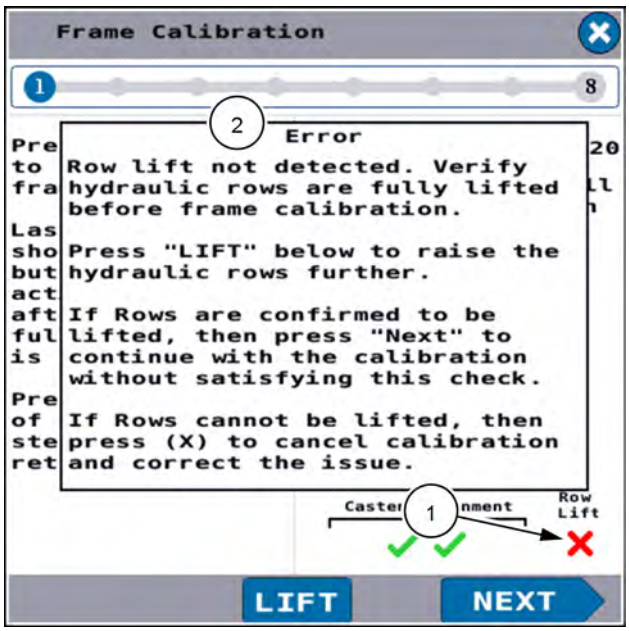
RAIL20PLM1535BA 7

Row unit lift

The “Row Lift” indicator displays a red “X” **(1)** if the sensor cannot detect the row units in the fully lifted position. An error message **(2)** appears.

The error message states, “Row lift not detected. Verify hydraulic rows are fully lifted before frame calibration. Pres “Lift” below to raise the hydraulic rows further. If rows are confirmed to be lifted, then press “Next” to continue with the calibration without satisfying this check. If rows cannot be lifted, then press (X) to cancel calibration and correct the issue.”

Follow the instructions in the error message. When row units are fully lifted, the error message will automatically clear.



RAIL20PLM1538BA 8

Start frame calibration

Green check marks appear in the “Caster Alignment” area **(1)** when the casters are aligned.

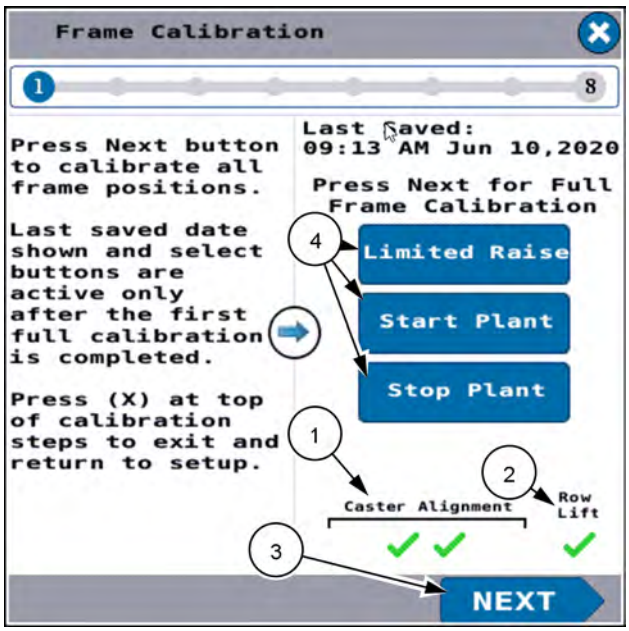
The “Row Lift” indicator **(2)** displays a green check mark to indicate that the hydraulic row lift row units are being detected in the correct position (fully lifted).

With all error messages cleared the “Frame Calibration” screen states, “Press Next button to calibrate all frame positions. Last saved date shown and select buttons are active only after the first full calibration is completed. Press (X) at top of calibration steps to exit and return to setup.”

NOTE: *When performing the initial frame calibration, you must complete every step. After the initial frame calibration has been completed, you can set individual calibration values by using the buttons in the “Frame Calibration” screen, or pressing the “Skip” button until the desired screen displays. The first time you perform a frame calibration in a tractor, the control buttons in the “Frame Calibration” screen appear grayed out.*

Press the “Next” button **(3)** to begin a sequence of all of the frame height calibrations. The “Frame Cal – Stop Plant” screen appears.

NOTE: *You can press any frame height button **(4)** to select one of the frame heights for calibration. If you select one of the frame heights the procedure skips to the selected height. When you press the “Set” button in the selected calibration, the next calibration in the sequence appears.*



RAIL20PLM1547BA 9

Full lower

NOTE: *The frame height settings depicted in the images are for illustrative purposes only. Calibrate frame heights as needed for your operation.*

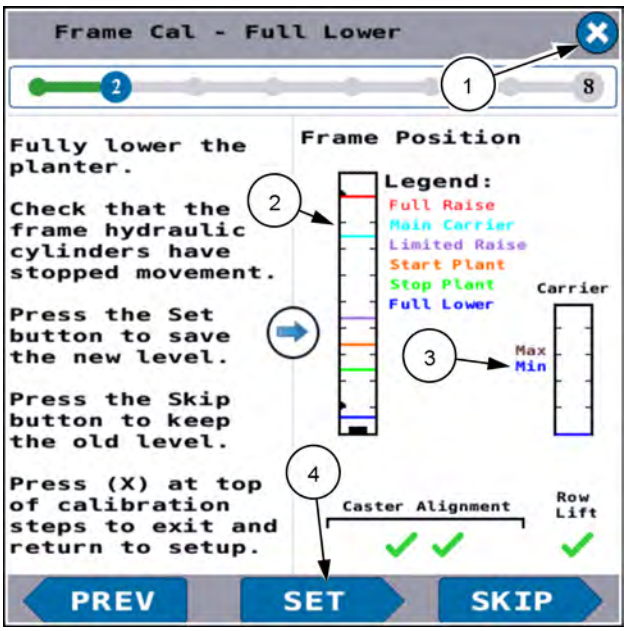
The “Frame Cal – Full Lower” screen appears.

The “Frame Cal – Full Lower” screen states, “Fully lower the planter. Check that the frame hydraulic cylinders has stopped movement. Press the Set button to save the new level. Press the Skip button to keep the old level. Press (X) **(1)** at top of calibration steps to exit and return to setup.”

NOTE: *Because the “Full Lower” height, the “Stop Plant” height, the “Start Plant” height, and the “Limited Raise” height would be clustered near the bottom of a “Frame” bar graph, a zoomed-in “Frame Position” bar graph* ***(2)*** *allows the user to view these heights more easily. The “Carrier” bar graph* ***(3)*** *gives a full proportional view of the carrier height.*

Fully lower the toolbar frame. The “Frame Position” bar graph and the “Carrier” bar graph indicate that the frame is in the lowered position.

Press the “Set” button **(4)** to configure the Full Lower height. The procedure continues to the next step.



RAIL20PLM1539BA 10

Stop plant

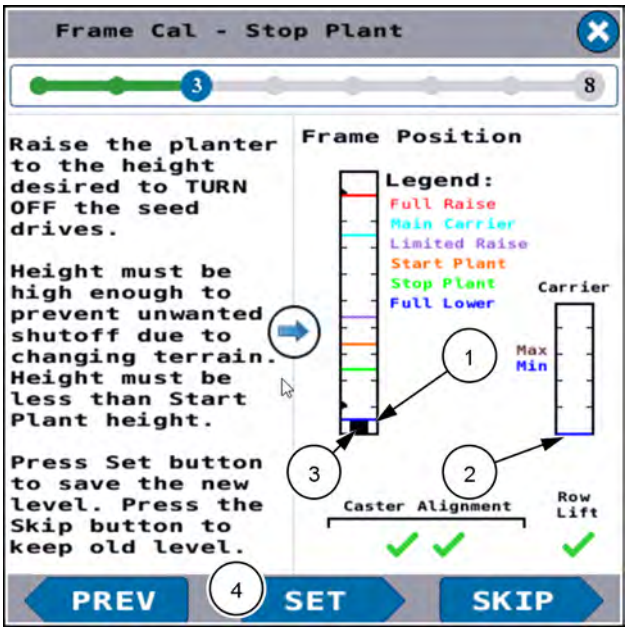
The “Frame Cal – Stop Plant” screen appears. The blue “Full Lower” index **(1)** appears at the height of the black level bar in the “Frame Position” bar graph. The blue “Min” index **(2)** appears at the established lower limit in the “Carrier” bar graph.

The “Frame Cal – Stop Plant” screen states, “Raise the planter to the height desired to TURN OFF the seed drives. Height must be high enough to prevent unwanted shutoff due to changing terrain. Height must be less than Start Plant height. Press Set button to save the new level. Press the Skip button to keep old level.”

Raise the toolbar to the height at which the product drives should disengage. The black level indicator **(3)** moves to represent the frame height.

NOTE: *“Stop Plant” height must be equal to or less than the “Start Plant” height. It must also be high enough to prevent inadvertent shutoff due to changing terrain.*

Press the “Set” button **(4)** to save the “Stop Plant’ height and continue to the next step.



RAIL20PLM1540BA 11

Start plant

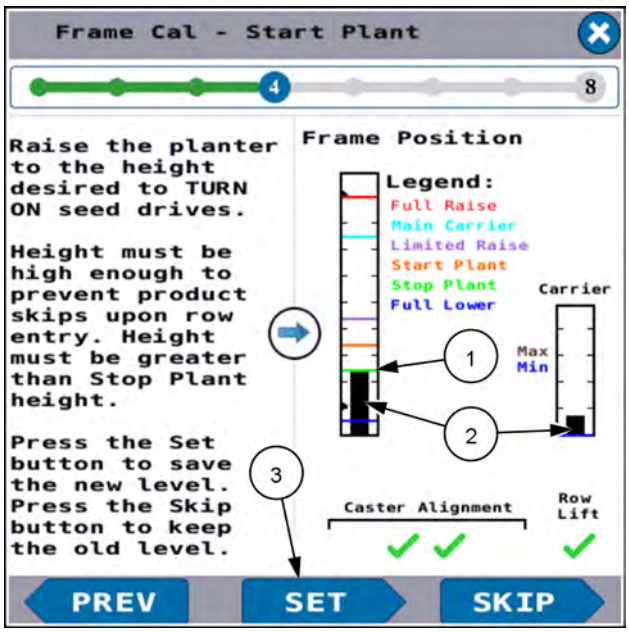
The “Frame Cal – Start Plant” screen appears. The green “Stop Plant” index **(1)** appears at the height of the black level bar.

The “Frame Cal – Start Plant” screen states, “Raise the planter to the height desired to TURN ON the seed drives. Height must be high enough to prevent product skips upon row entry. Height must be greater than Stop Plant height. Press the Set button to save new level. Press the Skip button to keep old level.”

Adjust the frame height as instructed in the screen. The black level indicators **(2)** move to represent the frame height.

NOTE: *The “Start Plant” height must be equal to or greater than the “Stop Plant” height. It must also be high enough to prevent product skips upon row entry.*

Press the “Set” button **(3)** to configure the Start Plant Height. The procedure continues to the next step.



RAIL20PLM1542BA 12

Limited raise

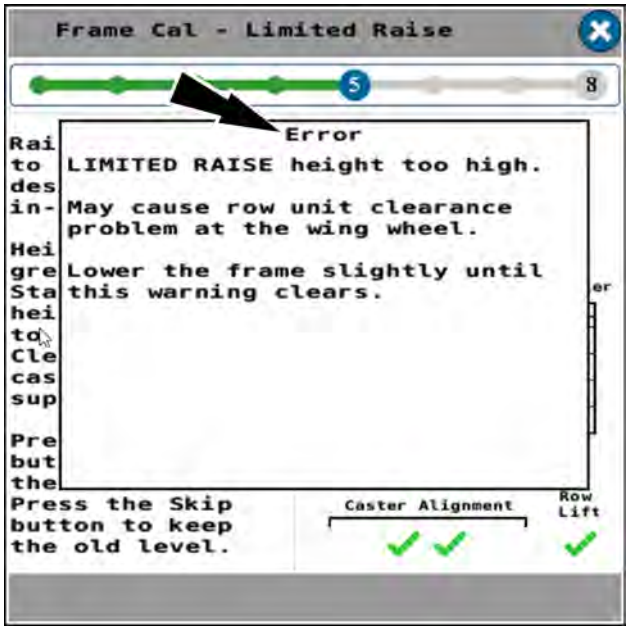
NOTE: *There is a predetermined maximum level for the “Limited Raise” height. To prevent a row unit clearance problem at the wing wheel when you raise the toolbar at a headland, you must set the “Limited Raise” height below the predetermined maximum level. If you attempt to set the “Limited Raise” height above the predetermined maximum level, the pop-up error message appears.”*

The “Frame Cal – Limited Raise” screen appears.

If you raise the frame too high, an error message pops up on the display.

The error message states, “Limited Raise height too high. May cause row unit clearance problem at the wing wheel. Lower the frame slightly until this warning clears.

Lower the frame slightly. The error message automatically clears when the frame is no longer too high for the limited raise adjustment.



RAIL20PLM1541BA 13

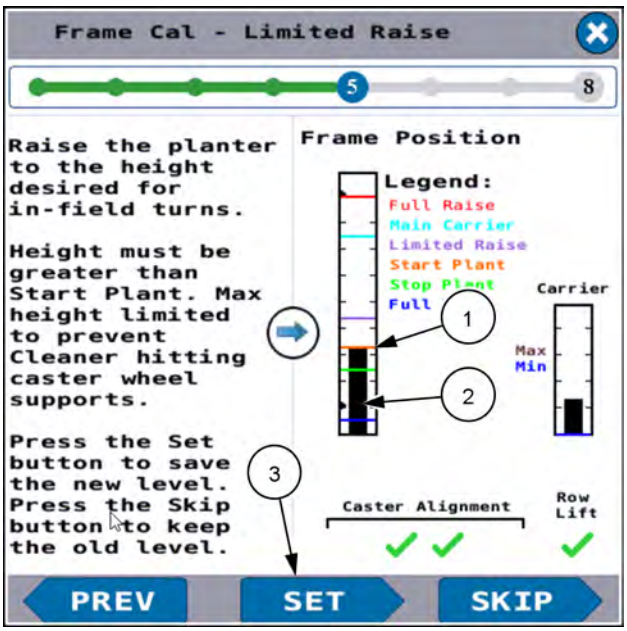
With no error messages present, the red “Start Plant” index **(1)** appears at the height of the black level bar.

The “Frame Cal – Limited Raise” screen states, “Raise the planter to the height desired for in-field turns. Height must be greater than Start Plant. Max height limited to prevent Cleaner hitting caster wheel supports. Press the Set button to save new level. Press the Skip button to keep old level.”

Adjust the frame height as instructed in the screen. The black level indicator **(2)** moves to represent the frame height.

NOTE: *The “Limited Raise” height must be greater than the “Start Plant” height.*

Press the “Set” button **(3)** to configure the Limited Raise Height. The procedure continues to the next step.



RAIL20PLM1543BA 14

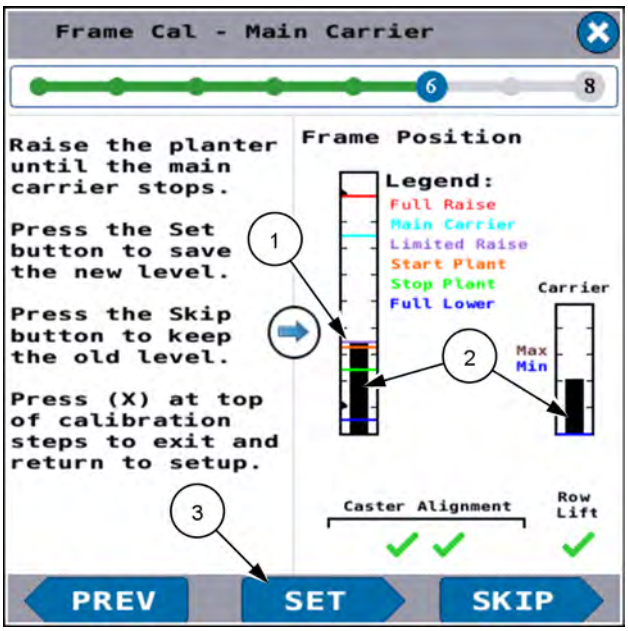
Main carrier

The purple “Limited Raise” index **(1)** appears at the height of the black level bar.

The “Frame Cal – Main Carrier” screen states, “Raise the planter until the main carrier stops. Press the Set button to save the new level. Press the Skip button to keep the old level. Press (X) at top of calibration steps to exit ad return to setup.”

Raise the toolbar until the main carrier stops as instructed in the screen. The black level indicators **(2)** move to represent the main carrier height.

Press the “Set” button **(3)** to configure the main carrier height. The procedure continues to the next step.



RAIL20PLM1544BA 15

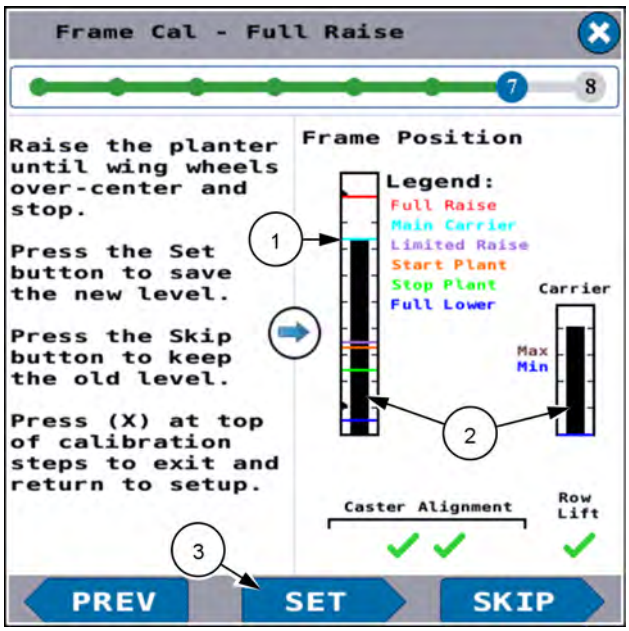
Full raise

The light blue “Main Carrier” index **(1)** appears at the height of the black level bar in the “Frame Position” bar.

The “Frame Cal – Full Raise” screen states, “Raise the planter until wing wheels over-center and stop. Press the Set button to save the new level. Press the Skip button to keep the old level. Press (X) at top of calibration steps to exit and return to setup.”

Raise the toolbar fully as instructed in the screen. The black level indicators **(2)** move to represent the main carrier height.

Press the “Set” button **(3)** to configure the full raise height.



RAIL20PLM1545BA 16

End of procedure

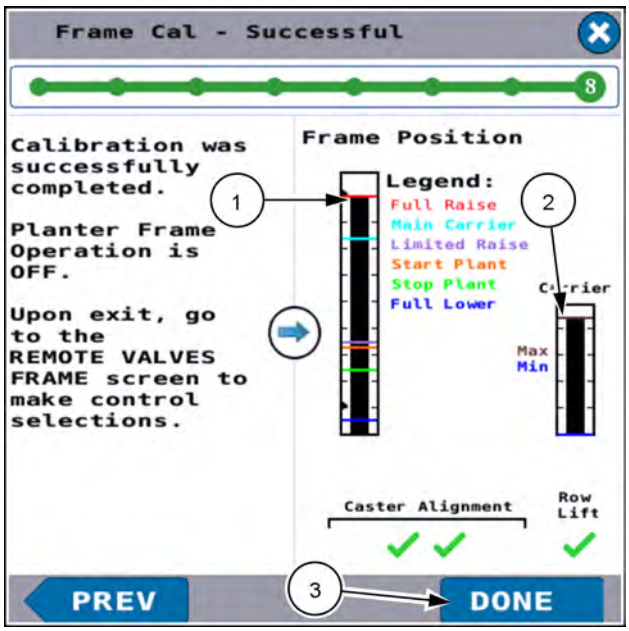
The “Frame Cal – Successful” screen appears.

The “Frame Cal – Successful” screen states, “Calibration was successfully completed. Planter Frame Operation is OFF. Upon exit, go to the REMOTE VALVES FRAME screen to make control selections.”

The red “Full Raise” index **(1)** appears at the height of the black level bar in the “Frame Position” bar graph. The brown “Max” index **(2)** appears at the end of the black level bar in the “Carrier” bar graph.

Press the “Done” button **(3)** to exit the frame calibration procedure.

In 2160 model planters you must open the “Unfold” procedure if you wish to place the planter frame back into the limited raise state. See “Frame control: 2160 model front fold planters” (**4-116**) for instructions.



RAIL20PLM1546BA 17

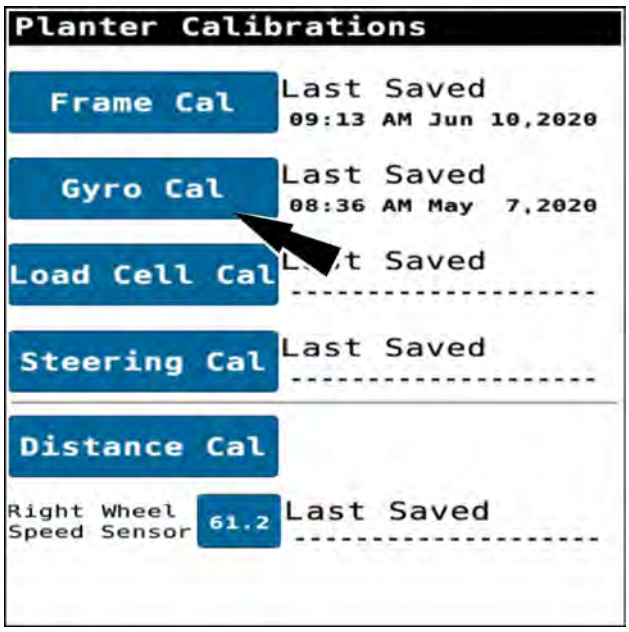
Gyro calibration (turn compensation)

NOTE: *Position the planter on level ground for this procedure.*

Unfold the planter if applicable. See Chapter 6.5 “Frame Control” (**4-50**).

Lower the planter to a height that is typical of in-field turns.

In the “Planter Calibrations” screen, press the “Gyro Cal” button.



RAIL20PLM1551BA 1

The “Gyro Calibration” screen appears.

The “Current Offset” value appears as a percentage. This is the “Turn compensation gyro offset.”

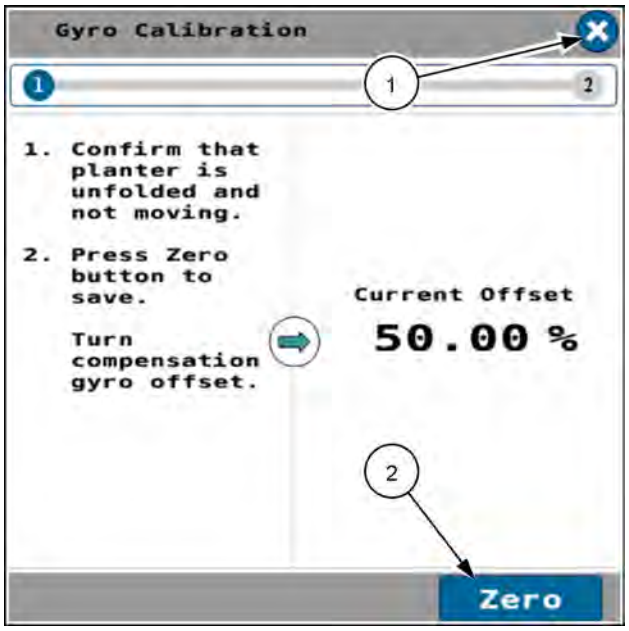
The “Gyro Calibration” screen states:

1. “Confirm that planter is unfolded and not moving.”
2. “Press Zero button to save.

Follow the instructions in the “Gyro Calibration” screen.

If you wish to cancel the calibration, press the (X) **(1)** button.

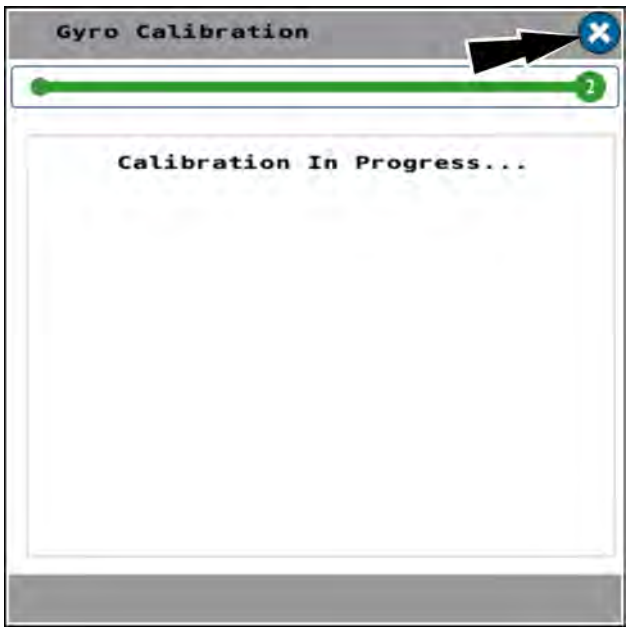
Press the “Zero” **(2)** button.



RAPH21PLM1505BA 2

A status screen appears.

If you need to cancel the gyro calibration, press the (X) button. Otherwise, allow the calibration to continue.



RAIL20PLM1549BA 3

When the turn compensation gyro is calibrated, The “Gyro Calibration” screen shows that the calibration is complete.

The “Gyro Calibration” screen states, “Calibration Complete. The Offset has been Zeroed. Saved Offset: xx.xx%. Last Cal (time and date).”

Press the “Done” button to close the “Gyro Calibration” screen and return to the “Planter Calibration” screen.

RAIL20PLM1550BA 4

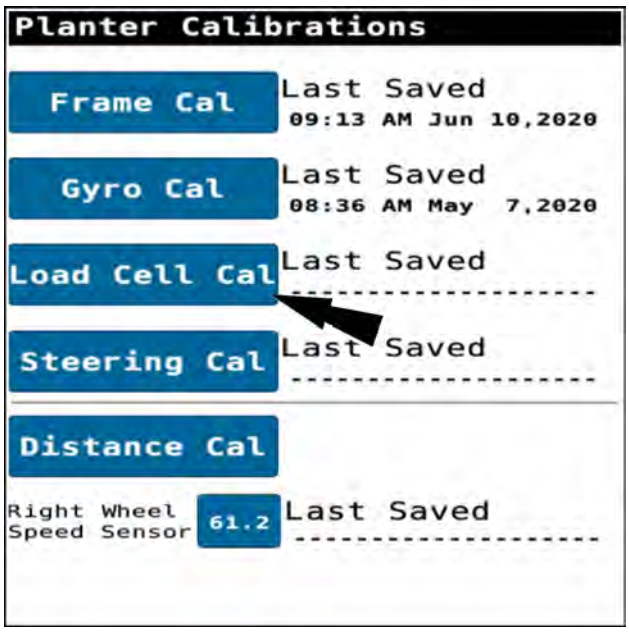
Load cell calibration

Unfold the planter if applicable. See Chapter 6.5 “Frame Control” (**4-50**).

Use the remote lever to raise the planter above the limited raise height so that no force is being applied to any of the row unit gauge wheels.

NOTE: *The planter must be raised to the "Limited Raise" height in order to perform load cell calibration. The load cell calibration screen is not available when the planter is below the "Limited Raise" height.*

In the “Planter Calibrations” screen, press the “Load Cell Cal” button.



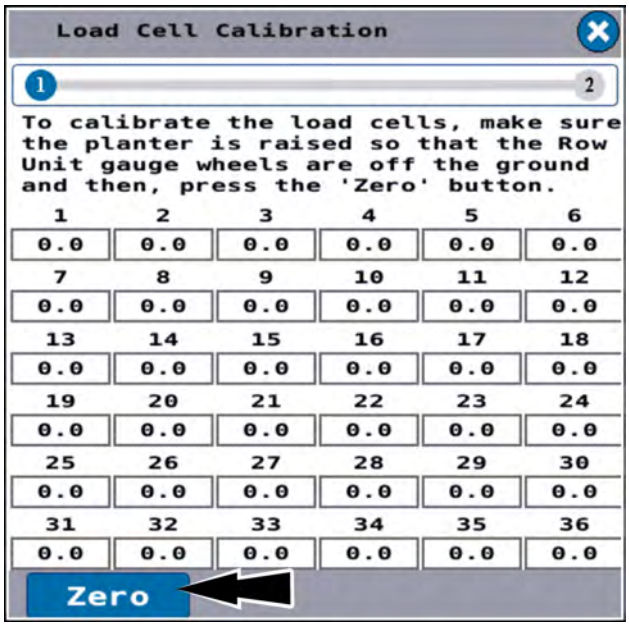
RAIL20PLM1551BA 1

The “Load Cell Calibration” screen appears.

The “Load Cell Calibration” screen states, “To calibrate the load cells, make sure the planter is raised so that the Row Unit gauge wheels are off the ground and then press the “Zero” button.”

Each numbered item represents a row unit load cell on the planter. The top number on each item indicates the row number. The bottom number on each item is the current sensor reading. When the planter is raised and stationary, each sensor should report a value that is near 0.0 (zero).

Press the “Zero” button to calibrate all of the row-unit load cells. The statement “detection in progress” appears in the middle of the screen when the system does not see a load cell for each row. The detection process can take up to **20 s** When every row unit load cell is properly calibrated, each numbered button indicates a sensor reading of 0.0 (zero).

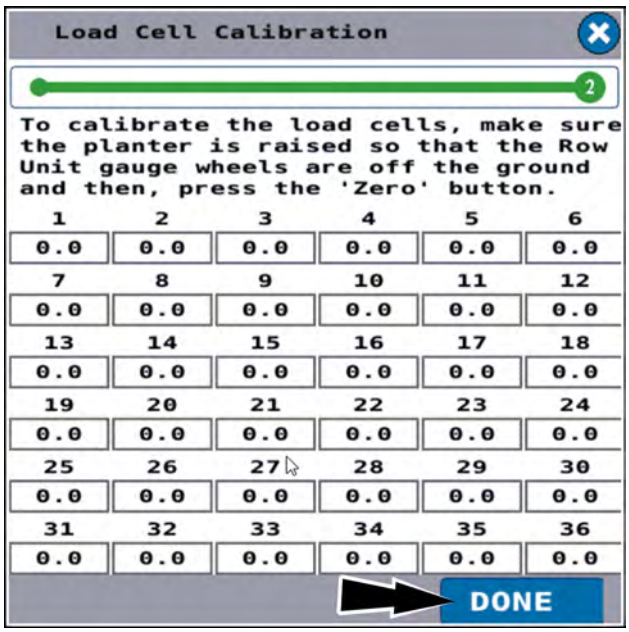


RAIL20PLM1552BA 2

When every row unit load cell is properly calibrated, each numbered button indicates a sensor reading of 0.0 (zero).

DONE

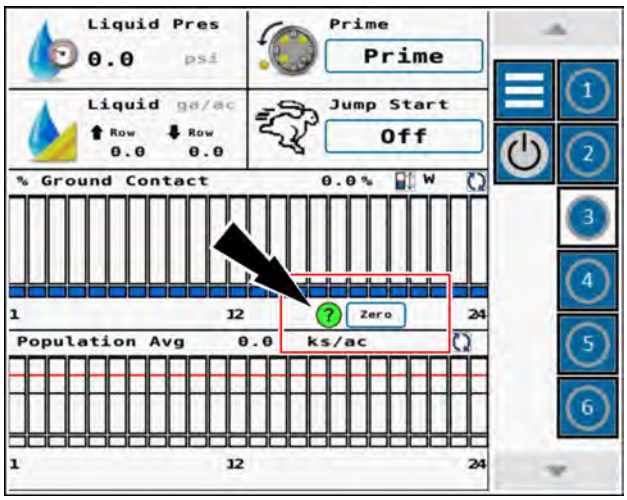
Press the “Done” button to close the “Load Cell Calibration” screen and return to the “Planter Calibration” screen.



RAIL20PLM1553BA 3

Load cell calibration check

The “Load Cell Calibration Check Indicator” can be found on page 3 of the object pool.



NHPH25PLM0010AA 1

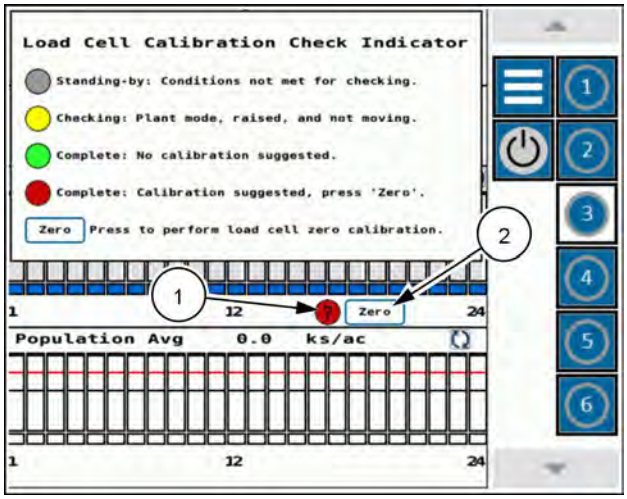
After the initial calibration, the “Load Cell Calibration Check Indicator” provides a means to quickly view the status of the load cells to determine if a zero calibration is necessary.

Press the “status” button **(1)** to view information about each status.

Press the “Zero” button **(2)** to perform a load cell zero calibration.

In this example, the “status” button is red, indicating that a zero calibration is necessary.

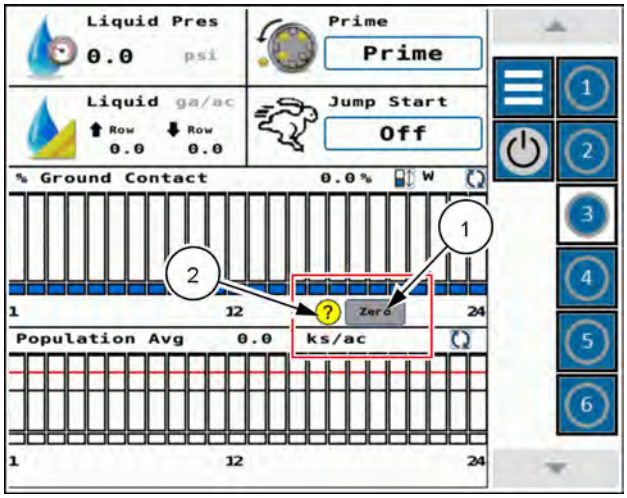
NOTE: *Press the “status” button* ***(1)*** *again to close the informational pop-up window.*



NHPH25PLM0011AA 2

During a load cell zero calibration, the “zero” button **(1)** is grayed out and unavailable.

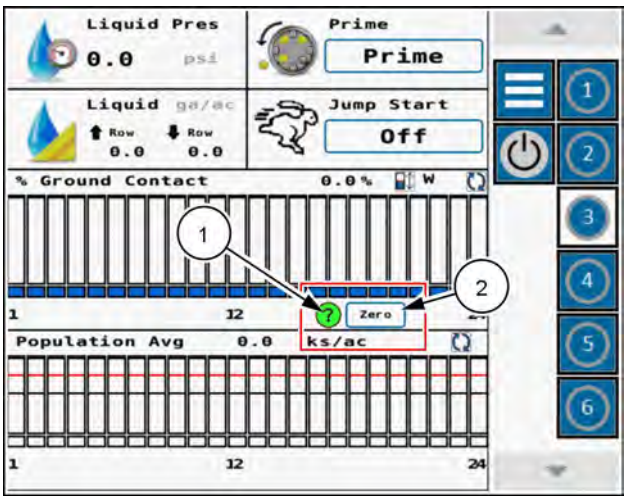
The “status” button **(2)** turns yellow indicating that the system is checking the load cells.



NHPH25PLM0012AA 3

The calibration is successful when the “status” button **(1)** turns green.

The “Zero” button **(2)** becomes available and can be pushed again if necessary.



NHPH25PLM0010AA 4

Steering calibration (if equipped)

Check steering control sensor values

Before calibrating the sensor, you must ensure the control linkage arm is set to the proper length. With the planter fully raised and the steering system activated, use the display to view the position sensor voltage values.

Unfold and lower the planter to a height typical of in-field turns. See Chapter 6.5 “Frame Control” (**4-50**).

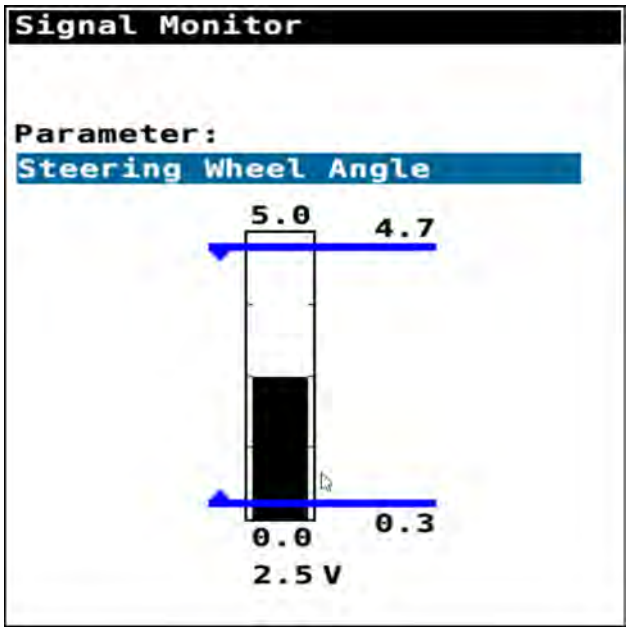
In the “Signal Monitor” screen, select the “Steering Wheel Angle” option. See “Signal Monitor screen” (**5-17**) for more information.

The axle position sensor voltage must remain between a minimum and maximum voltage range.

Acceptable voltage values:

Minimum (full right turn): Greater than **0.68 V**

Maximum (full left turn): Less than **4.32 V**



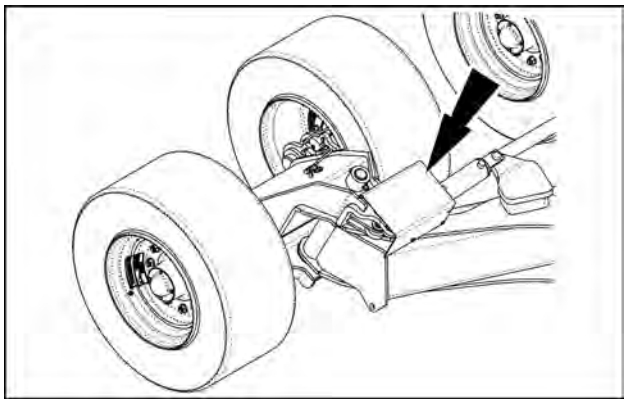
RAPH21PLM1541BA 1

Adjusting steering position sensor linkage for carrier wheel option (if equipped)

If the voltage values are out of range, the steering angle sensor linkage will need to be adjusted.

1. Position the planter steering wheels to the full left position.
2. Access the steering linkage by removing the sensor cover located on the right wheel end.

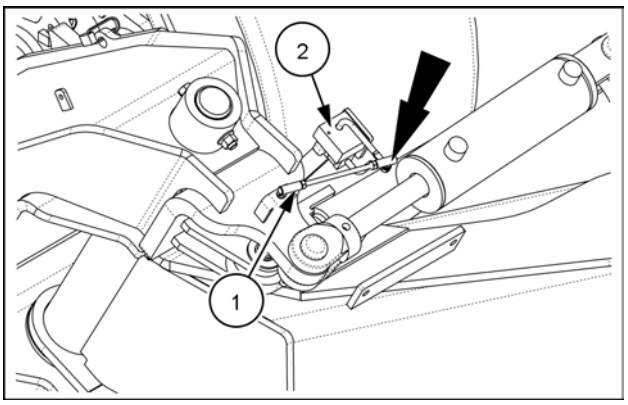
NOTE: *Steerable carrier wheel option shown.*



SAPE13PLA0640AA 2

3. Remove one end of the connecting rod **(1)** joining the wheel end with the steering angle sensor **(2)**.
   A. Shorten the rod length to increase the voltage value.
   B. Increase the rod length to lower the voltage value.
4. After you obtain the proper voltage, reinstall the connecting rod and shield, and tighten all the hardware.

   NOTE: *Machines equipped with the tracks carrier option have position sensors internal to the cylinders. No position adjustment is required.*



SAPE13PLA0641AA 3

Steering system calibration

Preparation

In the “Planter Calibrations” screen, press the “Steering Cal” button.

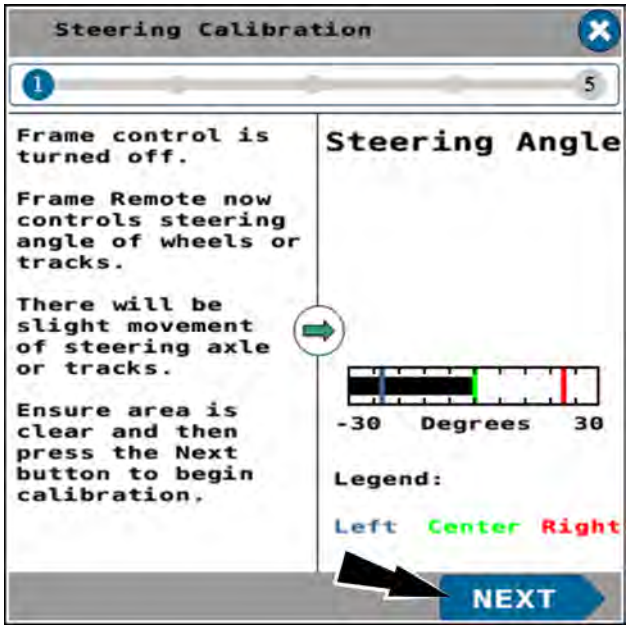
The “Steering Calibration” screen appears.

The “Steering Calibration” screen states, “Frame control is turned off. Frame Remote now controls steering angle of wheels or tracks. There will be slight movement of steering axle or tracks. Ensure area is clear and then press the Next button to begin calibration.”

Follow the instructions in the “Steering Calibration” screen.

NEXT

Press the “Next” button to begin the calibration.



RAIL20PLM1559BA 4

Left turn calibration

The “Steering Cal - Left” screen appears.

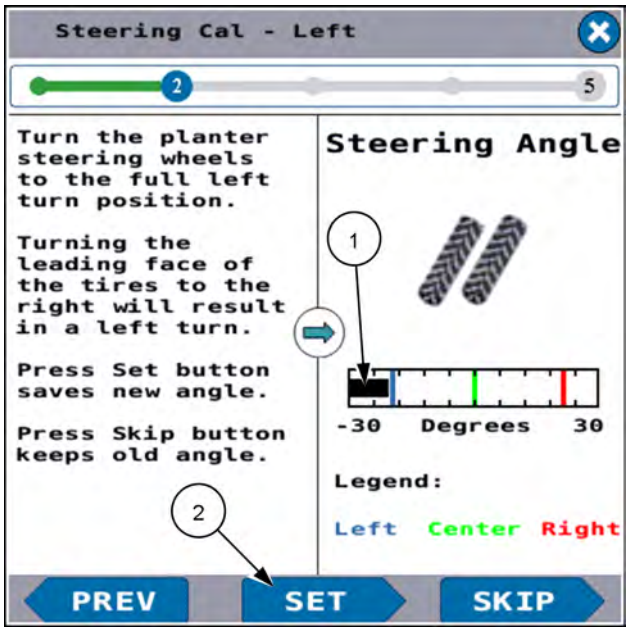
The “Steering Cal - Left” screen states, “Turn the planter steering wheels to the full left turn position. Turning the leading face of the tires to the right will result in a left turn. Pressing the Set button saves the new angle. Pressing the Skip button keeps the old angle.”

Follow the instructions in the “Steering Cal - Left” screen.

The bar graph level indicator **(1)** follows the position of the turn.

SET

Press the “Set” **(2)** button to continue the calibration.



RAIL20PLM1560BA 5

Right turn calibration

The “Steering Cal - Right” screen appears.

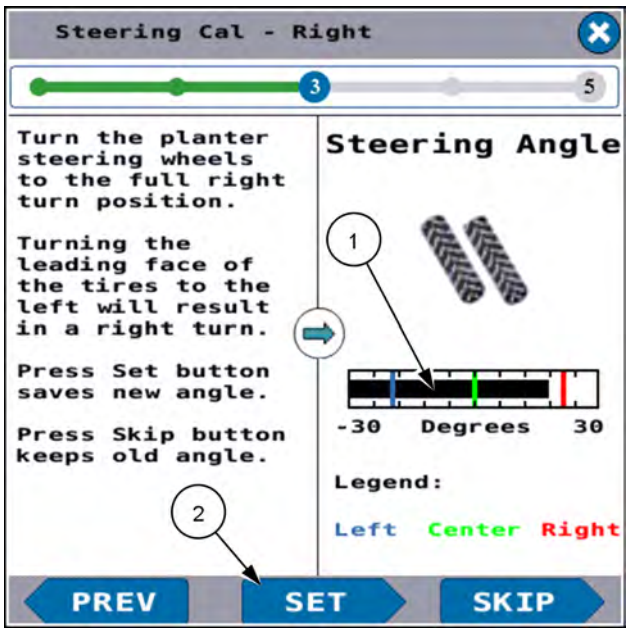
The “Steering Cal - Right” screen states, “Turn the planter steering wheels to the full right turn position. Turning the leading face of the tires to the left will result in a right turn. Pressing the Set button saves the new angle. Pressing the Skip button keeps the old angle.”

Follow the instructions in the “Steering Cal - Right” screen.

The bar graph level indicator **(1)** follows the position of the turn.

SET

Press the “Set” **(2)** button to continue the calibration.



RAIL20PLM1561BA 6

Wheels centered calibration

The “Steering Cal - Center” screen appears.

The “Steering Cal - Center” screen states, “Position the planter steering wheels until they appear centered. Measure the length at each steering cylinder: base pin to rod pin. Adjust steering left/right until both cylinders have equal length. Pressing the Set button saves the new angle. Pressing the Skip button keeps the old angle.”

Follow the instructions in the “Steering Cal - Center” screen.

Visually position the wheels to the centered position using tractor hydraulics. Measure the distance between the inner edges of the rims to ensure they are at their closest point and nearly equal in distance from the forward edge of the rim **(A)** and rear edge of the rim **(B)**. The measuring device should be at a right angle to the rim edge.

Measure the length from base pin to rod pin at each steering cylinder.

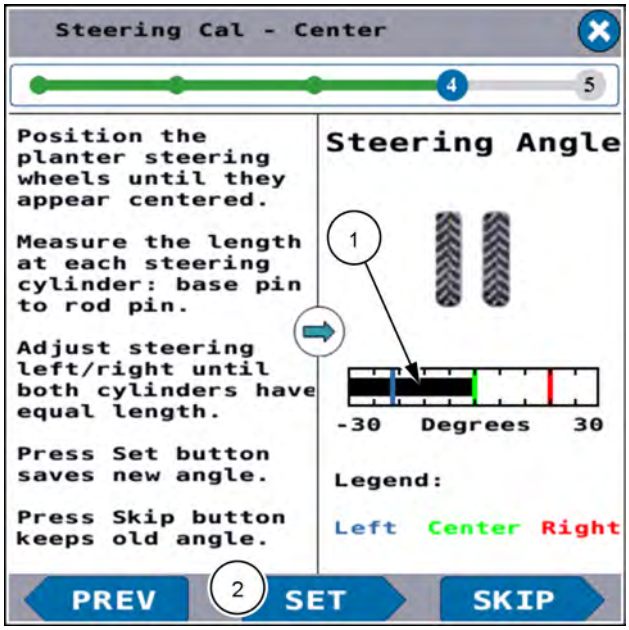
Adjust steering in either direction until both cylinders appear to have equal length.

NOTE: *Verify the position in field by measuring guess row spacing.*

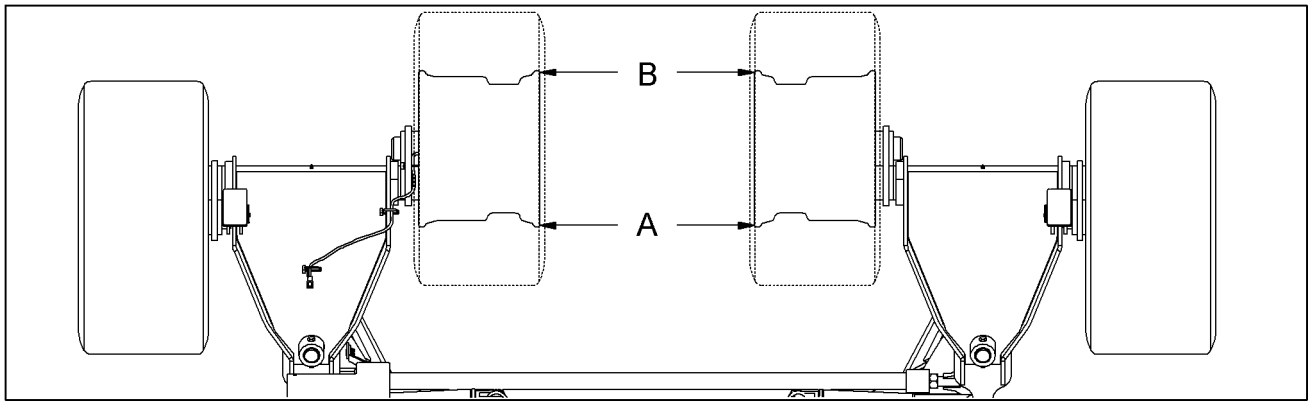
The bar graph level indicator **(1)** follows the position of the turn.

SET

Press the “Set” **(2)** button to continue the calibration.

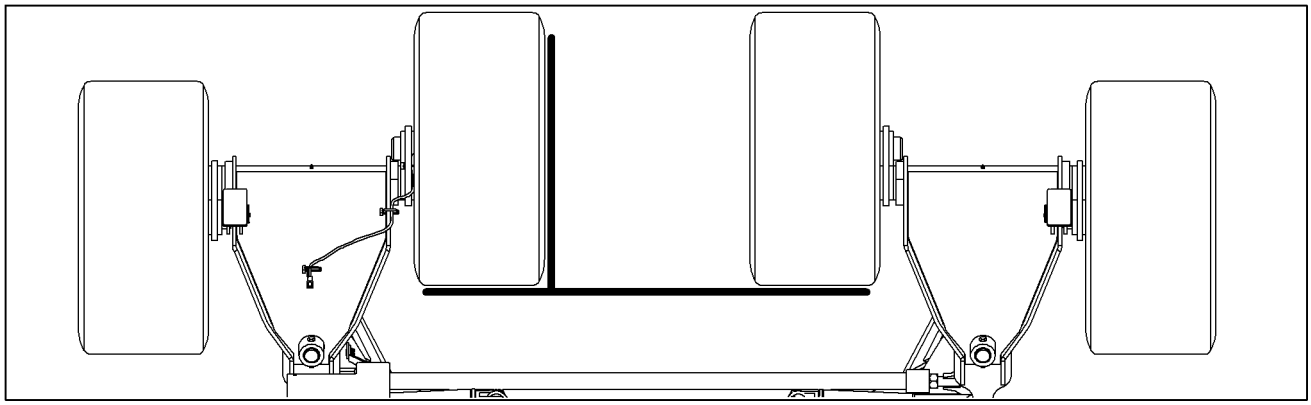


RAIL20PLM1562BA 7



409658C 8

NOTE: *An alternative measuring method is to use a T-square which can span the width between the inner carrier tires. Align the square with the inside edge of the rim and the rear surface of the tire and activate the steering system until the square contacts the opposite inner tire surface and then press "OK".*



409659C 9

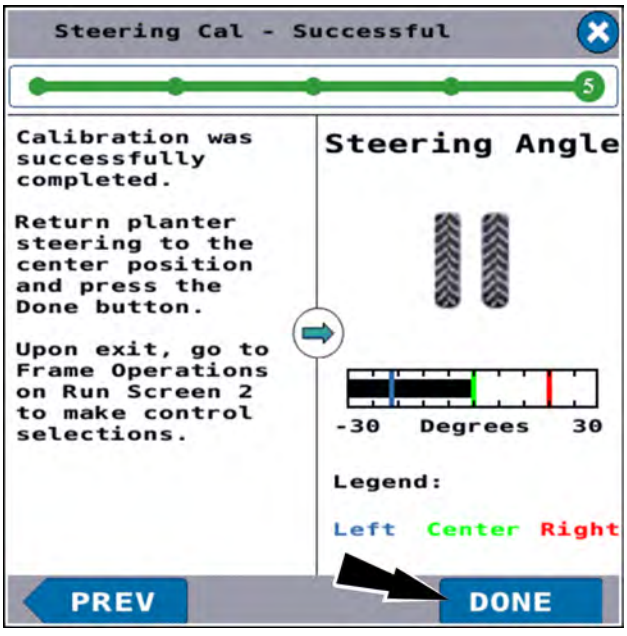
Calibration successful

The “Steering Cal - Successful” screen appears.

The “Steering Cal - Successful” screen states, “Calibration was successfully completed. Return the planter steering to the center position and press the “Done” button. Upon exit, go to Frame Operations on page 2 to make control selections.”

DONE

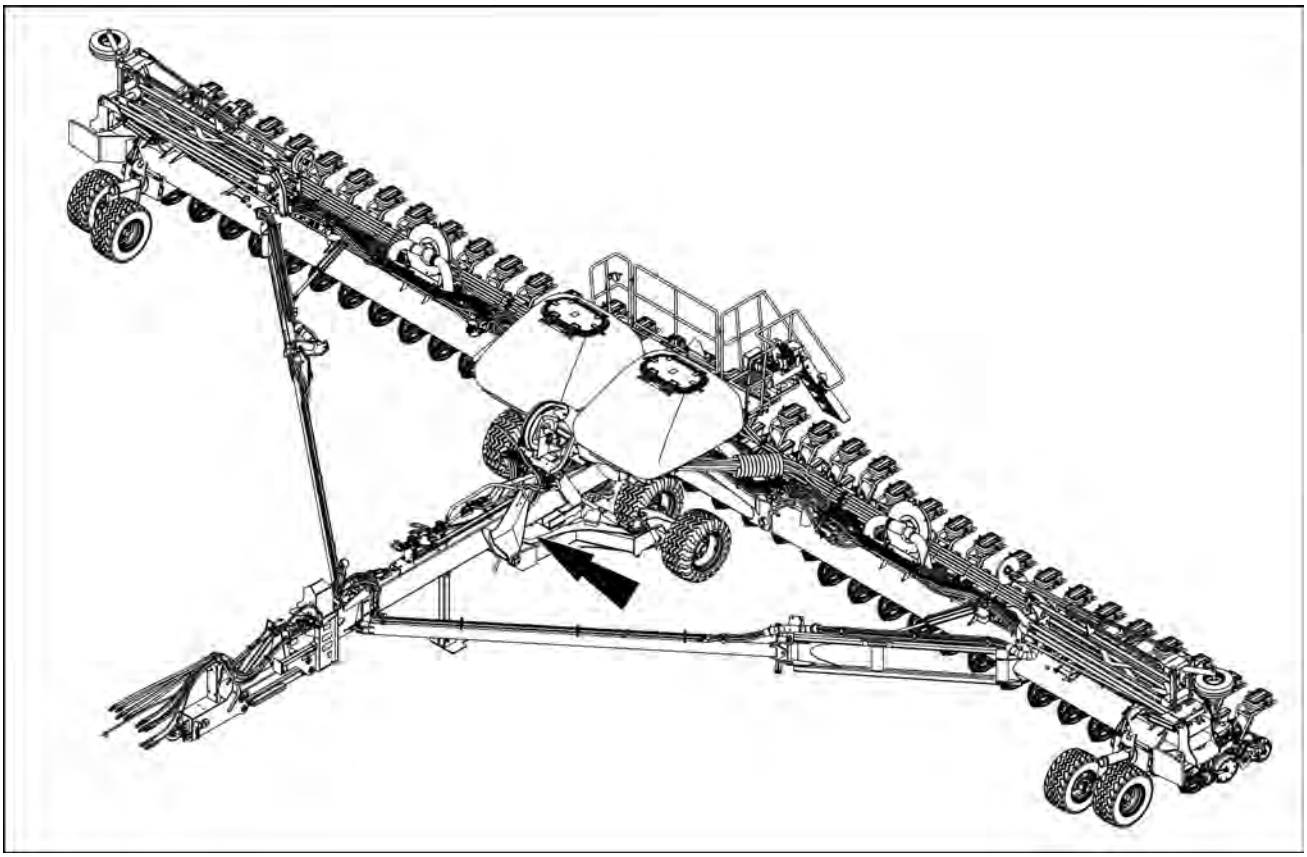
Press the “Done” button to close the “Steering Calibration” screen and return to the “Planter Calibration” screen.



RAIL20PLM1563BA 10

Carrier position sensor adjustment

In addition to the steering angle sensor, the planter is equipped with a carrier position sensor located on the left-hand side of the main carrier. To ensure a correct calibration, the carrier position sensor control arm must be set correctly.



SAVM16PLA0709FA 11

Carrier position sensor control arm location

Fully lower the planter.

In the “Signal Monitor” screen, select the “Steering Carrier Height” option. See “Signal Monitor screen” (**5-17**) for more information.

The axle position sensor voltage must remain between a minimum and maximum voltage range.

Acceptable voltage values:

Minimum (full right turn): Greater than **0.68 V**

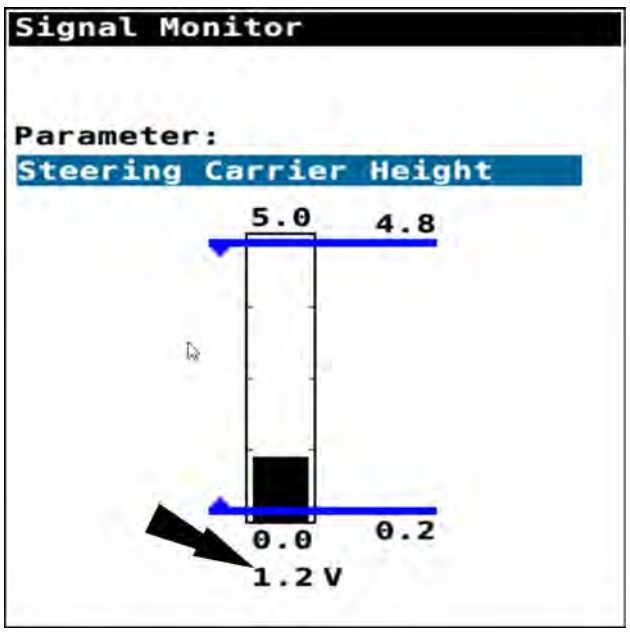
Maximum (full left turn): Less than **4.32 V**

With the planter fully lowered, verify the voltage value. The expected value is between **0.6 – 1.3 V**.

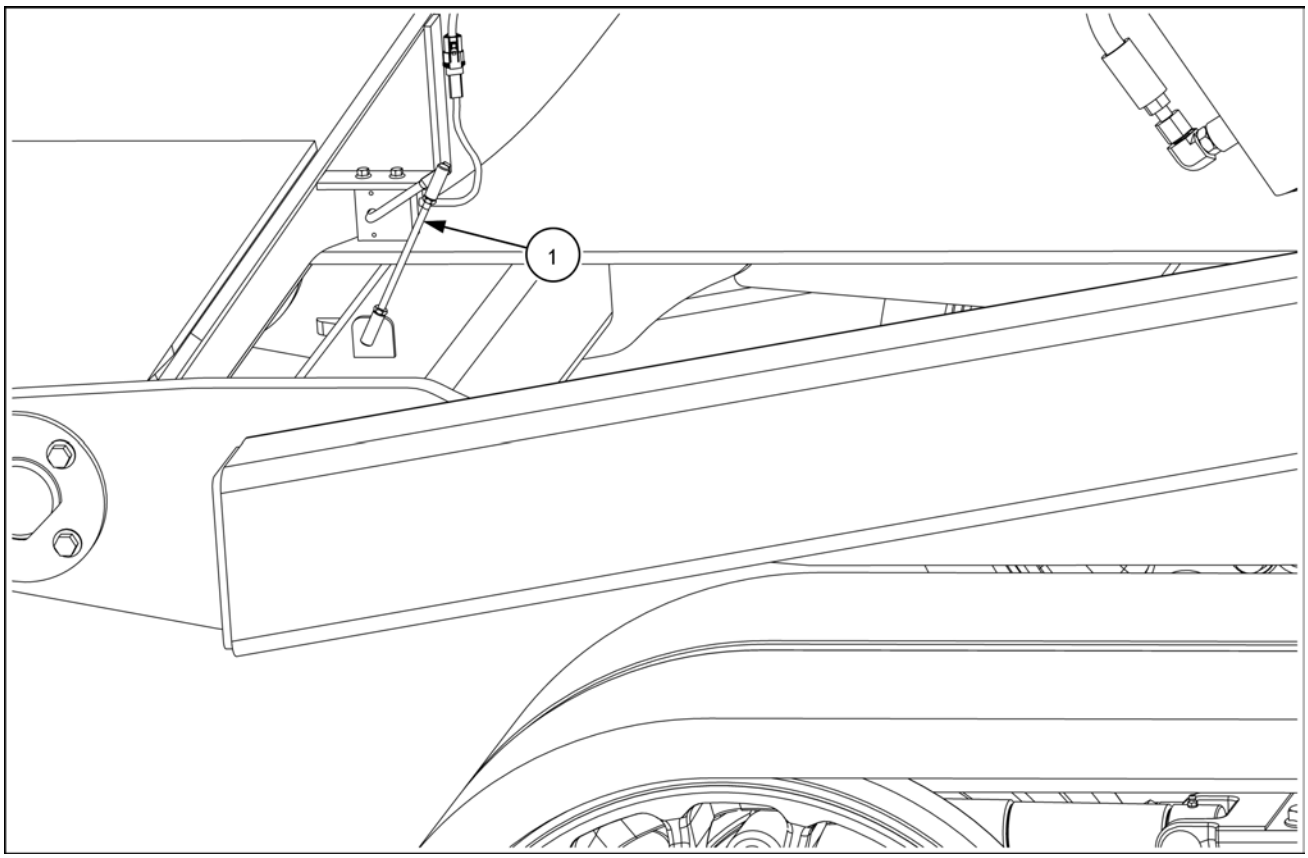
If the value is less than **0.6 V**, shorten the tie rod **(1)** between the carrier and the potentiometer arm.

If the value is greater than **1.3 V**, lengthen the tie rod **(1)** between the carrier and the potentiometer arm.

With the planter fully raised, verify the voltage value does not exceed **4.4 V**.



RAPH21PLM1542BA 12



SAVM17PLA0998FA 13

Tracks carrier option position sensor shown – Wheeled carrier option is similar

Distance calibration (planter wheel speed sensors)

Introduction

The values from a distance calibration are used for calculating speed, area, and application rates. Distance calibrations are recommended for the highest planting accuracy.

The closer actual planting conditions are duplicated when performing the calibration(s), the more reliable the results will be. To get the best results from the procedure:

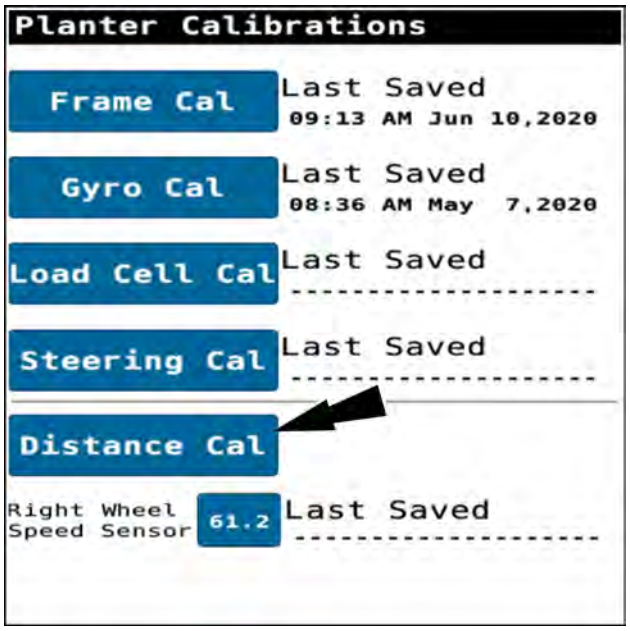
- The planter must be leveled and lowered to the ground in planting position.
- Planter hoppers and tanks should be one-half full to average the fill level for seed hoppers, granular chemical hoppers, and liquid fertilizer tanks, if equipped.
- Planter and tractor tires must be inflated to the proper pressure.
- Calibration must be performed in the field in soil and conditions like those to be planted (e.g.,No-til, Min-til).
- Row unit planting depth and spring pressure setup must be complete.
- Fertilizer openers/coulters and any tillage attachments, if equipped, should be installed and adjusted to the intended operating depth.

Perform a distance calibration:

- When the planter is first set up.
- At the beginning of the season.
- Whenever planting in markedly different soil conditions.
- Whenever planter attachments or row unit setup changes greatly.

Calibration procedure

In the “Planter Calibrations” screen, press the “Distance Cal” button.



RAIL20PLM1551BA 1

NOTE: *The left wheel values and calibration controls do not appear if there is no left wheel speed sensor installed.*

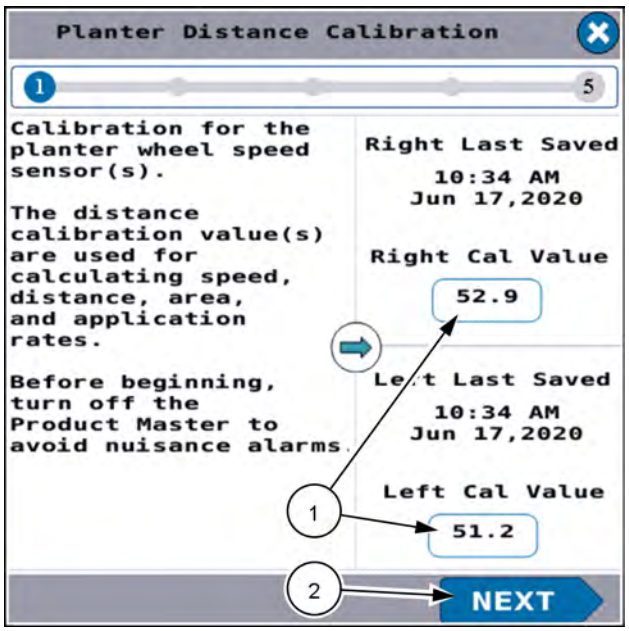
The “Planter Distance Calibration” screen appears showing step 1.

The “Planter Distance Calibration” screen states, “Calibration for the planter wheel speed sensor(s).The distance calibration values (s) are used for calculating speed, distance, area, and application rates. Before beginning, turn off the Product Master to avoid nuisance alarms.”

The “Right Cal Value” and “Left Cal Value” areas **(1)** give the last saved value. The time and date the values were saved also appear.

Follow the instructions in the screen.

Press the “Next” **(2)** button to begin the calibration.



RAIL20PLM1564BA 2

The “Planter Distance Calibration” screen appears showing step 2.

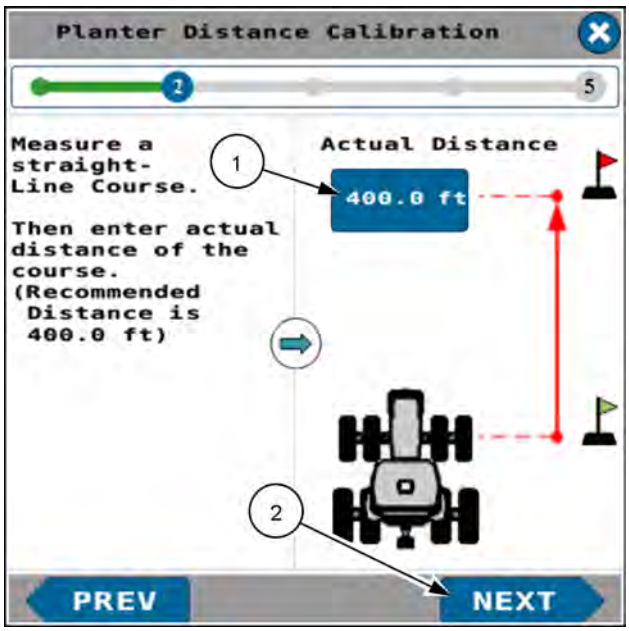
The “Planter Distance Calibration” screen states, “Measure a straight-line course. Then enter the actual distance of the course. (The recommended distance is **121.9 m** (**400.0 ft**)

Follow the instructions in the screen.

Press the “Actual Distance” **(1)** button to open in input screen.

Enter the measured distance you will drive for the calibration.

Press the “Next” **(2)** button to continue the calibration.



RAIL20PLM1565BA 3

The “Planter Distance Calibration” screen appears showing step 3.

The “Planter Distance Calibration” states, “Press the Start button. Drive the course as accurately as possible. Press the Stop button at the end of the course.”

Follow the instructions in the screen.

Press the “Start” button to continue the calibration.

Begin driving the vehicle along the measured course.

RAIL20PLM1566BA 4

The “Right Last Saved” and “Left Last Saved” areas **(1)** show the increasing driven distance.

NOTE: *The “Right Last Saved” and “Left Last Saved” areas* ***(1)*** *show the distance that was measured by vehicle, using the last calibration value in the distance calculation.*

NOTE: *You can stop the vehicle during the calibration and then press the “Stop”* ***(2)*** *button to cancel the calibration. The “Right Last Saved” and “Left Last Saved” values reset to zero.*

RAIL20PLM1567BA 5

When you have driven the measured distance, stop the vehicle.

Press the “Stop” button to record the new calibration values.

RAIL20PLM1568BA 6

The navigation buttons appear in the “Planter Distance Calibration” screen.

Press the “Next” button to proceed to the next step.

RAIL20PLM1569BA 7

The “Planter Distance Calibration” screen appears showing step 4.

NOTE: *The calibration values are a factor the software uses in distance calculations to compensate for any inaccuracy in distance data from the speed sensor(s).*

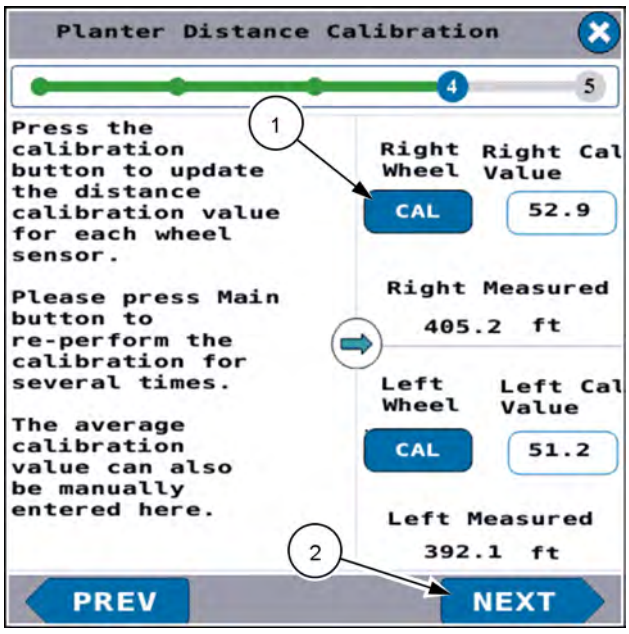
The “Planter Distance Calibration” screen states, “Press the calibration button to update the distance calibration value for each wheel sensor. Press the Main button to re-perform the calibration several times. The average calibration value can also be manually entered here.”

NOTE: *You can perform the distance calibration more than once. Each time you perform a satisfactory distance calibration, record the calibration values in step 4. Then manually enter the average of the calibration values in the “Planter Calibrations” screen.*

Press a “Cal” button **(1)** to update the calibration value in the software.

NOTE: *No popup window or other indication of the update appears.*

Press the “Next” button **(2)**.



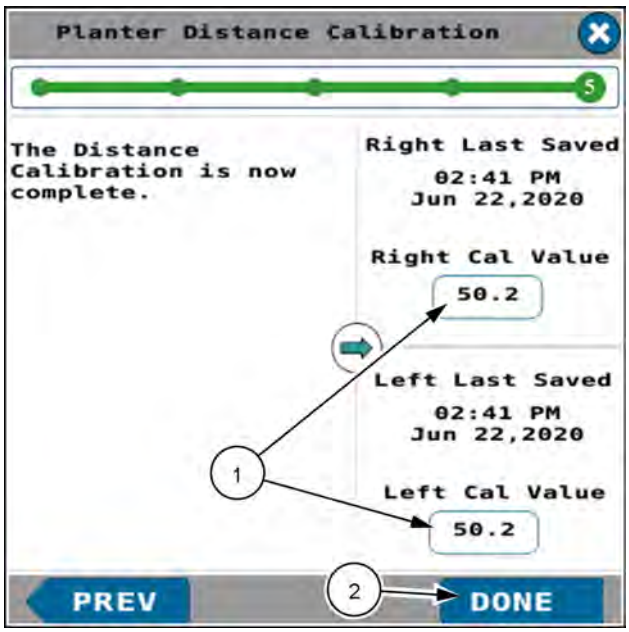
RAIL20PLM1570BA 8

The “Planter Distance Calibration” screen appears showing step 5.

The “Planter Distance Calibration” screen states, “The Distance Calibration is now complete.”

The screen gives the new recorded calibration values **(1)**.

Press the “Done” **(2)** button to exit the distance calibration procedure and return to the “Planter Calibration” screen.



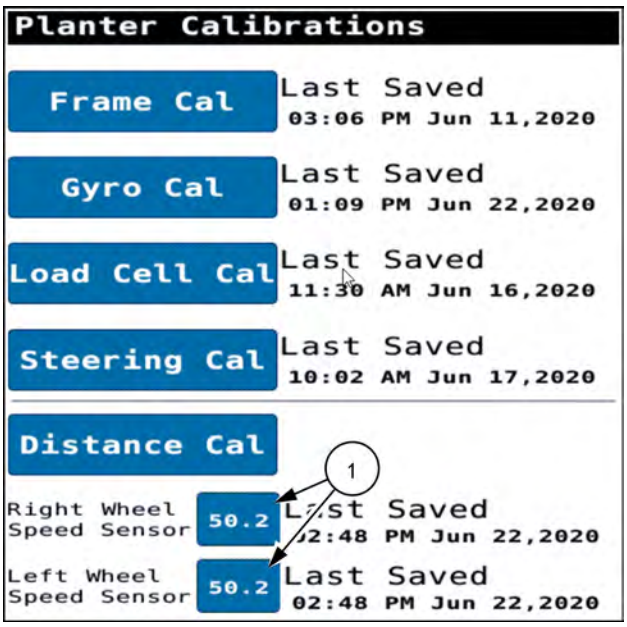
RAIL20PLM1571BA 9

Manually enter an average value

You can manually enter distance calibration values in the “Planter Calibrations” screen.

Perform two or more distance calibrations. Record the calibration numbers. Then calculate the average for each sensor.

In the “Planter Calibrations” screen press a sensor button **(1)** to open an editing popup. Use the popup to enter the average you calculated in the previous steps.



RAIL20PLM1572BA 10

WORK CONDITION SETUP

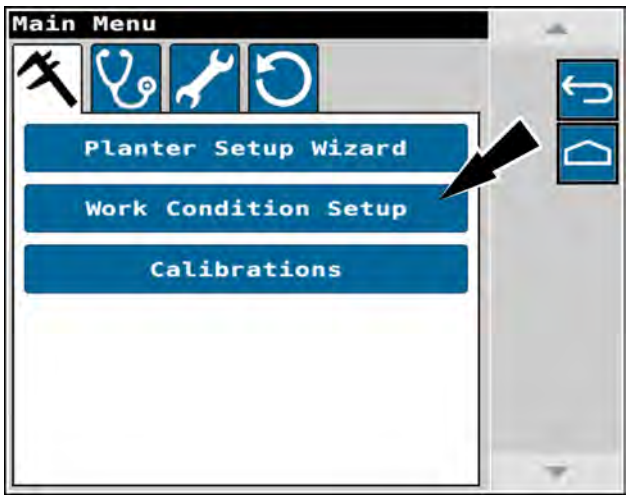
"Work Condition Setup" screen

NOTE: *You can leave the rates in the Universal Terminal (UT) application at zero in the "Work Condition Setup" screen. In this case you configure work conditions in the "Work Condition" card in the setup menu of the display. However if you turn the Task Controller (TC) application OFF, or if you connect to another tractor that does not have TC, you do not have the default rates. The rates you configure in the "Work Condition Setup" screen stay with the planter. Because of this, it is a good practice to configure at least one rate in the "Work Condition Setup" screens in the UT application.*

NOTE: *You can also use the setup wizard to configure work conditions. See "Planter setup wizard" (**3-8**) for more information about the setup wizard.*

Press the "main menu" button on the home screen.

From the wizard tab, select "Work Condition Setup".



RAPH23PLM1007BA 1

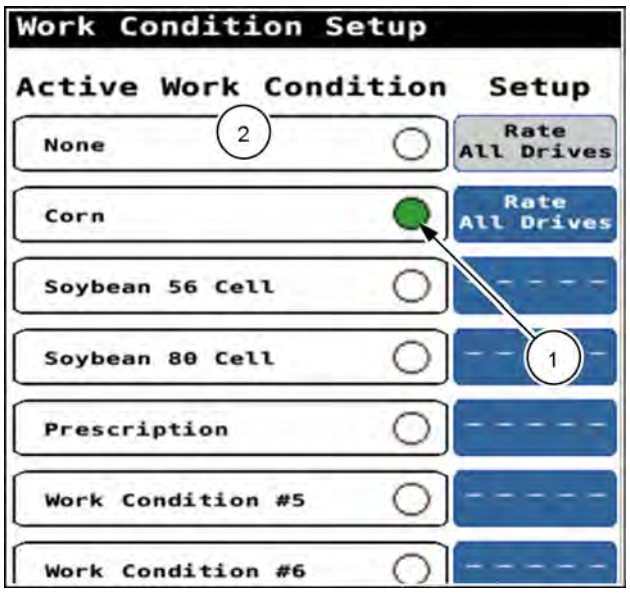
Select a work condition

The "Work Condition Setup" screen appears.

The current work condition has a green indicator **(1)**.

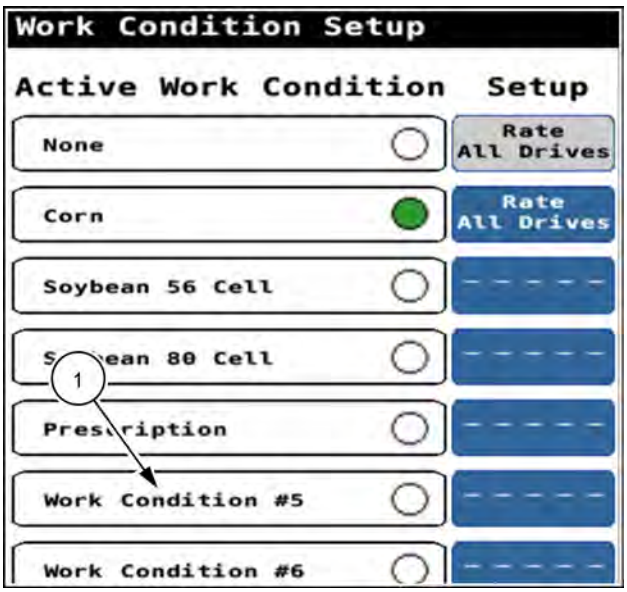
You can select the "None" item **(2)** if you do not wish to use a planter work condition in the UT application.

NOTE: *The "None" item cannot be edited.*



RAPH22PLM0865BA 2

Press a work condition menu item **(1)** to select the work condition.

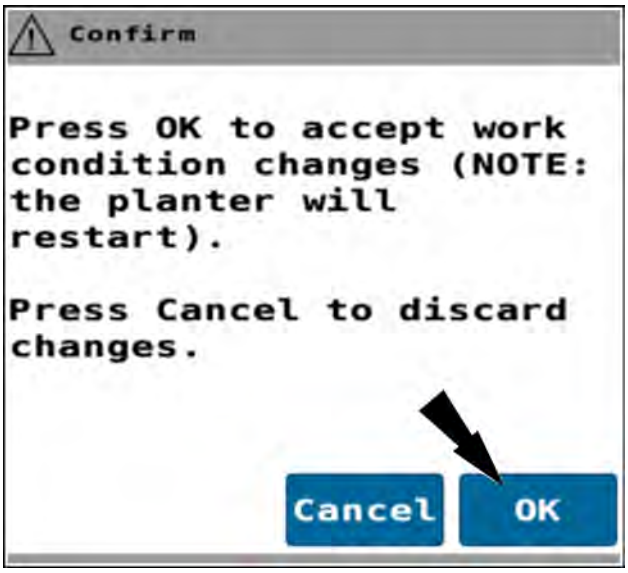


RAPH22PLM0865BA 3

If you change the current work condition, a “Confirm” window appears.

The “Confirm” window states, “Press OK to accept work condition changes (NOTE: the planter will restart). Press Cancel to discard changes.”

Press the “OK” button to confirm the work condition selection.

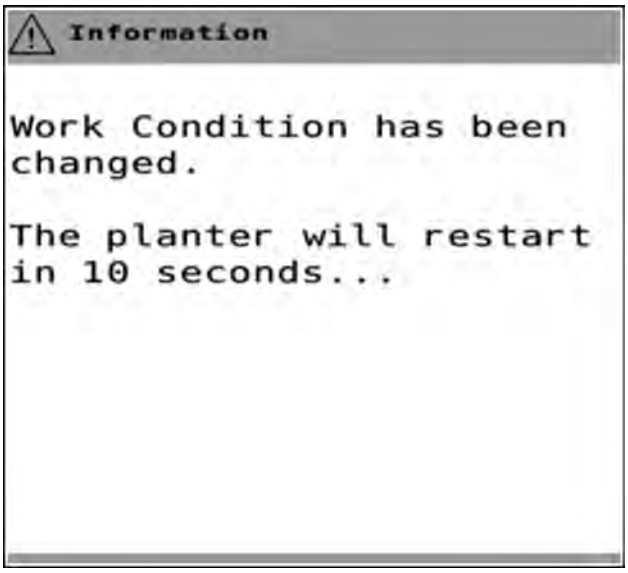


RAPH22PLM0866BA 4

An advisory message appears.

The advisory message states, “Work condition has been changed. The planter will restart in 10 seconds...”

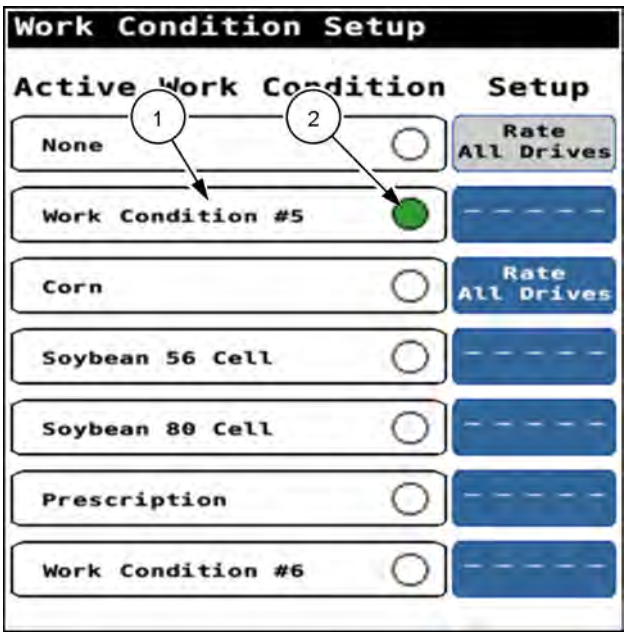
Allow the process to continue. The object pool clears and then reloads.



RAPH22PLM0867BA 5

Return to the “Work Condition Setup” screen according to the instructions given above.

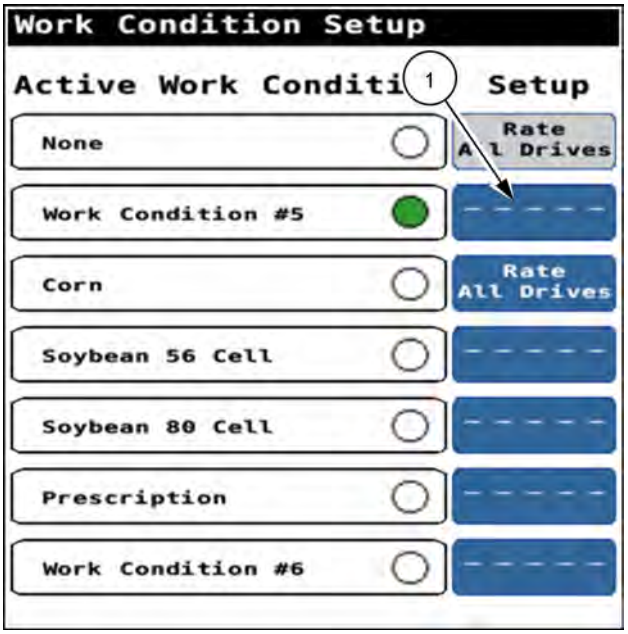
The selected work condition **(1)** appears second in the “Active Work Condition” column with a green indicator **(2)**.



RAPH22PLM0868BA 6

Setup

Press the setup button **(1)** for a work condition to review or modify the configurations.



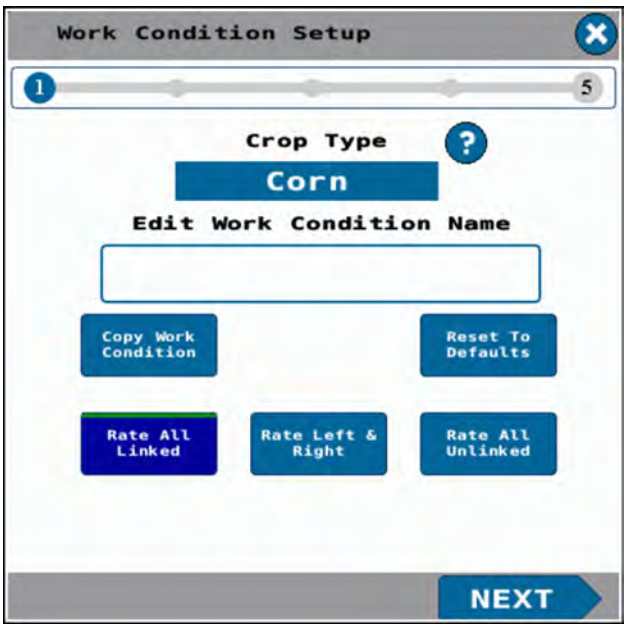
RAPH22PLM0868BA 7

The “Work Condition Setup” screen appears.

NOTE: *The number of steps that appear in the progress bar across the top of the screen depend upon your planter configuration.*

The following actions are available:

- View or change the crop type.
- Edit the work condition name.
- Copy the work condition parameters for use in another work condition.
- Reset the parameters to the default settings.
- Configure the rates for all of the planter drives.
- Select rates for each side of the planter.
- Select rates for each drive of the planter.



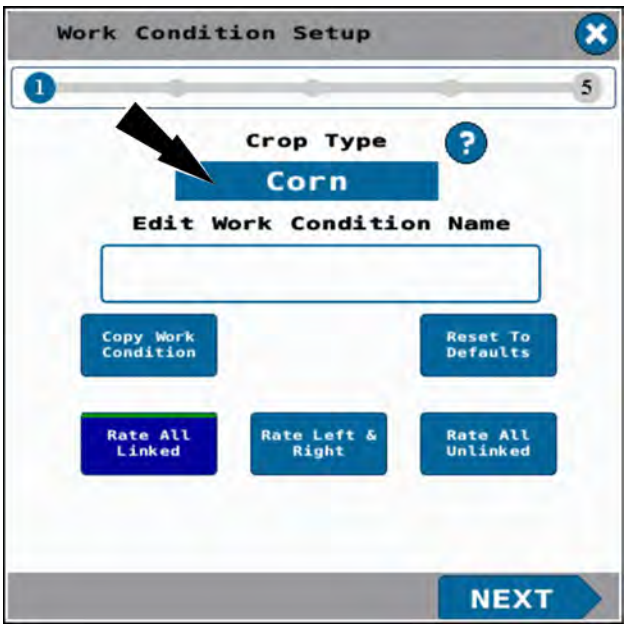
NHPH25PLM0519BA 8

Change the crop type

NOTE: *The “Crop Type” is only displayed in planters that are equipped with a speed belt.*

The current crop type is displayed in the “Crop Type” window.

Press the “Crop Type” window to change the crop type, if necessary.

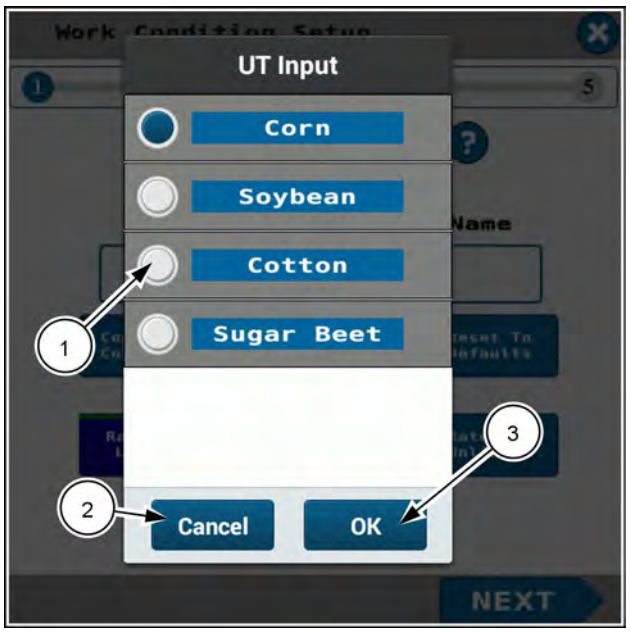


NHPH25PLM0519BA 9

Press the radial button **(1)** to select the correct crop type.

Press the “Cancel” button **(2)** at any time to return to the previous screen.

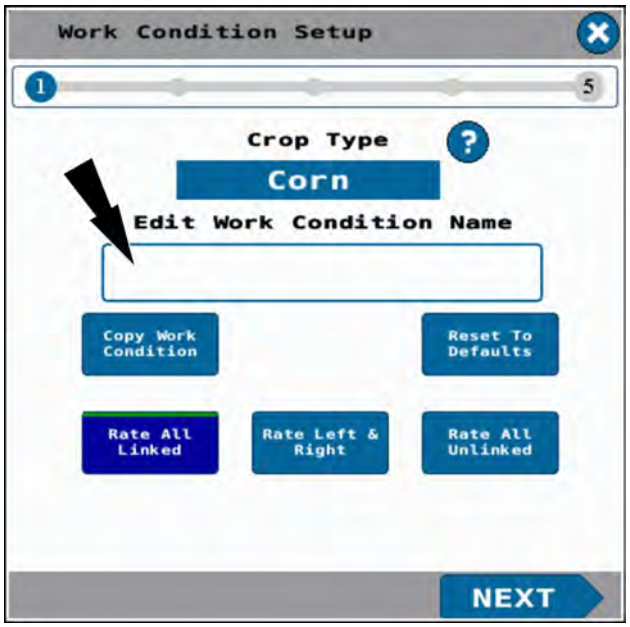
Press the “OK” button **(3)** to accept the selected crop type and exit.



NHPH25PLM0522BA 10

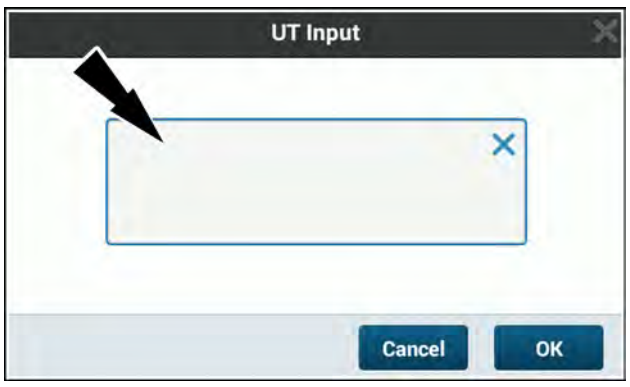
Edit the work condition name

Press the name field. An editing window appears.



NHPH25PLM0519BA 11

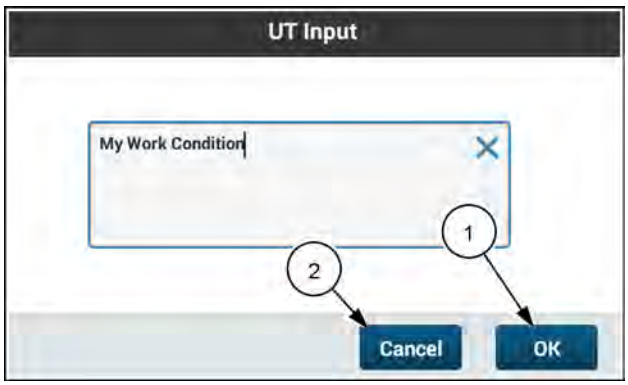
Press the editing field. Use the keypad to enter the desired name.



NHPH25PLM0013AA 12

Press the “OK” button **(1)** to accept your changes.

Press the “Cancel” button **(2)** to discard your changes and return to the “Work Condition Seed Control” screen.

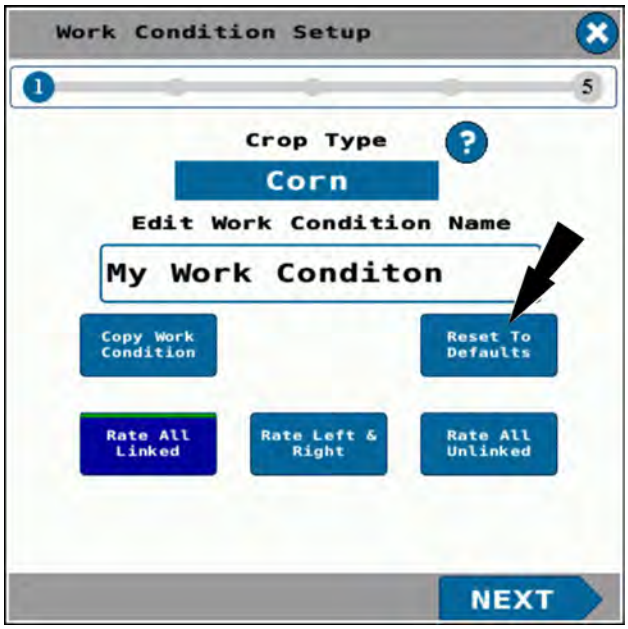


RAIL20PLM1116AA 13

Reset to defaults

The software provides default values. You can reset all of the parameters in a work condition to the default values, including the name.

Press the “Reset To Defaults” button.

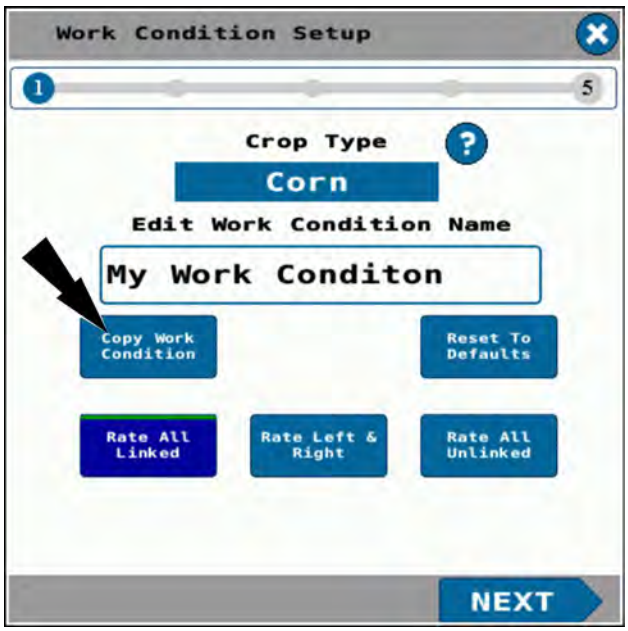


NHPH25PLM0520BA 14

Copy a work condition

You can make new work conditions by copying existing work conditions. This makes new work conditions with the parameters of the selected work condition. You can then modify the parameters of the new work conditions as needed for your operation.

Press the “Copy Work Condition” button.

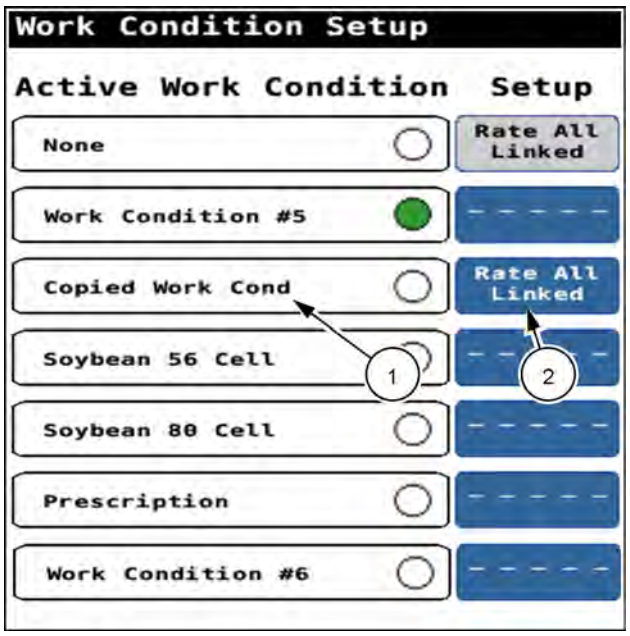


NHPH25PLM0520BA 15

A new work condition **(1)** appears in the “Work Condition Setup” screen. The new work condition has a rate button **(2)** in the “Setup” column with the same rate selection as the copied work condition.

Additional copies **(1)** of your work condition appear in the “Active Work Condition” column each time you press the “Copy Work Condition” button. The default name of copies is, “Copied Work Condition.”

If needed, press the “Rate” button **(2)** in the “Setup” column to begin modifying the parameters of the new work condition as needed for your operation.



RAPH23PLM1036BA 16

Drive selection

You can use the “Work Condition Setup” screens to configure rates.

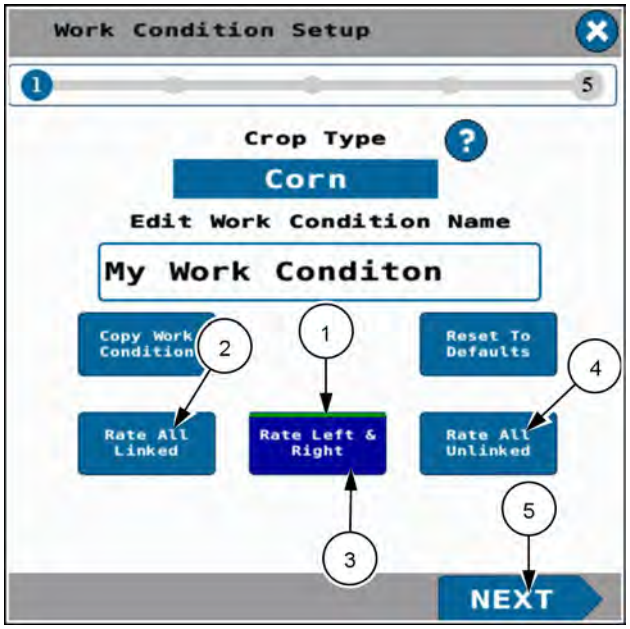
The “Work Condition Setup” screen provides the drive selections listed here. A green indicator **(1)** appears on the currently configured drive selection.

- All drives **(2)**
- Per side **(3)**
- Per drive **(4)**

Press the desired drive selection button. The green indicator moves to the selected drive selection button.

NOTE: *Make sure the drive selection setting is the same as the task controller setting in your display if one exists. Otherwise problems can occur with prescriptions not controlling correctly.*

Press the “Next” button **(5)**.



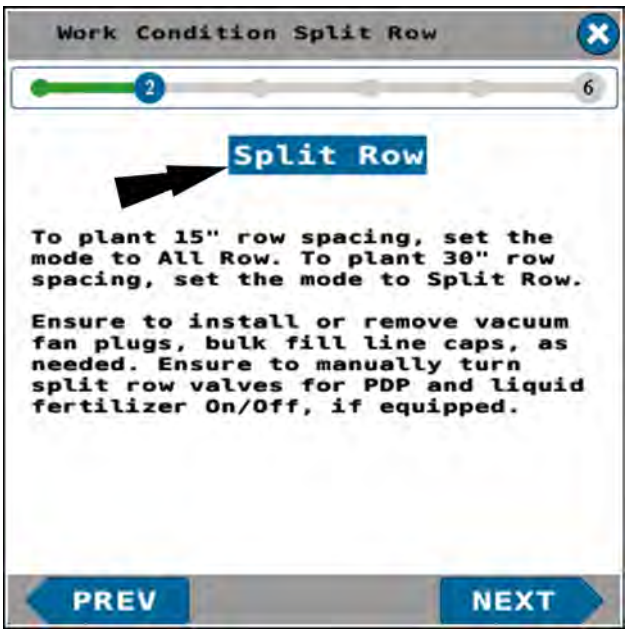
NHPH25PLM0521BA 17

Split row selection

If your planter supports split rows, the “Work Condition Split Row” screen appears.

Review the information in the “Work Condition Split Row” screen and follow the onscreen instructions.

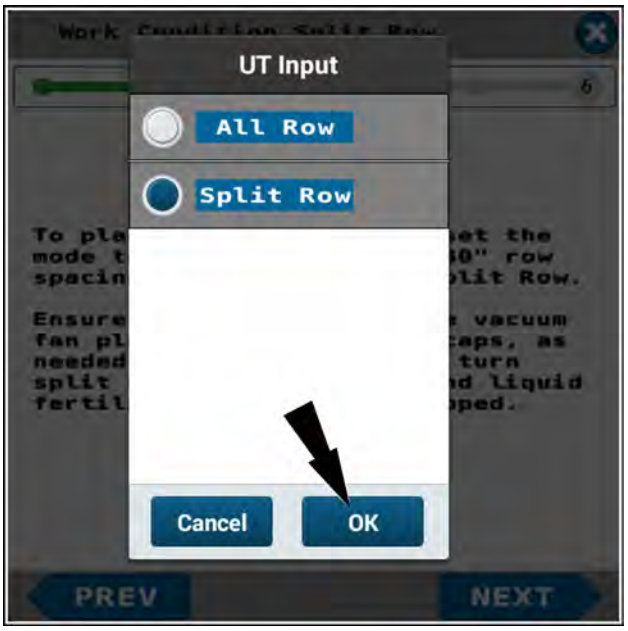
Press the selection button to configure the split row planter for all rows or split rows.



RAPH23PLM1039BA 18

In planters that support split row operation, select from the given options in the menu.

Press the next button in the “Work Condition Split Row” screen to advance to the next step in the wizard.



RAPH23PLM1038BA 19

Work condition row disable

NOTE: *If your planter supports split rows and split row capability is active, the even-numbered rows are locked to the disabled state by the system. The split row setup procedure above automatically adjusts this screen.*

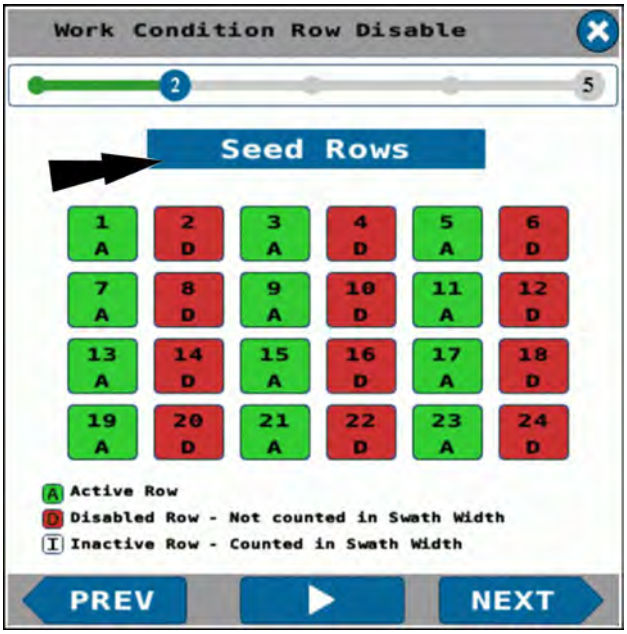
The “Work Condition Row Disable” screen appears.

You can disable individual rows.

Disabled rows are not counted by the software as part of the swath width.

Inactive rows are counted by the software as part of the swath width.

Press the “Seed Rows” button to open the menu.



NHPH24PLM1178AA 20

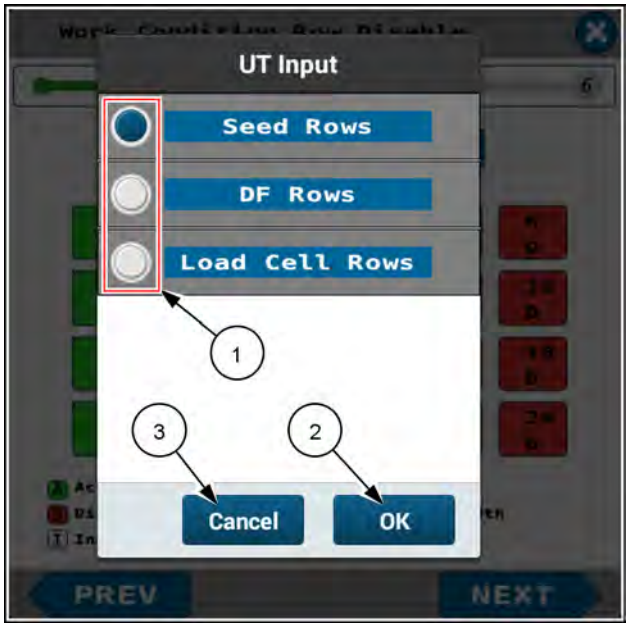
The drop-down menu provides the following options:

- Seed rows
- Down force rows
- Load cell rows

Press a radio button **(1)** to choose a menu item.

Press the “OK” button **(2)** to accept your changes.

Press the “Cancel” button **(3)** to discard your changes and return to the “Work Condition Seed Control” screen.



RAPH23PLM1041BA 21

The “Work Condition Row Disable” screen displays up to 24 rows. If your planter contains more than 24 rows, press the row navigation button **(1)** to display the remaining rows.

The buttons give the row number and the status.

The legend at the bottom of the screen provides information about the row statuses.

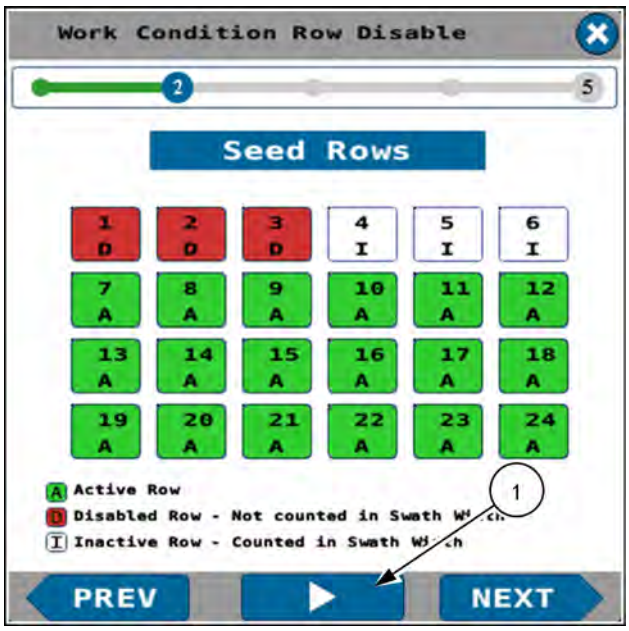
Press green active buttons for the rows you wish to make inactive. Green active buttons become white inactive buttons.

Press white inactive buttons for the rows you wish to disable. White inactive buttons become red disabled buttons.

NOTE: *Disabling a seed row also disables the same down force row. In the Down Force Rows screen you cannot modify the setting for a down force row that is disabled by a disabled seed row.*

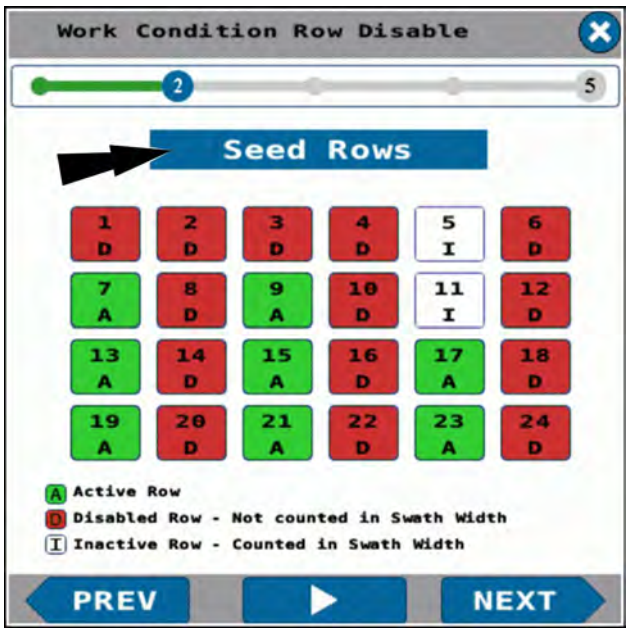
Press red disabled buttons for rows you wish to make active. Red disabled buttons become green active buttons.

NOTE: *Disabling rows in the “Work Condition Row Disable” screen also disables the corresponding rows in “Row Alarms” screen under “Customizable Settings.”*

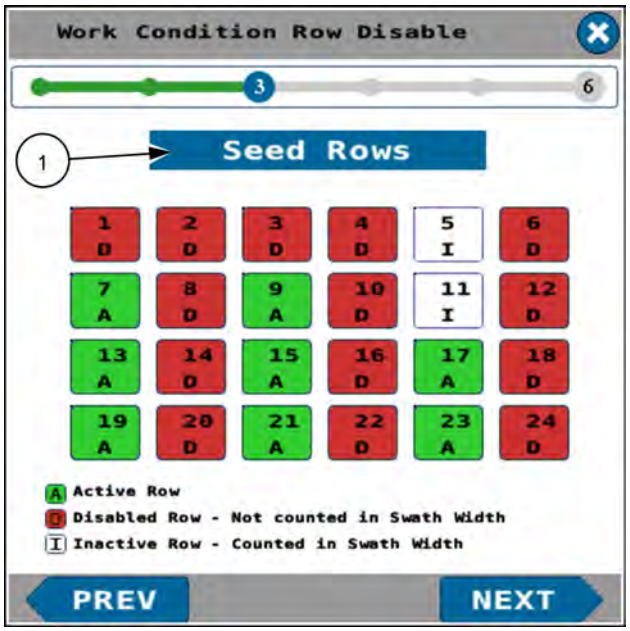


NHPH24PLM1172AA 22

When you have finished deactivating or disabling seed rows, press the selection button to view the settings in the down force rows and load cell rows as needed for your operation.



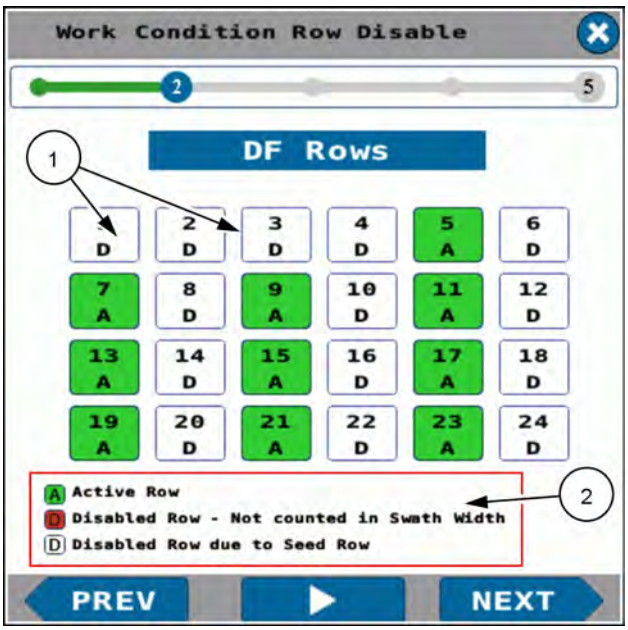
NHPH24PLM1179AA 23



RAPH23PLM1042BA 24

Down force rows that you disabled in the “Seed Rows” settings appear white **(1)** in the “Down Force Rows” screen. The white buttons are disabled. However you can change the down force rows settings for seed rows that are active or deactivated and not disabled due to split row status.

The legend **(2)** in the “Down Force Rows” screen explains the effects of row status.

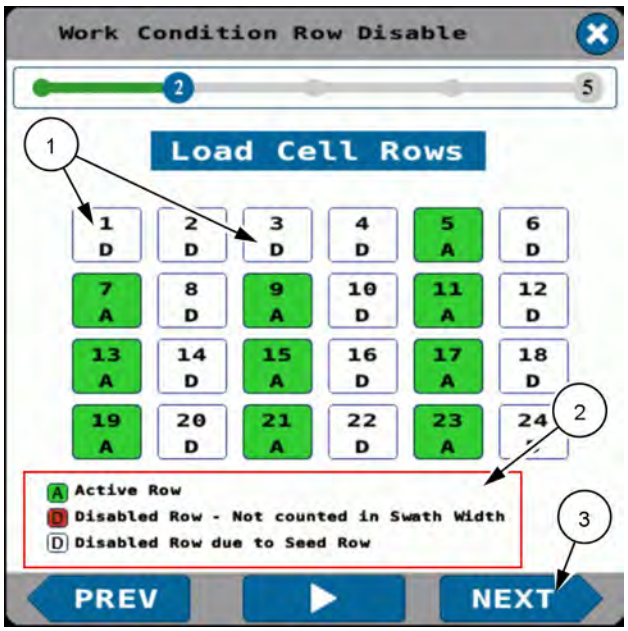


NHPH24PLM1180AA 25

Load Cell Rows that you disabled in the “Seed Rows” settings appear white **(1)** in the “Load Cell Rows” screen. The white buttons are disabled. However you can change the load cell rows settings for seed rows that are active or deactivated and not disabled due to split row status.

The legend **(2)** in the “Load Cell Rows” screen explains the effects of row status.

Press the “Next” button **(3)** to accept your selections and continue the procedure.



NHPH24PLM1181AA 26

Speed belt factor

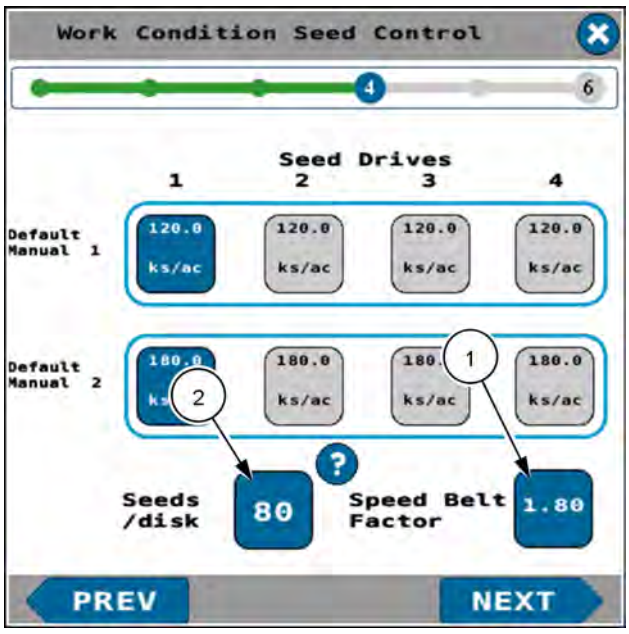
The “Speed Belt Factor” button **(1)** appears in the “Work Condition Seed Control” window for all drive configurations.

NOTE: *In planters that do not have a speed belt, the “Speed Belt Factor” button can appear. It is a calculated figure that does not affect planter operations.*

If the “Seeds/disk” setting **(2)** is less than 54, the “Speed Belt Factor” button is inactive. The system uses the default value of 1.50.

If the “Seeds/disk” setting is 54 or greater, the “Speed Belt Factor” button is active. The default value is 1.80. Press the “Speed Belt Factor” button if you wish to change the speed belt factor. The range allowed by the software is 1.20 - 2.54. Changes to the speed belt factor persist through key cycles.

NOTE: *Changes to the speed belt factor can result in significant changes to seed spacing. Only make adjustments to the speed belt factor if you are directed to do so by CASE IH service personnel.*

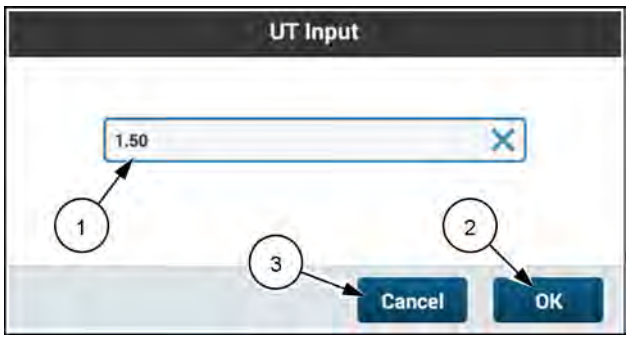


RAPH23PLM1047BA 27

Press the editing field **(1)** to open a keypad. Enter the desired value.

Press the “OK” button to **(2)** accept your changes.

Press the “Cancel” button **(3)** to discard your changes and return to the “Work Condition Seed Control” screen.

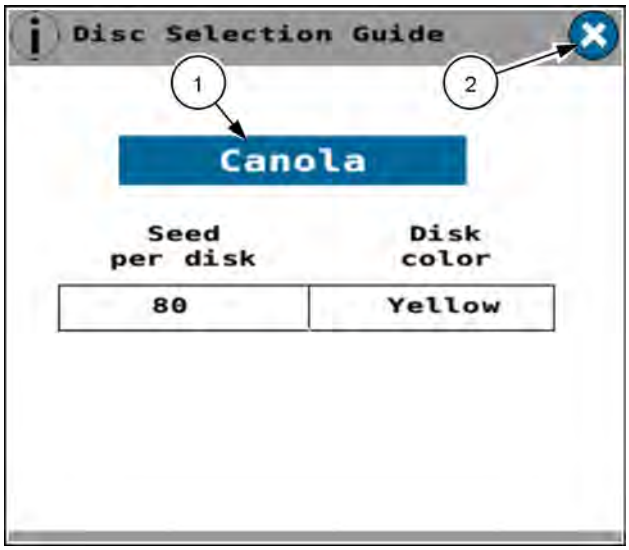


RAPH21PLM3094AA 28

If you pressed the help button in the “Seed Drives” screen, the “Disc Selection Guide” screen appears.

Press the seed type button **(1)** to see a menu from which you select your seed type to get the seeds/disk number.

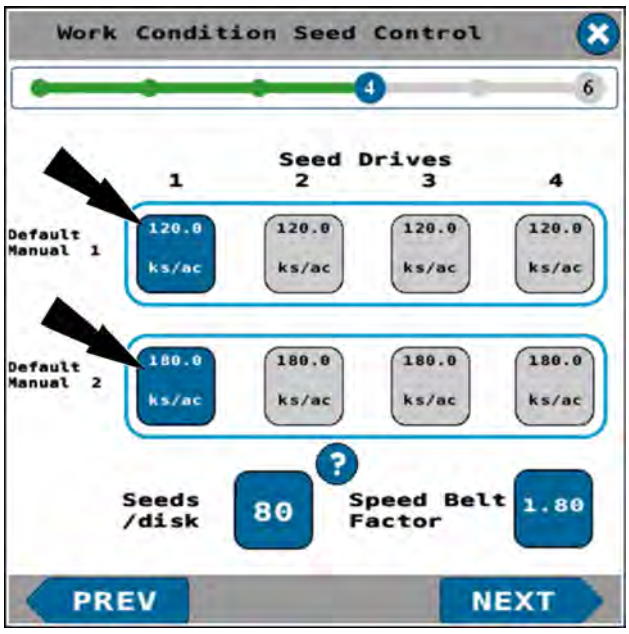
Press the close button **(2)** to close the “Disc Selection Guide” screen.



RAPH23PLM1020BA 29

Target seed rate for the entire planter

Press a drive button to configure a rate for that drive.

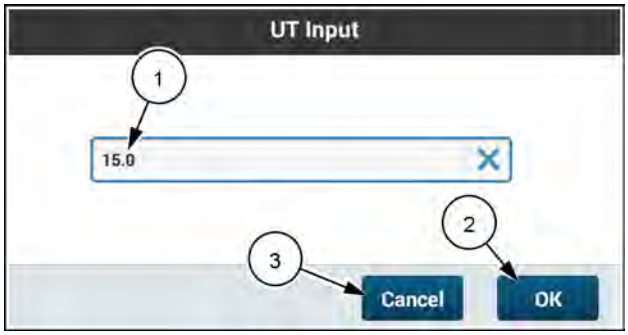


RAPH23PLM1047BA 30

Press the editing field **(1)** to open a keypad. Enter the desired rate.

Press the “OK” button to **(2)** accept your changes.

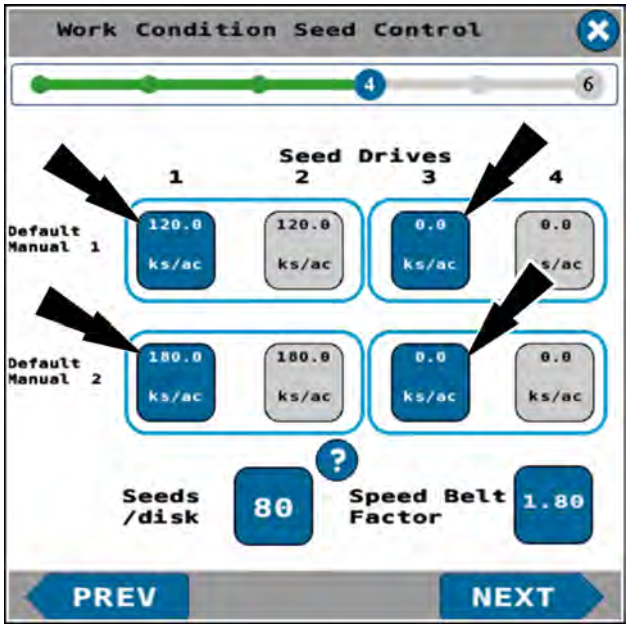
Press the “Cancel” button **(3)** to discard your changes and return to the “Work Condition Seed Control” screen.



RAIL20PLM1117AA 31

Seed rate per side

Press a drive button to configure a rate for that drive.

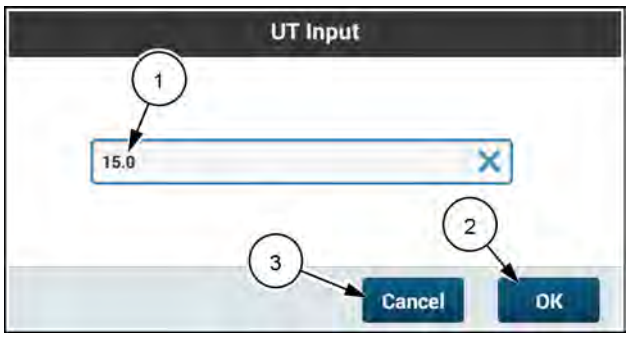


RAPH23PLM1048BA 32

Press the editing field **(1)** to open a keypad. Enter the desired rate.

Press the “OK” button to **(2)** accept your changes.

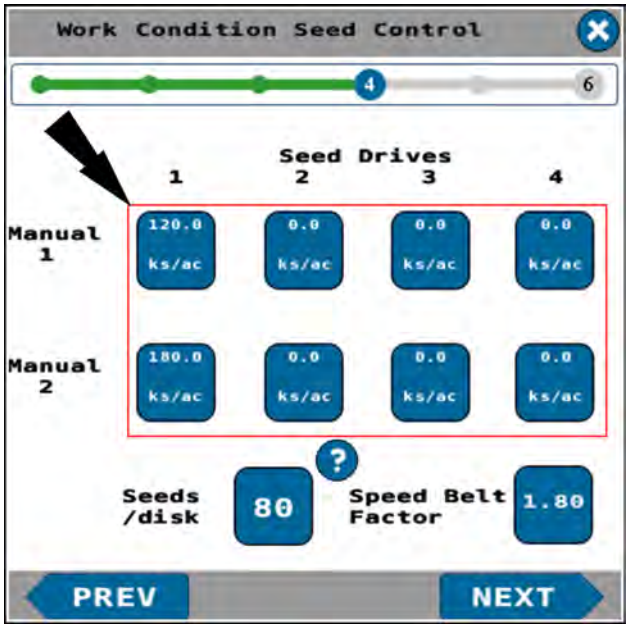
Press the “Cancel” button **(3)** to discard your changes and return to the “Work Condition Seed Control” screen.



RAIL20PLM1117AA 33

Seed rate per drive

Press a drive button to configure a rate for that drive.

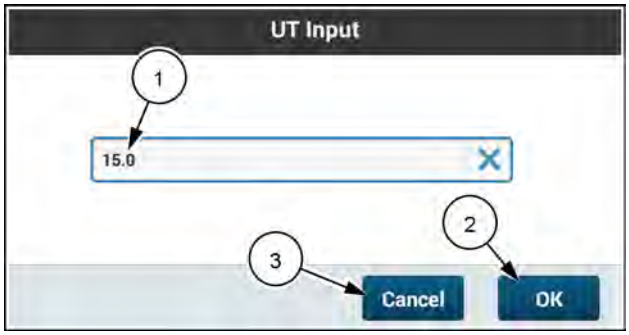


RAPH23PLM1049BA 34

Press the editing field **(1)** to open a keypad. Enter the desired rate.

Press the “OK” button to **(2)** accept your changes.

Press the “Cancel” button **(3)** to discard your changes and return to the “Work Condition Seed Control” screen.



RAIL20PLM1117AA 35

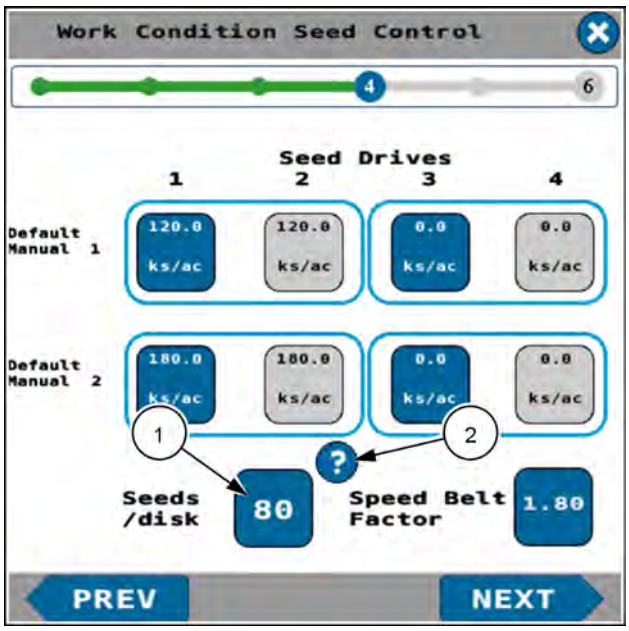
Seeds per disk

The currently configured seeds per disk appears in the “Seeds/disk” button **(1)**.

The help button **(2)** in the seed drives screen provides a disk selection guide for the “Seeds/disk” setting for common seed types. Specific operations may have different requirements.

NOTE: *The default for the “Corn” work condition is 27. The default for the “Soybeans 56” work condition is 56. The default for the “Soybeans 80” work condition is 80. The default for previously undefined work conditions is 0.*

Press the “Seeds/disk” button.



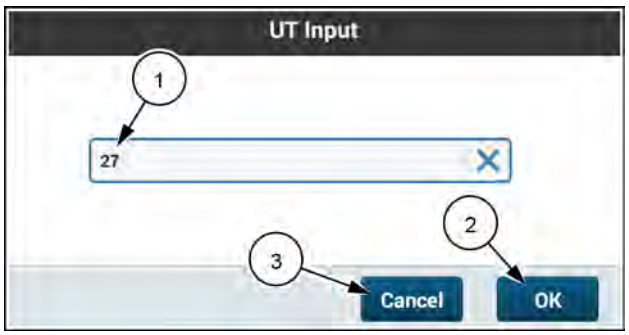
RAPH23PLM1048BA 36

A “UT Input” window appears.

Press the editing field **(1)** to open a keypad. Enter the seeds per disk.

Press the “OK” button **(2)** to accept your changes.

Press the “Cancel” button **(3)** to discard your changes and return to the “Work Condition Seed Control” screen.

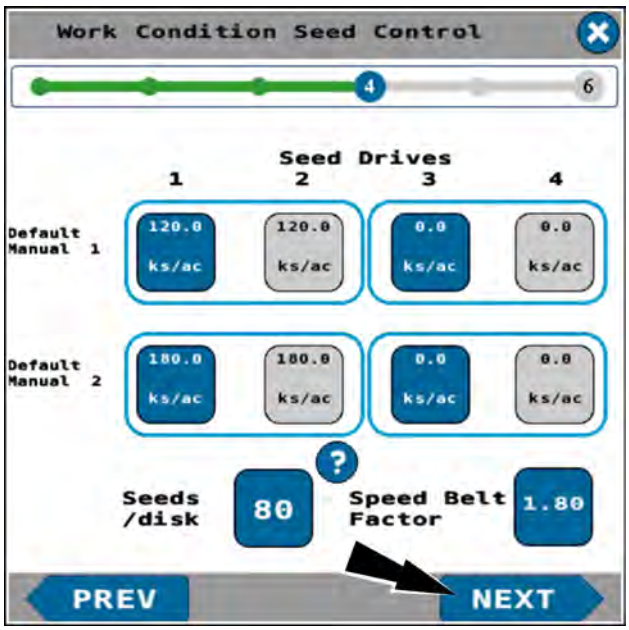


RAIL20PLM1120AA 37

The entries appear in the “Work Condition Seed Control” screen.

NOTE: *The entries given here are for illustration purposes only. Use settings that are correct for your operation.*

Press the “Next” button.



RAPH23PLM1048BA 38

Vacuum, bulk fill, and product delay

The “Work Condition Seed Control” screen appears.

You can configure the following parameters:

- Vacuum
- Bulk Fill
- Start product delay
- Stop product delay

NOTE: *The “Bulk Fill” parameter may not be present in some planters.*

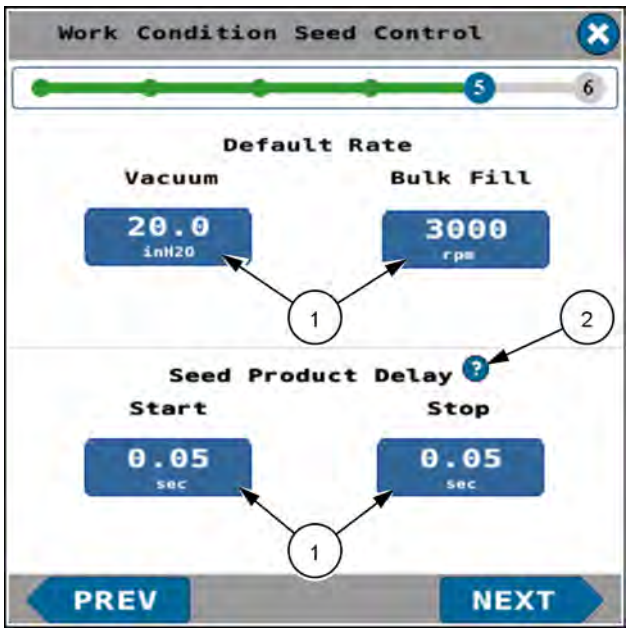
The current settings appear in the buttons **(1)**. Press the buttons as needed to configure the settings for your operation.

NOTE: *Record the units of measure in the buttons for the parameters you intend to change. These are the units of measure applicable to the entries you will make in the next step.*

Press the information icon **(2)** to see product delay information in a popup window.

The “Product Delay Setup” popup windows states, “Product Delay should only be modified in this screen. Modification in the Task Controller will permanently override this value. To reset product delay to planter software control see your Task Controller software guide.”

Press the “X” button **(3)** to close the information popup window.



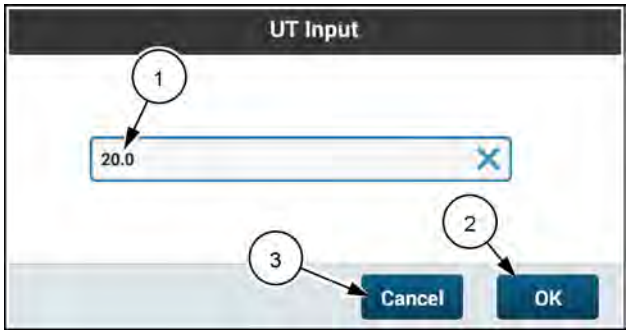
RAPH23PLM1050BA 39

RAPH21PLM2596BA 40

“UT Input” screens appear when you select these settings. Press the number **(1)** in a “UT Input” window to open a keypad. Enter the desired setting. Use the units of measure that appear in the buttons in the “Work Condition Seed Control” screen.

Press the “OK” button **(2)** to accept your changes.

Press the “Cancel” button **(3)** to discard your changes and return to the “Work Condition Seed Control” screen.

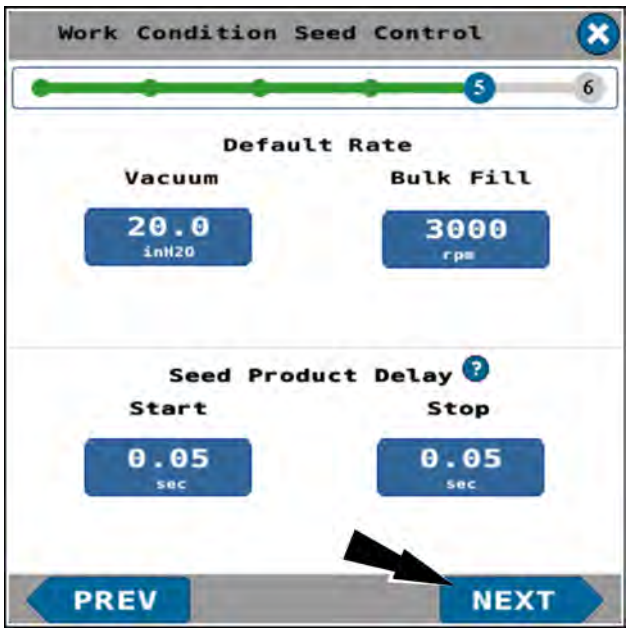


RAIL20PLM1118AA 41

The entries appear in the “Work Condition Seed Control” screen.

NOTE: *The entries given here are for illustration purposes only. Use settings that are correct for your operation.*

Press the “Next” button.



RAPH23PLM1050BA 42

Liquid control

If you have liquid control configured in the “Application Control” screens, a “Work Condition Liquid Control” screen appears.

You can configure the following entries:

- Default rate 1 **(1)**
- Default rate 2 **(2)**
- Start product delay **(3)**
- Stop product delay **(4)**
- Agitate % **(5)**

The “Cal Value” field **(6)** contains the flowmeter calibration number. It is either a default value or the value from the last calibration. See “Introduction: liquid fertilizer calibration” (**3-101**).

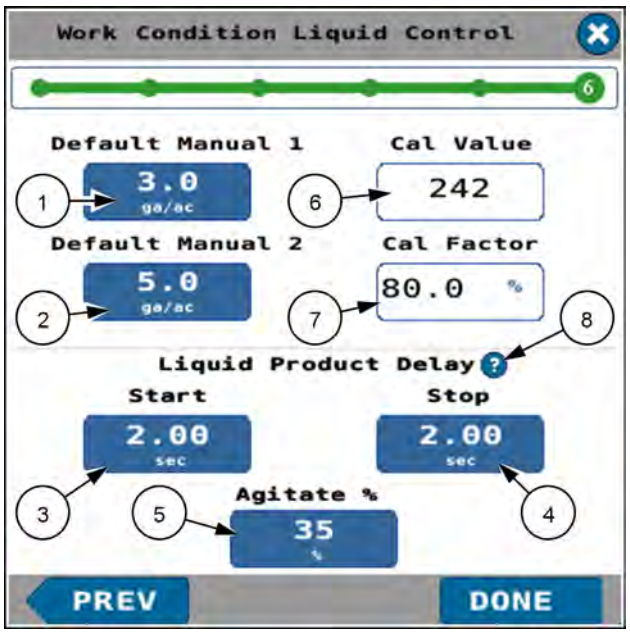
The “Cal Factor” field **(7)** gives the percentage by which the calibration is adjusted to get the true or desired rate of liquid disbursement. See “Introduction: liquid fertilizer calibration” (**3-101**).

See “Application rate control: liquid fertilizer” (**4-19**) for details on configuring liquid rate control.

Press the information icon **(8)** to see product delay information in a popup window.

The “Product Delay Setup” popup windows states, “Product Delay should only be modified in this screen. Modification in the Task Controller will permanently override this value. To reset product delay to planter software control see your Task Controller software guide.”

Press the “X” button **(9)** to close the information popup window.



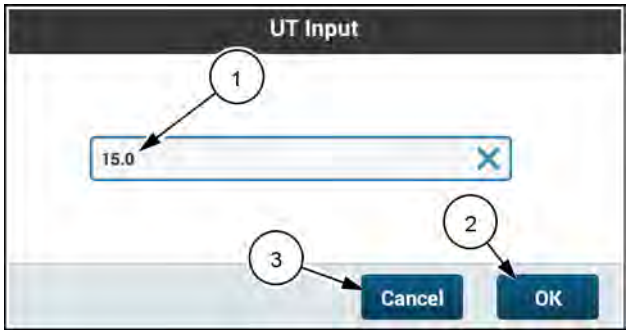
RAPH23PLM1051BA 43

RAPH21PLM2596BA 44

“UT Input” screens appear when you select these settings. Press the number **(1)** in a “UT Input” window to open a keypad. Enter the desired setting. Use the units of measure that appear in the buttons in the “Work Condition Liquid Control” screen.

Press “OK” button **(2)** to accept your changes.

Press the “Cancel” button **(3)** to discard your changes and return to the “Work Condition Liquid Control” screen.

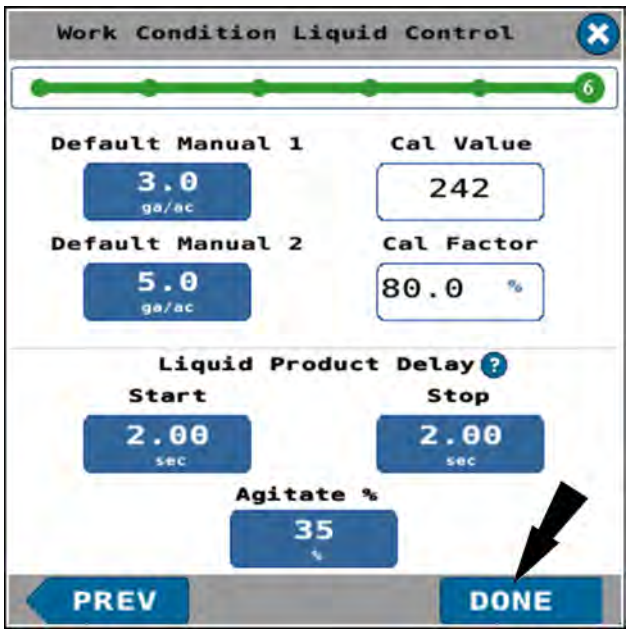


RAIL20PLM1119AA 45

The entries appear in the “Work Condition Liquid Control” screen.

NOTE: *The entries given here are for illustration purposes only. Use settings that are correct for your operation.*

Press the “Done” button to return to the work condition setup screen.



RAPH23PLM1051BA 46

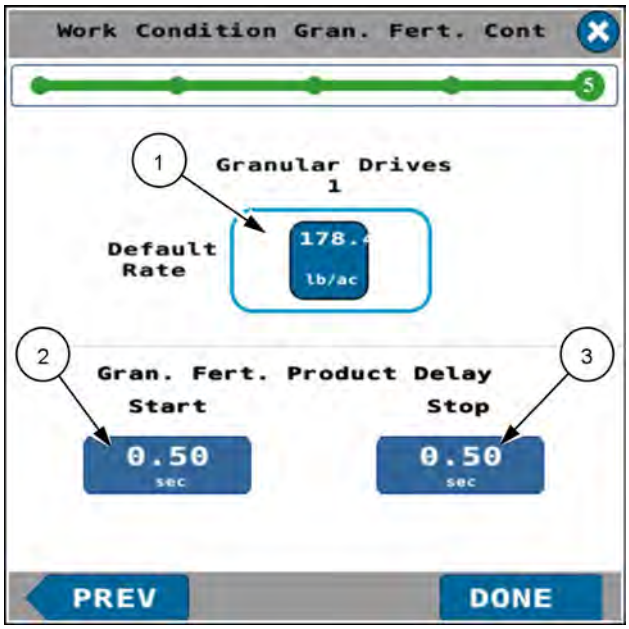
Granular control

If you have granular control configured in the “Application Control” screens, a “Work Condition Gran. Fert. Cont” screen appears.

You can configure the following entries:

- Default rate **(1)**
- Start product delay **(2)**
- Stop product delay **(3)**

See “Application rate control: granular fertilizer” (**4-24**) for details on configuring granular rate control.

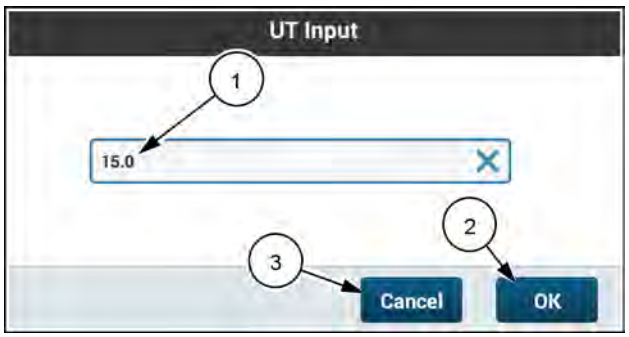


RAPH23PLM1260BA 47

“UT Input” screens appear when you select these settings. Press the number **(1)** in a “UT Input” window to open a keypad. Enter the desired setting. Use the units of measure that appear in the buttons in the “Work Condition Liquid Control” screen.

Press “OK” button **(2)** to accept your changes.

Press the “Cancel” button **(3)** to discard your changes and return to the “Work Condition Liquid Control” screen.

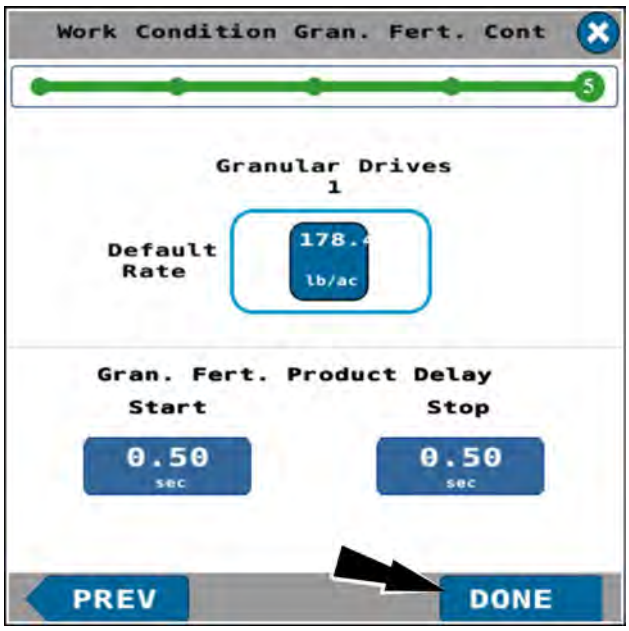


RAIL20PLM1119AA 48

The entries appear in the “Work Condition Gran. Fert. Cont” screen.

NOTE: *The entries given here are for illustration purposes only. Use settings that are correct for your operation.*

Press the “Done” button to return to the work condition setup screen.



RAPH23PLM1260BA 49

LIQUID CALIBRATION

Introduction: liquid fertilizer calibration

This chapter provides an overview of liquid fertilizer calibration, and explains how to perform the calibration and verify the calibration results.

The planter must be fully operational and equipped when you perform a product calibration. Set up the planter for field operations.

Perform the liquid calibration on all planter sections at the same time for accuracy. The procedure for each section must finish successfully to store a correct calibration value.

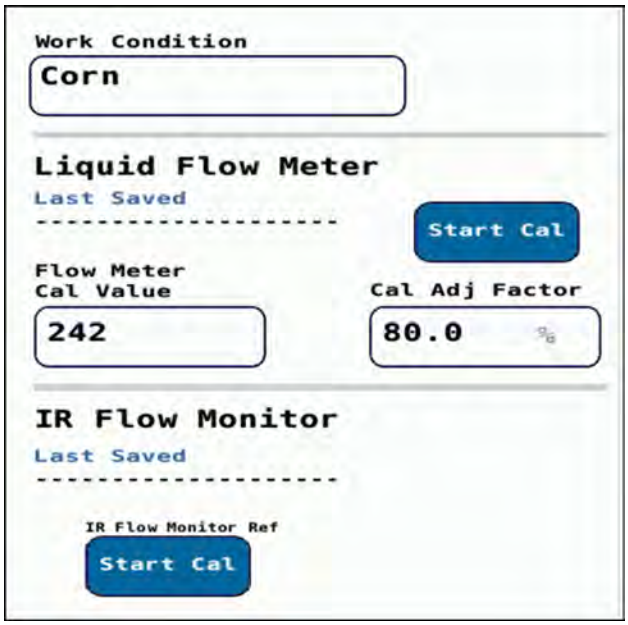
To ensure accuracy, enter default values, row width, and section row entries before attempting calibration.

The main reasons for performing liquid fertilizer calibration are to calibrate the controller software for maximum accuracy at your planting speed and to calibrate the flowmeter for the correct application rate.

The procedure also provides a means to check the physical planter setup for all applicators.

Perform liquid fertilizer calibration:

- When the planter is first setup.
- At the beginning of each season of use.
- When you replace a major fertilizer component – for example, hydraulic drive, pump, flowmeter, or any of the controllers.
- Whenever there is a significant change of viscosity in the type of fertilizer.
- Whenever you change the orifice size.
- When there is a significant change in planting speed.



NHPH25PLM0523BA 1

Liquid flow meter calibration

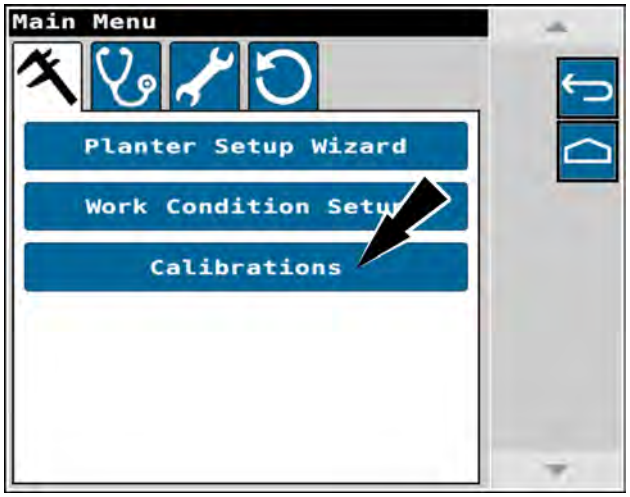
NOTE: *The depicted values in these instructions are for illustrative purposes only. Use values that are best for your operation.*

NOTE: *The liquid fertilizer calibration process automatically activates the liquid controller. Also, the liquid controller remains active after the calibration process finishes.*

Press the “main menu” button on the home screen.

From the wizard tab, select “Calibrations".

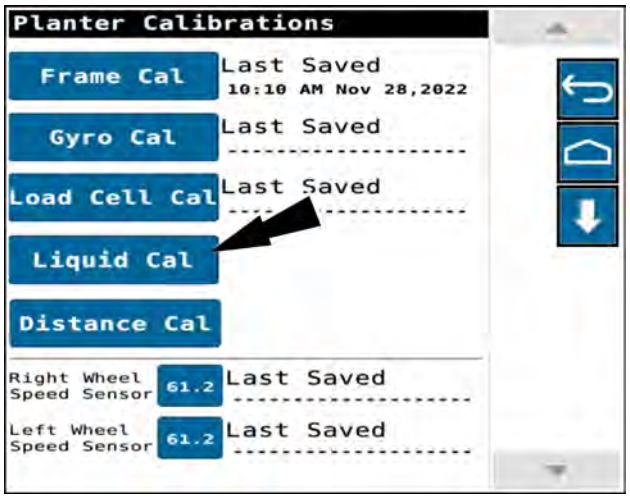
Press the “Calibrations” button.



RAPH23PLM1007BA 1

The “Planter Calibrations” screen appears.

Press the “Liquid Cal” button.

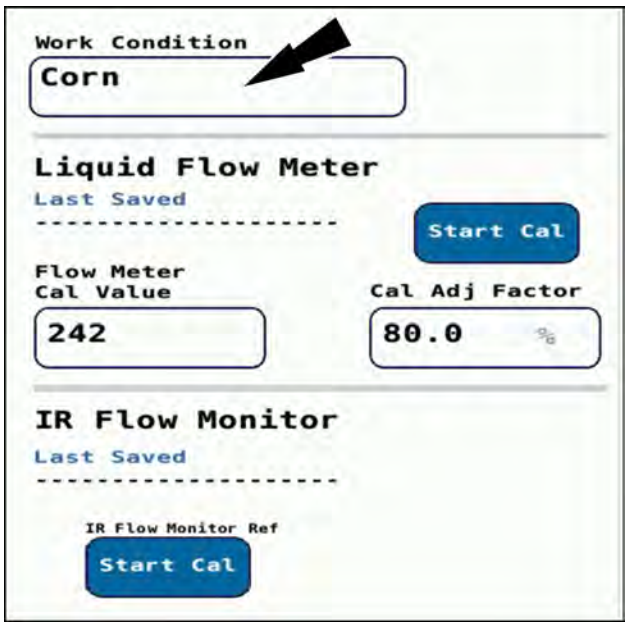


RAPH23PLM1129BA 2

Choose work condition

The liquid calibration wizard appears.

Press the “Work Condition” field.



NHPH25PLM0523BA 3

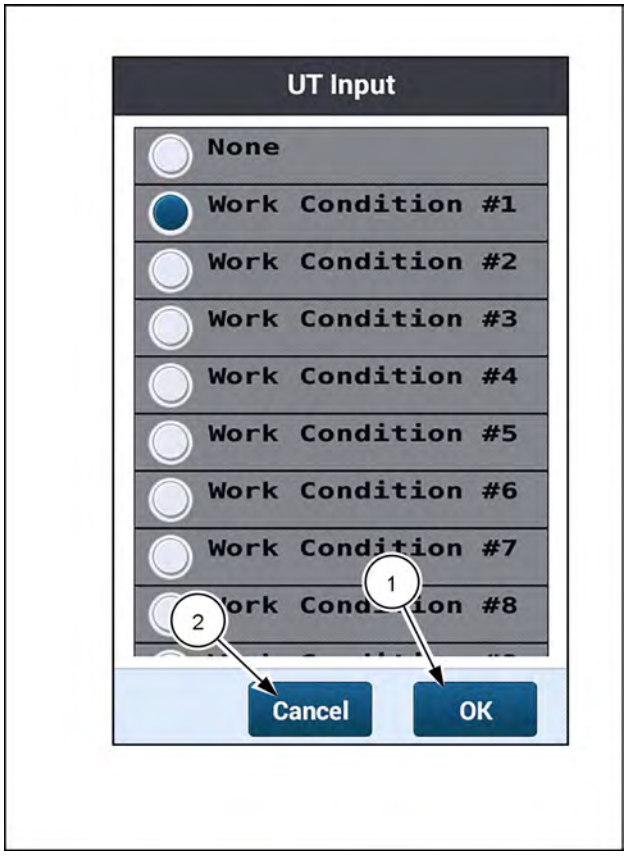
A “UT Input” window appears.

Press the work condition that is applicable to the calibration. Scroll as needed to access the desired work condition.

The radio button activates for the selected work condition.

Press the “OK” button **(1)** to accept your selection.

Press the “Cancel” button **(2)** to discard your changes and return to the previous screen.

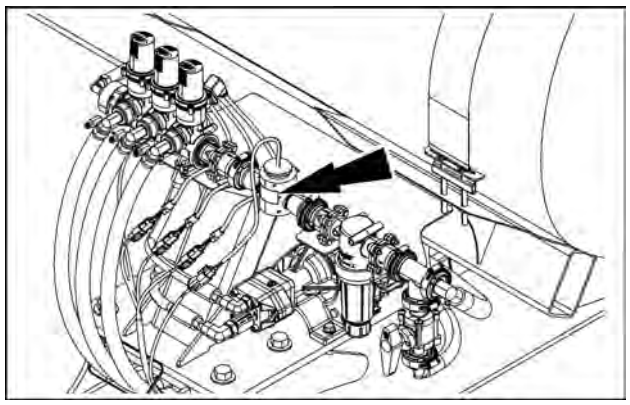


RAIL20PLM1594BA 4

Flowmeter calibration value

NOTE: *You can skip this step if the value was recorded previously.*

Locate the label on the liquid fertilizer flowmeter and record the calibration value. Record the value that is labeled “TeeJet”. This value is for water. Fertilizer is more dense and results in a lower percentage value.

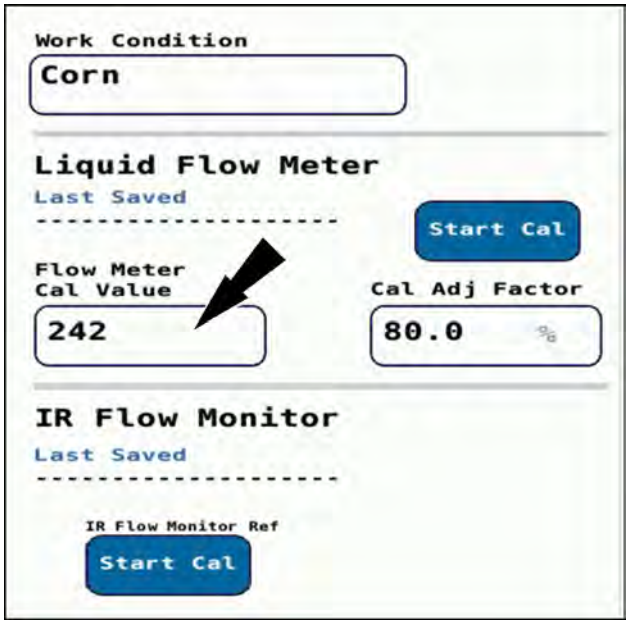


RAPH16DSP0049BA 5

In the “Flow Meter Cal Value” field, enter the recorded value from the flowmeter.

The flow meters used on these planters have the calibration values in this table:

Part Number	Rating	Calibration Value
47714564	**1.5 – 83.3 L/min** (**0.4 – 22.0 US gpm**)	242
48055912	**4.5 – 159.0 L/min** (**1.2 – 42.0 US gpm**)	65



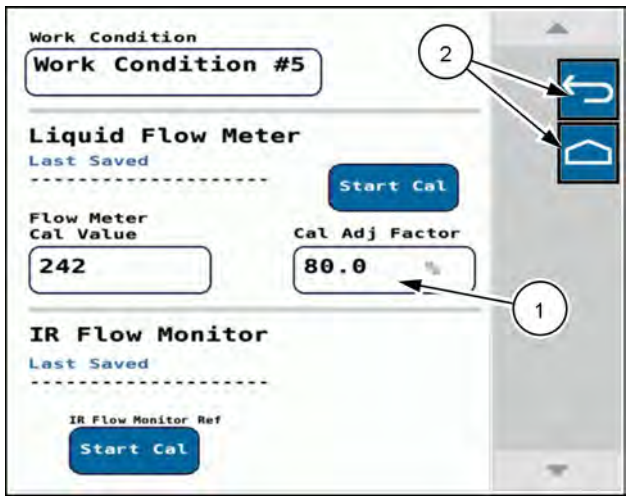
NHPH25PLM0523BA 6

The “Cal Adjust Factor” is the percentage by which the calibration is adjusted to get the true or desired rate of liquid disbursement. The calibration adjustment percentage defaults to 100%, unless drives have been calibrated. Then it defaults to the last calibrated value. The system automatically recognizes all installed sections or drives. The number of drive entry fields is equivalent to the number of installed and configured drives. Each installed drive section appears as a separate field.

If you are aware of a successfully used calibration adjustment factor on the planter for the fertilizer mix that you are using, you can manually enter that calibration adjustment factor. Then you will not need to perform the entire calibration procedure.

You can also use a calibration adjustment factor that you calculate during orifice selection. See your planter operator’s manual for information about orifice selection.

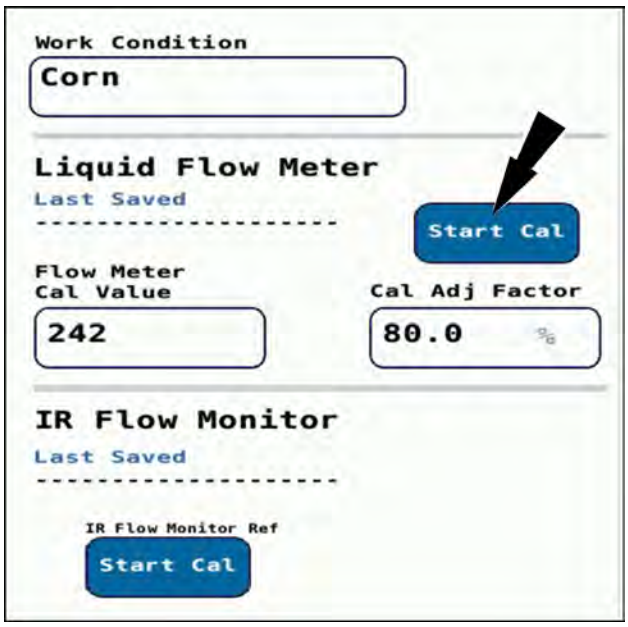
Press the “Cal Adjust Factor” field **(1)**. Enter the calibration adjustment factor using the “UT Input” window that appears.).



NHPH25PLM0014AA 7

If you do not have a previously used or calculated calibration adjustment factor, use the wizard in the software to obtain one.

Press the “Start Cal” button.



NHPH25PLM0523BA 8

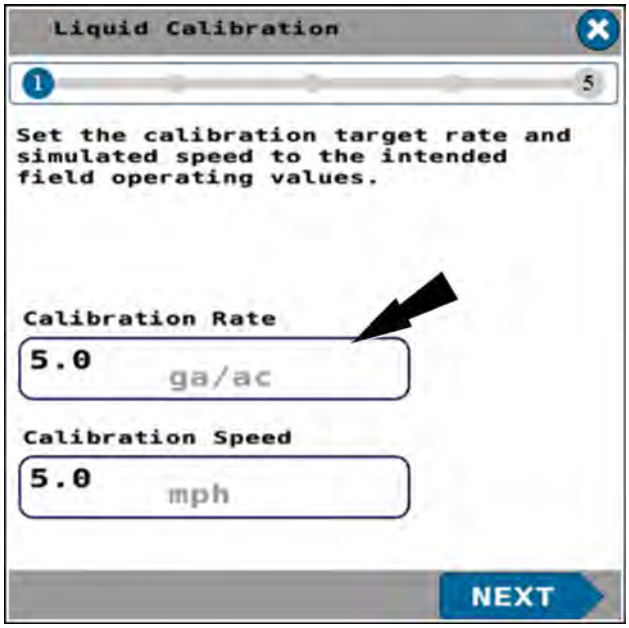
The “Liquid Calibration” step 1 screen appears.

Press the “Calibration Rate” field to open an input window. Use the input window to enter the desired calibration rate.

Use the input window to enter the desired calibration rate.

NOTE: *Do NOT enter the adjusted GPA value used when selecting an orifice or nozzle. Enter your intended application rate.*

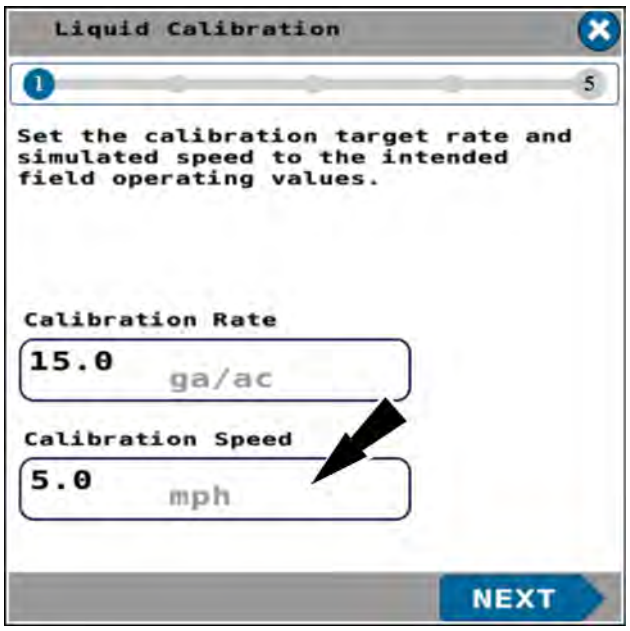
NOTE: *The values in the image here are the default values of the software. Use values that are best for your operation.*



RAPH21PLM2607BA 9

Press the “Calibration Speed” field to open an input window. Use the input window to enter the desired calibration speed.

Press the “Next” button.

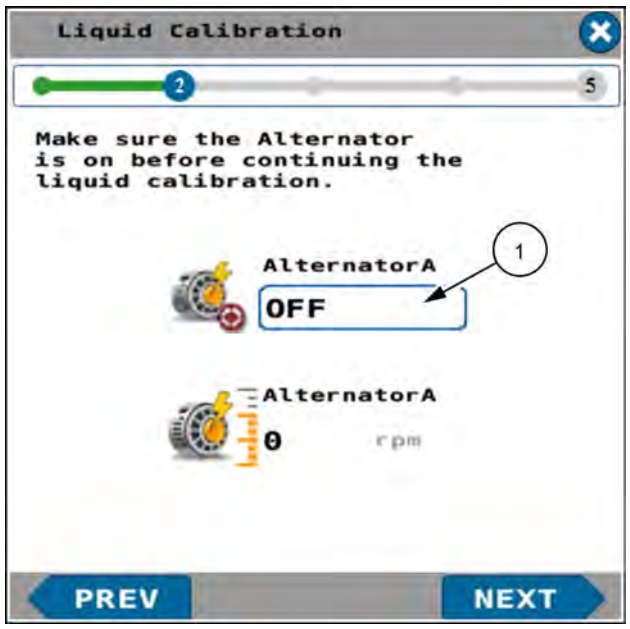


NHIL21PLM0174AA 10

The “Liquid Calibration” step 2 screen appears.

Press the “Alternator” field **(1)** to open a control screen. Use the control screen to turn ON the alternator.

NOTE: *Press the (X) button to close the control screen.*



NHIL21PLM0171AA 11

After turning ON the alternator, the alternator speed is displayed **(2)**.

NEXT Press the “Next” button.

NHIL21PLM0172AA 12

The “Liquid Calibration” step 3 screen appears.

The “Liquid Calibration” step 3 screen states, “Activate the tether or Manual Run switch until flow is stable. Once flow is stable, collect 60s sample from several nozzles. Note: Dense liquids may require a lower Cal Adjust Factor for stable flow. To adjust release tether switch, enter a slightly lower percentage and repeat step.”

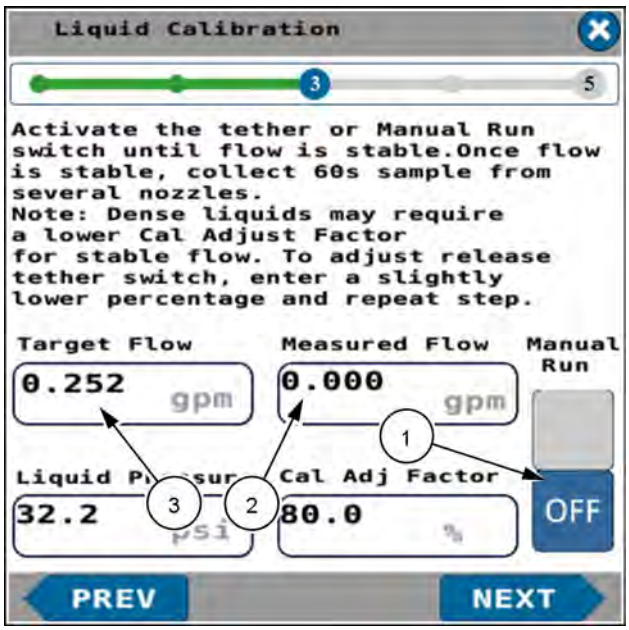
Before measuring the volume of fertilizer on the planter, press the “Manual Run” switch **(1)** and allow the “Measured Flow” **(2)** to stabilize near the “Target Flow” value **(3)**.

When the flow is stabilized, press the “Manual Run” switch again to turn the pump off.

Attach the calibration tether.

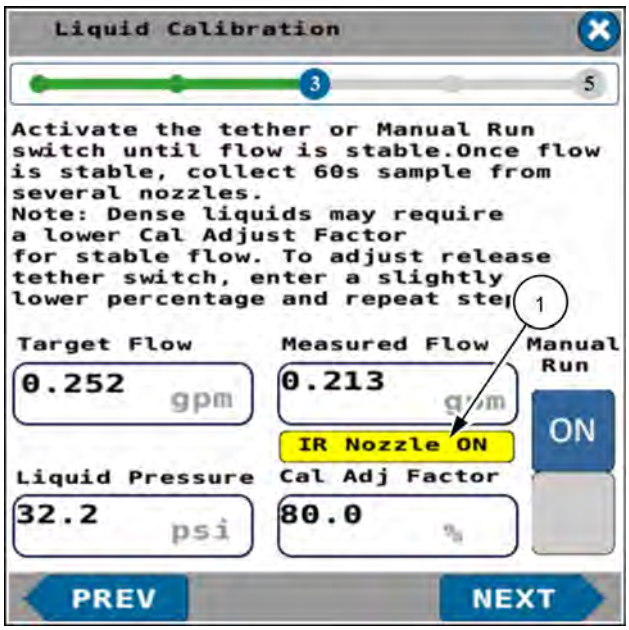
1. Remove the cap from the connector for the tether harness.
2. Attach the calibration tether to the tether plug.

NEXT Press the “Next” button.



NHIL21PLM0175AA 13

NOTE: *If the planter is equipped with individual row nozzles, an indicator* ***(1)*** *appears, informing the operator that the IR Nozzle function is ON.*



NHIL21PLM0176AA 14

Once the flow of fertilizer is stable, collect one-minute samples from at least three applicators, and record the volume for each sample:

- Press and hold the button on the calibration tether. Use an assistant to hold the calibration button or to gather the samples.
- You can press and release the tether between samples as often as required without stopping the calibration procedure. When you press the button, always wait until the system pressure is stable before you take a sample.
- Use a stop watch and a graduated beaker to gather and measure the samples with great accuracy.
- If the container will not hold a one-minute sample, collect a half-minute sample and multiple by two.

The “Liquid Calibration” step 4 screen appears.

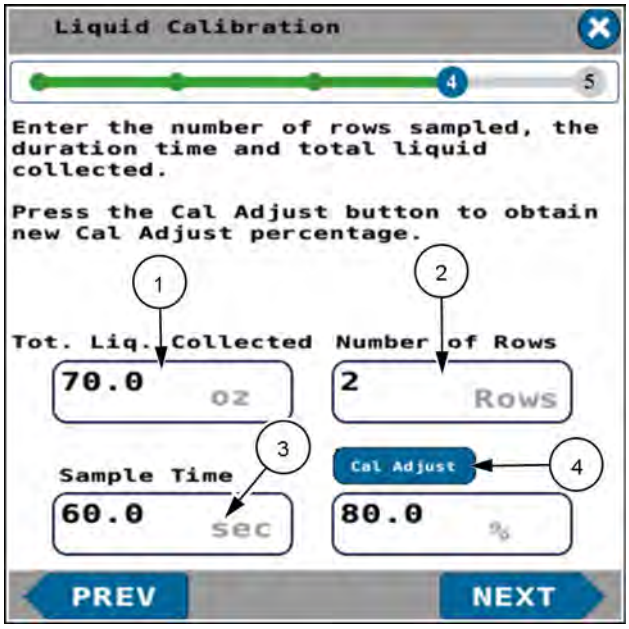
The “Liquid Calibration” step 4 screen states, “Enter the number of rows sampled, the duration time and total liquid collected. Press the Cal Adjust button **(4)** to obtain a new Cal Adjust percentage.

Press and enter the measured liquid into the “Tot. Liq. Collected” field **(1)**.

Press and enter the number of rows that you collected the sample from in the “Number of Rows” field **(2)**.

Press and enter the sample time duration in the “Sample time” field **(3)**.

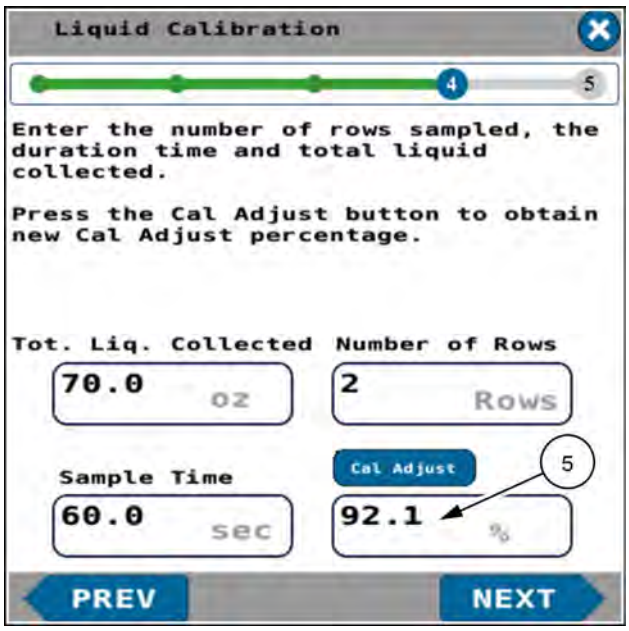
Press the “Cal Adjust” button **(4)** to automatically calculate a new calibration adjustment factor.



NHIL21PLM0177AA 15

The new, calculated calibration adjustment factor **(5)** is shown.

NEXT Press the “Next” button.



NHIL21PLM0178AA 16

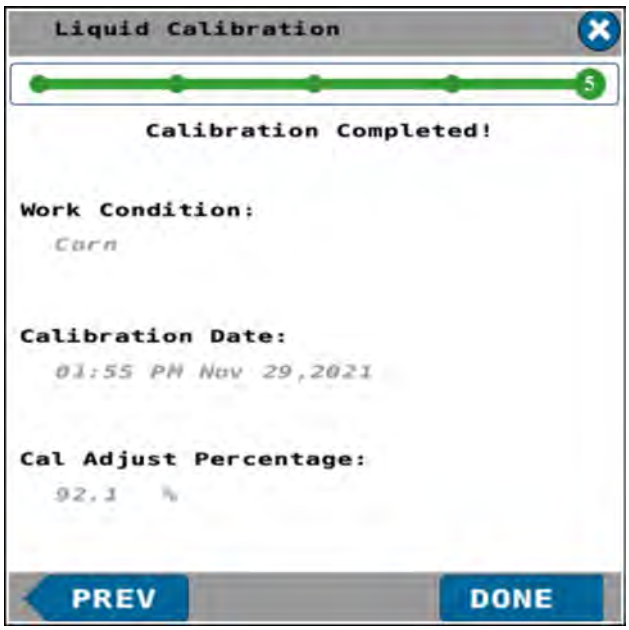
The “Liquid Calibration” step 5 screen appears.

The “Liquid Calibration” step 5 screen states, “Calibration Completed!” The screen provides the following information:

- Affected work condition
- Calibration date
- Calibration adjustment percentage

DONE Press the “Done” button.

The liquid calibration is complete, and the system returns you to the main menu. The new calibration adjustment factor is saved for the designated work condition.



NHIL21PLM0179AA 17

Liquid flow monitor calibration

NOTE: *The depicted values in these instructions are for illustrative purposes only. Use values that are best for your operation.*

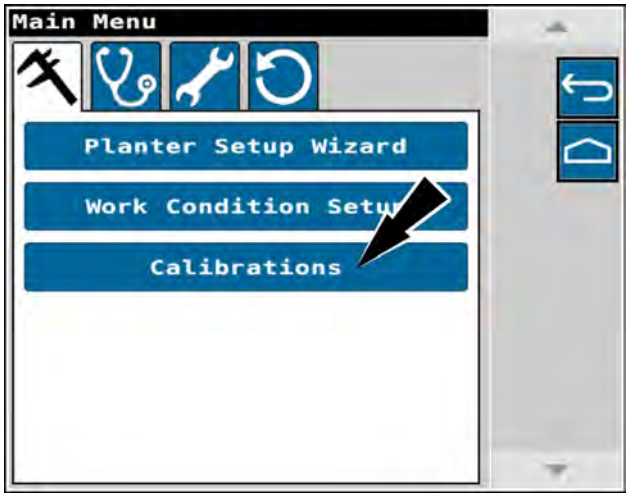
NOTE: *The liquid fertilizer calibration process automatically activates the liquid controller. Also, the liquid controller remains active after the calibration process finishes.*

The “IR Flow Monitor” system utilizes electromagnetic sensing to measure the rate of liquid flow through the system. This requires the the lines to be pre-charged, or filled, before a zero calibration can be performed. The following calibration procedure is required when you use a liquid product for the first time, or when changing liquid products to be applied. This allows for accurate row flow monitoring in the field.

Press the “main menu” button on the home screen.

From the wizard tab, select “Calibrations".

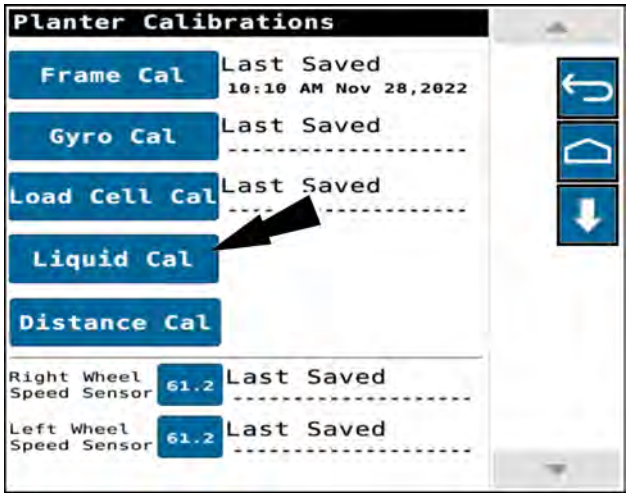
Press the “Calibrations” button.



RAPH23PLM1007BA 1

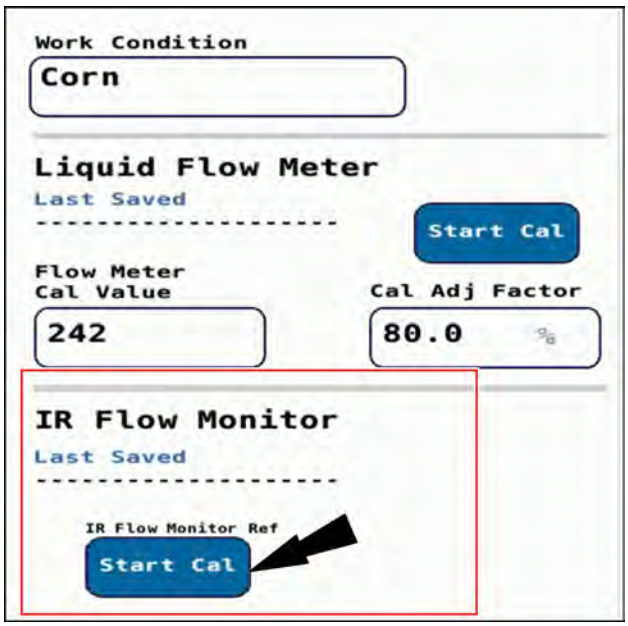
The “Planter Calibrations” screen appears.

Press the “Liquid Cal” button.



RAPH23PLM1129BA 2

In the “IR Flow Monitor” section, press the “Start Cal” button



NHPH25PLM0523BA 3

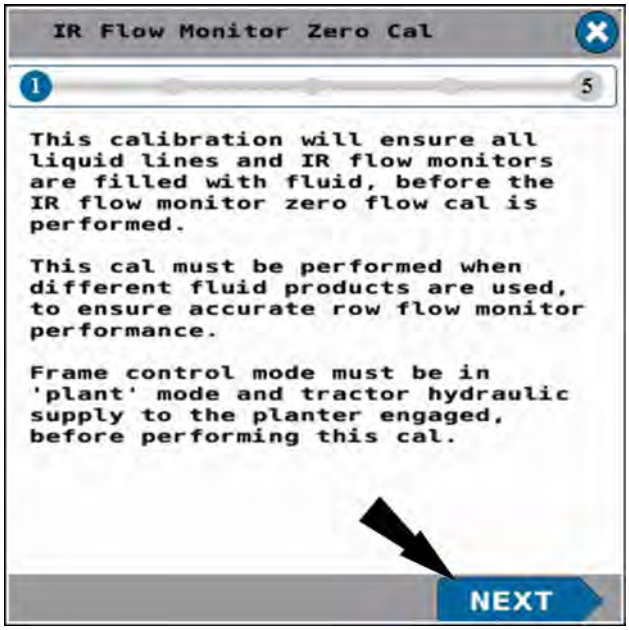
A message appears:

“This calibration will ensure all liquid lines and IR flow monitors are filled with fluid, before the IR flow monitor zero flow cal is performed.

“This cal must be performed when different fluid products are used, to ensure accurate row flow monitor performance.

“Frame control mode must be in ‘plant’ mode and tractor hydraulic supply to the planter engaged, before performing this cal.”

Press the “Next” button.

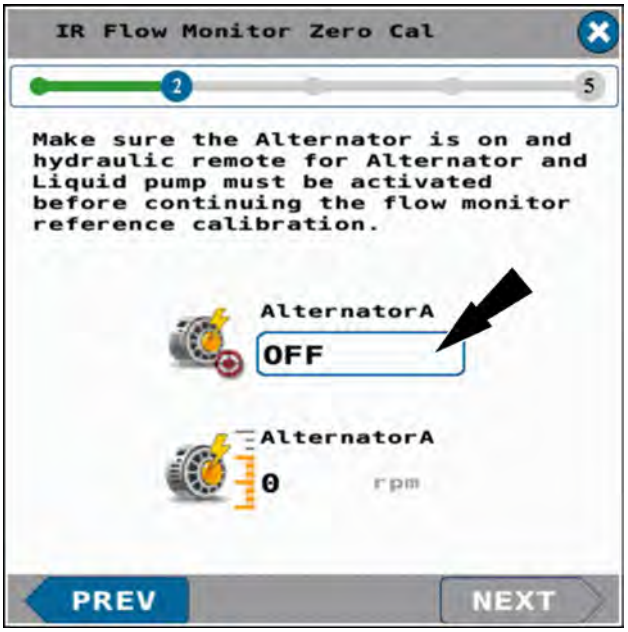


NHPH25PLM0528BA 4

The alternator is required to be running during the calibration.

If necessary, press the alternator window to open the alternator control screen to turn the alternator on and set the desired alternator RPM.

NOTE: *This is a required step. The “Next” button will not be available until the alternator is verified to be running. Any alternator speed greater than zero is acceptable.*



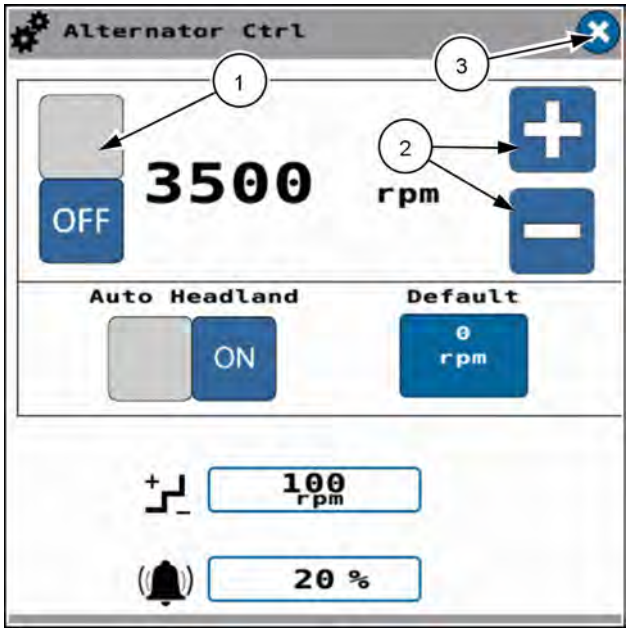
NHPH24PLM1194AA 5

Press the “ON/OFF” button **(1)** to turn the alternator ON.

Use the “plus and minus” buttons **(2)** to change the desired alternator speed, for your operation.

NOTE: *For more information regarding alternator control, see* ***4-46***

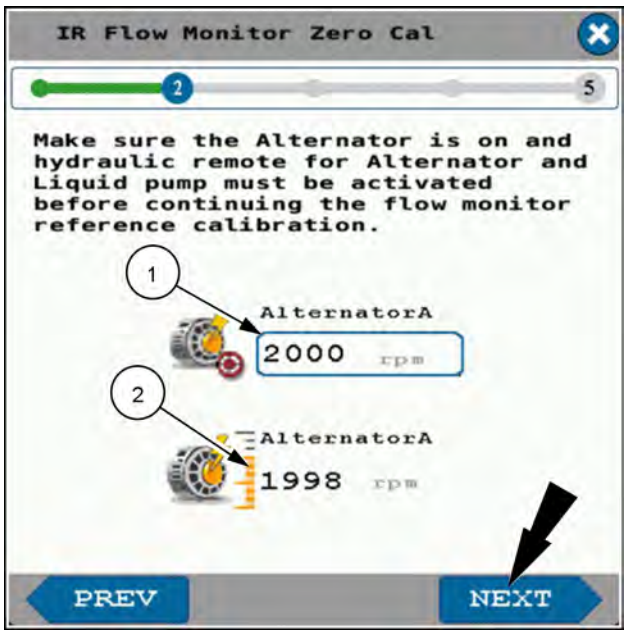
Press the “X” button **(3)** to close the “Alternator Ctrl” screen and return to the calibration.



NHPH25PLM0529BA 6

When the alternator is turned on, the default speed **(1)** and current speed **(2)** display in the “AlternatorA” windows.

NEXT Press the “Next” button.



NHPH24PLM1193AA 7

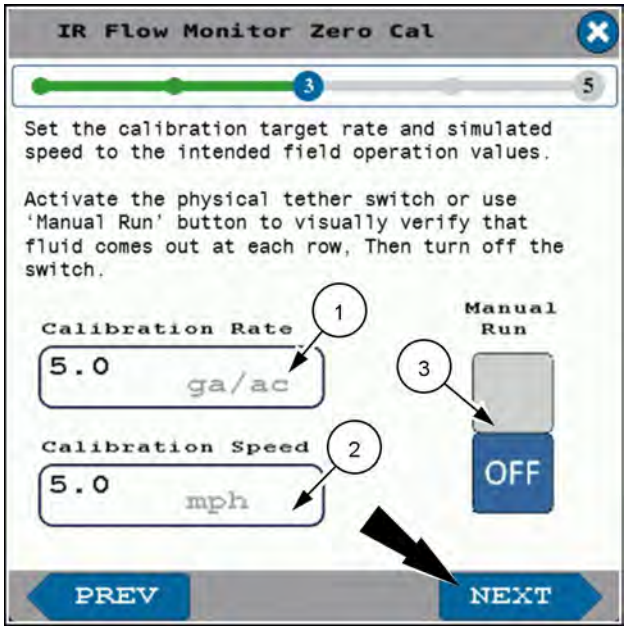
Enter the liquid flow rate that you intend to use in the “Calibration Rate” window **(1)**.

Enter a simulated implement speed in the “Calibration Speed” window **(2)**.

You will need to verify that the lines are charged with liquid by momentarily turning on the liquid system until it is visually obvious that all lines that are equipped with IR Flow Monitor are delivering liquid. This can be done with a tether switch or the “Manual Run” “ON/OFF” button **(3)**.

NOTE: *The “Manual Run” button is a latching button. When you press the “ON” button, liquid will continue to flow until the “OFF” button is pressed.*

NEXT Press the “Next” button.



NHPH24PLM1195AA 8

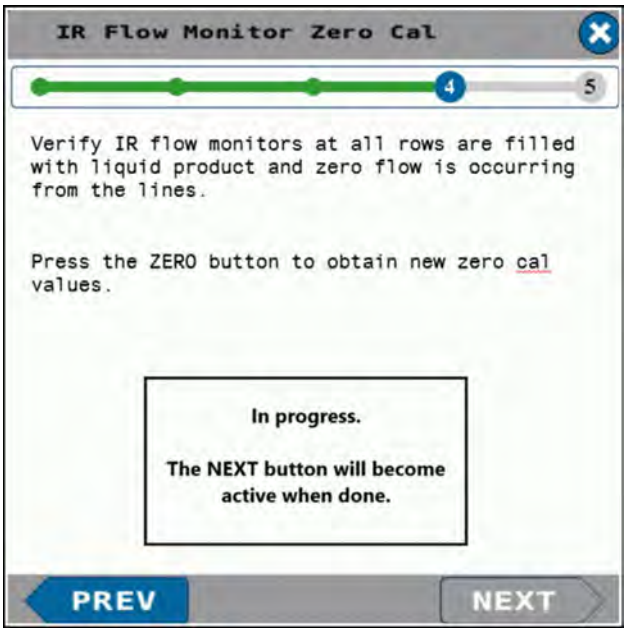
“Verify IR flow monitors at all rows are filled with liquid product and zero flow is occuring from the lines.”

Press the “Zero” button to start the zero calibration.

NHPH24PLM1196AA 9

The system will wait approximately two seconds while the calibration is in progress.

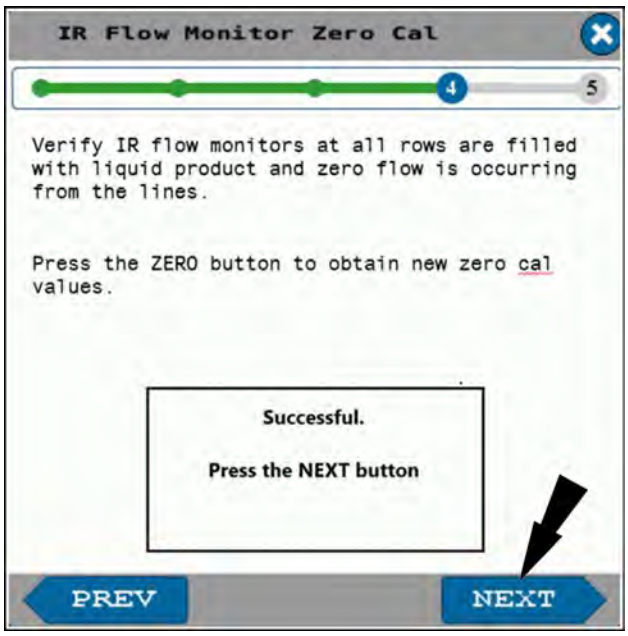
The “Next” button is grayed out and unavailable until the calibration has finished.



NHPH24PLM1197AA 10

The zero calibration was successful.

NEXT Press the “Next” button.



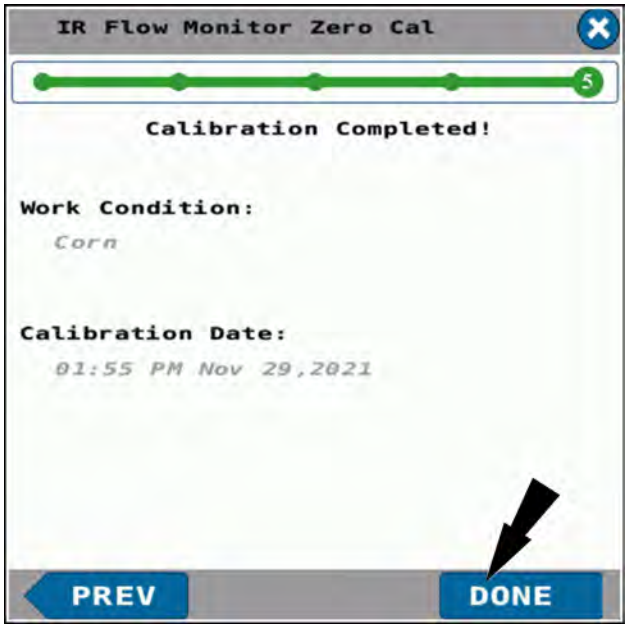
NHPH24PLM1198AA 11

The screen provides the following information:

- Affected work condition
- Calibration date

DONE Press the “Done” button.

The “IR Flow Monitor Zero Cal” is complete and the system returns you to the main menu. The new calibration adjustment factor is saved for future use.



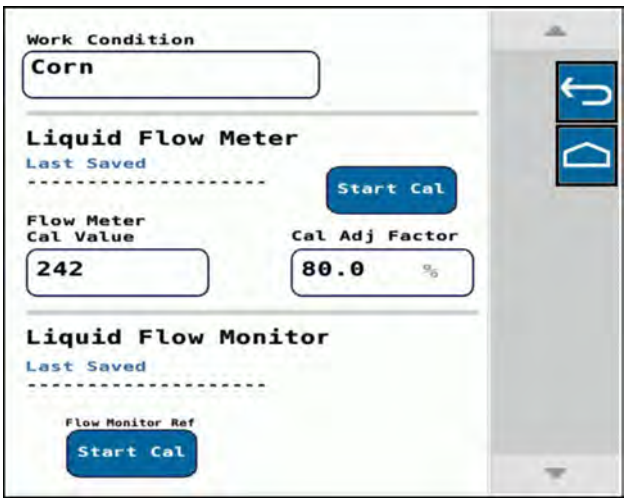
NHPH24PLM1199AA 12

Fine-tune the calibration value

For the highest level of accuracy, perform liquid fertilizer calibration several times to fine tune the calibration value with each repetition.

- With the first calibration, use the value from the flow meter tag and perform the procedure. The first calibration will bring your application rate within ± **9 – 10%** of the target delivery rate (normally on the high side).
- Use the calibration value obtained from the first calibration for a second calibration. The second calibration will bring your application rate within ± **4 – 5%** of the target delivery rate (normally on the low side).
- Use the refined calibration value obtained from the second calibration for a third calibration. The third calibration will bring your application rate within ± **1%** of the target delivery rate.

NOTE: *The value of 242 on the tag is the calibration value used with water. Common calibration values for more-dense starter fertilizer will be lower. They are approximately* ***90%*** *in the Cal Adjust Factor.*



NHPH24PLM1191AA 1

GRANULAR CALIBRATION

Introduction: granular fertilizer calibration

Granular fertilizer application is supported in some 2120–series planters. Planters with the granular fertilizer feature cannot also have a liquid fertilizer feature.

The planter must be fully operational and equipped when you perform a product calibration. Set up the planter for field operations. The frame control must be in “Plant” mode to perform a granular fertilizer calibration.

To ensure accuracy, enter default values, row width, and section row entries before attempting calibration.

The main reason for performing granular fertilizer calibration is to calibrate the controller software for maximum accuracy at your planting speed.

The procedure also provides a means to check the physical planter setup for all applicators.

Perform granular fertilizer calibration:

- When the planter is first set up.
- At the beginning of each season of use.
- When you replace a major fertilizer component.
- When there is a significant change in planting speed.

Granular fertilizer calibration procedure

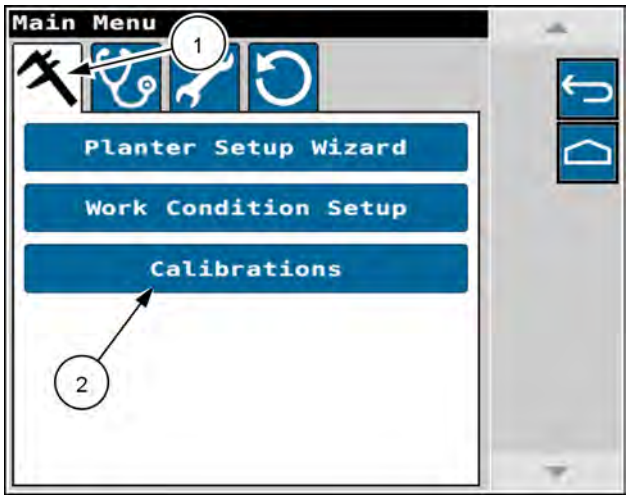
In this procedure you collect product in containers during a given number of applicator motor revolutions. You then measure the total collected product by weight and the number of rows collected. Then you enter the total product and number of rows into the display. The software calculates the calibration factor from this information. The calibration factor is the amount of applied product per row for each 100 revolutions of the applicator motor.

NOTE: *The accuracy of the calibration improves with an increase in the number of rows collected.*

Use the frame control feature to place the planter frame into “Plant” mode. See “Frame control: 2110 and 2120 model planters” (**4-51**) for instructions on frame control.

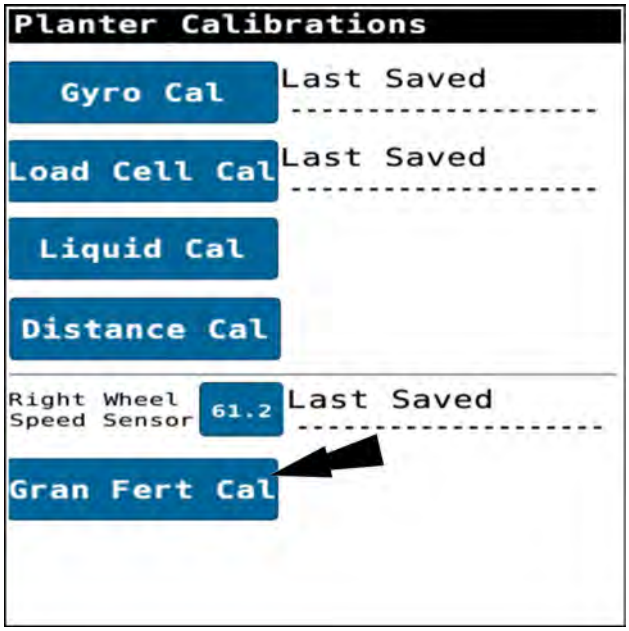
In the “Main Menu” screen, press to select the caliper tab. **(1)**.

Press the “Calibrations” button **(2)**. The “Planter Calibrations” screen appears.



RAPH23PLM1007BA 1

Press the “Gran Fert Cal” button.



RAPH23PLM1252BA 2

The “Gran Fert Calibration” screen step 1 appears.

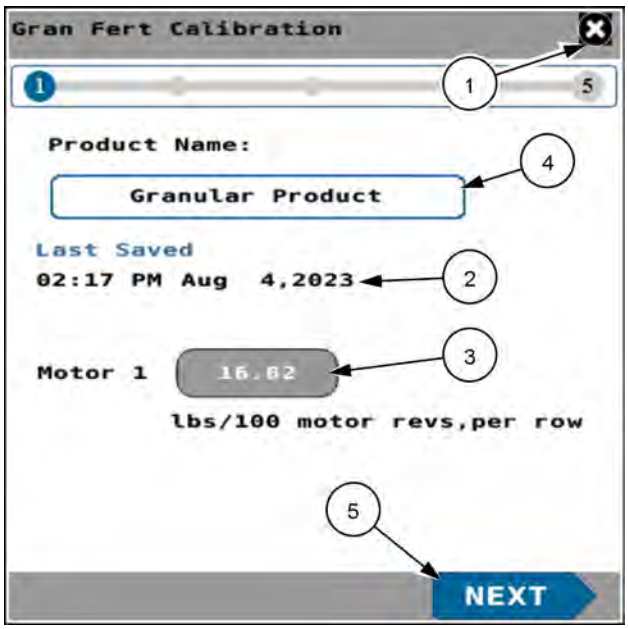
You can press the “X” button **(1)** at any time to cancel the calibration.

The “Last Saved” area **(2)** gives the date of the last calibration. The “Motor 1” field **(3)** gives the last calibration value, in weight per 100 motor revolutions per row.

NOTE: *If there has not been a granular calibration previously on your planter or if the value has been removed from the memory, the “Last Saved” area* ***(2)*** *appears with dashes. Also, the “Motor 1” field* ***(3)*** *gives a value of 0.00.*

You can rename the product, or keep the default. Press the “Product Name” field **(4)** to call up a keypad and rename the product.

Press the “Next” button **(5)**.



RAPH23PLM1259BA 3

The “Gran Fert Calibration” screen step 2 appears.

The “Gran Fert Calibration” screen step 2 states, “Place containers to catch the product. When ready to dispense the product press Next. The system will move while dispensing product. Stay clear of moving parts until calibration is complete.”

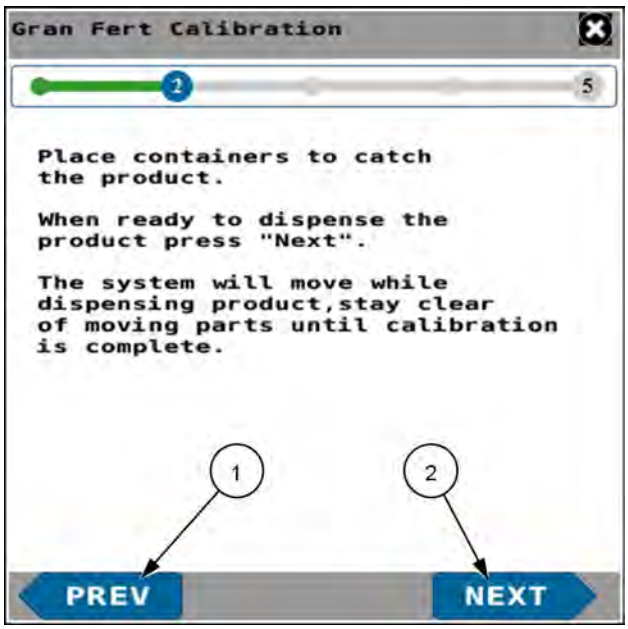
Turn ON the planter hydraulics using the remote valve controls.

Follow the instructions given in the screen.

NOTICE: *The granular application system contains moving and rotating components that can cause severe injury. Ensure all personnel remain clear of moving and rotating components during this procedure.*

NOTE: *In any calibration step that gives a “Prev” button* ***(1)****, you can press the “Prev” button to navigate to the previous step.*

Press the “Next” button **(2)** to continue.



RAPH23PLM1254BA 4

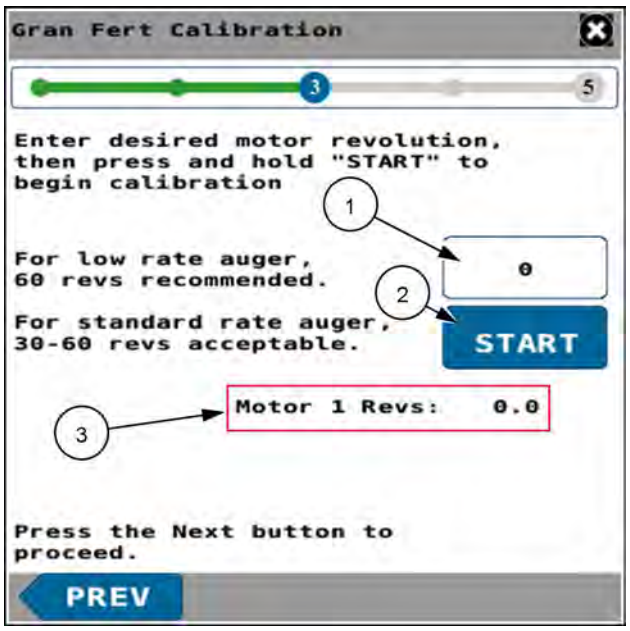
The “Gran Fert Calibration” screen step 3 appears.

The “Gran Fert Calibration” screen step 3 states, “Enter desired motor revolutions, then press and hold “Start” to begin calibration. For a low rate auger, 60 revolutions is recommended. For a standard rate auger, 30–60 revs is acceptable.”

Press the motor rate field **(1)**. Enter the desired motor rate in revolutions. The “Start” button **(2)** activates.

Press and hold the “Start” button **(2)**. The “Motor 1 Revs” readout **(3)** gradually climbs to the motor rate that you entered.

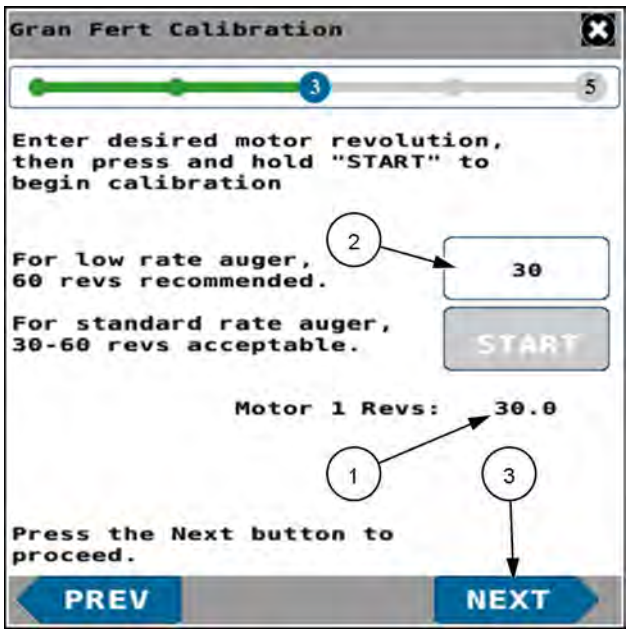
The “Start” button **(2)** becomes a “Stop” button. You can press the “Stop” button to stop the motor rate increase at a desired motor rate. However the “Stop” button disappears when the motor rate reaches the rate that you entered.



RAPH23PLM1255BA 5

The “Next” button appears when the motor revolutions **(1)** reach the number **(2)** that you entered in the previous step.

When the “Next” button **(3)** appears, press the “Next” button **(3)**.



RAPH23PLM1256BA 6

The “Gran Fert Calibration” screen step 4 appears.

The “Gran Fert Calibration” screen step 4 states, “Enter the number of rows sampled and total weight collected. Press the Next button.”

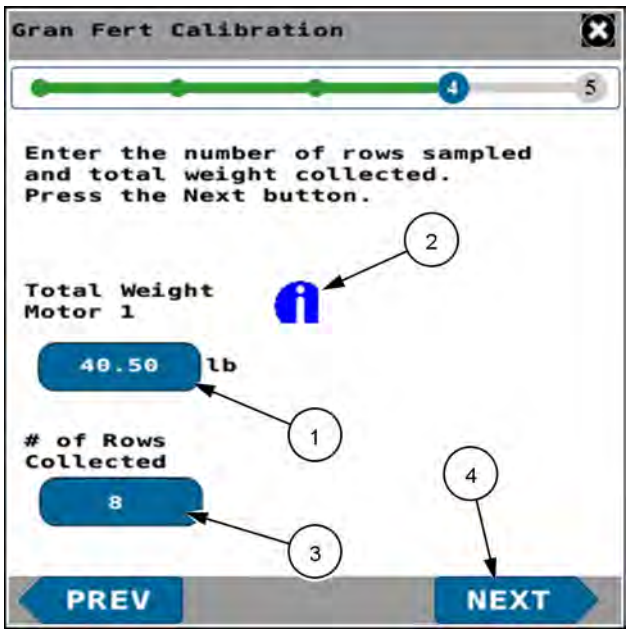
Press the “Total Weight Motor 1” button **(1)**. Enter the total weight of the product collected in all of the rows. Use a decimal number instead of ounces. In this example, the entered weight is 40.50 pounds. This was converted from 40 pounds, 8 ounces.

NOTE: *If you are using containers or scales that measure in pounds and ounces, you must convert this to a decimal number of pounds. Press the information button* ***(2)*** *if you wish to see a conversion table of pounds/ounces to a decimal number of pounds.*

Press the “# of Rows Collected” button **(3)**. Enter the number of rows from which you collected product.

The calibration value saves to the system memory. The calibration value will appear in step 1 of the next calibration.

Press the “Next” button **(4)** to continue.



RAPH23PLM1257BA 7

The “Gran Fert Calibration” screen step 5 appears.

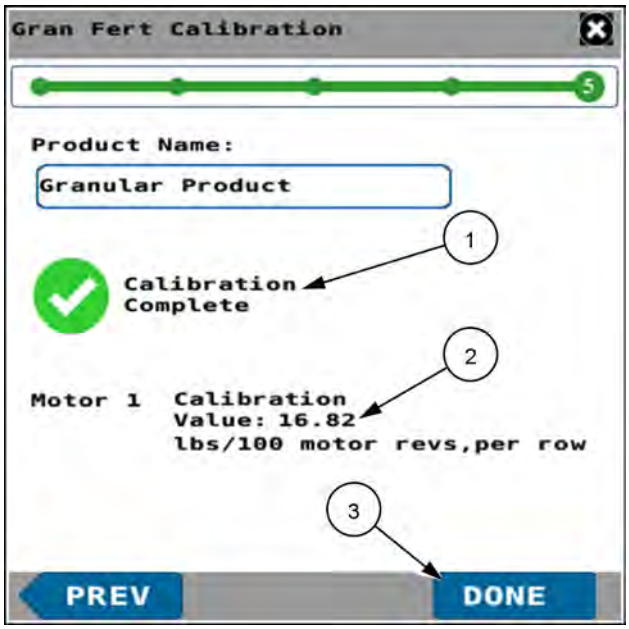
A status indicator **(1)** states that the calibration is complete.

The “Gran Fert Calibration” screen step 5 gives the calibration value **(2)** in weight per 100 motor revolutions, per row.

NOTE: *The calibration value saves to the memory at the completion of step 4. Pressing the abort button in this step does not delete the calibration value from the system memory.*

NOTE: *You cannot change the product name in this step.*

Press the “Done” button **(3)**. The “Planter Calibrations” screen appears.



RAPH23PLM1258BA 8

4 - OPERATION

GETTING STARTED

Daily setup

Refer to your planter operators manual, “WORKING OPERATIONS” section. Perform all needed steps to prepare your planter for your planting operation.

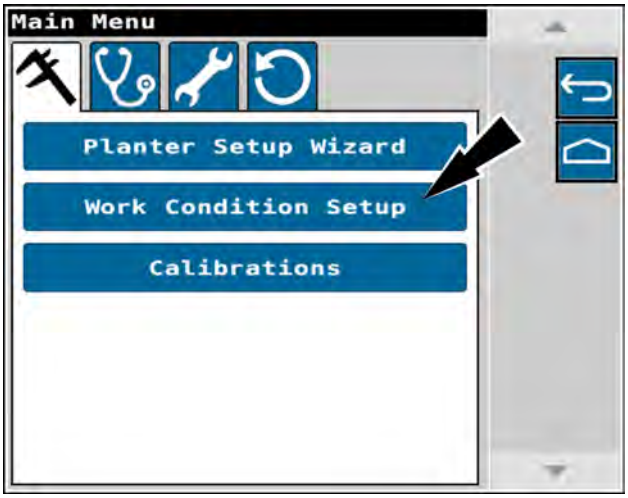
Your planter operators manual refers you to this software operating guide for actions you perform in the display. Follow the instructions in the applicable sections in this software operating guide when you are referred to them by your planter operators manual.

Perform any setups that you have not already accomplished for setting up your planter for the first time and for setting up your planter for the season. See “Planter setup wizard” (**3-8**).

If needed, change the user.

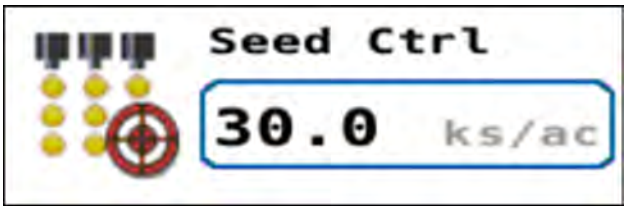
To change the user, press the user button. Refer to the user management section of your tractor operator’s manual for more information.

Select the desired work condition, if not already accomplished. See “Work Condition Setup screen” (**3-80**) for more information about setting up and selecting work conditions.



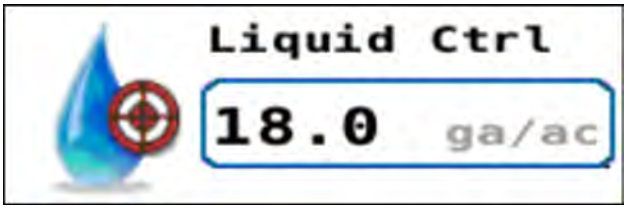
RAPH23PLM1007BA 1

If you will not use the default seed application rates in your selected work condition, configure your seed application rates. See “Application rate control: seed” (**4-5**).



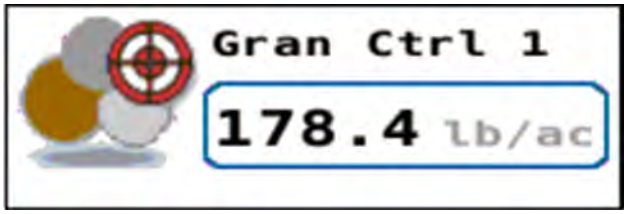
RAIL20PLM1148AA 2

If you will not use the default liquid application rate in your selected work condition, configure your liquid application rate. See “Application rate control: liquid fertilizer” (**4-19**).



RAIL20PLM1137AA 3

If you will not use the default granular application rate in your selected work condition, configure you granular application rate. See “Application rate control: granular fertilizer” (**4-24**).

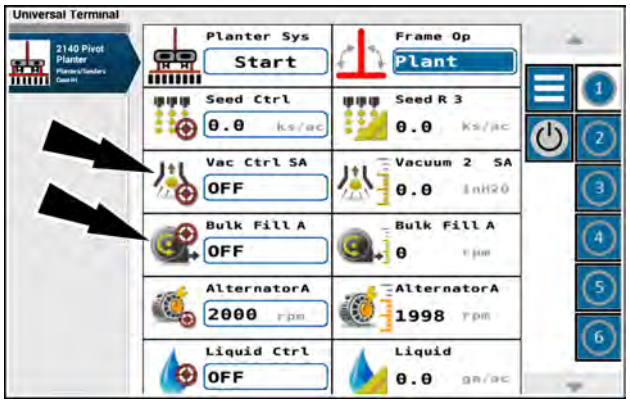


RAPH22PLM1845AA 4

If you intend to use a task controller application, configure crop type, grower/farm/field, and other precision farming parameters. See the operating guide for your task controller application for additional information.

Check the vacuum setting in the “Vac Ctrl” window. See “Vacuum fan control” (**4-38**) for more information about the vacuum fan control.

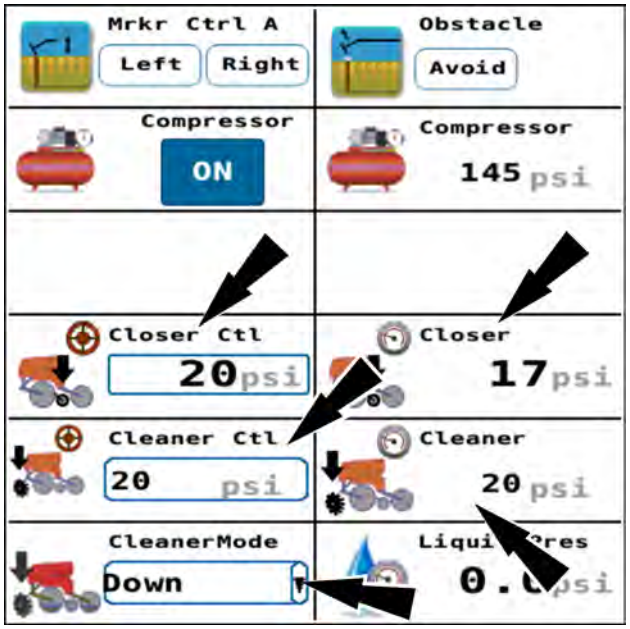
Check the bulk fill fan setting in the “Bulk Fill” window. See “Bulk fan control” (**4-42**) for more information about bulk fill fan control.



NHIL21PLM0149AA 5

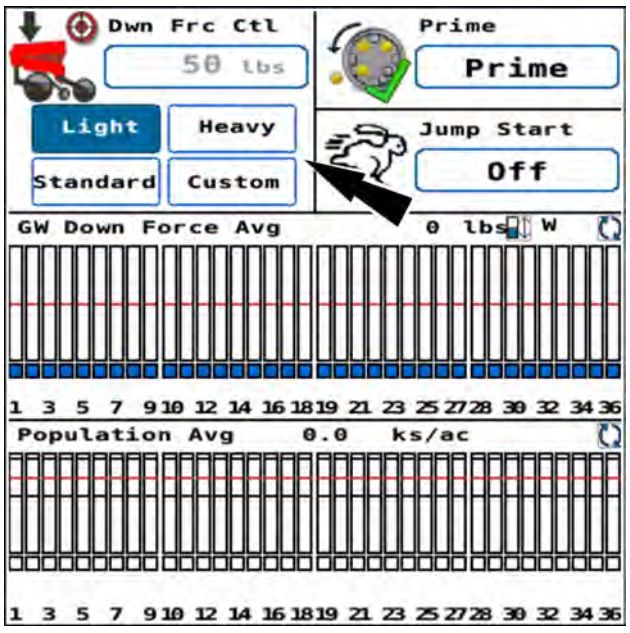
Set up the cleaner controls. See “Pneumatic cleaner control” (**4-163**).

Set up the closer controls. See “Pneumatic closer control” (**4-167**).



RAPH21PLM1521BA 6

Set up down force control. See “Introduction: down force control” (**4-147**).



RAPH21PLM1522BA 7

When the planter is positioned in the field to start planting, go to page 1 of the object pool. In the “Planter Sys” window, press the “Start” button for approximately **5 s** until the hourglass icon appears and the “Start” button becomes a blue “Stop” button.

NOTE: *Similarly, to stop the planter system, press the “Stop” button for approximately* ***5 s****.*

RAPH21PLM1059AA 8

PRODUCT CONTROL

Introduction: product control

This chapter explains how to use the Universal Terminal (UT) screens to prepare your planter for product control related to:

- Seed planting:

  See “Application rate control: seed” (**4-5**).

  See (Application monitoring: seed” (**4-8**).

- Liquid fertilizing (if equipped):

  See “Application rate control: liquid fertilizer” (**4-19**).

  See “Application monitoring: liquid fertilizer” (**4-22**).

- Granular Fertilizing (if equipped):

  See “Application rate control: granular fertilizer” (**4-24**).

  See “Application monitoring: granular fertilizer” (**4-28**).

Additional topics that this chapter covers include:

- See “Area monitoring” (**4-29**).
- See “Row clutch control windows” (**4-31**).
- See “Prime control” (**4-170**).
- See “Jump start control” (**4-33**).
- See “Seed level” (**4-35**).

Application rate control: seed

Use the work condition windows to configure seed application rates. See “Work Condition Setup screen” (**3-80**) for instructions on configuring work conditions.

NOTE: *The application rates shown in the images in this section are for illustration purposes only. Use application rates appropriate for your operation.*

You can use the default application rate configured in the selected work condition, or configure target rates for your operation. Use the “Seed Ctrl” window to enter a desired target rate.

The target rate for seed is controllable:

- For the entire planter.
- By the left and right sides split at the planter centerline.
- By planter drive.

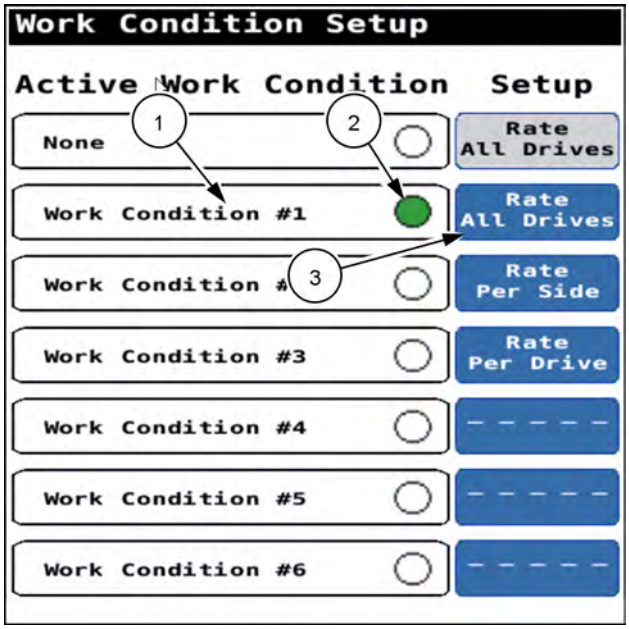
Default rate

In the “Work Condition Setup” screen, select the desired work condition **(1)**. The green indicator **(2)** moves to the selected work condition.

If you need to change the configuration in this work condition, press the button **(3)** in the “Setup” column to open the work condition screens.

Adjust the work condition as needed for your operation. See “Work Condition Setup screen” (**3-80**) for instructions on configuring work conditions.

NOTE: *You can also create a new work condition with the correct parameters for the planting operation you wish to configure. See “Work Condition Setup screen” (**3-80**) for instructions on configuring work conditions.*



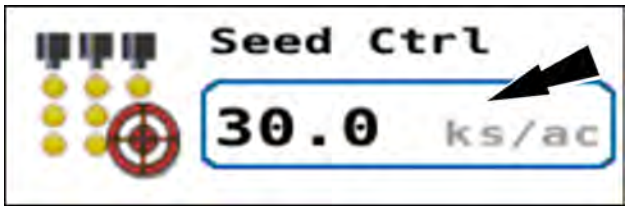
RAIL20PLM1574BA 1

Target rate for the entire planter

If you wish to configure a target rate for the entire planter, configure or select a work condition for an application by the entire planter. See “Work Condition Setup screen” (**3-80**) for instructions on configuring work conditions.

In page 6 of the object pool press the “Seed Ctrl” window. The “Seed Ctrl” control panel appears.

Use the “Seed Ctrl” control panel to override the rate that is configured in the work condition. See “Seed Ctrl” panel” at the end of this section.



RAIL20PLM1148AA 2

Target rate by side

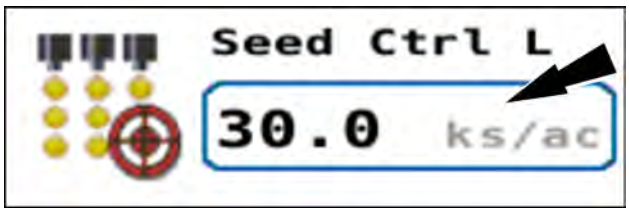
If you wish to configure target rates for the left and right sides of the planter, configure or select a work condition for an application by side. See “Work Condition Setup screen” (**3-80**) for instructions on configuring work conditions.

In page 6 of the object pool press the “Seed Ctrl L” window. The “Seed Ctrl” control panel appears.

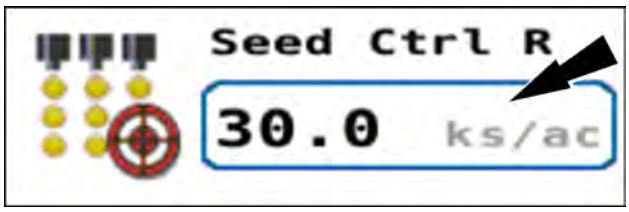
Use the “Seed Ctrl” control panel to configure the desired rate. See “Seed Ctrl” panel” at the end of this section.

Rates for each side are independent of each other and may or may not share the same values.

Repeat in the “Seed Ctrl R” window.



RAIL20PLM1146AA 3



RAIL20PLM1147AA 4

Target rate by drive

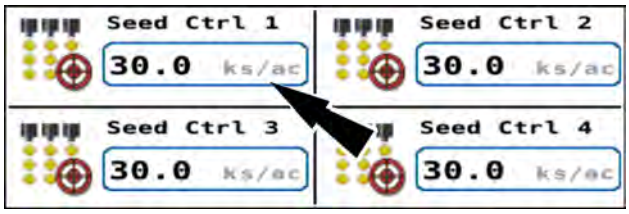
If you wish to configure target rates for each drive of the planter, configure or select a work condition for an application by drive. See “Work Condition Setup screen” (**3-80**) for instructions on configuring work conditions.

In page 6 of the object pool press a “Seed Ctrl X” window. The “Seed Ctrl” control panel appears.

Use the “Seed Ctrl” control panel to configure the desired rate. See “Seed Ctrl” panel” at the end of this section.

Rates for each drive are independent of each other and may or may not share the same values.

Repeat in the remaining numbered “Seed Ctrl X” windows.

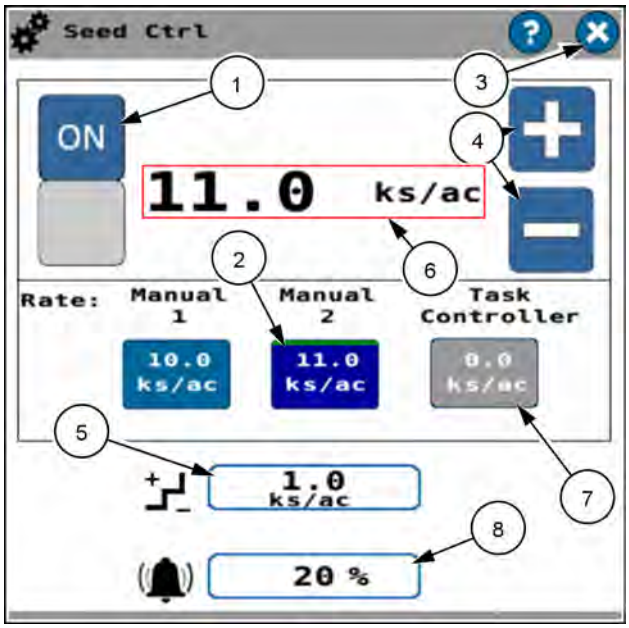


RAIL20PLM1149AA 5

“Seed Ctrl” panel

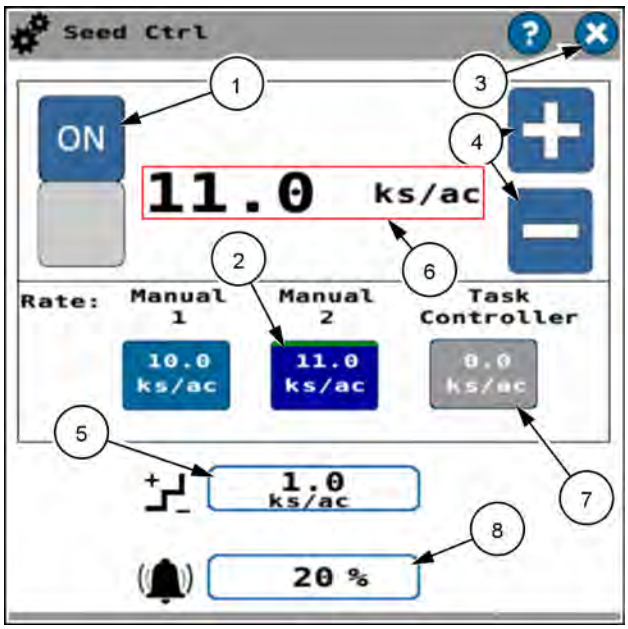
1. Press the “ON” button **(1)** to activate seed rate control.
2. The green indicator **(2)** shows the currently selected rate. If the selected rate is the desired rate for your operation, press the “X” button **(3)** to exit the procedure. If one of the default rates is the desired rate for your operation, press the default rate button.
3. If you need to temporarily configure a different rate, press the “Rate” button if it is not already selected as indicated by the green indicator. Use the “plus” and “minus” buttons **(4)** to enter the desired application rate. You can use the stepper control **(5)** to adjust the increment of the “plus” and “minus” buttons. Another option is to press the rate that is displayed in the screen **(6)**. Use the keypad that appears to manually input the desired rate.

   NOTE: *Alternatively, you can use the Task Controller (TC) rate* ***(7)****. You cannot use this screen to change the TC rate. The TC application in your display provides this rate.*



RAPH22PLM0871BA 6

4. If needed, press the alarm field **(8)** to adjust the percentage deviation from the target that triggers an alarm.
5. Press the “X” button **(3)** to exit the control panel and save your changes.



RAPH22PLM0871BA 7

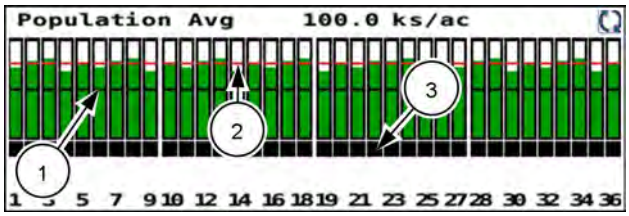
Application monitoring: seed

The Universal Terminal (UT) provides windows that give the status of seed application.

The UT provides the following seed application parameters:

- Seed population
- Spaces
- Multiples
- Skips
- Singulation
- Seed Release Index (SRI)

Bar graphs



RAPH23PLM0230AA 1

Application bar graphs appear on page 3 and page 6 of the object pool.

The black alarm limit bar **(1)** gives the lower alarm limit.

The red target rate bar **(2)** gives the target rate.

The bar graphs show the seed application rates for each row relative to the target rate.

The bar graph colors indicate the listed statuses. The statuses are determined by the seed information thresholds you establish in the “Customizable Settings” screen. See “Customizable Settings” screen” (**3-25**) for more information.

- Green – Within tolerance
- Yellow – Marginally out of tolerance
- Red – Significantly out of tolerance

The boxes below the seed graphs are row clutch status indicators **(3)**:

- Black – Row unit is ON and the clutch state allows planting
- Transparent – Row unit is OFF and the clutch state prevents planting
- Flashing Brown/Black – Priming failed
- Gray – Row unit is disabled or inactive

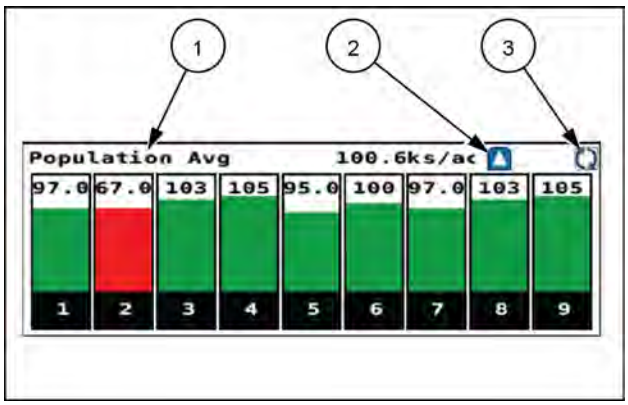
NOTE: *The boxes do not necessarily represent row status. For example a machine using the task controller rate could still show the boxes as black, even if the machine is raise in a unplanted area. This is because the task controller is telling the clutches to be based on overlap. But the rows are being sent a zero rate, so they do not apply product.*

You can zoom in on a bar graph. The first zoom level gives a drive view. Press the desired drive to obtain the drive view.

The drive view gives the selected parameter **(1)** for each row unit in the selected drive.

Press the up-arrow **(2)** to return to the full planter view.

Press the cycle button **(3)** to scroll between the parameters.



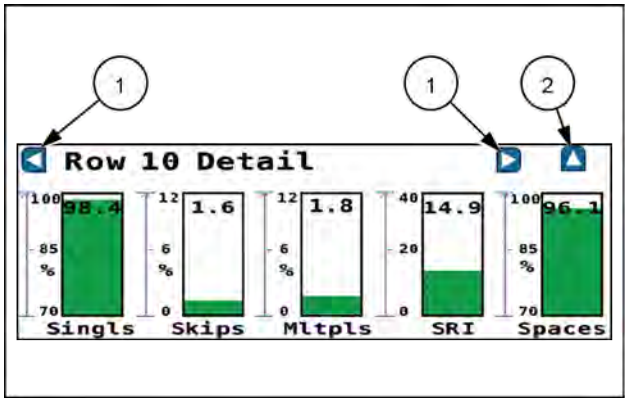
RAPH23PLM0223AA 2

In the drive view, press an individual row to see the row view of the bar graph.

The row view gives information for all five parameters for a selected row. Each bar includes a scale legend, which does not change with adjustments to the seed information thresholds.

Press the right or left-arrow buttons **(1)** to navigate between row units.

Press the up-arrow button **(2)** to return to the drive view.



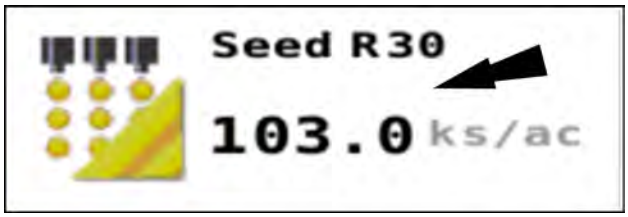
RAIL20PLM1141AA 3

Seed population

You can press the seed population window to bring up a control window. The control window allows you configure the view.

This example shows seed population on row 30. The readout in the window changes in real time as the rate changes.

Press the seed population window to customize the readout.



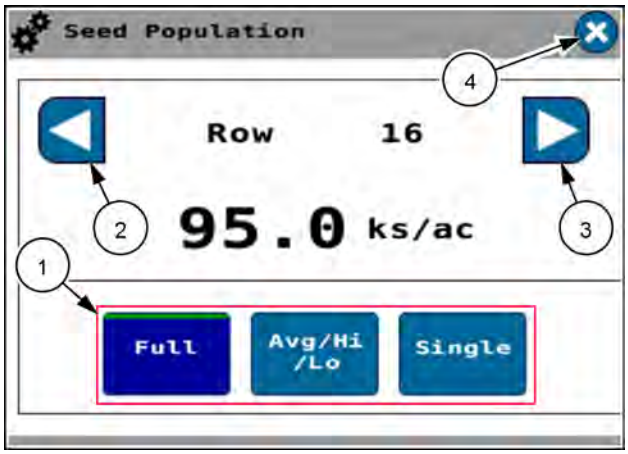
RAPH23PLM0222AA 4

The “Seed Population” control window appears. Select one of the three readout options **(1)**.

In the “Full” option the row number cycles through all the rows in the planter automatically. The cycle also gives the row numbers with the highest and lowest readouts in the row number area. The average of all rows also appears in the row number area.

Press the left-arrow **(2)** or right-arrow **(3)** buttons to more quickly cycle to the desired row number readout, high-or-low row number readout, and average readout.

Press the close (X) button **(4)** to close the “Seed Population” window. The readout in the seed population window matches the selection you make in the “Seed Population” window.



RAPH23PLM1151BA 5

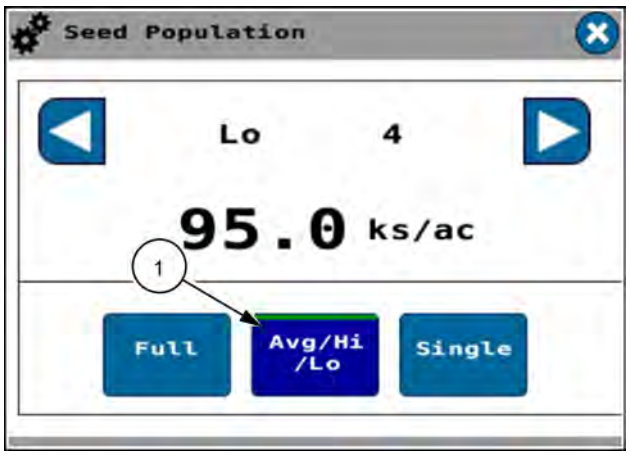
In the “Avg/Hi/Lo” option **(1)** the readout cycles through:

- The average application rate of all rows with no row number given.
- The row number and its application rate of the row with the highest readout.
- The row number and its application rate of the row with the lowest readout.

The readouts update continuously.

Pressing the left and right-arrow buttons changes the selected option from “Avg/Hi/Lo” to “Single.”

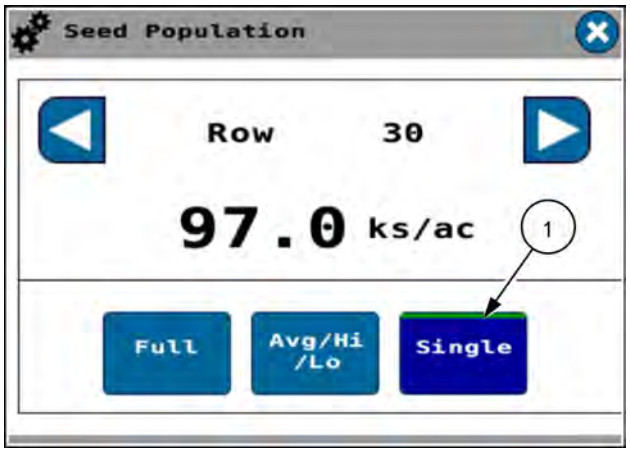
In this example row 4 had the lowest application rate on the planter during the current cycle of readouts. The next time the lowest row number appears, it may be a different row number.



RAPH23PLM1149BA 6

The “Single” option **(1)** gives a continuously updating application rate for the selected row. There is also an option to continuously monitor the average application rate for the planter. The average application rate is denoted by the “Avg” annotation.

Use the left and right-arrow buttons to scroll through the rows until you reach the desired row number or the average application rate. The “Avg” annotation is after the highest numbered row.



RAPH23PLM1150BA 7

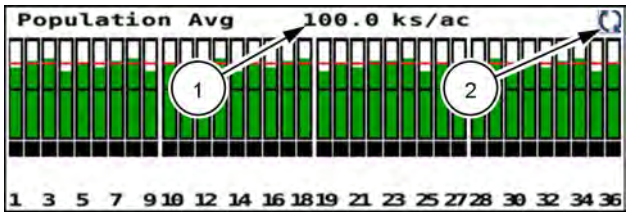
Seed population bar graph

The seed bar graph always reflects the current planter performance for each row unit relative to the target population rate.

The bars are numbered by row number. The drives are denoted by separations between the bars.

The bar graph gives the population average **(1)**.

Several bar graphs that denote different parameters are possible. If the bar graph gives a parameter other than seed population, press the cycle button **(2)** to cycle through the visible bar graphs until the seed population graph appears.



RAPH23PLM0230AA 8

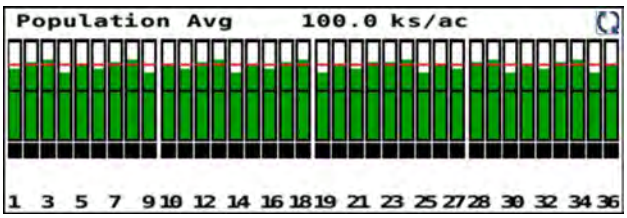
The bar colors denote the warning level you configure in the “Customizable Settings” screen.

The warning level defines the degree of deviation from theoretically perfect performance. The colors denote escalating conditions from green through yellow to red, with red being the most severe deviation. Higher warning levels trigger changes that have less degree of deviation than do lower warning levels.

The target population rate is represented by the red line. It can be:

- The default application rate in the selected work condition.
- A configured rate that you configured in a “Seed Control” window or that is sent to the system from the Task Controller (TC) application in the display. The configured rate overrides the default rate from the selected work condition.
- The rate from a seed prescription map during automatic operation.

See the section “Bar graphs” above for more information on bar graphs.



RAPH23PLM0230AA 9

Spacing

The “Spaces” window displays the spacing between seeds for each row unit, one row at a time.

The “Spaces” window appears on page 5 of the object pool in the Universal Terminal (UT) window.

Use the “Spaces” window to monitor the spacing for:

- Each seed sensor, one row at a time
- Each planter drive
- The row currently reporting the highest value
- The row currently reporting the lowest value
- The entire planter average

Press the “Spaces” window to open a “Seed Spacing” control window.

RAIL20PLM1133AA 10

Select the desired readout mode. The readout in the control window and in the “Spaces” window changes to your selection.

The selected mode has a green indicator.

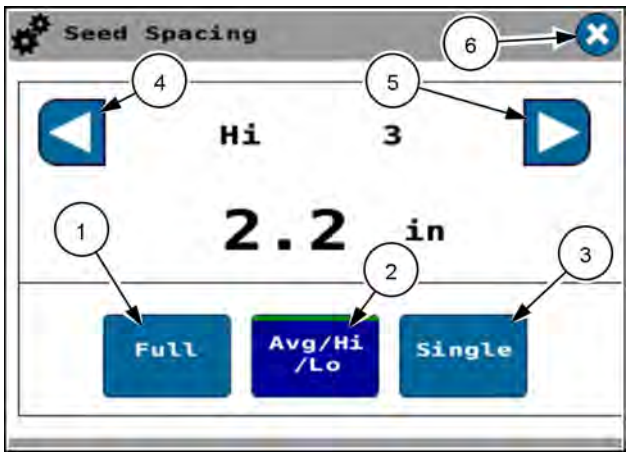
The “Full” mode **(1)** cycles the readout through all of the individual row readouts one at a time. The “Full” mode also gives the average across all rows, between the last row and row 1.

The “Avg/Hi/Lo” mode **(2)** cycles the readout between the average for all rows and the readouts for the rows representing the lowest and highest values.

The “Single” mode **(3)** gives the readout for the selected row. You can also scroll to see the average.

Press the left **(4)** and right **(5)** arrows to manually cycle through the rows until you get to a desired row. The readout mode automatically shifts to the “Single” mode.

Press the “X” button **(6)** to close the control window.



RAPH23PLM1152BA 11

Multiples

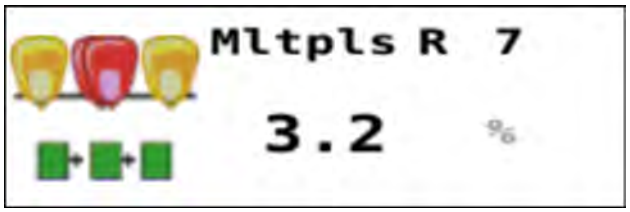
The “Multiples” window reports the percentage of multiples for the seed meter. Multiples are instances when the planter has dropped more than one seed in a location. Multiples cannot be zero, which would be theoretical perfection. But multiples should be as close to zero as possible.

Find the multiples scan window on page 6 of the object pool.

Use the “Multiples” window to monitor the multiples percentage for:

- Each seed sensor, one row at a time
- Each planter drive
- The row currently reporting the highest value
- The row currently reporting the lowest value
- The entire planter average

Press the “Multiples” window to open a “Percent Multiples” control window.



RAIL20PLM1129AA 12

Select the desired readout mode. The readout in the control window and in the “Multiples” window changes to your selection.

The selected mode has a green indicator .

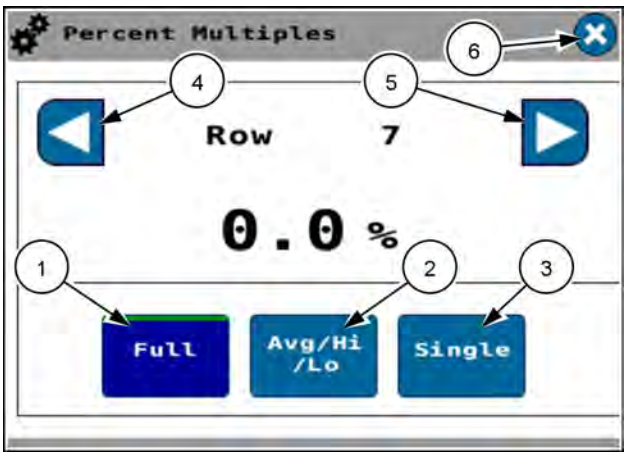
The “Full” mode **(1)** cycles the readout through all of the individual row readouts one at a time. The “Full” mode also gives the average across all rows, between the last row and row 1.

The “Avg/Hi/Lo” mode **(2)** cycles the readout between the average for all rows and the readouts for the rows representing the lowest and highest values.

The “Single” mode **(3)** gives the readout for the selected row only. You can also scroll to see the average.

Press the left **(4)** and right **(5)** arrows to manually cycle through the rows until you get to a desired row. The readout mode automatically shifts to the “Single” mode.

Press the “X” button **(6)** to close the control window.



RAPH23PLM1153BA 13

Multiples bar graph

This example shows a drive view of multiples.

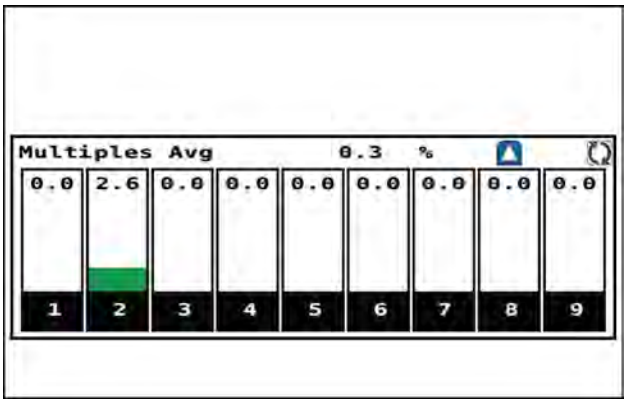
The multiples bar graph always reflects the current planter performance for each row unit relative to the target multiples rate.

The bars are numbered by row number. The drives in the entire planter view are denoted by separations between the bars.

The bar graph gives the average.

Several bar graphs that denote different parameters are possible. If the bar graph gives a parameter other than multiples, press the cycle button to cycle through the visible bar graphs until the multiples bar graph appears.

See the section “Bar graphs” above for more information on bar graphs.



RAPH23PLM0226AA 14

Skips scan

RAIL20PLM1130AA 15

The “Skips” window reports the percentage of skips for the seed meter. Skips are instances when the planter has missed dropping a seed in a location. Skips cannot be zero, which would be theoretical perfection. But skips should be as close to zero as possible.

Find the skips scan window on page 6 of the object pool.

Use the “Skips” window to monitor the skips percentage for:

- Each seed sensor, one row at a time
- Each planter drive
- The row currently reporting the highest value
- The row currently reporting the lowest value
- The entire planter average

Press the “Skips” window to open a “Percent Skips” control window.

Select the desired readout mode. The readout in the control window and in the “Multiples” window changes to your selection.

The selected mode has a green indicator **(1)**.

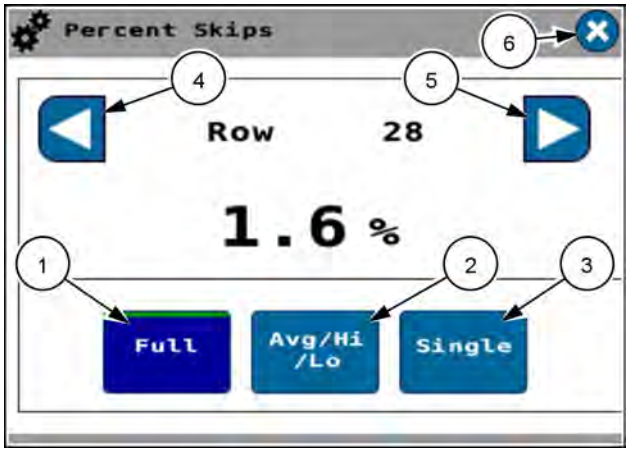
The “Full” mode **(2)** cycles the readout through all of the individual row readouts one at a time. The “Full” mode also gives the average across all rows, between the last row and row 1.

The “Avg/Hi/Lo” mode **(3)** cycles the readout between the average for all rows and the readouts for the rows representing the lowest and highest values.

The “Single” mode **(4)** gives the readout for the selected row only. You can also scroll to see the average.

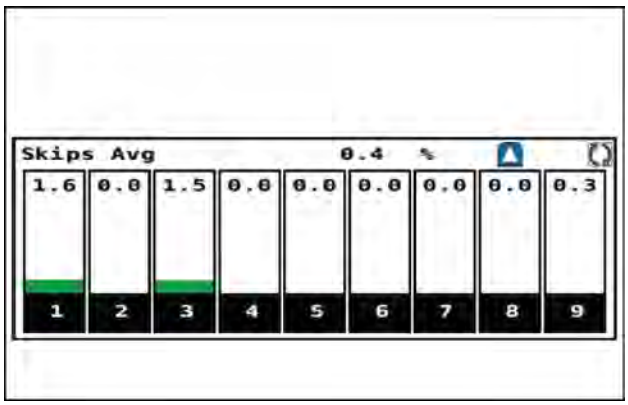
Press the left **(5)** and right **(6)** arrows to manually cycle through the rows until you get to a desired row. The readout mode automatically shifts to the “Single” mode.

Press the “X” button **(7)** to close the control window.



RAPH23PLM1154BA 16

Skips bar graph



RAPH23PLM0227AA 17

This example shows a drive view of skips.

The skips bar graph always reflects the current planter performance for each row unit relative to the target skips rate.

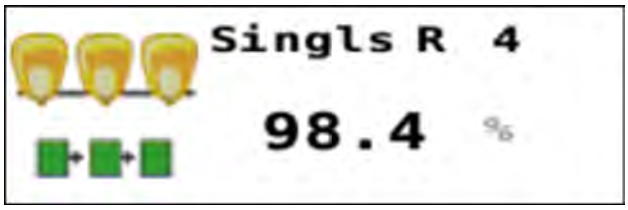
The bars are numbered by row number. The drives are denoted by separations between the bars.

The bar graph gives the average.

Several bar graphs that denote different parameters are possible. If the bar graph gives a parameter other than skips, press the cycle button to cycle through the visible bar graphs until the skips bar graph appears.

See the section “Bar graphs” above for more information on bar graphs.

Singulation



RAIL20PLM1131AA 18

The “Singulation” window reports the percentage of singulation for the seed meter. The “Singulation” window reports detailed singulation information for each row and planter section as well as the average percentage for the entire planter. Singulation cannot be 100 percent, which would be theoretical perfection. But singulation should be as close to 100 percent as possible.

Find the singulation scan window on page 6 of the object pool.

Use the “Singulation” window to monitor the singulation percentage for:

- Each seed sensor, one row at a time
- Each planter drive
- The row currently reporting the highest value
- The row currently reporting the lowest value
- The entire planter average

Press the “Singulation” window to open a “Percent Singulation” control window.

Press the button for the desired readout mode. The readout in the control window and in the “Singulation” window changes to your selection.

The selected mode has a green indicator.

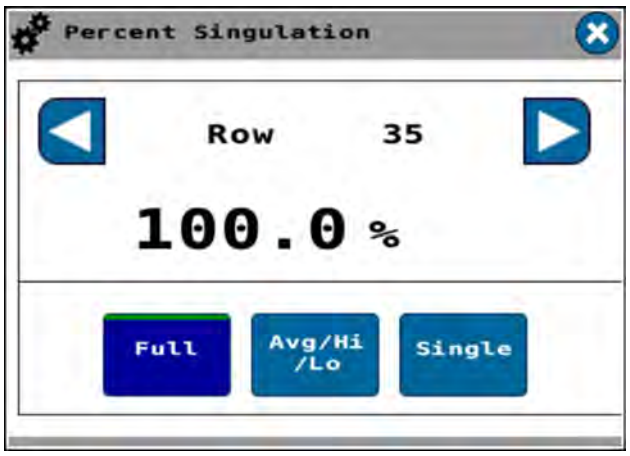
The “Full” mode cycles the readout through all of the individual row readouts one at a time. The “Full” mode also gives the average across all rows, between the last row and row 1.

The “Avg/Hi/Lo” mode cycles the readout between the average for all rows and the readouts for the rows representing the lowest and highest values.

The “Single” mode gives the readout for the selected row only. You can also scroll to see the average.

Press the left and right arrows to manually cycle through the rows until you get to a desired row. The readout mode automatically shifts to the “Single” mode.

Press the “X” button to close the control window.



RAPH23PLM1155BA 19

Singulation bar graph

This example shows a drive view of singulation.

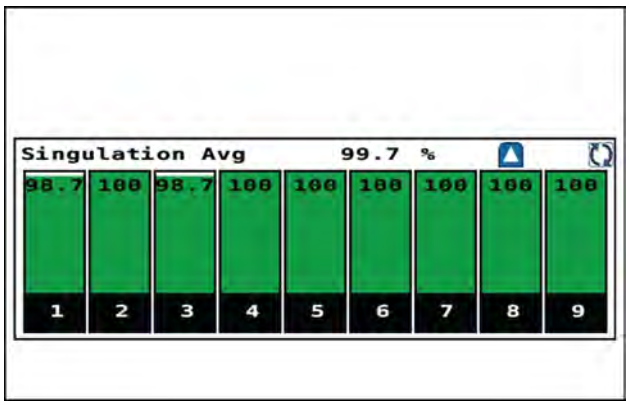
The “Singulation” bar graph displays the singulation percentage for each row in bar graph form

The bars are numbered by row number. The drives are denoted by separations between the bars.

The bar graph gives the average.

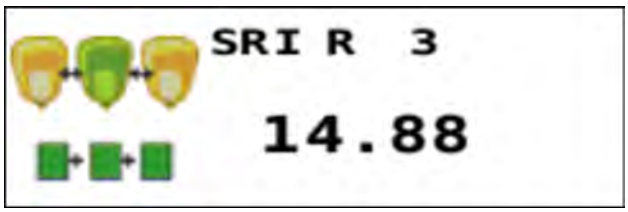
Several bar graphs that denote different parameters are possible. If the bar graph gives a parameter other than singulation, press the cycle button to cycle through the visible bar graphs until the singulation bar graph appears.

See the section “Bar graphs” above for more information on bar graphs.



RAPH23PLM0228AA 20

Seed Release Index (SRI)



RAIL20PLM1132AA 21

The “SRI” window reports detailed Seed Release Index (SRI) information for each row and the average value for the entire planter. The SRI is a measure of the consistency of seed drop (a lower number represents more consistent seed drop). The “SRI” window reports detailed SRI information for each row and planter section as well as the average SRI for the entire planter.

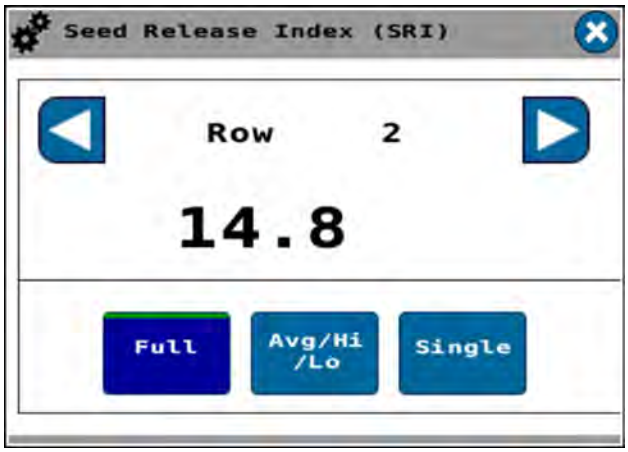
Find the SRI scan window on page 6 of the object pool.

Use the “SRI” window to monitor the SRI for:

- Each seed sensor, one row at a time
- Each planter drive
- The row currently reporting the highest value
- The row currently reporting the lowest value
- The entire planter average

Press the “SRI” window to open an “SRI” control window.

Press the button for the desired readout mode. The readout in the control window and in the “SRI” window changes to your selection.



RAPH23PLM1156BA 22

The selected mode has a green indicator.

The “Full” mode cycles the readout through all of the individual row readouts one at a time. The “Full” mode also gives the average across all rows, between the last row and row 1.

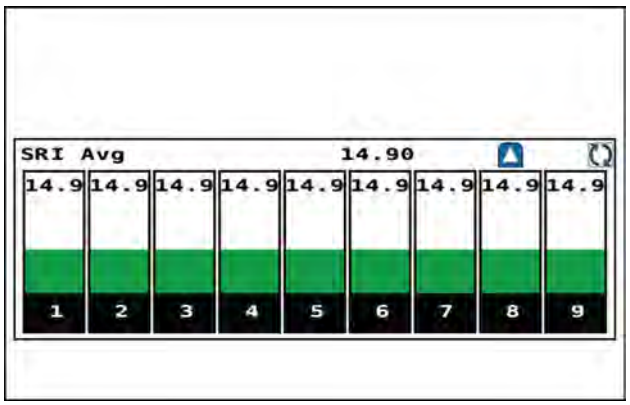
The “Avg/Hi/Lo” mode cycles the readout between the average for all rows and the readouts for the rows representing the lowest and highest values.

The “Single” mode gives the readout for the selected row only. You can also scroll to see the average.

Press the left and right arrows to manually cycle through the rows until you get to a desired row. The readout mode automatically shifts to the “Single” mode.

Press the “X” button to close the control window.

SRI bar graph



RAPH23PLM0229AA 23

This example shows a drive view of SRI.

The “SRI” bar graph displays the singulation percentage for each row in bar graph form

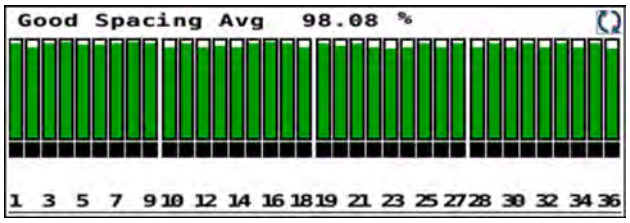
The bars are numbered by row number. The drives are denoted by separations between the bars.

The bar graph gives the average.

Several bar graphs that denote different parameters are possible. If the bar graph gives a parameter other than SRI, press the cycle button to cycle through the visible bar graphs until the SRI bar graph appears.

See the section “Bar graphs” above for more information on bar graphs.

Good spacing bar graph



RAPH23PLM0231AA 24

The good spacing bar graph always reflects the current planter performance for each row unit relative to the target seed spacing rate.

The bars are numbered by row number. The drives are denoted by separations between the bars.

The bar graph gives the population average.

Several bar graphs that denote different parameters are possible. If the bar graph gives a parameter other than good spacing, press the cycle button to cycle through the visible bar graphs until the multiples bar graph appears.

Application rate control: liquid fertilizer

Use the work condition windows to configure liquid application rates. See “Work Condition Setup screen” (**3-80**) for instructions on configuring work conditions.

NOTE: *The application rates shown in the images in this section are for illustration purposes only. Use application rates appropriate for your operation.*

You can use a default application rate configured in the selected work condition, or configure a target rate for your operation. Use the “Liquid Ctrl” window to enter a desired target rate.

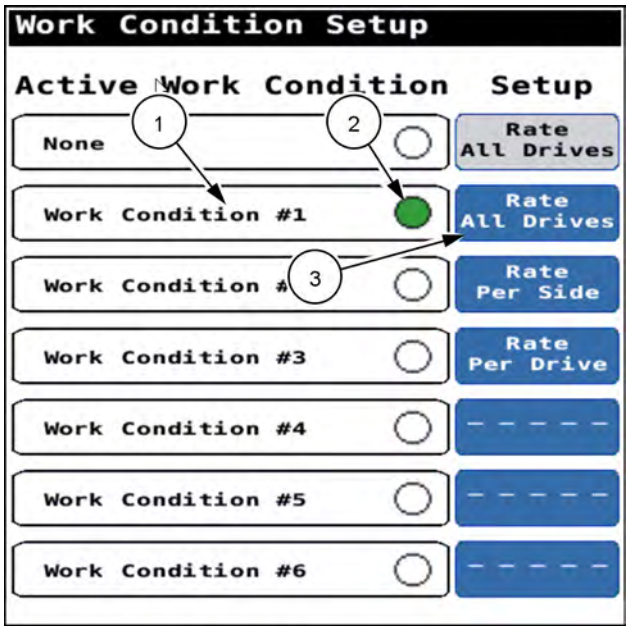
Default rates

In the “Work Condition Setup” screen, select the desired work condition **(1)**. The green indicator **(2)** moves to the selected work condition.

If you need to change the configuration in this work condition, press the button **(3)** in the “Setup” column to open the work condition screens.

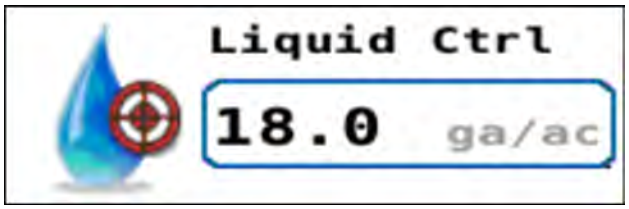
Adjust the work condition as needed for your operation. See “Work Condition Setup screen” (**3-80**) for instructions on configuring work conditions.

NOTE: *You can also create a new work condition with the correct parameters for the planting operation you wish to configure. See “Work Condition Setup screen” (**3-80**) for instructions on configuring work conditions.*



RAIL20PLM1574BA 1

In page 1 of the object pool, press the “Liquid Ctrl” window.



RAIL20PLM1137AA 2

The “Liquid Ctrl” screen appears.

Press the “ON” button **(1)** to activate liquid rate control.

The green indicator will appear on the currently selected rate **(2)**. If the selected rate is the desired rate for your operation, press the “X” button **(3)** to exit the screen.

If one of the rates is the desired rate for your operation, press the rate button (“Manual 1” or “Manual 2”). The green indicator moves to the selected button. The desired rate appears in the rate area **(4)**.

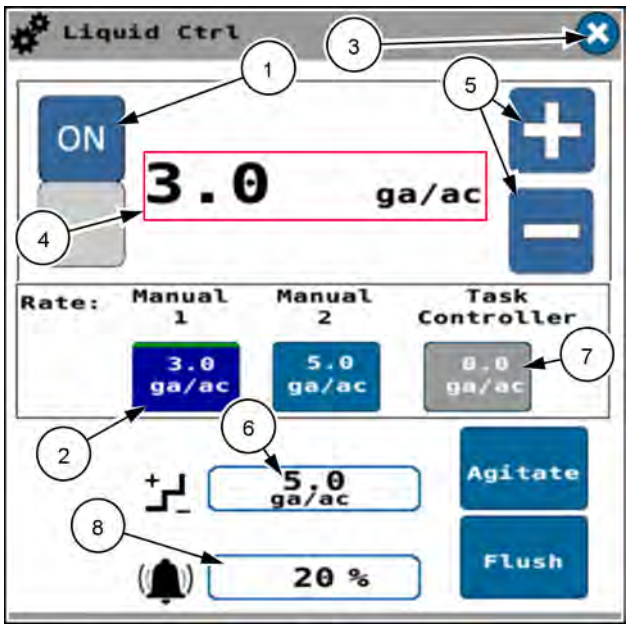
If you need to temporarily configure a different rate, press the “Rate” button if it is not already selected as indicated by the green indicator. Use the “plus” and “minus” buttons **(5)** to enter the desired application rate. You can also use the stepper control **(6)** to adjust the increment of the “plus” and “minus” buttons **(4)**.

Alternatively, you can press the rate area **(4)** on the screen to manually enter the desired rate.

NOTE: *The “Manual 1” and “Manual 2” values are stored in the active work condition. Alternatively, you can use the task controller rate from the display* ***(7)****. If no rate is available from the task controller, the “Task Controller” button is inactive.*

If needed, press the alarm field **(8)** to adjust the percentage deviation from the target that triggers an alarm.

Press the “X” button **(3)** to exit the screen and save your changes.



RAPH22PLM0872BA 3

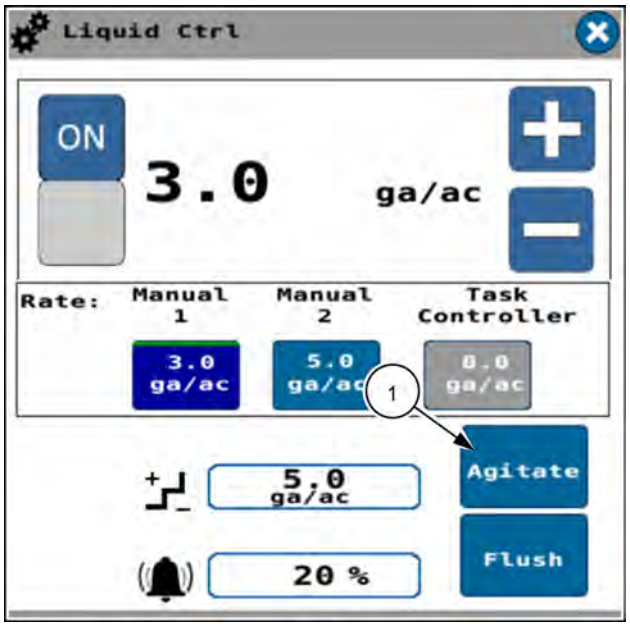
Fertilizer agitation operation

Use the “Agitate” function in the display to provide tank agitation when the planter is raised and not applying liquid fertilizer. The agitator, which is part of the recirculation circuit for the liquid fertilizer system, is located at the bottom of the tank, next to the drain fitting.

Raise the planter. Verify the planter is raised.

With liquid control enabled, press the “Agitate” button to turn the agitate function ON. When the function is active, the button reads “Agitate On” **(1)**. The liquid fertilizer pump is activated to recirculate the liquid fertilizer through the control valve and into the tank. The section control valves remain OFF.

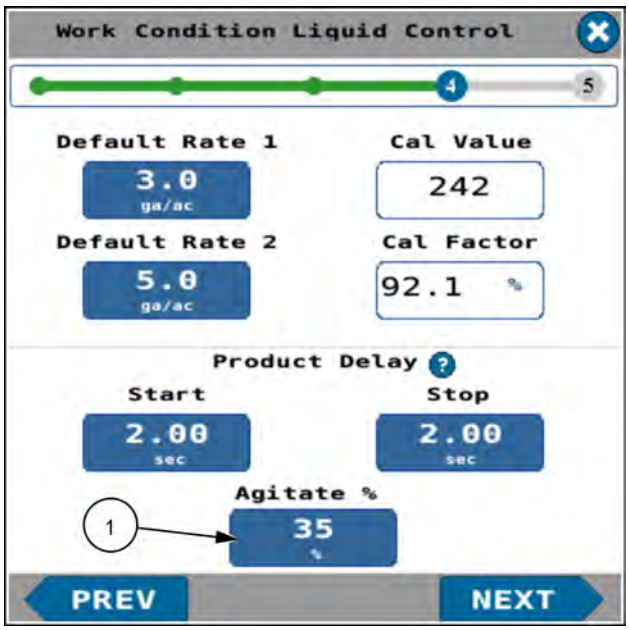
NOTE: *The “Agitate” and “Flush” operations can not be run simultaneously; when one function is ON, the other is disabled.*



RAPH22PLM0872BA 4

When you turn the agitate function on, the system will divert the specified amount of flow through the agitator, defined by the agitate percentage **(1)** set in the “Work Condition Liquid Control” screen. For more information on setting up work conditions, see “Work Condition Setup screen” (**3-80**).

Press the “Agitate On” button to turn the fertilizer agitator OFF. The agitate function is deactivated.



NHIL21PLM0191AA 5

Flush operation

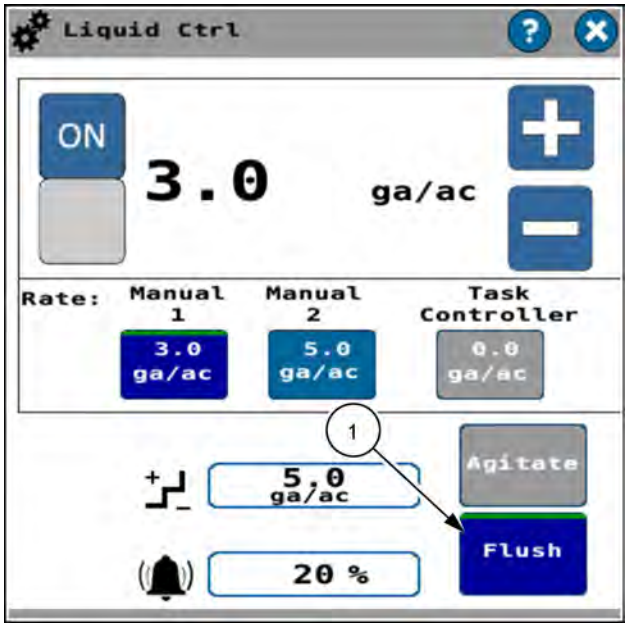
Use the “Flush” function in the display to run the fertilizer system while the planter is stationary, to check for plugging or flush out the distribution lines after use.

With liquid control enabled, press the “Flush” button to perform the flush operation. When the function is active, the button reads “Flush On” **(1)**. The liquid fertilizer pump and the section control valves are activated.

NOTE: *The “Agitate” and “Flush” operations can not be run simultaneously; when one function is ON, the other is disabled.*

Raise the planter. Verify the planter is raised.

Press the “Flush On” button to turn the flush operation ON. The liquid fertilizer pump and the section valves are deactivated.



RAPH23PLM1263BA 6

Application monitoring: liquid fertilizer

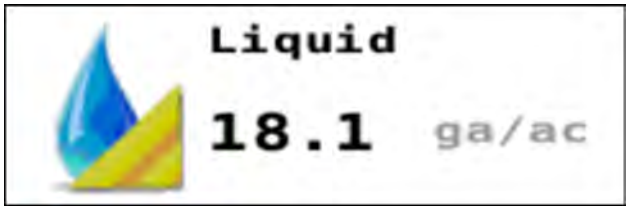
The following windows provide information on fertilizer application in progress:

- The “Liquid” window continuous average applied rate for the entire planter.
- The “Liquid Flow” window reports the average flow rate for the entire planter.
- The “Liquid Pressure” window reports the average pressure for the entire planter.
- The “Liquid” IR flow monitor window reports the highest and lowest application rate for all rows equipped with IR flow monitoring.

Liquid

Find the “Liquid” window on page 1 of the object pool.

Use the “Liquid” window to monitor the average applied rate (volume per unit of area) for the entire planter.

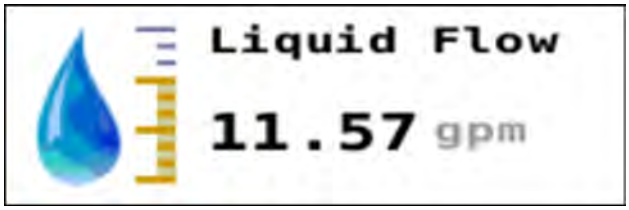


RAIL20PLM1136AA 1

Liquid flow

Find the “Liquid Flow” window on page 4 of the object pool.

Use the “Liquid Flow” window to monitor the average flow rate (volume per minute) for the entire planter.

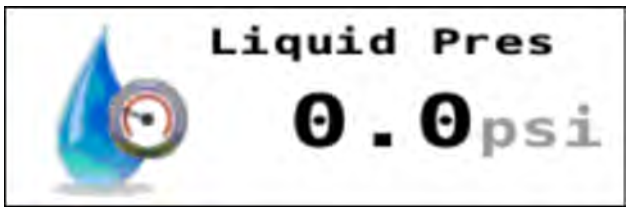


RAIL20PLM1135AA 2

Liquid pressure

Find the “Liquid Pres” window on page 3 of the object pool.

Use the “Liquid Pres” window to monitor the liquid application pressure in kPa or psi.



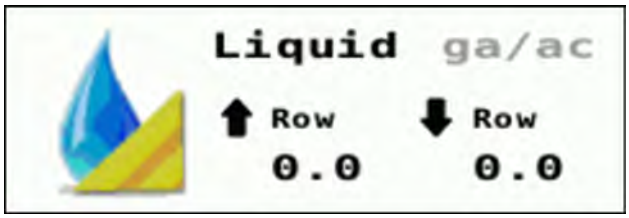
RAIL20PLM1216AA 3

IR flow monitor (all rows)

Find the “Liquid” IR flow monitor window on page 3 of the object pool.

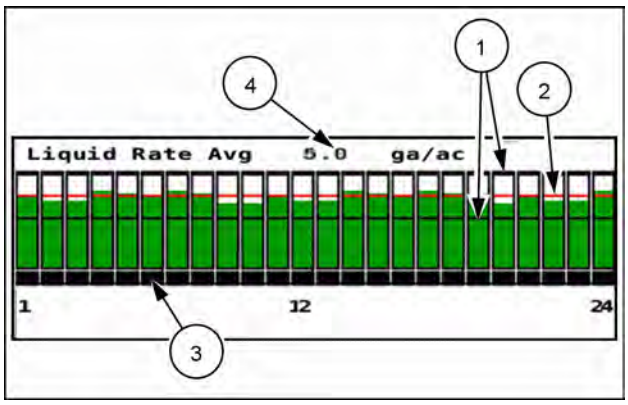
Use the “Liquid” IR flow monitor window to monitor the highest liquid flow measurement and the lowest liquid flow measurement during the measurement cycle. The values represent all rows that are equipped with IR flow monitor.

Press the “Liquid” IR flow monitor to view the liquid application rates of each row on the “Liquid Rate Avg” bar graph, located on page 6 of the object pool.



NHPH25PLM0027AA 4

Liquid application rate bar graph



NHPH25PLM0030AA 5

The liquid bar graph appears on page 6 of the object pool.

The black alarm limit bars **(1)** show the upper and lower limits of the alarm percentage you establish in the liquid controller.

The red target rate bar **(2)** visually displays the target rate.

The bar graphs show the liquid application rates for each row relative to the target rate.

The bar graph colors indicate the listed statuses.

- Green – Within tolerance
- Yellow – Marginally out of tolerance
- Red – Significantly out of tolerance

The boxes below the liquid graphs indicate the rows that have IR flow monitoring enabled **(3)**:

- Black – Row unit is ON and the clutch state allows planting
- White – Row unit is OFF and the clutch state prevents planting

The current average application rate **(4)** for the liquid system displays at the top of the graph.

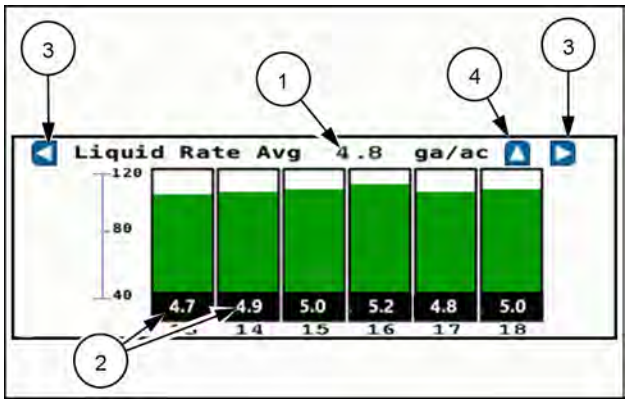
You can zoom in on the bar graph. This provides a section-wide view. Press the desired section to obtain the section view.

The section view bar graph displays the average application rate **(1)** for the section at the top of the window.

Each row displays the application rate **(2)** for each row in the selected section.

Press the right or left-arrow buttons **(3)** to navigate between sections.

Press the up-arrow button **(4)** to return to the system-wide view.



NHPH25PLM0031AA 6

Application rate control: granular fertilizer

Use the work condition windows to configure granular application rates. See “Work Condition Setup screen” (**3-80**) for instructions on configuring work conditions.

NOTE: *The application rates shown in the images in this section are for illustration purposes only. Use application rates appropriate for your operation.*

You can use a default application rate configured in the selected work condition, or configure a target rate for your operation. Use the “Gran Ctrl” window to enter a desired target rate.

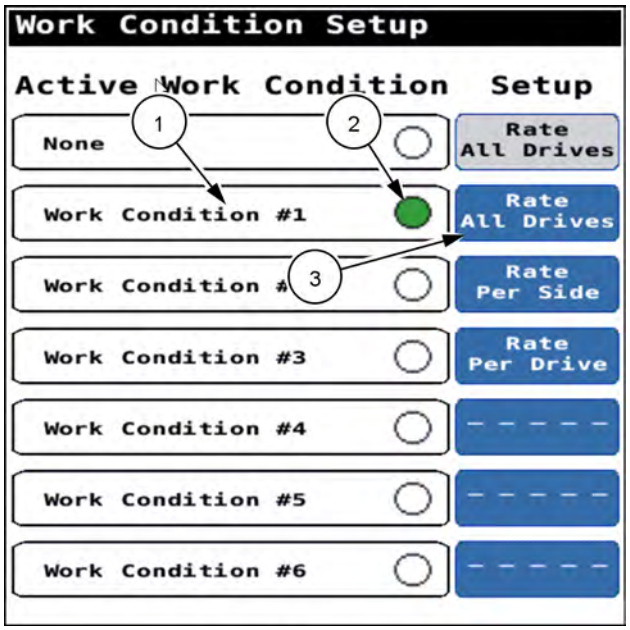
Default rates

In the “Work Condition Setup” screen, select the desired work condition **(1)**. The green indicator **(2)** moves to the selected work condition.

If you need to change the configuration in this work condition, press the button **(3)** in the “Setup” column to open the work condition screens.

Adjust the work condition as needed for your operation. See “Work Condition Setup screen” (**3-80**) for instructions on configuring work conditions.

NOTE: *You can also create a new work condition with the correct parameters for the planting operation you wish to configure. See “Work Condition Setup screen” (**3-80**) for instructions on configuring work conditions.*



RAIL20PLM1574BA 1

In page 1 of the object pool, press the “Gran Ctrl” window.

After you turn ON the granular system in the next step, this window gives the target application rate.

RAPH23PLM0455AA 2

The “Granular Ctrl” screen appears.

Press the “ON” button **(1)** to activate granular rate control.

The green indicator will appear on the default rate **(2)** or the configured rate. If the rate is the desired rate for your operation, press the “X” button **(3)** to exit the screen. The desired rate appears on the “Gran Ctrl” window in run screen 1.

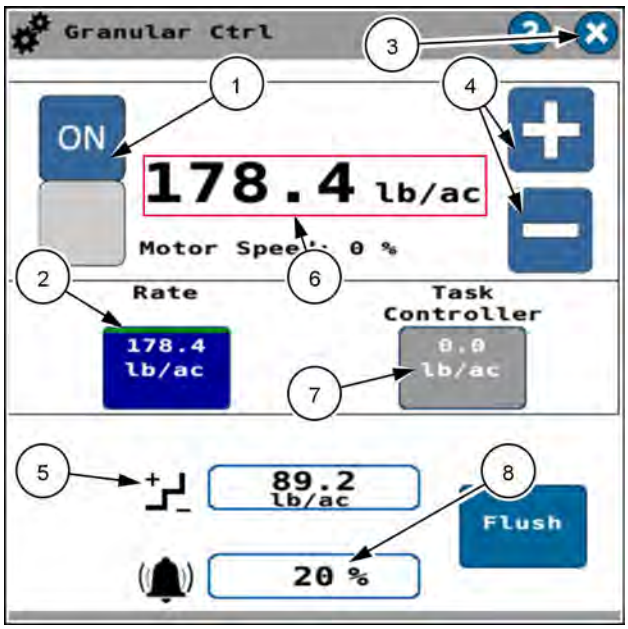
If you need to temporarily configure a different rate, press the “Rate” button **(2)** if it is not already selected as indicated by the green indicator. Use the “plus” and “minus” buttons **(4)** to enter the desired application rate. You can use the stepper control **(5)** to adjust the increment of the “plus” and “minus” buttons **(4)**.

Alternatively, you can press the rate area **(6)** on the screen to manually enter the desired rate.

NOTE: *The “Rate value is stored in the active work condition. Alternatively, you can use the task controller rate from the display. If no rate is available from the task controller, the “Task Controller” button* ***(7)*** *is inactive.*

If needed, press the alarm field **(8)** to adjust the percentage deviation from the target that triggers an alarm.

Press the “X” button **(3)** to exit the screen and save your changes.



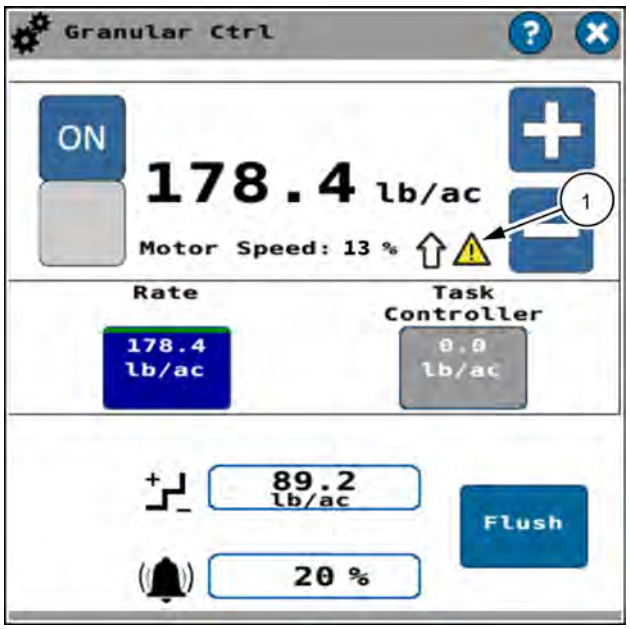
RAPH23PLM1261BA 3

Motor speed

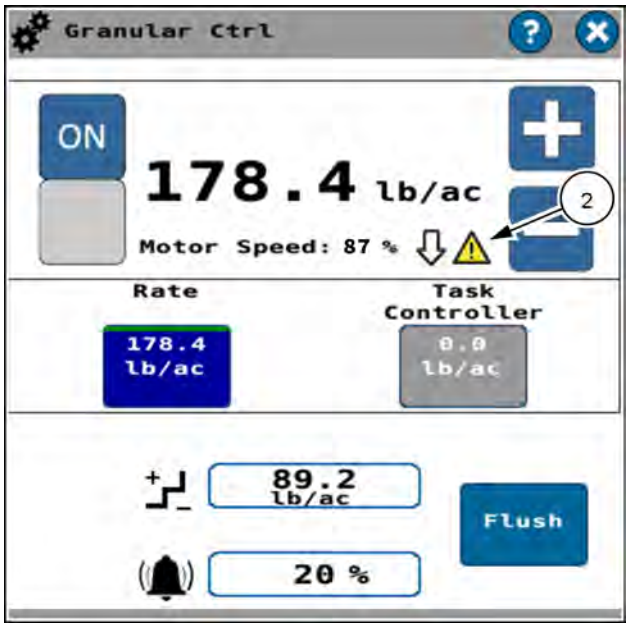
The granular system motor speed appears as a percentage of the system capability.

If the motor speed is below the value determined in the software, an icon **(1)** appears alerting you of the need to increase the motor speed. You do this by increasing the tractor speed until the motor runs fast enough to apply product at the configured rate.

If the motor speed is above the value determined in the software, an icon **(2)** appears alerting you of the need to decrease the motor speed. You do this by decreasing the tractor speed until the motor slows down enough to apply product efficiently at the configured rate.



RAPH23PLM1264BA 4



RAPH23PLM1265BA 5

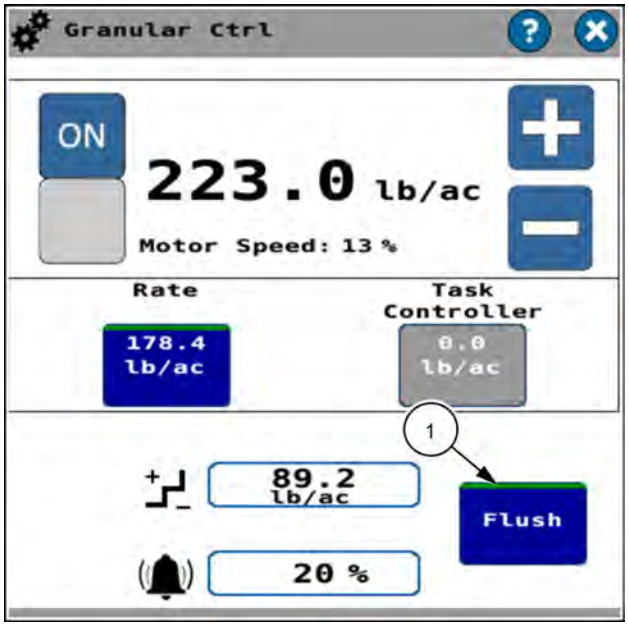
Flush operation

Use the “Flush” function in the display to run the fertilizer system while the planter is stationary or moving, to check for plugging or flush out the distribution lines after use.

NOTE: *The flush function allows you to apply the small amount of product remaining in your planter over an area of field.*

With granular control enabled, press and hold the “Flush” button to perform the flush operation. When the function is active, the button reads “Flush On” **(1)** and a green indicator appears on the button.

The product motor runs at a simulated speed of **8 km/h** (**5 mph**).



RAPH23PLM1262BA 6

Application monitoring: granular fertilizer

Liquid

Find the “Gran Fert” window on page 1 of the object pool.

Use the “Gran Fert” window to monitor the average applied rate (weight per unit of area) for the entire planter.

RAPH23PLM0456AA 1

Area monitoring

The area windows found on page 5 of the object pool show the area that the implement has covered while in work and moving.

The four monitored types of accumulated areas are:

- Area Farm
- Area Field
- Area Season
- Area Life

Area farm

The “Area Farm” window gives the accumulated area covered by your implement on the farm being worked. This is the area covered since the last time you reset this counter.

To reset the “Area Farm” window, press the readout.

RAPH21PLM1062AA 1

Press the “Reset” button **(1)** to reset the “Area Farm” window to zero.

Press the “No” button **(2)** to cancel the reset and return to the readout.

RAPH21PLM1066AA 2

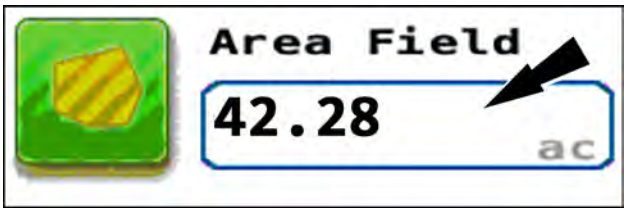
The “Area Farm” window resets to zero.

RAPH21PLM1068AA 3

Area field

The “Area Field” window gives the accumulated area covered by your implement on the field being worked. This is the area covered since the last time you reset this counter.

To reset the “Area Field” window, press the readout.



RAPH21PLM1063AA 4

Press the “Reset” button to reset the “Area Field” window to zero.

Press the “No” button to cancel the reset and return to the readout.

RAPH21PLM1067AA 5

The “Area Field” window resets to zero.

RAPH21PLM1069AA 6

Area season

The “Area Season” window gives the accumulated area covered by your implement during the season. This is the area covered since the last time you reset this counter.

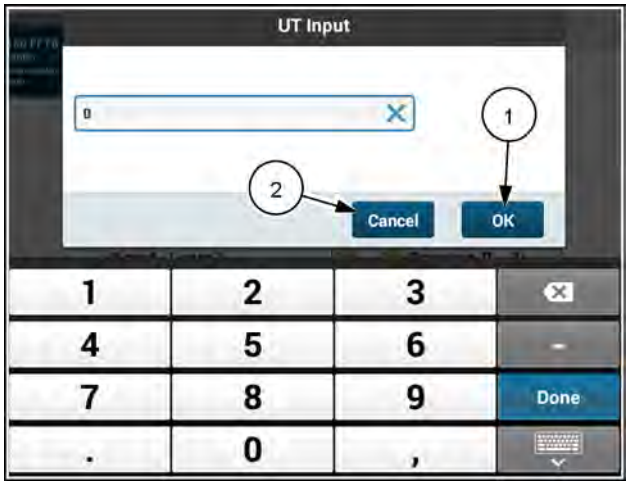
To reset the “Area Season” window, press the readout.

RAPH21PLM1064AA 7

An input window appears that allows you to bring up a keypad. Press the field in the input window to bring up the keypad. Use the keypad to enter zero or an area that you wish to reset the counter to.

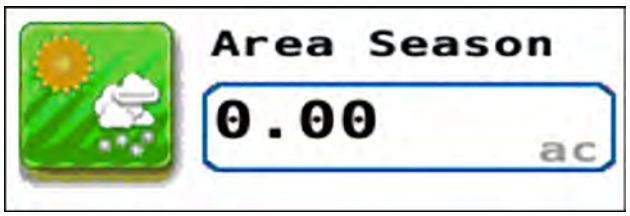
Press the “OK” button **(1)** to accept your changes and reset the “Area Season” window.

Press the “Cancel” button **(2)** to cancel the area season reset.



RAPH21PLM1530BA 8

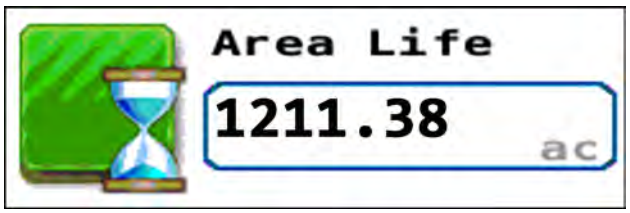
The “Area Season” window resets to zero.



RAPH21PLM1070AA 9

Area life

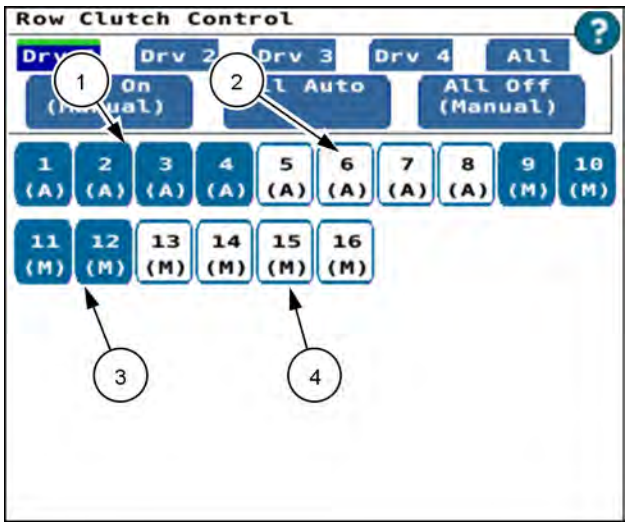
The “Area Life” window gives the accumulated total area covered by your implement during its life. You cannot reset this counter.



RAPH21PLM1065AA 10

Row clutch control windows

Row clutch control



RAPH22PLM0873BA 1

The “Row Clutch Control” window on page 4 of the object pool provides controls and indications of individual row unit status in seed application. In Auto (A) mode the row units are commanded ON and OFF by the Task Controller (TC) application, and the buttons indicate the status of a row unit by being blue (ON) or white (OFF). In Manual (M) mode, you manually turn individual row units ON or OFF.

The individual row buttons can have two or four states.

If there is no section control from the Task Controller (TC), the individual row buttons will have two states: manual ON and manual OFF.

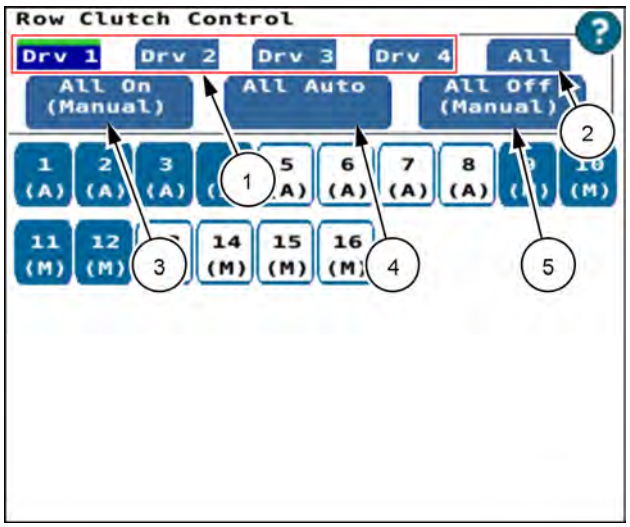
If the TC has section control, the individual row buttons have four states:

- Auto ON **(1)** – Blue, (A). The row is being commanded ON by the TC application.
- Auto OFF **(2)** – White, (A). The row is being commanded OFF by the TC application.
- Manual ON **(3)** – Blue, (M). The clutches are always ON and will plant until the user turns them OFF. There is no overlap control at all.
- Manual OFF **(4)** – White, (M). The clutches are turned OFF and will not plant until the operators turns the manual ON or sets them to auto.

NOTE: *If you need to return a row clutch setting to auto mode from a manual mode, cycle the applicable drive control in its section control window. You can also use the “All Auto” button.*

You can control the mode groups of row units with shortcut buttons:

- The buttons in the top row allow you to select individual drives or to select the entire planter. First select the group you wish to control.
- “Drv #” buttons **(1)** – Selects all of the row units in a drive. The currently selected drive appears highlighted.
- The “All” button **(2)** – Selects all row units.
- The “All On (Manual)” button **(3)** – Places all selected row units into manual mode and turns ON.
- The “All Auto” button **(4)** – Places all selected row units into automatic mode. The TC application controls the row units.
- The “All Off (Manual)” button **(5)** – Places all selected row units into manual mode and turns them OFF.



RAPH22PLM0873BA 2

You can turn individual row units that are configured to the manual mode ON or OFF after you have used the shortcut buttons to configure the rows.

You can place an individual row unit that is in auto mode into manual mode. However, you cannot change the mode of an individual row unit from manual into auto mode. You must place the applicable drive or the entire planter into auto mode first.

Jump start control

The jump start feature allows the product drives to start applying product early. Use the jump start feature when the planter is starting from a dead stop or where you cannot reach adequate ground speed to achieve the desired application rate – for example, after backing the planter into a corner of the field.

NOTE: *The jump start feature applies to all product controllers. All active controllers must be primed and ready to apply product before you activate the jump start feature.*

When you activate the jump start feature, application rate calculations ignore the actual ground speed and instead use the configured jump-start speed value.

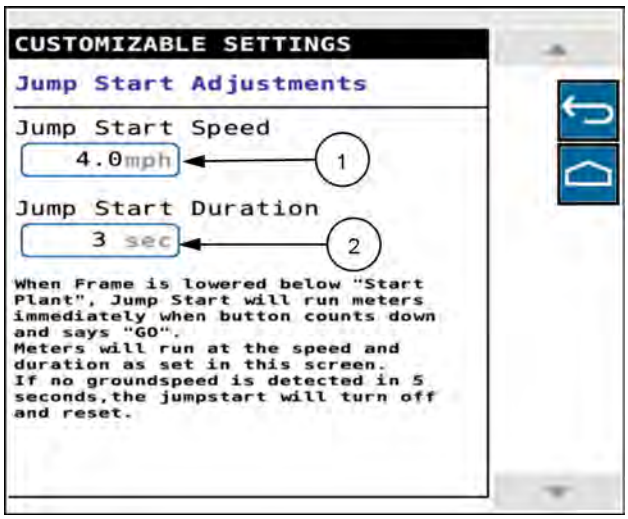
When active, the jump start feature controls product application rates until one of the following conditions occurs:

- The ground speed exceeds the configured jump-start speed value.
- The jump start duration time expires.
- The system detects no ground speed for five seconds.

Before you use the jump start feature, review the jump start settings (Menu > Settings > Customizable Settings > Jump Start Settings).

- "Jump Start Speed" **(1)** – The speed that the software uses for application rate calculations when you activate the jump start feature.

  NOTE: *The jump start feature is disabled when ground speed is greater than the "Jump Start Speed" value.*
- "Jump Start Duration" **(2)** – The time that the meters will run for when the "Jump Start" window on the planter home screen says "GO".



NHIL21PLM0150AA 1

Find the "Jump Start" window in page 3 of the object pool in the Universal Terminal (UT) application.

RAIL20PLM1159AA 2

A countdown gives you time to prepare. Start to drive when the "Jump Start" window says, "Go." The planter runs the meters to apply product using the jump start speed value until the actual ground speed exceeds the jump start speed value. When ground speed exceeds the "jump start speed" value, the planter applies product based on the actual ground speed.

When you are ready to activate the jump start feature:

1. Ensure that all active controllers are primed and ready to apply product.
2. Lower the planter to planting height.
3. Press and hold the button in the "Jump Start" window for five seconds.

During the jump start delay, the countdown number icon **(1)** appears, and counts down. The jump start button **(2)** turns blue and states, "Countdown."

If you choose to cancel the jump start feature, press the jump start button. The jump start feature turns OFF and the "Jump Start" window returns to the OFF state.

RAIL20PLM1160AA 3

When the countdown expires, product application starts at the target rates using the jump start speed.

The jump start button states, “Go.”

The planter applies product at the target rates until the ground speed exceeds the jump start speed or if the ground speed is zero and the jump start time expires. When the jump start process finishes, the “Jump Start” window returns to the OFF state.

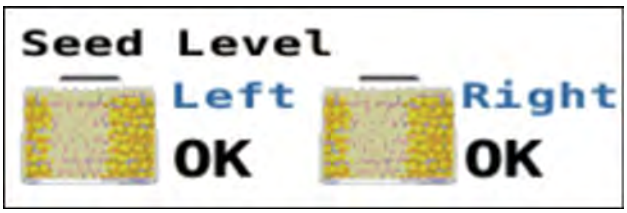
If you choose to cancel the jump start feature after the activation, press the jump start button. The jump start feature turns OFF and the “Jump Start” window returns to the OFF state.

RAIL20PLM1161AA 4

Seed level

The “Seed Level” window in run screen 5 displays the status of the left and right bulk fill hoppers. When a hopper is approaching empty, the corresponding level indicator reports it.

NOTE: *When a planter is equipped with only one seed hopper level sensor, only the left icon displays in the “Seed Level” window.*



RAIL20PLM1164AA 1

When one of the seed bins drops to a low enough level to trigger the level sensor, the corresponding icon in the “Seed Level” window indicates the condition.

RAIL20PLM1162AA 2

If a seed level drops too low, a warning message appears.

Press the “OK” button to acknowledge the warning and remove the message from the screen.

RAIL20PLM1163AA 3

Granular level

In planters equipped with granular fertilizer application, the “Gran Fert Level” window in run screen 5 displays the status of the left and right bulk fill hoppers. When a hopper is approaching empty, the corresponding level indicator reports it.

RAPH23PLM0459AA 1

When one of the granular bins drops to a low enough level to trigger the level sensor, the corresponding icon in the “Gran Fert Level” window indicates the condition.

RAPH23PLM0458AA 2

If a granular level drops too low, a warning message appears.

Press the “OK” button to acknowledge the warning and remove the message from the screen.

RAPH23PLM0457AA 3

FAN CONTROL

Introduction: fan control

This chapter explains:

- The available control and reporting screens for the vacuum fans and bulk fill fan, if equipped
- How the screens operate
- How setup selections affect the screens when applicable

Vacuum fan control

Use the “Vacuum Control” window to change the target vacuum rate used to hold seed on the seed disks while planting. The rate is in millimeters of H_2O or inches of H_2O.

If your planter is equipped with more than one vacuum fan, the rate set with the control window applies to both fans.

The software default rate is **508.0 mm H_2O** (**20.0 in H_2O**).

Place the “Frame Op” window into the “Plant” position. See “Introduction: frame control” (**4-50**) and the frame control section for your planter.

NOTE: *Choosing any selection other than “Plant” in the “Frame Op” window turns the vacuum fans OFF.*

NOTE: *Once you enable the hydraulics, the “Start” button in the “Planter Sys” window automatically turns the vacuum fans ON.*

RAIL20PLM1165AA 1

If the vacuum fans are driven by a PTO pump, engage the PTO.

Find the “Vac Ctrl” window in page 1 of the object pool. Press the “OFF” button in the “Vac Ctrl” window.

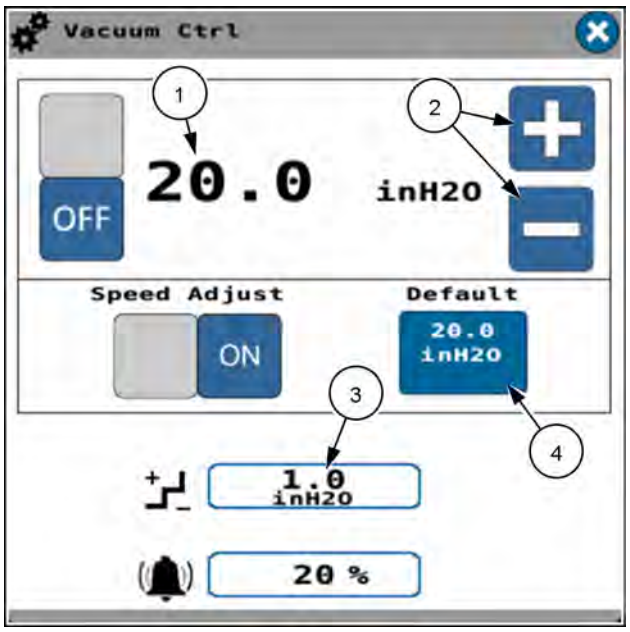
The “Vacuum Ctrl” screen appears.

The vacuum rate **(1)** that appears is the configured rate in the selected work condition. See “Work Condition Setup screen” (**3-80**) for information on work conditions.

You can use the plus and minus **(2)** buttons to adjust the vacuum control setting for your operation. You can use the stepper **(3)** setting to adjust the changes that are made by the plus and minus buttons.

The vacuum level change is immediate when a button is pressed. Each press of an arrow repeats the action, increasing or decreasing the vacuum level by the stepper rate for the selected window.

The “Default” button **(4)** provides a means of returning the setting to the work condition default.

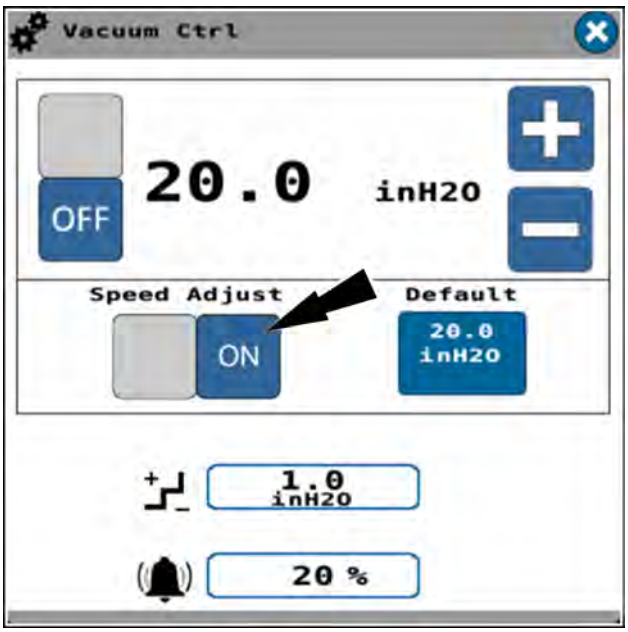


RAPH21PLM2644BA 2

At higher operating speeds, the vacuum required to maintain consistent seed spacing increases. The software can automatically adjust the vacuum level in response to increases in ground speed.

When speed adjusted vacuum is enabled, the vacuum level set by the operator in the “Vacuum Control” window becomes the minimum vacuum level. The software increases the vacuum level as required to maintain consistent seed spacing.

Press the “Speed Adjust” button to enable speed adjusted vacuum.



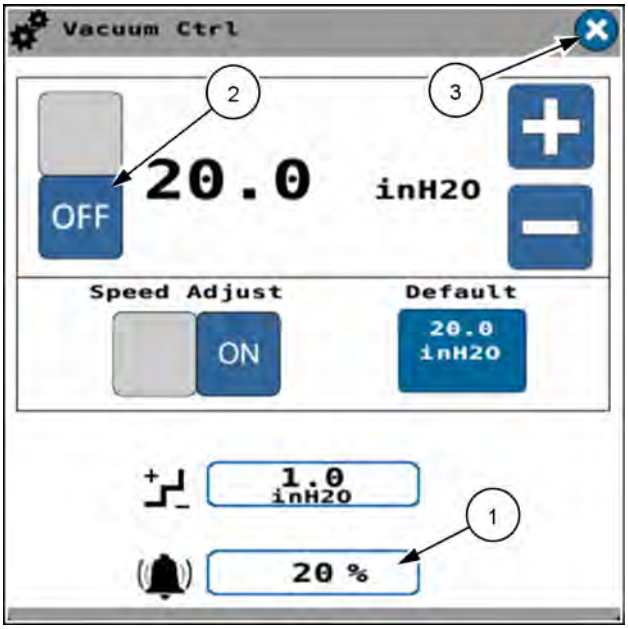
RAPH21PLM2644BA 3

The alarm limit **(1)** shows the percentage above or below the target rate allowable before a vacuum ctrl alarm occurs.

You can press the alarm limit field **(1)** to adjust the alarm limit percentage. Enter the desired alarm limit in the dialog screen that appears when you press the alarm limit field.

Press the ON/OFF button **(2)** to turn the vacuum fans ON.

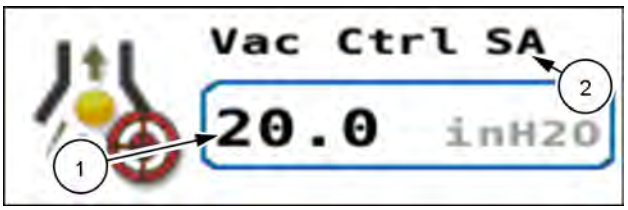
Press the “X” button **(3)** to close the “Vacuum Ctrl” window.



RAPH21PLM2644BA 4

With the vacuum fans ON, the “Vac Ctrl” window gives the target vacuum setting **(1)**.

If the speed adjust feature is turned ON, the “SA” indication **(2)** appears in the “Vac Ctrl” window. If the speed adjust feature is not turned ON, the “SA” indication does not appear.



RAIL20PLM1166AA 5

Frame not in plant mode

If you attempt to turn ON the vacuum fans when the “Frame Op” window setting is not in “Plant” mode, a warning message appears.

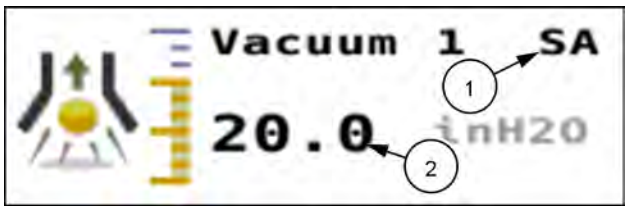
The warning message states, “Vacuum Control Not Available. Operation mode must be set to ‘Plant’ in Frame Operations to perform selected function.”

Press the “OK” button to acknowledge the message and close the warning window.

RAPH21PLM2608BA 6

Vacuum rate monitoring

With the vacuum fans operating, the “Vacuum” window gives you a status readout.



RAIL20PLM1167AA 1

There is an indicator that appears if the speed adjust function is turned ON. The indicator says, “SA” **(1)** when the speed adjust function is turned ON. The indicator does not appear if the speed adjust function is turned OFF.

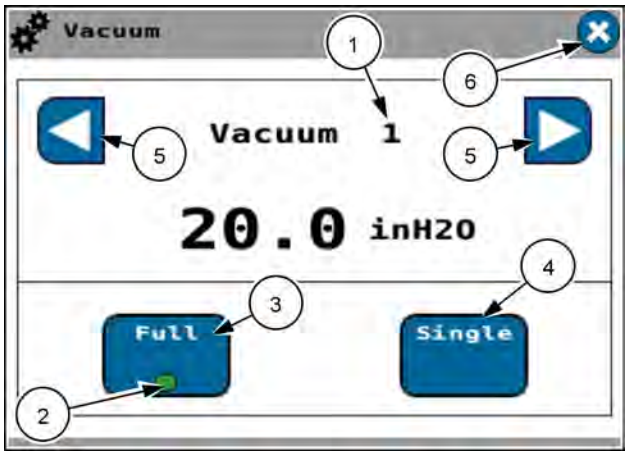
The readout gives you the vacuum rate **(2)** for the individual fans, or the overall average.

If two vacuum fans are operating, the fan numbers cycle between each fan, and the overall average.

If you wish to change the presentation of the parameters, press the “Vacuum” window.

NOTE: *For planters with a single vacuum fan, the “Vacuum” window shows the measured value of the single fan. Pressing on the window does nothing, and the control panel does not appear.*

In planters with two vacuum fans, the “Vacuum” control panel appears.



RAIL20PLM1623BA 2

The “Vacuum” control panel gives the vacuum fan currently being presented **(1)**.

The selected presentation mode appears as a green indicator **(2)** on the mode button. The “Full” mode **(3)** cycles the readouts between fan 1, fan 2, and the average. The “Single” mode **(4)** shows only the selected fan or the average.

Press the desired mode button. The green indicator moves to the selected button.

You can also press the arrow buttons **(5)** to place the presentation into “Single” mode and select which display you want the “Vaccum” window to show.

Press the “X” button **(6)** to close the “Vacuum” control panel.

Bulk fan control

Use the “Bulk Fill” window to change the target fan speed used to deliver seed from the bulk hoppers to the minihoppers on the row units. The rate is in RPM regardless of the unit of measurement selected.

Place the “Frame Op” window into the “Plant” position. See “Introduction: frame control” (**4-50**) and the frame control section for your planter.

NOTE: *Choosing any selection other than “Plant” in the “Frame Op” window turns the bulk fill fan OFF.*

NOTE: *Once you enable the hydraulics, the “Start” button in the “Planter Sys” window automatically turns the bulk fill fan ON.*

RAIL20PLM1168AA 1

If the bulk fill fan is driven by a PTO pump, engage the PTO.

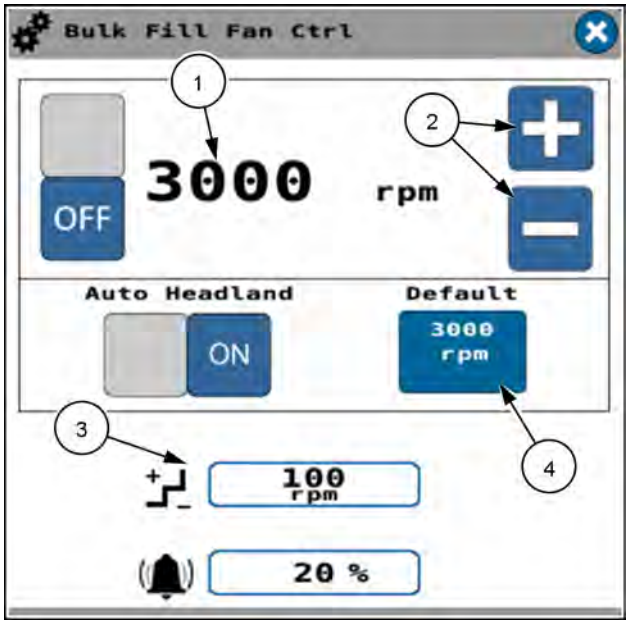
Find the “Bulk Fill” window in page 1 of the object pool. Press the “OFF” button in the “Bulk Fill” window.

The “Bulk Fill Fan Ctrl” screen appears.

The bulk fill motor RPM **(1)** that appears is the configured RPM in the selected work condition. See “Work Condition Setup screen” (**3-80**) for information on work conditions.

You can use the plus and minus **(2)** buttons to adjust the bulk fill control setting for your operation. You can use the stepper **(3)** setting to adjust the changes that are made by the plus and minus buttons.

The “Default” button **(4)** provides a means of returning the setting to the work condition default.



RAPH21PLM2602BA 2

Some planters have a “Headland Auto Off” feature for the bulk fill fan. If your planter has the button in the “Bulk Fill Control” window, the feature is present. The feature makes more hydraulic flow available for raising and lowering the planter when making end of pass turns. The feature should be used whenever it is present.

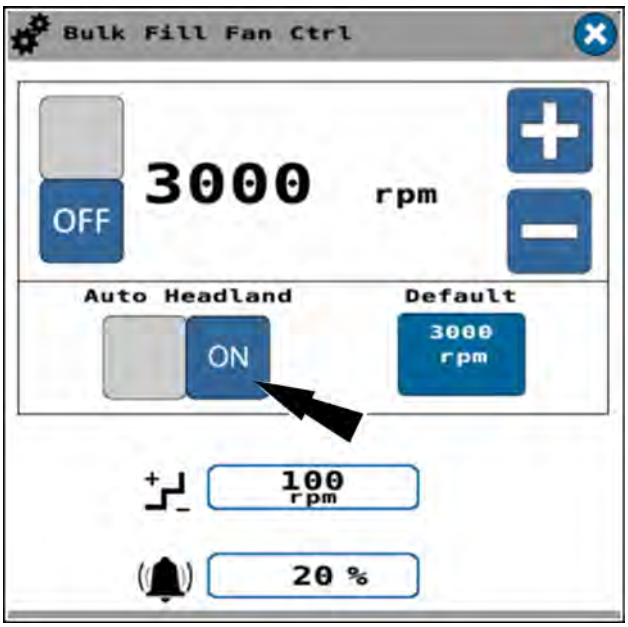
While planting, based on the position of the toolbar, the bulk fill fan is automatically turned OFF or ON as needed.

- The fan is automatically disabled when the planter toolbar is raised above the stop plant height.

  NOTE: *The stop plant height for the toolbar is selected during frame calibration.*

- The fan is automatically enabled when the planter toolbar is lowered below the start plant height.

  NOTE: *The start plant height for the toolbar is selected during frame calibration.*



RAPH21PLM2602BA 3

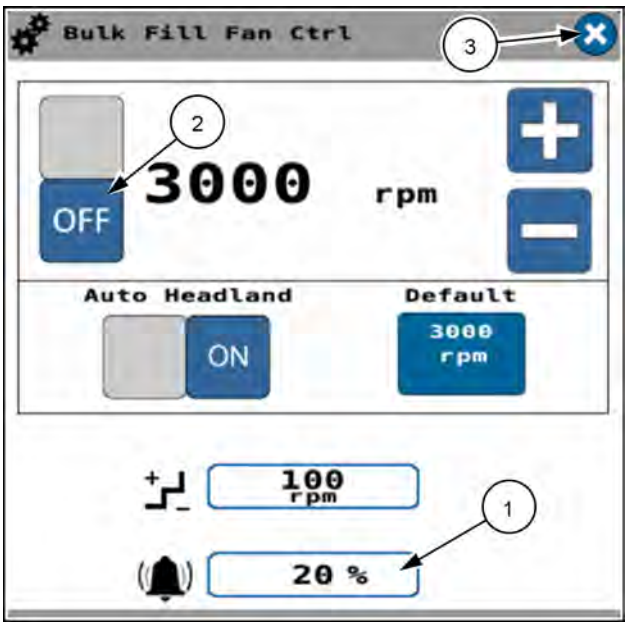
Press the “Auto Headland” button ON/OFF button to enable the “Auto Headland” feature.

The alarm limit **(1)** shows the percentage above or below the target RPM allowable before a bulk fill alarm occurs.

You can press the alarm limit field **(1)** to adjust the alarm limit percentage. Enter the desired alarm limit in the dialog screen that appears when you press the alarm limit field.

Press the ON/OFF button **(2)** to turn the bulk fill fan ON.

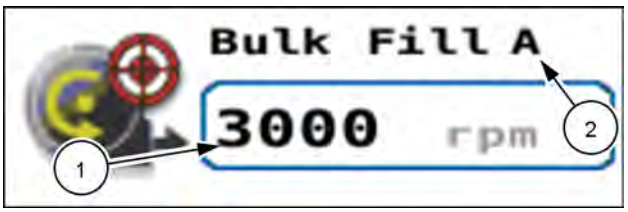
Press the “X” button **(3)** to close the “Bulk Fill Fan Ctrl” window.



RAPH21PLM2602BA 4

With the bulk fill fan ON, the “Bulk Fill” window gives the target RPM setting **(1)**.

If the “Headland Auto Off” feature is turned ON, the “A” indication **(2)** appears in the “Bulk Filll” window. If the “Headland Auto Off” feature is not turned ON, the “A” indication does not appear.



RAIL20PLM1169AA 5

Frame not in plant mode

If you attempt to turn ON the bulk fill fans when the “Frame Op” window setting is not in “Plant” mode, a warning message appears.

The warning message states, “Bulk Fill Control Not Available. Operation mode must be set to ‘Plant’ in Frame Operations to perform selected function.”

Press the “OK” button to acknowledge the message and close the warning window.

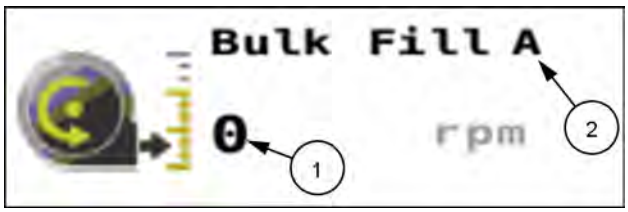
RAPH21PLM2609BA 6

Bulk fan speed monitoring

With the bulk fill fan OFF, the “Bulk Fill” window shows **0 RPM**. **(1)**

There is an indicator **(2)** that appears if the “Auto Headland” function is turned ON. The indicator says, “A” when the “Auto Headland” function is turned ON. The indicator does not appear if the “Auto Headland” function is turned OFF.

With the bulk fill fan operating, the readout gives you the RPM for the bulk fill fan motor.



RAIL20PLM1170AA 1

RAIL20PLM1171AA 2

ALTERNATOR CONTROL

Alternator speed control

The “Alternator” window indicates the alternator target rate. The target rate automatically changes to accommodate the power requirements of the planter’s row units.

The alternator turns ON automatically after power up. After the hydraulics are engaged, the alternator spins up to the alternator default rate of **2000 RPM**.

When the you first lower the planter to start planting, the alternator target rate will increase to a predetermined RPM based on the number of row units, how the row units are equipped, and the seed application target rate.

If necessary for greater current requirements associated with higher row unit motor drive speeds, the alternator target speed may increase further. This may happen with high population products at planting speeds greater than **13.0 km/h** (**8.1 mph**).

Alternator speed will automatically adjust when entering work for the first time per key cycle. It is stored by the system in a matrix of requirements based upon row count and row components, such as speed tube and seed tube.

Find the “Alternator” window on page 1 of the object pool. Press the button in the “Alternator” window.

RAIL20PLM1172AA 1

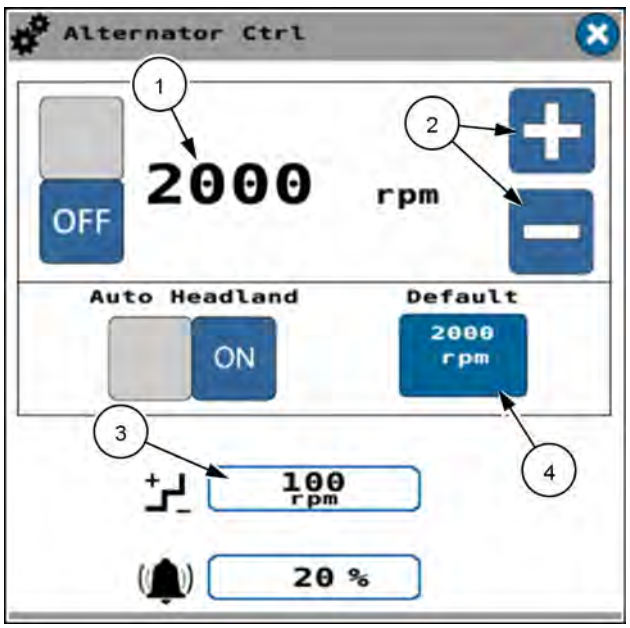
The “Alternator Ctrl” window appears.

The default alternator speed of **2000 RPM (1)** is shown in the window.

You can use the plus and minus **(2)** buttons to adjust the default speed setting for your operation. You can use the stepper **(3)** setting to adjust the changes that are made by the plus and minus buttons.

The speed change is immediate when a button is pressed. Each press of a plus or minus button repeats the action, increasing or decreasing alternator speed by the stepper rate for the selected window.

The “Default” button **(4)** provides a means of returning the setting to the default speed of **2000 RPM**.



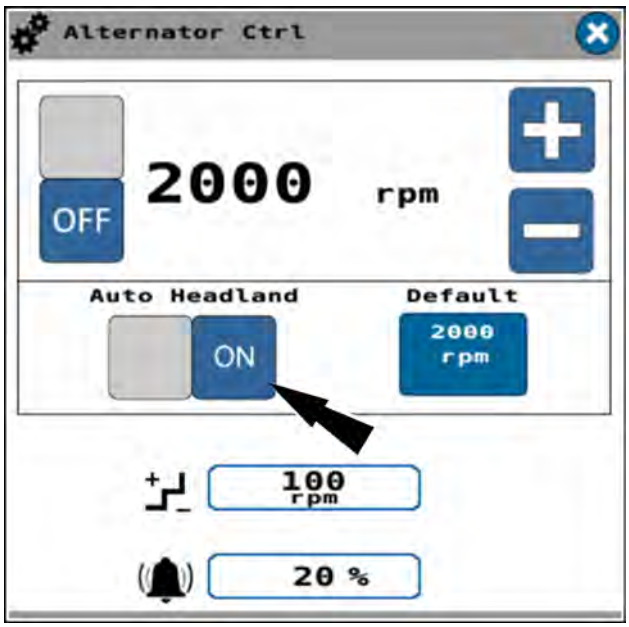
RAPH21PLM2613BA 2

When the “Auto Headland” feature is OFF, the alternator does not turn OFF when you raise the planter. When the “Auto Headland” feature is ON, the alternator will be turned OFF when the planter is raised past its stop plant height.

The alternator returns to its default speed when the planter reaches its limited raise height.

When the “Auto Headland” feature is ON, more hydraulic flow is available to raise the planter faster.

Press the “Auto Headland” button ON/OFF button to enable the “Auto Headland” feature.



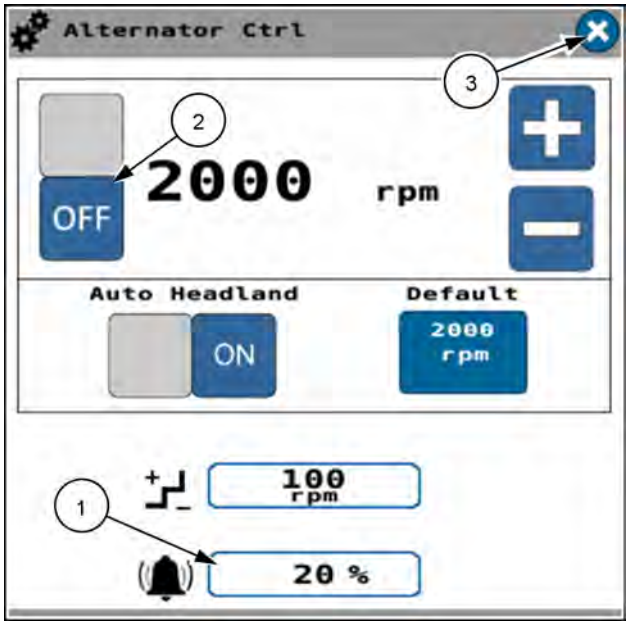
RAPH21PLM2613BA 3

The alarm limit **(1)** shows the percentage above or below the target RPM allowable before an alternator speed alarm occurs.

You can press the alarm limit field **(1)** to adjust the alarm limit percentage. Enter the desired alarm limit in the dialog screen that appears when you press the alarm limit field.

Press the ON/OFF button **(2)** to turn the alternator ON.

Press the “X” button **(3)** to close the “Alternator Ctrl” window.



RAPH21PLM2613BA 4

With the alternator ON, the “Alternator” window gives the target RPM setting **(1)**.

If the “Auto Headland Off” feature is turned ON, the “A” indication **(2)** appears in the “Alternator” window. If the “Auto Headland Off” feature is not turned ON, the “A” indication does not appear.

RAIL20PLM1173AA 5

Frame not in plant mode

If you attempt to turn ON the alternator when the “Frame Op” window setting is not in “Plant” mode, a warning message appears.

The warning message states, “Alternator Control Not Available. Operation mode must be set to ‘Plant’ in Frame Operations to perform selected function.”

Press the “OK” button to acknowledge the message and close the warning window.

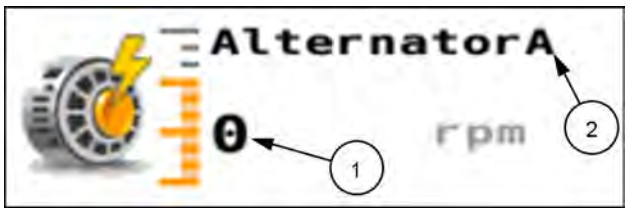
RAPH21PLM2610BA 6

Alternator speed monitoring

With the alternator OFF, the “Alternator” window shows **0 RPM**. **(1)**

There is an indicator **(2)** that appears if the “Auto Headland” function is turned ON. The indicator says, “A” when the “Auto Headland” function is turned ON. The indicator does not appear if the “Auto Headland” function is turned OFF.

With the alternator operating, the readout gives you the RPM for the alternator.



RAIL20PLM1175AA 1

RAIL20PLM1174AA 2

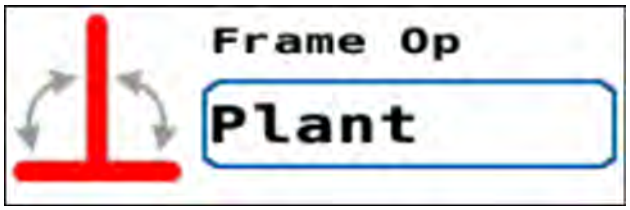
FRAME CONTROL

Introduction: frame control

This chapter explains:

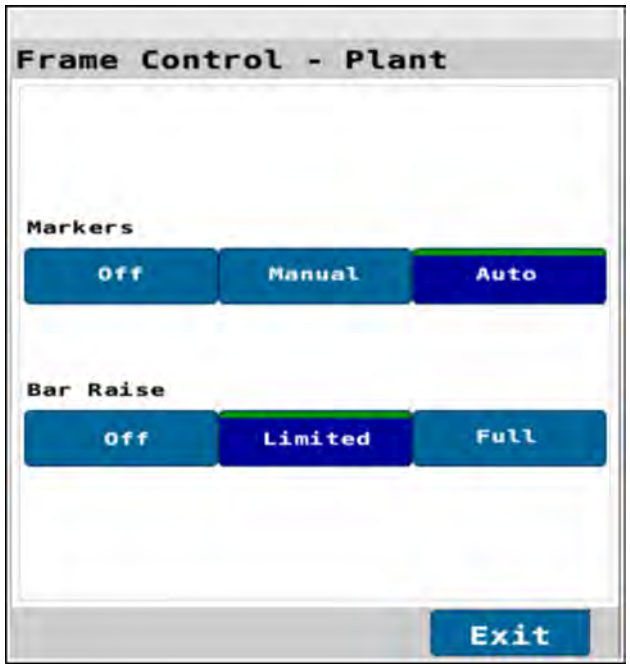
- How to change the planter from planting position to road transport position.
- How to change the planter from road transport position to planting position.
- How to enter “Plant” mode and deploy markers, if equipped.

Find the “Frame Op” window in page 1 of the object pool.



RAIL20PLM1176AA 1

If the planter is powered down while the “Frame Op” window is set to “Plant,” all settings on the “Frame Control – Plant” screen are recalled the next time the vehicle is turned ON. This has the effect of reducing startup time for “in field” and “in shed” startup. If the planter is powered down while the “Planter Frame Operation” window is set to any other state, the window is reset to “Off” the next time the vehicle is turned ON.



RAPH22PLM0874BA 2

The following sections explain frame control for each supported type of planter.

Frame control: 2110 and 2120 model planters

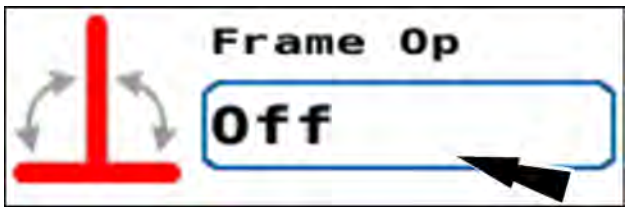
Split row setup: raise split rows (if equipped)

The split row setup if equipped allows you to enable all rows on the planter for planting soybeans at **38 cm** (**15 in**) or enable every other row for planting corn at **76 cm** (**30 in**) row width. The row lift setup screen also allows you to enable the planter hydraulics to lift the even numbered rows when planting corn.

When configured for corn, all of the even numbered rows are disabled by the system. This includes all product application and speed belts.

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



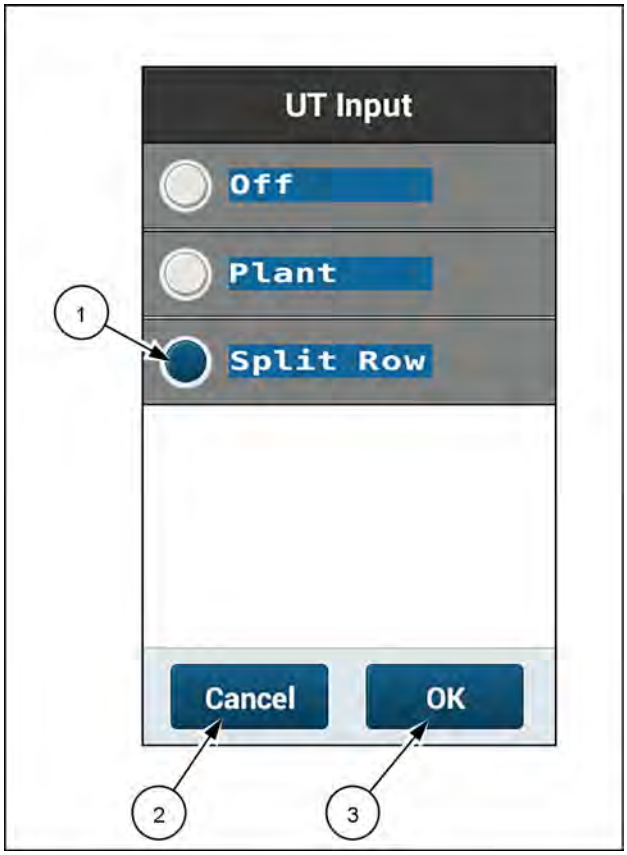
RAIL20PLM1179AA 1

The frame operation menu appears.

Press the “Split Row” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue the split row setup.



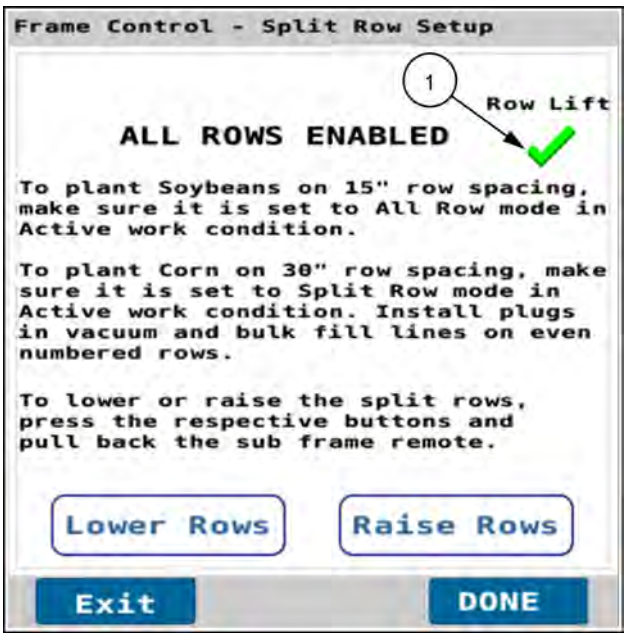
RAPH23PLM1145BA 2

The “Frame Control – Split Row Setup” screen appears.

To plant soybeans on **38 cm** (**15 in**) row spacing, make sure it is set to All Row mode in Active work condition. The screen indicates “All Rows Enabled” when set up for **38 cm** (**15 in**) row width.

A green check mark **(1)** in the “Row Lift” area indicates that the center section row units are completely lifted.

If the center section row units are not completely lifted, a red “X” appears in the “Row Lift” area.

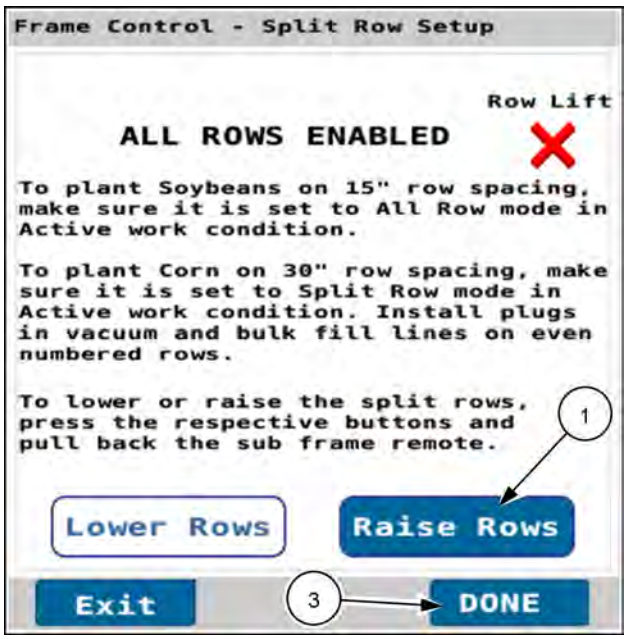


RAPH23PLM1123BA 3

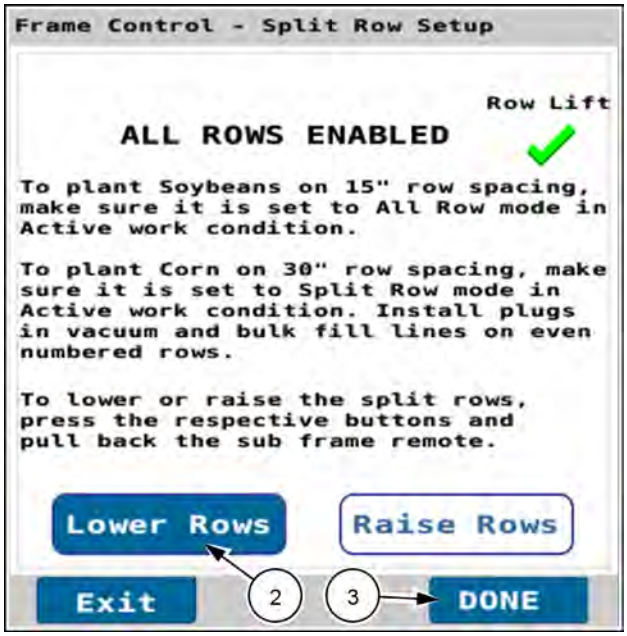
To raise or lower the rows using this screen, press the “Raise Rows” button **(1)** or the “Lower Rows” button **(2)** to enable the button.

Pull back on the sub-frame remote to raise or lower the rows.

Press the “Done” button **(3)** to complete the procedure and close the window.



RAPH23PLM1122BA 4



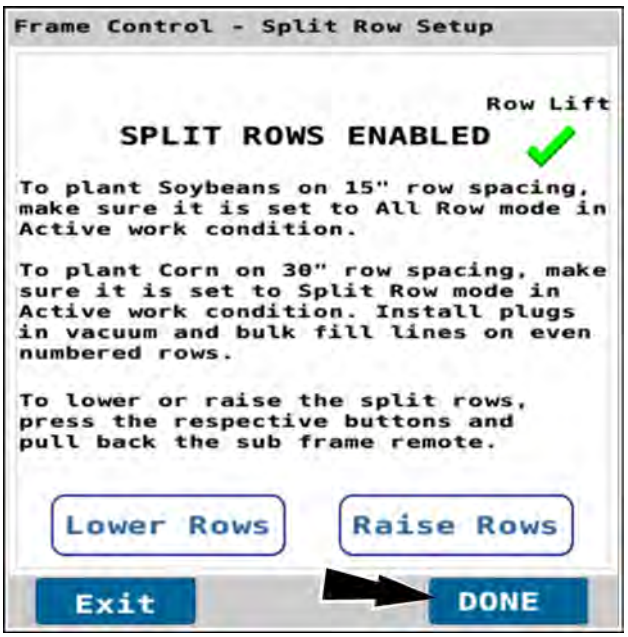
RAPH23PLM1121BA 5

If split rows are selected in the active work condition,, the “Frame Control – Split Row Setup” window indicates that split rows are enabled.

To plant corn on a **76 cm** (**30 in**), row width, install plugs in the vacuum and bulk fill lines on even numbered rows. In the active work condition change the row configuration from “All Rows” to “Split Rows.” See “Work Condition Setup screen” (**3-80**).

If you wish to leave the setup option in the “All Rows Enabled” mode, press the “Done” button. The “Frame Control – Split Row Setup” window closes and the procedure is complete.

NOTE: *Changing the split row setup automatically enables/disables rows in work conditions and implement setup.*

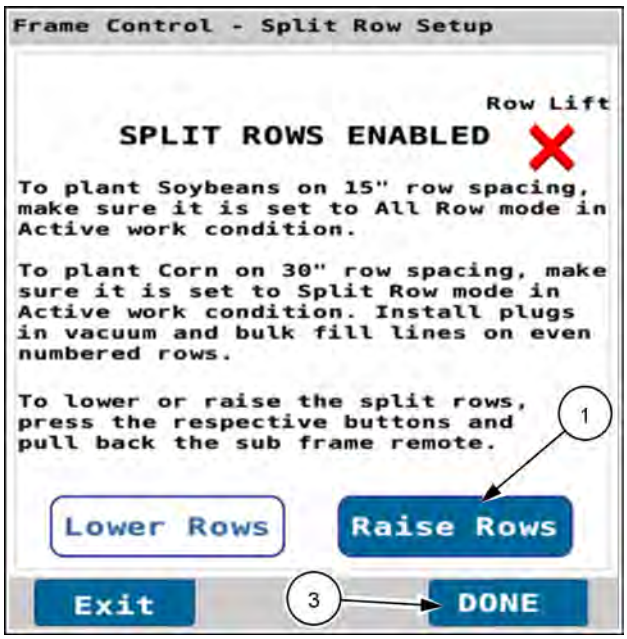


RAPH23PLM1118BA 6

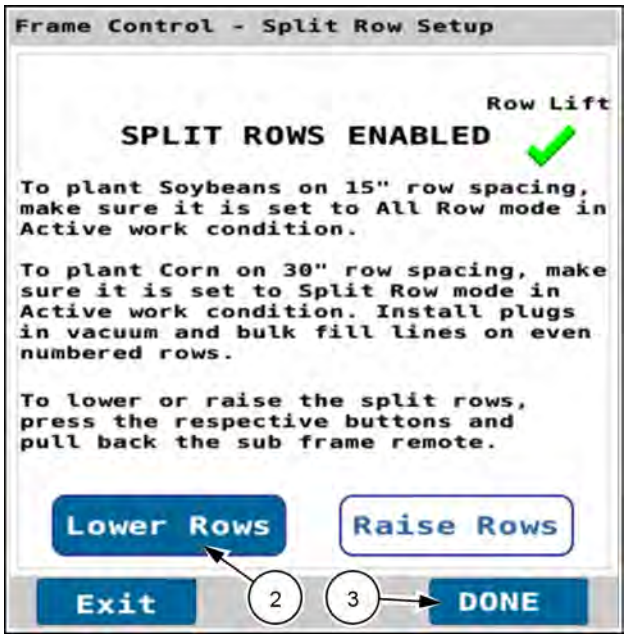
To raise or lower the rows in this screen, press the “Raise Rows” button **(1)** or the “Lower Rows” button **(2)** to enable the button.

Pull back on the sub-frame remote to raise or lower the rows.

Press the “Done” button **(3)** to complete the procedure and close the window.



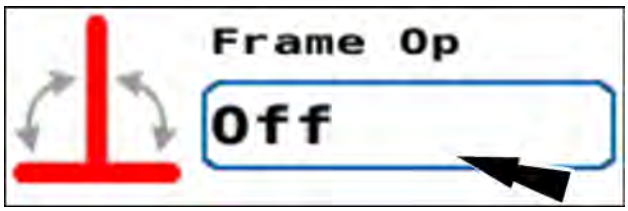
RAPH23PLM1120BA 7



RAPH23PLM1119BA 8

Plant and Markers

In page 1 of the object pool, press the button in the “Frame Op” window.



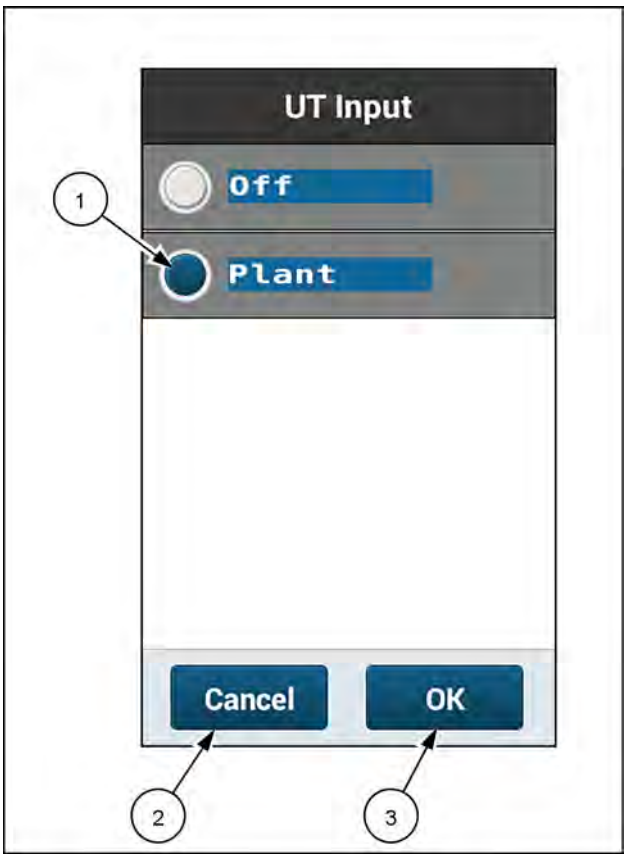
RAIL20PLM1179AA 9

The frame operation menu appears.

Press the “Plant” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the planting setup procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue the planting setup procedure.



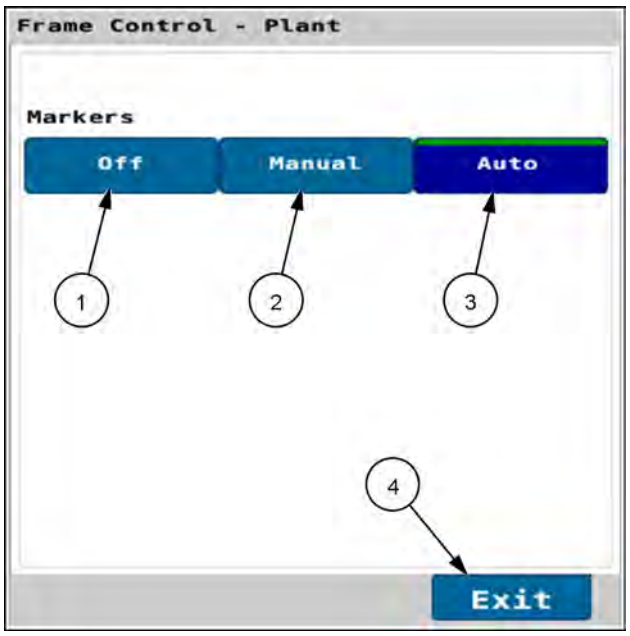
RAPH23PLM1146BA 10

The “Frame Control – Plant” window appears.

The “Markers” section contains the following options:

- If the planter does not have markers, select the “Off” **(1)** option.
- Press the “Auto” button **(2)** for automatic alternating of the markers each time you raise and lower the frame.
- Press the “Manual” button **(3)** to control marker deployment manually with the “Mrkr Ctrl” window on page 2. See “Marker operating modes” (**4-142**) for more information.

Press the “Exit” button **(4)** to close the window.



RAPH23PLM1147BA 11

In page 2 of the object pool in the “Mrkr Ctrl” window, press the button for the marker you wish to deploy.

NOTE: *If marker control is configured to automatic mode, your selection is the first marker you wish to deploy. After that the markers will alternately deploy automatically.*

Use the remote lever to unfold the marker and lower the planter to the ground.

Move the remote lever to the float position so that the marker will follow the contour of the ground.

RAIL20PLM1181AA 12

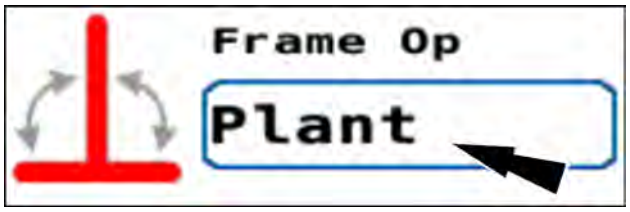
Frame control: 2130 model stacker planters

Fold the planter to the transport position

- The step sequence in this procedure must be followed exactly.
- Steps directing the operator to push the tractor remote lever forward or pull the tractor remote lever back assume that the hydraulic lines are correctly installed on the tractor.
- The planter must not be moving faster than **6 km/h** (**4 mph**).
- The planter must be on a level surface.
- The marker and planter raise/lower functions share a common hydraulic circuit and are controlled by one tractor remote lever. The markers must be fully retracted to transport position before you fold the planter. See “Marker operating modes” (**4-142**) for additional information.

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



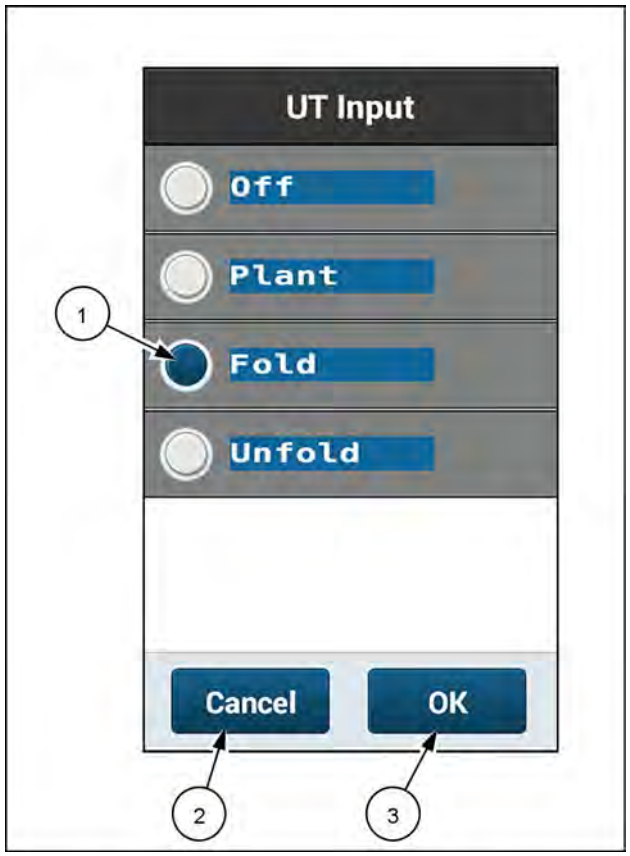
RAIL20PLM1176AA 1

The frame operation menu appears.

Press the “Fold” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue folding the planter.

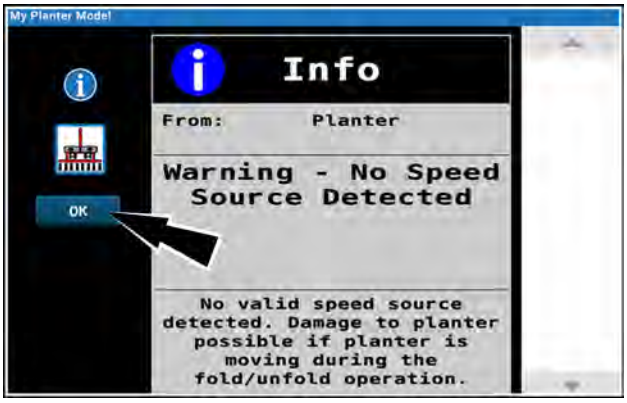


RAPH23PLM1077BA 2

If no valid speed source is detected by the system, a warning popup appears.

The warning popup states, “Warning – No Speed Source Detected. No valid speed source detected. Damage to the planter is possible if the planter is moving during the fold or unfold operation." Verify the planter is not moving. Press the “OK” button.

Follow the instructions given in the window.

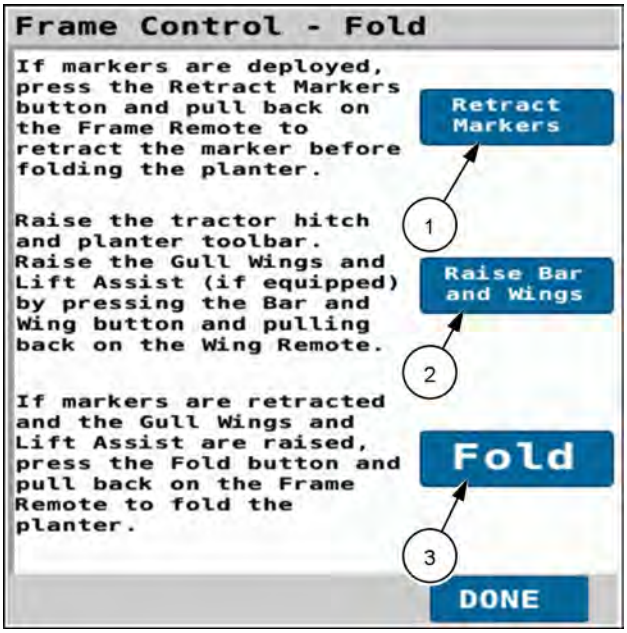


RAPH21PLM3112AA 3

The “Frame Control – Fold” window appears.

The “Frame Control – Fold” window has three buttons, with instructions for each:

- “Retract Markers” button **(1)** – If markers are deployed, press the Retract Markers button and pull back on the frame remote to retract the marker before folding the planter.
- “Raise Bar and Wings” button **(2)** – Raise the tractor hitch and planter toolbar. Raise the Gull Wings and Lift Assist (if equipped) by pressing the Bar and Wing button and pulling back on the Wing Remote.
- “Fold” button **(3)** – If markers are retracted and the gull wings and lift assist are raised, press the Fold button and pull back on the frame remote to fold the planter.



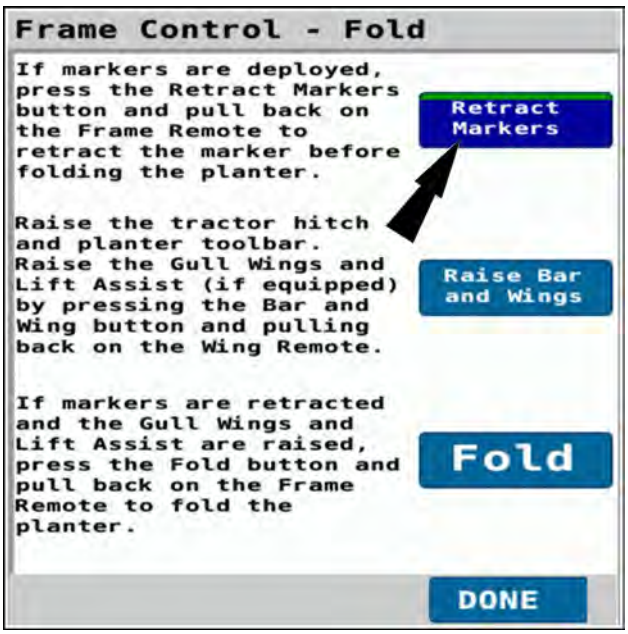
RAPH23PLM1102BA 4

NOTE: *The markers must be fully retracted to transport position before you fold the planter. See “Marker operating modes” (**4-142**) for additional information.*

If you need to retract markers, press the “Retract Markers” button. The button appears pressed (darker blue) until you press another button in the window.

NOTE: *Markers are an optionally installed feature.*

Pull back the frame remote until the markers are fully retracted.

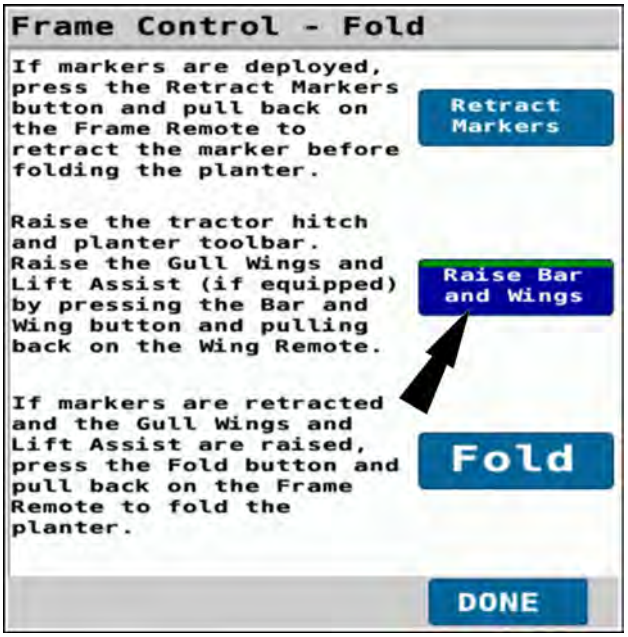


RAPH23PLM1103BA 5

Press the “Raise Bar and Wings” button. The button appears pressed (darker blue) until you press another button in the window.

If the planter is still lowered, use the tractor hitch to raise the planter.

Pull back on the remote controlling the gull wings and the rear assist (if equipped). This raises the gull wings and center section.

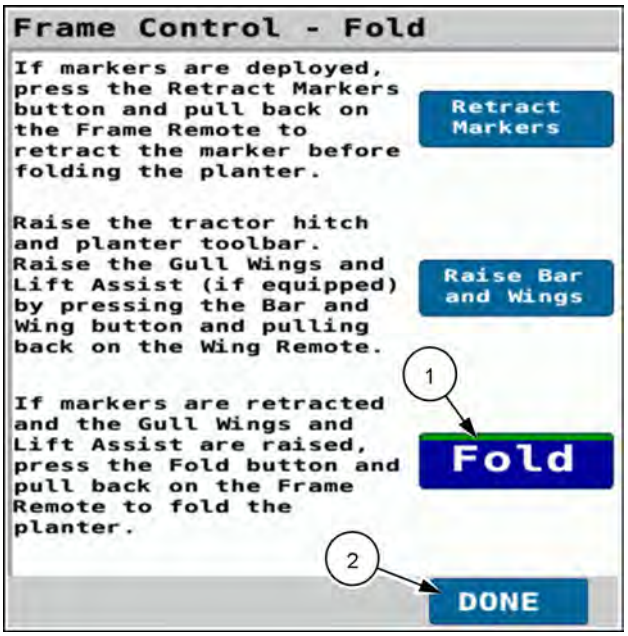


RAPH23PLM1104BA 6

Press the “Fold” button **(1)**. The button appears pressed (darker blue) until you press another button in the window.

Move the frame remote lever back to fold the planter.

Press the “Done” button **(2)** to complete the fold operation.



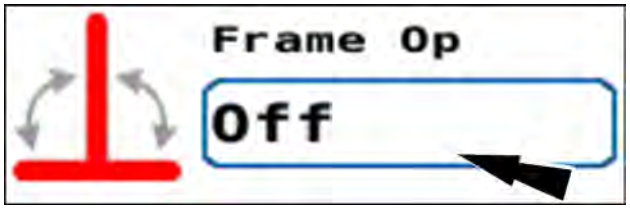
RAPH23PLM1105BA 7

Unfold the planter to the planting position

- The step sequence in this procedure must be followed exactly.
- Steps directing the operator to push the tractor remote lever forward or pull the tractor remote lever back assume that the hydraulic lines are correctly installed on the tractor.
- The planter must not be moving faster than **6 km/h** (**4 mph**).
- The planter must be on a level surface.

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



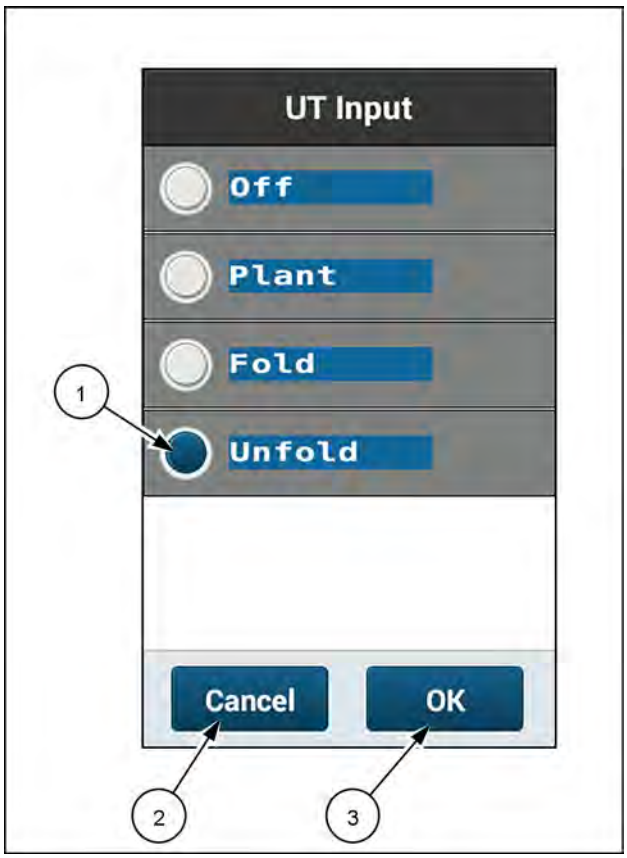
RAIL20PLM1179AA 8

The frame operation menu appears.

Press the “Unfold” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue unfolding the planter.

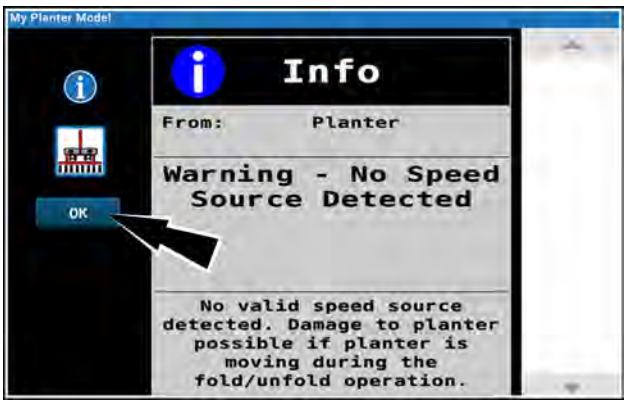


RAPH23PLM1078BA 9

If no valid speed source is detected by the system, a warning popup appears.

The warning popup states, “Warning – No Speed Source Detected. No valid speed source detected. Damage to the planter is possible if the planter is moving during the fold or unfold operation." Verify the planter is not moving. Press the “OK” button.

Follow the instructions given in the window.



RAPH21PLM3112AA 10

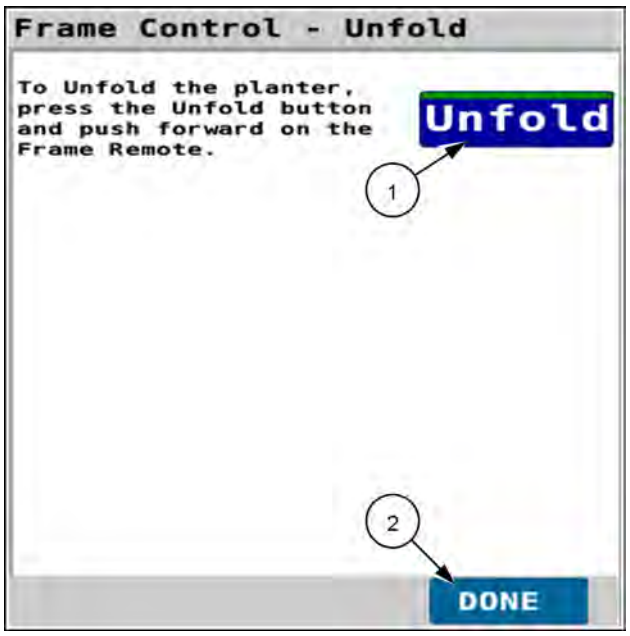
The “Frame Control – Unfold” window appears.

The “Frame Control – Unfold” window states, “To Unfold the planter, press the Unfold button and push forward on the Frame Remote.”

Press the “Unfold” button **(1)**. The button appears pressed (darker blue).

Move the frame remote lever forward to unfold the planter.

Press the “Done” button **(2)** to complete the fold operation.

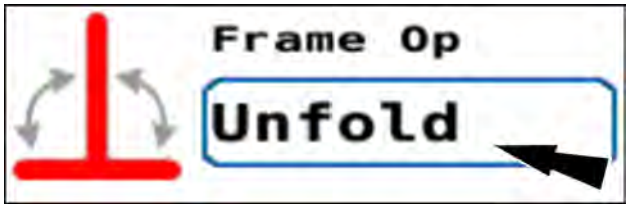


RAPH23PLM1106BA 11

Plant

In page 1 of the object pool, press the button in the “Frame Op” window.

In the frame operation window, press the “Plant” radio button.



RAIL20PLM1180AA 12

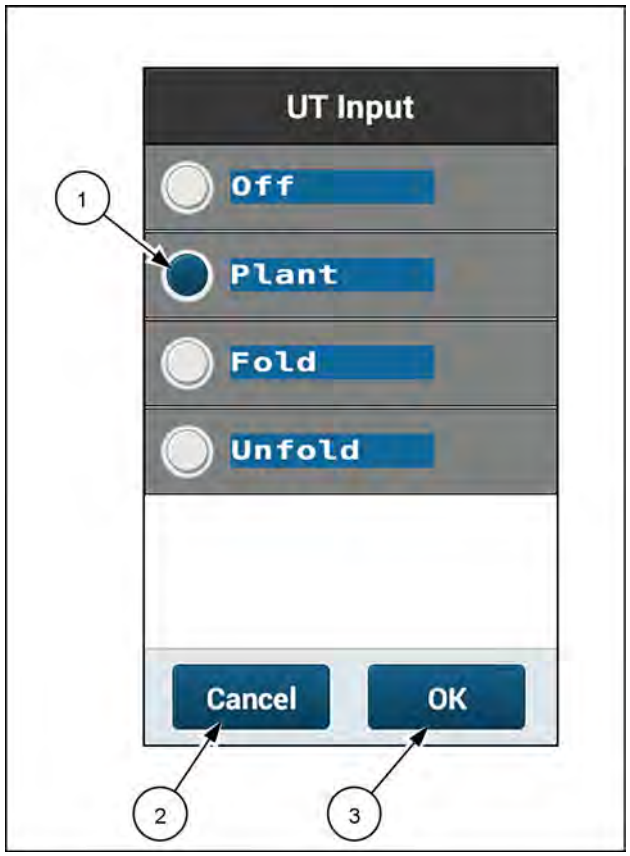
The frame operation menu appears.

Press the “Plant” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the planting setup procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue the planting setup procedure.

The “Frame Control – Plant” window appears.



RAPH23PLM1076BA 13

Fold in Plant

On 2130 model planters you can enable the option to fold and unfold the planter while the frame is in “Plant” mode. This feature facilitates headland turns, in which operators sometimes need to fold and then unfold the planter while executing an end-of-row turn. With this feature turned ON you do not need to use the “Frame Op” screen in the display to fold and unfold the planter. You only need to operate the frame remote lever to fold and unfold the planter. The frame solenoids remain open while the “Fold in Plant” feature is ON.

NOTE: *The “Fold in Plant” feature is disabled at a speed of* ***6 km/h*** *(****4 mph****) or greater. The “Fold in Plant” toggle in the “Frame Control – Plant” screen remains in the ON position if you exceed the* ***6 km/h*** *(****4 mph****) speed threshold, but the frame control solenoids deactivate.*

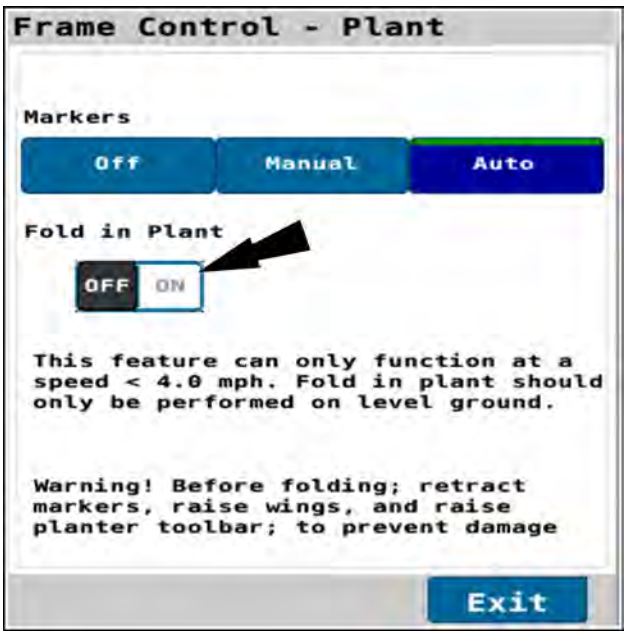
NOTE: *Use this feature only on level ground.*

NOTICE: *Before folding, to prevent damage retract the markers, raise the wings, and raise the planter toolbar.*

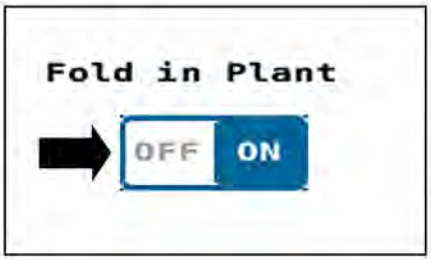
Press the “Fold in Plant” toggle to turn the “Fold in Plant” feature ON.

To fold the planter with the speed less than **6 km/h** (**4 mph**), pull back on the frame remote lever.

To unfold the planter with the speed less than **6 km/h** (**4 mph**), push forward on the frame remote lever.



RAPH23PLM1058BA 14



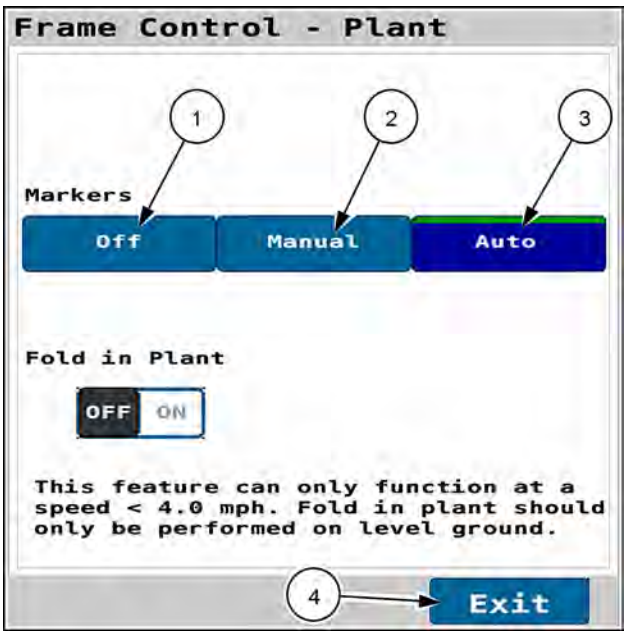
RAPH22PLM0916BA 15

Markers

The “Markers” section contains the following options:

- If the planter does not have markers, select the “Off” **(1)** option.
- Press the “Auto” button **(2)** for automatic alternating of the markers each time you raise and lower the frame.
- Press the “Manual” button **(3)** to control marker deployment manually with the “Mrkr Ctrl” window on page 2. See “Marker operating modes” (**4-142**) for more information.

Press the “Exit” button **(4)** to close the window.



RAPH22PLM0915BA 16

In page 2 of the object pool in the “Mrkr Ctrl” window, press the button for the marker you wish to deploy.

NOTE: *If marker control is configured to automatic mode, your selection is the first marker you wish to deploy. After that the markers will alternately deploy automatically.*

Use the remote lever to unfold the marker and lower the planter to the ground.

Move the remote lever to the float position so that the marker will follow the contour of the ground.

RAIL20PLM1181AA 17

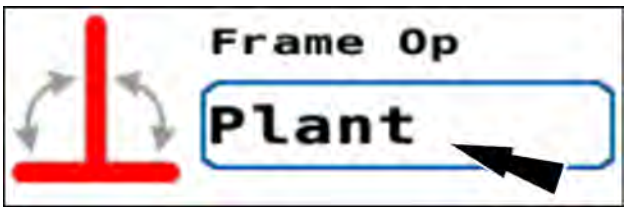
Frame control: 2140 model pivot transport planters

Fold the planter to transport position

- The step sequence in this procedure must be followed exactly.
- Steps directing the operator to push the tractor remote lever forward or pull the tractor remote lever back assume that the hydraulic lines are correctly installed on the tractor.
- The planter must not be moving (no ground speed sensed).
- The planter must be on a level surface.
- The planter must be in the limited raise position.
- The wing down force remote lever must be in the float position for the duration of the procedure.

Put the remote lever in the neutral position.

In page of the object pool, press the button in the “Frame Op” window.



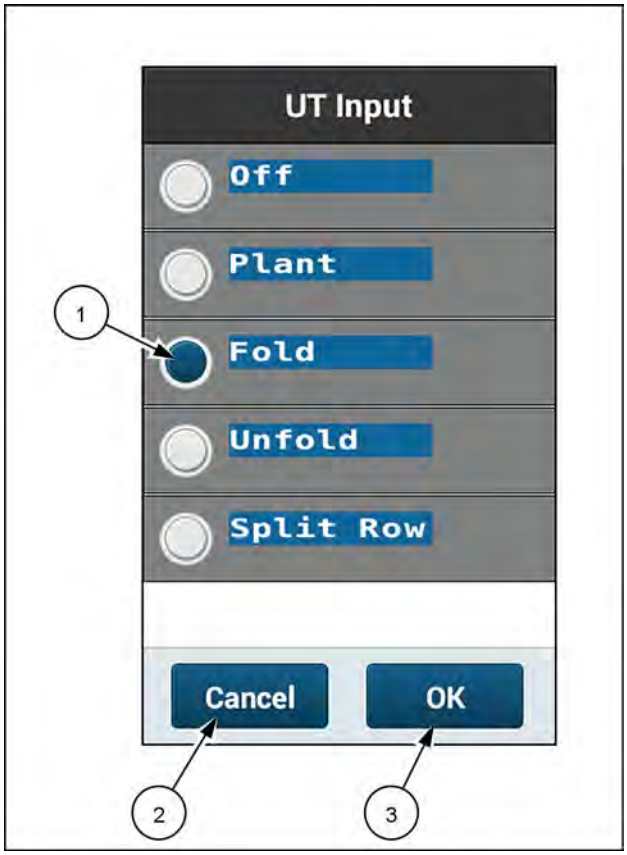
RAIL20PLM1176AA 1

The frame operation menu appears.

Press the “Fold” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue folding the planter.



RAPH23PLM1080BA 2

If the nitrogen pressure in the hitch lock is too low, a pop-up message displays: “Hitch Lock nitrogen pressure too low. If Planter Hitch is unlocked, it cannot be re-locked."

NOTICE: *Operation when hitch lock pressure is low can lead to seal failure of the hitch lock cylinder.*

To complete the fold process, the hitch lock must be able to unlock, allowing the hitch to extend, and then re-lock, securing the hitch. If the nitrogen pressure in the hitch lock is too low, the hitch lock will not be able to re-lock after the hitch is extended.

RAIL20PLM1673BA 3

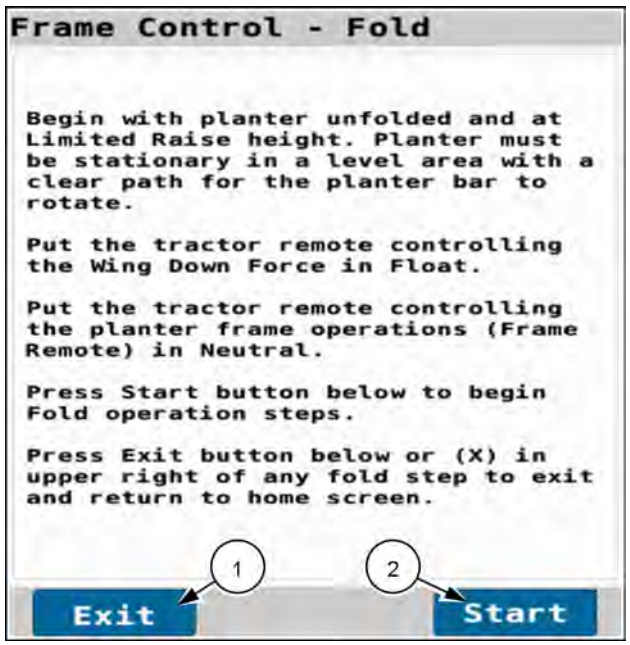
The “Frame Control – Fold” window appears.

The “Frame Control – Fold” window states, “Begin with the planter unfolded and at Limited Raise height. The planter must be stationary in a level area with a clear path for the planter bar to rotate. Put the tractor remote controlling the Wing Down Force in Float. Put the tractor remote controlling the planter frame operations (Frame Remote) in Neutral. Press the Start button below to begin Fold operation steps. Press the Exit button below or (X) in the upper right of any fold step to exit and return to the home screen.”

Follow the instructions given in the window.

If you need to cancel the procedure, press the “Exit” button **(1)**.

Press the “Start” button **(2)** to start the fold wizard.



RAIL20PLM1674BA 4

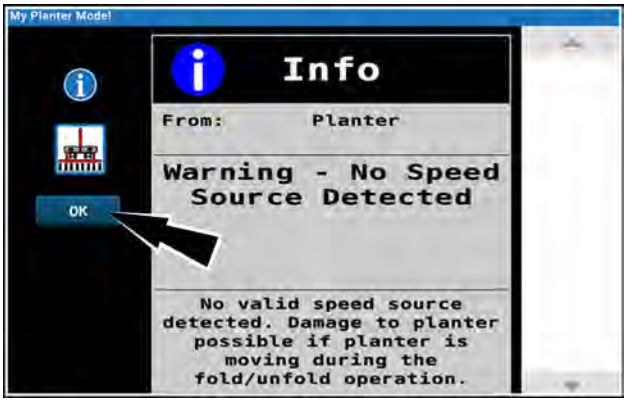
NOTICE: *The wing down force remote must be placed in the float position.*

A pop-up message displays: “Put the Wing Down Force remote in the Float position. Planter must be stationary and in a level area with planter bar at the limited raise position.”

If no valid speed source is detected by the system, a warning popup appears.

The warning popup states, “Warning – No Speed Source Detected. No valid speed source detected. Damage to the planter is possible if the planter is moving during the fold or unfold operation." Verify the planter is not moving. Press the “OK” button.

Follow the instructions given in the window.



RAPH21PLM3112AA 5

The “Frame Control – Fold” wizard step 1 appears.

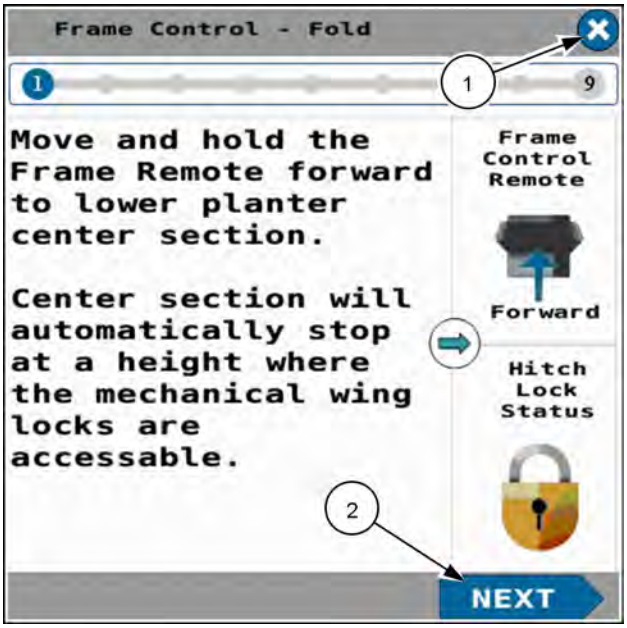
The “Frame Control – Fold” wizard step 1 states, “Move and hold the Frame Remote forward to lower the planter center section. The center section will automatically stop at a height where the mechanical wing locks are accessible.”

As the center section lowers, the wings will slope upward. The center section will automatically stop at a height that allows access to the wing lock pin.

Follow the instructions given in the window.

If you need to cancel the wizard in this and all future steps, press the “X” button **(1)**.

Press the “Next” button **(2)** to continue the wizard.

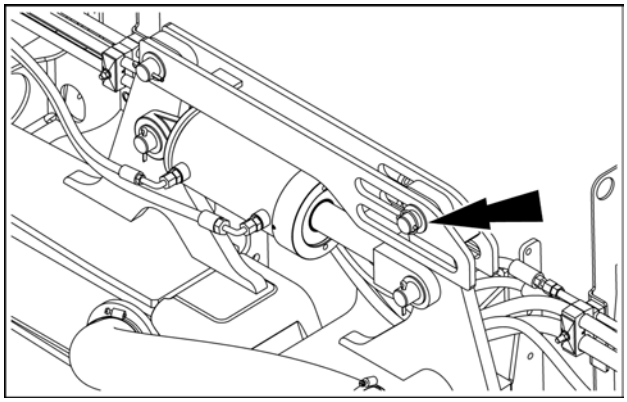


RAIL20PLM1675BA 6

The “Frame Control – Fold” wizard step 2 appears. This step deactivates the solenoids that were activated by the previous steps.

The “Frame Control – Fold” wizard step 2 states, “Mechanical wing lock pins make sure that the wings do not drop during transport. Place the Wing Lock Pins into the TRANSPORT position.”

Put the wing locks into transport position.



SAVM17PLA1048AA 7

Press the “Next” button to continue the wizard.

RAIL20PLM1676BA 8

The “Frame Control – Fold” wizard step 3 appears.

The “Frame Control – Fold” wizard step 3 states, “Move and hold the Frame Remote back to raise the center section of the planter to its transport/folding height. The toolbar will stop rising at this height and the wing wheels will be off the ground.”

Follow the instructions given in the window.

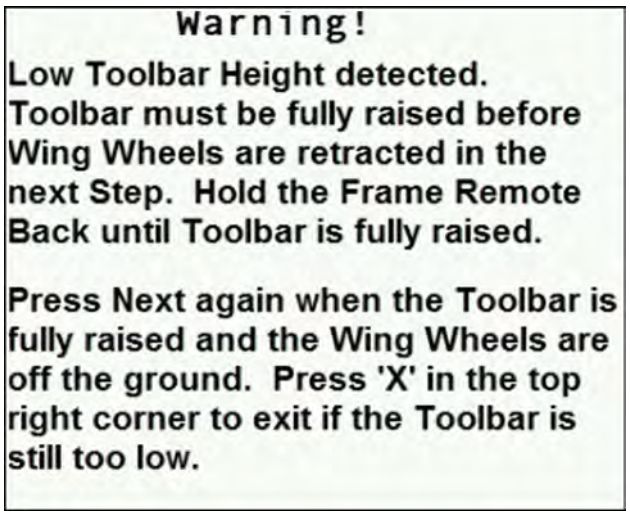
RAIL20PLM1677BA 9

If the toolbar is not fully raised, a pop-up message appears. The pop-up message states, “Low Toolbar Height detected. The toolbar must be fully raised before the Wing Wheels are retracted in the next step. Hold the Frame Remote Back until the Toolbar is fully raised. Press Next again when the Toolbar is fully raised and the Wing Wheels are off the ground. Press ‘X’ in the top right corner to exit if the Toolbar is still too low.”

NOTE: *The toolbar must be fully raised. The toolbar cannot be lower than the calibrated full height.*

If needed, follow the instructions in the pop-up message.

Press the “Next” button to continue the wizard.



RAIL20PLM1678BA 10

The “Frame Control – Fold” wizard step 4 appears.

The “Frame Control – Fold” wizard step 4 states, “Move and hold the Frame Remote forward to retract the wing wheels.”

Follow the instructions given in the window.

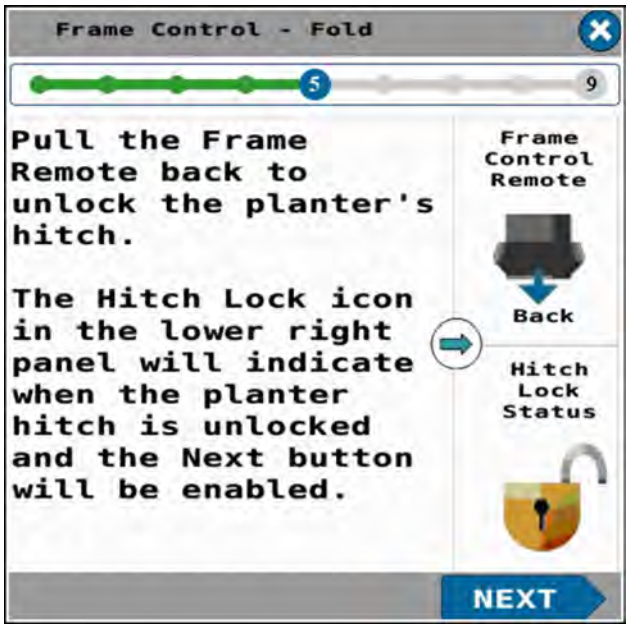
Press the “Next” button to continue the wizard.

RAIL20PLM1679BA 11

The “Frame Control – Fold” wizard step 5 appears. This deactivates previously activated solenoids.

The “Frame Control – Fold” wizard step 5 states, “Pull the frame remote back to unlock the planter’s hitch. The hitch lock icon in the lower right panel will indicate when the planter hitch is unlocked and the Next button will be enabled.

NOTE: *In this step the hitch lock for the telescopic hitch mechanism is unlocked so that the hitch can be lengthened enough so that the toolbar can pivot to fold the planter.*



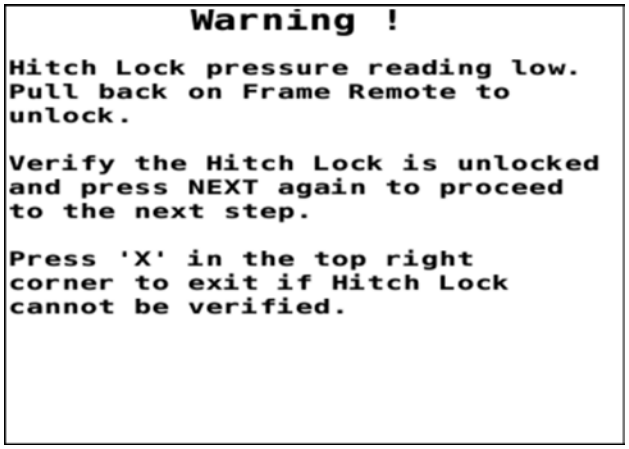
RAIL20PLM1680BA 12

Hitch lock status – locked

Hitch lock status – unlocked

If the system cannot detect that the hitch lock is unlocked, a pop-up message appears stating, “Warning! Hitch lock pressure reading low. Pull back on the Frame Remote to unlock. Verify the hitch lock is unlocked and press Next again to proceed to the next step. Press ‘X’ in the top right corner to exit if hitch lock cannot be verified.”

NOTE: *If the hitch lock pressure warning appeared at the beginning of the fold process, the hitch lock pressure sensor may not be able to indicate the position of the hitch lock. In this case, press the "Next" button only if you can physically confirm that the hitch lock is in the unlocked position.*



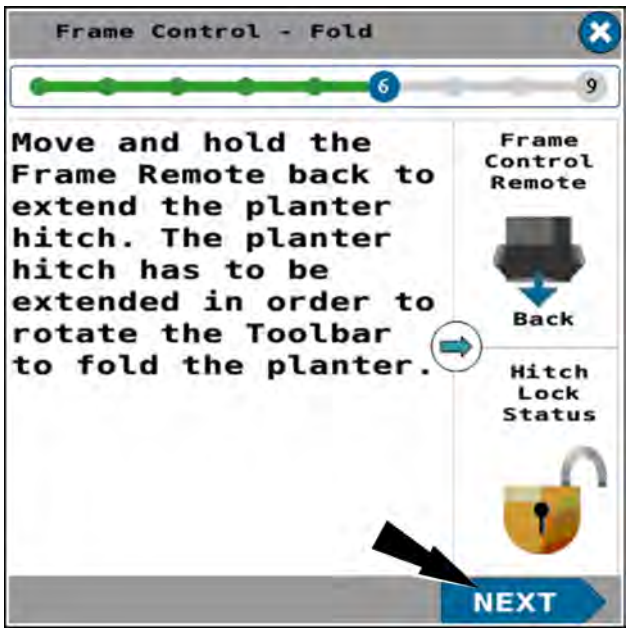
RAIL20PLM1681BA 13

The “Frame Control – Fold” wizard step 6 appears.

The “Frame Control – Fold” wizard step 6 states, “Move and hold the Frame Remote back to extend the planter hitch. The planter hitch has to be extended in order to rotate the toolbar to fold the planter.

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



RAIL20PLM1682BA 14

The “Frame Control – Fold” wizard step 7 appears. This step deactivates the previously activated solenoids.

The “Frame Control – Fold” wizard step 7 states, “Pull the Frame Remote back to lock the planter’s hitch. The hitch lock icon in the lower right panel will indicated when the planter hitch is locked. After the hitch lock is locked, the rotate lock will unlock. Visibly check the rotate lock to be unlocked and then press the Next button.”

The nitrogen pressure in the hitch lock system pushes the lock back into the locked position.

Follow the instructions given in the window.

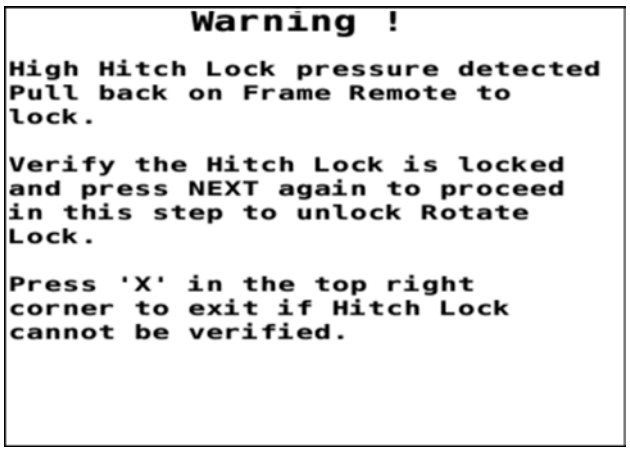
Press the “Next” button to continue the wizard.

RAIL20PLM1683BA 15

If the system cannot detect that the hitch lock is locked, a pop-up message appears stating, “Warning! High hitch lock pressure detected. Pull back on the Frame Remote to lock. Verify the hitch lock is locked and press Next again to proceed in this step to unlock the rotate lock. Press ‘X’ in the top right corner to exit if hitch lock cannot be verified.”

Press the “Next” button if you can verify that the hitch lock is locked.

Press the “X” button to exit the folding procedure if you cannot verify that the hitch lock is locked.



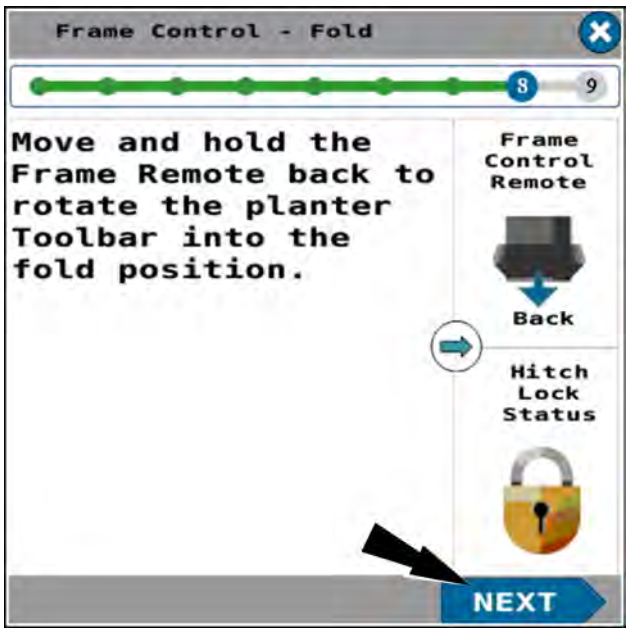
RAIL20PLM1684BA 16

The “Frame Control – Fold” wizard step 8 appears. This deactivates the solenoid that was left activated in the previous step.

The “Frame Control – Fold” wizard step 8 states, “Move and hold the Frame Remote back to rotate the planter toolbar into the fold position.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



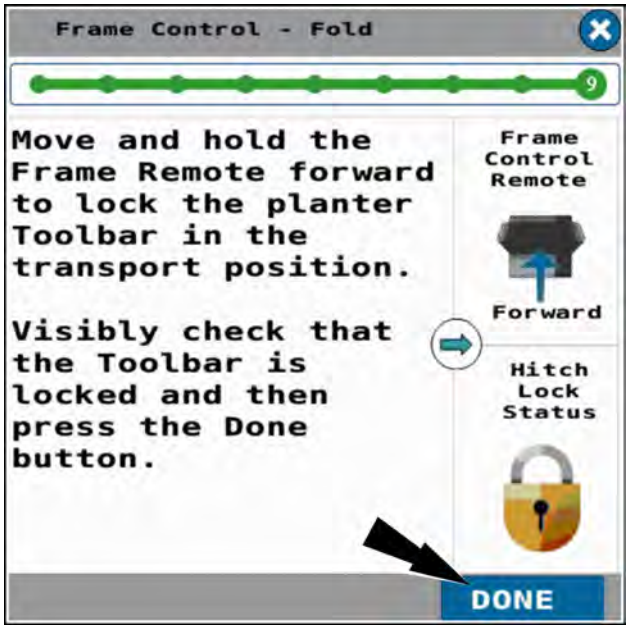
RAIL20PLM1685BA 17

The “Frame Control – Fold” wizard step 9 appears. This deactivates all solenoids that were left activated in the previous step.

The “Frame Control – Fold” wizard step 9 states, “Move and hold the Frame Remote forward to lock the planter toolbar in the transport position. Visibly check that the toolbar is locked and then press the Done button.

Follow the instructions given in the window.

Press the “Done” button to finish the wizard.

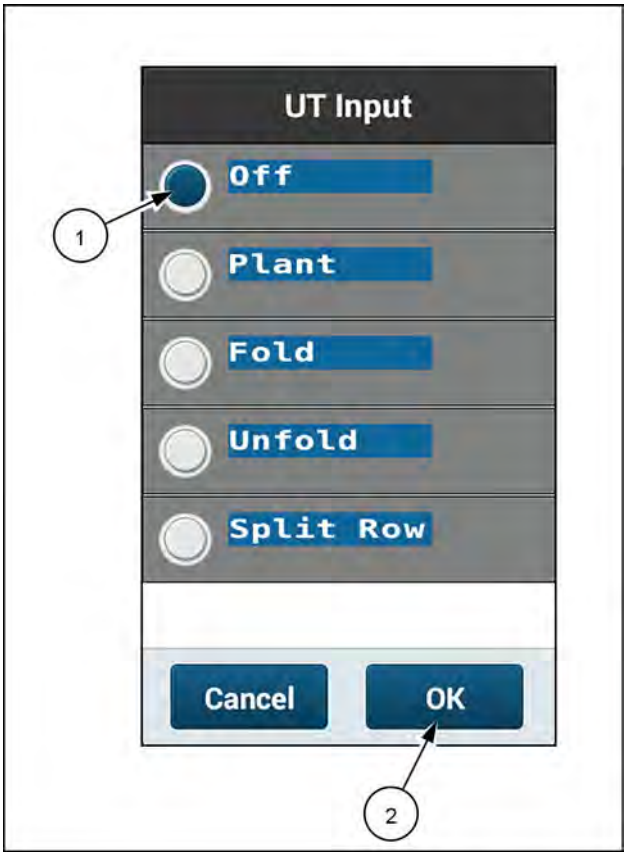


RAIL20PLM1686BA 18

In page 1 of the object pool, press the button in the “Frame Op” window.

In the frame operation window, press the “Off” radio button **(1)**.

Press the “OK” button **(2)** to disable all solenoid functions during road transport.



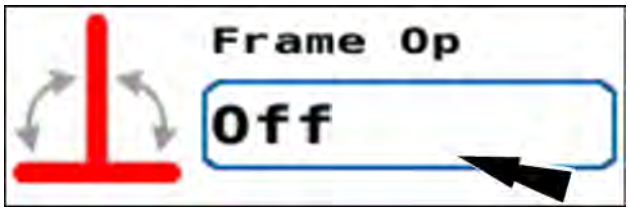
RAPH23PLM1107BA 19

Unfold the planter to the planting position

- The step sequence in this procedure must be followed exactly.
- Steps directing the operator to push the tractor remote lever forward or pull the tractor remote lever back assume that the hydraulic lines are correctly installed on the tractor.
- The planter must not be moving (no ground speed sensed).
- The planter must be on a level surface.
- The wing down force remote lever must be in the float position for the duration of the procedure.

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



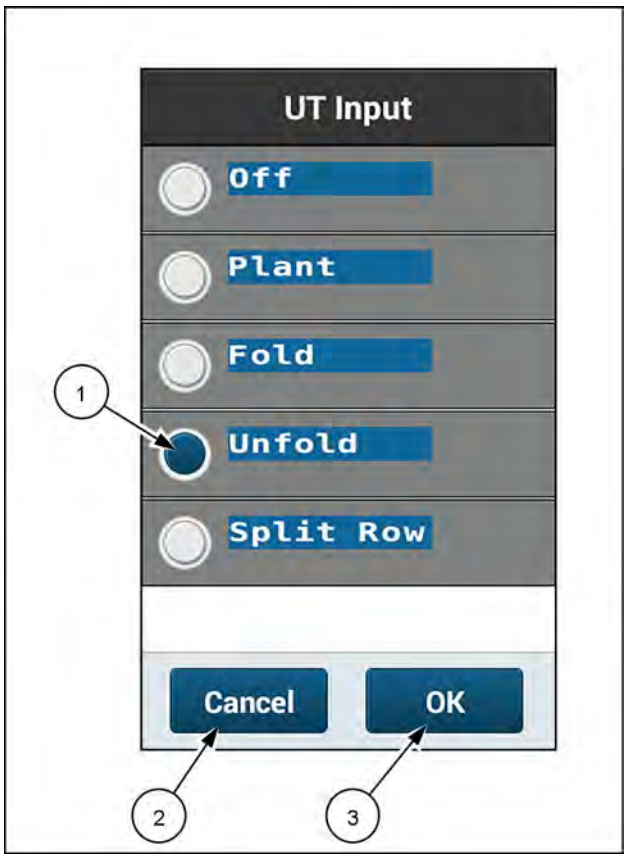
RAIL20PLM1179AA 20

The frame operation menu appears.

Press the “Unfold” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue unfolding the planter.



RAPH23PLM1081BA 21

If the nitrogen pressure in the hitch lock is too low, a pop-up message displays: “Hitch Lock nitrogen pressure too low. If Planter Hitch is unlocked, it cannot be re-locked."

To complete the fold process, the hitch lock must be able to unlock, allowing the hitch to extend, and then re-lock, securing the hitch. If the nitrogen pressure in the hitch lock is too low, the hitch lock will not be able to re-lock after the hitch is extended.

RAIL20PLM1673BA 22

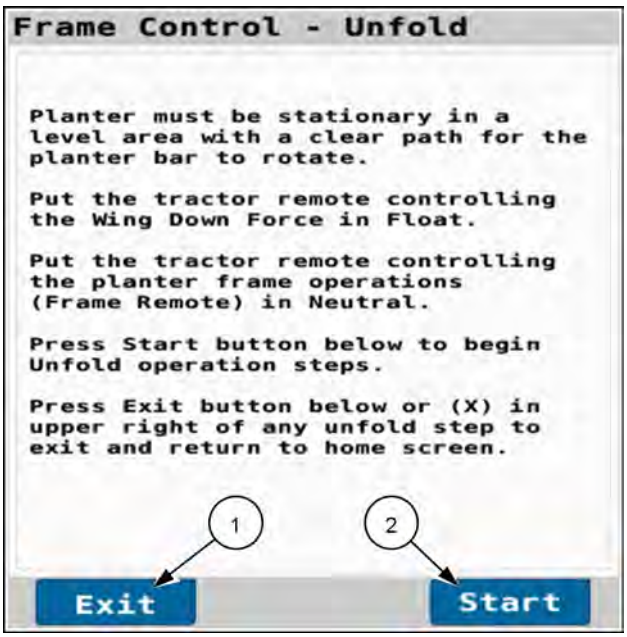
The “Frame Control – Unfold” window appears.

The “Frame Control – Unfold” window states, “The planter must be stationary in a level area with a clear path for the planter bar to rotate. Put the tractor remote controlling the Wing Down Force in Float. Put the tractor remote controlling the planter frame operations (Frame Remote) in Neutral. Press the Start button below to begin unfold operation steps. Press the Exit button below or (X) in the upper right of any unfold step to exit and return to the home screen.”

Follow the instructions given in the window.

If you need to cancel the procedure, press the “Exit” button **(1)**.

Press the “Start” button **(2)** to start the unfold wizard.

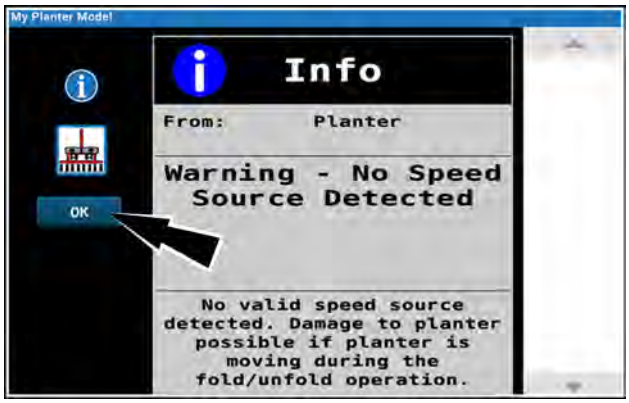


RAIL20PLM1689BA 23

If no valid speed source is detected by the system, a warning popup appears.

The warning popup states, “Warning – No Speed Source Detected. No valid speed source detected. Damage to the planter is possible if the planter is moving during the fold or unfold operation." Verify the planter is not moving. Press the “OK” button.

Follow the instructions given in the window.



RAPH21PLM3112AA 24

The “Frame Control – Unfold” wizard step 1 appears.

The “Frame Control – Unfold” wizard step 1 states, “Move and hold the Frame Remote backward to raise the center section of the planter. The wings will rise with the center section. As the planter toolbar raises the rotate lock will unlock to prepare for rotating the toolbar in the next step.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

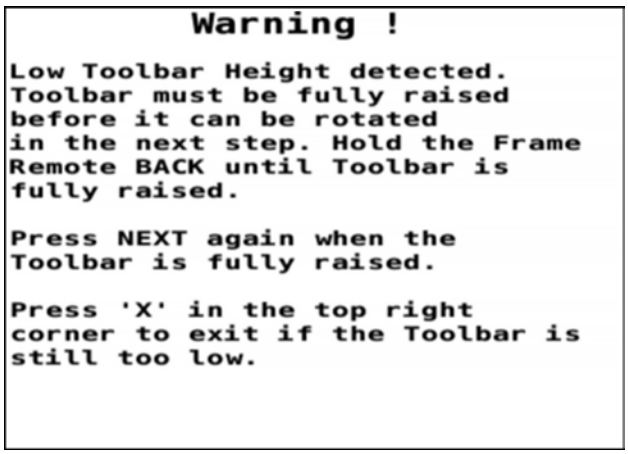
RAIL20PLM1690BA 25

If the toolbar is not fully raised, a pop-up message appears. The pop-up message states, “Low toolbar height detected. The toolbar must be fully raised before it can be fully rotated in the next step. Hold the Frame Remote back until the toolbar is fully raised. Press Next again when the toolbar is fully raised. Press ‘X’ in the top right corner to exit if the toolbar is still too low.”

NOTE: *The toolbar must be fully raised. The toolbar cannot be lower than the calibrated full height.*

If needed, follow the instructions in the pop-up message.

Press the “Next” button again.



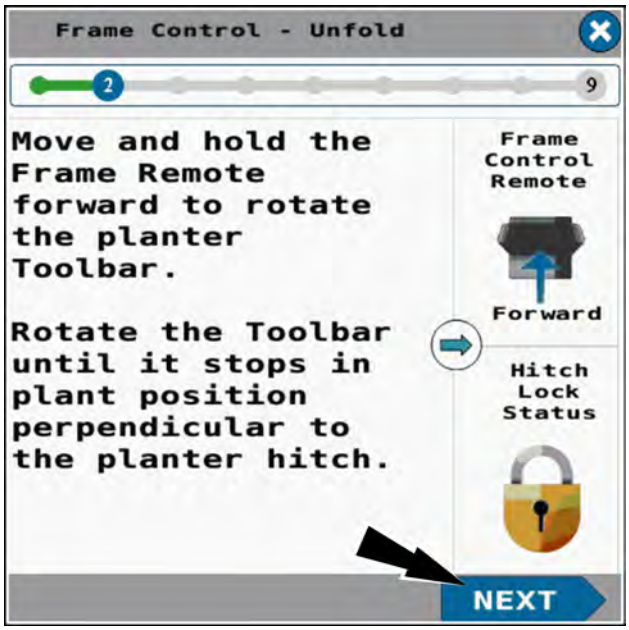
RAPH21PLM2606BA 26

The “Frame Control – Unfold” wizard step 2 appears. This deactivates solenoids that were activated in the previous step.

The “Frame Control – Unfold” wizard step 2 states, “Move and hold the Frame Remote forward to rotate the planter toolbar. Rotate the toolbar until it stops in plant position perpendicular to the planter hitch.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



RAIL20PLM1691BA 27

The “Frame Control – Unfold” wizard step 3 appears.

The “Frame Control – Unfold” wizard step 3 states, “Move and hold the Frame Remote forward to lock the rotate lock. After the rotate lock locks, then the planter’s hitch lock will unlock to prepare for retracting the planter’s hitch. The hitch lock icon in the lower right panel will indicate when the planter hitch is unlocked and the Next button will be enabled.”

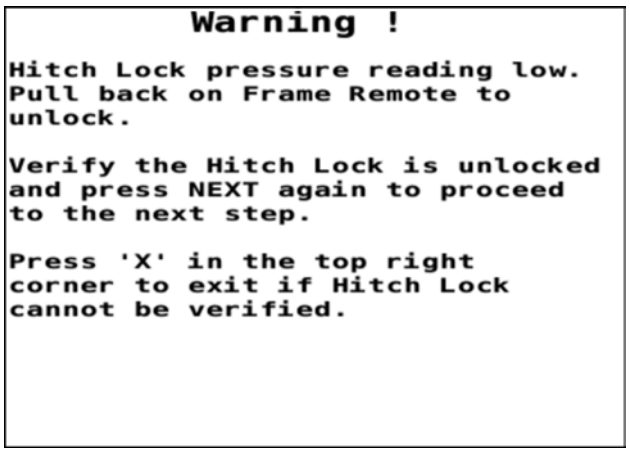
Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

RAIL20PLM1692BA 28

If the system cannot detect that the hitch lock is unlocked, a pop-up message appears stating, “Warning! Hitch lock pressure reading low. Pull back on the Frame Remote to unlock. Verify the hitch lock is unlocked and press Next again to proceed to the next step. Press ‘X’ in the top right corner to exit if hitch lock cannot be verified.”

NOTE: *If the hitch lock pressure warning displayed at the beginning of the fold process, the hitch lock pressure sensor may not be able to indicate the position of the hitch lock. In this case, press the "Next" button only if you can physically confirm that the hitch lock is in the unlocked position.*



RAIL20PLM1681BA 29

Follow the instructions given in the window.

Press the “Next” button again.

The “Frame Control – Unfold” wizard step 4 appears.

The “Frame Control – Unfold” wizard step 4 states, “Move and hold the Frame Remote forward to retract the planter hitch. Keep the remote forward until the planter hitch is fully retracted and stops moving. The planter hitch has to be fully retracted in order to lock it in the planting position.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

RAIL20PLM1693BA 30

The “Frame Control – Unfold” wizard step 5 appears. This deactivates all solenoids that were active in the previous step.

The “Frame Control – Unfold” wizard step 5 states, “Pull the Frame Remote back to lock the planter’s hitch. The hitch lock icon in the lower right panel will indicate when the planter hitch is locked.”

Follow the instructions given in the window.

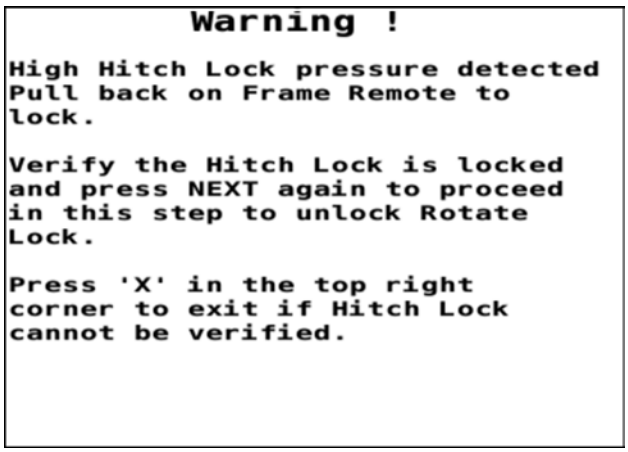
Press the “Next” button to continue the wizard.

RAIL20PLM1694BA 31

If the system cannot detect that the hitch lock is locked, a pop-up message appears stating, “Warning! High hitch lock pressure detected. Pull back on the Frame Remote to lock. Verify the hitch lock is locked and press Next again to proceed in this step to unlock the rotate lock. Press ‘X’ in the top right corner to exit if hitch lock cannot be verified.”

Press the “Next” button if you can verify that the hitch lock is locked.

Press the “X” button to exit the unfolding procedure if you cannot verify that the hitch lock is locked.



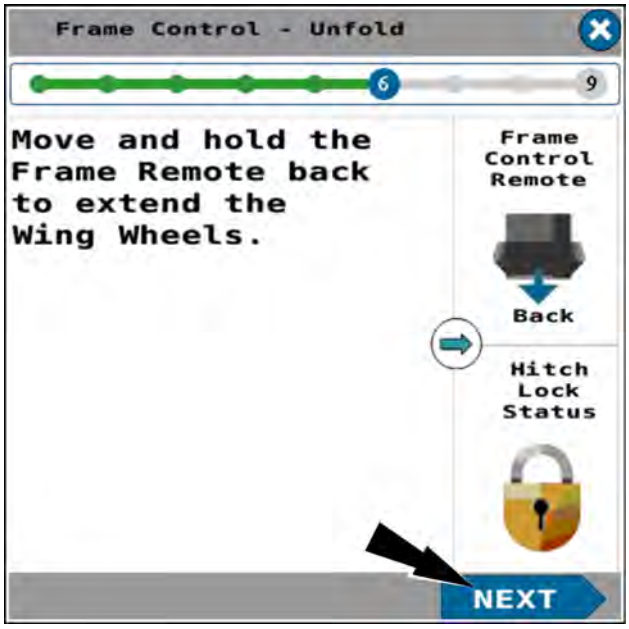
RAIL20PLM1684BA 32

The “Frame Control – Unfold” wizard step 6 appears.

The “Frame Control – Unfold” wizard step 6 states, “Move and hold the Frame Remote back to extend the wing wheels.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.”



RAIL20PLM1695BA 33

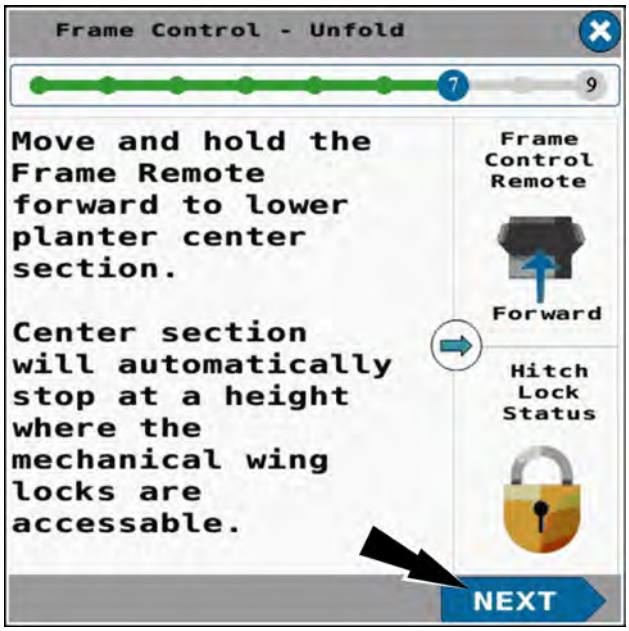
The “Frame Control – Unfold” wizard step 7 appears. This deactivates previously activated solenoids.

The “Frame Control – Unfold” wizard step 7 states, “Move and hold the Frame Remote forward to lower the planter center section. The center section will automatically stop at a height where the mechanical wing locks are accessible.”

NOTE: *In this step, the planter center section and wings are lowered. As the wing wheels hit the ground, the center section keeps lowering to a poit where the wing locks can be reached. At the same time since the center section is lower than the wings the pressure is taken off the wing lock pins.*

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.”

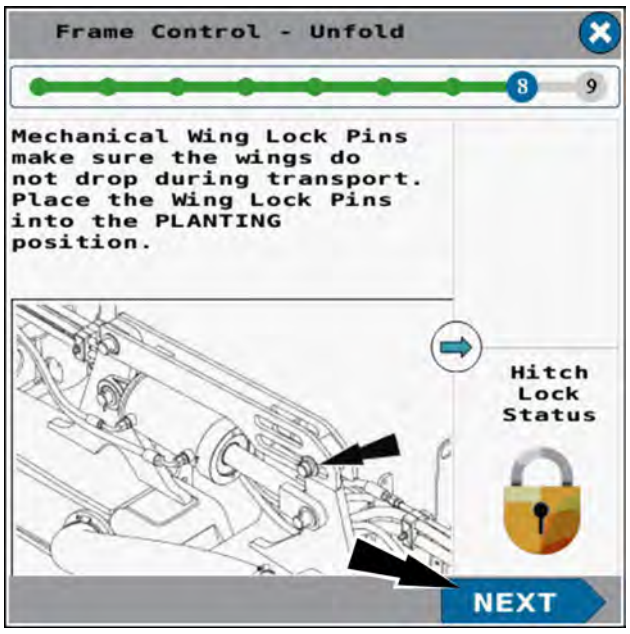


RAIL20PLM1696BA 34

The “Frame Control – Unfold” wizard step 8 appears.

The “Frame Control – Unfold” wizard step 8 states, “Mechanical wing lock pins make sure that the wings do not drop during transport. Place the wing lock pins into the PLANTING position.”

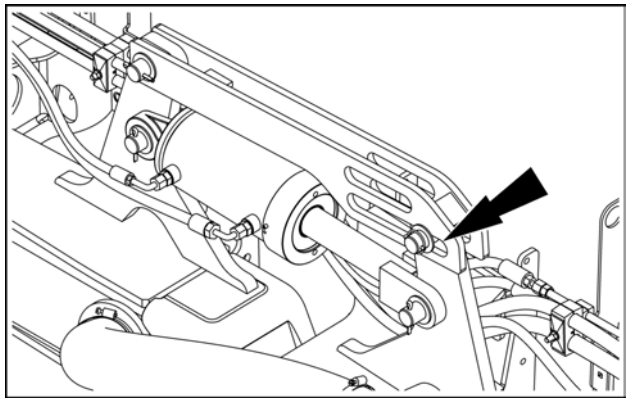
Follow the instructions given in the window.



RAIL20PLM1697BA 35

Put the wing locks into field position.

Press the “Next” button to continue the wizard.”



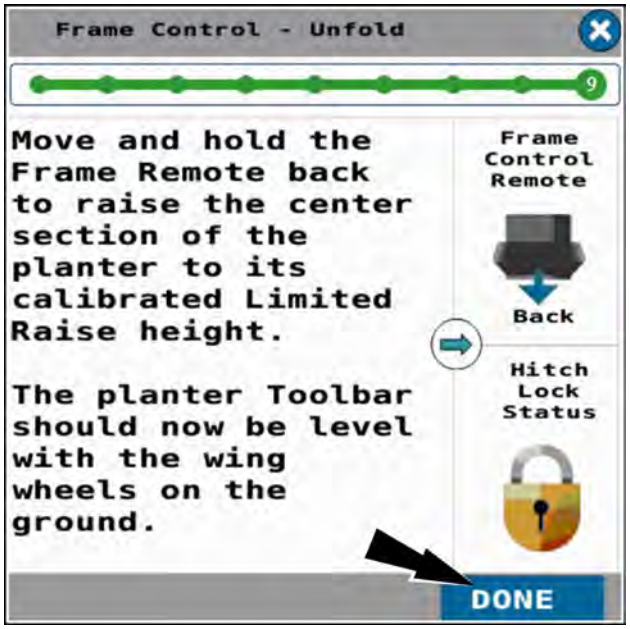
SAVM17PLA1050AA 36

The “Frame Control – Unfold” wizard step 9 appears.

The “Frame Control – Unfold” wizard step 9 states, “Move and hold the Frame Remote back to raise the center section of the planter to its calibrated limited raise height. The planter toolbar should now be level with the wing wheels on the ground.”

Follow the instructions given in the window.

Press the “Done” button to finish the wizard.



RAIL20PLM1698BA 37

Split row setup: raise or lower split rows

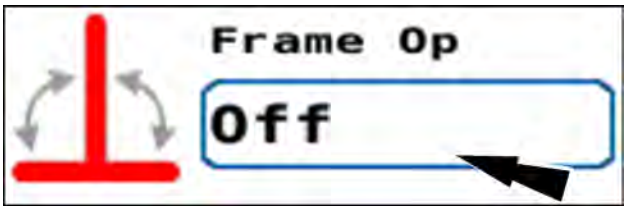
The split row setup screen allows you to raise and lower all rows on the planter when planting narrow rows such as soybeans. The setup screen also allows you to raise and lower all the active rows when planting wider rows such as corn.

When configured for split rows, all of the even numbered rows are disabled by the system. This includes all product application and speed belts.

You use the work condition setup to configure the planter for all rows or for split rows. See “Work Condition Setup screen” (**3-80**) for information on configuring the planter to plant all rows or split rows.

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



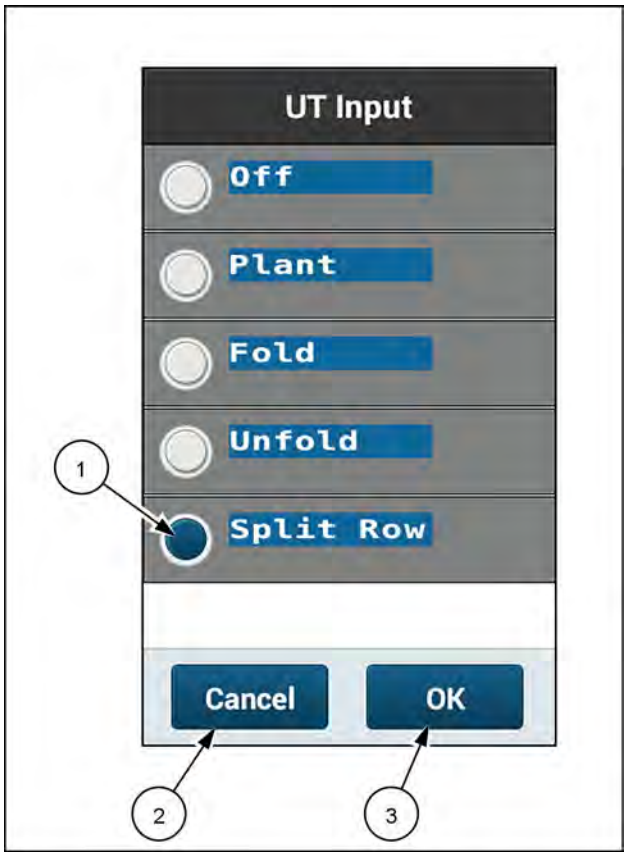
RAIL20PLM1179AA 38

The frame operation menu appears.

Press the “Split Row” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue the split row setup.

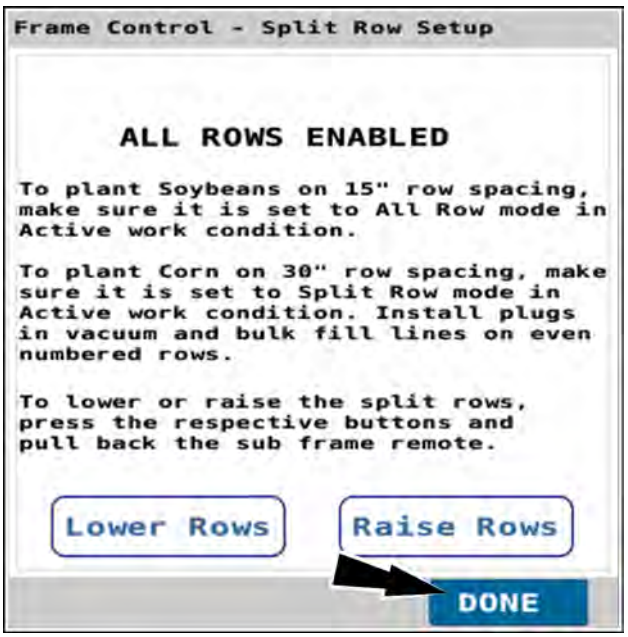


RAPH23PLM1082BA 39

The “Frame Control – Split Row Setup” screen appears.

If all rows are selected in the active work condition,, the “Frame Control – Split Row Setup” window indicates that all rows are enabled. To plant soybeans on **38 cm** (**15 in**) row spacing, make sure it is set to All Row mode in Active work condition. The screen indicates “All Rows Enabled” when set up for **38 cm** (**15 in**) row width.

If you wish to leave the setup option in the “All Rows Enabled” mode, press the “Done” button. The “Frame Control – Split Row Setup” window closes and the procedure is complete.

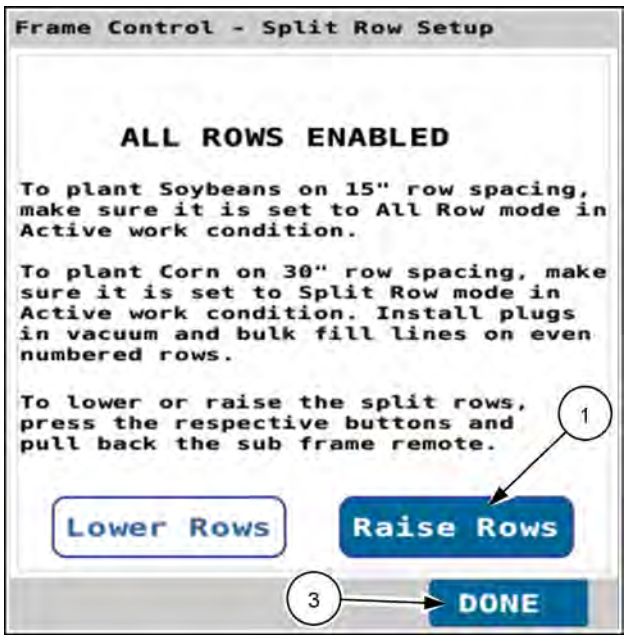


RAPH23PLM1111BA 40

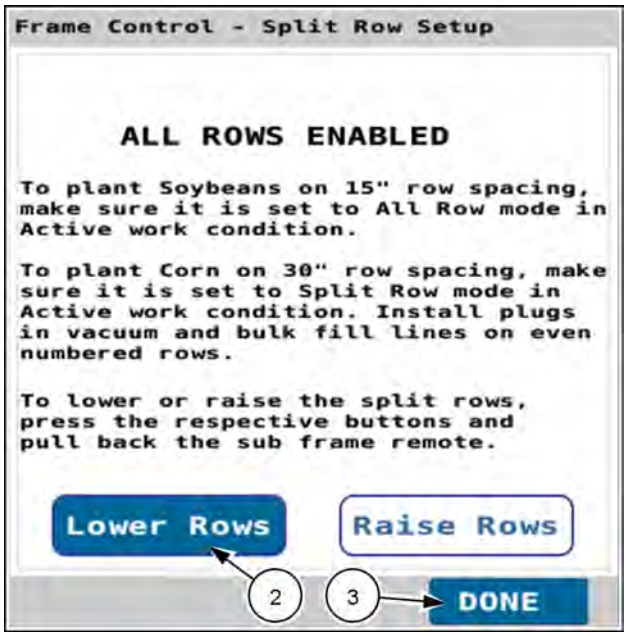
To raise or lower the rows using this screen, press the “Raise Rows” button **(1)** or the “Lower Rows” button **(2)** to enable the button.

Pull back on the sub-frame remote to raise or lower the rows.

Press the “Done” button **(3)** to complete the procedure and close the window.



RAPH23PLM1113BA 41



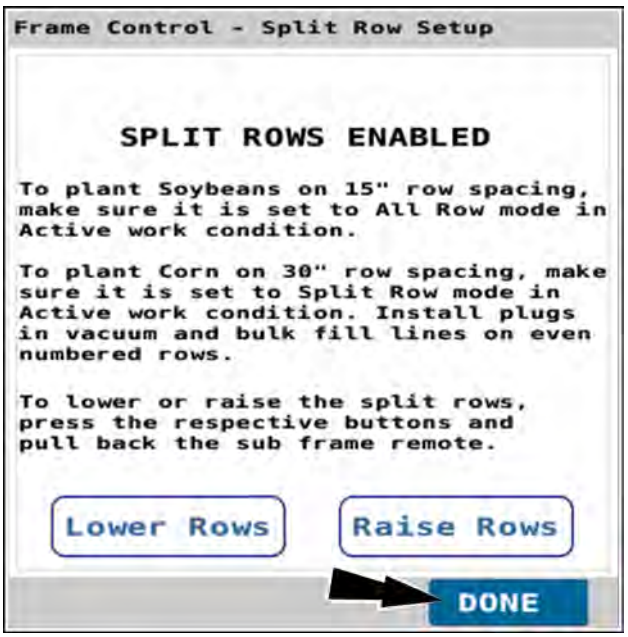
RAPH23PLM1112BA 42

If split rows are selected in the active work condition,, the “Frame Control – Split Row Setup” window indicates that split rows are enabled.

To plant corn on a **76 cm** (**30 in**), row width, install plugs in the vacuum and bulk fill lines on even numbered rows. In the active work condition change the row configuration from “All Rows” to “Split Rows.” See “Work Condition Setup screen” (**3-80**).

If you wish to leave the setup option in the “All Rows Enabled” mode, press the “Done” button. The “Frame Control – Split Row Setup” window closes and the procedure is complete.

NOTE: *Changing the split row setup automatically enables/disables rows in work conditions and implement setup.*

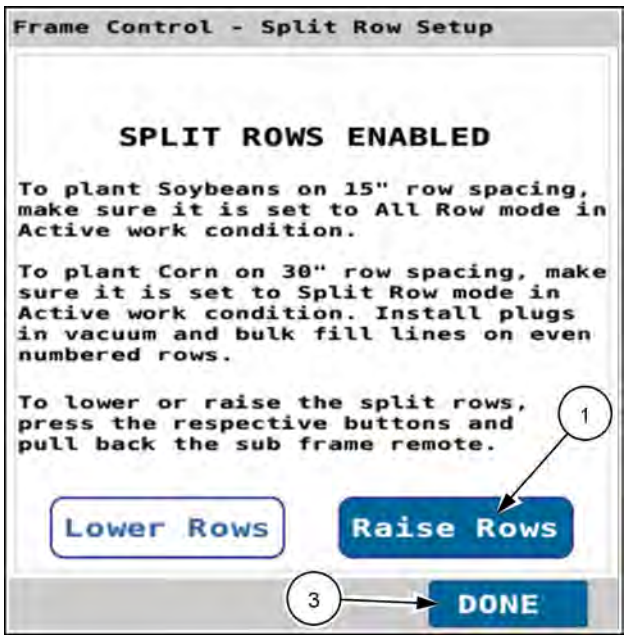


RAPH23PLM1108BA 43

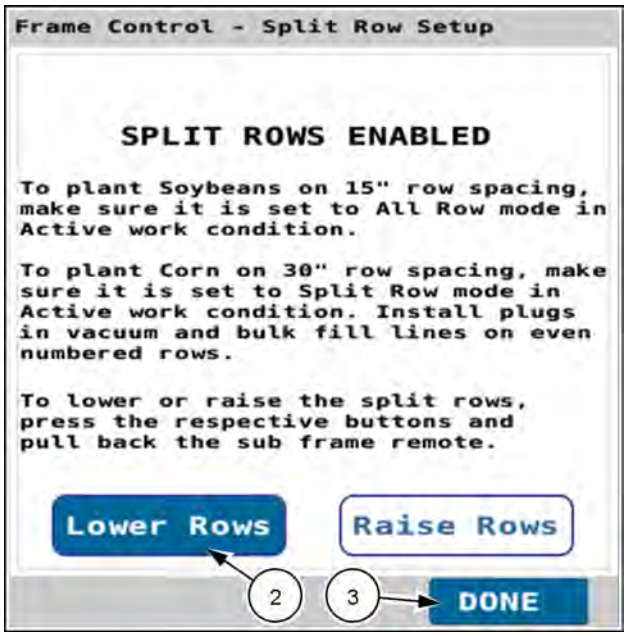
To raise or lower the rows in this screen, press the “Raise Rows” button **(1)** or the “Lower Rows” button **(2)** to enable the button.

Pull back on the sub-frame remote to raise or lower the rows.

Press the “Done” button **(3)** to complete the procedure and close the window.



RAPH23PLM1109BA 44

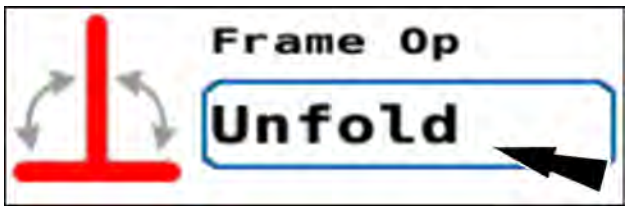


RAPH23PLM1110BA 45

Plant

In page 1 of the object pool, press the button in the “Frame Op” window.

In the frame operation window, press the “Plant” radio button.



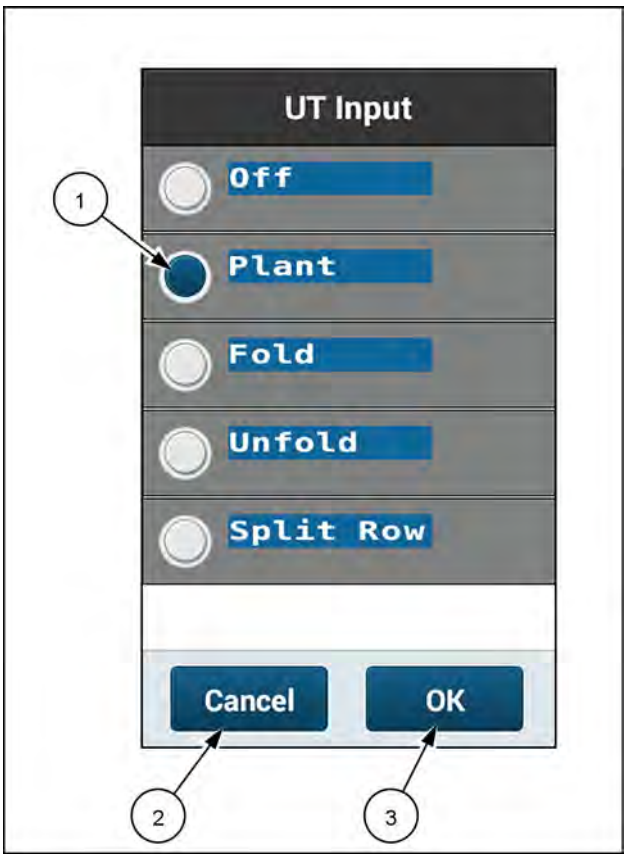
RAIL20PLM1180AA 46

The frame operation menu appears.

Press the “Plant” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the planting setup procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue the planting setup procedure.



RAPH23PLM1079BA 47

The “Frame Control – Plant” window appears.

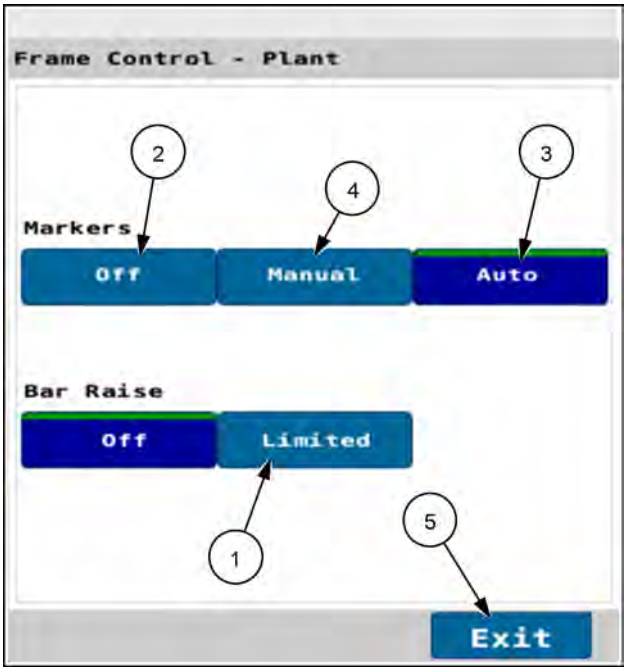
In the “Bar Raise” section, press the “Limited” button **(1)** to perform typical end of row turns.

NOTE: *With the “Bar Raise” section set to the “Off” position, the planter will not raise or lower in response to the Frame Remote.*

The “Markers” section contains the following options:

- If the planter does not have markers, select the “Off” **(2)** option.
- Press the “Auto” button **(3)** for automatic alternating of the markers each time you raise and lower the frame.
- Press the “Manual” button **(4)** to control marker deployment manually with the “Mrkr Ctrl” window on page 1. See “Marker operating modes” (**4-142**) for more information.

Press the “Exit” button **(5)** to close the window.



RAPH22PLM0875BA 48

In page 2 of the object pool in the “Mrkr Ctrl” window, press the button for the marker you wish to deploy.

NOTE: *If marker control is configured to automatic mode, your selection is the first marker you wish to deploy. After that the markers will alternately deploy automatically.*

Use the remote lever to unfold the marker and lower the planter to the ground.

Move the remote lever to the powered down position.

NOTE: *CASE IH recommends placing the frame remote in the powered down position at all times, to avoid having the frame creep upwards.*

RAIL20PLM1181AA 49

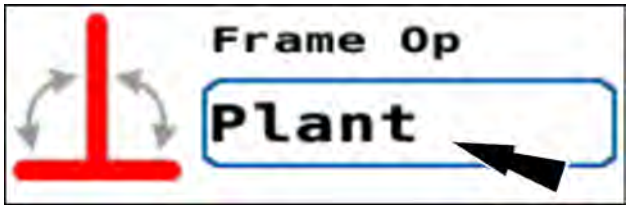
Frame control: 2150 model front fold planters

Fold the planter to the transport position

- The step sequence in this procedure must be followed exactly.
- Steps directing the operator to push the tractor remote lever forward or pull the tractor remote lever back assume that the hydraulic lines are correctly installed on the tractor.
- The marker and planter raise/lower functions share a common hydraulic circuit and are controlled by one remote valve lever. The markers must be fully retracted to transport position before you fold the planter. See “Marker operating modes” (**4-142**) for additional information.
- The planter must not be moving (no ground speed sensed).

Put the remote lever in the neutral position.

On page one of the object pool, press the button in the “Frame Op” window.



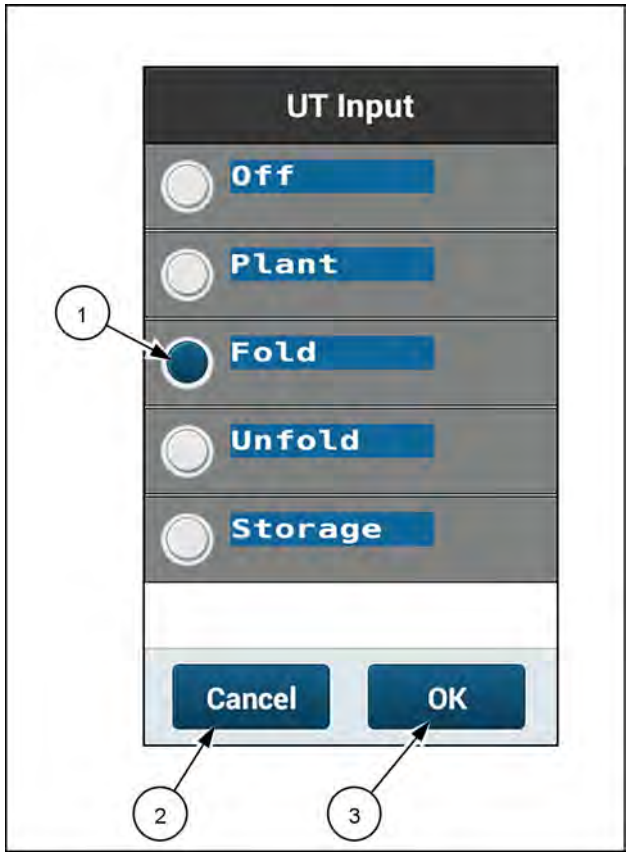
RAIL20PLM1176AA 1

The frame operation menu appears.

Press the “Fold” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue folding the planter.



RAPH23PLM1084BA 2

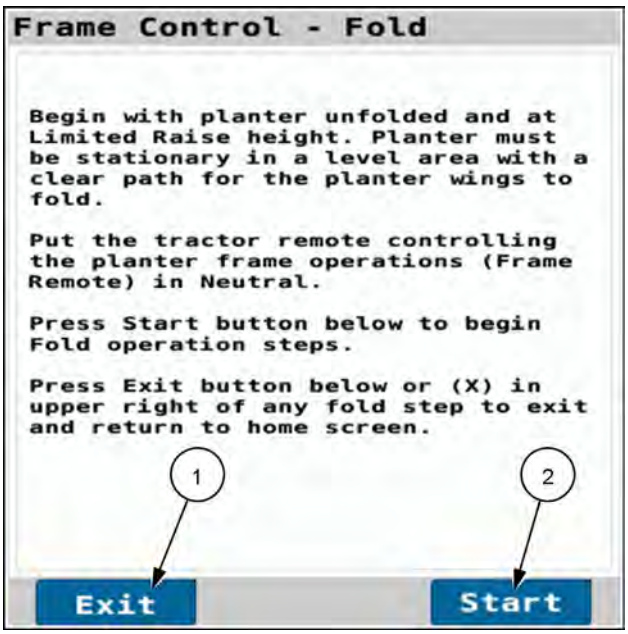
The “Frame Control – Fold” window appears.

The “Frame Control – Fold” window states, “Begin with the planter unfolded and at limited raise height. The planter must be stationary in a level area with a clear path for the planter wings to fold. Put the tractor remote controlling the planter frame operations (Frame Remote) in neutral. Press the Start button below to begin fold operation steps. Press the Exit button below or (X) in the upper right of any fold step to exit and return to the home screen.”

Follow the instructions given in the window.

If you need to cancel the procedure, press the “Exit” button **(1)**.

Press the “Start” button **(2)** to start the fold wizard.

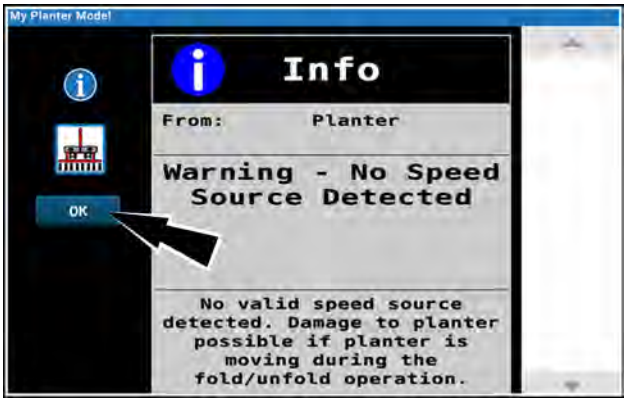


RAIL20PLM1630BA 3

If no valid speed source is detected by the system, a warning popup appears.

The warning popup states, “Warning – No Speed Source Detected. No valid speed source detected. Damage to the planter is possible if the planter is moving during the fold or unfold operation." Verify the planter is not moving. Press the “OK” button.

Follow the instructions given in the window.



RAPH21PLM3112AA 4

The “Frame Control – Fold” wizard step 1 appears.

The “Frame Control – Fold” wizard step 1 states, “Move and hold the Frame Remote back to raise the planter. Raise the planter to its Fold height with the wing wheel cylinders fully extended.”

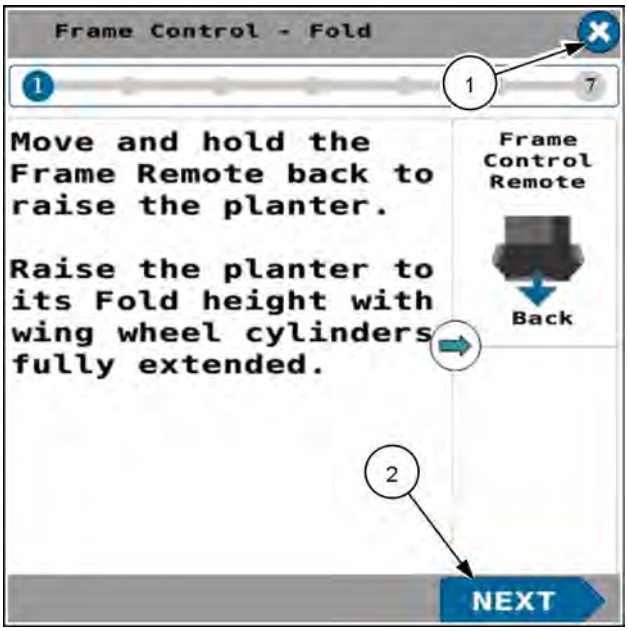
Follow the instructions given in the window.

NOTE: *The fold/unfold height is the height at which the carrier cylinders are fully extended. You configure the fold/unfold height on the “Frame Cal” screen. See “Frame calibration: 2150 model front fold planters” (**3-47**) for information on the frame calibration.*

NOTE: *If the planter does not raise to folding height, either the planter is already at the correct height or the frame calibration for fold height was performed incorrectly.*

If you need to cancel the wizard in this and all future steps, press the “X” button **(1)**.

Press the “Next” button **(2)** to continue the wizard.



RAIL20PLM1655BA 5

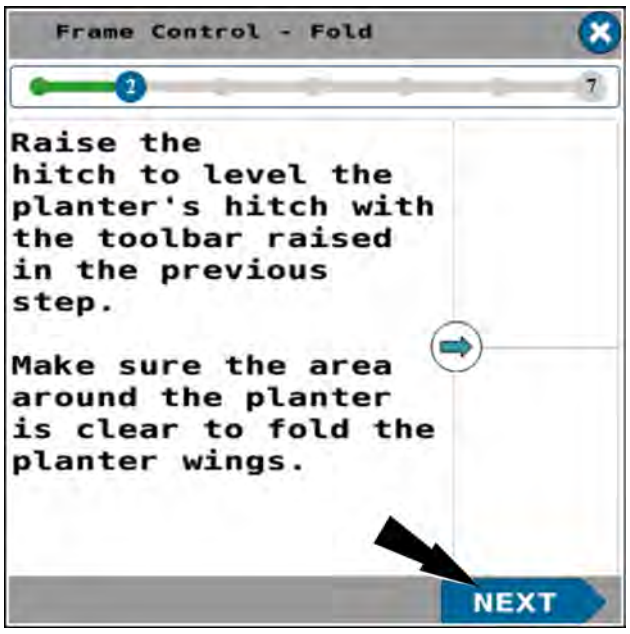
The “Frame Control – Fold” wizard step 2 appears.

The “Frame Control – Fold” wizard step 2 states, “Raise the hitch to level the planter’s hitch with the toolbar raised in the previous step. Make sure the area around the planter is clear to fold the planter wings.”

This step deactivates the previously activated solenoids.

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

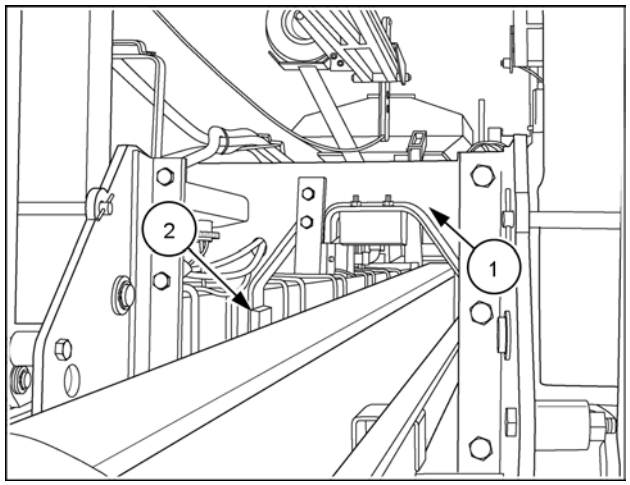


RAIL20PLM1656BA 6

Use the hitch controls to raise the tongue to an appropriate height for engaging the mechanical latches later. The tongue height should be approximately level with the toolbar when raised.

The tongue must be raised high enough that the wing latching mechanism **(1)** can pass over the tongue, and the bumper pads **(2)** on the wing toolbar will contact the tongue.

Press the “Next” button to continue the wizard.



RCPH10DSP003GAG 7

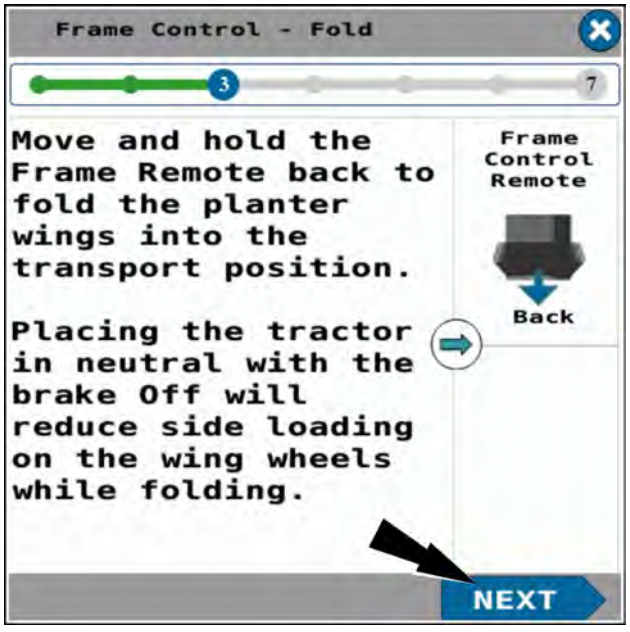
The “Frame Control – Fold” wizard step 3 appears.

The “Frame Control – Fold” wizard step 3 states, “Move and hold the frame remote back to fold the planter wings into the transport position. Placing the tractor in neutral with the brake off will reduce side loading on the wing wheels while folding.”

If space permits, the tractor should be in neutral with the brake OFF to permit the tractor to move during this step. This reduces side loading on the wing wheels as the wings fold.

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



RAIL20PLM1657BA 8

The “Frame Control – Fold” wizard step 4 appears. Previously activated solenoids are deactivated.

The “Frame Control – Fold” wizard step 4 states, “Raise the hitch until the wing latches engage on the planter’s hitch extension.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

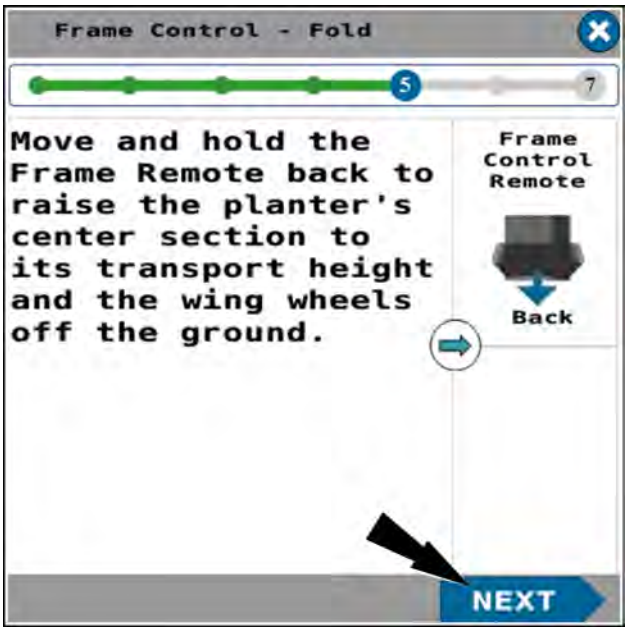
RAIL20PLM1658BA 9

The “Frame Control – Fold” wizard step 5 appears

The “Frame Control – Fold” wizard step 5 states, “Move and hold the frame remote back to raise the planter’s center section to its transport height and the wing wheels off the ground.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



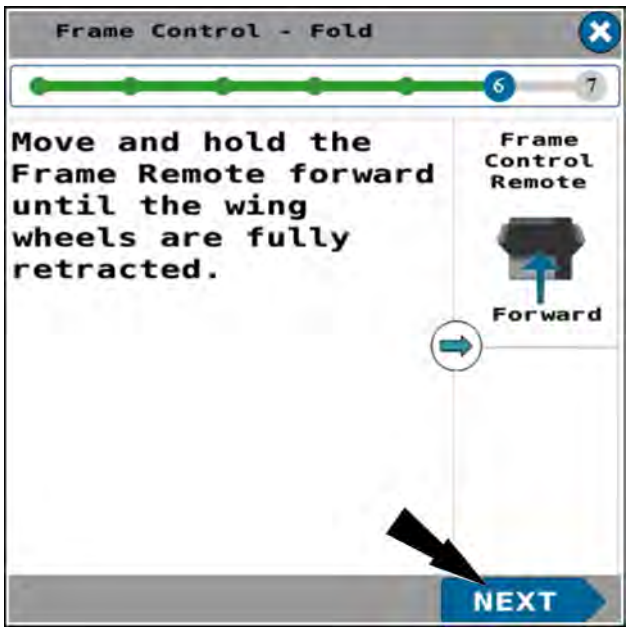
RAIL20PLM1659BA 10

The “Frame Control – Fold” wizard step 6 appears. This deactivates the frame solenoids that were activated by the previous step.

The “Frame Control – Fold” wizard step 6 states, “Move and hold the frame remote forward until the wing wheels are fully retracted.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



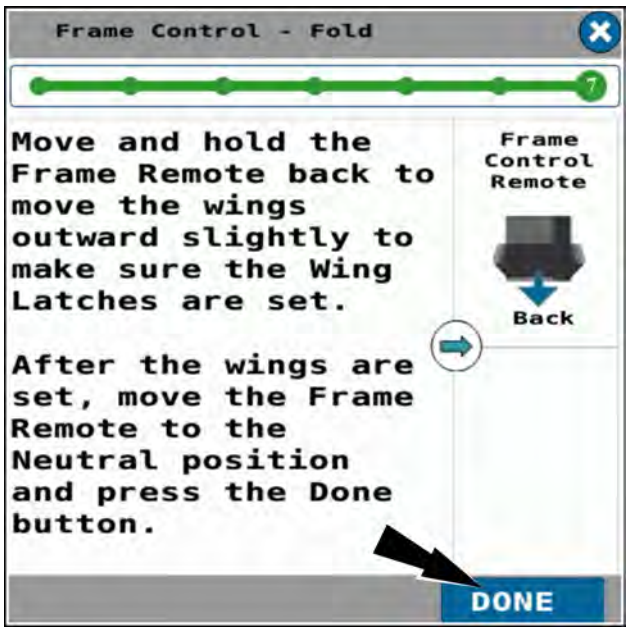
RAIL20PLM1660BA 11

The “Frame Control – Fold” wizard step 7 appears. This deactivates the solenoids that were activated by step 6.

The “Frame Control – Fold” wizard step 7 states, “Move and hold the frame remote back to move the wings outward slightly to make sure the wing latches are set. After the wings are set, move the frame remote to the neutral position and press the Done button.”

Follow the instructions given in the window.

Press the “Done” button to finish the “Frame Control – Fold” wizard. The system deactivates all frame solenoids.

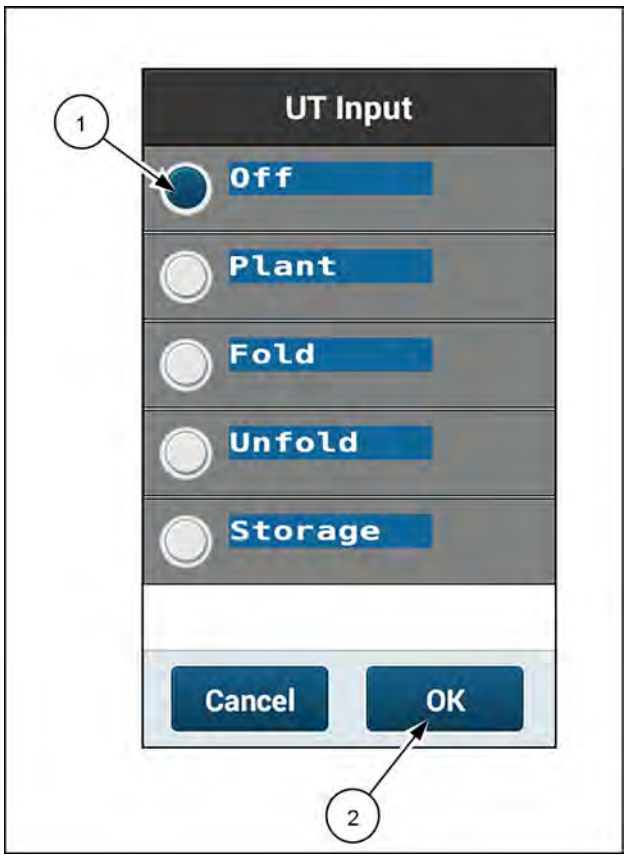


RAIL20PLM1671BA 12

In page 1 of the object pool, press the button in the “Frame Op” window.

In the frame operation window, press the “Off” radio button **(1)**.

Press the “OK” button **(2)** to disable all solenoid functions during road transport.



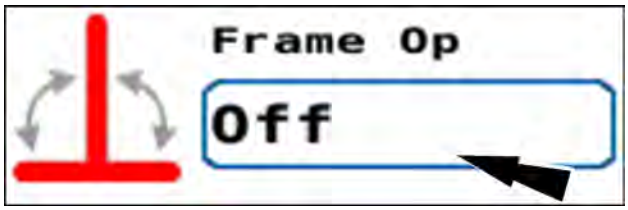
RAPH23PLM1114BA 13

Unfold the planter to the planting position

- The step sequence in this procedure must be followed exactly.
- Steps directing the operator to push the tractor remote lever forward or pull the tractor remote lever back assume that the hydraulic lines are correctly installed on the tractor.
- The planter must not be moving (no ground speed sensed).

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



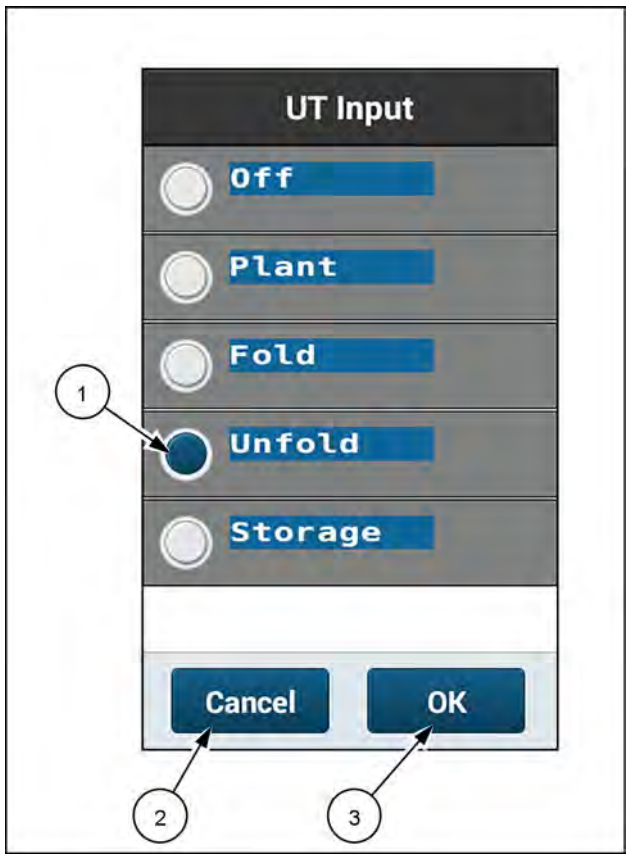
RAIL20PLM1179AA 14

The frame operation menu appears.

Press the “Unfold” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue unfolding the planter.



RAPH23PLM1085BA 15

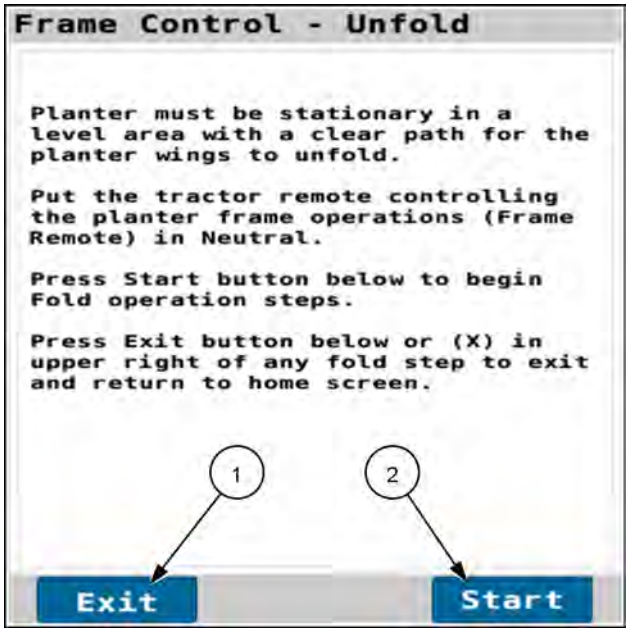
The “Frame Control – Unfold” window appears.

The “Frame Control – Unfold” window states, “The planter must be stationary in a level area with a clear path for the planter wings to unfold. Put the tractor remote controlling the planter frame operations (frame remote) in neutral. Press the Start button below to begin unfold operation steps. Press the Exit button below or (X) in the upper-right of any unfold step to exit and return to the home screen.”

Follow the instructions given in the window.

If you need to cancel the procedure, press the “Exit” button **(1)**.

Press the “Start” button **(2)** to start the unfold wizard.

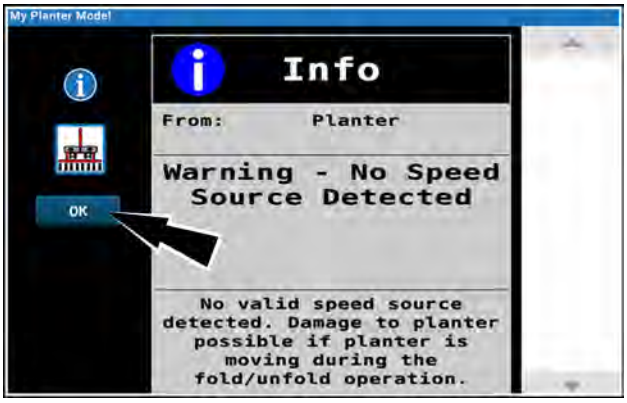


RAIL20PLM1639BA 16

If no valid speed source is detected by the system, a warning popup appears.

The warning popup states, “Warning – No Speed Source Detected. No valid speed source detected. Damage to the planter is possible if the planter is moving during the fold or unfold operation." Verify the planter is not moving. Press the “OK” button.

Follow the instructions given in the window.



RAPH21PLM3112AA 17

The “Frame Control – Unfold” wizard step 1 appears.

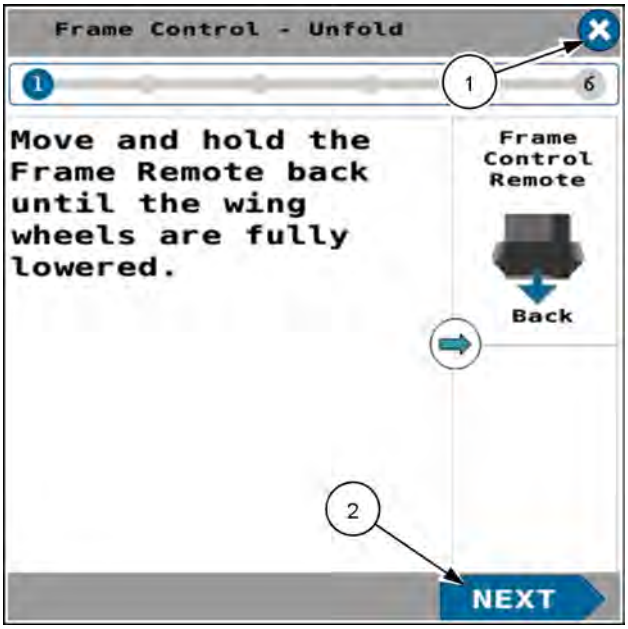
NOTE: *Follow the exact step sequence for the unfolding procedure. Do not perform the steps out of order.*

The “Frame Control – Unfold” wizard step 1 states, “Move and hold the frame remote back until the wing wheels are fully lowered.”

Follow the instructions given in the window.

If you need to cancel the wizard in this and all future steps, press the “X” button **(1)**.

Press the “Next” button **(2)** to continue the wizard.



RAIL20PLM1663BA 18

The “Frame Control – Unfold” wizard step 2 appears. This deactivates the solenoids that were activated by the previous step.

The “Frame Control – Unfold” wizard step 2 states, “Move and hold the frame remote forward to lower the planter until it stops at the unfold height. The unfold height is set during the frame calibration and can be adjusted if required.”

NOTE: *The fold/unfold height is the height at which the carrier cylinders are fully extended. You configure the fold/unfold height on the “Frame Cal” screen. See “Frame calibration: 2150 model front fold planters” (**3-47**) for information on the frame calibration.*

Follow the instructions given in the window.

When the planter reaches the unfold height, all frame solenoids are deactivated by the system.

Press the “Next” button to continue the wizard.

RAIL20PLM1664BA 19

The “Frame Control – Unfold” wizard step 3 appears. The system deactivates the solenoids that were activated by step 2.

The “Frame Control – Unfold” wizard step 3 states, “Move and hold the frame remote back to release tension on the wing latch. The wings will shift slightly inward toward the planter hitch bar.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

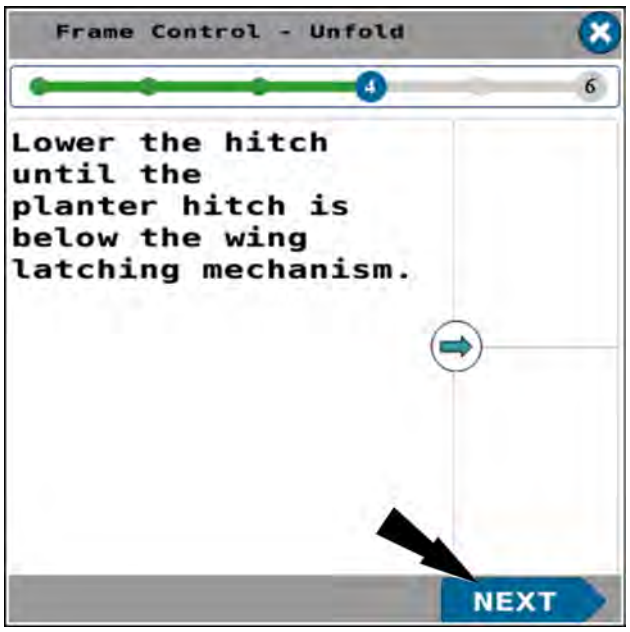
RAIL20PLM1665BA 20

The “Frame Control – Unfold” wizard step 4 appears. The system deactivates the solenoids that were activated in step 3.

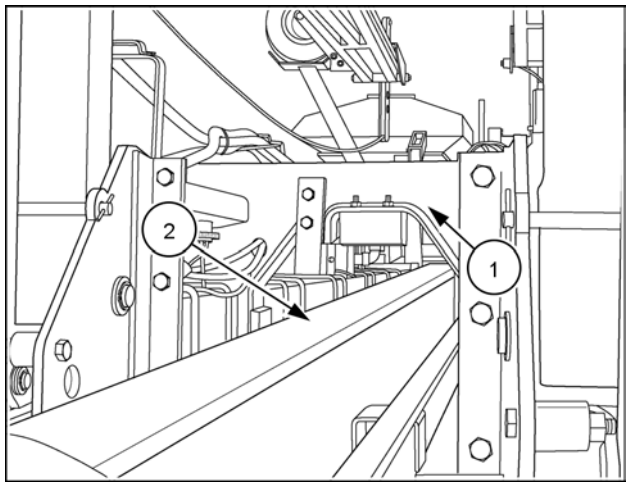
The “Frame Control – Unfold” wizard step 4 states, “Lower the hitch until the planter hitch is below the wing latching mechanism.”

Use the hitch controls to lower the hitch until the planter tongue **(1)** is free of the wing latching mechanism **(2)**.

Press the “Next” button to continue the wizard.



RAIL20PLM1666BA 21



RCPH10DSP003GAG 22

The “Frame Control – Unfold” wizard step 5 appears.

The “Frame Control – Unfold” wizard step 5 states, “Move and hold the frame remote forward to unfold the planter wings. Make sure the area around the planter is clear to unfold the planter wings.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

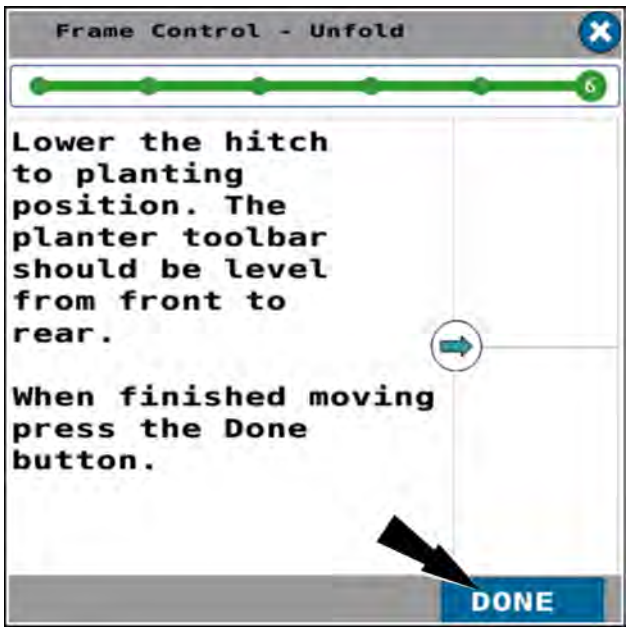
RAIL20PLM1667BA 23

The “Frame Control – Unfold” wizard step 6 appears. This deactivates the solenoid that was activated by the previous step.

The “Frame Control – Unfold” wizard step 6 states, “Lower the hitch to planting position. The planter toolbar should be level from the front to rear. When finished moving press the Done button.”

Follow the instructions given in the window.

Press the “Done” button to finish the “Frame Control – Unfold” wizard. The system deactivates all frame solenoids.

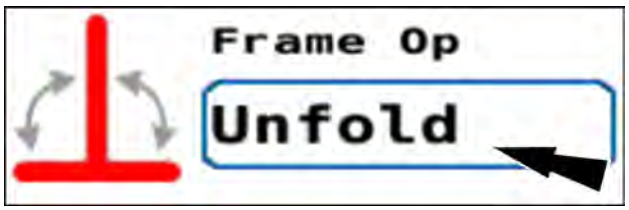


RAIL20PLM1668BA 24

Plant

In page 1 of the object pool, press the button in the “Frame Op” window.

In the frame operation window, press the “Plant” radio button.



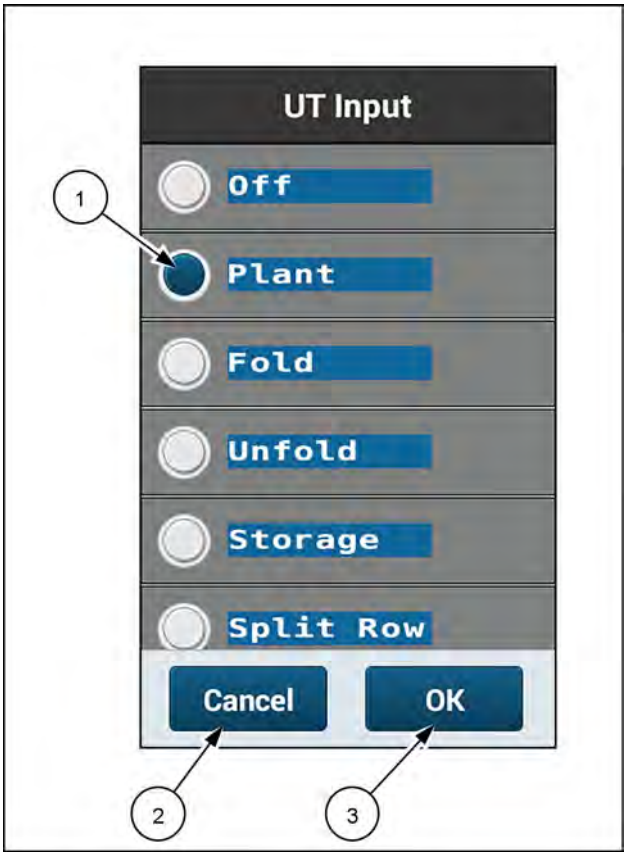
RAIL20PLM1180AA 25

The frame operation menu appears.

Press the “Plant” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the planting setup procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue the planting setup procedure.



RAPH23PLM1087BA 26

The “Frame Control – Plant” window appears.

Press the “Limited” **(1)** or “Full” **(2)** button in the options window (to perform typical end of pass turns).

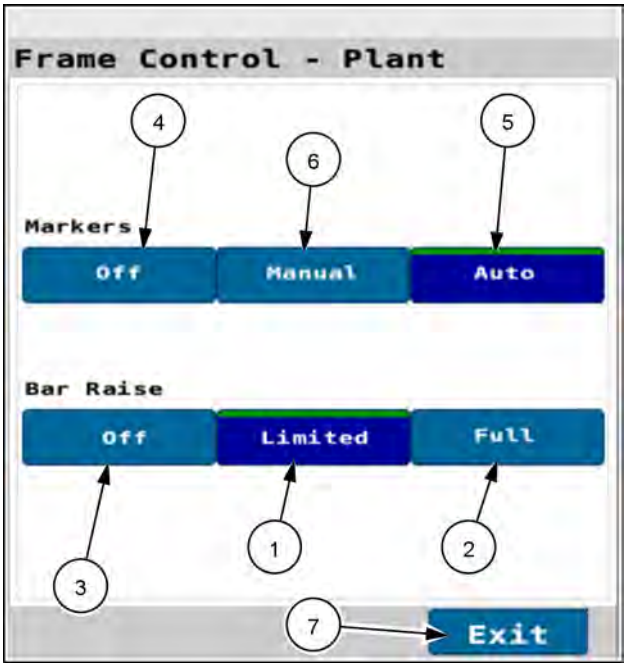
NOTE: *This setting is determined by operator preference. The limited raise height is a calibrated frame height that is set at a height that ensures the row units are out of the ground and high enough to make a turn in the headland.*

NOTE: *With the “Bar Raise” section set to the “Off” **(3)** position, the planter will not raise or lower in response to the Frame Remote.*

The “Markers” section contains the following options:

- If the planter does not have markers, select the “Off” **(4)** option.
- Press the “Auto” button **(5)** for automatic alternating of the markers each time you raise and lower the frame.
- Press the “Manual” button **(6)** to control marker deployment manually with the “Mrkr Ctrl” window on page 1. See “Marker operating modes” (**4-142**) for more information.

Press the “Exit” button **(7)** to close the window.



RAPH22PLM0874BA 27

In page 2 of the object pool in the “Mrkr Ctrl” window, press the button for the marker you wish to deploy.

NOTE: *If marker control is configured to automatic mode, your selection is the first marker you wish to deploy. After that the markers will alternately deploy automatically.*

Use the remote lever to unfold the marker and lower the planter to the ground.

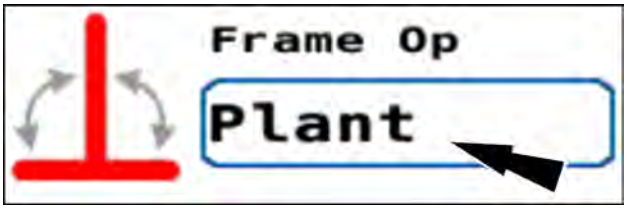
Move the remote lever to the float position so that the marker will follow the contour of the ground.

RAIL20PLM1181AA 28

Raise Row

On planters that are equipped with hydraulic down force, use the “Raise Row” function to lift the row units with the down force cylinders for increased ground clearance when entering fields, exiting fields, or navigating across uneven terrain.

On page one of the object pool, press the button in the “Frame Op” window.

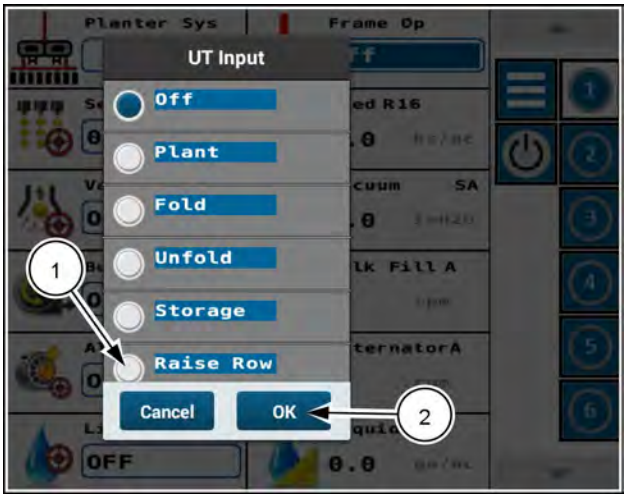


RAIL20PLM1176AA 29

The frame operation menu appears.

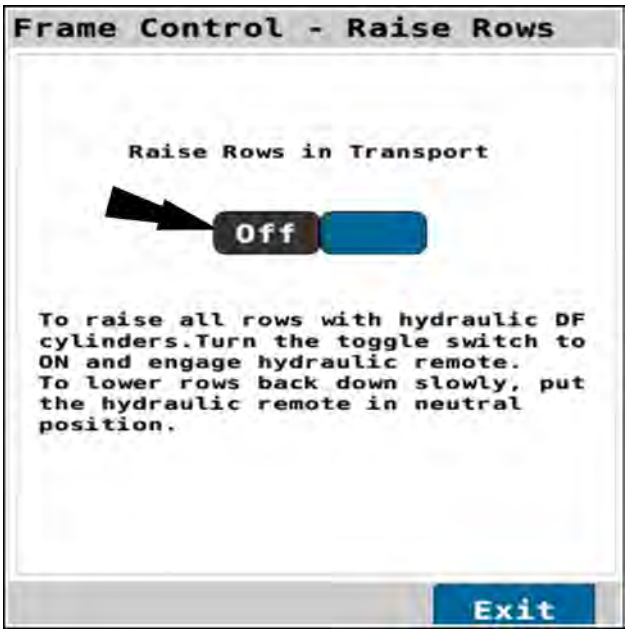
Press the “Raise Row” radio button **(1)**.

Press the “OK” button **(2)** to continue.



NHIL21PLM0270AA 30

Press the “Off” soft toggle to energize the **DeltaForce®** valve.

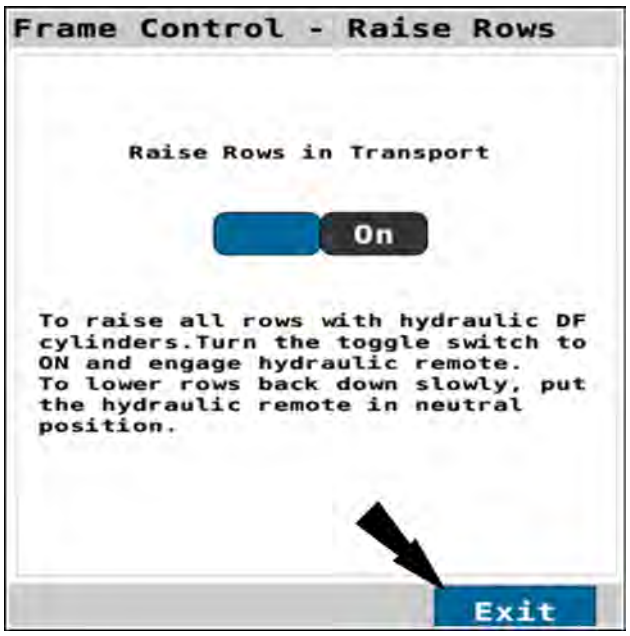


RAPH22PLM0877BA 31

When the soft toggle is in the “ON” state, use the hydraulic remote (green-labeled hoses) to raise the row units with the down force cylinders.

Use the hydraulic to lower the row units when the obstacle is passed. To lower the row units slowly, place the hydraulic remote into the “float position”.

Press the “Exit” button to return to the planter page. The selection for the soft toggle does not persist when you exit the screen.



RAPH22PLM0878BA 32

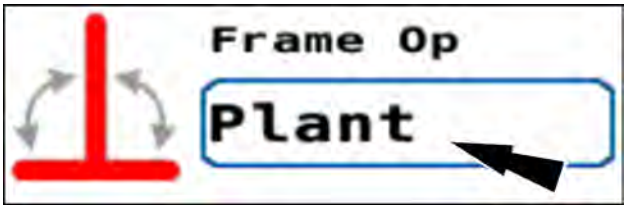
Frame control: 2150S model front fold planters

Fold the planter to the transport position

- The step sequence in this procedure must be followed exactly.
- Steps directing the operator to push the tractor remote lever forward or pull the tractor remote lever back assume that the hydraulic lines are correctly installed on the tractor.
- The marker and planter raise/lower functions share a common hydraulic circuit and are controlled by one remote valve lever. The markers must be fully retracted to transport position before you fold the planter. See “Marker operating modes” (**4-142**) for additional information.
- The planter must not be moving (no ground speed sensed).

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



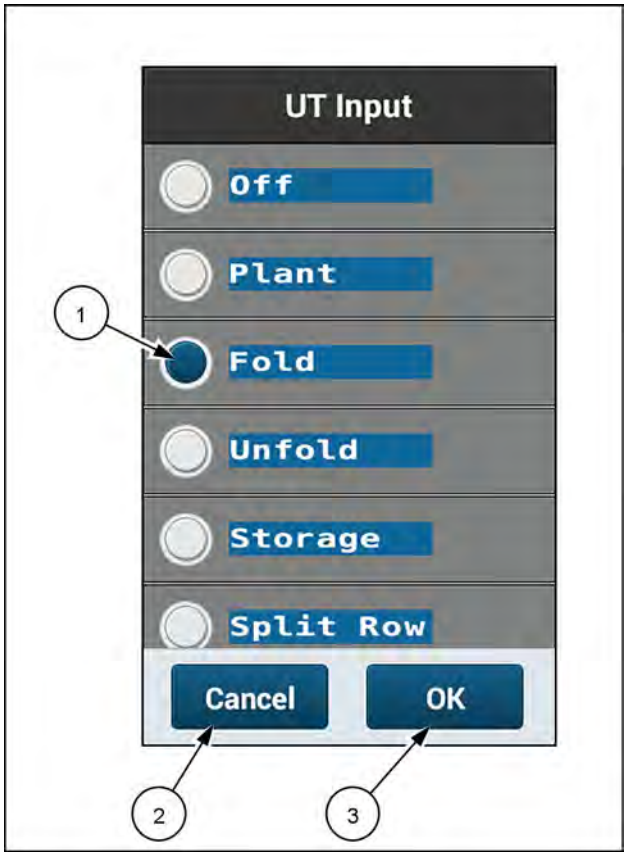
RAIL20PLM1176AA 1

The frame operation menu appears.

Press the “Fold” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue folding the planter.



RAPH23PLM1088BA 2

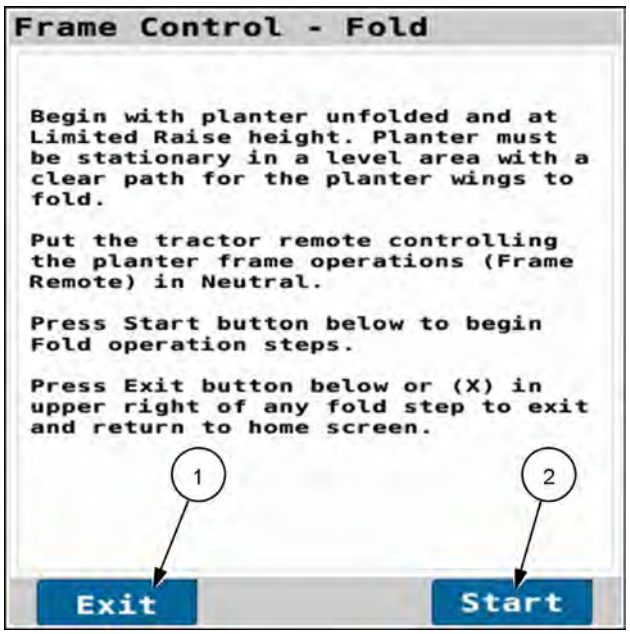
The “Frame Control – Fold” window appears.

The “Frame Control – Fold” window states, “Begin with the planter unfolded and at limited raise height. The planter must be stationary in a level area with a clear path for the planter wings to fold. Put the tractor remote controlling the planter frame operations (Frame Remote) in neutral. Press the Start button below to begin fold operation steps. Press the Exit button below or (X) in the upper right of any fold step to exit and return to the home screen.”

Follow the instructions given in the window.

If you need to cancel the procedure, press the “Exit” button **(1)**.

Press the “Start” button **(2)** to start the fold wizard.

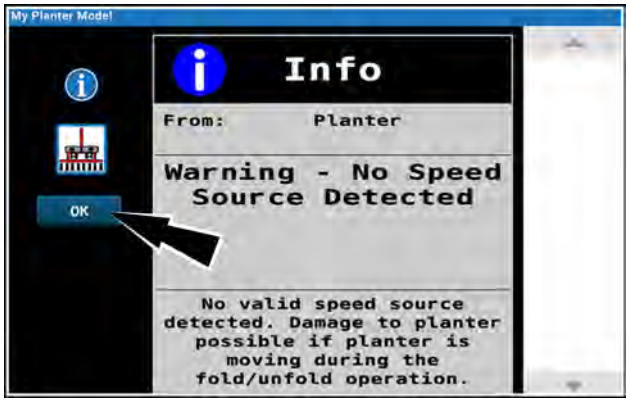


RAIL20PLM1630BA 3

If no valid speed source is detected by the system, a warning popup appears.

The warning popup states, “Warning – No Speed Source Detected. No valid speed source detected. Damage to the planter is possible if the planter is moving during the fold or unfold operation." Verify the planter is not moving. Press the “OK” button.

Follow the instructions given in the window.



RAPH21PLM3112AA 4

The “Frame Control – Fold” wizard step 1 appears.

The “Frame Control – Fold” wizard step 1 states, “Move and hold the Frame Remote back to raise the planter. Raise the planter to its Fold height with the wing wheel cylinders fully extended.”

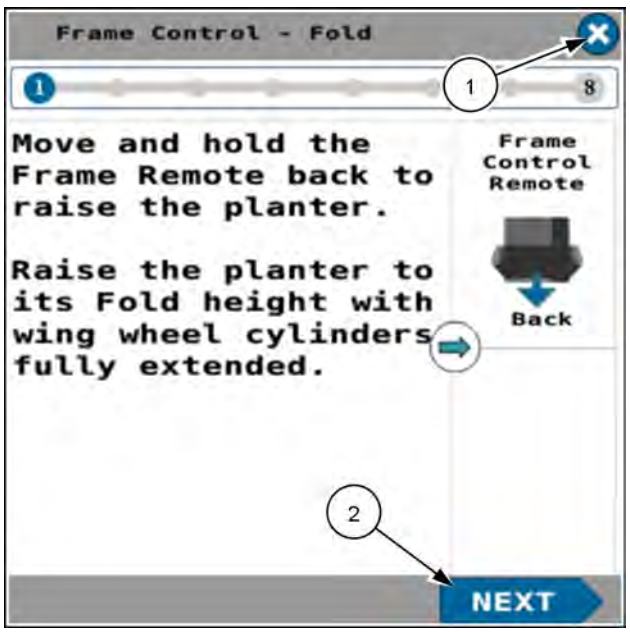
Follow the instructions given in the window.

NOTE: *The fold/unfold height is the height at which the carrier cylinders are fully extended. You configure the fold/unfold height on the “Frame Cal” screen. See “Frame calibration: 2150 and 2150S model front fold planters” (**3-47**) for information on the frame calibration.*

NOTE: *If the planter does not raise to folding height, either the planter is already at the correct height or the frame calibration for fold height was performed incorrectly.*

If you need to cancel the wizard in this and all future steps, press the “X” button **(1)**.

Press the “Next” button **(2)** to continue the wizard.



RAPH21PLM2587BA 5

The “Frame Control – Fold” wizard step 2 appears.

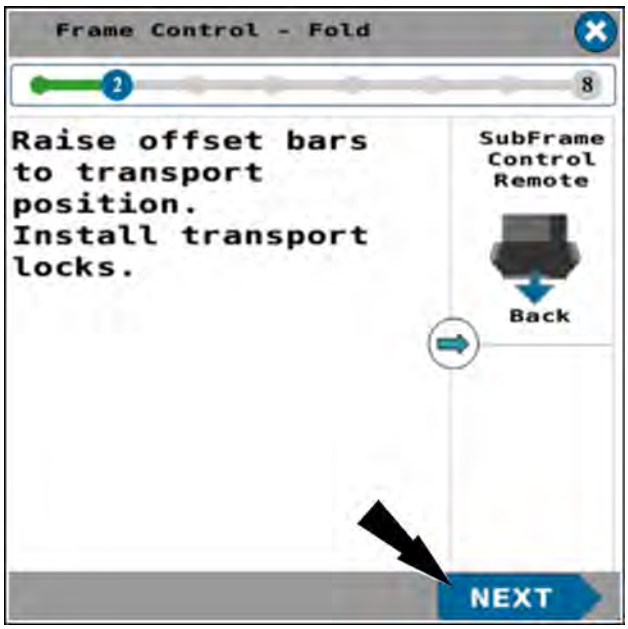
The “Frame Control – Fold” wizard step 2 states, “Raise the offset bars to the transport position. Install the transport locks.”

This step deactivates the previously activated solenoids.

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

NOTE: *For planters with* ***38 cm*** *(****15 in****) row spacing, CASE IH recommends raising the center-section row units and engaging the row unit lift locks in order to maximize row unit ground clearance.*



RAPH21PLM2564BA 6

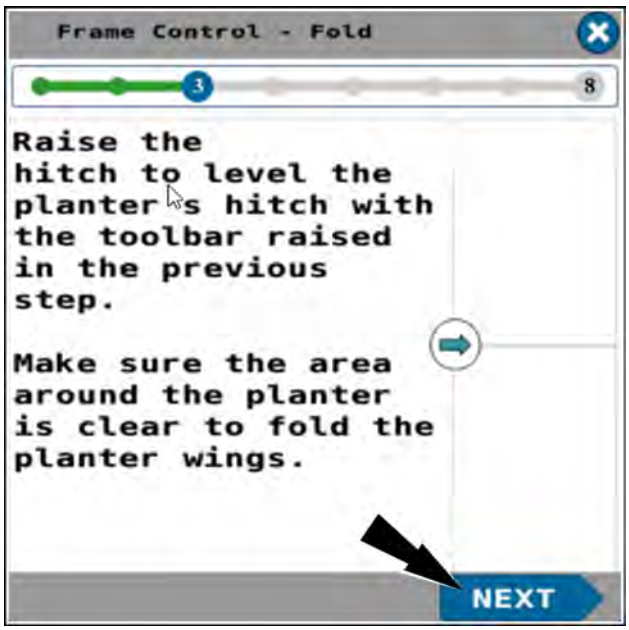
The “Frame Control – Fold” wizard step 3 appears.

The “Frame Control – Fold” wizard step 3 states, “Raise the hitch to level the planter’s hitch with the toolbar raised in the previous step. Make sure the area around the planter is clear to fold the planter wings.”

This step deactivates the previously activated solenoids.

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

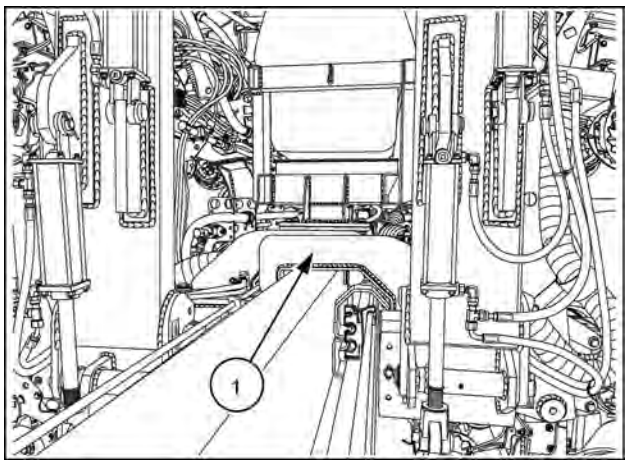


RAPH21PLM2565BA 7

Use the hitch controls to raise the tongue to an appropriate height for engaging the mechanical latches later. The tongue height should be approximately level with the toolbar when raised.

The tongue must be raised high enough that the wing latching mechanism **(1)** can pass over the tongue.

Press the “Next” button to continue the wizard.



RAIL22PLM1003BA 8

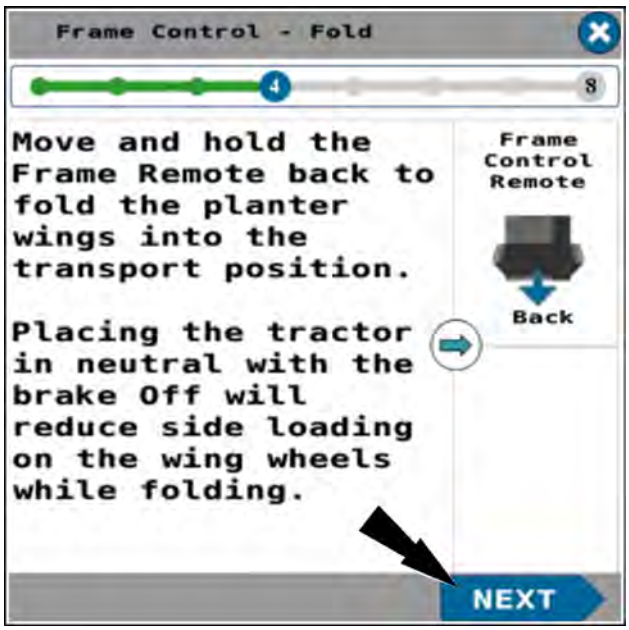
The “Frame Control – Fold” wizard step 4 appears.

The “Frame Control – Fold” wizard step 4 states, “Move and hold the frame remote back to fold the planter wings into the transport position. Placing the tractor in neutral with the brake off will reduce side loading on the wing wheels while folding.”

If space permits, the tractor should be in neutral with the brake OFF to permit the tractor to move during this step. This reduces side loading on the wing wheels as the wings fold.

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



RAPH21PLM2566BA 9

The “Frame Control – Fold” wizard step 5 appears. Previously activated solenoids are deactivated.

The “Frame Control – Fold” wizard step 5 states, “Raise the hitch until the wing latches engage on the planter’s hitch extension.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

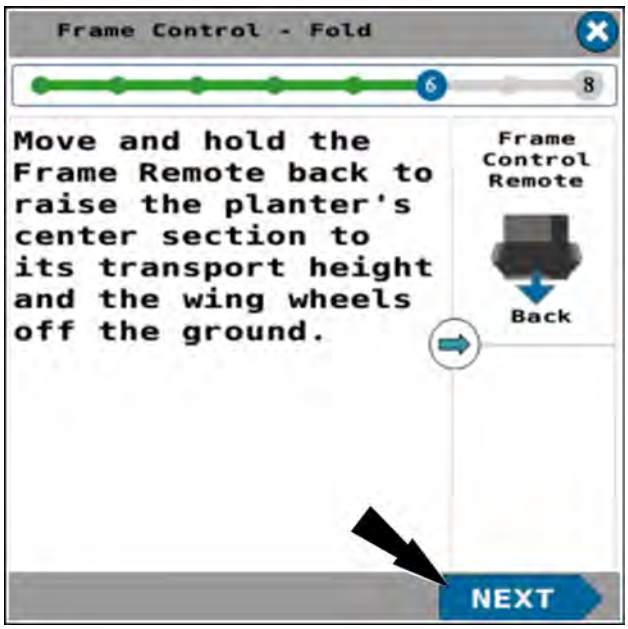
RAPH21PLM2567BA 10

The “Frame Control – Fold” wizard step 6 appears

The “Frame Control – Fold” wizard step 6 states, “Move and hold the frame remote back to raise the planter’s center section to its transport height and the wing wheels off the ground.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



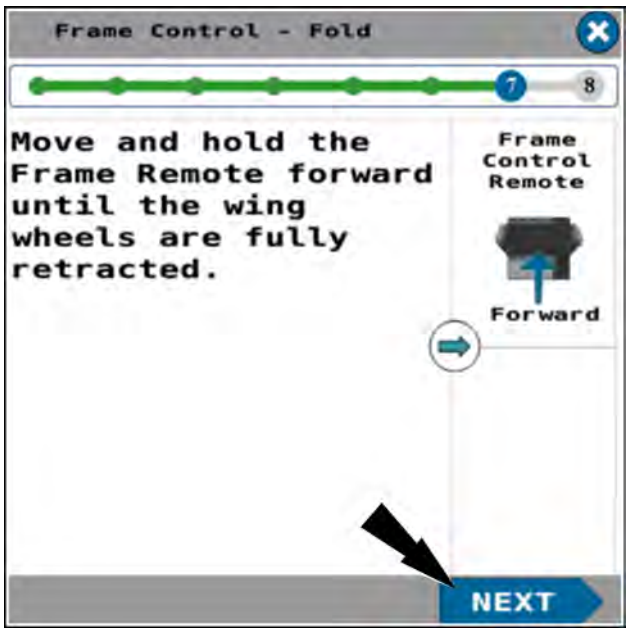
RAPH21PLM2568BA 11

The “Frame Control – Fold” wizard step 7 appears. This deactivates the frame solenoids that were activated by the previous step.

The “Frame Control – Fold” wizard step 7 states, “Move and hold the frame remote forward until the wing wheels are fully retracted.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



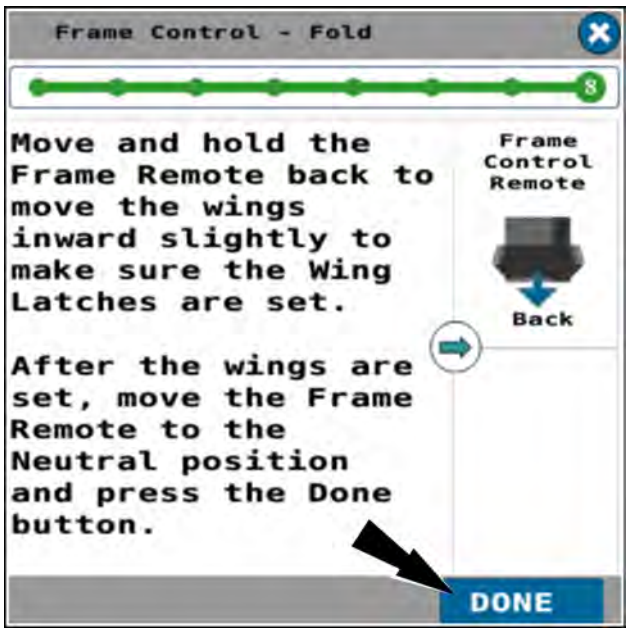
RAPH21PLM2569BA 12

The “Frame Control – Fold” wizard step 8 appears. This deactivates the solenoids that were activated by step 6.

The “Frame Control – Fold” wizard step 8 states, “Move and hold the frame remote back to move the wings inward slightly to make sure the wing latches are set. After the wings are set, move the frame remote to the neutral position and press the Done button.”

Follow the instructions given in the window.

Press the “Done” button to finish the “Frame Control – Fold” wizard. The system deactivates all frame solenoids.

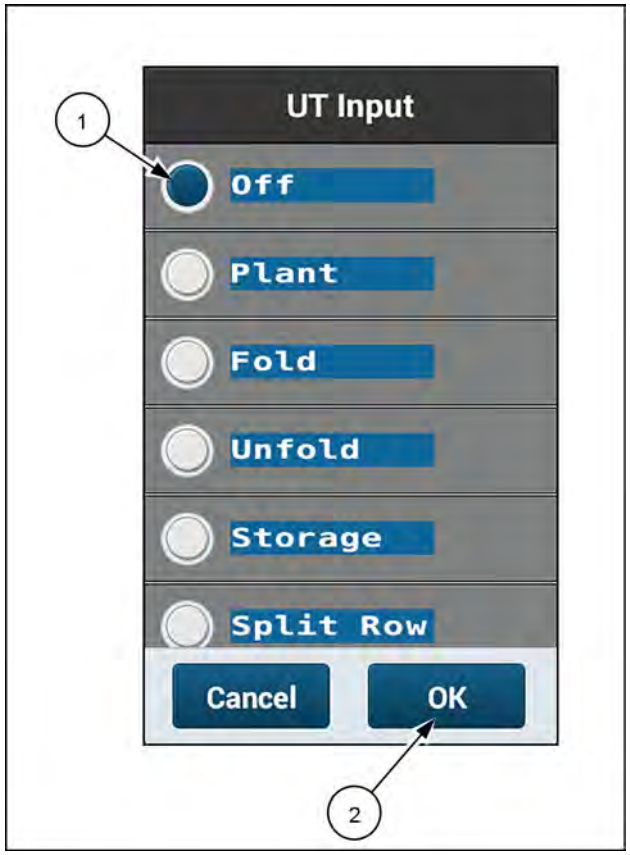


RAPH21PLM2570BA 13

In page 1 of the object pool, press the button in the “Frame Op” window.

In the frame operation window, press the “Off” radio button **(1)**.

Press the “OK” button **(2)** to disable all solenoid functions during road transport.



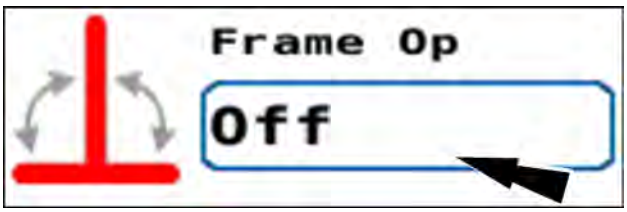
RAPH23PLM1116BA 14

Unfold the planter to the planting position

- The step sequence in this procedure must be followed exactly.
- Steps directing the operator to push the tractor remote lever forward or pull the tractor remote lever back assume that the hydraulic lines are correctly installed on the tractor.
- The planter must not be moving (no ground speed sensed).

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



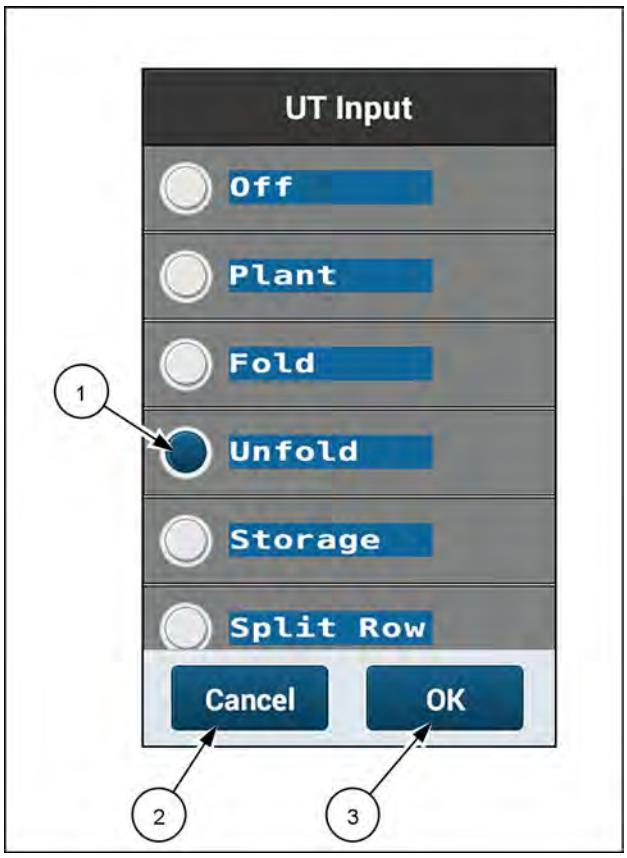
RAIL20PLM1179AA 15

The frame operation menu appears.

Press the “Unfold” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue unfolding the planter.



RAPH23PLM1089BA 16

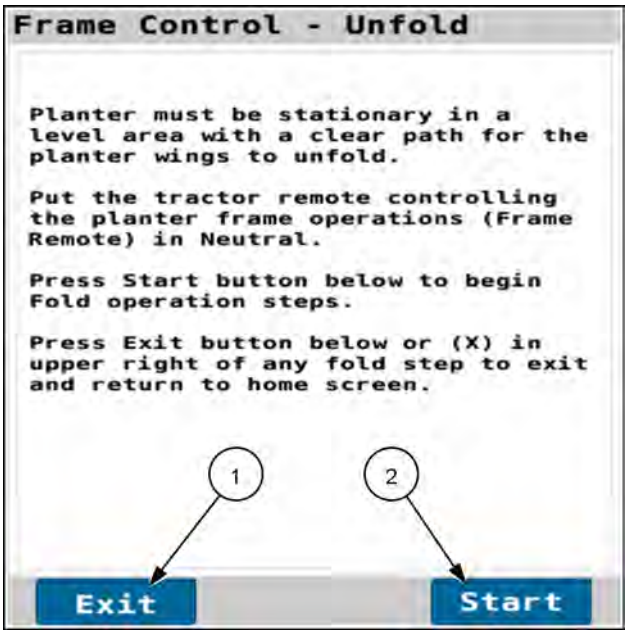
The “Frame Control – Unfold” window appears.

The “Frame Control – Unfold” window states, “The planter must be stationary in a level area with a clear path for the planter wings to unfold. Put the tractor remote controlling the planter frame operations (frame remote) in neutral. Press the Start button below to begin unfold operation steps. Press the Exit button below or (X) in the upper-right of any unfold step to exit and return to the home screen.”

Follow the instructions given in the window.

If you need to cancel the procedure, press the “Exit” button **(1)**.

Press the “Start” button **(2)** to start the unfold wizard.

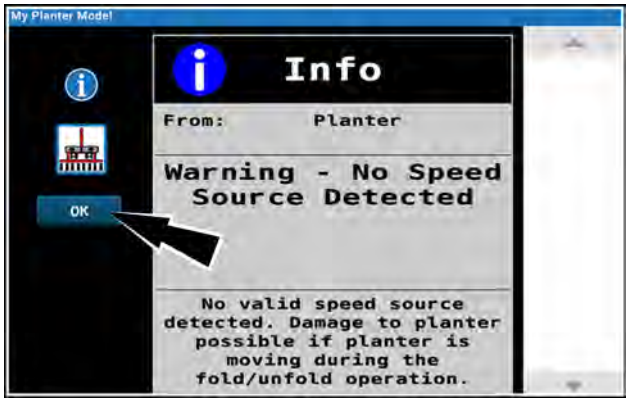


RAIL20PLM1639BA 17

If no valid speed source is detected by the system, a warning popup appears.

The warning popup states, “Warning – No Speed Source Detected. No valid speed source detected. Damage to the planter is possible if the planter is moving during the fold or unfold operation." Verify the planter is not moving. Press the “OK” button.

Follow the instructions given in the window.



RAPH21PLM3112AA 18

The “Frame Control – Unfold” wizard step 1 appears.

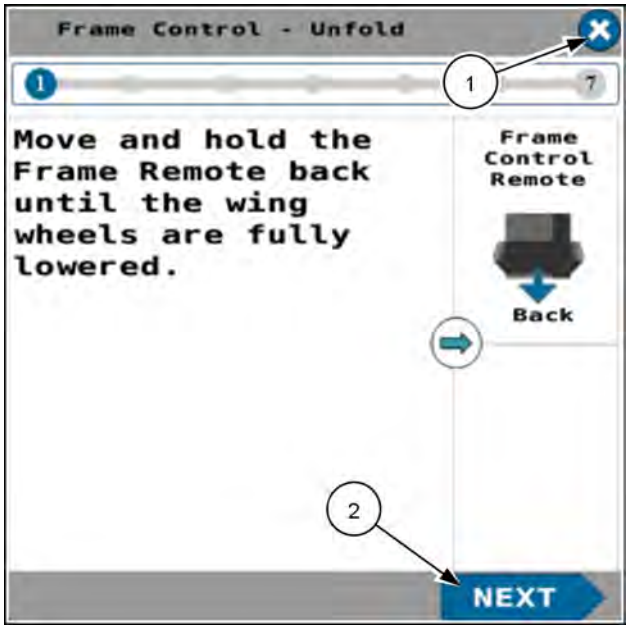
NOTE: *Follow the exact step sequence for the unfolding procedure. Do not perform the steps out of order.*

The “Frame Control – Unfold” wizard step 1 states, “Move and hold the frame remote back until the wing wheels are fully lowered.”

Follow the instructions given in the window.

If you need to cancel the wizard in this and all future steps, press the “X” button **(1)**.

Press the “Next” button **(2)** to continue the wizard.



RAPH21PLM2573BA 19

The “Frame Control – Unfold” wizard step 2 appears. This deactivates the solenoids that were activated by the previous step.

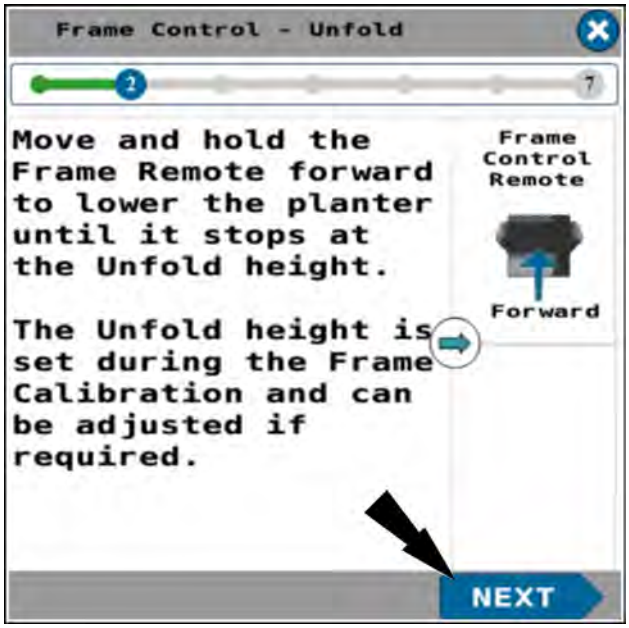
The “Frame Control – Unfold” wizard step 2 states, “Move and hold the frame remote forward to lower the planter until it stops at the unfold height. The unfold height is set during the frame calibration and can be adjusted if required.”

NOTE: *The fold/unfold height is the height at which the carrier cylinders are fully extended. You configure the fold/unfold height on the “Frame Cal” screen. See “Frame calibration: 2150 and 2150S model front fold planters” (**3-47**) for information on the frame calibration.*

Follow the instructions given in the window.

When the planter reaches the unfold height, all frame solenoids are deactivated by the system.

Press the “Next” button to continue the wizard.



RAPH21PLM2574BA 20

The “Frame Control – Unfold” wizard step 3 appears. The system deactivates the solenoids that were activated by step 2.

The “Frame Control – Unfold” wizard step 3 states, “Move and hold the frame remote back to release tension on the wing latch. The wings will shift slightly inward toward the planter hitch bar.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

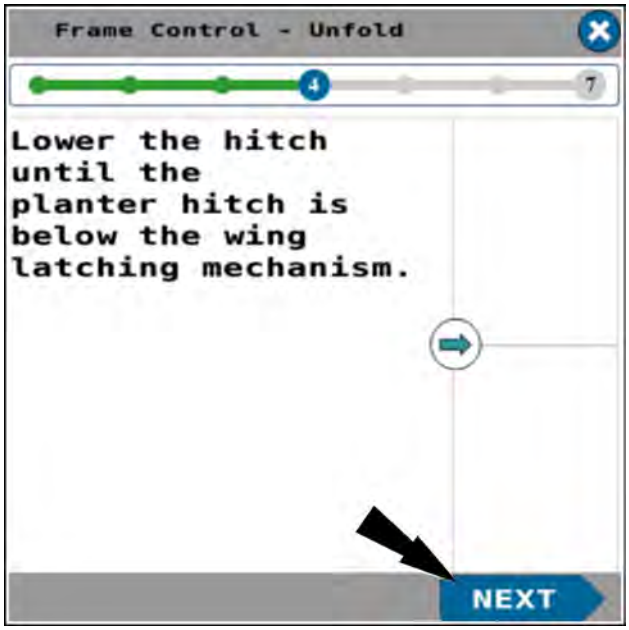
RAPH21PLM2575BA 21

The “Frame Control – Unfold” wizard step 4 appears. The system deactivates the solenoids that were activated in step 3.

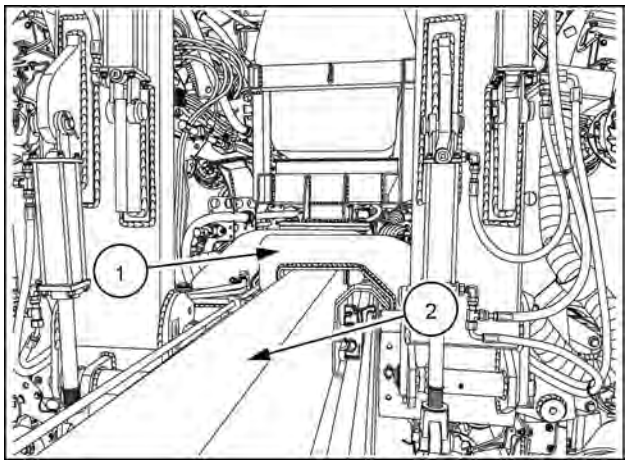
The “Frame Control – Unfold” wizard step 4 states, “Lower the hitch until the planter hitch is below the wing latching mechanism.”

Use the hitch controls to lower the hitch until the planter tongue **(1)** is free of the wing latching mechanism **(2)**.

Press the “Next” button to continue the wizard.



RAPH21PLM2576BA 22



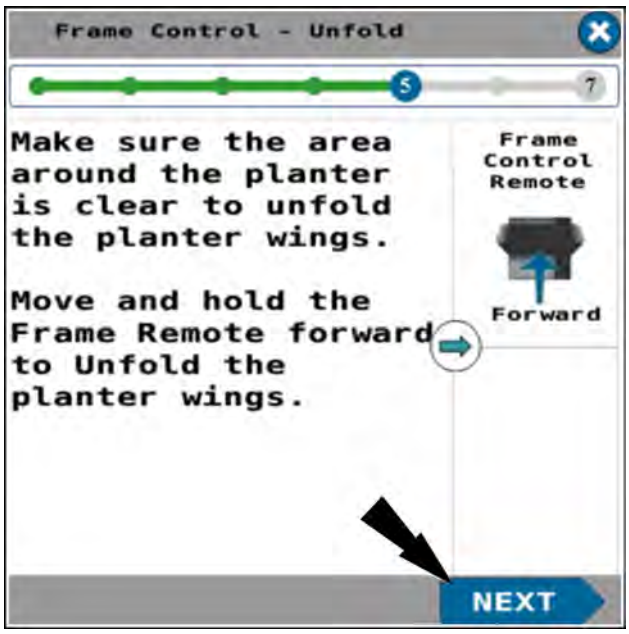
RAIL22PLM1003BA 23

The “Frame Control – Unfold” wizard step 5 appears.

The “Frame Control – Unfold” wizard step 5 states, “Make sure the area around the planter is clear to unfold the planter wings. Move and hold the frame remote forward to unfold the planter wings. ”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



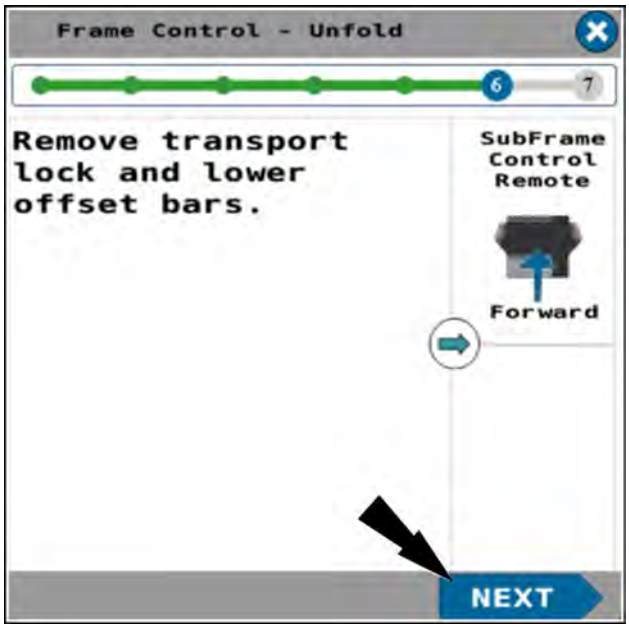
RAPH21PLM2577BA 24

The “Frame Control – Unfold” wizard step 6 appears

The “Frame Control – Unfold” wizard step 6 states, “Remove the transport lock and lower the offset bars.”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



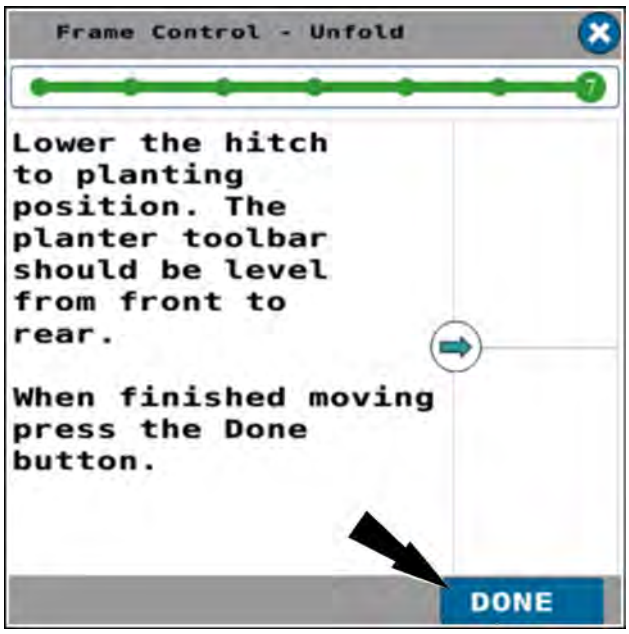
RAPH21PLM2578BA 25

The “Frame Control – Unfold” wizard step 7 appears. This deactivates the solenoid that was activated by the previous step.

The “Frame Control – Unfold” wizard step 7 states, “Lower the hitch to planting position. The planter toolbar should be level from the front to the rear. When finished moving press the Done button.”

Follow the instructions given in the window.

Press the “Done” button to finish the “Frame Control – Unfold” wizard. The system deactivates all frame solenoids.



RAPH21PLM2579BA 26

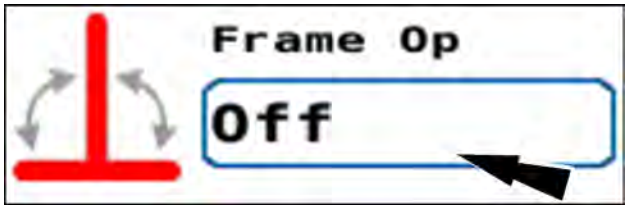
Split row setup: raise split rows

The split row setup allows you to enable all rows on the planter for planting soybeans at **38 cm** (**15 in**) or enable every other row for planting corn at **76 cm** (**30 in**) row width. The row lift setup screen also allows you to enable the planter hydraulics to lift the even numbered rows when planting corn.

When configured for corn, all of the even numbered rows are disabled by the system. This includes all product application and speed belts.

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



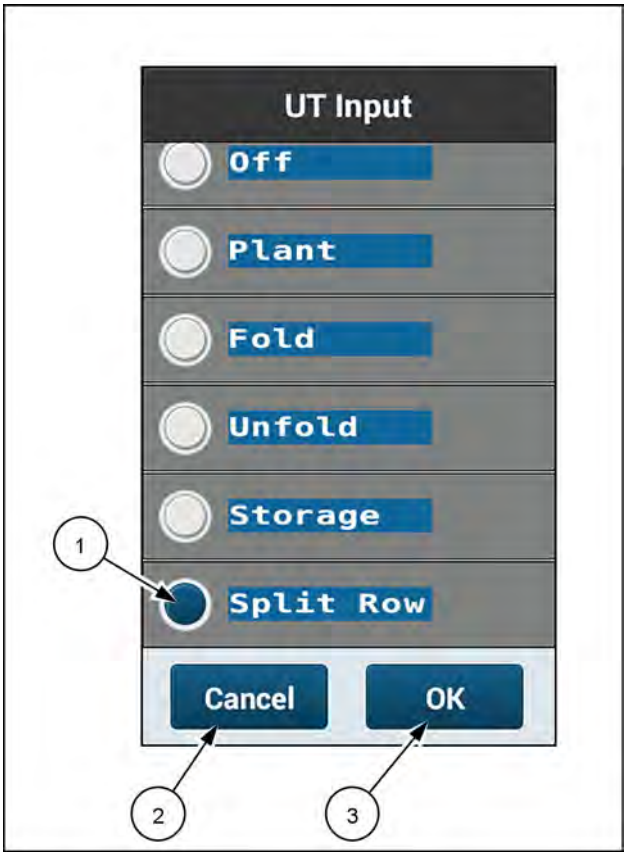
RAIL20PLM1179AA 27

The frame operation menu appears.

Press the “Split Row” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue the split row setup.



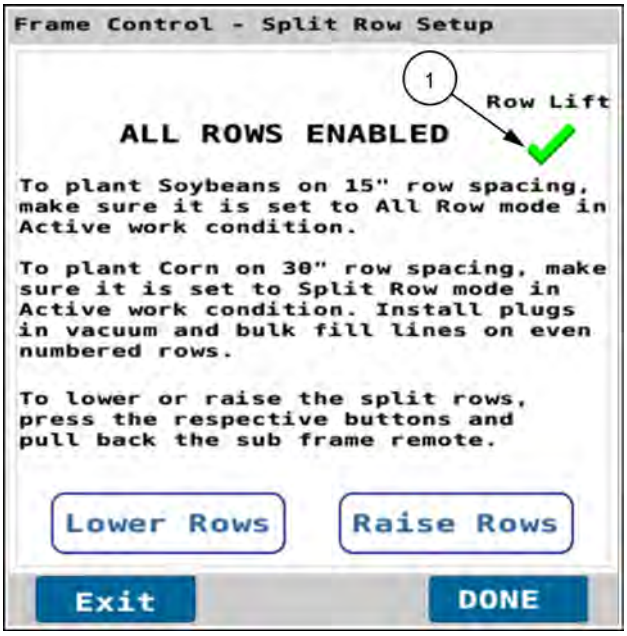
RAPH23PLM1091BA 28

The “Frame Control – Split Row Setup” screen appears.

To plant soybeans on **38 cm** (**15 in**) row spacing, make sure it is set to All Row mode in Active work condition. The screen indicates “All Rows Enabled” when set up for **38 cm** (**15 in**) row width.

A green check mark **(1)** in the “Row Lift” area indicates that the center section row units are completely lifted.

If the center section row units are not completely lifted, a red “X” appears in the “Row Lift” area.

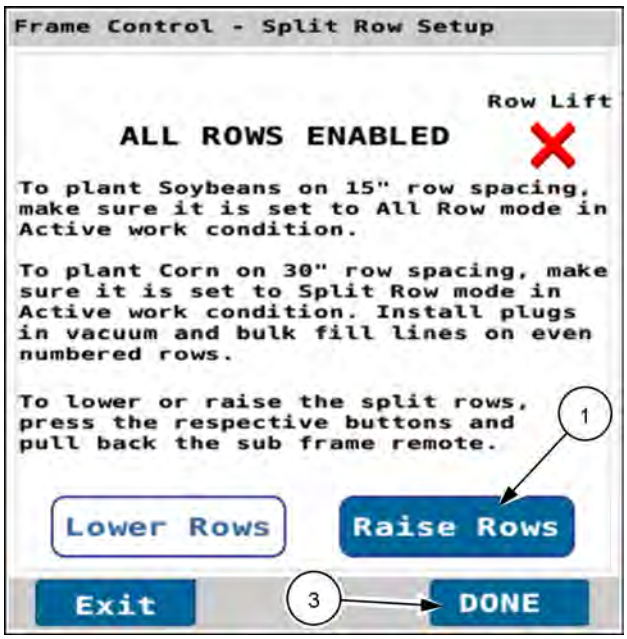


RAPH23PLM1123BA 29

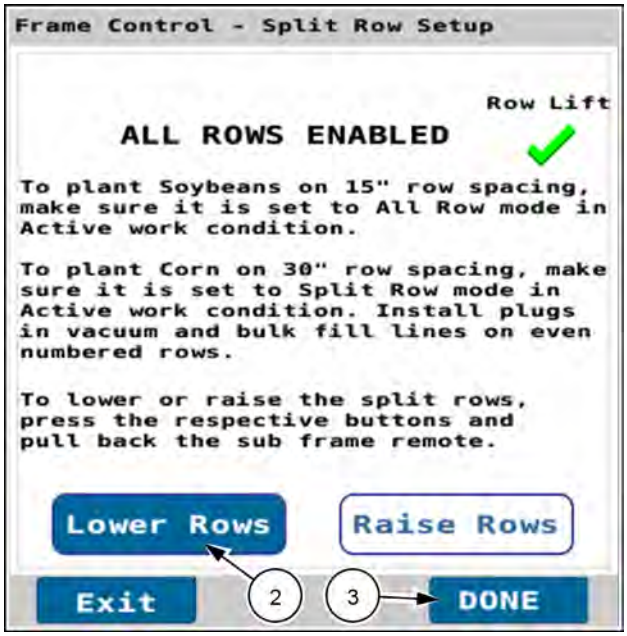
To raise or lower the rows using this screen, press the “Raise Rows” button **(1)** or the “Lower Rows” button **(2)** to enable the button.

Pull back on the sub-frame remote to raise or lower the rows.

Press the “Done” button **(3)** to complete the procedure and close the window.



RAPH23PLM1122BA 30



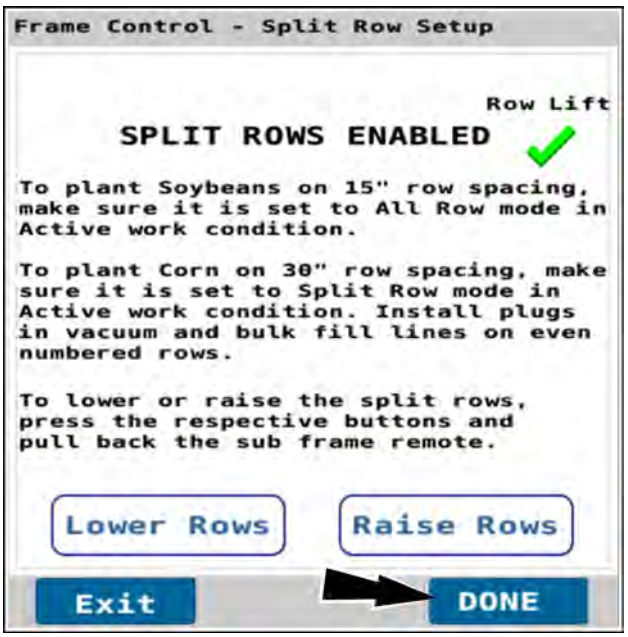
RAPH23PLM1121BA 31

If split rows are selected in the active work condition,, the “Frame Control – Split Row Setup” window indicates that split rows are enabled.

To plant corn on a **76 cm** (**30 in**), row width, install plugs in the vacuum and bulk fill lines on even numbered rows. In the active work condition change the row configuration from “All Rows” to “Split Rows.” See “Work Condition Setup screen” (**3-80**).

If you wish to leave the setup option in the “All Rows Enabled” mode, press the “Done” button. The “Frame Control – Split Row Setup” window closes and the procedure is complete.

NOTE: *Changing the split row setup automatically enables/disables rows in work conditions and implement setup.*

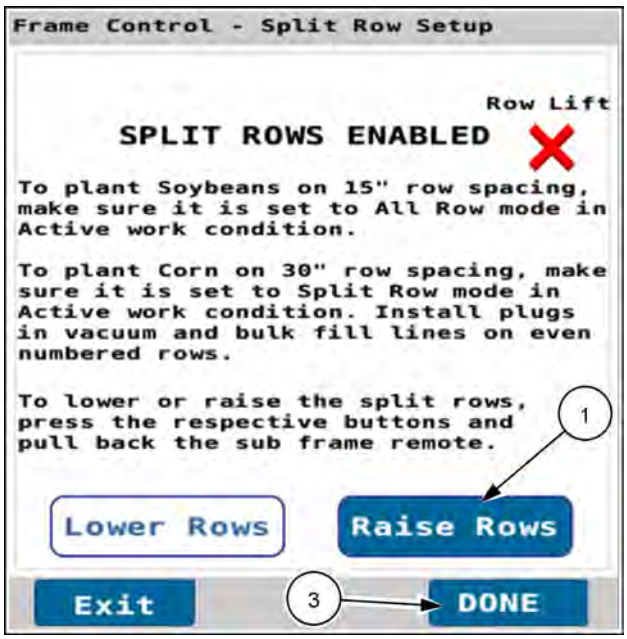


RAPH23PLM1118BA 32

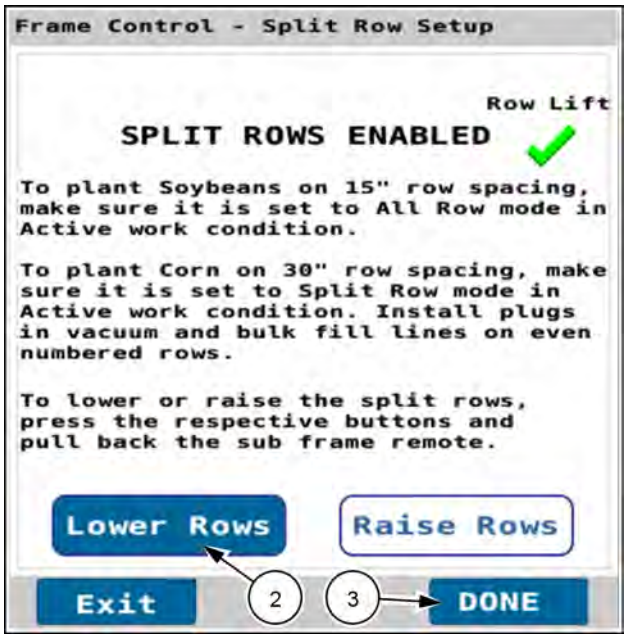
To raise or lower the rows in this screen, press the “Raise Rows” button **(1)** or the “Lower Rows” button **(2)** to enable the button.

Pull back on the sub-frame remote to raise or lower the rows.

Press the “Done” button **(3)** to complete the procedure and close the window.



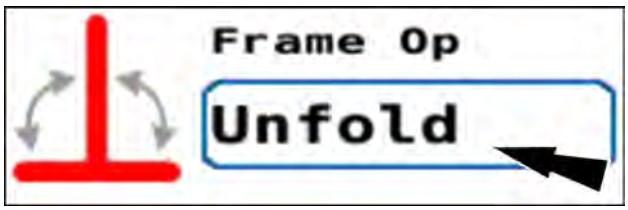
RAPH23PLM1120BA 33



RAPH23PLM1119BA 34

Plant

In page 1 of the object pool, press the button in the “Frame Op” window.



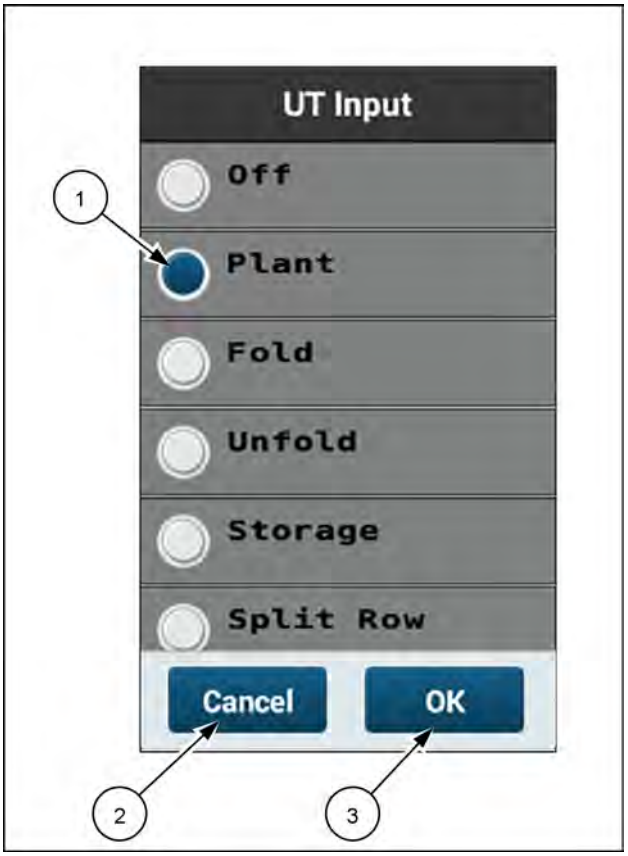
RAIL20PLM1180AA 35

The frame operation menu appears.

Press the “Plant” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the planting setup procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue the planting setup procedure.



RAPH21PLM2580BA 36

The “Frame Control – Plant” window appears.

Press the “Limited” **(1)** or “Full” **(2)** button in the options window (to perform typical end of pass turns).

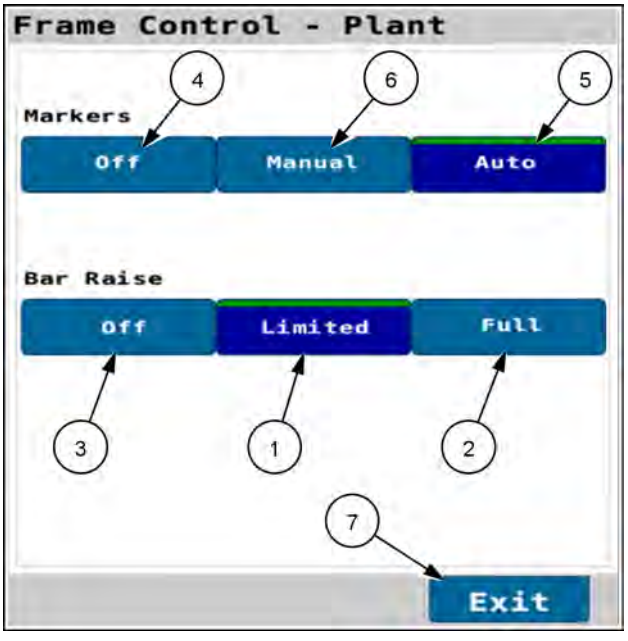
NOTE: *This setting is determined by operator preference. The limited raise height is a calibrated frame height that is set at a height that ensures the row units are out of the ground and high enough to make a turn in the headland.*

NOTE: *With the “Bar Raise” section set to the “Off” **(3)** position, the planter will not raise or lower in response to the Frame Remote.*

The “Markers” section contains the following options:

- If the planter does not have markers, select the “Off” **(4)** option.
- Press the “Auto” button **(5)** for automatic alternating of the markers each time you raise and lower the frame.
- Press the “Manual” button **(6)** to control marker deployment manually with the “Mrkr Ctrl” window on page 2. See “Marker operating modes” (**4-142**) for more information.

Press the “Exit” button **(7)** to close the window.



RAPH23PLM1115BA 37

In page 2 of the object pool in the “Mrkr Ctrl” window, press the button for the marker you wish to deploy.

NOTE: *If marker control is configured to automatic mode, your selection is the first marker you wish to deploy. After that the markers will alternately deploy automatically.*

Use the remote lever to unfold the marker and lower the planter to the ground.

Move the remote lever to the float position so that the marker will follow the contour of the ground.

RAIL20PLM1181AA 38

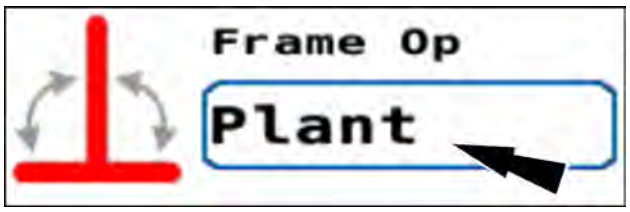
Frame control: 2160 model front fold planters

Fold the planter to the transport position

- The step sequence in this procedure must be followed exactly.
- Steps directing the operator to push the tractor remote lever forward or pull the tractor remote lever back assume that the hydraulic lines are correctly installed on the tractor.
- The marker and planter raise/lower functions share a common hydraulic circuit and are controlled by one tractor remote lever. The markers must be fully retracted to transport position before you fold the planter. See “Marker operating modes” (**4-142**) for additional information.
- Unpin the row cleaners on the row units at the caster wheels so that they can float during the fold and unfold process.
- The planter must not be moving (no ground speed sensed).

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



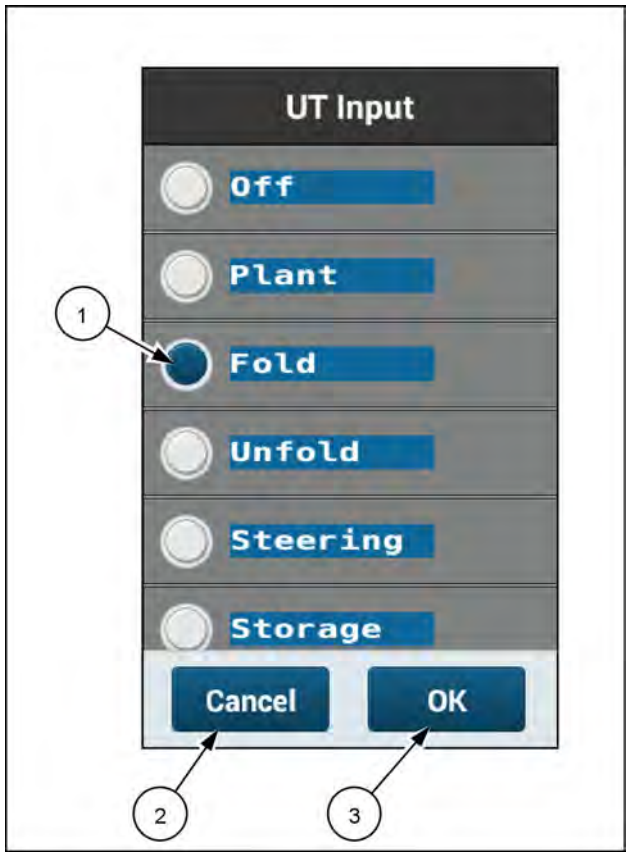
RAIL20PLM1176AA 1

The frame operation menu appears.

Press the “Fold” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue folding the planter.



RAPH23PLM1097BA 2

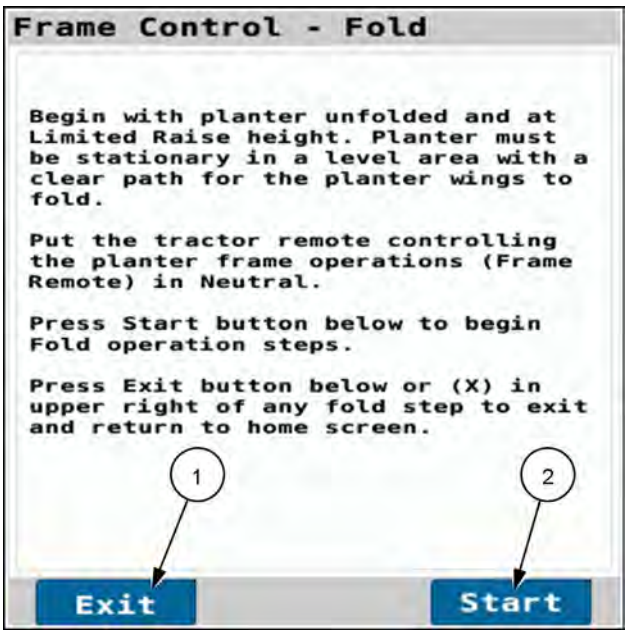
The “Frame Control – Fold” window appears.

The “Frame Control – Fold” window states, “Begin with the planter unfolded and at limited raise height. The planter must be stationary in a level area with a clear path for the planter wings to fold. Put the tractor remote controlling the planter frame operations (Frame Remote) in neutral. Press the Start button below to begin fold operation steps. Press the Exit button below or (X) in the upper right of any fold step to exit and return to the home screen.”

Follow the instructions given in the window.

If you need to cancel the procedure, press the “Exit” button **(1)**.

Press the “Start” button **(2)** to start the fold wizard.

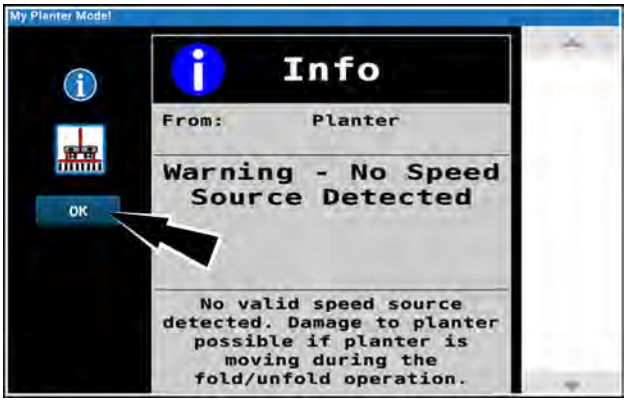


RAIL20PLM1630BA 3

If no valid speed source is detected by the system, a warning popup appears.

The warning popup states, “Warning – No Speed Source Detected. No valid speed source detected. Damage to the planter is possible if the planter is moving during the fold or unfold operation." Verify the planter is not moving. Press the “OK” button.

Follow the instructions given in the window.



RAPH21PLM3112AA 4

The “Frame Control – Fold” wizard step 1 appears.

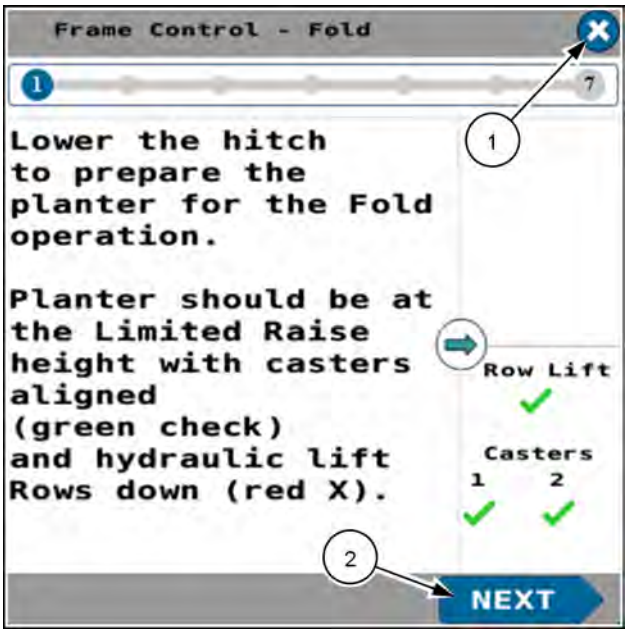
The “Frame Control – Fold” wizard step 1 states, “Lower the hitch to prepare the planter for the fold operation. The planter should be at the limited raise height with the casters aligned (green check) and hydraulic lift rows down (red X).

NOTE: *2160 36R20 and 36R22 planters have two “Casters” status icons. 2160 32R30 & 36R30 planters have four “Casters” status icons.*

Follow the instructions given in the window.

If you need to cancel the wizard in this and all future steps, press the “X” button **(1)**.

Press the “Next” button **(2)** to continue the wizard.



RAPH21PLM2634BA 5

The “Frame Control – Fold” wizard step 2 appears.

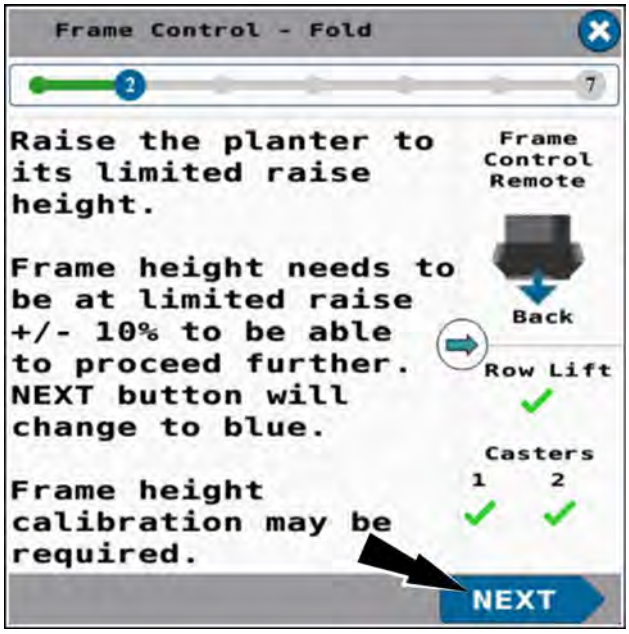
The “Frame Control – Fold” wizard step 2 states, “Raise the planter to its limited raise height. Frame height needs to be at limited raise +/- 10% to be able to proceed further. NEXT button will change to blue. Frame height calibration may be required.”

In this step the row lift solenoid is activated. Move and hold the frame remote back to raise the hydraulic lift rows. When you pull back on the frame remote, the hydraulic lift rows will raise.

RAPH21PLM2635BA 6

NOTE: *Several row units must be lifted so that they will clear the planter carrier during wing folding.*
On 36R20 planters: rows 12, 13, 24, and 25
On 36R22 planters: rows 12, 13, 24, and 25
On 32R30 planters: rows 12, 13, 20, and 21
On 36R30 planters: rows 14, 15, 22, and 23
In addition, the row units at the caster wing wheels must be lifted so that the wing wheels can move underneath them.
On 36R20 planters: rows 1, 2, 3, 3, 35, and 36
On 36R22 planters: rows 1, 2, 3, 3, 35, and 36
On 32R30 planters: rows 1, 2, 3, 3, 7, 8, 9, 24, 25, 26, 30, 31, and 32
On 36R30 planters: rows 1, 2, 3, 3, 7, 8, 9, 28, 29, 30, 34, 35, and 36

NOTE: *A proximity detector indicates when the row units are fully lifted. This detector is located on the row unit that is designed to be the last to fully lift.*
On 2160 model 36-row planters, the proximity detector is at row 34.
On 2160 model 32-row planters, the proximity detector is at row 30.



RAPH21PLM2635BA 7

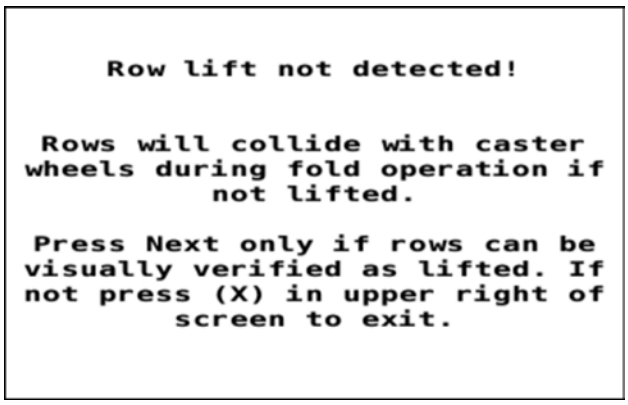
Follow the instructions given in the window. If the row lift sensor detects the row units as lifted, the “Row Lift” indicator becomes a green check mark. The system energizes the fold height solenoids.

Press the “Next” button to continue the wizard.

NOTICE: *Verify that the row units are fully lifted.*

If the row lift sensor does not detect the row units as lifted, the “Row Lift” indicator is a red X. If you press the “Next” button, a pop-up message displays: “Row lift not detected! Rows will collide with caster wheels during the fold operation if not lifted. Press Next only if rows can be visually verified as lifted. If not press (X) in the upper-right of the screen to exit.”

- When this popup appears, a “Lift” button appears next to the “Next” button in the fold menu. Press the “Lift” button to raise the row lift rows. The “Lift” button only appears when the row lift has a “X” on this specific step. When you raise the row lift, the tool bar begins to pick up and this popup disappears.
- If the row units cannot be fully lifted, press the “X” button in the upper-right corner of the wizard to abort the folding process. Determine the cause of the problem.
- If the row units are fully lifted, press the “Next” button in the wizard. This may be necessary to override a faulty row lift sensor.

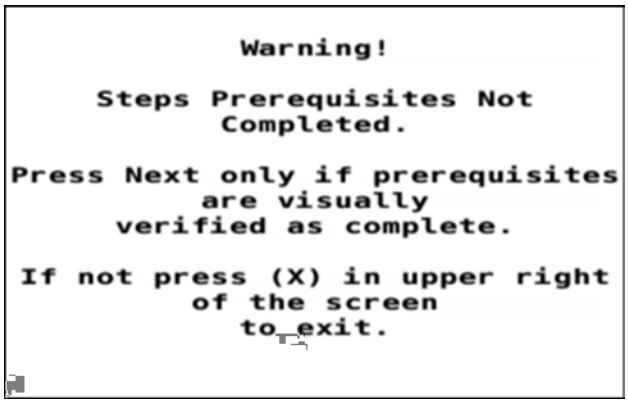


RAIL20PLM1177AA 8

You must visually verify that all previous steps are completed. The row units must be in the fully lifted position.

Press the “X” button to exit the procedure if the row units are not in the fully lifted position.

Press the “Next” button if the row units are in the fully lifted position.



RAPH21PLM3093AA 9

The “Frame Control – Fold” wizard step 3 appears.

The “Frame Control – Fold” wizard step 3 states, “Move and hold the frame remote back to raise the hydraulic lift rows. The row lift indicator will change to a (green check)."

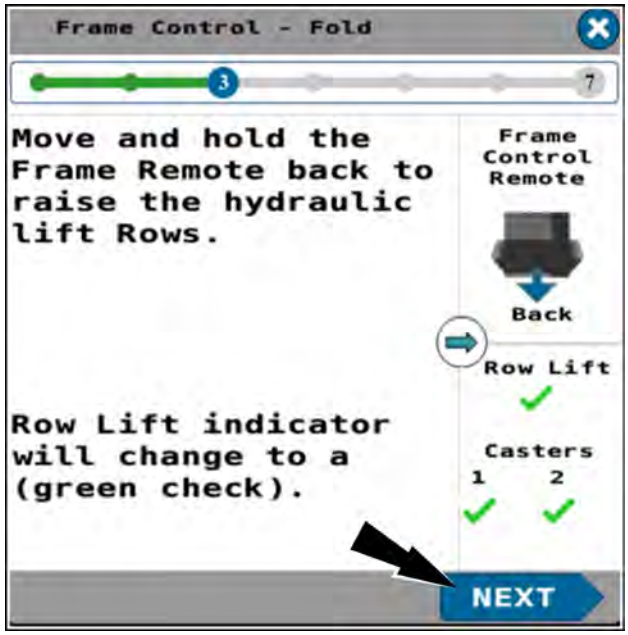
When you pull back on the frame remote, the planter center section rises. When the planter reaches the unfold height, the system deactivates all frame solenoids. This stops the planter from lowering any further and stops it at the calibrated unfold height.

Follow the instructions given in the window.

NOTE: *The fold/unfold height is the height at which the carrier cylinders are fully extended. You configure the fold/unfold height on the “Frame Cal” screen. See “Frame calibration: 2160 model front fold planters” (**3-53**) for information on the frame calibration.*

NOTE: *If the planter does not raise to the folding height, either the planter is already at the correct height or the frame calibration for fold height was performed incorrectly.*

Press the “Next” button to continue the wizard.

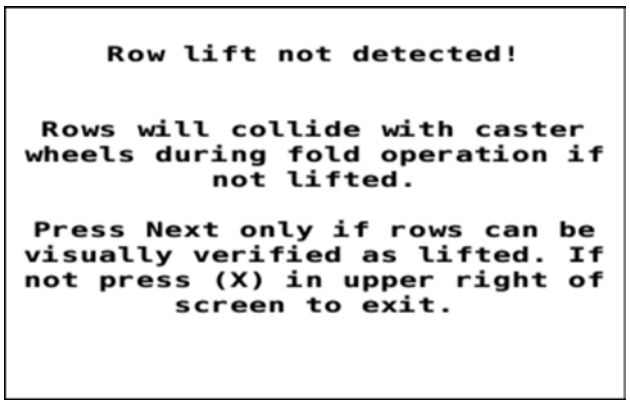


RAPH21PLM2620BA 10

NOTICE: *Verify that the row units are fully lifted.*

If the row lift sensor does not detect the row units as lifted, the “Row Lift” indicator is a red X. If you press the “Next” button, a pop-up message displays: “Row lift not detected! Rows will collide with caster wheels during the fold operation if not lifted. Press Next only if rows can be visually verified as lifted. If not press (X) in the upper-right of the screen to exit.”

- If the row units are cannot be fully lifted, press the “X” button in the upper-right corner of the wizard to abort the folding process. Determine the cause of the problem.
- If the row units are fully lifted, press the “Next” button in the wizard. This may be necessary to override a faulty row lift sensor.



RAIL20PLM1182AA 11

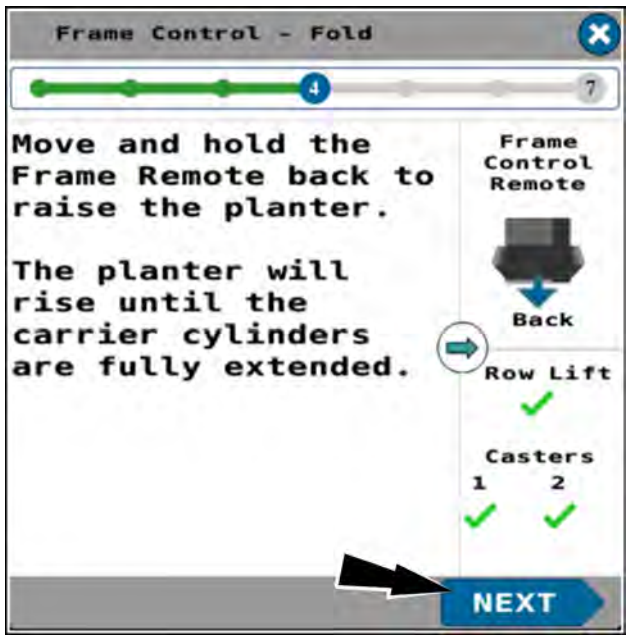
The “Frame Control – Fold” wizard step 4 appears.

The “Frame Control – Fold” wizard step 4 states, “Move and hold the frame remote back to raise the planter. The planter will rise until the carrier cylinders are fully extended.”

Follow the instructions given in the window.

The wings will continue to raise until the carrier cylinders are fully extended. Hold the remote lever back until this happens.

Press the “Next” button to continue the wizard.



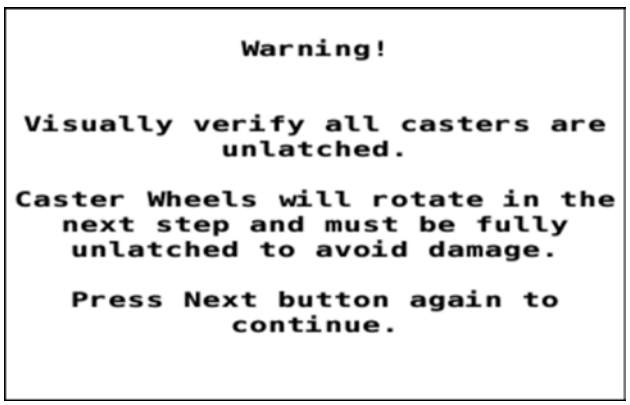
RAPH21PLM2621BA 12

NOTICE: *When you perform step 4, verify that the casters are unlatched to avoid damage.*

The first time you press the “Next” button in step 4, a popup message appears stating, “Warning! Visually verify all casters are unlatched. Caster wheels will rotate in the next step and must be fully unlatched to avoid damage. Press the Next button again to continue.”

Follow the instructions in the popup message.

Press the “Next” button in the wizard after unlatching the casters. The message clears from the screen. The wing fold solenoids energize.



RAIL20PLM1178AA 13

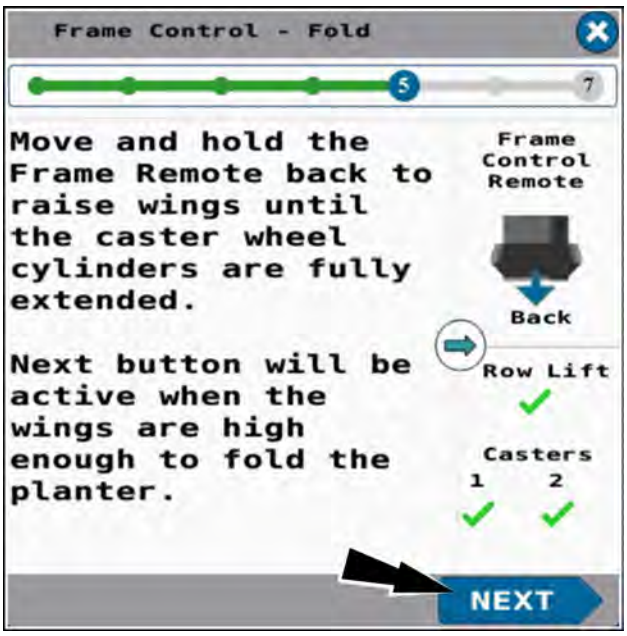
The “Frame Control – Fold” wizard step 5 appears.

The “Frame Control – Fold” wizard step 5 states, “Move and hold the Frame Remote back to raise wings until the caster wheel cylinders are fully extended. Next button will be active when the wings are high enough to fold the planter.”

If space permits, slowly drive forward to set the casters in the pulled state during this step.

Move and hold the remote lever back to fold the planter wings to transport position.

Press the “Next” button to continue the wizard.



RAPH21PLM2622BA 14

The “Frame Control – Fold” wizard step 6 appears.

The “Frame Control – Fold” wizard step 6 states, “Move and hold the frame remote back to fold the planter wings into transport position. Drive slowly forward to aid folding as needed. Caster indicators will change to (red X).”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

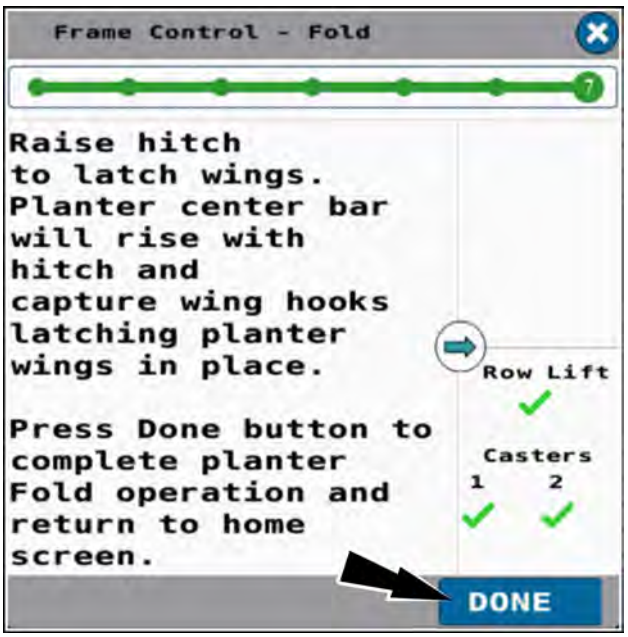
RAPH21PLM2636BA 15

The “Frame Control – Fold” wizard step 7 appears.

The “Frame Control – Fold” wizard step 7 states, “Raise hitch to latch wings. Planter center bar will rise with hitch and capture wing hooks latching planter wings in place. Press the Done button to complete planter fold operation and return to the home screen.”

The system deactivates all frame solenoids.

Follow the instructions given in the window.

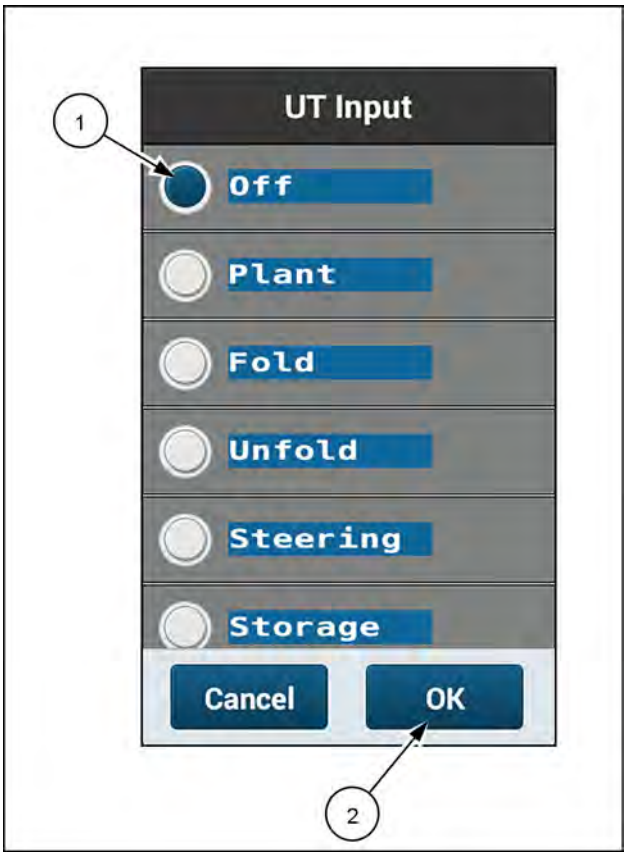


RAPH21PLM2624BA 16

In page 1 of the object pool, press the button in the “Frame Op” window.

In the frame operation window, press the “Off” radio button **(1)**.

Press the “OK” button **(2)** to disable all solenoid functions during road transport.



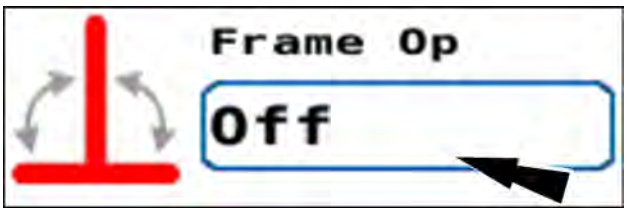
RAPH23PLM1100BA 17

Unfold the planter to the planting position

- The step sequence in this procedure must be followed exactly.
- Steps directing the operator to push the tractor remote lever forward or pull the tractor remote lever back assume that the hydraulic lines are correctly installed on the tractor.
- Unpin the row cleaners on the row units at the caster wheels so that they can float during the fold and unfold process.
- The planter must not be moving (no ground speed sensed).

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



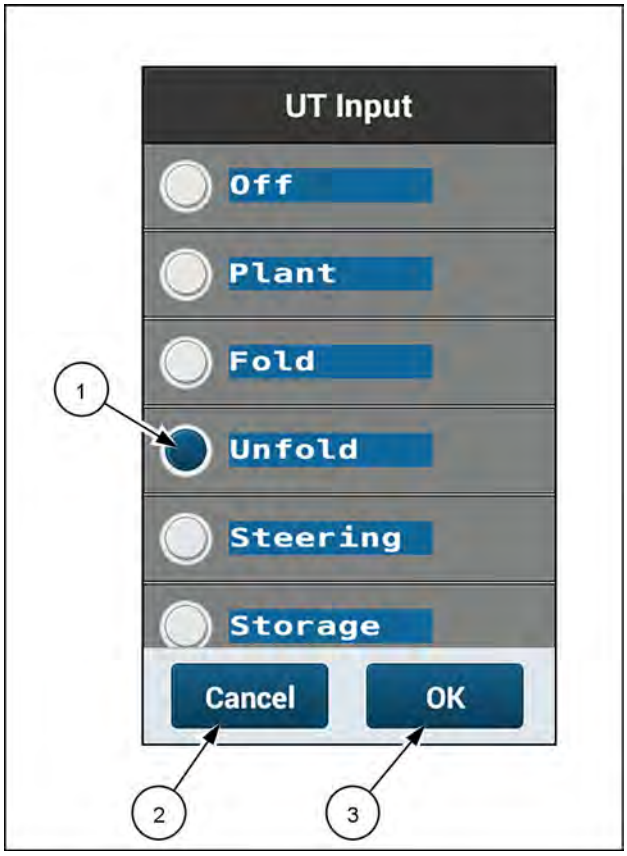
RAIL20PLM1179AA 18

The frame operation menu appears.

Press the “Unfold” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue unfolding the planter.



RAPH23PLM1098BA 19

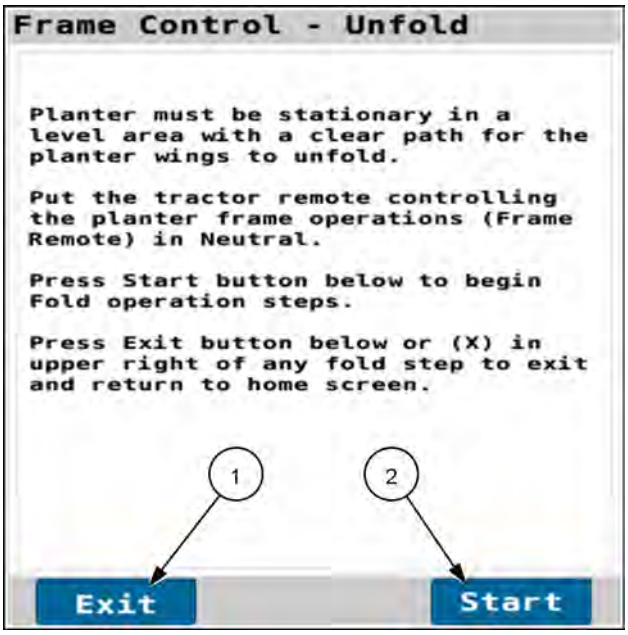
The “Frame Control – Unfold” window appears.

The “Frame Control – Unfold” window states, “The planter must be stationary in a level area with a clear path for the planter wings to unfold. Put the tractor remote controlling the planter frame operations (frame remote) in neutral. Press the Start button below to begin unfold operation steps. Press the Exit button below or (X) in the upper-right of any unfold step to exit and return to the home screen.”

Follow the instructions given in the window.

If you need to cancel the procedure, press the “Exit” button **(1)**.

Press the “Start” button **(2)** to start the unfold wizard.

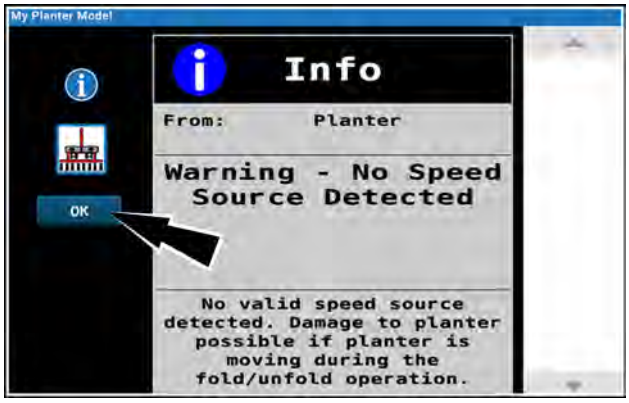


RAIL20PLM1639BA 20

If no valid speed source is detected by the system, a warning popup appears.

The warning popup states, “Warning – No Speed Source Detected. No valid speed source detected. Damage to the planter is possible if the planter is moving during the fold or unfold operation." Verify the planter is not moving. Press the “OK” button.

Follow the instructions given in the window.



RAPH21PLM3112AA 21

The “Frame Control – Unfold” wizard step 1 appears.

NOTE: *Follow the exact step sequence for the unfolding procedure. Do not perform the steps out of order.*

The “Frame Control – Unfold” wizard step 1 states, “Lower the hitch. The Planter wing hooks will unlatch for the planter center bar as the hitch lowers. The planter casters will not be aligned (red X) and the hydraulic lift rows will be up (green check).”

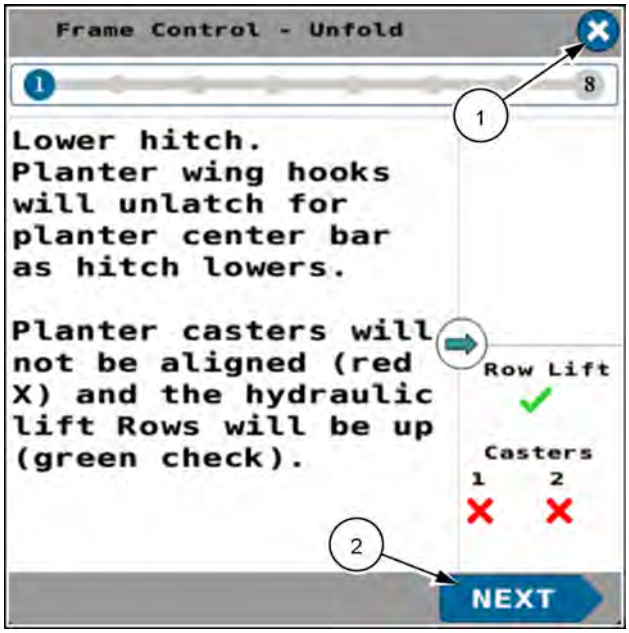
NOTE: *2160 36R20 and 36R22 planters have two “Casters” status icons. 2160 32R30 & 36R30 planters have four “Casters” status icons.*

Follow the instructions given in the window.

Use the hitch controls to lower the hitch until the planter tongue is free of the wing latching mechanism.

If you need to cancel the wizard in this and all future steps, press the “X” button **(1)**.

Press the “Next” button **(2)** to continue the wizard.



RAPH21PLM2637BA 22

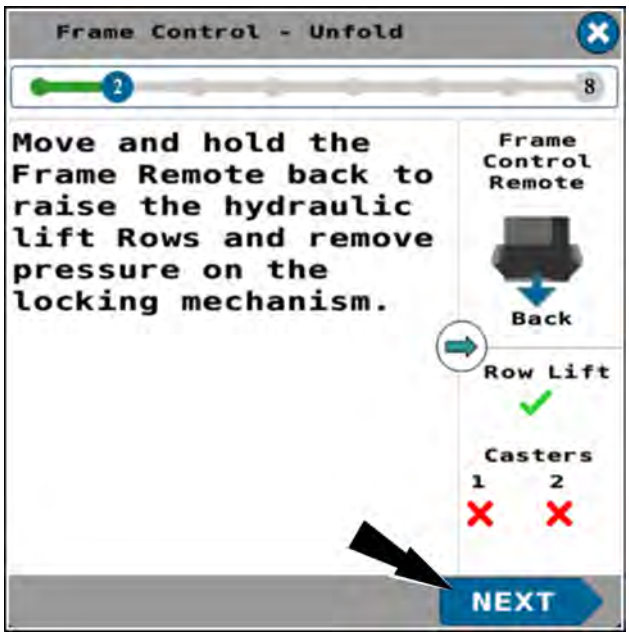
The “Frame Control – Unfold” wizard step 2 appears.

The “Frame Control – Unfold” wizard step 2 states, “Move and hold the frame remote back to raise the hydraulic lift rows and remove pressure on the locking mechanism.”

Follow the instructions given in the window.

Move and hold the remote lever back to raise the hydraulic lift rows of the planter.

Press the “Next” button to continue the wizard.



RAPH21PLM2638BA 23

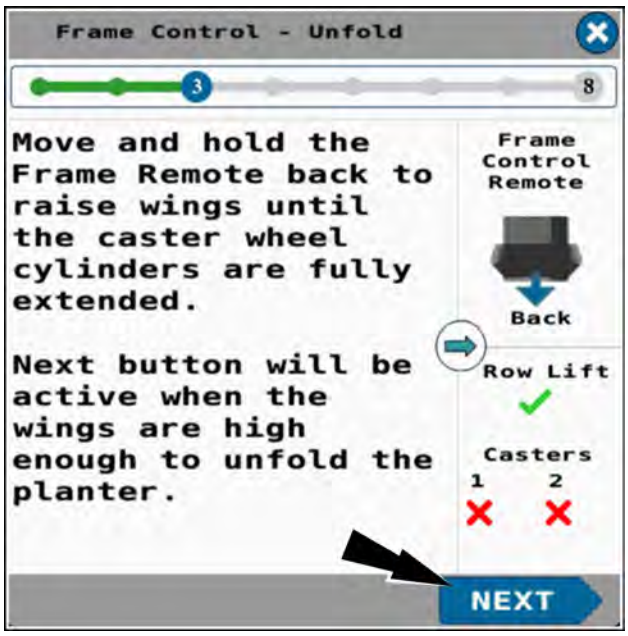
The “Frame Control – Unfold” wizard step 3 appears.

The “Frame Control – Unfold” wizard step 3 states, “Move and hold the frame remote back to raise the wings until the caster wheel cylinders are fully extended. The Next button will be active when the wings are high enough to unfold the planter.”

When you move and hold the frame remote back the planter wings raise as the wing wheel cylinders become fully extended. The “Next” button does not appear until the wings are high enough to perform the unfold operation in the next step.

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



RAPH21PLM2639BA 24

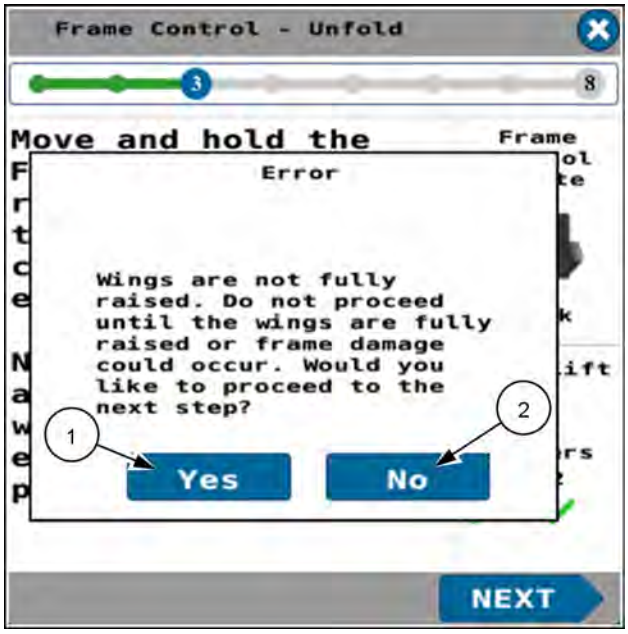
If the wings are not fully raised, an error popup appears.

The error popup states, “Error. The wings are not fully raised. Do not proceed until the wings are fully raised or frame damage could occur. Would you like to proceed to the next step?”

NOTICE: *Do not press the “Yes” button unless the wings are fully raised.*

Press the “Yes” button **(1)** to proceed to the next step.

Press the “No” button **(2)** to discontinue the procedure.



RAPH21PLM2628BA 25

The “Frame Control – Unfold” wizard step 4 appears.

The “Frame Control – Unfold” wizard step 4 states, “Move and hold the frame remote forward to unfold the planter wings. If space permits, slowly drive backwards to assist the wing movement.”

Hold the frame remote forward. The planter wings unfold.

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.

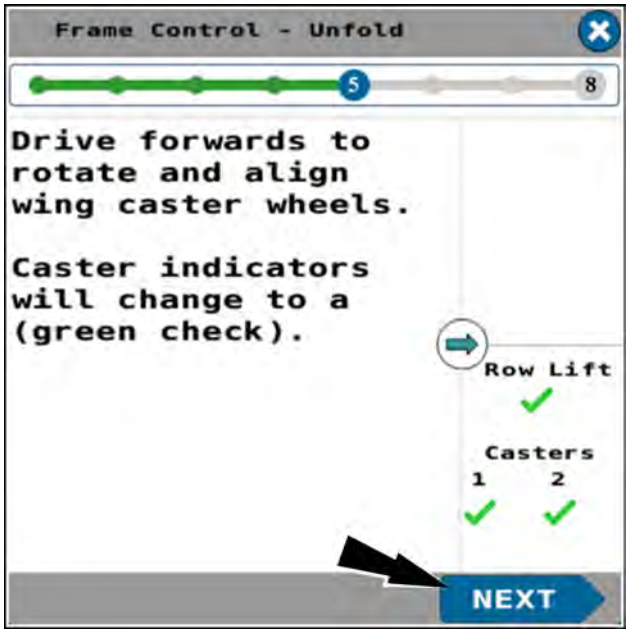
RAPH21PLM2640BA 26

The “Frame Control – Unfold” wizard step 5 appears.

The “Frame Control – Unfold” wizard step 5 states, “Drive forwards to rotate and align the wing caster wheels. The caster indicators will change to a (green check).”

Follow the instructions given in the window.

Press the “Next” button to continue the wizard.



RAPH21PLM2630BA 27

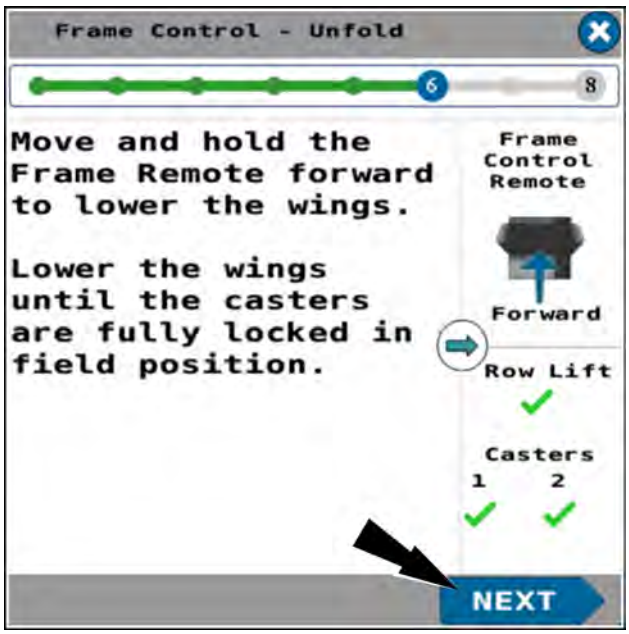
The “Frame Control – Unfold” wizard step 6 appears.

The “Frame Control – Unfold” wizard step 6 states, “Move and hold the frame remote forward to lower the wings. Lower the wings. Lower the wings until the casters are fully locked in the field position.”

Move and hold the remote lever forward to lower the wings until the casters are fully locked in the field position.

NOTE: *If able, you can drive forward slowly to keep casters aligned while lowering the wings.*

Press the “Next” button to continue the wizard.

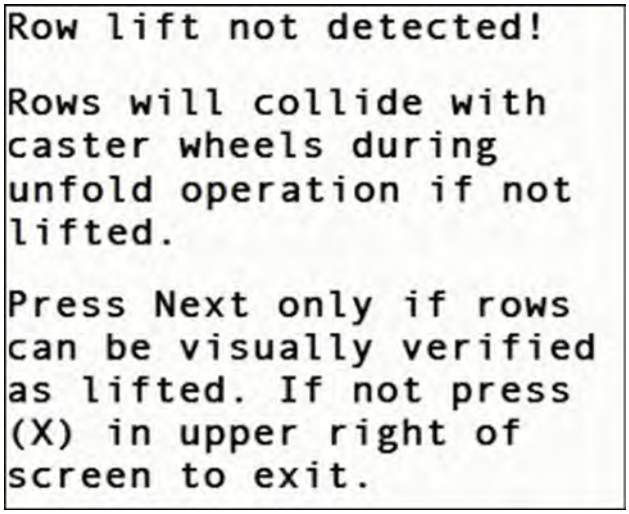


RAPH21PLM2631BA 28

NOTICE: *Verify that the row units are fully lifted.*

If the row lift sensor does not detect the row units as lifted, the “Row Lift” indicator is a red X. If you press the “Next” button, a pop-up message displays: “Row lift not detected! Rows will collide with caster wheels during the unfold operation if not lifted. Press Next only if rows can be visually verified as lifted. If not press (X) in the upper-right of the screen to exit.”

- If the row units are cannot be fully lifted, press the “X” button in the upper-right corner of the wizard to abort the folding process. Determine the cause of the problem.
- If the row units are fully lifted, press the “Next” button in the wizard. This may be necessary to override a faulty row lift sensor.

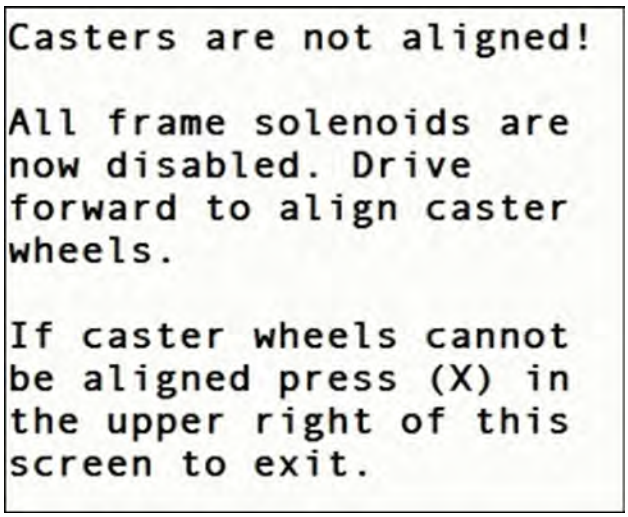


RAIL20PLM1648BA 29

If the casters are not aligned, a warning popup appears.

The warning popup states, “The casters are not aligned! All frame solenoids are now disabled. Drive forward to align caster wheels. If the caster wheels cannot be aligned press (X) in the upper right of this screen to exit.”

Follow the instruction in the popup message.



RAIL20PLM1649BA 30

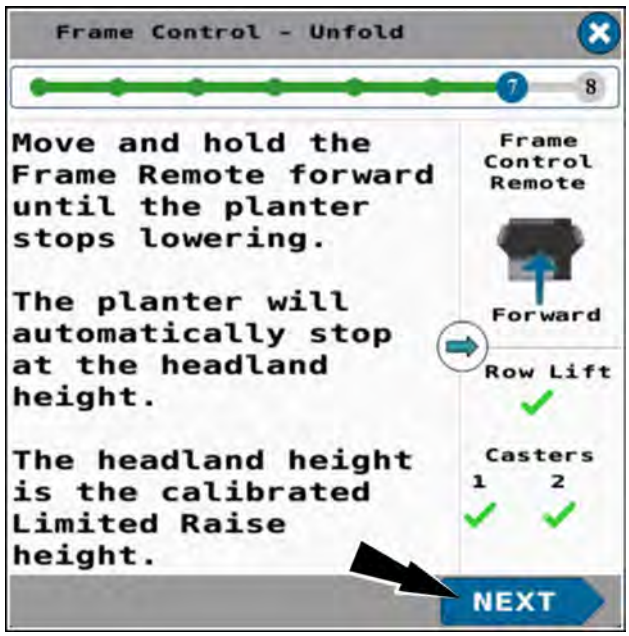
The “Frame Control – Unfold” wizard step 7 appears.

The “Frame Control – Unfold” wizard step 7 states, “Move and hold the frame remote forward until the planter stops lowering. The planter will automatically stop at the headland height. The headland height is the calibrated limited raise height.”

Moving the frame remote forward will lower the planter until it reaches the calibrated limited raise height.

NOTE: *You configure the “Limited Raise” height on the “Frame Cal” screen. See “Frame calibration: 2160 model front fold planters” (**3-53**) for information on the frame calibration.*

Press the “Next” button to continue the wizard.



RAPH21PLM2632BA 31

The “Frame Control – Unfold” wizard step 8 appears.

The “Frame Control – Unfold” wizard step 8 states, “Unlock the lift rows. Move and hold the frame remote back until all hydraulic lift rows are fully lowered. The Row Lift indicator changes to a (red X) as rows lower.”

Moving the frame remote back will lower the hydraulic lift rows to prepare for planting.

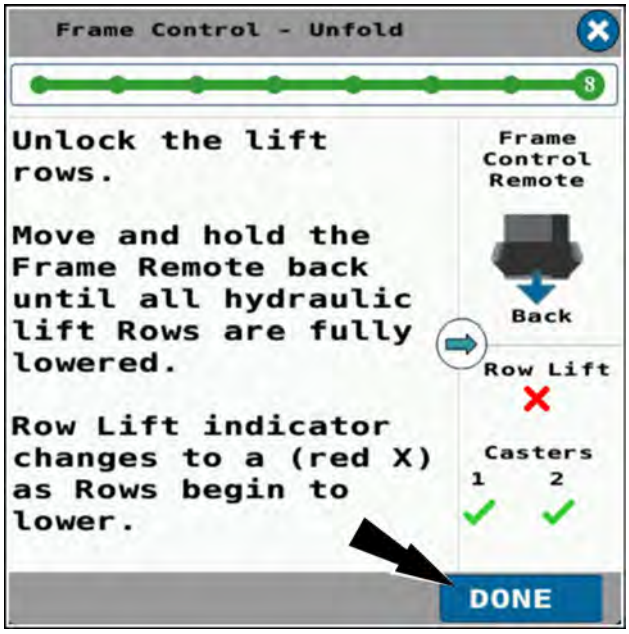
NOTE: *The hydraulic row lift row units must be lowered before you lower the planter to the “Full Lower” position.*

NOTE: *The row units with the proximity detectors are designed to be the last to lower.*
On 2160 model 36-row planters, the proximity detector is at row 34.
On 2160 model 32-row planters, the proximity detector is at row 30.

Disengage all mechanical latches on the hydraulic row lift row units.

Move and hold the remote lever back to lower the hydraulic row lift row units. The “Row Lift” status icon changes to a red “X” as the rows lower.

Press the “Done” button to finish the “Frame Control – Unfold” wizard. The system deactivates all frame solenoids.

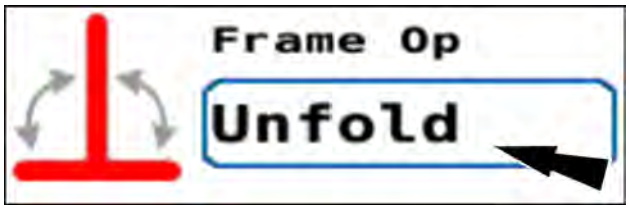


RAPH21PLM2641BA 32

Plant

In page 1 of the object pool, press the button in the “Frame Op” window.

In the frame operation window, press the “Plant” radio button.



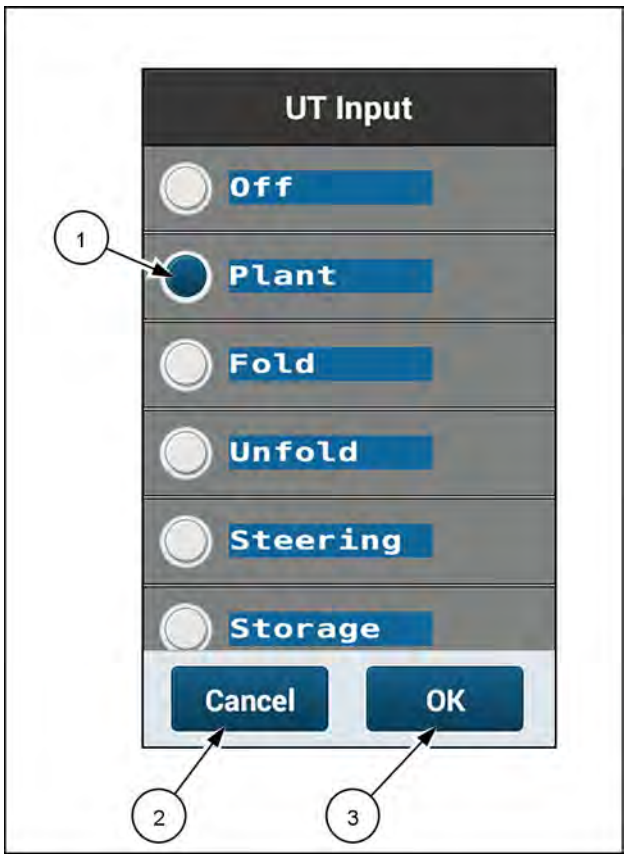
RAIL20PLM1180AA 33

The frame operation menu appears.

Press the “Plant” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the planting setup procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue the planting setup procedure.



RAPH23PLM1096BA 34

The “Frame Control – Plant” window appears.

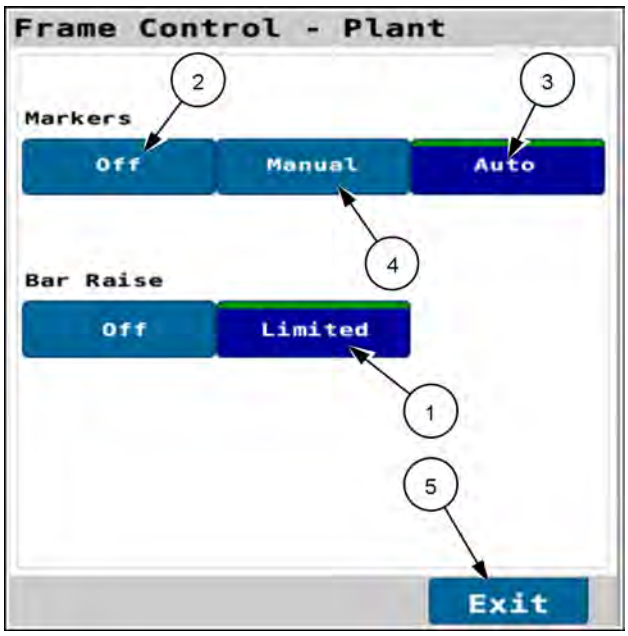
In the “Bar Raise” section, press the “Limited” button **(1)** to perform typical end of row turns.

NOTE: *With the “Bar Raise” section set to the “Off” position, the planter will not raise or lower in response to the Frame Remote.*

The “Markers” section contains the following options:

- If the planter does not have markers, select the “Off” **(2)** option.
- Press the “Auto” button **(3)** for automatic alternating of the markers each time you raise and lower the frame.
- Press the “Manual” button **(4)** to control marker deployment manually with the “Mrkr Ctrl” window on page 2. See “Marker operating modes” (**4-142**) for more information.

Press the “Exit” button **(5)** to close the window.



RAPH23PLM1101BA 35

In page 1 of the object pool in the “Mrkr Ctrl” window, press the button for the marker you wish to deploy.

NOTE: *If marker control is configured to automatic mode, your selection is the first marker you wish to deploy. After that the markers will alternately deploy automatically.*

Use the remote lever to unfold the marker and lower the planter to the ground.

Move the remote lever to the float position so that the marker will follow the contour of the ground.

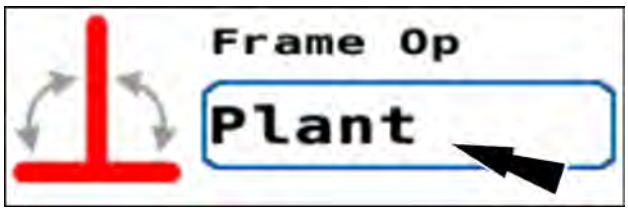
NOTE: *In some field conditions it may be necessary to run the frame remote in the powered down position to maintain ground contact with the marker.*

RAIL20PLM1181AA 36

Steering mode: 2160 model front fold planters

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



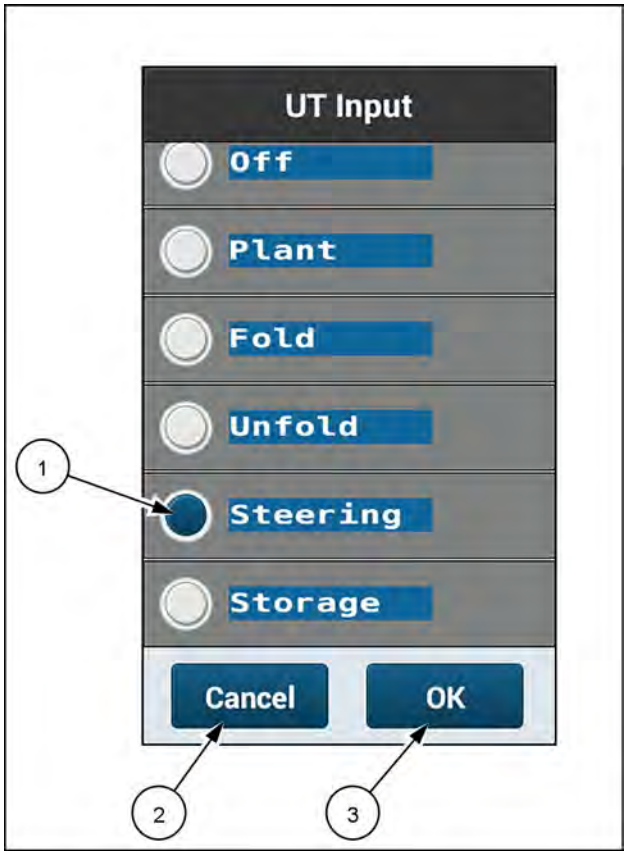
RAIL20PLM1176AA 1

The frame operation menu appears.

Press the “Steering” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue steering the planter.



RAPH23PLM1094BA 2

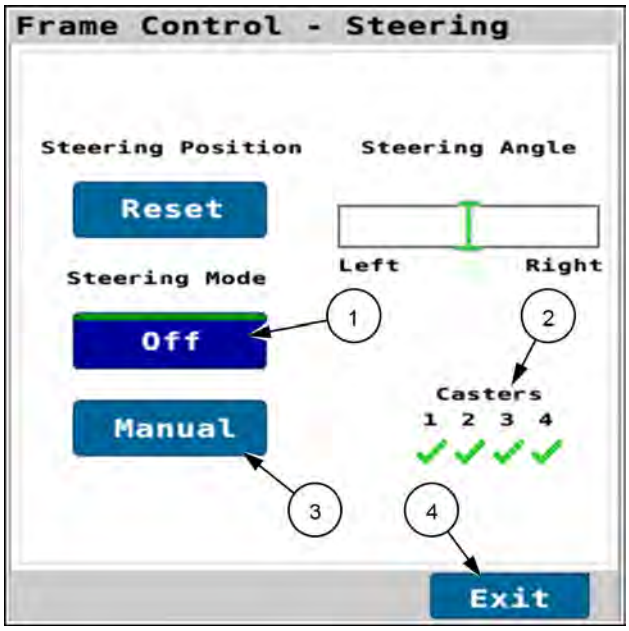
The “Frame Control – Steering” screen appears. In the “Steering Mode” section, the “Off” button **(1)** is selected by default, as indicated by the darker blue color. Two or four green check marks appear in the “Casters” section **(2)**, depending upon your planter model.

NOTE: *You must place the frame remote to float and then neutral before engaging the planter steering system. The system will not allow you to proceed without first performing this step.*

Place the frame remote lever to float, and then to neutral. This relieves residual hydraulic pressure in the implement steering system.

Press the “Manual” button **(3)** to activate the steering solenoids.

Press the “Exit” button **(4)** if you wish to discontinue implement steering control

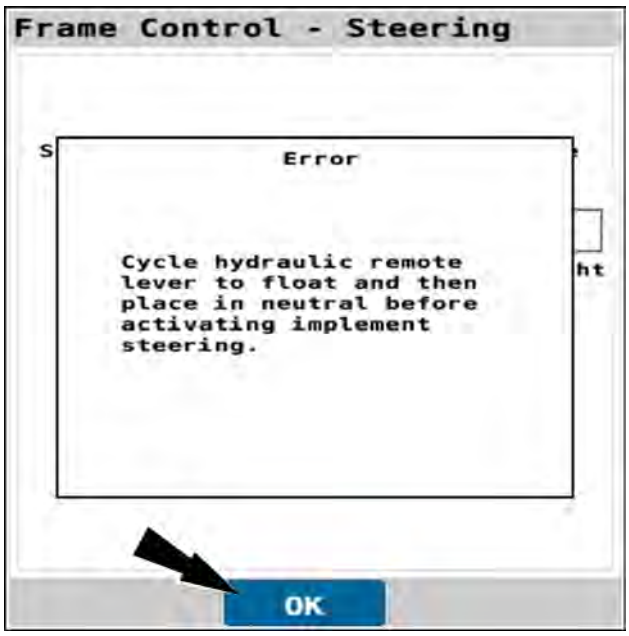


RAPH23PLM1092BA 3

If you do not place the frame remote to float and then neutral, an error message appears.

The error message states, “Error. Cycle the hydraulic remote lever to float and then place it in neutral before activating implement steering.”

Follow the instructions in the error message. Then press the “OK” button to continue the procedure.

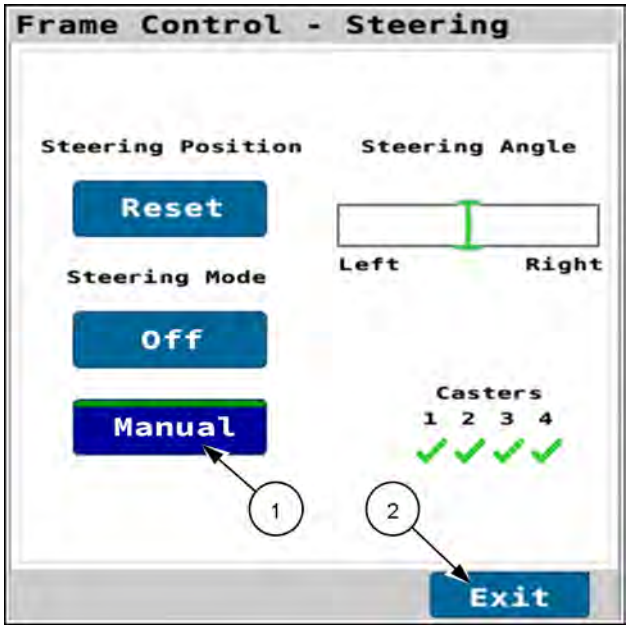


RAIL20PLM1724BA 4

The “Manual” button **(1)** is highlighted to indicate that the steering solenoids are energized. The implement steering mode “Off” button is not highlighted.

You can now use the remote lever to steer the implement left or right.

Press the “Exit” button **(2)** if you wish to discontinue the procedure.



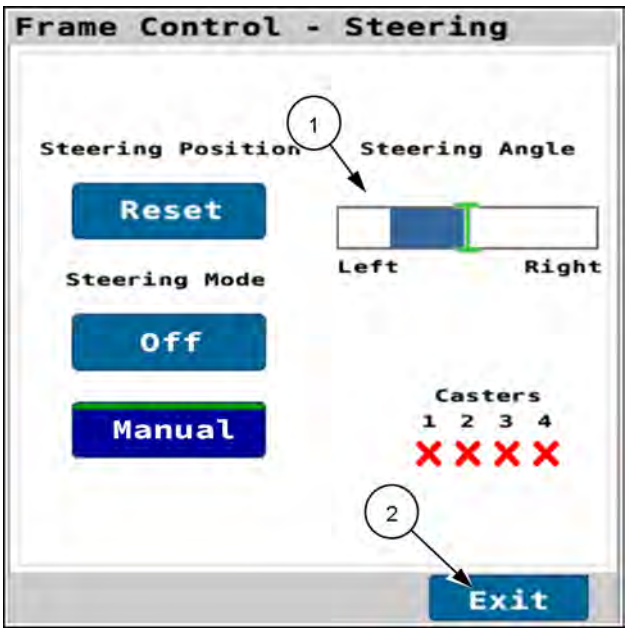
RAPH23PLM1095BA 5

The “Steering Angle” bar graph **(1)** displays real-time feedback of the steering axle's turning angle.

The bar graph is centrally anchored and moves either left or right depending on the signal feedback.

Any bar displayed is not equal to a centered position, i.e. wheels straight. The bar graph is logarithmic so the center area, near the green center vertical bar, has maximum resolution to assist in centering the axle.

Press the “Exit” button **(2)** if you wish to discontinue the procedure.



RAPH23PLM1093BA 6

If the wheels are not centered and you press the “Off” button in the “Frame Control – Steering” screen, a caution message appears.

The caution message states, “Caution. The implement steering axle is not in the center position.”

Press the “OK” button to continue.

RAIL20PLM1727BA 7

NOTICE: *If the steering angle is off-center, the implement steering will move during the reset procedure.*

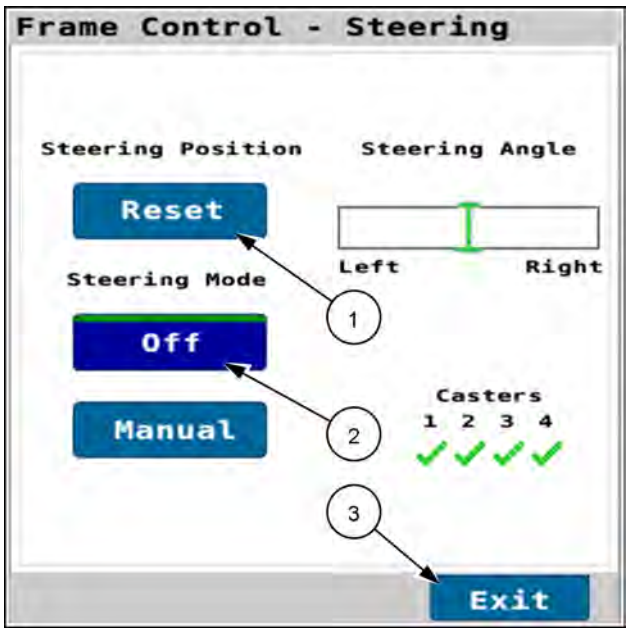
Using the “Reset” button **(1)** runs an automatic process that centers the steering axle to a predefined calibrated centered value.

NOTE: *Ensure that the implement steering mode is set to “Off” **(2)** and that the remote valve is activated before attempting to reset the implement steering position.*

Press the “Reset” button **(1)** to activate the auto-center reset process. The button is a momentary activation button. When pressed, the “Steering Mode” buttons become unavailable.

NOTE: *Auto-centering of the steering wheels also takes place when the planter is in “Plant” mode and you raise the planter at the headland turn.*

Press the “Exit” button **(3)** if you wish to discontinue the procedure.



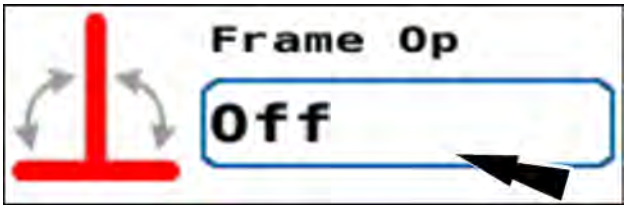
RAPH23PLM1092BA 8

"Storage" mode: 2150 model front fold planters

Use the “Storage” mode to lower the center section of the planter for door clearance, shipping, and bulk tank filling.

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



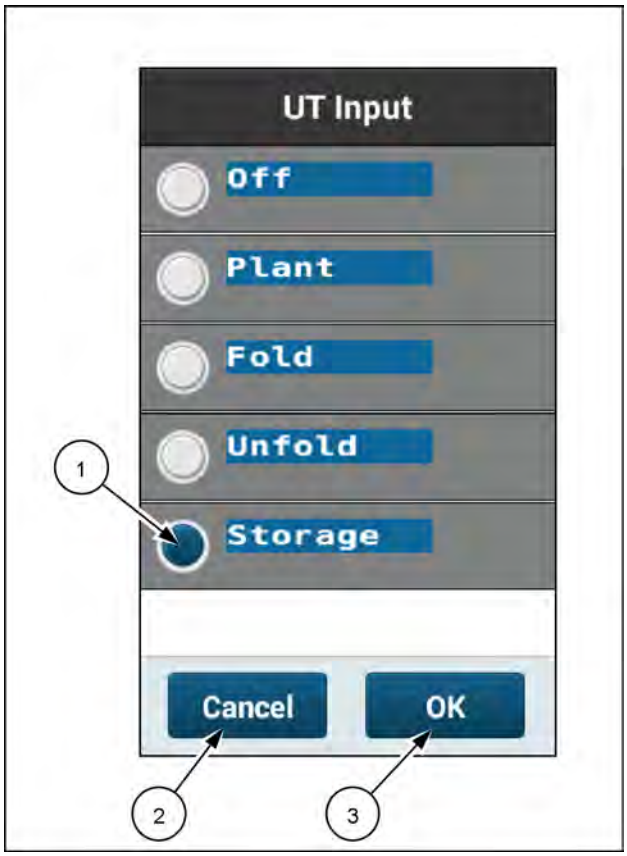
RAIL20PLM1179AA 1

The frame operation menu appears.

Press the “Storage” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue placing the planter into “Storage” mode.



RAPH23PLM1074BA 2

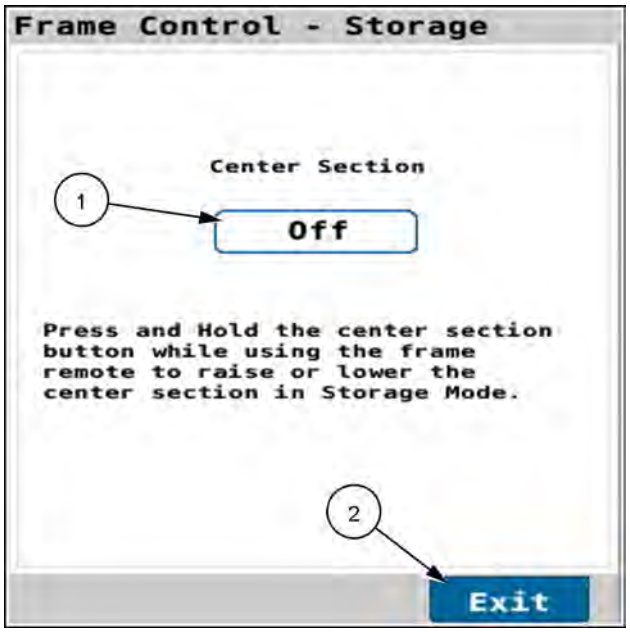
The “Frame Control – Storage” screen appears.

The “Frame Control – Storage” screen states, “Press and Hold the center section button while using the frame remote to raise or lower the center section in the Storage Mode.”

With the frame remote lever held in the desired position, press and hold the button **(1)** in the “Center Section” area. While you hold the button, it is active in the “On” position.

NOTE: *The storage solenoids remain energized for as long as you hold the button, and de-energize when you release the button.*

Press the “Exit” button **(2)** if you wish to exit the procedure.



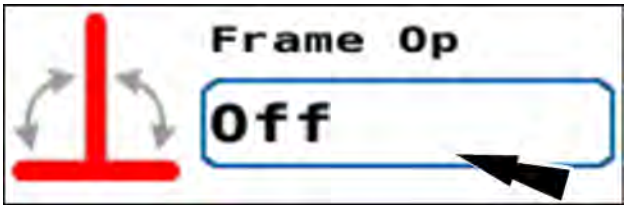
RAPH23PLM1071BA 3

"Storage" mode: 2150S model front fold planters

Use the “Storage” mode to lower the center section of the planter for door clearance, shipping, and bulk tank filling.

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



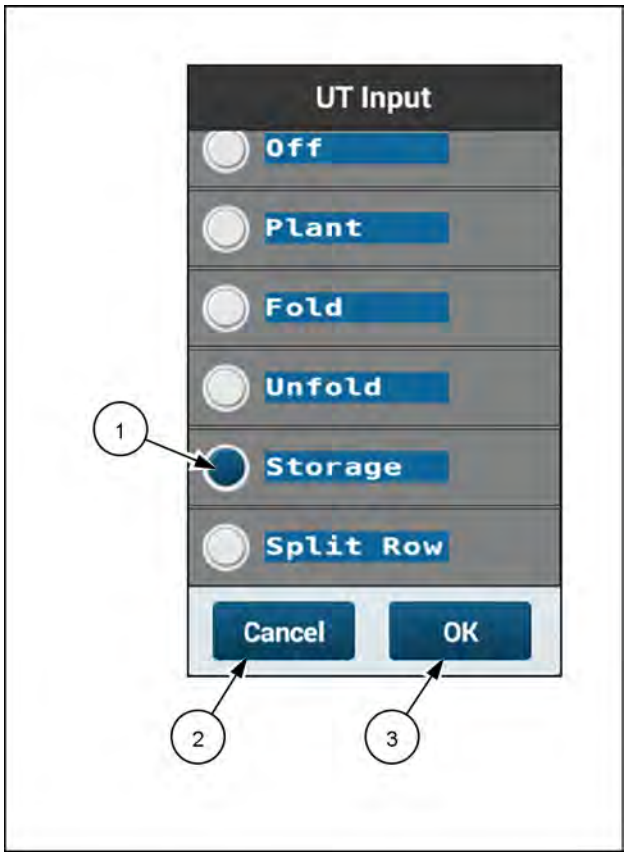
RAIL20PLM1179AA 1

The frame operation menu appears.

Press the “Storage” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue placing the planter into “Storage” mode.



RAPH21PLM2599BA 2

Center section

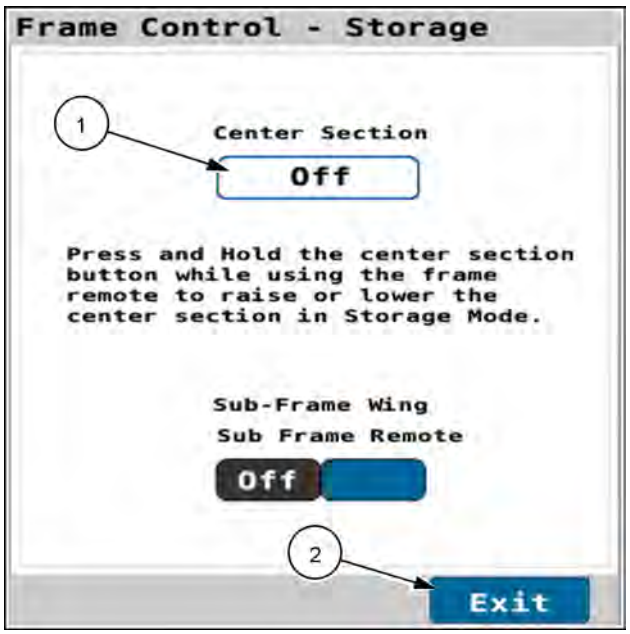
The “Frame Control – Storage” screen appears.

The “Frame Control – Storage” screen under the “Center Section” area states, “Press and hold the center section button while using the frame remote to raise or lower the center in Storage Mode.”

With the frame remote lever held in the desired position, press and hold the “Center Section” button **(1)**. While you hold the button, it is active in the “On” position.

NOTE: *The storage solenoids for the center section remain energized for as long as you hold the button, and de-energize when you release the button.*

Press the “Exit” button **(2)** if you wish to exit the procedure.



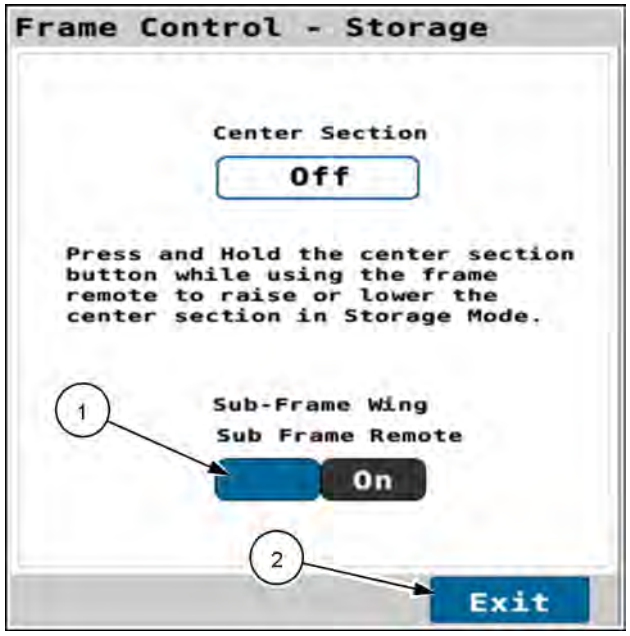
RAPH23PLM1072BA 3

Sub-frame

Press the “Sub-Frame Wing” button **(1)** to turn it ON.

Use the remote lever to lower the sub-frame as required.

Press the “Exit” button **(2)** if you wish to discontinue the procedure.



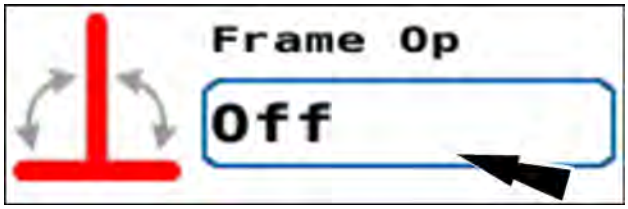
RAPH23PLM1073BA 4

"Storage" mode: 2160 model front fold planters

Use the “Storage” mode to lower the center section of the planter for door clearance, shipping, and bulk tank filling.

Put the remote lever in the neutral position.

In page 1 of the object pool, press the button in the “Frame Op” window.



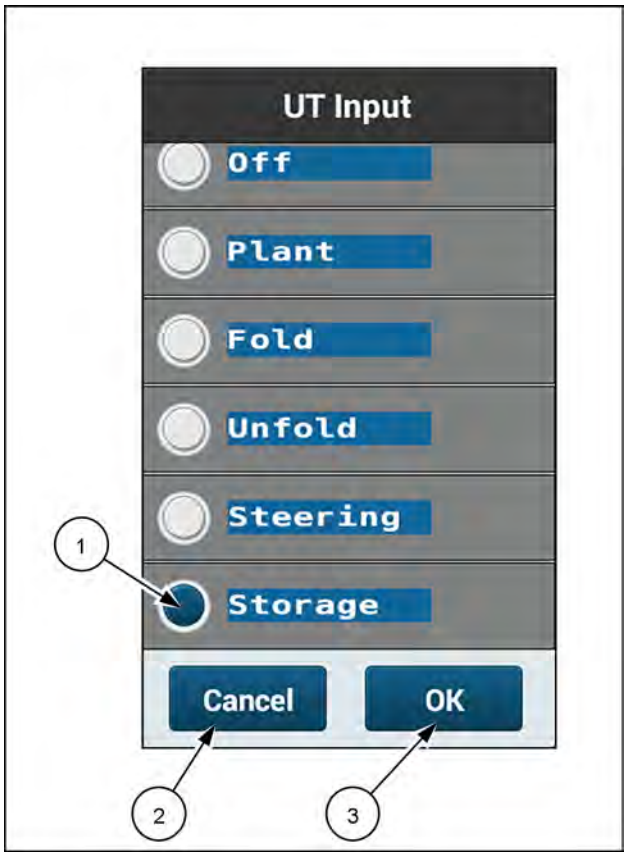
RAIL20PLM1179AA 1

The frame operation menu appears.

Press the “Storage” radio button **(1)**.

If you need to cancel the procedure, press the “Cancel” button **(2)** to cancel the folding procedure and close the frame operation menu.

Press the “OK” button **(3)** to continue placing the planter into “Storage” mode.



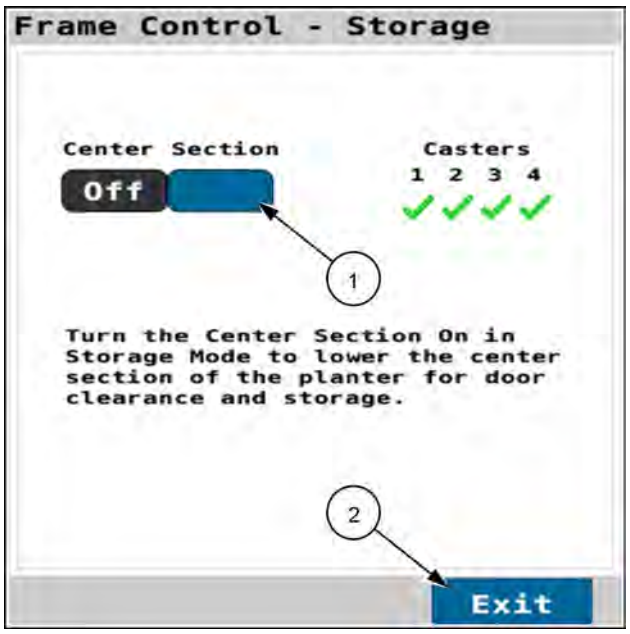
RAPH23PLM1075BA 2

The “Frame Control – Storage” screen appears.

The “Frame Control – Storage” screen states, “Turn the Center Section On in Storage Mode to lower the center section of the planter for door clearance and storage.”

Press the blue button **(1)** in the “Center Section” area. This activates the storage solenoids.

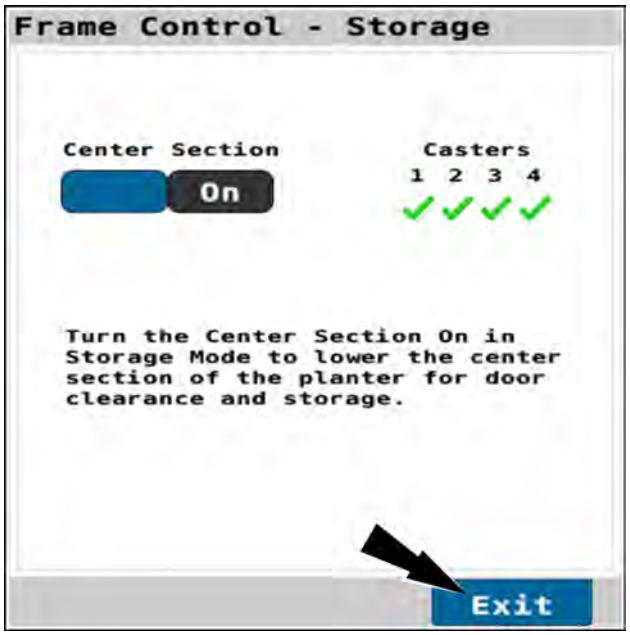
Press the “Exit” button **(2)** if you wish to discontinue the procedure.



RAIL20PLM1730BA 3

Use the remote lever to lower the center section as required.

Press the “Exit” button if you wish to discontinue the procedure.

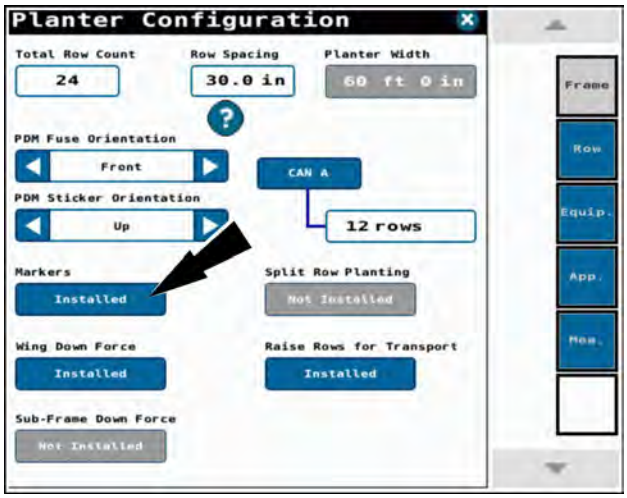


RAIL20PLM1731BA 4

MARKER CONTROL

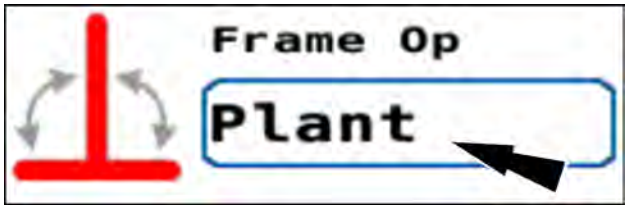
Marker availability

The “Planter Configuration” screen indicates that a marker system has been installed.



NHPH25PLM0020AA 1

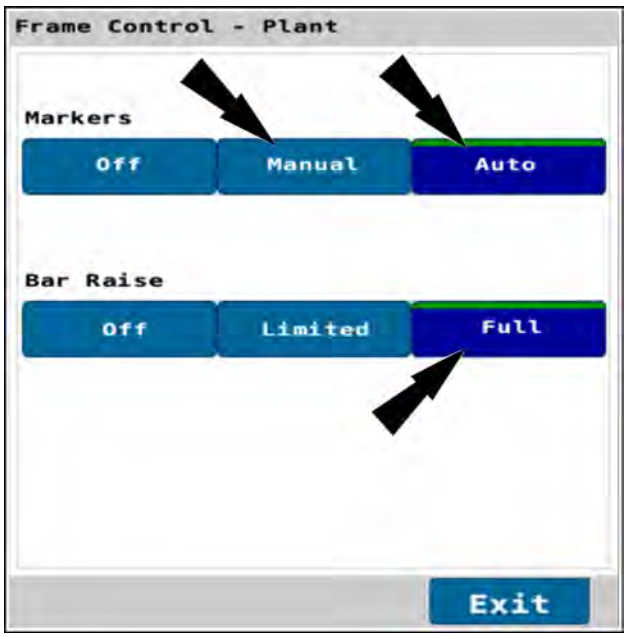
The “Frame Op” window is configured to “Plant” mode.



RAIL20PLM1176AA 2

Markers are not turned OFF, but are configured for manual or automatic operation on the same screen.

On front fold planters the “Frame Control – Plant” window, the “Bar Raise” area is configured to the “Full” setting.



RAPH23PLM1124BA 3

Marker operating modes

The “Mrkr Ctrl” window displays the current mode of operation: “A” for “Automatic,” “M” for “Manual,” and no letter when markers are turned OFF.

The highlighted button indicates which marker will deploy the next time the toolbar is lowered. Whenever markers are ON, the next marker to deploy can be advanced by pressing the opposite button. The new button highlights to indicate the change.

If no button is highlighted in “Automatic” or “Manual” mode, the first marker to deploy was not selected, or one of the conditions on the previous pages is missing.

RAIL20PLM1183AA 1

RAIL20PLM1184AA 2

RAIL20PLM1181AA 3

Marker automatic alternation

If no marker is highlighted in the “Mrkr Ctrl” window and markers are turned ON, press the button for the first marker you wish to deploy. Thereafter, marker alternating is automatic.

NOTE: *The “Mrkr Ctrl” window highlights the marker that will deploy the next time the toolbar is lowered, not the currently deployed marker.*

On most planters during planting, when the toolbar is raised with the remote lever to make the turn at the end of the pass, the current lowered marker is also raised. The system detects a pressure change and toggles the arrow to the opposite position in the “Marker Control” window. However, the current marker remains active until it is completely raised.

On 2150 model planters, the markers alternate when the bar is raised past **3%** below the limited raise point.

When the turn is completed and the toolbar is lowered, the system energizes the opposite marker and lowers it to the ground with the toolbar.

System logic prevents the markers from alternating again for a **15 s** interval from the detection of the pressure change. In practical terms, if the wrong marker is deployed or you attempt to immediately cycle between the left and right hand markers, the system will honor the **15 s** interval before responding to a request.

RAIL20PLM1181AA 4

Marker manual alternation

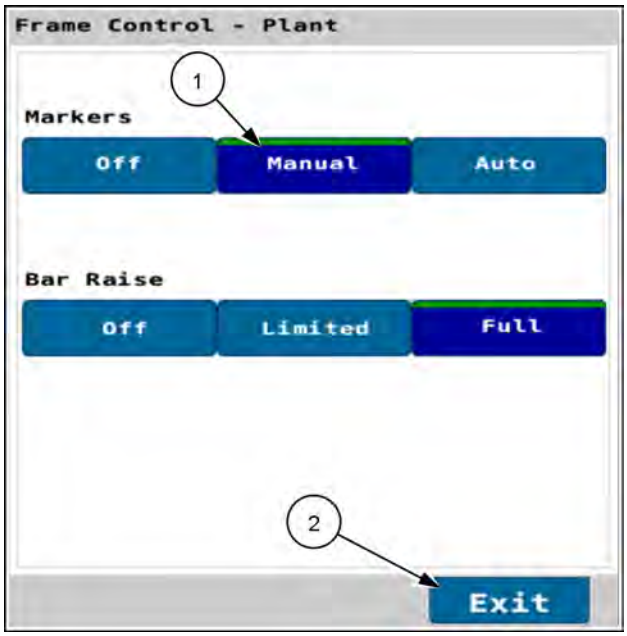
In “Manual” mode, markers function independently. Both markers can be selected with the “Mrkr Ctrl” window to deploy the next time the toolbar is lowered. Both markers can be selected to raise when the toolbar is raised. Or marker alternating can be controlled manually by the operator

The highlighted button in the window is the marker that will deploy when the toolbar is lowered.

Use the “Frame Control – Plant” window to select the operating mode **(1)** for the markers. In this example, the “Manual” mode is selected.

Press the “Exit” button **(2)** when you have finished configuring the markers.

RAIL20PLM1184AA 5



RAPH23PLM1125BA 6

Lower both markers to open a field

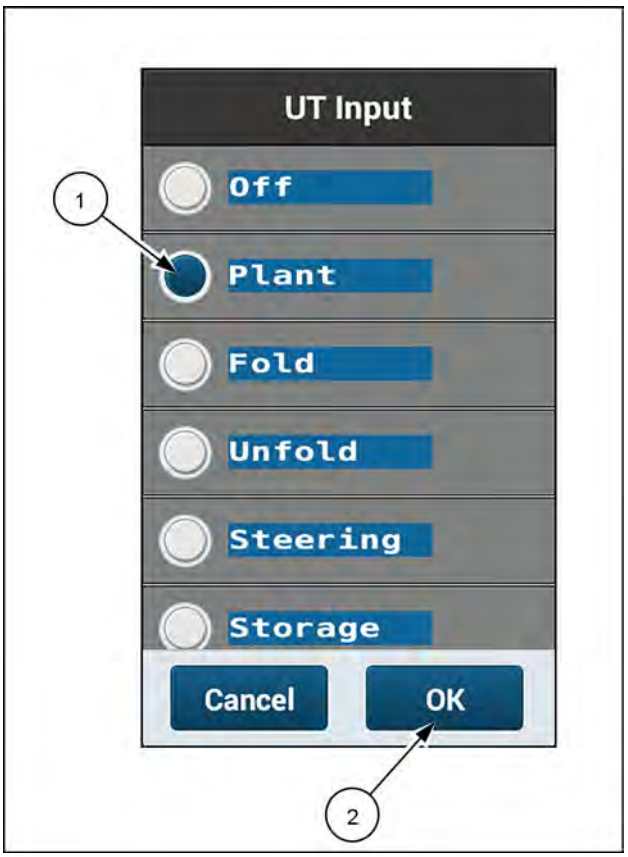
To lower both markers to open a field:

Put the remote lever in the neutral position.

In page 2 of the object pool, press the button in the “Frame Op” window.

In the frame operation window, press the “Plant” radio button **(1)**. The frame operation windows differ depending upon your planter model.

Press the “OK” button **(2)**.

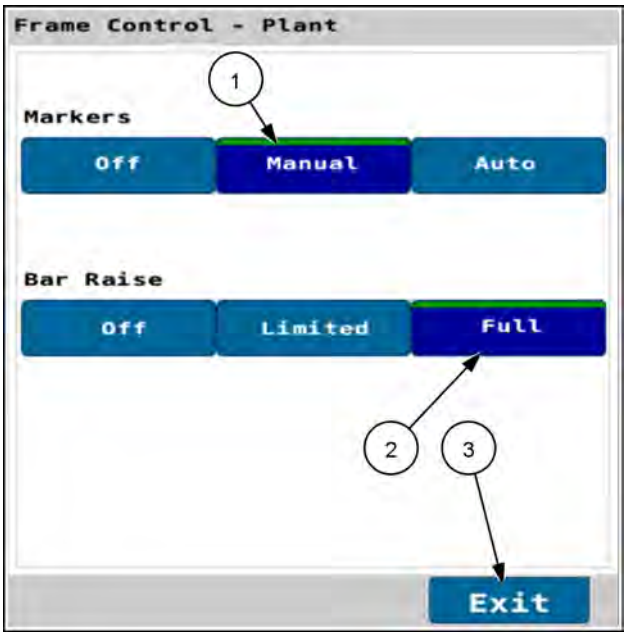


RAPH23PLM1096BA 1

In the “Frame Control – Plant” window select the “Manual” operating mode **(1)** for the markers.

Select the “Full” option **(2)** in the “Bar Raise” section.

Press the “Exit” button **(3)** when you have finished configuring the markers.



RAPH23PLM1125BA 2

Locate the “Mrkr Ctrl” window in page 1 of the object pool.

Press both buttons to make both markers active.

Use the tractor remote lever to lower the toolbar and both markers to field operating position.

Proceed with opening the field.

At the end of the pass, raise both markers and the toolbar with the tractor remote lever and make the turn.

Before beginning the next pass, deselect both markers, and then use the “Frame Control – Plant” window to change the setting to “Auto” if desired. Select the first marker to deploy with the “Mrkr Cntrl” window.

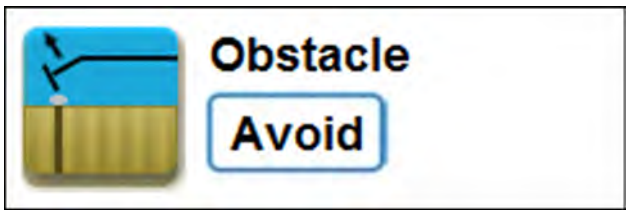
RAIL20PLM1185AA 3

RAIL20PLM1181AA 4

Obstacle control

NOTE: *This feature is not available on 2110, 2120, and 2130 model planters, even if the machine has markers.*

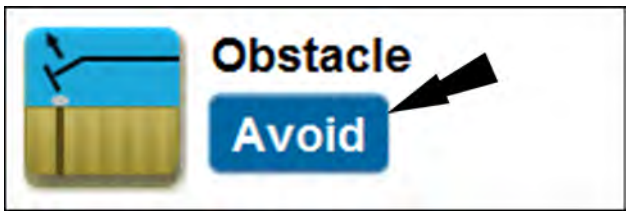
Use the “Obstacle” window to avoid a field obstacle to a marker.



RAPH22PLM0068AA 1

Press the “Avoid” button in the “Obstacle Control” window to completely fold the active marker to avoid an obstacle without raising the toolbar. The button highlights, and the toolbar is locked in the lowered position.

Use the remote lever to raise the active marker. The toolbar does not raise with the marker.



RAPH22PLM0069AA 2

When the marker is clear of the obstacle, lower the same marker with the remote lever, and press the “Avoid” button again to unlock the toolbar.

NOTE: *The marker does not automatically advance because only the marker, not the toolbar, is raised and then lowered.*

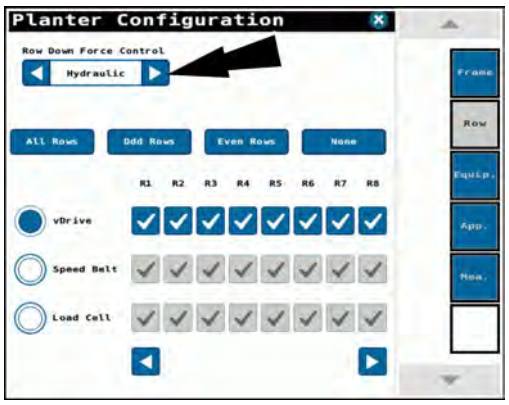
DOWN FORCE CONTROL AND MONITORING

Introduction: down force control

You can control and monitor feedback from a pneumatic down pressure system or a hydraulic down force system.

The type of system on your planter determines which control and monitoring windows are available for the run screens.

NOTE: *The "Planter Configuration" screen indicates what type of system is installed on your planter.*

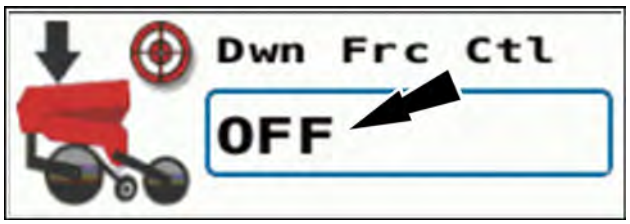


NHPH25PLM0021AA 1

Hydraulic down force control

Find the “Dwn Frc Ctl” window in page 2 of the object pool.

Press the “Down Force Control” window to enable the feature and set the target down force across the entire planter in kilograms or pounds.

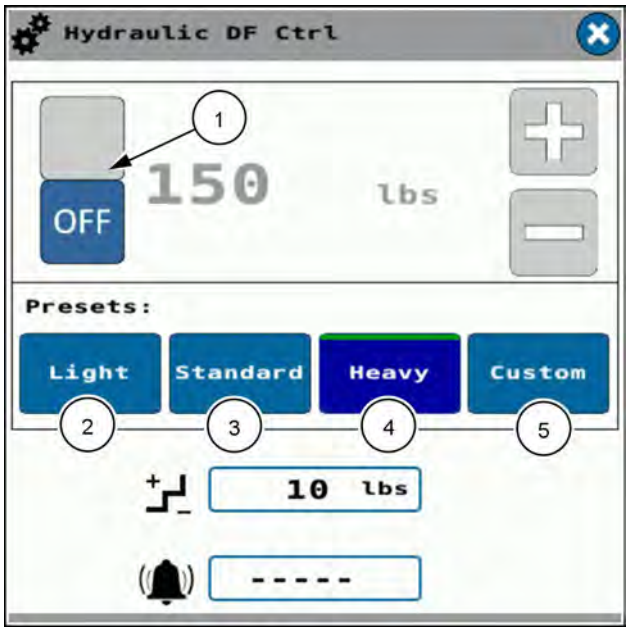


NHPH25PLM0022AA 1

There are four latching buttons in the “Down Force Control” window.

- Press the “Light” button **(2)** to apply **23 kg** (**50 lb**) of down force.
- Press the “Standard” button **(3)** to apply **45 kg** (**100 lb**) of down force.
- Press the “Heavy” button **(4)** to apply **68 kg** (**150 lb**) of down force.
- Press the “Custom” button **(5)** to enter a custom value.

NOTE: *If you select any setting other than “Custom,” the down force amount is not editable and appears grayed out.*



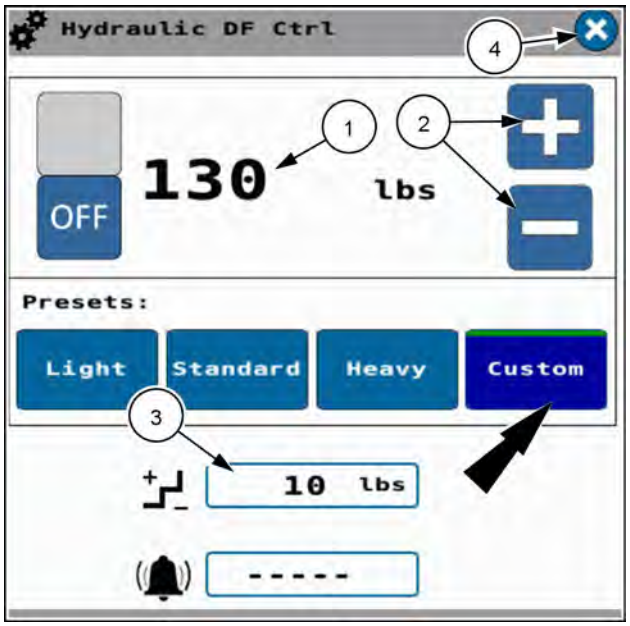
NHPH25PLM0531BA 2

If you press the “Custom” button, the application sets the target rate to the most recent custom value **(1)**. If you have not used a custom value in the past, the application sets the target rate to **0 kg** (**0 lb**).

You can use the plus and minus buttons **(2)** to adjust the custom value for your operation.

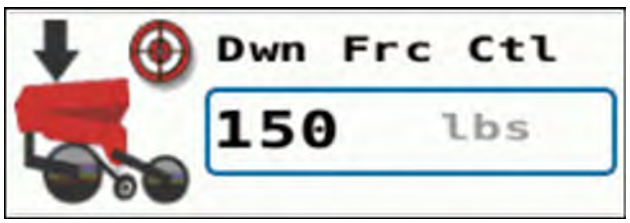
You can use the stepper **(3)** setting to adjust the changes that are made by the plus and minus buttons.

Press the “X” button **(4)** to save your changes and exit.



NHPH25PLM0533BA 3

The “Down Force Control” window reports the value that is currently in effect. **(1)**.



NHPH25PLM0023AA 4

Hydraulic down force monitoring

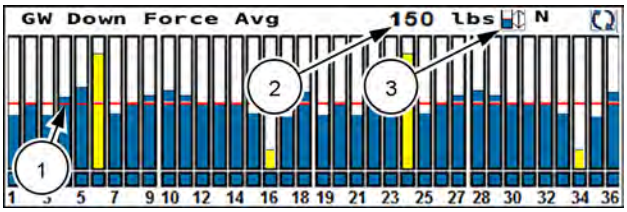
A bar graph on page three of the object pool provides monitoring of the down force for each row unit of the planter.

The down force bar graph reports:

- Gauge wheel (GW) force
- Net applied force
- Ground contact percentage

Use the cycling icon  to navigate through the three parameters.

Gauge wheel (GW) down force



RAPH23PLM0203AA 1

In the “GW Down Force” graph, the red line **(1)** denotes the target down force that you configure in the “Dwn Frc Ctl” window. See “Hydraulic down force control” (**4-148**) for more information.

The “GW Down Force” window gives the average down force **(2)** across all row units.

Use the minimum/maximum icon **(3)** to choose between a normal scale and a wide scale for the bars in the bar graph. The icon gives a status of “N” for the normal scale and “W” for the wide scale. You configure the scaling levels in the “Down Force Parameterst” screen. See “Down force parameters” (**3-35**).

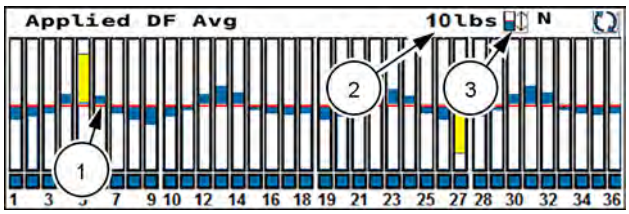
For example:

If the down force control is configured to **68 kg** (**150 lb**), the normal scale level is configured to **14 kg** (**30 lb**), and the wide scale level is configured to **34 kg** (**75 lb**):

- Normal scale: The red line = **68 kg** (**150 lb**). The bar graph bottom = **54 kg** (**120 lb**). The bar graph top = **82 kg** (**180 lb**).
- Wide scale: The red line = **68 kg** (**150 lb**). The bar graph bottom = **34 kg** (**75 lb**). The bar graph top = **102 kg** (**225 lb**).

A bar changes to yellow in a row if the measured down force exceeds the alarm percentage. You configure the down force alarm percentage in the down force parameters setup. See “Down force parameters” (**3-35**).

Net applied force



RAPH23PLM0204AA 2

In the “Applied Down Force” bar graph, the red line **(1)** denotes a net applied force of **0 kg** (**0 lb**). A bar above the red line indicates a positive net applied force. A bar below the red line indicates a negative net applied force.

The “Applied Down Force” window gives the average down force **(2)** across all row units.

Use the minimum/maximum icon **(3)** to choose between a normal scale and a wide scale for the bars in the bar graph. The icon gives a status of “N” for the normal scale and “W” for the wide scale. You configure the scaling levels in the “Down Force Parameters” screen. See “Down force parameters” (**3-35**).

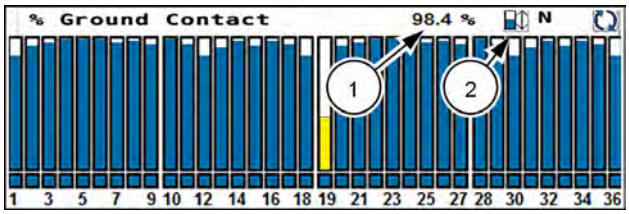
For example:

The applied force is configured for a normal scale level of **11 kg** (**25 lb**) and a wide scale level of **23 kg** (**50 lb**).

- Normal scale: The red line = **0 kg** (**0 lb**). The bar graph bottom = **–11 kg** (**–25 lb**). The bar graph top = **11 kg** (**25 lb**).
- Wide scale: The red line = **0 kg** (**0 lb**). The bar graph bottom = **–23 kg** (**–50 lb**). The bar graph top = **23 kg** (**50 lb**).

A bar changes to yellow in a row if the measured down force exceeds the alarm percentage. You configure the down force alarm percentage in the down force parameters setup. See “Down force parameters” (**3-35**).

Ground contact percentage



RAPH23PLM0205AA 3

The “% Ground Contact” window gives the average ground contact percentage **(1)** across all row units.

There is no red line in the “% Ground Contact” bar graph. The top of the bar graph is always **100%**. The bottom of the bar graph is the minimum value that you establish using the scale icon **(2)**. The icon gives a status of “N” for the normal scale and “W” for the wide scale.

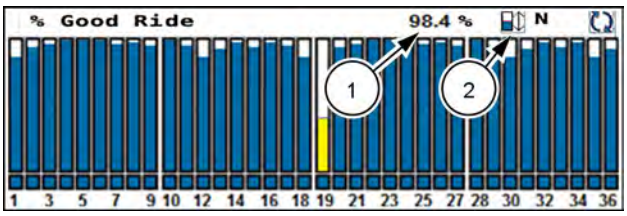
You configure the normal and wide scale percentages in the down force parameters setup. See "Down force parameters” (**3-35**).

Example:

- The normal scale establishes the bottom of the bar graph at **90%**.
- The wide scale establishes the bottom of the bar graph at **70%**.

A bar changes to yellow if the good ride percentage exceeds the alarm percentage that you configure in the down force parameters setup. See “Down force parameters” (**3-35**).

Good ride percentage



RAPH23PLM0206AA 4

The “% Good Ride” window gives the average good ride percentage **(1)** across all row units.

There is no red line in the “% Good Ride” bar graph. The top of the bar graph is always **100%**. The bottom of the bar graph is the minimum value that you establish using the scale icon **(2)**. The icon gives a status of “N” for the normal scale and “W” for the wide scale.

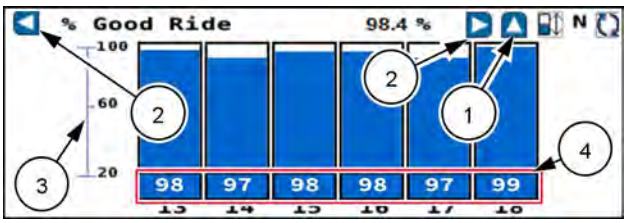
You configure the normal and wide scale percentages in the down force parameters setup. See “Down force parameters” (**3-35**.

Example:

- The normal scale establishes the bottom of the bar graph at **80%**.
- The wide scale establishes the bottom of the bar graph at **60%**.

A bar changes to yellow if the ground contact percentage exceeds the alarm percentage that you configure in the down force parameters setup. See “Down force parameters” (**3-35**).

Section view



RAPH23PLM0207AA 5

If you press a section in any of the bar graph windows, the view zooms to show that section only.

The bar graph behavior and controls are the same as in the all-rowl bar graph view.

Press the return button **(1)** to return to the all rows view.

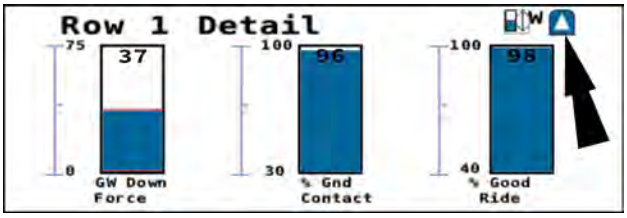
Press the scroll left and right buttons **(2)** to scroll between sections.

The scale legend **(3)** gives the currently applied minimum and maximum scale.

The boxes **(4)** give the numerical values for their respective rows.

This example gives the section view of the “GW Down Force” window. The “ Applied Down Force” and “% Ground Contact” section views are similar.

Row view



RAPH23PLM0208AA 6

If you press a row in any of the section views, a bar graph with all three down force parameters for the selected row appears.

The bar graph behavior is the same as in the all-row and section views.

Scale legends for each bar give the currently applied minimum and maximum scales.

Press the left-arrow and right-arrow icons to scroll between rows. Press the return button to see the section view that contains the currently selected row.

Down force summary

The “DF Summary” window displays the following down force amounts, scanning through them one at a time”

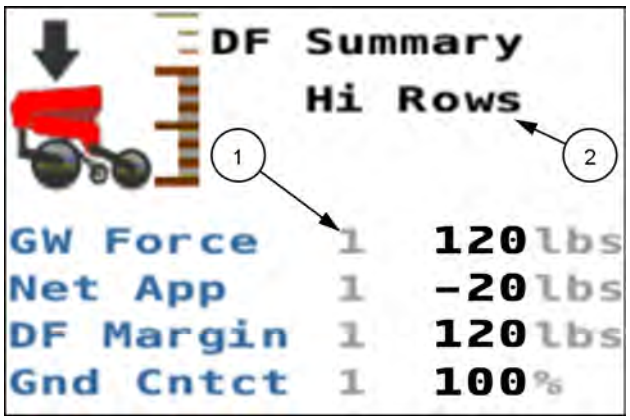
- All-row average
- High row data
- Low row data

The scanned parameters are:

- Gauge Wheel (GW) force
- Net applied force
- Down Force (DF) margin
- Percentage of ground contact

The “Hi Rows” and “Lo Rows” displays give the row number **(1)** for each parameter.

This example shows the “DF Summary” window for the “Hi Rows” parameter **(2)**. The “All Row Avg” and “Lo Rows” window are similar.



RAIL20PLM1720BA 7

Wing down force control

The wing down force system in equipped models provides additional usable weight to the planter wings to allow higher levels of row unit down force in hard soil conditions.

The system consists of a hydraulic cylinder mounted between the inner and outer wings on both sides of the planter. The wing down force system controls a pressure control valve to adjust the hydraulic flow to the cylinder while monitoring feedback from a pressure sensor.

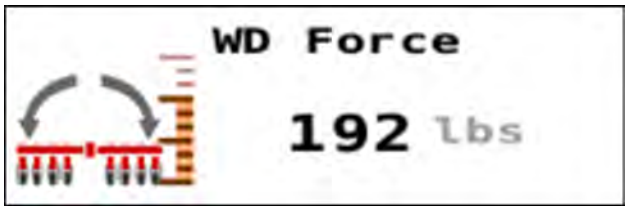
NOTE: *The wing down force system removes the load on the wings during headland turns to minimize soil disturbance at the wing wheel. The wing down force system automatically reapplies the load when the frame transitions through the "Start Plant" height when exiting the headland.*

Use the "Wing Down Force Control" window to enter the number of pounds to be added to each wing. The wing down force system calculates and controls to the pressure required to maintain the set target wing down force.

The recommended setting for wing down force is based on the expected row unit down force requirements. Press the help "?" icon in the "Wing Down Force Ctrl" window to see the recommended settings for your planter. You can also use the tables in the next section to select the proper wing down force setting based on row unit down force. Locate the row unit down force value at the top of the table and then set the "Wing Down Force Control" window to the applicable value in the table. See "Wing down force control setup" (**4-154**) for more information.

NOTE: *For split row planters, the display automatically turns wing down force OFF when the split rows are raised. The weight of the raised rows is typically adequate to keep the planting rows down. If you require additional wing down force, use the "Wing Down Force Control" window to turn wing down force back ON.*

The "WD Force" window gives the currently applied wing down force.



RAIL20PLM1209AA 1

Wing down force control setup

There is a single “Wing DF Ctl” window to set the rate for the wing down force on the planter.

Press the field to open the “Wing Down Force Ctl” window.

RAIL20PLM1090AA 1

The frame operation must be in “Plant” mode to use wing down force control. If the field in the “Wing DF Ctl” window is pressed when frame operation is not in “Plant” mode, a warning appears. The warning states, “Wing Down Force Control Not Available. Operation mode must be set to Plant in Frame Operations to perform selected function.” See “Introduction: frame control” (**4-50**) and subsequent sections for more information on frame control.

Press the “OK” button to acknowledge the message. Place the frame in plant mode as needed.

RAPH21PLM2611BA 2

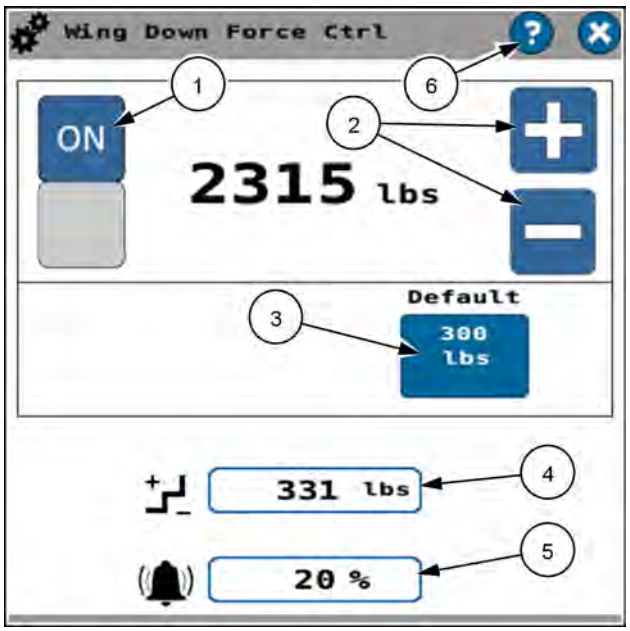
Press the ON/OFF soft toggle **(1)** to turn wing down force control ON and OFF. The soft toggle shows the current state, so if the toggle reads, “OFF,” wing down force control is OFF.

Press the ON/OFF soft toggle **(1)** to turn wing down force control ON and OFF. The soft toggle shows the current state, so if the toggle reads, “OFF,” wing down force control is OFF.

Use the “+” and “-” buttons **(2)** to increase or decrease the wing down force setting.

You can also press the “Default” button **(3)** to configure the wing down force control to the default setting for your planter.

Press the help icon **(6)** to see the recommended wing down force settings based upon row unit down force range.



RAPH21PLM1523BA 3

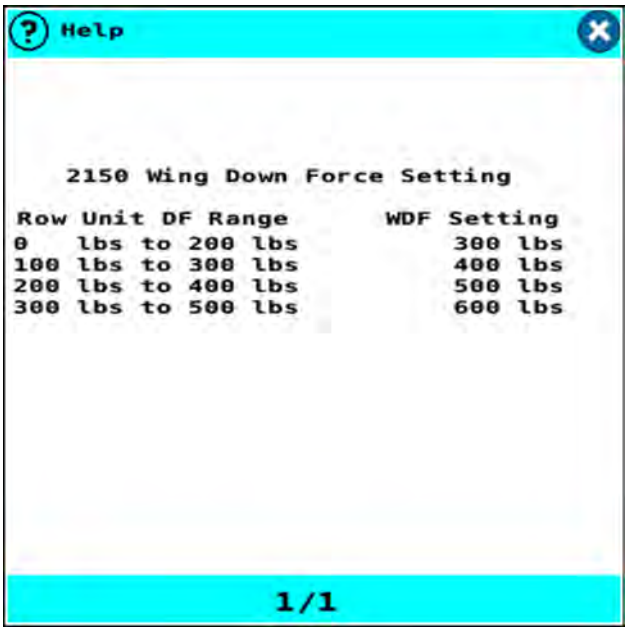
You can use the step control **(4)** to adjust the amount of the increment that the setting will change by when you adjust it.

The alarm limit **(5)** is the percentage above or below the target allowable before triggering the “Wing DF Ctrl” alarm. Press the alarm limit field to adjust the alarm limit setting.

The default values and ranges are listed below.

Model	Configuration	Minimum	Maximum	Default	Step size
2130	All	**91 kg** (**200 lb**)	**454 kg** (**1000 lb**)	**136 kg** (**300 lb**)	**45 kg** (**100 lb**)
2140	12/23 split row* 12/24 split row* * **127 mm** (**5 in**) cylinder	**816 kg** (**1800 lb**)	**953 kg** (**2100 lb**)	**816 kg** (**1800 lb**)	**68 kg** (**150 lb**)
	12/23 split row* 12/24 split row* * **89 mm** (**3.5 in**) cylinder	**272 kg** (**600 lb**)	**953 kg** (**2100 lb**)	**408 kg** (**900 lb**)	**136 kg** (**300 lb**)
	16/31 split row 16/32 split row 24R20 24R22	**408 kg** (**900 lb**)	**816 kg** (**1800 lb**)	**476 kg** (**1050 lb**)	**68 kg** (**150 lb**)
2150	12R30	**91 kg** (**200 lb**)	**816 kg** (**1800 lb**)	**136 kg** (**300 lb**)	**45 kg** (**100 lb**)
	16R30	**91 kg** (**200 lb**)	**408 kg** (**900 lb**)	**136 kg** (**300 lb**)	**45 kg** (**100 lb**)
	24R30	**91 kg** (**200 lb**)	**272 kg** (**600 lb**)	**136 kg** (**300 lb**)	**45 kg** (**100 lb**)
2150S	12/23 split row 12/24 split row 16/31 split row 16/32 split row	**91 kg** (**200 lb**)	**590 kg** (**1300 lb**)	**136 kg** (**300 lb**)	**45 kg** (**100 lb**)
	24R20	**91 kg** (**200 lb**)	**408 kg** (**900 lb**)	**136 kg** (**300 lb**)	**45 kg** (**100 lb**)

If you press the help “?” icon in the “Wing Down Force Ctrl” window, a table appears showing you the recommended settings for wing down force based upon the row unit down force range for your planter. This example is for a model 2150 planter.



RAPH21PLM1524BA 4

Subframe down force control: 2150S planters

The subframe down force system provides additional usable weight to the offset bars to allow higher levels of row unit down force in hard soil conditions.

The system consists of hydraulic cylinders that mount between the wing toolbars and the offset bars. The subframe down force system controls a pressure control valve to adjust the hydraulic flow to the cylinders while monitoring feedback from a pressure sensor.

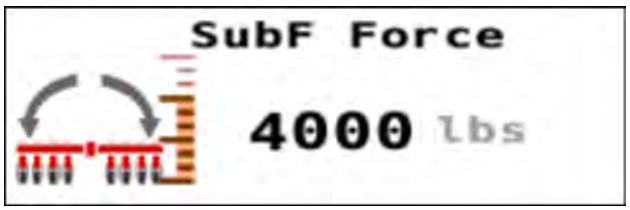
NOTE: *The subframe down force system removes the load on the offset bars during headland turns to minimize soil disturbance. The subframe down force system automatically reapplies the load when the frame transitions through the "Start Plant" height when exiting the headland.*

Use the "Subframe Down Force Control" window to enter the number of pounds to be added to the offset bar. The subframe down force system calculates and controls to the pressure required to maintain the set target subframe down force.

The recommended setting for subframe down force is based on the expected row unit down force requirements. Press the help "?" icon in the "Subframe Down Force Ctrl" window to see the recommended settings for your planter. You can also use the tables in the next section to select the proper subframe down force setting based on row unit down force. Locate the row unit down force value at the top of the table and then set the "Subframe Down Force Control" window to the applicable value in the table. See "Subframe down force control setup: 2150S planters" (**4-157**) for more information.

NOTE: *For split row planters, the display automatically turns subframe down force OFF when the split rows are raised. The weight of the raised rows is typically adequate to keep the planting rows down. If you require additional subframe down force, use the "Subframe Down Force Control" window to turn subframe down force back ON.*

The "SubF Force" window gives the currently applied sub-frame down force.



RAPH22PLM1846AA 1

Subframe down force control setup: 2150S planters

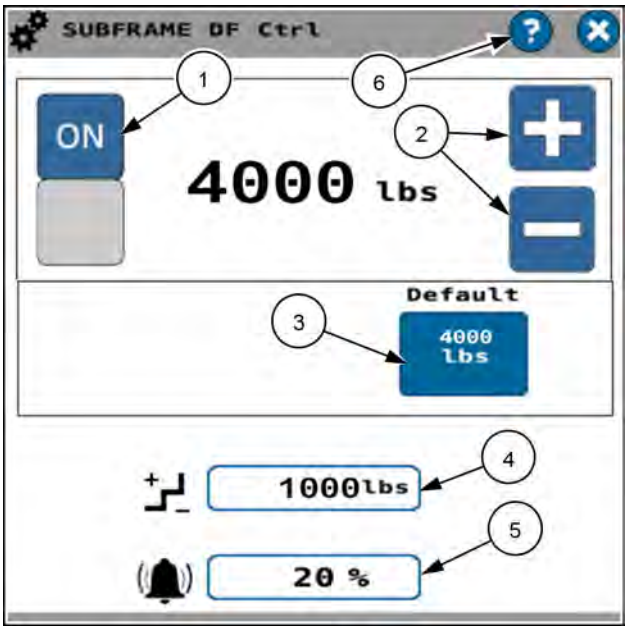
There is a single “SubF DF Ctl” window to set the rate for the subframe down force on the planter.

NHIL21PLM0164AA 1

The frame operation must be in “Plant” mode to use subframe down force control. If the field in the “SubF DF Ctl” window is pressed when frame operation is not in “Plant” mode, a warning appears. The warning states, “Wing Down Force Control Not Available. Operation mode must be set to “Plant” in Frame Op window on page 1 of the object pool.” See “Introduction: frame control” (**4-50**) and subsequent sections for more information on frame control.

Press the field to open the “SubF DF Ctl” window.

Press the ON/OFF soft toggle **(1)** to turn subframe down force control ON. The soft toggle shows the current state, so if the toggle reads, “OFF,” subframe down force control is OFF.



NHIL21PLM0168AA 2

Press the ON/OFF soft toggle **(1)** to turn subframe down force control ON. The soft toggle shows the current state, so if the toggle reads, “OFF,” subframe down force control is OFF.

Use the “+” and “-” buttons **(2)** to increase or decrease the subframe down force setting.

You can also press the “Default” button **(3)** to configure the subframe down force control to the default setting for your planter.

Press the help icon **(6)** to see the recommended subframe down force settings based upon row unit down force range.

You can use the step control **(4)** to adjust the amount of the increment that the setting will change by when you adjust it.

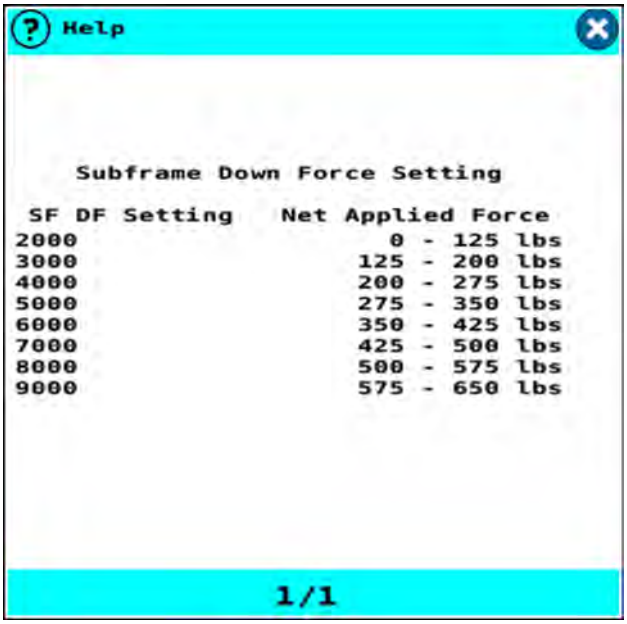
The alarm limit **(5)** is the percentage above or below the target allowable before triggering the “Subframe DF Ctrl” alarm. Press the alarm limit field to adjust the alarm limit setting.

The default values and ranges are listed below.

Model	Minimum	Maximum	Default	Step size
12/23 split row 12/24 split row	**454 kg** (**1000 lb**)	**2041 kg** (**4500 lb**)	**907 kg** (**2000 lb**)	**227 kg** (**500 lb**)
16/31 split row 16/32 split row	**454 kg** (**1000 lb**)	**3175 kg** (**7000 lb**)	**907 kg** (**2000 lb**)	**454 kg** (**1000 lb**)
24R20	**907 kg** (**2000 lb**)	**4082 kg** (**9000 lb**)	**1814 kg** (**4000 lb**)	**454 kg** (**1000 lb**)

If you press the help “?” icon in the “Subframe DF Ctrl” window, a table appears showing you the recommended settings for subframe down force based upon the row unit down force range for your planter. The example shown is for the 24R20 model 2150S planter.

You can also use the tables below.



NHIL21PLM0169AA 3

Subframe down force values – 2150S 12/23 row and 12/24 row

Subframe down force setting	Average net applied row unit downforce
1000	**0 – 57 kg (0 – 125 lb)**
1500	**57 – 91 kg (125 – 200 lb)**
2000	**91 – 125 kg (200 – 275 lb)**
2500	**125 – 159 kg (275 – 350 lb)**
3000	**159 – 1933 kg (350 – 425 lb)**
3500	**193 – 227 kg (425 – 500 lb)**
4000	**227 – 261 kg (500 – 575 lb)**
4500	**261 – 295 kg (575 – 650 lb)**

Subframe down force values – 2150S 16/31 row and 16/32 row

Subframe down force setting	Average net applied row unit downforce
1000	**0 – 23 kg (0 – 50 lb)**
2000	**23 – 68 kg (50 – 150 lb)**
3000	**68 – 113 kg (150 – 250 lb)**
4000	**113 – 159 kg (250 – 350 lb)**
5000	**159 – 204 kg (350 – 450 lb)**
6000	**204 – 250 kg (450 – 550 lb)**
7000	**250 – 295 kg (550 – 650 lb)**

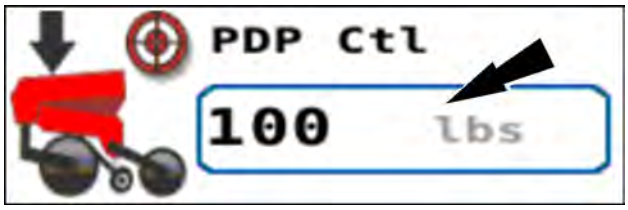
Subframe down force values – 2150S 24R20

Subframe down force setting	Average net applied row unit downforce
2000	**0 – 57 kg (0 – 125 lb)**
3000	**57 – 91 kg (125 – 200 lb)**
4000	**91 – 125 kg (200 – 275 lb)**
5000	**125 – 159 kg (275 – 350 lb)**
6000	**159 – 1933 kg (350 – 425 lb)**
7000	**193 – 227 kg (425 – 500 lb)**
8000	**227 – 261 kg (500 – 575 lb)**
9000	**261 – 295 kg (575 – 650 lb)**

Pneumatic Down Pressure (PDP) control

You control the Pneumatic Down Pressure (PDP) across the entire planter. To adjust the down force on individual rows you view the resultant load cell feedback in the same page and adjust the PDP Down Force setting. The PDP system only has load cells on a representative number of row units.

Find the “PDP Ctl” window in page 3 of the object pool. Use the “PDP Ctl” window to set the target rate for the Pneumatic Down pressure (PDP) in kilograms or pounds.



RAIL20PLM1192AA 1

The valid range is **0 – 181 kg** (**0 – 400 lb**).

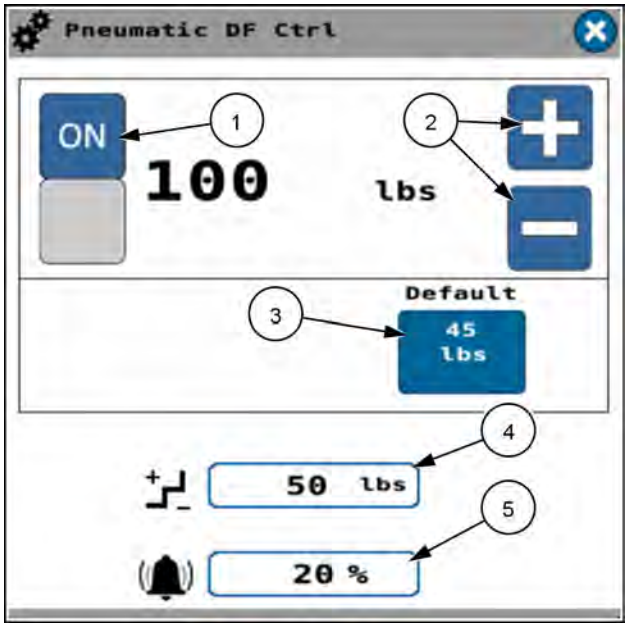
Press the button in the “PDP Ctl” window to set the target down force across the entire planter in kilograms or pounds.

Press the ON/OFF soft toggle **(1)** to turn pneumatic down pressure control ON and OFF. The soft toggle shows the current state, so if the toggle reads, “OFF,” wing down force control is OFF.

Press the ON/OFF soft toggle **(1)** to turn pneumatic down presssure control ON and OFF. The soft toggle shows the current state, so if the toggle reads, “OFF,” wing down force control is OFF.

Use the “+” and “-” buttons **(2)** to increase or decrease the pressure setting.

You can also press the “Default” button **(3)** to configure the pneumatic down pressure control to the default setting for your planter.

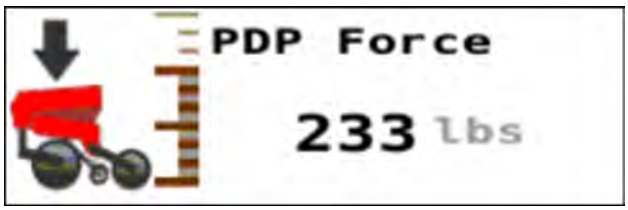


RAPH22PLM0880BA 2

You can use the step control **(4)** to adjust the amount of the increment that the setting will change by when you adjust it.

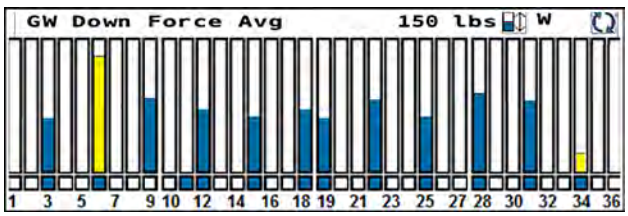
The alarm limit **(5)** is the percentage above or below the target allowable before triggering the “Wing DF Ctrl” alarm. Press the alarm limit field to adjust the alarm limit setting.

You can monitor the “PDP Force” window. The “PDP Force” window reports the total down force achieved by the Pneumatic Down Pressure (PDP) system.



RAIL20PLM1193AA 3

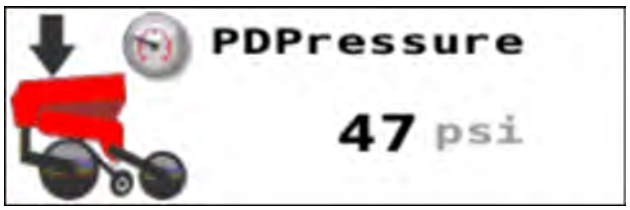
While adjusting the PDP force, monitor the down force in the gauge wheels using the “GW Down Force” Window. See “Pneumatic Down Pressure (PDP) monitoring” (**4-160**) for more information.



RAPH23PLM0209AA 4

Pneumatic Down Pressure (PDP) monitoring

You can monitor the pneumatic down pressure in the system using the “PDPressure” window.

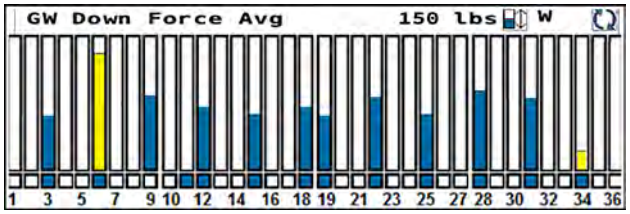


RAIL20PLM1196AA 1

Bar graphs

Monitor the following parameters for each row unit in the bar graph on page 3 of the object pool”

- Gauge Wheel (GW) force – Kilograms or pounds
- Ground contact percentage
- Good ride percentage



RAPH23PLM0209AA 2

Use the cycling icon  to navigate through the three parameters.

Gauge wheel (GW) down force

NOTE: *For proper averaging, the rows missing load cells should have them disabled in the active work condition. See the section “Work condition row disable” in “Work Condition Setup screen” (**3-80**)*

The “GW Down Force” window gives the average down force **(1)** across all row units.

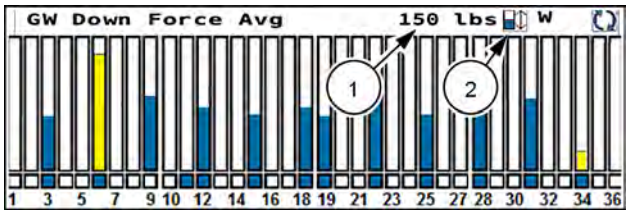
Use the scale icon **(2)** to choose between a normal scale and a wide scale for the bars in the bar graph. The icon gives a status of “N” for the normal scale and “W” for the wide scale. You configure the scaling levels in the “Implement Setup Adjustment” screen. See “Implement setup adjustment” (**3-35**).

For example:

If the down force control is configured to **68 kg** (**150 lb**), the normal scale level is configured to **14 kg** (**30 lb**), and the wide scale level is configured to **34 kg** (**75 lb**):

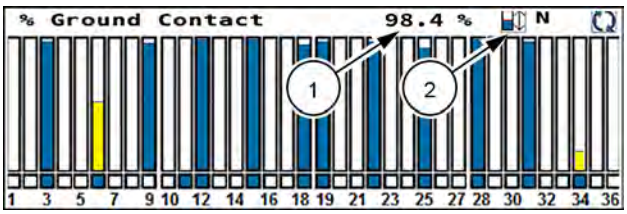
- Normal scale: The red line = **68 kg** (**150 lb**). The bar graph bottom = **54 kg** (**120 lb**). The bar graph top = **82 kg** (**180 lb**).
- Wide scale: The red line = **68 kg** (**150 lb**). The bar graph bottom = **34 kg** (**75 lb**). The bar graph top = **102 kg** (**225 lb**).

A bar changes to yellow in a row if the measured down force exceeds the alarm percentage. You configure the down force alarm percentage in the implement setup adjustments. See “Implement setup adjustment” (**3-35**).



RAPH23PLM0209AA 3

Ground contact percentage



RAPH23PLM0210AA 4

The “% Ground Contact” window gives the average ground contact percentage **(1)** across all row units.

There is no red line in the “% Ground Contact” bar graph. The top of the bar graph is always **100%**. The bottom of the bar graph is the minimum value that you establish using the scale icon **(2)**. The icon gives a status of “N” for the normal scale and “W” for the wide scale.

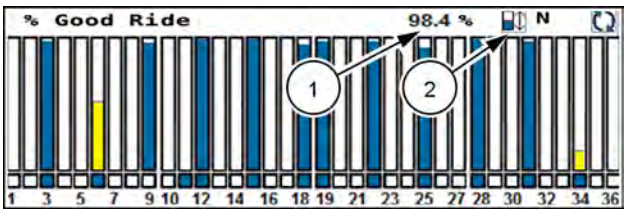
You configure the normal and wide scale percentages in the implement setup adjustments. See “Implement setup adjustment” (**3-35**).

Example:

- The normal scale establishes the bottom of the bar graph at **90%**.
- The wide scale establishes the bottom of the bar graph at **70%**.

A bar changes to yellow if the ground contact percentage exceeds the alarm percentage that you configure in the implement setup adjustments. See “Implement setup adjustment” (**3-35**).

Good ride percentage



RAPH23PLM0211AA 5

The “% Good Ride” window gives the average good ride percentage **(1)** across all row units.

There is no red line in the “% Good Ride” bar graph. The top of the bar graph is always **100%**. The bottom of the bar graph is the minimum value that you establish using the scale icon **(2)**. The icon gives a status of “N” for the normal scale and “W” for the wide scale.

You configure the normal and wide scale percentages in the implement setup adjustments. See “Implement setup adjustment” (**3-35**).

Example:

- The normal scale establishes the bottom of the bar graph at **90%**.
- The wide scale establishes the bottom of the bar graph at **70%**.

A bar changes to yellow if the ground ride percentage exceeds the alarm percentage that you configure in the implement setup adjustments. See “Implement setup adjustment” (**3-35**).

Section view

If you press a section in any of the bar graph windows, the view zooms to show that section only.

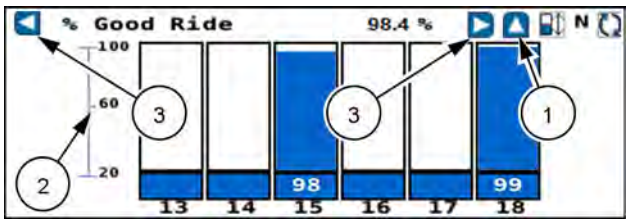
The bar graph behavior and controls are the same as in the all-row bar graph view.

Press the return button **(1)** to return to the all rows view.

The scale legend **(2)** gives the currently applied minimum and maximum scale.

Use the left and right-arrows **(3)** to navigate between sections.

This example gives the section view of the “GW Down Force” window. The “% Ground Contact” section view is similar.



RAPH23PLM0212AA 6

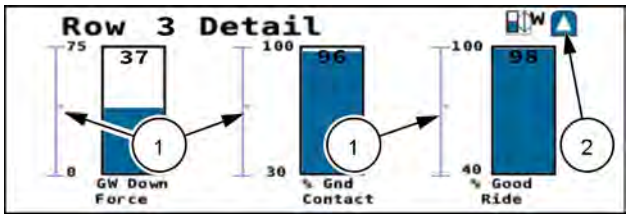
Row view

If you press a row in any of the section views, a bar graph with both down force parameters for the selected row appears.

The bar graph behavior is the same as in the all-row and section views.

Scale legends **(1)** for each bar give the currently applied minimum and maximum scales.

Press the return button **(2)** to see the section view that contains the currently selected row.



RAPH23PLM0213AA 7

CROP RESIDUE MANAGEMENT

Pneumatic cleaner control

The hydraulic air compressor provides air pressure for the pneumatic cleaner system.

Press the ON/OFF button in the “Compressor” window to turn ON the compressor.

RAPH23PLM0214AA 1

You can monitor the air compressor pressure in the “Compressor” window.

The acceptable range is **0 – 999 kPa** (**0 – 145 psi**).

RAIL20PLM1195AA 2

You can use the display to command the pneumatic cleaner system to adjust the ride of the residue managers.

Find the cleaner control and monitoring windows on page 2 of the object pool.

Use the “Cleaner Mode” window to select one of four cleaner operating modes:

- “Float” mode allows the residue managers to float with no active control.
- “Down” mode allows you to add down pressure to the residue manager for tougher no-till conditions.
- “Lift” mode allows you to lift the residue managers in soft field conditions with less residue.
- “Full Lift” mode allows you to fully lift the residue managers.

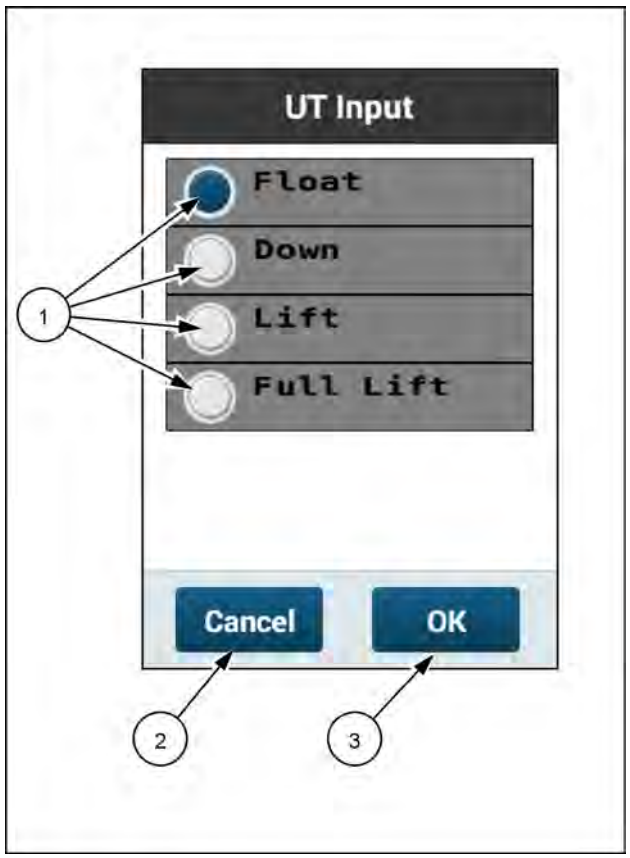
Press the button in the “Cleaner Mode” window to access the pop-up options window.

RAPH21PLM3099AA 3

Press the radio button **(1)** for the desired cleaner operating mode.

Press the “Cancel” button **(2)** to cancel configuring the cleaner operating mode.

Press the “OK” button **(3)** to continue configuring the cleaner.



RAIL20PLM1721BA 4

Cleaner “Down” mode

Use the “Cleaner Control” window to set the target down pressure for the pneumatic cleaner system in kPa or psi.

Press the button in the “Cleaner Ctl” window.

Use the input window and keypad that appear to enter the desired pressure.

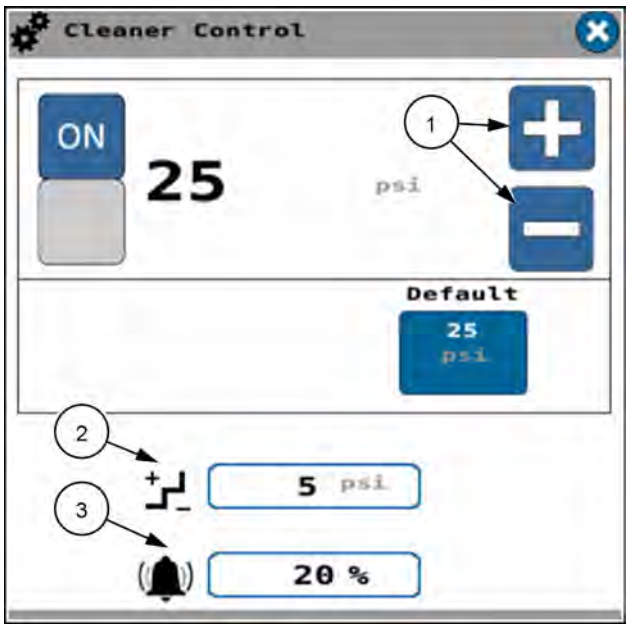
The valid range is from **0 – 517 kPa** (**0 – 75 psi**).

Use the “+” or “-” buttons **(1)** to adjust the pressure.

You can adjust the stepper control **(2)** to change the stepper increments.

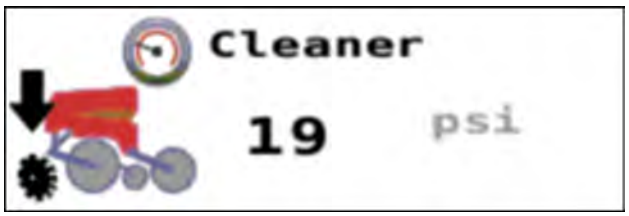
Use the alarm setting **(3)** to set the threshold that will generate an alarm when the cleaner pressure differs from the configured pressure by the configured percentage.

RAPH22PLM0025AA 5



RAPH21PLM2594BA 6

The “Cleaner” window reports the measured pressure from the cleaning system pressure transducers.



RAPH21PLM3106AA 7

Cleaner “Lift” mode

RAPH22PLM0026AA 8

Use the “Cleaner Control” window to set the target down pressure for the pneumatic cleaner system in kPa or psi.

Press the button in the “Cleaner Ctl” window.

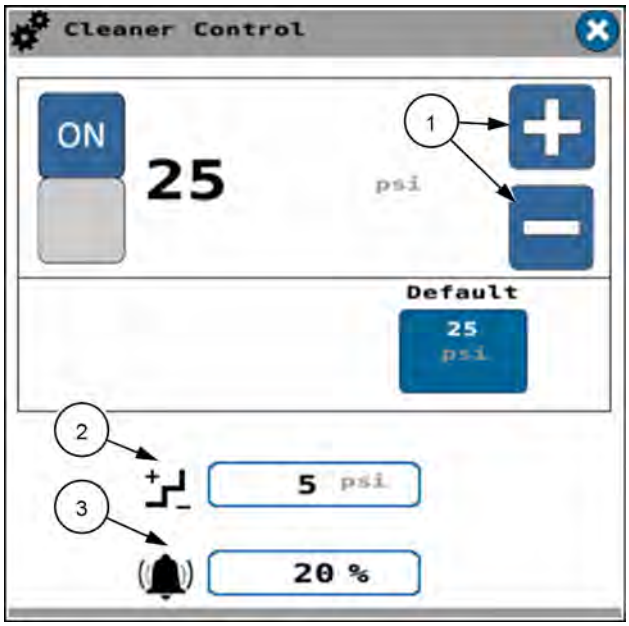
Use the input window and keypad that appear to enter the desired pressure.

The valid range is from **0.0 – 517 kPa** (**0.0 – 75 psi**).

Use the “+” and “-” buttons **(1)** to adjust the pressure.

You can adjust the stepper control **(2)** to change the stepper increments.

Use the alarm setting **(3)** to set the threshold that will generate an alarm when the cleaner pressure differs from the configured pressure by the configured percentage.



RAPH21PLM2594BA 9

The “Cleaner” window reports the measured pressure from the cleaning system pressure transducers.

RAPH21PLM3107AA 10

Cleaner “Full Lift” mode

The “Full Lift” mode provides the necessary lift pressure to lift the residue manager.

Though the operator cannot control the pressure, it is set to **689 kPa** (**100 psi**) and will raise the cleaners to their maximum raise position. The “Cleaner Ctl” window indicates dashes for pressure.

RAPH22PLM0027AA 11

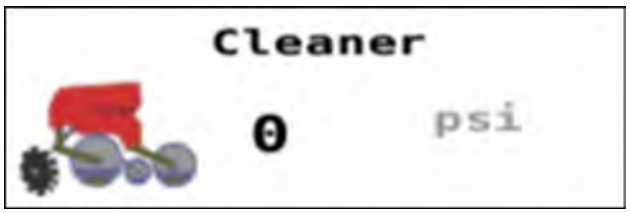
RAPH21PLM3102AA 12

Cleaner “Float” mode

In the “Float” mode there is no active pneumatic control of the residue manager. It floats.

You cannot control the pressure. The “Cleaner Ctl” window indicates zero for pressure.

RAPH21PLM3099AA 13



RAPH21PLM3098AA 14

Pneumatic closer control

The hydraulic air compressor provides air pressure for the pneumatic cleaner system.

Press the ON/OFF button in the “Compressor” window to turn ON the compressor.

RAPH23PLM0214AA 1

You can monitor the air compressor pressure in the “Compressor” window.

The acceptable range is **0 – 999 kPa** (**0 – 145 psi**).

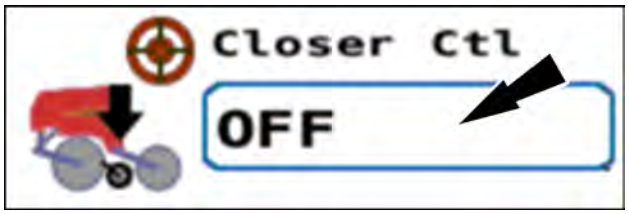
RAIL20PLM1195AA 2

Use the “Closer Ctl” window to set the target down pressure for the pneumatic closer system in kPa or psi.

Press the button in the “Closer Ctl” window.

Use the input window and keypad that appear to enter the desired pressure.

The valid range is from **0 – 517 kPa** (**0 – 75 psi**).

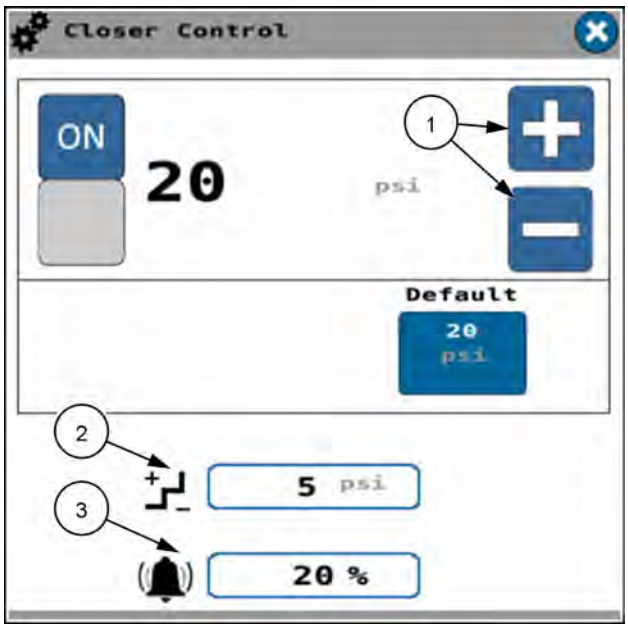


RAPH21PLM3095AA 3

Use the “+” and “-” buttons **(1)** to adjust the pressure.

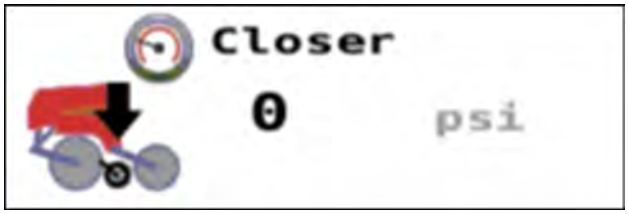
You can adjust the stepper control **(2)** to change the stepper increments. The control brings up an input window with a keypad for entering the values.

Use the alarm setting **(3)** to set the threshold that will generate an alarm when the closer pressure differs from the configured pressure by the configured amount. The control brings up an input window with a keypad for entering the values.



RAPH21PLM2595BA 4

The “Closer” window reports the measured pressure from the closing system pressure transducer.



RAPH21PLM3096AA 5

BULK FILL LIGHTS CONTROL

Bulk fill or work lights control

NOTE: *Planter models with bulk fill capability have a "B.F. Lights" option in the "Planter Setup" screen. Planter models that do not have bulk fill capability have a "Work Lights" option in the "Planter Setup" screen. The "B.F. Lights" and "Work Lights" options operate similarly.*

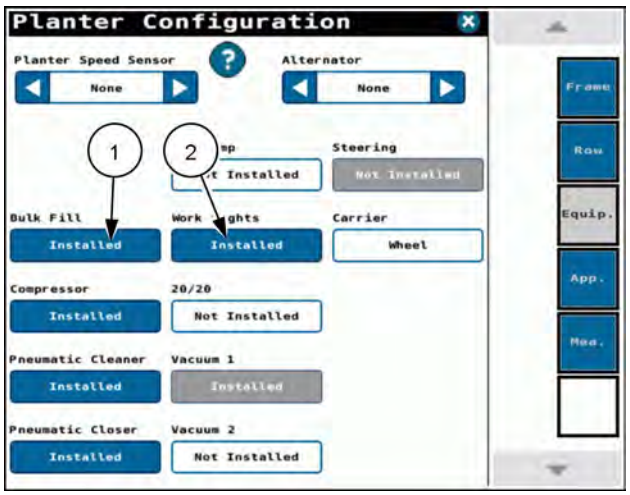
Press the "main menu" button on the home screen.

From the settings tab, select "Planter Configuration".

If the planter has bulk fill lights, verify that "Bulk Fill" **(1)** and "Work Lights" **(2)** are set to "Installed" in the "Planter Configuration" screen. .

In planter models that do not have the bulk fill feature, verify that the "Work Lights" option **(2)** is set to "Installed".

NOTE: *Some planters have a switch on the ladder to control the bulk fill lights. On planters with no bulk fill option, the work lights switch is on the side of the work lights bracket. See the operating manual for your planter for more details.*



NHPH25PLM0534BA 1

Find the “BF Light Ctl” or “Work Lights” window on page 5 of the object pool.

When neither the “On” button nor the “Auto” button is selected in the “BF Light Ctl” or “Work Lights” window, the lights remain OFF regardless of frame position, frame mode, or speed.

When you select the “On” button in the “BF Light Ctl” or “Work Lights” window, the lights are always ON when the planter is in plant mode.

When you select the “Auto” button in the BF Light Ctl” or “Work Lights” window and:

- the frame position is not in “Plant” mode, the lights remain OFF.
- the frame position is in “Plant” mode, and the ground speed is less than **1.6 km/h** (**1.0 mph**), the lights are ON.
- the frame position is in “Plant” mode, and the ground speed is greater than or equal to **1.6 km/h** (**1.0 mph**), the lights are OFF.

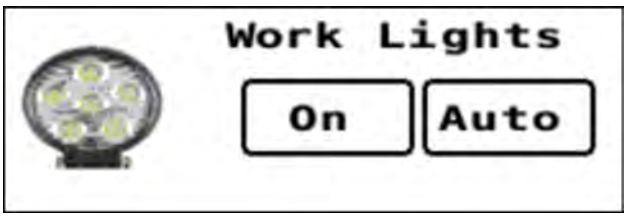
Bulk fill lights

RAPH23PLM0219AA 2

RAPH23PLM0220AA 3

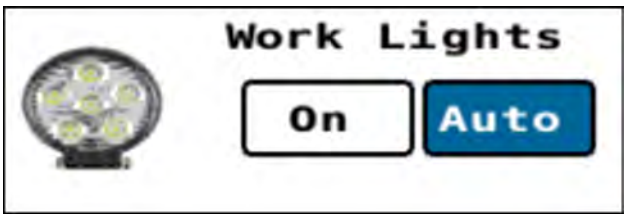
RAPH23PLM0221AA 4

Work lights



RAPH23PLM0216AA 5

RAPH23PLM0217AA 6



RAPH23PLM0218AA 7

PRIMING

Prime control

Use the “Prime” window to prime the seed disks and liquid drives. The “Prime” window is on page 3 of the object pool in the Universal Terminal (UT). Priming the product drives is particularly beneficial:

- When restarting after the vacuum fan was turned OFF – prime the seed meters to refill the seed disks with seed before planting

NOTE: *It may be necessary to press the “Prime” button several times to completely fill the seed disk, depending on the applied rate selected.*

NOTE: *Priming affects all enabled products. For example, if only the seed meters require priming, liquid control can momentarily be turned off in its application control window.*

Place the “Frame Op” window into the “Plant” position. See “Introduction: frame control” (**4-50**) and the frame control section for your planter.

Turn the alternator ON. See “Alternator speed control” (**4-46**).

Turn ON the vacuum fans. See “Vacuum fan control” (**4-38**) for instructions.

Turn on the bulk fill fan. See “Bulk fan control” (**4-42**) for instructions.

Use the row clutch control window to enable or disable planter sections. See “Row clutch control windows” (**4-31**).

Press and hold the “Start” button **(1)** in the “Planter Sys” window on page 1 of the object pool for approximately **5 s** to start the planter and prime all of the enabled products on all enabled planter sections. The prime sequence initiates.

NOTE: *You can also use the “Prime” window* ***(2)*** *if needed to initiate the priming sequence. CASE IH recommends using the “Planter Sys” window. Use “Prime” window only as required for your operation.*

RAPH21PLM1059AA 1

RAIL20PLM1155AA 2

If you attempt to turn ON prime control when the “Frame Op” window setting is not in “Plant” mode, a warning message appears.

The warning message states, “Prime Control Not Available. Operation mode must be set to ‘Plant’ in Frame Operations to perform selected function.” Press the “OK” button to acknowledge the message. Place the frame into plant mode. Then start the prime procedure again.

RAPH21PLM2612BA 3

While priming is in progress, the icon in the “Prime” window shows a flashing hourglass. The “Prime” button turns blue.

NOTE: *You can press the blue “Prime” button to cancel priming.*

RAIL20PLM1156AA 4

After a successful priming sequence, a green check mark appears. The “Prime” button turns white.

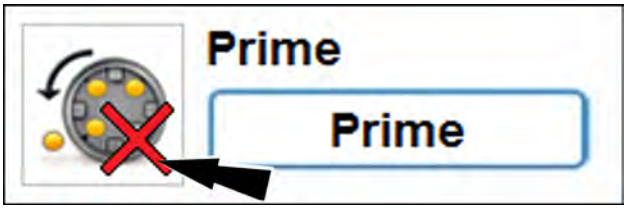
RAIL20PLM1157AA 5

After an unsuccessful priming sequence, a red “X” appears. The “Prime” button turns white.

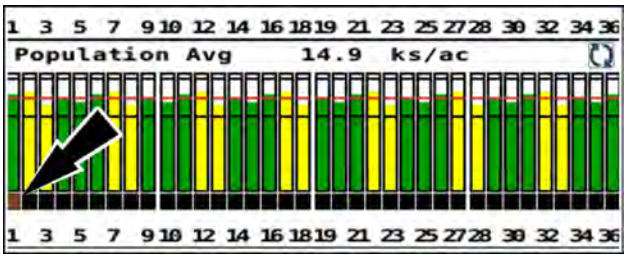
NOTE: *If a row fails the priming function, the row status box in the “Population” seed bar graph appears brown.*

Investigate the cause.

NOTE: *It may be necessary to press the “Prime” button several times to completely fill the seed disk, depending on the applied rate selected.*



RAIL20PLM1158AA 6



RAPH21PLM1060AA 7

5 - TROUBLESHOOTING

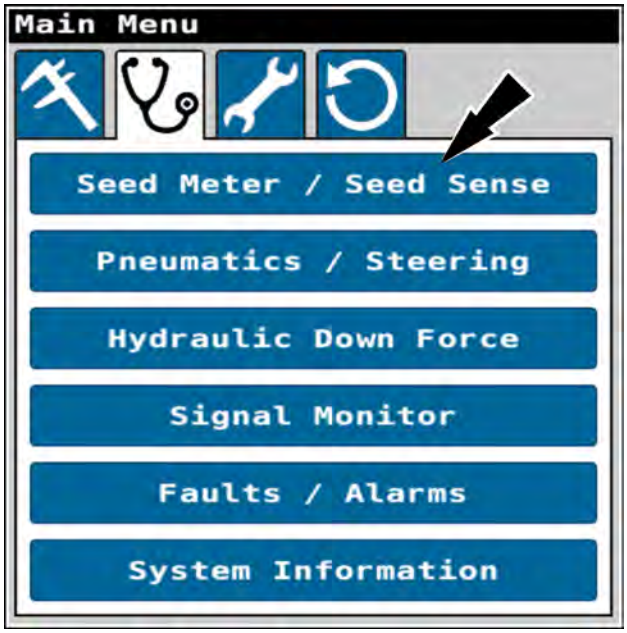
SEED METER / SEED SENSE DIAGNOSTICS

"Seed Meter / Seed Sense" screen

Press the “main menu” button on the home screen.

Select the “Diagnostics” tab.

Press the “Seed Meter/Seed Sense” menu option.



RAPH23PLM1126BA 1

Seed meter

The “Seed Meter / Seed Sense” screen appears.

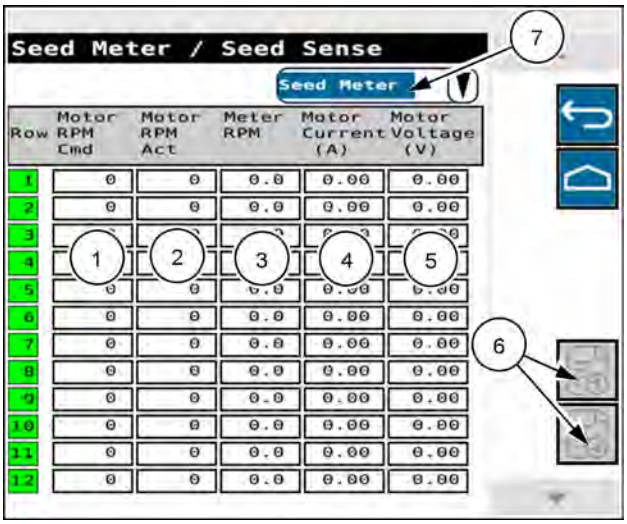
The “Seed Meter / Seed Sense” screen provides information for each row of the planter.

Use the navigation buttons **(6)** if necessary to scroll through the rows. If a navigation button is blue, more rows are available in the indicated direction.

The “Seed Meter” view provides the following parameters:

- Commanded motor RPM **(1)**
- Actual motor RPM **(2)**
- Meter RPM **(3)**
- Motor current **(4)**
- Motor voltage **(5)**

Press the view selection menu **(7)** to obtain other views.



RAPH21PLM2616BA 2

View selection menu

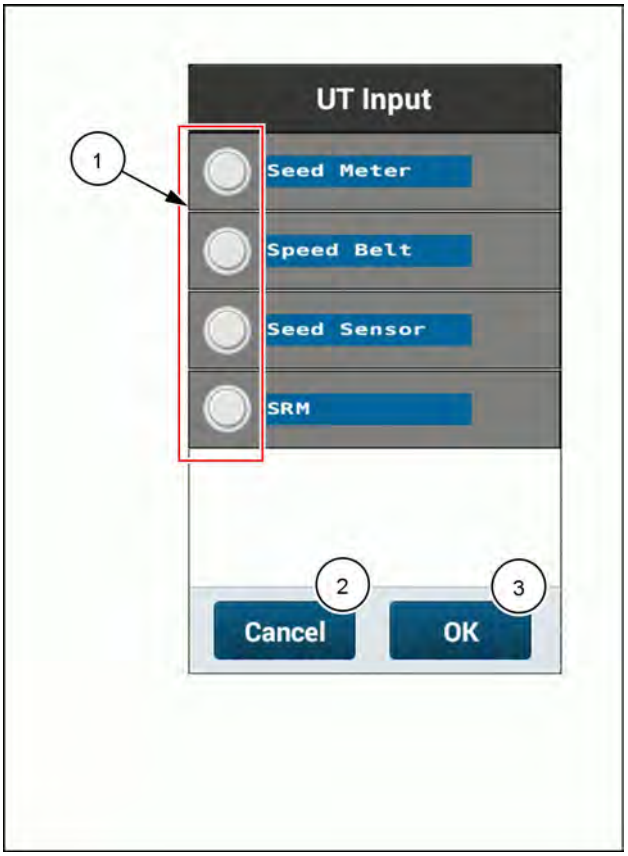
The view selection menu provides the following views:

- “Seed Meter”
- “Speed Belt”
- “Seed Sensor”
- “SRM”

Press the radio button **(1)** for the view you wish to open.

Press the “Cancel” button **(2)** to close the menu without changing the view.

Press the “OK” button **(3)** to select the desired view and close the menu.

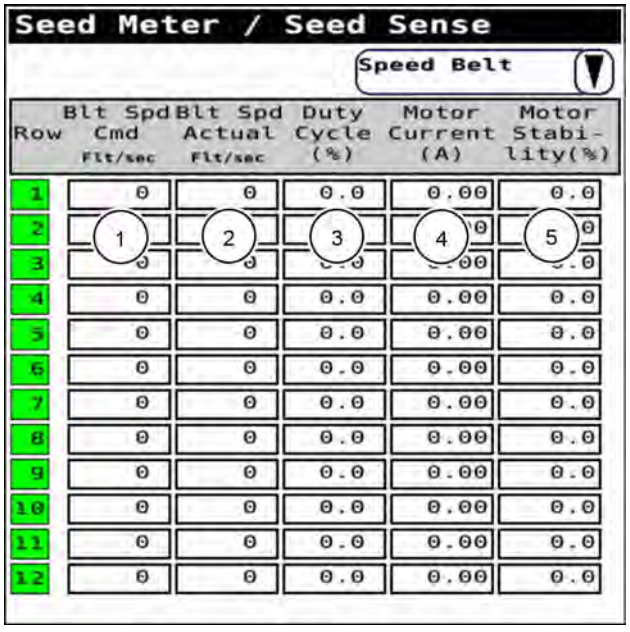


NHPH25PLM0535BA 3

Speed belt

The “Speed Belt” view provides the following parameters:

- Commanded belt speed **(1)**
- Actual belt speed **(2)**
- Duty cycle **(3)**
- Motor current **(4)**
- Motor stability **(5)**

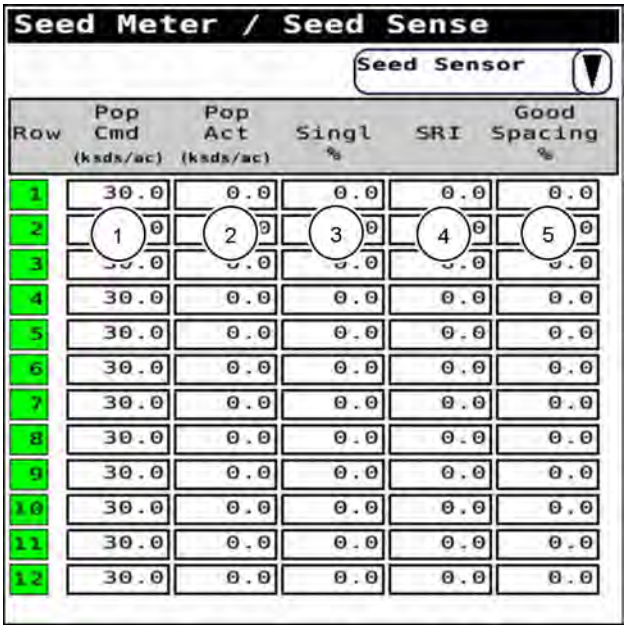


RAIL20PLM1738BA 4

Seed sensor

The “Speed Belt” view provides the following parameters:

- Commanded population **(1)**
- Actual population **(2)**
- Singulation percentage **(3)**
- Seed Release Index (SRI) **(4)**
- Good spacing percentage **(5)**



RAIL20PLM1739BA 5

Single Row Module (SRM)

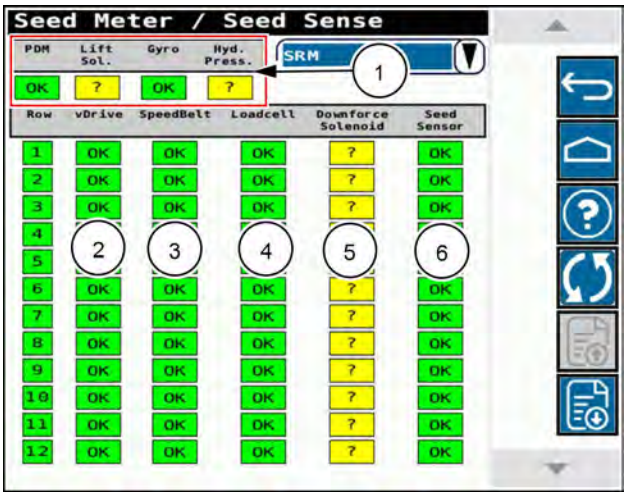
The “SRM” view provides the system status of the following **(1)**:

- PDM
- Lift Solenoid
- Gyro
- Hydraulic Pressure

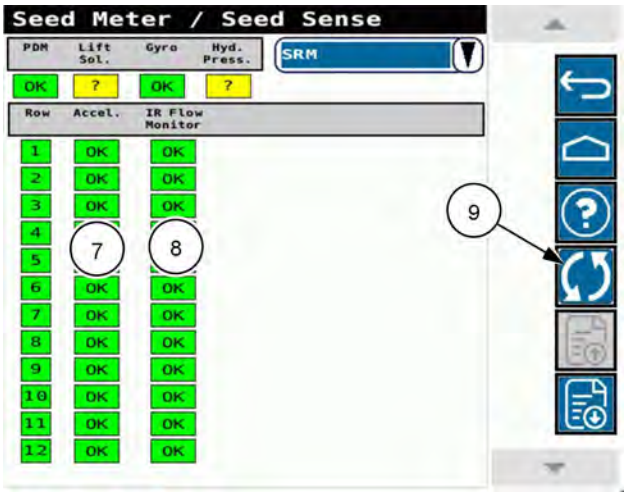
The “SRM” view provides the individual row status of the following:

- vDrive **(2)**
- Speedbelt **(3)**
- Loadcell **(4)**
- Downforce solenoid **(5)**
- Speed sensor **(6)**
- Accel. **(7)**
- IR flow monitor **(8)**

Press the button **(9)** to cycle between menu screens.

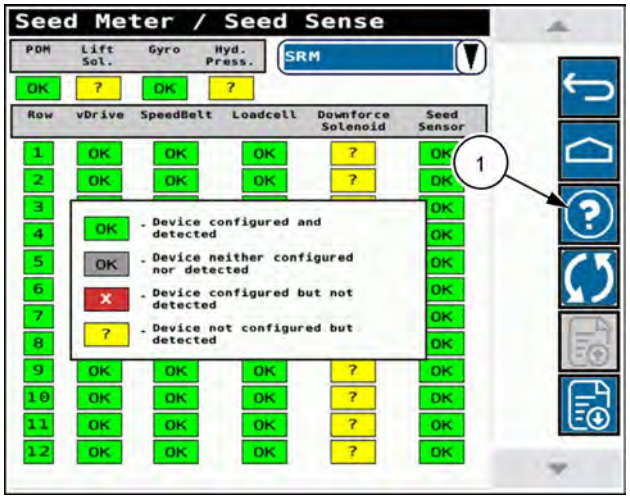


NHPH25PLM0537BA 6



NHPH25PLM0538BA 7

Press the “?” button **(1)** to view the status descriptions.

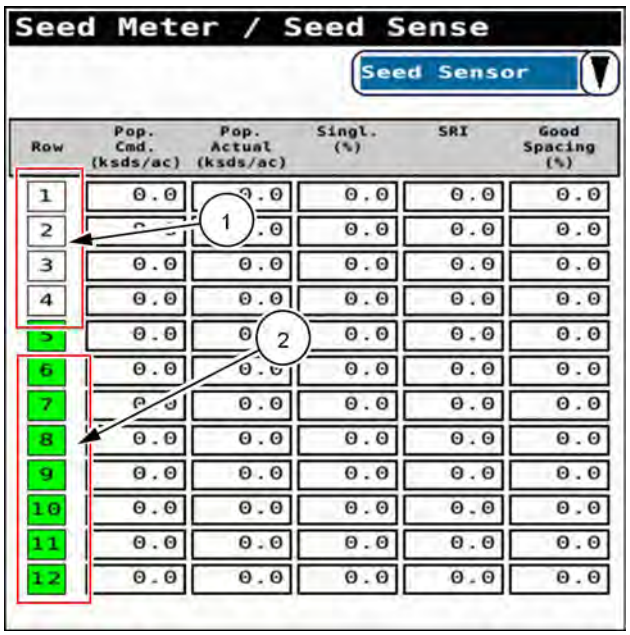


NHPH25PLM0539BA 8

Row offline

A green label **(1)** indicates that the row unit is online and functional.

A white label **(2)** indicates that the row unit is offline.



NHPH25PLM0536BA 9

PNEUMATICS / STEERING DIAGNOSTICS

"Pneumatic Diagnostic" screen

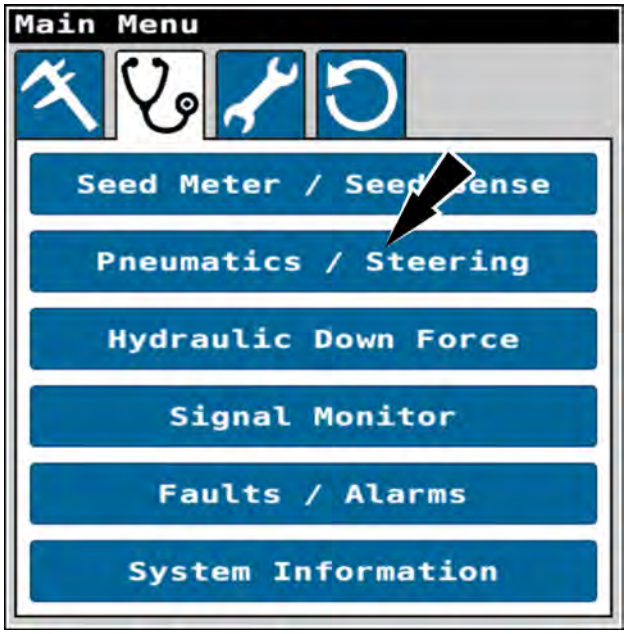
On equipped planters, you can override the pneumatic compressor if it runs for more than ten minutes before reaching the set pressure.

The compressor turns ON when the tank pressure sensor signal level indicates a pressure below **827 kPa** (**120 psi**). The compressor turns OFF when the pressure rises to **1000 kPa** (**145 psi**). If the compressor has run continuously for **10.0 min** without reaching the shut-off pressure, the compressor timeout alarm is triggered. To continue running, you must override the compressor shut-off. You are permitted to do this three consecutive times. After the third time, the compressor will be locked out until the system is restarted.

Press the “main menu” button on the home screen.

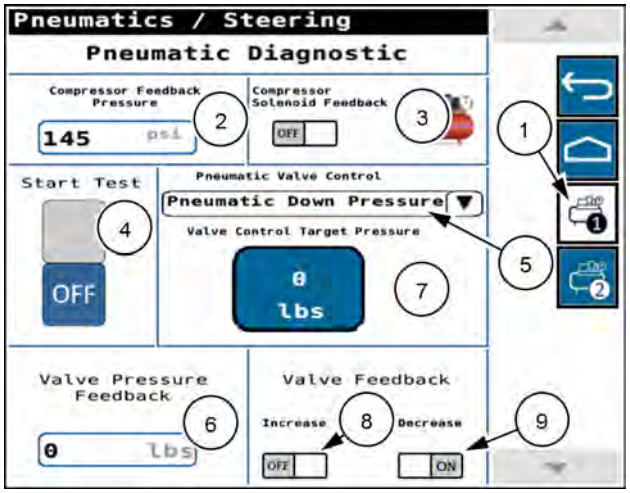
Select the “Diagnostics” tab.

Press the “Pneumatics/Steering” menu option.



RAPH23PLM1126BA 1

Press the pneumatics tab 1 button **(1)** to open the “Pneumatics Diagnostics” screen 1.



RAPH22PLM0883BA 2

See the table below for the functions of the “Pneumatic Diagnostic” test screen.

When entering this screen, the currently set pressure values for each pneumatic system available on the planter will be saved if those values have been entered in the working condition.

If you have set the pressure for the system in the working condition, use those values to populate the Valve Control Target Pressure. Otherwise, the Valve Control Target Pressure is populated with a middle range pressure value as given in the table below.

When you press the Valve Control Target Pressure button, a keyboard popup appears to enter or change the target pressure for the system currently under test. Changes to the target pressure are saved when exiting or returning to the screen and over power cycles.

When you turn ON the “Start Test” switch, the system controls the valves to match the target pressure. When you turn OFF the “Start Test” switch, the screen provides feedback on the valves and pressures but does not control the valves.

When you exit the diagnostics, the system restores the values stored for each pneumatic system and returns the system to the pretested state.

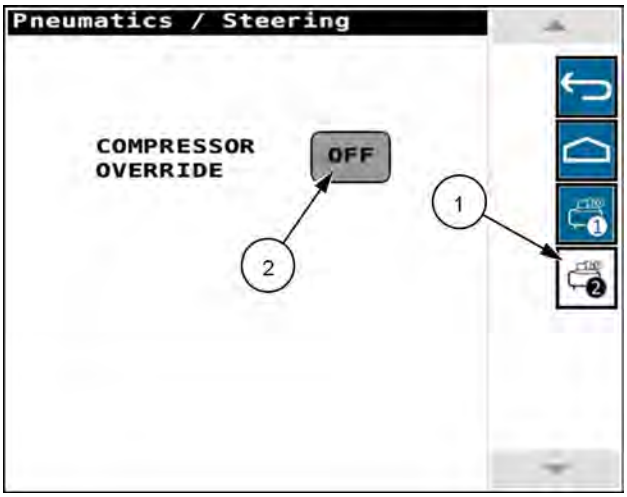
	Item	Description	Data values	Data range	Default
2	Compressor feedback pressure	Shows the current pressure in the compressor tank	Pressure in kPa or psi	**0.0 – 1000 kPa** (**0.0 – 145 psi**)	Zero
3	Compressor Solenoid Feedback	Shows state of the solenoid for increasing pressure. ON or OFF.	Not applicable	ON/OFF	OFF
4	Start Test	Direct toggle switch manual control to turn ON or OFF the Test diagnostic mode for the valve that is currently selected from the pull-down menu.	Not applicable	ON/OFF	OFF
5	Pneumatic Valve Control	Pull down menu of available valves on the planter.	"Pneumatic Down Pressure", "Cleaner Down Pressure", "Cleaner Lift" or "Closer Down Pressure"	Not applicable	When first used the default value will be the first available item in the list. However, if an item had been previously selected that item will be saved and shown when the user returns to this screen

	Item	Description	Data values	Data range	Default
6	Valve Pressure	Shows the current pressure of the valve selected in the list view.	"Cleaner Down Pressure", and "Closer Down Pressure": **0 – 517 kPa** (**0 – 75 psi**) Pneumatic Down Pressure" and "Cleaner Lift": **0 – 931 kPa** (**0 – 135 psi**)	**0 – 517 kPa** (**0 – 75 psi**), **0 – 931 kPa** (**0 – 135 psi**)	Zero
7	Valve Control Target Pressure	Adjust the target pressure of the current valve under test.	"Cleaner Down Pressure", and "Closer Down Pressure": **0 – 517 kPa** (**0 – 75 psi**) Pneumatic Down Pressure" and "Cleaner Lift": **0 – 931 kPa** (**0 – 135 psi**)	**0 – 517 kPa** (**0 – 75 psi**), **0 – 931 kPa** (**0 – 135 psi**)	Use saved values if available from the working condition, otherwise use mid-Range pressures for the system under test. Cleaner Down Pressure", and "Closer Down Pressure": **276 kPa** (**40 psi**) "Pneumatic Down Pressure" and Cleaner Lift": **483 kPa** (**70 psi**)
8	Valve Feed-back In-crease	Shows state of the valve for increasing pressure. ON or OFF.	Not applicable	ON/OFF	OFF
9	Valve Feed-back De-crease	Shows state of the valve for decreasing pressure. ON or OFF.	Not applicable	ON/OFF	OFF

NOTE: *Compressor override only appears when the compressor times out. The compressor times out when the compressor fails to turn off for* ***10 min*** *continuously. Once that happens, a popup will appear and this over ride button becomes selectable. This override can be used up to three times per key cycle before being locked out.*

Press the pneumatics tab 2 button **(1)** to open the “Pneumatics Diagnostics” screen 2.

Press the “Compressor Override” button **(2)** to override the compressor shutoff.



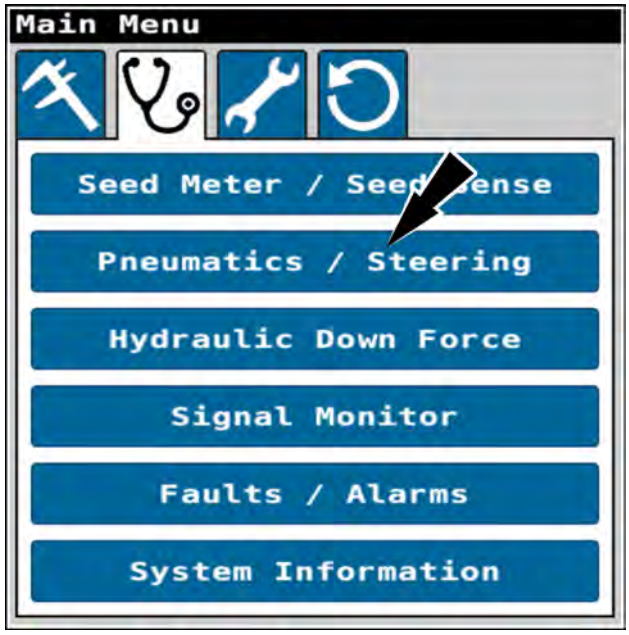
RAPH22PLM0884BA 3

Steering Diagnostics screen: 2160 model front fold planters

Press the “main menu” button on the home screen.

Select the “Diagnostics” tab.

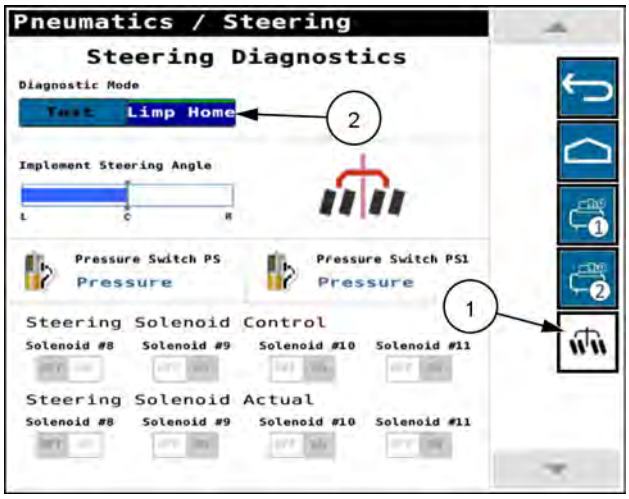
Press the “Pneumatics/Steering” menu option.



RAPH23PLM1126BA 1

Press the steering tab **(1)** to open the “Steering Diagnostics” screen.

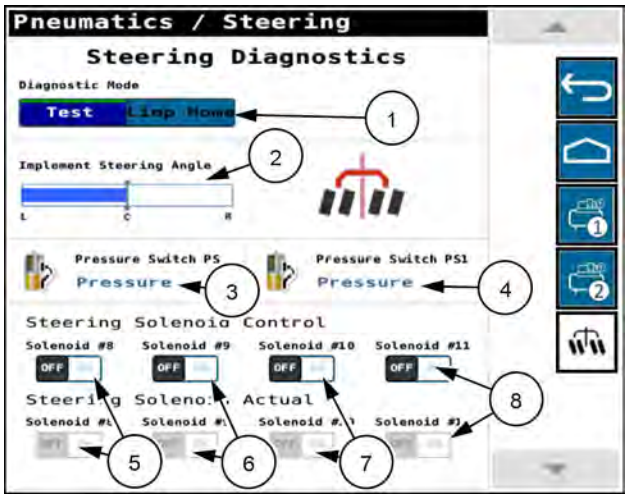
The “Diagnostics Mode” toggle **(2)** allows you to select the steering diagnostics mode of the planter: “Test” or “Limp Home.”



RAPH23PLM1128BA 2

See the table and figure below for descriptions of the controls and readouts.

Field Name	Description	Values
Diagnostic Mode **(1)**	The diagnostics mode switch toggles between “Test” or “Limp Home.”	“Test” or “Limp Home”
Implement Steering Angle **(2)**	Bar graph shows the current status of the implement steering angle	Slider indicator from center indication to full left or full right
Pressure Switch PS **(3)**	Feedback window to show the current state of “Pressure Switch PS.” The indicator should show either "Pressure" when PS is closed or "No Pressure" when PS is open.	"Pressure or "No Pressure."
Pressure Switch PS1 **(4)**	Feedback window to show the current state of “Pressure Switch PS1.” The indicator should show either "Pressure" when PS1 is closed or "No Pressure" when PS1 is open.	"Pressure" or "No Pressure."
Solenoid #8 **(5)**	Direct toggle switch manual control of Solenoid #8 to turn ON or OFF for the “Test” diagnostic mode. The switch indicates OFF and is inactive for the “Limp Home” diagnostic mode.	Shows the state of Solenoid #8. ON or OFF.
Solenoid #9 **(6)**	Direct toggle switch manual control of Solenoid #9 to turn ON or OFF for the “Test” diagnostic mode. The switch indicates ON and is inactive for the “Limp Home” diagnostic mode.	Shows the state of Solenoid #9. ON or OFF.
Solenoid #10 **(7)**	Direct toggle switch manual control of Solenoid #10 to turn ON or OFF for the “Test” diagnostic mode. The switch indicates ON and is inactive for “Limp Home” diagnostic mode.	Shows the state of Solenoid #10. ON or OFF.
Solenoid #11 **(8)**	Direct toggle switch manual control of Solenoid #11 to turn ON or OFF for the “Test” diagnostic mode. The switch indicates ON and is inactive for the “Limp Home” diagnostic mode.	Shows the state of Solenoid #11. ON or OFF.



RAPH23PLM1127BA 3

HYDRAULIC DOWN FORCE DIAGNOSTICS

"Hydraulic Down Force" screen (general diagnostics)

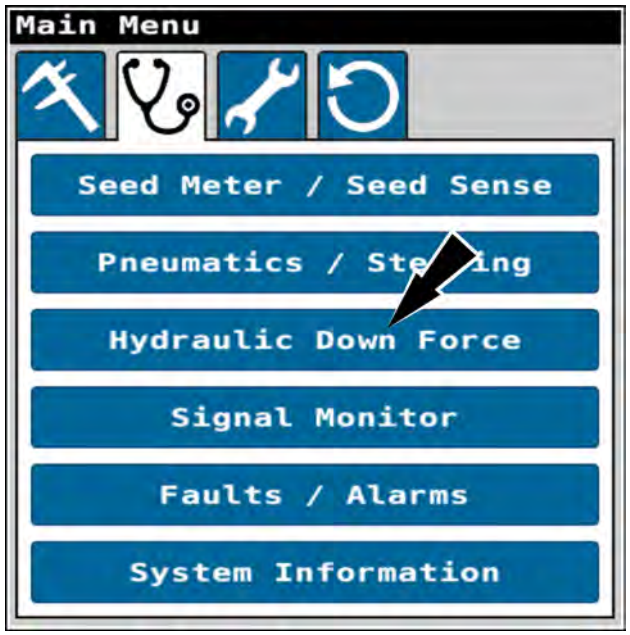
The “Hydraulic Down Force Diagnostics” screen (general diagnostics) allows you to view the status of the hydraulic down force system across the whole planter at a glance.

NOTE: *The diagnostic information on this screen displays only when the planter is lowered, moving, and applying product.*

Press the “main menu” button on the home screen.

Select the “Diagnostics” tab.

Press the “Hydraulic Down Force” menu option.

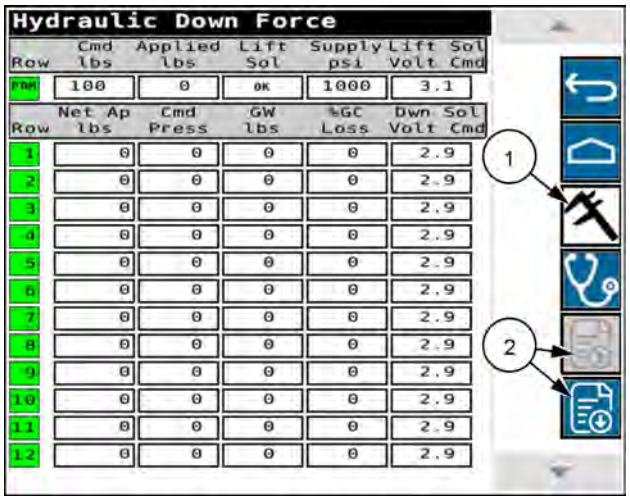


RAPH23PLM1126BA 1

The “Hydraulic Down Force” screen appears.

If needed, press the measurements tab **(1)** to open the measurements screen.

You can use the navigation buttons **(2)** to scroll through the rows. If a navigation button is blue, more rows are available in the indicated direction.



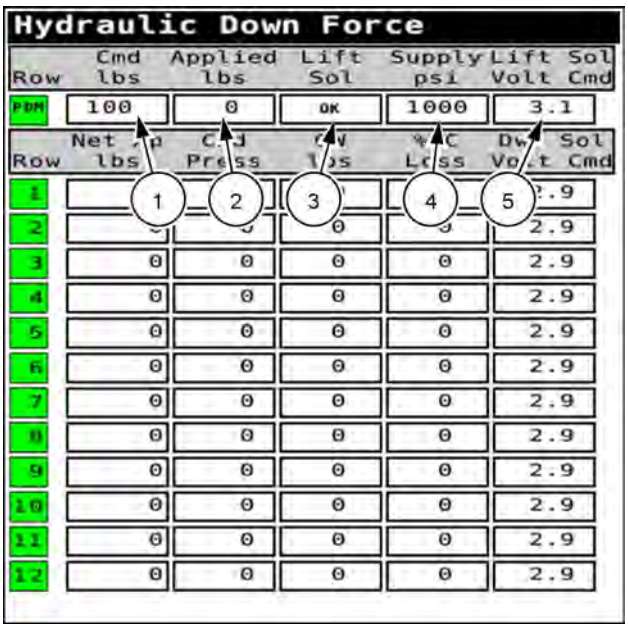
RAIL20PLM1746BA 2

The “Hydraulic Down Force” screen appears.

The “Hydraulic Down Force” screen provides information for each row of the planter.

The top row of information applies to the Power Distribution Module (PDM). The information includes:

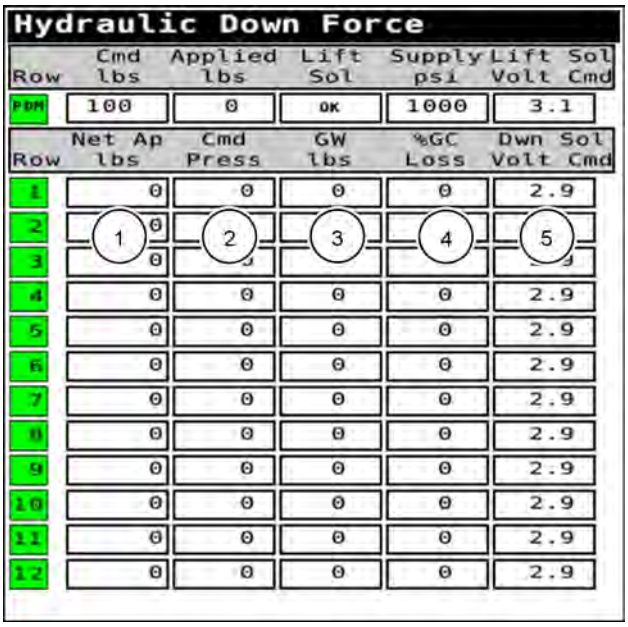
- Commanded UP force **(1)**
- Applied Force **(2)**
- Lift solenoid status **(3)**
- Supply pressure **(4)**
- Commanded lift solenoid voltage **(5)**



RAIL20PLM1747BA 3

The remaining rows of information apply to the individual row units. The information includes:

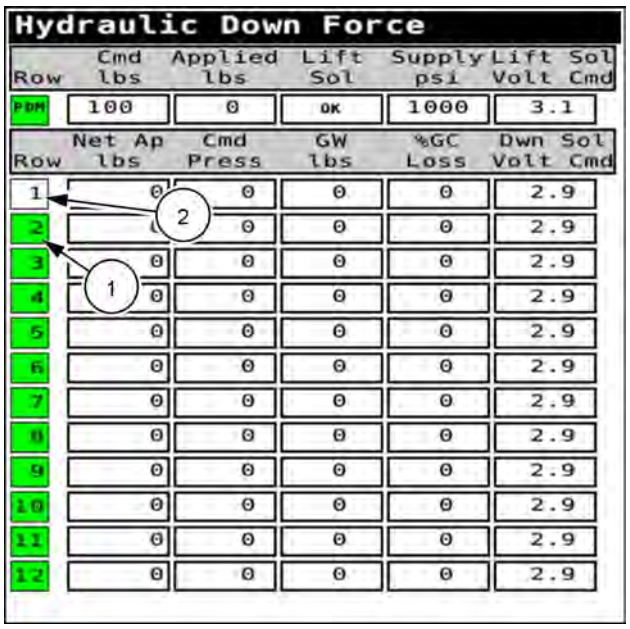
- Net applied force **(1)**
- Commanded pressure **(2)**
- Gauge wheel (GW) force **(3)**
- Lost ground contact percentage **(4)**
- Commanded down solenoid voltage **(5)**



RAIL20PLM1747BA 4

The color of each row label indicates the status of that row.

- A green label **(1)** indicates that the row unit is online and functional.
- A white label **(2)** indicates that there is no communication from the row unit. There could be a wiring issue, or be caused by a problem in the row unit.



RAIL20PLM1748BA 5

"Hydraulic Down Force" screen (health checks)

The “Hydraulic Down Force Diagnostics” screen allows you to perform a variety of health checks on the hydraulic down force system.

Perform health checks:

- with the planter at limited raise height
- with the planter stationary (zero ground speed)

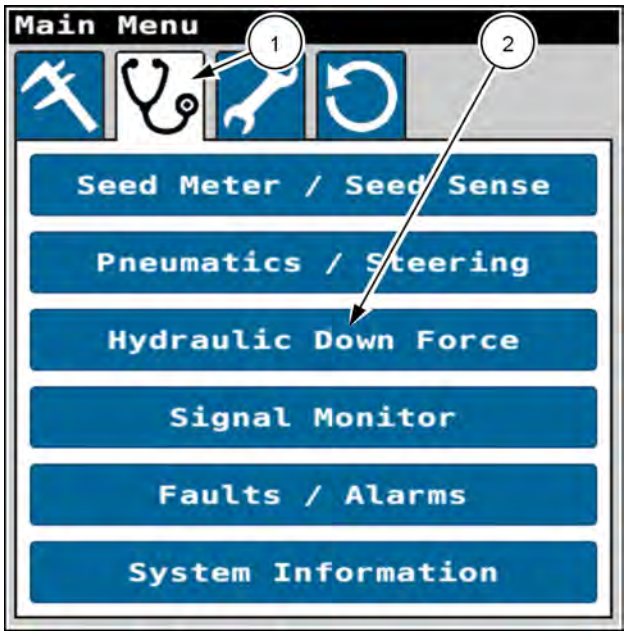
NOTE: *For 2140 model planters, you must lower all rows in order to perform the health checks. Do not perform the health checks if split rows are mechanically pinned in the raised position.*

NOTE: *For 2150 and 2160 model planters, you must raise the planter to the "Limited Raise" height in order to perform the health checks. The “Health Checks” pop-up window is not available when the planter is below the "Limited Raise" height.*

Press the “main menu” button on the home screen.

Select the “Diagnostics” tab **(1)**.

Press the “Hydraulic Down Force” menu option **(2)** .



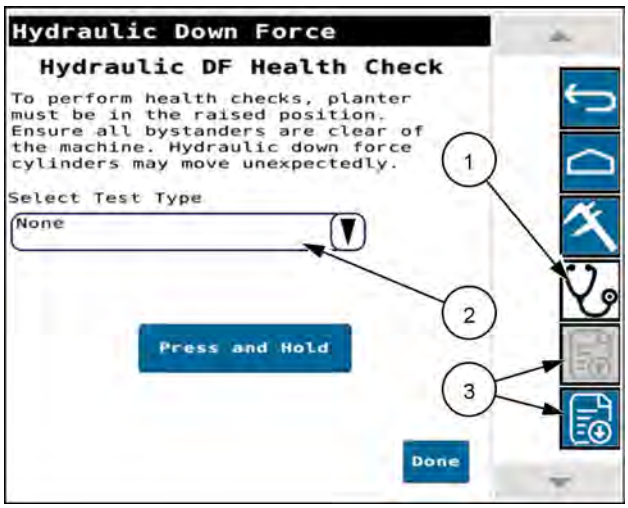
RAPH23PLM1126BA 1

The “Hydraulic Down Force” screen appears.

If needed, press the health check tab **(1)** to open the “Hydraulic DF Health Check” screen.

Press the “Select Test Type” menu **(2)**.

NOTE: *The page-up and page-down navigation buttons **(3)** are not applicable to the health check screen.*



RAIL20PLM1749BA 2

The health check menu appears.

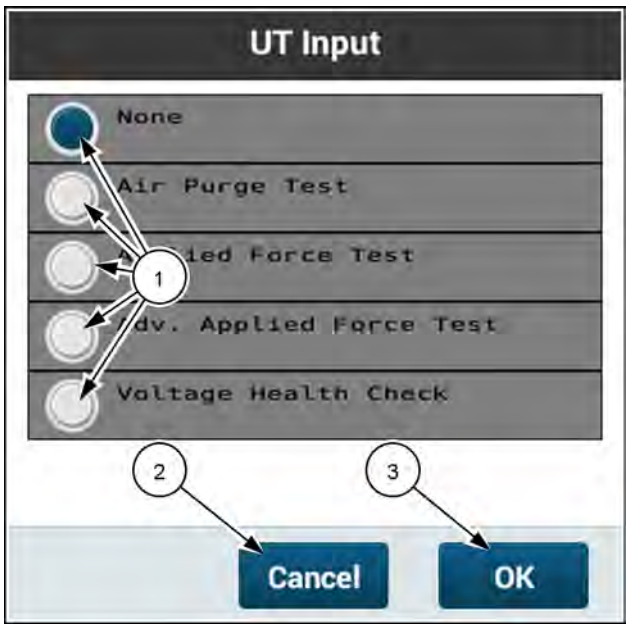
The following health checks are available:

- “Air Purge Test”
- “Applied Force Test”
- “Advanced Applied Force Test
- “Voltage Health Check”

Press the radio button **(1)** for the health check that you wish to perform.

Press the “Cancel” button **(2)** if you wish to discontinue the procedure.

Press the “OK” button **(3)** if you wish to continue.



RAIL20PLM1750BA 3

The “Hydraulic DF Health Check” screen reappears. The selected test appears in the “Select Test Type” menu **(1)**.

The “Hydraulic DF Health Check” screen states, “To perform health checks, the planter must be in the raised position. Ensure all bystanders are clear of the machine Hydraulic down force cylinders may move unexpectedly.” Previous test results may also appear if you performed any health checks since the last key cycle.

Follow the instructions given in the screen.

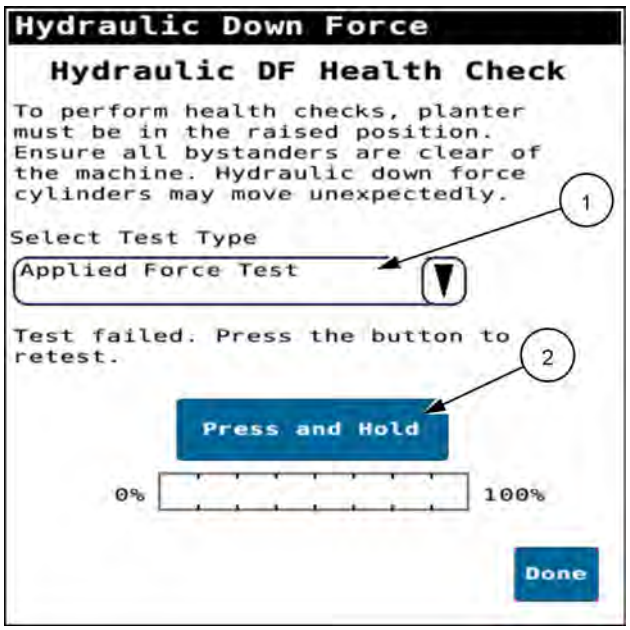
When you are ready to begin the selected health check, press and hold the “Press and Hold” button **(2)**.

If you wish to interrupt the test at any time, release the “Press and Hold” button **(2)**.

NOTE: *The air purge test, applied force test, and advanced applied force test are visual tests. You must determine if the system passed or failed the health check.*

NOTE: *If the system passes the applied force test there is no need to run the advanced applied force test.*

NOTE: *The Voltage Health Check gives you a report card to determine if each row passed the health check.*

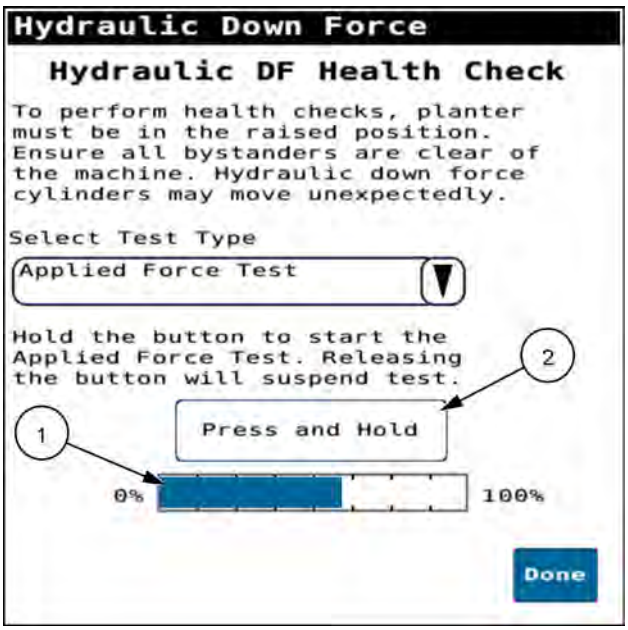


RAIL20PLM1751BA 4

If you selected “Advanced Applied Force Test”,“ Air Purge Test,” or “Applied Force Test,” a progress bar **(1)** displays the progress of the test.

If you selected the “Voltage Health Check,” a message states, “Test in progress. Please wait.”

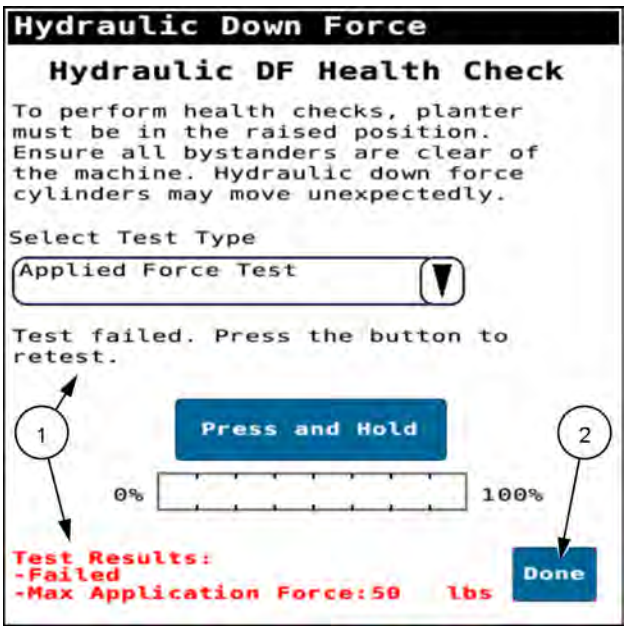
Continue holding the “Press and Hold” button **(2)** until the results of the health check appear.



RAIL20PLM1752BA 5

The test result **(1)** appears on the screen. See the table below for possible test results per test.

Press the “Done” button **(2)** to return to the default “Hydraulic DF Health Check” screen with no test selected.



RAIL20PLM1753BA 6

Table 1

Health check	Completion messages	Additional information
“Air Purge Test”	“Test complete. Press the button to retest.”	The air purge test cycles pressure to each **DeltaForce®** cylinder to purge air from the system. It is necessary to run this test after doing an installation or opening any lines in the hydraulic system. The bottom pin used to pin the **DeltaForce®** cylinder to the bottom bracket must be unpinned. At the completion of the test, the cylinders should be extended. It may be necessary to run the air purge test multiple times to fully purge air from the hydraulic system. Visually inspect each row before reinstalling the bottom pin.
“Applied Force Test”	• “Test passed. Press the button to retest.” • “Test failed. Press the button to retest.”	The applied force test tests the health of the **DeltaForce®** hydraulic and mechanical system. Ensure that everyone is clear of the planter before performing this health check. Once the test is started, all row units should rise. Next, each row unit should lower, individually, in sequence. This is a visual test. The operator determines if the test passed or failed.

Health check	Completion messages	Additional information
“Advanced Applied Force Test”	• “Test passed. Press the button to retest.” • “Test failed. Press the button to retest.”	***NOTE:*** *If the system passes the applied force test there is no need to run the advanced applied force test* The advanced applied force test tests the health of the **DeltaForce®** hydraulic and mechanical system. Ensure that everyone is clear of the planter before performing this health check. During this test, row units will rise and then lower, one at a time, in order. This test may be run if the planter cannot pass or has issues with an applied force test and further diagnostics are needed. This is a visual test. The operator determines if the test passed or failed.
“Voltage Health Check”	• “Test passed. Press the button to retest.” • “Test failed. Ensure the alternator is running. Check the harness connections. Press the button to retest.”	The voltage health check cycles power to each of the **DeltaForce®** solenoids to assess the stability of the system. It will test for electrical shorts and high currents. Row units will not move during this test. The voltage health check test will give the user a report card to determine if each row passed the health check.

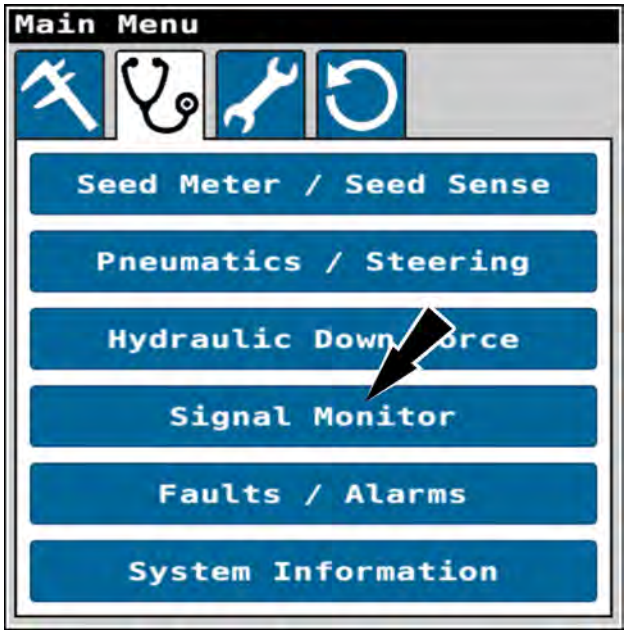
SIGNAL MONITOR

"Signal Monitor" screen

Press the “main menu” button on the home screen.

Select the “Diagnostics” tab.

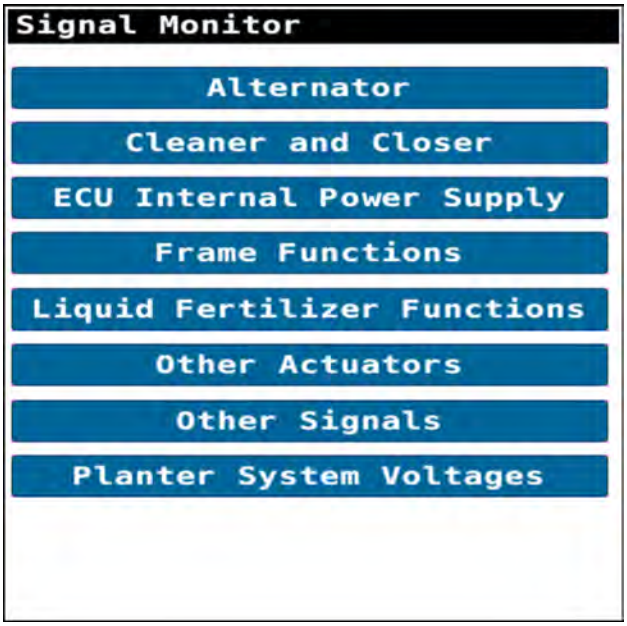
Press the “Signal Monitor” menu option.



RAPH23PLM1126BA 1

The “Signal Monitor” system-group menu appears.

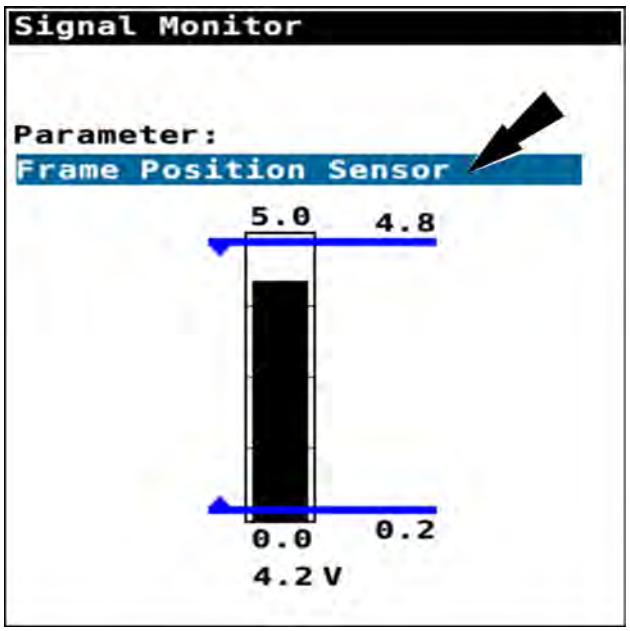
Press the menu option for the desired system group.



RAPH23PLM1033BA 2

The system remembers the last parameter selection within a system group while the key remains ON. However, the default parameter for each system group appears if you cycle key power.

Press the “Parameter:” bar to obtain a menu of other parameters.



RAIL20PLM1754BA 3

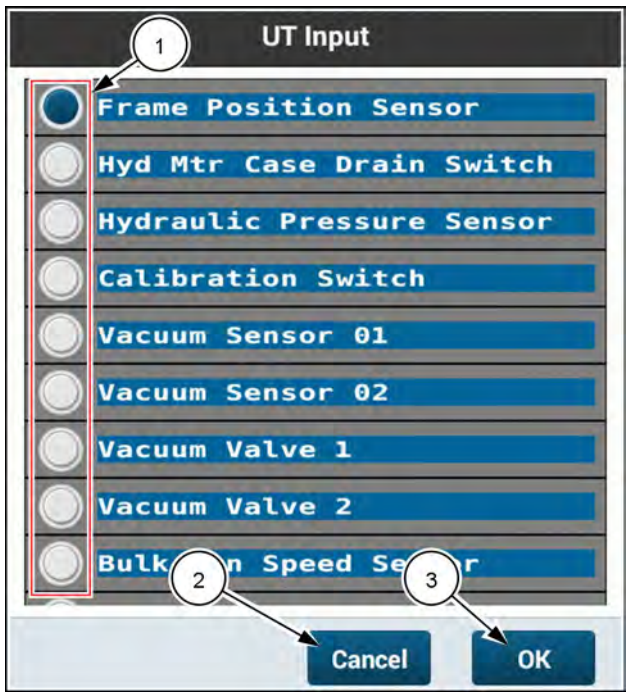
The parameter menu appears.

Scroll up and down through the parameter menu to find the desired parameter.

Press the radio button **(1)** of the desired parameter.

Press the “Cancel” button **(2)** to return to the last viewed parameter.

Press the “OK” button **(3)** to open the “Signal Monitor” screen with the newly selected parameter.



RAIL20PLM1755BA 4

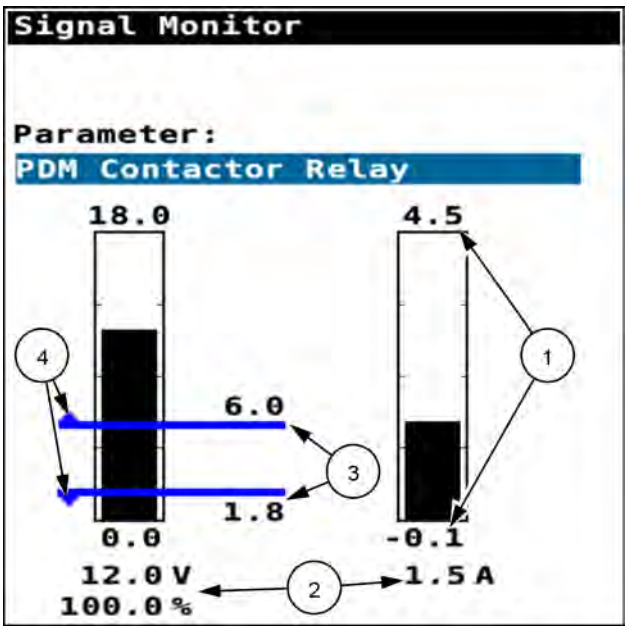
The readouts appear as bar graphs.

The top and bottom of a bar graph have annotations **(1)** that show the upper and lower range of the bar graph.

The numerical readout of the parameter **(2)** appears below the bar graph. The readouts are given as:

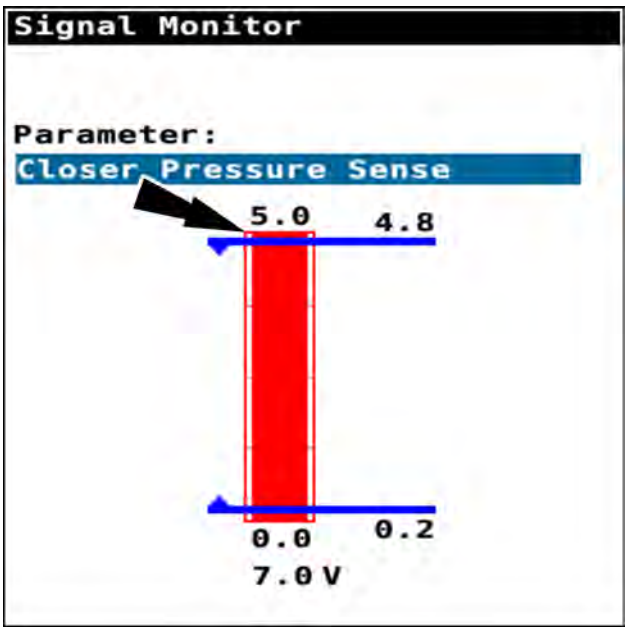
- Voltage (V)
- Current (A)
- Pulse Width Modulation (PWM) duty (%)
- Frequency (Hz)
- Rotations per Minute (RPM)

Some bar graphs include acceptable range indices **(3)**. Indices with arrows **(4)** that point outward from each other give an unacceptable range. Indices with arrows that point inward towards each other give the acceptable range.



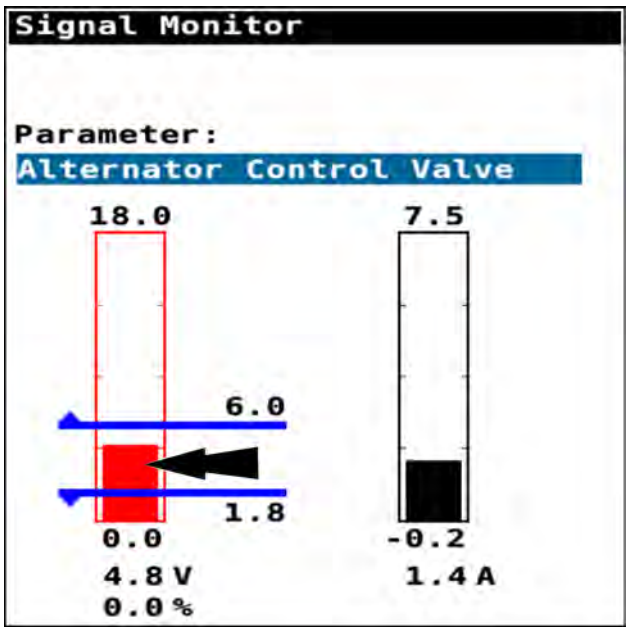
RAIL20PLM1758BA 5

A parameter with a readout that falls outside of the acceptable range has a red bar graph.



RAIL20PLM1757BA 6

For a parameter in which the readout must fall outside of an unacceptable range, such as a 2-way valve, the bar graph appears red when the readout is within the unacceptable range.



RAIL20PLM1756BA 7

FAULTS / ALARMS

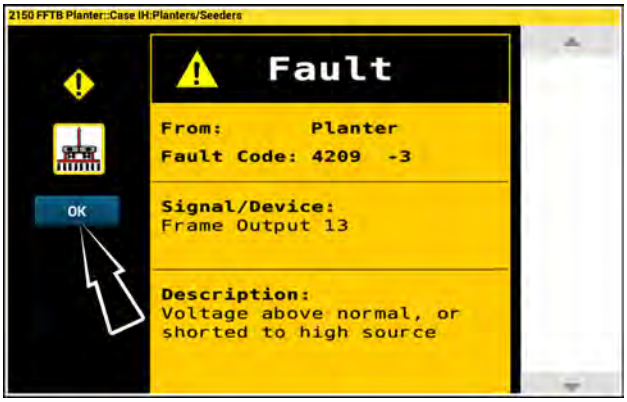
"Faults" screen

NOTE: *The “Faults” screen records faults that appear during operation. The faults appear as popup windows that you can clear. However, the “Faults” screen records all of the faults that appear even though the cause is resolved.*

When the system detects a fault condition, a fault window appears. The fault window provides information about the fault. See “Planter controller faults” (**5-25**) for more information about detected faults.

Press the “OK” button to clear the window. Then resolve the cause of the fault.

If there is more than one fault, you must clear the fault window for each fault.

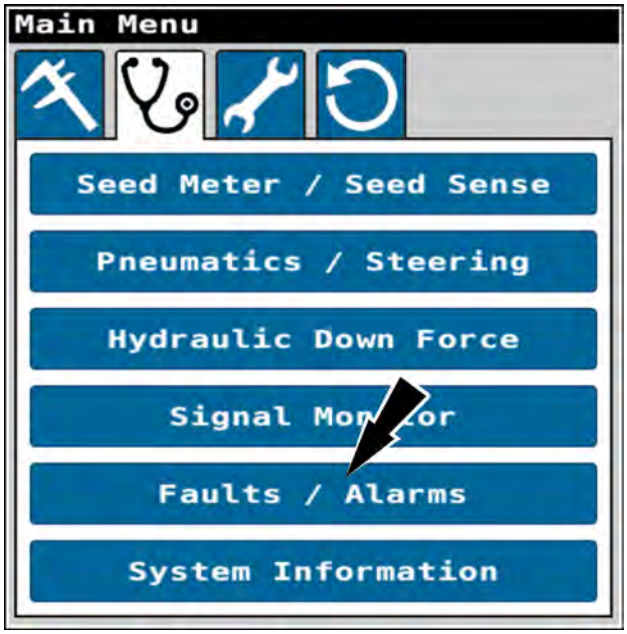


RAPH22PLM0035AA 1

Press the “main menu” button on the home screen.

Select the “Diagnostics” tab.

Press the “Faults/Alarms” menu option.



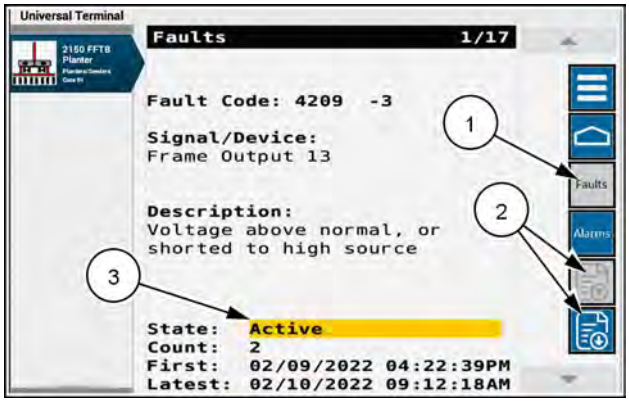
RAPH23PLM1126BA 2

Press the “Faults” icon **(1)** .

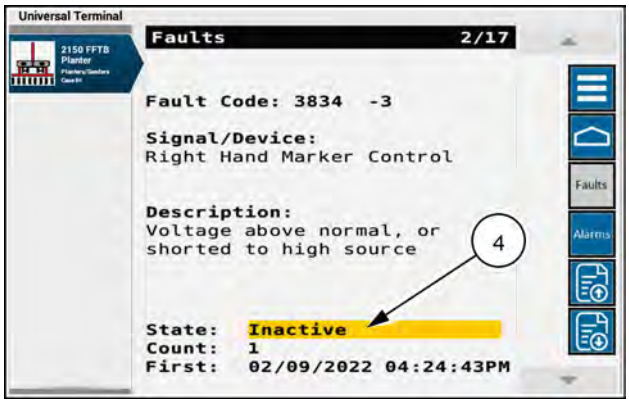
The “Faults” screen opens.

You can use the navigation buttons **(2)** to scroll through the rows. If a navigation button is blue, more rows are available in the indicated direction.

Active **(3)** and inactive **(4)** faults appear highlighted by their color code when there is another fault that is still active. Active and inactive faults that are highlighted remain highlighted for the remainder of the key cycle. The fault that triggered the fault window remains active in the “Faults” screen until you cycle power to the planter.

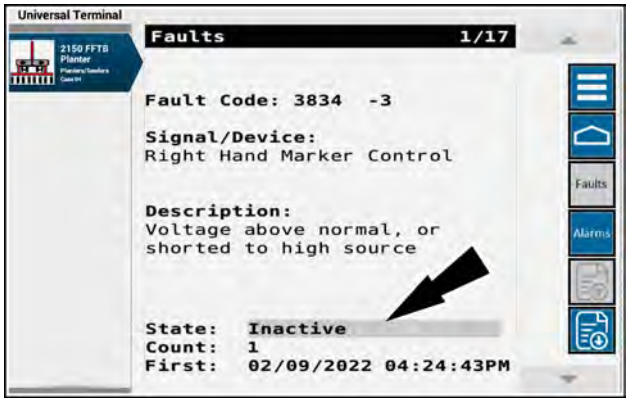


RAPH22PLM0036AA 3



RAPH22PLM0037AA 4

If there are no detected active faults after a key cycle, inactive faults appear highlighted in gray.



RAPH22PLM0038AA 5

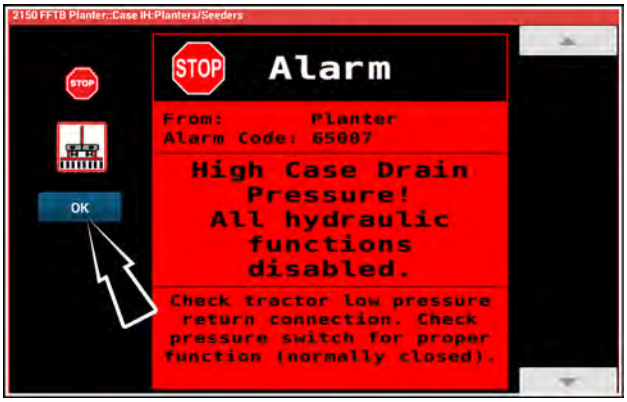
"Alarms" screen

The “Alarms” screen records alarms that appear during operation. The alarms can be temporary alerts that appear as red or yellow popups. You clear the popup after you remove the condition. The “Alarms” screen records all of the alarms that appear even though the cause is resolved.

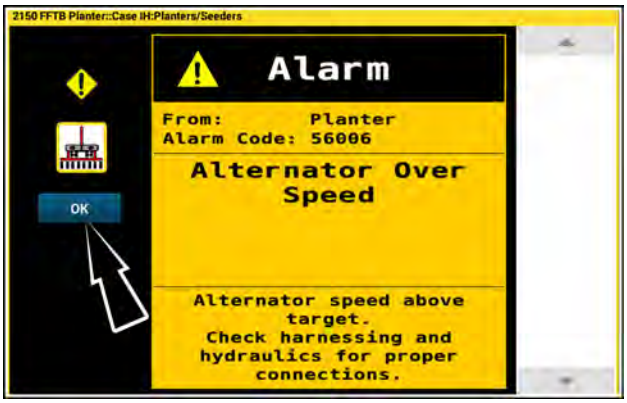
Turning the key OFF removes resolved alarms from the display memory, and they do not appear the next time the key is turned ON.

The alarm popup window provides information about the condition that causes the alarm.

Press the “OK” button to clear the window. Then resolve the cause of the alarm.



RAPH22PLM0040AA 1

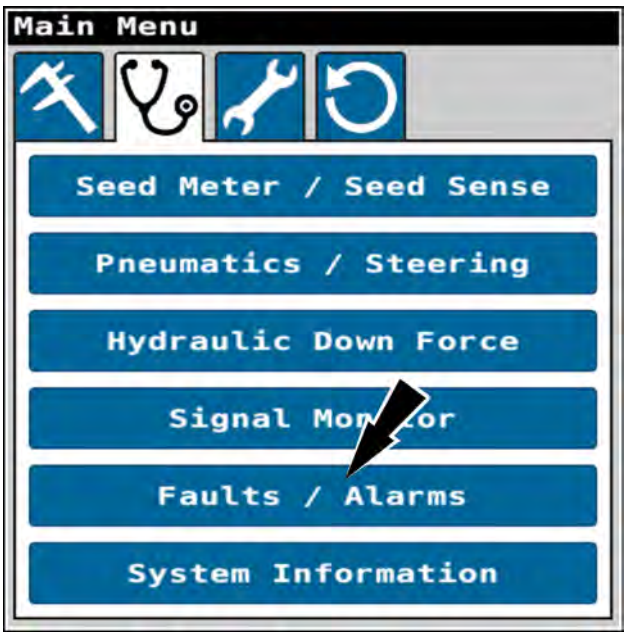


RAPH22PLM0039AA 2

Press the “Main Menu” button on the home screen.

Select the “Diagnostics” tab.

Press the “Faults/Alarms” menu option.



RAPH23PLM1126BA 3

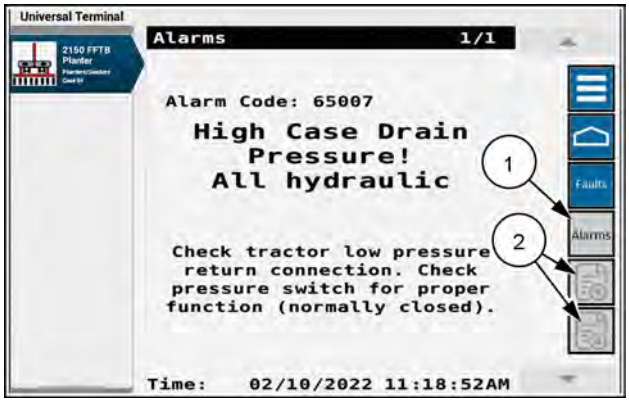
Press the “Alarms” icon **(1)**.

The “Alarms” screen opens.

If there are no recorded alarms, the “Alarms” screen states, “No Alarms.”

If there are recorded alarms, the “Alarms” screen provides information about the alarm, including the alarm number, and a description of the alarm.

You can use the navigation buttons **(2)** to scroll through the alarms. If a navigation button is blue, more alarms are available in the indicated direction.



RAPH22PLM0041AA 4

Planter controller faults

1900-01	Cannot Enter Frame Mode - Excessive Speed Detected
	Check that speed is under **6.4 km/h** (**4.0 mph**).
2602-12	Planter Type Invalid
	Universal Control Module (UCM) planter type corrupted in Non-Volatile Memory (NVM). Default value used.
	Possible causes: 1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Reinstall planter UCM software and configure planter with service tool.
2603-12	Number of sections Invalid
	Saved number of planter sections corrupted in NVM. Default values used.
	1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Reinstall planter UCM software and configure planter with service tool.
2604-12	Planter Options Invalid
	Saved planter options corrupted in NVM. Default values used.
	1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the full setup wizard to enter/verify planter configuration setup and calibrations.
2605-12	Planter Right Distance Calibration Invalid
	Saved calibration corrupted in NVM. Default value used.
	1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the planter setup wizard to calibrate/verify planter right distance calibration.
2606-12	Planter Left Distance Calibration Invalid
	Saved calibration corrupted in NVM. Default value used.
	1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the planter setup wizard to calibrate/verify planter left distance calibration.
2607-12	Planter Frame Calibration Invalid
	Saved minimum frame height calibration corrupted in NVM. Default value used.
	1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the planter frame calibration (Home > Calibration > Sensors) to calibrate/verify the desired minimum frame height setting.

2608-12	Planter Frame Calibration Invalid Saved start plant height calibration corrupted in NVM. Default value used. 1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the planter frame calibration (Home > Calibration > Sensors) to calibrate/verify the desired start plant height setting.
2609-12	Planter Frame Calibration Invalid Saved stop plant height calibration corrupted in NVM. Default value used. 1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the planter frame calibration (Home > Calibration > Sensors) to calibrate/verify the desired stop plant height setting.
2610-12	Planter Frame Calibration Invalid Saved wing drop height calibration corrupted in NVM. Default value used. 1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the planter frame calibration (Home > Calibration > Sensors) to calibrate/verify the desired wing drop height setting.
2611-12	Planter Frame Calibration Invalid Saved limited raise height calibration corrupted in NVM. Default value used. 1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the planter frame calibration (Home > Calibration > Sensors) to calibrate/verify the desired limited raise height setting.
2612-12	Planter Frame Calibration Invalid Saved frame maximum height calibration corrupted in NVM. Default value used. 1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the planter frame calibration (Home > Calibration > Sensors) to calibrate/verify the desired setting.
2619-12	Planter Liquid Cal Invalid Saved calibration corrupted in NVM. Default value used. 1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the “Planter Liquid Calibration” screen (Home > Work Condition > Liquid) to enter the liquid calibration value and calibrate the liquid control.

2620-12	Vacuum Gain Invalid
	Normally default gain values are used. Only on rare occasions would a gain value be changed. However, if a control system gain is changed, it is saved in the planter UCM NVM (non-volatile memory) This alarm indicates the saved gain value is corrupted in NVM and the default gain value used.
	1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the “Advanced Setups” screen (Home> Toolbox > Adv. Set) to re-enter a custom controller gain value if a custom gain is required.
2622-12	Bulk Fill Gain Invalid
	Normally default gain values are used. Only on rare occasions would a gain value be changed. However, if a control system gain is changed, it is saved in the planter UCM NVM (non-volatile memory) This alarm indicates the saved gain value is corrupted in NVM and the default gain value used.
	1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the “Advanced Setups” screen (Home> Toolbox > Adv. Set) to re-enter a custom controller gain value if a custom gain is required.
2623-12	Liquid Gain Invalid
	Normally default gain values are used. Only on rare occasions would a gain value be changed. However, if a control system gain is changed, it is saved in the planter UCM NVM (non-volatile memory) This alarm indicates the saved gain value is corrupted in NVM and the default gain value used.
	1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the “Advanced Setups” screen (Home> Toolbox > Adv. Set) to re-enter a custom controller gain value if a custom gain is required
2624-12 (2160 model planters)	Maximum Carrier Position Invalid
	The saved carrier height calibration is corrupted in NVM. The default value is used.
	1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM 3. Faulty internal planter UCM NVM 4. Planter UCM NVM inadvertently cleared during a software update Use the planter frame calibration (Home > Calibration > Sensors) to calibrate/verify the maximum carrier height setting.
2625-12	Down Pressure Gain Invalid
	Normally default gain values are used. Only on rare occasions would a gain value be changed. However, if a control system gain is changed, it is saved in the planter UCM NVM (non-volatile memory) This alarm indicates the saved gain value is corrupted in NVM and the default gain value used.
	1. Low battery voltage (less than **9.8 V**) 2. Poor power supply connections to the planter UCM. 3. Faulty internal planter UCM NVM. 4. Planter UCM NVM inadvertently cleared during a software update. Use the “Advanced Setups” screen (Home> Toolbox > Adv. Set) to re-enter a custom controller gain value if a custom gain is required

3701-02 (2160 model planters, 36R20/22)	Left Caster Proximity Switch
	Planter UCM digital input 01 is detecting an invalid voltage.
	Proximity switch device failure
3701-02 (2160 model planters, 36/32R30)	Outer Left Caster Proximity Switch
	Planter UCM digital input 01 is detecting an invalid voltage.
	Proximity switch device failure
3701-03 (2160 model planters, 36R20/22)	Left Caster Proximity Switch
	Planter UCM digital input 01 is detecting an above normal voltage.
	Check the harness connection to the proximity sensor for a short to power.
3701-03 (2160 model planters, 36/32R30)	Outer Left Caster Proximity Switch
	Planter UCM digital input 01 is detecting an above normal voltage.
	Check the harness connection to the proximity sensor for a short to power.
3706-02 (2120 model planters, 6/8R30)	Left-hand Granular bin sensor
	Feedback voltage is invalid.
	Check the harness for damage and the sensor for proper function.
3706-03 (2120 model planters, 6/8R30)	Left-hand Granular bin sensor
	Short to power. Sensor voltage is above normal.
	1. Check the harness for a short to power. 2. Ensure the sensor is functional
3707-02 (2160 model planters)	Right Caster Proximity Switch
	Planter UCM digital input 07 is detecting an invalid voltage.
	Proximity switch device failure
3707-03 (2160 model planters)	Right Caster Proximity Switch
	Planter UCM digital input 07 is detecting an above normal voltage.
	Check the harness connection to the proximity sensor for a short to power.
3710-02 (2120 model planters, 6/8R30)	Right-Hand Granular bin sensor
	Feedback voltage is invalid.
	Check the harness for damage and the sensor for proper function.
3710-03 (2120 model planters, 6/8R30)	Right-hand Granular bin sensor
	Short to power. Sensor voltage is above normal.
	1. Check the harness for a short to power. 2. Ensure the sensor is functional
3711-02 (2160 model planters, 36/32R30)	Inner Right Caster Proximity Switch
	Planter UCM digital input 11 is detecting an invalid voltage.
	Proximity switch device failure
3711-03 (2160 model planters, 36/32R30)	Inner Right Caster Proximity Switch
	1. Check the harness for a short to power. 2. Ensure the sensor is functional
3712-02 (2160 model planters, 36/32R30)	Outer Right Caster Proximity Switch
	Planter UCM digital input 12 is detecting an invalid voltage.
	Proximity switch device failure
3712-03 (2160 model planters, 36/32R30)	Outer Right Caster Proximity Switch
	Planter UCM digital input 12 is detecting an above normal voltage.
	Check the harness connection to the proximity sensor for a short to power.
3716-03	Calibration switch
	Sensor voltage is above normal.
	Check harness for short to power.
3717-02	Left Bin Level Sensor
	Planter UCM digital input connected to the left bulk fill bin sensor is detecting an abnormal voltage.
	1. Check left bulk fill sensor for proper operation. 2. Check the harness connection to left bulk fill bin sensor.
3717-03	Left Bin Level Sensor
	Planter UCM digital input connected to the left bulk fill bin sensor is detecting an above normal voltage.
	Check the harness connections to the left bin level sensor for a short to PWR or ECU PWR.

3718-02	Right Bin Level Sensor
	Planter UCM digital input connected to the right bulk fill bin sensor is detecting an abnormal voltage.
	1. Check right bulk fill sensor for proper operation. 2. Check the harness connection to right bulk fill bin sensor.
3718-03	Right Bin Level Sensor
	Planter UCM digital input connected to the right bulk fill bin sensor is detecting an above normal voltage.
	Check the harness connections to the right bin level sensor for a short to PWR or ECU PWR.
3719	Alternator Voltage Sensor
3721-02 (2140, 2150S, and 2160 model planters)	Row Lift Proximity Switch
	Planter UCM digital input 21 is detecting an invalid voltage.
	Proximity switch device failure
3721-03 (2140, 2150S, and 2160 model planters)	Row Lift Proximity Switch
	Planter UCM digital input 21 is detecting an above normal voltage.
	Check the harness connection to the proximity sensor for a short to power.
3749	Hydraulic pressure sensor
3750	Hyd Mtr case drain switch
3801-03	Row Cleaner Solenoid - Lift Decrease
	Pneumatic Row Cleaner installed and Short to PWR or Open detected on Decrease Coil of Lift Pressure Valve (HSD 01)
	1. Row cleaner solenoid not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Row cleaner solenoid device failure – coil open.
3801-04 (2150S model planters)	Row Cleaner Solenoid - Lift Decrease
	Pneumatic Row Cleaner installed and Short to GND detected on Decrease Coil of Lift Pressure Valve (HSD 01) 1. Harness connection to lift pressure decrease solenoid short to GND 2. Shorted condition in coil.
3802-03	Row Cleaner Solenoid – Down Decrease
	Planter UCM digital output connected to the cleaner solenoid is detecting above normal voltage when OFF.
	1. Row cleaner solenoid not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Row cleaner solenoid device failure – coil open.
3802-04 (2150S model planters)	Row Cleaner Solenoid - Down Decrease
	Pneumatic Row Cleaner installed and Short to GND detected on Decrease Coil of Down Pressure Valve (HSD 02) 1. Harness connection to down pressure decrease solenoid short to GND 2. Shorted condition in coil.
3803-03 2160 model planters	Frame Solenoid 8 - Steering
	Shorted to PWR or Open circuit. Check connections and harness for damage. 1. Check harness connection to frame solenoid 8 open circuit or short to PWR.
3803-04 2160 model planters	Frame Solenoid 8 - Steering
	Shorted to GND. Check connections and harness for damage. 1. Check harness connection to frame solenoid 8 short to GND.
3804-03 (2140 and 2160 model planters)	Frame Solenoid 2 – Fold
	Planter UCM digital output connected to frame solenoid 2 is detecting above normal voltage when OFF.
	1. Frame solenoid 2 not connected. 2. Harness connection to frame solenoid 2 open circuit or shorted to PWR. 3. Frame solenoid 2 device failure – coil open.

3804-04 (2140 and 2160 model planters)	Frame Solenoid 2 – Fold
	Planter UCM digital output connected to frame solenoid 2 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 2 device failure – coil shorted.
3807-03	Row Cleaner Solenoid - Lift Increase
	Planter UCM digital output connected to the cleaner solenoid is detecting above normal voltage when OFF.
	1. Row cleaner solenoid not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Row cleaner solenoid device failure – coil open.
3809-03	Row Closer Solenoid - Pressure Increase
	Planter UCM digital output connected to the closer solenoid is detecting above normal voltage when OFF.
	1. Row closer solenoid not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Row closer solenoid device failure – coil open.
3809-04	Row Closer Solenoid - Pressure Increase
	Planter UCM digital output connected to the closer solenoid is detecting below normal voltage when ON.
	1. Row closer solenoid not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Row closer solenoid device failure – coil open.
3810-03	Row Closer Solenoid - Pressure Decrease
	Planter UCM digital output connected to the closer solenoid is detecting above normal voltage when OFF.
	1. Row closer solenoid not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Row closer solenoid device failure – coil open.
3811-03	Row Cleaner Solenoid - Down Increase
	Planter UCM digital output connected to the cleaner solenoid is detecting above normal voltage when OFF.
	1. Row cleaner solenoid not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Row cleaner solenoid device failure – coil open.
3812-03 (2140 model planters)	Frame Solenoid 1 - Center Lift
	Planter UCM digital output connected to frame solenoid 1 is detecting above normal voltage when OFF.
	1. Frame solenoid 1 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 1 device failure – coil open.
3812-03 (2150 model planters)	Frame Solenoid 17 - Center Lift
	Planter UCM digital output connected to frame solenoid 17 is detecting above normal voltage when OFF.
	1. Frame solenoid 17 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 17 device failure – coil open.
3812-04 (2140 model planters)	Frame Solenoid 1 - Center Lift
	Planter UCM digital output connected to frame solenoid 1 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 1 device failure – coil shorted.
3812-04 (2150 model planters)	Frame Solenoid 17 - Center Lift
	Planter UCM digital output connected to frame solenoid 17 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 17 device failure – coil shorted.

3813-03 (2150 and 2150S model planters)	Frame Solenoid 7 - Center Lift
	Planter UCM digital output connected to frame solenoid 7 is detecting above normal voltage when OFF.
	1. Frame solenoid 7 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 7 device failure – coil open.
3813-03 (2160 model planters)	Steering Solenoid 11 – Enable
	Planter UCM digital output connected to steering solenoid 11 is detecting above normal voltage when OFF.
	1. Steering solenoid 11 not connected. 2. Harness connection to steering solenoid 11 open circuit or shorted to PWR. 3. Steering solenoid 11 device failure – coil open.
3813-04 (2150 and 2150S model planters)	Frame Solenoid 7 - Center Lift
	Planter UCM digital output connected to frame solenoid 7 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 7 device failure – coil shorted.
3813-04 (2160 model planters)	Steering Solenoid 11 – Enable
	Planter UCM digital output connected to steering solenoid 11 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Steering solenoid 11 device failure – coil shorted.
3814-03 (2140 and 2160 model planters)	Frame Solenoid 5 – Lift
	Planter UCM digital output connected to frame solenoid 5 is detecting above normal voltage when OFF.
	1. Frame solenoid 5 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 5 device failure – coil open.
3814-04 (2140 and 2160 model planters)	Frame Solenoid 5 – Lift
	Planter UCM digital output connected to frame solenoid 5 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 5 device failure – coil shorted.
3814-04 (2150 and 2150S model planters)	Frame Solenoid 15 - Lift
	Planter UCM digital output connected to frame solenoid 15 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 15 device failure – coil shorted.
3816-03	Pneumatic Down Pressure (PDP) Increase Solenoid
	Planter UCM digital output connected to the PDP solenoid is detecting above normal voltage when OFF.
	1. PDP increase solenoid not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. PDP increase solenoid device failure – coil open.
3817-03 (2140 model planters)	Frame Solenoid 13
	Planter UCM digital output connected to frame solenoid 13 is detecting above normal voltage when OFF.
	1. Frame solenoid 13 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 13 device failure – coil open.
3817-03 (2150S model planters)	Left-hand subframe (offset bar) Solenoid 21
	Planter UCM digital output connected to left-hand subframe solenoid 21 is detecting above normal voltage when OFF.
	1. Left-hand subframe solenoid 21 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Left-hand subframe solenoid 21 device failure – coil open.

3817-04 (2140 model planters)	Frame Solenoid 13
	Planter UCM digital output connected to frame solenoid 13 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 13 device failure – coil shorted.
3817-04 (2150S model planters)	Left-hand subframe (offset bar) Solenoid 21
	Planter UCM digital output connected to left-hand subframe solenoid 21 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Left-hand subframe solenoid 21 device failure – coil shorted.
3818-03	Power Distribution Module (PDM) relay
	Planter UCM digital output connected to the PDM relay is detecting above normal voltage when OFF.
	1. PDM relay not connected. 2. Harness connection to PDM relay open circuit or shorted to PWR. 3. PDM relay device failure – coil open.
3818-04	PDM relay
	Planter UCM digital output connected to the PDM relay is detecting below normal voltage when ON.
	1. Harness connection to PDM relay shorted to ground. 2. PDM relay device failure – coil shorted.
3819-03 (2160 model planters)	Steering Solenoid 10 – Enable
	Planter UCM digital output connected to steering solenoid 10 is detecting above normal voltage when OFF.
	1. Steering solenoid 10 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Steering solenoid 10 device failure – coil open.
3819-04 (2160 model planters)	Steering Solenoid 10 – Enable
	Planter UCM digital output connected to steering solenoid 10 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Steering Solenoid 10 device failure – coil shorted.
3820-03	PDP Decrease Solenoid
	Planter UCM digital output connected to the PDP solenoid is detecting above normal voltage when OFF.
	1. PDP decrease solenoid not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. PDP decrease solenoid device failure – coil open.
3821-03 (2140 and 2150 model planters)	Left Marker Solenoid
	Planter UCM digital output connected to the left marker is detecting above normal voltage when OFF.
	1. Left marker solenoid not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Left marker solenoid device failure – coil open.
3821-04 (2140 and 2150 model planters)	Left Marker Solenoid
	Planter UCM digital output connected to the left marker is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Left marker solenoid device failure – coil shorted.
3822-03 (2140 and 2160 model planters)	Frame Solenoid 3 – Center Lift
	Planter UCM digital output connected to frame solenoid 3 is detecting above normal voltage when OFF.
	1. Frame solenoid 3 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 3device failure – coil open.

3822-03 (2150 model planters)	Frame Solenoid 6 - Center Lift
	Planter UCM digital output connected to frame solenoid 6 is detecting above normal voltage when OFF.
	1. Frame solenoid 6 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 6 device failure – coil open.
3822-04 (2140 and 2160 model planters)	Frame Solenoid 3 – Center Lift
	Planter UCM digital output connected to frame solenoid 3is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 3 device failure – coil shorted.
3822-04 (2150 model planters)	Frame Solenoid 6 - Center Lift
	Planter UCM digital output connected to frame solenoid 6 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 6 device failure – coil shorted.
3824-03	Compressor Ctrl Valve
	Planter UCM digital output connected to the compressor control valve is detecting above normal voltage when OFF.
	1. Compressor control valve not connected. 2. Harness connection to compressor control valve open circuit or shorted to PWR. 3. Compressor control valve device failure – coil open.
3824-04	Compressor Ctrl Valve
	Planter UCM digital output connected to the compressor control valve is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Compressor control valve device failure – coil shorted.
3827-03 (2140 and 2160 model planters)	Frame Solenoid 7 – Center Lift
	Planter UCM digital output connected to frame solenoid 7 is detecting above normal voltage when OFF.
	1. Frame solenoid 7 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 7 device failure – coil open.
3827-03 (2150 model planters)	Frame Solenoid 14 - Center Lift
	Planter UCM digital output connected to frame solenoid 14 is detecting above normal voltage when OFF.
	1. Frame solenoid 14 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 14 device failure – coil open.
3827-04 (2140 and 2160 model planters)	Frame Solenoid 7 – Center Lift
	Planter UCM digital output connected to frame solenoid 7 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 7 device failure – coil shorted.
3827-04 (2150 model planters)	Frame Solenoid 14 - Center Lift
	Planter UCM digital output connected to frame solenoid 14 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 14 device failure – coil shorted.
3828-03 (2140 model planters)	Frame Solenoid 12 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 12 is detecting above normal voltage when OFF.
	1. Frame solenoid 12 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 12 device failure – coil open.

3828-03 (2150 model planters)	Frame Solenoid 5 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 5 is detecting above normal voltage when OFF.
	1. Frame solenoid 5 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 5 device failure – coil open.
3828-04 (2140 model planters)	Frame Solenoid 12 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 12 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 12 device failure – coil shorted.
3828-04 (2150 model planters)	Frame Solenoid 5 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 5 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 5 device failure – coil shorted.
3829-03 (2140 and 2160 model planters)	Frame Solenoid 6 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 6 is detecting above normal voltage when OFF.
	1. Frame solenoid 6 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 6 device failure – coil open.
3829-03 (2150 model planters)	Frame Solenoid 4 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 4 is detecting above normal voltage when OFF.
	1. Frame solenoid 4 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 4 device failure – coil open.
3829-04 (2140 and 2160 model planters)	Frame Solenoid 6 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 6 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 6 device failure – coil shorted.
3829-04 (2150 model planters)	Frame Solenoid 4 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 4 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 4 device failure – coil shorted.
3831-03 (2140 model planters)	Frame Solenoid 14 – Hitch Unlock
	Planter UCM digital output connected to frame solenoid 14 is detecting above normal voltage when OFF.
	1. Frame solenoid 14 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 14 device failure – coil open.
3831-03 (2150S model planters)	Right-hand subframe (offset bar) Solenoid 22
	Planter UCM digital output connected to frame solenoid 22 is detecting above normal voltage when OFF.
	1. Right-hand subframe solenoid 22 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Right-hand subframe solenoid 22 device failure – coil open.
3831-04 (2140 model planters)	Frame Solenoid 14 – Hitch Unlock
	Planter UCM digital output connected to frame solenoid 14 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 14 device failure – coil shorted.

3831-04 (2150S model planters)	Right-hand subframe (offset bar) Solenoid 22
	Planter UCM digital output connected to right-hand subframe solenoid 22 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Right-hand subframe solenoid 22 device failure – coil shorted.
3832-03 (2140 model planters)	Frame Solenoid 16 - Hitch Lock 2
	Planter UCM digital output connected to frame solenoid 16 is detecting above normal voltage when OFF.
	1. Frame solenoid 16 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 16 device failure – coil open.
3832-03 (2150 model planters)	Frame Solenoid 16 - Lift
	Planter UCM digital output connected to frame solenoid 16 is detecting above normal voltage when OFF.
	1. Frame solenoid 16 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 16 device failure – coil open.
3832-04 (2140 model planters)	Frame Solenoid 16 - Hitch Lock 2
	Planter UCM digital output connected to frame solenoid 16 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 16 device failure – coil shorted.
3832-04 (2150 model planters)	Frame Solenoid 16 - Lift
	Planter UCM digital output connected to frame solenoid 16 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 16 device failure – coil shorted.
3833-03 (2140 model planters)	Frame Solenoid 15 – Hitch Lock 1
	Planter UCM digital output connected to frame solenoid 9 is detecting above normal voltage when OFF.
	1. Frame solenoid 15 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 15 device failure – coil open.
3833-03 (2150 model planters)	Frame Solenoid 9 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 9 is detecting above normal voltage when OFF.
	1. Frame solenoid 9 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 9 device failure – coil open.
3833-04 (2140 model planters)	Frame Solenoid 15 – Hitch Lock 1
	Planter UCM digital output connected to frame solenoid 15 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 15 device failure – coil shorted.
3833-04 (2150 model planters)	Frame Solenoid 9 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 9 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 9 device failure – coil shorted.
3834-03	Right Marker Solenoid
	Planter UCM digital output connected to the right marker is detecting above normal voltage when OFF.
	1. Right marker solenoid not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Right marker solenoid device failure – coil open.

3834-04	Right Marker Solenoid
	Planter UCM digital output connected to the right marker is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Right marker solenoid device failure – coil shorted.
3835-03 (2130 model planters)	Stacker Frame Control
	Planter UCM digital output connected to stacker frame control solenoid is detecting above normal voltage when OFF.
	1. Stacker frame control solenoid not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Stacker frame control solenoid device failure – coil open.
3835-03 (2140 model planters)	Frame Solenoid 17 - Rotate Lock
	Planter UCM digital output connected to frame solenoid 3 is detecting above normal voltage when OFF.
	1. Frame solenoid 17 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 17 device failure – coil open.
3835-03 (2150 model planters)	Frame Solenoid 3 - Fold
	Planter UCM digital output connected to frame solenoid 3 is detecting above normal voltage when OFF.
	1. Frame solenoid 3 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 3 device failure – coil open.
3835-03 (2160 model planters)	Frame Solenoid 1 - Fold
	1. Frame solenoid 1 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 1 device failure – coil open.
3835-04 (2130 model planters)	Stacker Frame Control
	Planter UCM digital output connected to stacker frame control solenoid is detecting below normal voltage when ON.
	1. Stacker frame control solenoid shorted to ground. 2. Stacker frame control solenoid device failure – coil shorted.
3835-04 (2140 model planters)	Frame Solenoid 17 - Rotate Lock
	Planter UCM digital output connected to frame solenoid 17 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 17 device failure – coil shorted.
3835-04 (2150 model planters)	Frame Solenoid 3 - Fold
	Planter UCM digital output connected to frame solenoid 3 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 3 device failure – coil shorted.
3835-04 (2160 model planters)	Frame Solenoid 1 - Fold
	Planter UCM digital output connected to frame solenoid 1 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 1 device failure – coil shorted.
3836-03 (2140 and 2160 model planters)	Frame Solenoid 4 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 4 is detecting above normal voltage when OFF.
	1. Frame solenoid 4 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 4 device failure – coil open.

3836-03 (2150 model planters)	Frame Solenoid 8 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 8 is detecting above normal voltage when OFF.
	1. Frame solenoid 8 not connected. 2. Harness connection to solenoid open circuit or shorted to PWR. 3. Frame solenoid 8 device failure – coil open.
3836-04 (2140 and 2160 model planters)	Frame Solenoid 4 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 4 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 4 device failure – coil shorted.
3836-04 (2150 model planters)	Frame Solenoid 8 – Wing Wheels
	Planter UCM digital output connected to frame solenoid 8 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Frame solenoid 8 device failure – coil shorted.
3841-03 (2160 model planters)	Booster Valve
	Shorted to PWR or open circuit. Check connections and harness for damage.
	Frame solenoid 4 is OFF and HSD36 is detecting voltage above **1.8 V**.
3841-04 (2160 model planters)	Booster Valve
	Shorted to GND. Check connections and harness for damage.
	Frame solenoid 4 is ON and HSD36 is detecting voltage below **6 V**
3845-03 (2150, 2150S, model planters)	Booster Valve
	Shorted to PWR or open circuit. Check connections and harness for damage.
	Frame solenoid 8 is OFF and HSD36 is detecting voltage above **1.8 V**.
3845-03 (2150, 2150S, model planters)	Booster Valve
	Shorted to GND. Check connections and harness for damage.
	Frame solenoid 8 is ON and HSD36 is detecting voltage below **6 V**
3903-03 (2160 model planters)	Steering Solenoid 8 – Control
	Shorted to PWR or open circuit. Check connections and harness for damage.
	1. Steering solenoid 8 not connected. 2. Open circuit in harness connection to steering solenoid 8. 3. Steering solenoid 8 device failure.
3904-03 (2150S model planters)	Subframe (offset bar) solenoid 20 – Subframe downforce control valve
	Planter UCM digital output connected to downforce control valve solenoid 20 is detecting above normal voltage when OFF.
	1. Subframe downforce control valve solenoid 20 not connected. Shorted to PWR or open circuit. Check connections and harness for damage. 3. Downforce control valve solenoid 20 failure.
3904-04 (2150S model planters)	Subframe (offset bar) solenoid 20 – Subframe downforce control valve
	Planter UCM digital output connected to downforce control valve solenoid 20 is detecting below normal voltage when ON.
	1. Harness connection shorted to ground. 2. Downforce control valve solenoid 20 failure – coil shorted.
3905-03	Bulk Fill Fan Valve
	Planter UCM PWM Output connected to bulk fill fan valve is detecting above normal voltage when OFF.
	1. Bulk fill fan valve not connected. 2. Harness connection to bulk fill fan valve open circuit or shorted to PWR. 3. Bulk fill fan valve device failure – coil open.
3908-03	Vacuum 1 Valve
	Planter UCM PWM Output connected to vacuum 1 valve is detecting above normal voltage when OFF.
	1. Vacuum 1 valve not connected. 2. Harness connection to vacuum 1 valve open circuit or shorted to PWR. 3. Vacuum 1 valve device failure – coil open.

3915-03	Liquid Pump Valve
	Planter UCM PWM Output connected to liquid pump valve is detecting above normal voltage when OFF.
	1. Liquid pump valve not connected. 2. Harness connection to liquid pump valve open circuit or shorted to PWR. 3. Liquid pump valve device failure – coil open.
3917–03 (2120 model planters, 6/8R30)	Granular Motor 2
	Valve solenoid short to power.
	HSD feedback above **1.8 V** for **2 s** when commanded OFF.
	1. Check the harness for a short to power. 2. Ensure the sensor is functional
3923-03	Wing Down Force Valve
	Planter UCM PWM Output connected to wing down force valve is detecting above normal voltage when OFF.
	1. Wing down force valve not connected. 2. Harness connection to wing down force valve open circuit or shorted to PWR. 3. Wing down force valve device failure – coil open.
3925-03	Vacuum 2 Valve
	Planter UCM PWM Output connected to vacuum 2 valve is detecting above normal voltage when OFF.
	1. Vacuum 2 valve not connected. 2. Harness connection to vacuum 2 valve open circuit or shorted to PWR. 3. Vacuum 2 valve device failure – coil open.
3926-03	Alternator Control Valve
	Planter UCM PWM Output connected to alternator control valve is detecting above normal voltage when OFF.
	1. Alternator control valve not connected. 2. Harness connection to alternator control valve open circuit or shorted to PWR. 3. Alternator control valve device failure – coil open.
3928–03 (2120 model planters, 6/8R30)	Granular Motor 1
	Valve solenoid short to power.
	HSD feedback above **1.8 V** for **2 s** when commanded OFF.
	1. Check the harness for a short to power. 2. Ensure the sensor is functional
3930-03 (2160 model planters)	Steering Solenoid 9 – Control
	Shorted to PWR or open circuit. Check connections and harness for damage.
	1. Steering solenoid 9 not connected. 2. Open circuit in harness connection to steering solenoid 9. 3. Steering solenoid 9 device failure.
4102-07 (2150S model planters)	Sub-Frame Down Force Control Error
	Actual force transferred is more than **1334 N** (**300 lb**) lower than the target for 5 consecutive seconds.
	Sub-Frame Down Force is Below Target. Check harnessing to the control valve and the hydraulic connections to the tractor.
4103-07 (2150S model planters)	Sub-Frame Down Force Control Error
	Actual force transferred is more than **1334 N** (**300 lb**) higher than the target for 5 consecutive seconds.
	Sub-Frame Down Force is Above Target. Check harnessing to the control valve and the hydraulic connections to the tractor
4205-03	Alternator Excite Relay
	Planter UCM digital output connected to the alternator excite relay is detecting above normal voltage when OFF.
	1. Alternator excite relay not connected. 2. Harness connection to the alternator excite relay open circuit or shorted to PWR. 3. Alternator excite relay device failure – coil open.

4205-04	Alternator Excite Relay
	Planter UCM digital output connected to the alternator excite relay is detecting below normal voltage when ON.
	1. Harness connection to the alternator excite relay shorted to ground. 2. Alternator excite relay device failure – coil shorted
4206-03	Liquid Fertilizer Section 1 Valve
	Planter UCM digital output connected to the liquid fertilizer section 1 valve is detecting above normal voltage when OFF.
	1. Liquid fertilizer section 1 valve not connected. 2. Harness connection to liquid fertilizer section 1 valve open circuit or shorted to PWR. 3. Liquid fertilizer section 1 valve device failure – coil open.
4206-04	Liquid Fertilizer Section 1 Valve
	Planter UCM digital output connected to the liquid fertilizer section 1 valve is detecting below normal voltage when ON.
	1. Harness connection to the liquid fertilizer section 1 valve shorted to ground. 2. Liquid fertilizer section 1 valve device failure – coil shorted
4207-03	Liquid Fertilizer Section 2 Valve
	Planter UCM digital output connected to the liquid fertilizer section 2 valve is detecting above normal voltage when OFF.
	1. Liquid fertilizer section 2 valve not connected. 2. Harness connection to liquid fertilizer section 2 valve open circuit or shorted to PWR. 3. Liquid fertilizer section 2 valve device failure – coil open.
4207-04	Liquid Fertilizer Section 2 Valve
	Planter UCM digital output connected to the liquid fertilizer section 2 valve is detecting below normal voltage when ON.
	1. Harness connection to the liquid fertilizer section 2 valve shorted to ground. 2. Liquid fertilizer section 2 valve device failure – coil shorted
4208-03	Liquid Fertilizer Section 3 Valve
	Planter UCM digital output connected to the liquid fertilizer section 3 valve is detecting above normal voltage when OFF.
	1. Liquid fertilizer section 3 valve not connected. 2. Harness connection to liquid fertilizer section 3 valve open circuit or shorted to PWR. 3. Liquid fertilizer section 3 valve device failure – coil open.
4208-04	Liquid Fertilizer Section 3 Valve
	Planter UCM digital output connected to the liquid fertilizer section 3 valve is detecting below normal voltage when ON.
	1. Harness connection to the liquid fertilizer section 3 valve shorted to ground. 2. Liquid fertilizer section 3 valve device failure – coil shorted
4209-03	Bulk Fill Light Relay
	Planter UCM digital output connected to the bulk fill light relay is detecting above normal voltage when OFF.
	1. Bulk fill light relay not connected. 2. Harness connection to the bulk fill light relay open circuit or shorted to PWR. 3. Bulk fill light relay device failure – coil open.
4209-04	Bulk Fill Light Relay
	Planter UCM digital output connected to the bulk fill light relay is detecting below normal voltage when ON.
	1. Harness connection to the bulk fill light relay shorted to ground. 2. Bulk fill light relay device failure – coil shorted.
4302-03	Row Test PWR Relay
	Planter UCM Digital Low Side Driver (LSD) Output cannot drive output low to activate Row Test Power Relay.
	1. Harness connection to the row test power relay shorted to PWR or ECU PWR. 2. Row test PWR relay device failure – coil shorted.

4302-04	Row Test PWR Relay
	Planter UCM Digital Low Side Driver (LSD) Output is detecting a low output when OFF.
	1. Row test PWR relay not connected or harness connection open. 2. Row test PWR relay return not connected to PWR. 3. Row test PWR relay device failure - coil open.
4314-03 (2140 and 2160 model planters)	Row Lift Solenoid SV2
	Planter UCM digital Low Side Driver (LSD) output cannot drive output low to activate row lift 1 solenoid.
	1. Harness connection to the row lift 1 solenoid shorted to PWR or ECU PWR. 2. Row test PWR relay device failure – coil shorted.
4314-03 (2150S model planters)	Row Lift Solenoid SV1
	Planter UCM digital Low Side Driver (LSD) output cannot drive output low to activate row lift 1 solenoid.
	1. Harness connection to the row lift 1 solenoid shorted to PWR or ECU PWR. 2. Row test PWR relay device failure – coil shorted.
4314-04 (2140 and 2160 model planters)	Row Lift Solenoid SV2
	Planter UCM Digital Low Side Driver (LSD) output is detecting a low output when OFF.
	1. Row lift 1 solenoid not connected or harness connection open. 2. Row lift 1 solenoid return not connected to PWR. 3. Row lift 1 solenoid device failure – coil open.
4314-04 (2150S model planters)	Row Lift Solenoid SV1
	Planter UCM Digital Low Side Driver (LSD) output is detecting a low output when OFF.
	1. Row lift 1 solenoid not connected or harness connection open. 2. Row lift 1 solenoid return not connected to PWR. 3. Row lift 1 solenoid device failure – coil open.
4315-03 (2140 and 2160 model planters)	Row Lift Solenoid SV1
	Planter UCM Digital Low Side Driver (LSD) Output cannot drive output low to activate Row Lift 2 Solenoid.
	1. Harness connection to the row lift 2 solenoid shorted to PWR or ECU PWR. 2. Row lift 2 solenoid device failure – coil shorted.
4315-04 (2140 and 2160 model planters)	Row Lift Solenoid SV1
	Planter UCM Digital Low Side Driver (LSD) Output is detecting a low output when OFF.
	1. Row Lift 2 solenoid not connected or harness connection open. 2. Row Lift 2 solenoid return not connected to PWR. 3. Row Lift 2 solenoid device failure - coil open.
4317-03	Liquid Fertilizer Section Valve PWR
	Planter UCM Digital Low Side Driver (LSD) Output cannot drive output low to activate liquid fertilizer section valve motor.
	1. Harness connection to the liquid fertilizer section valve shorted to PWR or ECU PWR. 2. Liquid fertilizer section valve device failure - motor coil shorted.
4405-05 (2120 model planters, 6/8R30)	Granular Motor 1
	Frequency feedback reading invalid. Sensor unplugged.
	Measured voltage between **1.5 V** and **4.5 V** for **2 s** on UCM pin FQ05.
	1. Check the harness and connections for an open circuit. 2. Ensure the sensor is functional.
4406	Alternator Speed Sensor
4407-00	Planter Left Wheel Speed Sensor Fault
	Planter UCM Frequency Input connected to the planter left wheel speed sensor is detecting an above normal frequency. Detected speed greater than **72 km/h** (**45 mph**).
	1. Distance incorrectly calibrated and incorrect speed reported. The correct calibration value should be about 61.00 for both the left and right wheel speed sensors. 2. Planter traveled faster than **72 km/h** (**45 mph**).

4407-05	Planter Left Wheel Speed Sensor Fault
	Planter UCM Frequency Input connected to the planter left wheel speed sensor is detecting a below normal current or an open circuit.
	1. Planter left wheel speed sensor not connected. 2. Open circuit in harness connection to planter left wheel speed sensor. 3. Planter left wheel speed sensor device failure.
4407-08	Planter Left Wheel Speed Sensor Fault
	Planter UCM Frequency Input connected to the planter left wheel speed sensor is detecting an unstable, constantly changing, frequency.
	1. Planter left wheel speed sensor not properly adjusted. 2. Intermittent connection in the left wheel speed sensor or harness. 3. Speed sensor target wheel damaged or warped.
4407-12	Planter Left Wheel Speed Sensor Fault
	Planter UCM Frequency Input connected to the planter left wheel speed sensor is detecting no frequency input.
	1. Bad connection or open circuit in power or ground wire to the left wheel speed sensor. 2. Planter left wheel speed sensor device failure.
4409-00	Planter Right Wheel Speed Sensor
	Planter UCM Frequency Input connected to the planter right wheel speed sensor is detecting an above normal frequency.
	1. Distance incorrectly calibrated and incorrect speed reported. The correct calibration value should be about 61.00 for both the left and right wheel speed sensors 2. Planter traveled faster than **72 km/h** (**45 mph**).
4409-05	Planter Right Wheel Speed Sensor
	Planter UCM Frequency Input connected to the planter right wheel speed sensor is detecting a below normal current or an open circuit.
	1. Planter right wheel speed sensor not connected. 2. Open circuit in harness connection to planter right wheel speed sensor. 3. Planter right wheel speed sensor device failure.
4409-08	Planter Right Wheel Speed Sensor
	Planter UCM Frequency Input connected to the planter right wheel speed sensor is detecting an unstable, constantly changing, frequency.
	1. Planter right wheel speed sensor not properly adjusted. 2. Intermittent connection in the left wheel speed sensor or harness. 3. Speed sensor target wheel damaged or warped.
4409-12	Planter Right Wheel Speed Sensor
	Planter UCM Frequency Input connected to the planter right wheel speed sensor is detecting no frequency input.
	1. Bad connection or open circuit in power or ground wire to the left wheel speed sensor. 2. Planter left wheel speed sensor device failure.
4410-05	Bulk Fill Fan Speed Fault
	Planter UCM Frequency Input connected to the planter's bulk fill fan speed sensor detecting an above normal voltage.
	1. Bulk fill fan speed sensor not connected. 2. Open circuit in harness connection to bulk fill fan speed sensor. 3. Bulk fill fan speed sensor device failure.
4412-05 (2120 model planters, 6/8R30)	Granular Motor 2
	Frequency feedback reading invalid. Sensor unplugged.
	Measured voltage between **1.5 V** and **4.5 V** for **2 s** on UCM pin FQ12.
	1. Check the harness and connections for an open circuit. 2. Ensure the sensor is functional.
4419-00	Planter GPS Ground Speed Sensor
	Unable to retrieve configuration from the planter.
	Check harness connections.

4419-05	Planter GPS Ground Speed Sensor
	Unable to retrieve sensor configuration from planter.
	Check harness connections.
4419-08	Planter GPS Ground Speed Sensor
	Unable to retrieve ID from the planter.
	Check harness connections.
4500-12	Planter Controller Offline
	Communication interrupted between the display and the planter UCM.
	1. Implement CAN Bus not properly terminated. Check for terminator at the end of the CAN Bus. 2. Loose or intermittent Implement CAN Bus connection between the display and the planter UCM. 3. Loose or intermittent power connection between the tractor and the planter UCM. 4. Faulty third party device on the Implement CAN Bus.
4501-12	Planter Controller Disabled
	The planter UCM has logged a fault that inhibits planting.
	1. The planter UCM failed initialization at power up. 2. The planter UCM has detected a fault in a control system that inhibits planting. Go to the “Fault Archive” screen (Home > Diagnostics > Fault) to identify the source of the problem.
4503-12	Display Software Update Required
	The system has determined that an update of the display software is required.
	Contact your CASE IH dealer for up-to-date software.
4504-12	Planter Config Unknown
	The display was unable to obtain the planter configuration from the UCM on the planter. Possible causes:
	1. Implement CAN Bus not properly terminated. Check for terminator at the end of the CAN Bus. 2. Loose or intermittent Implement CAN Bus connection between the Display and planter UCM. 3. Loose or intermittent power connection between the tractor and the planter UCM. 4. Faulty third party device on the Implement CAN Bus.
4505-12	Sensor Config Unknown
	The display was unable to obtain the sensor configuration from the UCM on the planter. Possible causes:
	1. Implement CAN Bus not properly terminated. Check for terminator at the end of the CAN Bus. 2. Loose or intermittent Implement CAN Bus connection between the Display and planter UCM. 3. Loose or intermittent power connection between the tractor and the planter UCM. 4. Faulty third party device on the Implement CAN Bus.
4506-12	Planter ID Unknown
	The display was unable to obtain the product configuration from the UCM on the planter. Possible causes:
	1. Implement CAN Bus not properly terminated. Check for terminator at the end of the CAN Bus. 2. Loose or intermittent Implement CAN Bus connection between the Display and planter UCM. 3. Loose or intermittent power connection between the tractor and the planter UCM. 4. Faulty third party device on the Implement CAN Bus.

46012	Row nn Fail
	The row indicated is currently in a failed state; not planting.
	1. Check the seed meter drive for proper operation and a successful prime. 2. Check electrical connections to the seed meter drive. 3. If the planter is equipped with a speed belt: Check electrical connections to the speed belt drive Check the belt for obstructions in either the seed or return sides. 4. If the planter is equipped with a seed tube: Check electrical connections to seed sensor. Check the tube for obstructions.
46032	Row nn Blocked
	Seed sensor at the indicated row blocked.
	1. Vacuum is too low or not turned on. 2. Seed hopper is empty. 3. Seed tube is blocked. 4. Seed sensor lens requires cleaning.
46042	Seed Rate Out of Range
	1. Check the harness connections. 2. Check the seeds/disc settings. 3. Ensure the speed source is valid.
46052	Unexpected Seed Flow
	Seed flow has been detected when the row should have been off (not planting).
	1. Check seed meter drive (VDM) for proper operation. 2. Check speed belt for debris.
46062	Product Master Off
	Product Master Apply is off while the planter is lowered and moving.
	1. Frame is above the stop plant height. 2. Frame calibration set incorrectly. 3. Press the “Apply” button in the “Master Control” window until it is highlighted.
47002	Vacuum Turned Off While Planting
	The vacuum controller is off but the planter is in an active planting mode (Product Master is in Apply mode). The vacuum system is required for planting. Activate the vacuum controller while planting.
47012	Vacuum nn At Min Speed
	The vacuum controller is operating at minimum speed.
	1. Increase the speed or controller rate. 2. Check the hydraulic system for proper flow to the vacuum fan hydraulic motor. 3. Check the vacuum sensor.
4702-02	Vacuum nn At Max Speed
	The vacuum controller is operating at maximum speed.
	1. Decrease the speed or controller rate. 2. Check the hydraulic system for proper flow to the vacuum fan hydraulic motor. 3. Check for vacuum leaks. 4. Check the vacuum sensor.
4703-02	Vacuum nn Control at **100%** PWM duty cycle
	The vacuum controller is operating at **100%** of its duty cycle and is not able to obtain the desired speed.
	1. Check the hydraulic system for proper flow to the vacuum fan hydraulic motor. 2. Check the vacuum sensor.
4704-02	Vacuum nn Out of Range
	The vacuum controller is operating outside the expected range. Check the hydraulic system for proper flow to the vacuum fan hydraulic motor. Check the vacuum sensor. Check for vacuum leaks. Insure the seed discs are primed.
48018	Seed Bin Level Low
	The seed bin is indicating it is low on seed. Refill the bin.

48012	Bulk Fill Fan Off While Planting
	The bulk fan controller is off but the planter is in an active planting mode (“Master Control” window is in “Apply” mode). The bulk fan system is required for planting. Activate the bulk fan controller while planting.
48022	Bulk Fill Fan At Min Speed
	The bulk fan controller is operating at minimum speed. Increase the speed or controller rate. Check the hydraulic system for proper flow to the bulk fan hydraulic motor. Check the bulk fan speed sensor.
48032	Bulk Fill Fan at Max Speed
	The bulk fan controller is operating at maximum speed. Decrease the speed or controller rate. Check the hydraulic system for proper flow to the bulk fan hydraulic motor. Check for pressure leaks. Check the bulk fan speed sensor.
4804-02	Bulk Fill Control at **100%** PWM duty cycle
	The bulk fan controller is operating at **100%** of its duty cycle and is not able to obtain the desired speed. Check the hydraulic system for proper flow to the bulk fan hydraulic motor. Check for pressure leaks. Check the bulk fan speed sensor.
4805-02	Bulk Fill Fan Rate out of Range
	The bulk fan controller is operating above maximum or below minimum speed. Adjust the speed or controller rate. Check the hydraulic system for proper flow to the bulk fan hydraulic motor. Check for pressure leaks. Check the bulk fan speed sensor.
4900-16	Row Unit PDP Pressure High
	The PDP pressure is **69 kPa** (**10 psi**) higher than the desired pressure. Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation.
4900-18	Row Unit PDP Pressure Low
	The PDP pressure is **69 kPa** (**10 psi**) lower than the desired pressure. Check the airlines for a possible air leak. Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation.
50007 (2160 model planters)	Implement Steering Axle
	The steering wheel angle sensor is indicated that the steering wheels are not centered.
	1. Stop the vehicle and manually center the steering system. 2. If the axle is already aligned, check the steering calibration.
50017 (2160 model planters)	Implement Steering Axle
	Steering tracks are not aligned. Stop vehicle and manually align steering track system. If tracks are aligned, check harness and hydraulics for damage.
50027 (2160 model planters)	Implement Steering Angle
	The steering track sensor is indicated that the tracks are >/= 4 degrees from center.
	1. Stop the vehicle and manually center the steering system. 2. If the axle is already aligned, check the steering calibration. Check the harness and hydraulics.
5003-07 (2160 model planters)	Implement Steering Angle
	The steering track sensor is indicated that the tracks are 2 - 4 degrees from center.
	Raise and lower the planter to initiate auto-centering.
	If the tracks are aligned, check the harness and hydraulics.
51008	Row Cleaner Lift Pressure Low
	The Cleaner lift pressure is **69 kPa** (**10 psi**) lower than the desired pressure. Check the airlines for a possible air leak. Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation.
51016	Row Cleaner Lift Pressure High
	The Cleaner lift pressure is **69 kPa** (**10 psi**) higher than the desired pressure. Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation.
51028	Row Cleaner Down Pressure Low
	The Cleaner down pressure is **69 kPa** (**10 psi**) lower than the desired pressure. Check the airlines for a possible air leak. Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation.

51036	Row Cleaner Down Pressure High
	The Cleaner down pressure is **69 kPa** (**10 psi**) higher than the desired pressure. Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation.
51046	Row Cleaner Lift Pressure Detected
	The Cleaner detected positive lift pressure at system startup. The Cleaner should not have positive lift pressure at startup. Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation.
51054	Row Cleaner Lift and Down Pressure
	The Cleaner detected positive pressure on both the lift and down pressure sides of the cylinders. Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation.
51064	Row Cleaner Transition Failed
	The Cleaner was unable to change modes properly (Float, Down, Lift, Full) Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation.
52028	Row Closer Down Pressure Low
	The Closer pressure is **69 kPa** (**10 psi**) lower than the desired pressure. Check the airlines for a possible air leak. Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation.
52036	Row Closer Down Pressure High
	The Closer pressure is **69 kPa** (**10 psi**) higher than the desired pressure. Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation.
53008	Compressor Tank Pressure Too Low
	The compressor was not able to reach its normal operating tank pressure. Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation. Check airline connections and tank for leaks.
53016	Compressor Tank Pressure Too High
	The compressor is operating at too high a tank pressure. Check the valve block assembly for a sticking valve. Check compressor and compressor pressure control circuit for proper operation.
53027	Compressor On Timeout
	The compressor has been in continuous operation for **10 min**. To continue running, the operator must over-ride the compressor shut-off. The operator is permitted to do this three consecutive times. After the third time, the compressor will be locked out until the system is restarted. Check the system for air leaks that might be causing this condition.
53037	Compressor Lockout
	The compressor has been in continuous operation for **10 min** or more and has reached a point at which it has been locked out. A key cycle will be required in order to operate the compressor further. Check the system for air leaks that might be causing this condition.
54000	Max wing down force Limit
	Wing Down Force is at maximum allowable for planter.
	1. Measured wing down force is exceeded maximum allowable for planter for more than 5 consecutive seconds. 2. Check the valve block assembly for a sticking valve. 3. Ensure wing down force settings are correct. 4. Check the wing down force pressure sensor feedback.
54017	Wing Down Force On While Planter Raised
	1. Check harnessing and pressure sensor on Wing Down Force valve. 2. Check hydraulic connections to the tractor.
54027	Wing Down Force Control Error
	Wing Down Force is below target amount.
	1. Measured wing down force is **136 kg** (**300 lb**) above the target amount for 30 consecutive seconds. 2. Ensure wing down force settings are correct. 3. Check the valve block assembly for a sticking valve. 4. Check the wing down force pressure sensor feedback.

54037	Wing Down Force Control Error
	Wing Down Force is above target amount.
	1. Measured wing down force is **136 kg** (**300 lb**) above the target amount for 30 consecutive seconds. 2. Ensure wing down force settings are correct. 3. Check the valve block assembly for a sticking valve. 4. Check the wing down force pressure sensor feedback.
54047	Wing Down Force Off While Planting
	1. Turn wing down force ON.
5500-12	Gran Chem Offline
	Toolbox>Config Active granular chemical set to Yes", but no granular chemical system detected.
	1. No granular chemical system installed on planter. 2. Open circuit in harness connecting UCM to the granular chemical control box. 3. Terminator on Aux CAN Bus missing.
55012	Gran Chem Application Detected
	Granular chemical system sensors detecting product when control is off.
	1. Granular chemical meter device failure. 2. Granular chemical meter sensor failure.
55021	Gran Chem Row Not Applying
	Granular chemical system sensors not detecting product flow when control in on.
	1. Granular chemical smart box is empty. 2. Granular chemical meter device failure. 3. Granular chemical meter sensor failure.
55032	Gran Chem Row Offline
	Granular chemical system not communicating with the indicated granular chemical Meter.
	1. Open circuit in harness from granular chemical control box to granular chemical Meter. 2. Granular chemical meter device failure.
5505-02 (2120 model planters, 6/8R30)	Feedback granular rate out of target range
	Above or below alarm limit for **10 s**
	1. Open the Granular Control window to see the motor speed. Drive the tractor at a speed that brings the application rate to within the configured alarm limits. 2. Check the square shaft to see if it is actually spinning. 3. Check for a bad sensor, a broken chain, a sticky hydraulic valve, or a jammed augur.
5506-07 (2120 model planters, 6/8R30	Motor is rotating in reversed direction
56006	Alternator Over Speed
	The alternator has existed in a condition in which the actual speed is more than **500 RPM** higher than the commanded speed for **10 s**. Check connections at the alternator (D terminal, W terminal) and connections to the hydraulic valve.
56018	Alternator Under Speed
	The alternator has existed in a condition in which the actual speed is **500 RPM** or more lower than the commanded speed for **10 s**. Check connections at the alternator (D terminal, W terminal) and connections to the hydraulic valve.
56027	Alternator Off While Planting
	The alternator controller is off but the planter is in an active planting mode ("Master Control" window is in "Apply" mode). The alternator is required for planting. Activate the alternator controller while planting.
56034	Alternator Not Charging
	The alternator controller has detected that the alternator is not charging the battery. Possible scenarios include:
	1. Poor connection from the alternator to the battery. Check connections. 2. Connection problems at the W or D terminal of the alternator. Check connections. 3. Possible battery problem. Check battery voltage.

56052	Alternator Ctrl at Min
	The alternator controller is at minimum output but the alternator is still running faster than desired.
	1. Check the connections to the W and D terminals at the alternator. 2. Check for a stuck valve on the hydraulic circuit powering the alternator.
56062	Alternator Ctrl at Max
	The alternator controller is at maximum output but the alternator is not reaching the desired speed.
	1. Check the connections to the W and D terminals at the alternator 2. Check the hydraulic system to insure that the alternator hydraulic motor is operating properly. 3. Check for a stuck valve on the hydraulic circuit powering the alternator.
56072	Alternator Control at **100%** PWM duty cycle
	The alternator controller is at maximum output but the alternator is not reaching the desired speed.
	1. Check the connections to the W and D terminals at the alternator 2. Check the hydraulic system to insure that the alternator hydraulic motor is operating properly. 3. Check for a stuck valve on the hydraulic circuit powering the alternator.
56082	Alternator Not Spinning
	Alternator is on but not spinning. Ensure hydraulic flow to alternator. Check harnessing on alternator for proper connections.
	1. Check the connections to the W and D terminals at the alternator 2. Check the hydraulic system to insure that the alternator hydraulic motor is operating properly. 3. Check for a stuck valve on the hydraulic circuit powering the alternator.
57008	Liquid Fert Pressure
	Liquid Fert pressure is **0.34 bar** (**5 psi**) or lower for five consecutive seconds while applying product (in work and speed > **1.6 km/h** (**1 mph**)).
	1. Orifice size too large for set application rate. 2. Leak in liquid system.
5701-16	Liquid Fert Pressure
	Liquid fertilizer system pressure too high.
	1. Orifice size to small for set application rate. 2. Liquid section valves not opening. 3. Open circuit in harness connection from UCM to liquid section valves. 4. Blocked liquid row nozzles. 5. If individual liquid row nozzle control installed: Open circuit in harness connection from VDM to individual liquid row nozzle.
5702-02	Liquid Fert Pump at Min Speed
	Liquid controller is at minimum output limit, but liquid flow is still over target.
	1. Target rate for liquid controller set too low. 2. Flow meter not calibrated correctly. 3. Hydraulic valve controlling hydraulic supply to pump motor sticking. 4. Indicated ground speed is incorrect.
5703-02	Liquid Fert Pump at Max Speed
	Liquid controller is at maximum output limit, but liquid flow is still under target.
	1. Target rate for liquid controller set too high. 2. Inadequate hydraulic supply to pump motor. 3. Flow meter not calibrated correctly. 4. Hydraulic valve controlling hydraulic supply to pump motor sticking. 5. Indicated ground speed is incorrect.

5704-02	Liquid Control Valve at **100%** PWM duty cycle
	Liquid controller is at maximum output.
	1. Target rate for liquid controller is too high. 2. Hydraulics not engaged. 3. Inadequate hydraulic supply to pump motor. 4. Hydraulic valve controlling hydraulic supply to pump motor damaged. 5. Flow meter not calibrated correctly. 6. Flow meter device failure. 7. Indicated ground speed is incorrect.
57067	Liquid Pump Dry
	No liquid pressure detected. Liquid control is shut off. Running the pump dry can damage seals. Ensure that liquid from the tank is getting to the pump.
	1. No liquid from liquid tank to pump. 2. Pressure sensor damaged or unplugged.
58013	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VB is above normal.
	Voltage level on ECU PWR from the tractor above normal.
58014	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VB is below normal.
	1. Voltage level on main ECU PWR from tractor below normal. 2. UCM main harness in UCM enclosure damaged.
58023	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VP is above normal.
	Voltage level on ECU PWR from the tractor above normal.
58024	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VP is below normal.
	1. Voltage level on ECU PWR from tractor below normal. 2. UCM main harness in UCM enclosure damaged.
58033	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VA1 is above normal.
	Voltage level on ECU PWR from the tractor above normal.
58034	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VA1 is below normal.
	1. Voltage level on ECU PWR from tractor below normal. 2. UCM main harness in UCM enclosure damaged.
58043	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VF1 is above normal.
	Voltage level on main PWR from the tractor above normal.
58044	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VF1 is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR control relay in UCM enclosure failed to operate. 3. PWR fuse 1 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.
58053	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VH1 is above normal.
	Voltage level on main PWR from the tractor above normal.
58054	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VH1 is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR control relay in UCM enclosure failed to operate. 3. PWR fuse 1 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.

58063	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VM is above normal.
	Voltage level on main PWR from the tractor above normal.
58064	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VM is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR control relay in UCM enclosure failed to operate. 3. PWR fuse 1 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.
58073	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VF3 is above normal.
	Voltage level on main PWR from the tractor above normal.
58074	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VF3 is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR control relay in UCM enclosure failed to operate. 3. PWR fuse 2 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.
58083	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VH is above normal.
	Voltage level on main PWR from the tractor above normal.
58084	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VH is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR control relay in UCM enclosure failed to operate. 3. PWR fuse 1 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.
58093	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VS2 is above normal.
	Voltage level on main PWR from the tractor above normal.
58094	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VS2 is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR control relay in UCM enclosure failed to operate. 3. PWR fuse 3 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.
58103	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VF2 is above normal.
	Voltage level on main PWR from the tractor above normal.
58104	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VF2 is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR control relay in UCM enclosure failed to operate. 3. PWR fuse 3 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.
58113	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VR is above normal.
	Voltage level on main PWR from the tractor above normal.
58114	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VR is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR control relay in UCM enclosure failed to operate. 3. PWR fuse 3 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.

58123	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VS1 is above normal.
	Voltage level on main PWR from the tractor above normal.
58124	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VS1 is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR control relay in UCM enclosure failed to operate. 3. PWR fuse 3 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.
58133	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VT1 is above normal.
	Voltage level on main PWR from the tractor above normal.
58134	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VT1 is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR control relay in UCM enclosure failed to operate. 3. PWR fuse 2 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.
58143	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VD is above normal.
	Voltage level on main PWR from the tractor above normal.
58144	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VD is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR control relay in UCM enclosure failed to operate. 3. PWR fuse 2 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.
58153	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VU2 is above normal.
	Voltage level on main PWR from the tractor above normal.
58154	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VU2 is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR control relay in UCM enclosure failed to operate. 3. PWR fuse 2 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.
58163	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VU1 is above normal.
	Voltage level on main PWR from the tractor above normal.
58164	UCM Power Fault (**12 V**)
	Planter UCM detecting the voltage at power input 12VU1 is below normal.
	1. Voltage level on main PWR from tractor below normal. 2. PWR Control Relay in UCM enclosure failed to operate. 3. PWR fuse 2 in UCM enclosure open. 4. UCM main harness in UCM enclosure damaged.
58173	UCM Power Fault (**8.5 V**)
	Planter UCM internal 8V5REF power supply above normal.
58174	UCM Power Fault (**8.5 V**)
	Planter UCM internal 8V5REF power supply below normal.
58183	UCM Power Fault (**5 V**)
	Planter UCM internal 5VREF IN power supply above normal.
58184	UCM Power Fault (**5 V**)
	Planter UCM internal 5VREF IN power supply below normal.
58193	UCM Power Fault (**1 V**)
	Planter UCM internal 1VREF power supply above normal.

58194	UCM Power Fault (**1 V**)
	Planter UCM internal 1VREF power supply below normal.
5820-03	UCM Power Fault (**5 V**)
	Planter UCM internal 5VREF IN power supply above normal.
5820-04	UCM Power Fault (**5 V**)
	Planter UCM internal 5VREF IN power supply below normal.
58213	UCM Power Fault (**5 V**)
	Planter UCM internal 5VREF3 OUT power supply above normal.
58214	UCM Power Fault (**5 V**)
	Planter UCM internal 5VREF3 OUT power supply below normal.
58223	UCM Power Fault (**5 V**)
	Planter UCM internal 5VREF 2 OUT power supply above normal.
58224	UCM Power Fault (**5 V**)
	Planter UCM internal 5VREF2 OUT power supply below normal.
58233	UCM Power Fault (**5 V**)
	Planter UCM internal 5VREF1 OUT power supply above normal.
58234	UCM Power Fault (**5 V**)
	Planter UCM internal 5VREF1 OUT power supply below normal.
5903-05	Load Sensor Error
	Load sensor on row #__ is missing. Check harness for proper connections or damaged.
	1. Load cell may not be connected. 2. Open circuit in harness connection to load cell 3. Recalibrate load cell and verify function of SRM 4. Load cell device failure – replace load cell and calibrate. Load Pin can be disabled to continue or cycle power to clear condition.
5904-18	Load Sensor Error
	The load sensor on row #___ is exhibiting a negative load pin value.
	Re-zero the load cell. See “Load cell calibration” (**Load cell calibration**). 2. Load cell device failure – replace load cell and calibrate.
59055	Hydraulic Down Force Error
	Hydraulic Down Force solenoid on row #___ is not detected. Check harnessing for proper connections or damage. Cycle power to clear condition.
	1. Hydraulic down force solenoid not connected. 2. Open circuit in harness connection to solenoid. 3. Hydraulic down force solenoid device failure – coil open.
5908-16	Hydraulic Down Force Error
	Hydraulic Down Force load reading is too high on row #___. Confirm down force settings.
	Harness connection to load cell damaged. 2. Load cell device failure – replace load cell and calibrate.
5909-18	Hydraulic Down Force Error
	Hydraulic Down Force load reading is too low on row #___. Confirm down force settings
	1. Check sensor connection and re-zero. 2. If the problem persists, disable or replace the sensor.
5910-16	Hydraulic Down Force Error
	Row #__ load sensor is more than **445 N** (**100 lb**) different from other rows.
	Temporarily disable the sensor, or check the mechanical settings and re-zero load sensor.
5911-18	Row # __ load sensor reading is out of range.
	1. Re-zero the load sensor. 2.Disable the sensor if damage is suspected.
5912-16	Load Sensor Error
	Intermittent detection Row # __ load sensor.
	1. Cycle power to clear the error. 2. Check harnessing and sensor for damage. 3. Disable the sensor to continue operation.
5913-02	Watchdog timer expired
	Restart the system.

5914-02	Load Sensor Error
	Hydraulic down force supply pressure is not detected.
	Check harness connections to the pressure sensor.
5916-02	Load Sensor Error
	Voltage on #___ Row module is below **9.5 V**.
	Check battery connections and alternator for proper function.
5917-02	Hydraulic Down Force Error
	Voltage on #___ Row module is between **10.5 V** and **9.5 V**.
	Check battery connections and alternator for proper function.
5918-02	Load Sensor Error
	Average down force for the SRM at the designated row number is < **–431 kg** (**–950 lb**) or > **431 kg** (**950 lb**)
	1. Re-zero the load cell. See “Load cell calibration” (**Load cell calibration**). 2. Load cell device failure – replace load cell and calibrate.
5919-02	Load Sensor Error
	Load Cell at the indicated row number has an intermittent connection.
	1. Harness has a bad/intermittent connection to load cell 2. Load cell device failure – replace load cell and calibrate.
5921-18	Hydraulic Down Force Error
	SRM at the indicated row number has detected low pressure in hydraulic down force (**DeltaForce®**) system.
	1. Trouble with hydraulic supply pressure to hydraulic down pressure system. 2. Harness connection to hydraulic down force pressure sensor. 3. Hydraulic down force pressure sensor device failure.
5922-04	Hydraulic Down Force Error
	SRM at the indicated row number has detected an open circuit on its output to the hydraulic down force (**DeltaForce®**) solenoid.
	1. Hydraulic down force solenoid not connected. 2. Open circuit in harness connection to hydraulic down force solenoid. 3. Hydraulic down force solenoid device failure.
5924-04	Low System Voltage
	Row #__ is applying a very low force compared to the other rows. The force is changed to the average on this row.
	Check row for damage at next power down.
5925-04	Low System Voltage
	Hydraulic down force disabled while planting. Check configuration and settings.
	Ensure frame height calibrations are correct.
59262	Device Detection Error
	SRM at the indicated row number unable to detect seed sensor.
	1. Open circuit in harness connection to seed sensor. 2. Seed Sensor device failure.
59282	Device Detection Error
	SRM at the indicated row number unable to detect seed meter drive.
	1. Open circuit in harness connection to seed meter drive. 2. Seed meter drive (VDM) device failure.
5929-13	Gyro Error
	The gyro turning rate does not match the GPS turning rate.
	Ensure that the gyro is installed properly and is calibrated.
5930-16	Hydraulic Down Force Error
	Communication with Seed Meter on row #___ has been lost.
	The planter Universal Control Module (UCM) A-001 generates this alarm when the communication between the UCM A-001 and the seed meter on a certain row is lost.
	Check harnessing for connections or broken wires.

5931-18	Hydraulic Down Force Error
	Unexpected Reset of Seed Meter Drive Module on row # ___.
	1. Check harnessing for connections and broken wires. 2. Cycle power to clear.
5971-07	Hydraulic Down Force Disabled
	Gyro data is erratic. Turn rate compensation has been disabled.
	The planter master Single Row Module (SRM) A-002 provides the **5.0 V** auxiliary power and ground reference to the gyro B-025 and monitors the z-axis signal generated by the gyro B-025. If the unfiltered gyro B-025 signal is significantly different than the filtered gyro B-025 signal, this fault occurs.
	Check the gyro for damage.
5972-07	Hydraulic Down Force Disabled
	Unstable gyro reading. Turn rate compensation has been disabled.
	The planter master Single Row Module (SRM) A-002 provides the 5.0 V auxiliary power and ground reference to the gyro B-025 and monitors the z-axis signal generated by the gyro B-025. If the gyro B-025 signal rate of change is too high, this fault occurs.
	Check the gyro for damage.
5973-12	Hydraulic Down Force Disabled
	The gyro is not detected. Turn rate compensation has been disabled.
	The planter master Single Row Module (SRM) A-002 provides the 5.0 V auxiliary power and ground reference to the gyro B-025 and monitors the z-axis signal generated by the gyro B-025. If the gyro B-025 signal level is **0.0 V** and it remains at **0.0 V**, this fault occurs.
	Check gyro for damage.
60012	Seed Meter Communication Lost
	SRM at the indicated row number can no longer communicate with the seed meter drive (VDM).
	1. VDM at the indicated row number has an intermittent connection. 2. Row CAN Bus harnessing has a bad/intermittent connection between SRM and VDM. 3. Seed meter drive (VDM) device failure.
6002-12	Unexpected Electric Meter Module Reset
	Row #__ is experiencing significant CAN communication errors on the row bus.
	1. Check connections. 2. Cycle power to clear the fault.
60032	Gyro Error
	Gyro data is erratic – turn compensation disabled.
	1. Gyro mounting problem within Power Distribution Module (PDM). 2. Intermittent connection to Gyro within the PDM. 3. Gyro in PDM device failure.
60040	Gyro Error
	Gyro signal rate of change to high – turn compensation disabled.
	Possible damage to Gyro within Power Distribution Module (PDM).
60050	Gyro Error
	Gyro is not detected – turn compensation disabled.
	1. Open circuit in harness connection to Gyro within the Power Distribution Module (PDM). 2. Gyro in PDM device failure.
60068	Seed Meter Stability Error
	Seed Meter motor at the indicated row number is unstable. Check seed meter for damage.
6007-12	Acceleration Error
	Row #__ has detected a meter jam and was unable to unjam itself.
	The planter Single Row Module (SRM) A-004 generates this alarm when the motor driver Integrated Circuit (IC) reports an over current condition and the vDrive Module (VDM) A-006 for **SpeedTube™** equipped machines. Also the vDrive Module (VDM) A-007 for machines without the **SpeedTube™** option unsuccessfully tried to unjam itself.
	Check the meter for debris or damage.

6032-19	Row CAN Error
	This fault is logged without a popup notification.
	Motor Encoder is reporting zero speed, but the motor current is consistent with the vDrive operating properly.
6033-18	Seed Meter Voltage Low
	Row #__ is detecting an open circuit condition.
	1. Check harnessing and meter for damage. 2. Cycle power to clear the condition.
6034-01	Seed Meter Voltage Low
	Row #__ is detecting an over temperature condition.
	The Seed Meter PWM driver reports itself as over temperature for **10 s**.
	Check the meter for debris or damage.
60355	Seed Meter Current High
	Seed meter motor at the indicated row number drawing excessive amount of current.
	1. Excessive debris in the seed meter. 2. Possible seed meter damage.
60370	Seed Meter Hard Jam
	Seed Meter at the indicated row number has detected a meter jam and is unable to unjam itself.
	1. Excessive debris in the seed meter. 2. Possible seed meter damage.
6038-12	Seed Meter Encoder Error Row #__
	Row #__ seed meter motor duty is **10%** lower than the planter average.
	Check for damage or debris.
60395	Seed Meter Open Circuit
	SRM at the indicated row number unable to detect seed meter drive.
	1. Open circuit in harness connection to seed meter drive. 2. Seed meter drive (VDM) device failure.
6040-16	Seed Meter Driver Temp
	20/20 SeedSense® installed, but not detected.
	1. Check wiring from the **20/20 SeedSense®** System to the planter CAN Bus at Row 1. 2. A power cycle required to plant.
6041-07	Seed Meter Rate Error
	There is a break in program line after row #___. Planting can continue as long as row modules are not moved or replaced.
	Repair the harness as soon as possible.
60426	Seed Meter Clutch Output
	Seed Meter clutch output at the indicated row number used to drive individual liquid row shut off drawing excessive current.
	1. Possible damage in harnessing from VDM to individual row nozzle valve. 2. Individual row nozzle device failure.
6066-16	VDM Duty Cycle High
	Row module on row #___ offline.
	Check harnessing connections and cycle power to clear the condition.
	Planting cannot occur until the condition is fixed.
6067-18	VDM Duty Cycle Low
	Some row modules are offline.
	Check harnessing connections and cycle power to clear the condition.
	Planting cannot occur until the condition is fixed.

61012	20/20 System Detected
	Planter configured for CASE IH display control, but the planter UCM has detected 20/20 system connected. Both planter UCM and 20/20 system sending commands and possible software upgrades to the row unit electronic modules (SRM, VDM and STM).
	1. Disconnect 20/20 system from the Planter (High Speed) CAN bus. OR 2. Leave 20/20 system connected, but reconfigure Planter for 20/20 Display Control. Recycle power to allow the re-initialization of the row unit electronic modules (SRM, VDM and STM).
61022	20/20 System Not Detected
	Planter configured for 20/20 Display Control, but the Planter UCM does not detect 20/20 system.
	Planter UCM does not send commands and possible software upgrades to the row unit electronic modules (SRM, VDM and STM).
	1. Connect 20/20 system to the Planter (High Speed) CAN bus for 20/20 Display control. OR 2. Reconfigure the planter for AFS Pro 700 display control (if equipped with the AFS Pro 700) or disable 20/20 Display control in the universal terminal (if equipped with the AFS Pro 1200. Recycle power to allow the initialization of the row unit electronic modules (SRM, VDM and STM).
61032	Row Module Wake Up Line Break Detected
	The planter UCM detects a break in the daisy chain process during power up. The planter can continue to plant as long as no SRMs are moved or replaced.
	1. The number of SRMs detected equal the number of SRMs expected. 2. Planter UCM matches SRM serial numbers to previously assigned row positions. 3. Planter UCM identifies the last match to determine location of daisy chain break. 4. Open Wake Up Line in harnessing at identified row number.
6104-12	Row Module Wake Up Out Break Detected
	The planter UCM detects a break in the daisy chain process during power up. The planter can continue to plant as long as no SRMs are moved or replaced.
	1. The number of SRMs detected equal the number of SRMs expected. 2. Planter UCM matches SRM serial numbers to previously assigned row positions. 3. Planter UCM identifies the last match to determine location of daisy chain break. 4. Open Wake Up Out line in harnessing at identified row number.
61052	Row Modules Offline
	The SRM at the indicated row number is offline.
	1. During the daisy chain process at power up, the number of SRMs detected by the planter UCM is less than the expected number. 2. The SRMs that are detected match the previously assigned serial number to row position. 3. The SRMs identified as offline are not connected. 4. Open circuit in row harness to the identified SRMs.
61062	Row Modules Offline
	All or multiple SRMs are offline. Row numbers cannot be identified.
	1. During the daisy chain process at power up, the number of SRMs detected by the planter UCM is less than the expected number. 2. The SRMs that are detected to not match the previously assigned serial number to row position. 3. Any SRM may be disconnected. 4. Open circuit may be on any row harness.
61072	Wake Up In Line Short to GND
	Multiple SRMs identifying themselves as the SRM as first in the daisy chain process.
	The planter UCM compares previously assigned SRM serial number to assigned addresses to identify the SRM row number that most likely has its Wake Up in line shorted to ground.

61082	SRM Firmware Update Error
	SRM at the indicated row number failed the software update process.
	1. SRM not connected. 2. Open circuit or intermittent connection in harness between UCM and SRM. 3. After checking SRM connections, cycle power to retry firmware update.
61092	VDM Firmware Update Error
	VDM at the indicated row number failed the software update process.
	1. VDM not connected. 2. Open circuit or intermittent connection in harness between SRM and VDM. 3. After checking STM connections, cycle power to retry firmware update.
61102	Speed Belt Module Firmware Update Error
	The Speed Belt (STM) at the indicated row number failed the software update process.
	1. STM not connected. 2. Open circuit or intermittent connection in harness between SRM and STM. 3. After checking STM connections, cycle power to retry firmware update.
6111-12	Device Detection Error
	SRM at the indicated row number has detected an open circuit on its output to the hydraulic down force (**DeltaForce®**) solenoid.
	1. Hydraulic down force solenoid not connected. 2. Open circuit in harness connection to hydraulic down force solenoid. 3. Hydraulic down force solenoid device failure.
61122	Row Modules Not Detected
	The speed belt sensor on row #__ has sensed an obstruction.
	Check speed belt for debris near the sensor.
6112-14	SRM Reboot While Planting
	The speed belt sensor on row #__ has sensed a persistent obstruction.
	Check speed belt for debris near the sensor.
61132	PDM Sensor Disconnect
	Check to make sure auxiliary input cable inside the PDM is connected.
6200-12	Speed Belt Module Firmware Update Error
	Row #__ is experiencing significant CAN communication errors on the row bus.
	Check connections. Cycle power to clear the error.
6201-12	Speed Belt Communication Lost
	SRM at the indicated row number can no longer communicate with the speed belt drive (STM).
	1. STM at the indicated row number has an intermittent connection. 2. Row CAN Bus harnessing has a bad/intermittent connection between SRM and STM. 3. Speed belt drive (STM) device failure.
6202-12	Unexpected Speed Belt Module Reset
	Row #__ supply voltage below **9.5 V**.
	Check battery and alternator connections and function.
6216-12	Speed Belt Error
	Row #__ is drawing excessive current.
	Check speed belt for debris or damage.
6217-08	Speed Belt Seed Sensor
	Row #__ has detected a speed belt jam and is attempting to unjam itself.
	This code is logged only, with no popup
6218-08	Speed Belt Seed Sensor
	Row #__ has detected a speed belt jam and was unable to unjam itself.
	Check belt for debris or damage.
6232-19	Row CAN Error
	Row #__ has detected a speed belt encoder failure. However, the current is within operation limits.
	This code is logged only, with no popup

6233-18	Speed Belt Voltage Low
	Row #__ is detecting an open circuit condition.
	1. Check harnessing and speed belt for damage. 2. Cycle power to clear the condition.
6234-01	Speed Belt Voltage Low
	Row #__ is detecting an over temperature condition.
	Check speed belt for debris or damage.
6235-15	Speed Belt Current High
	Speed belt (STM) motor at the indicated row number drawing excessive amount of current.
	1. Jammed seed in speed belt. 2. Excessive debris in the seed meter. 3. Possible speed belt damage.
6236-16	Speed Belt Soft Jam
	Fragment Detected on row #__.
	Check seed for damage, dust and debris.
6237-00	Speed Belt Hard Jam
	Speed belt (STM) at the indicated row number has detected a meter jam and is unable to unjam itself.
	1. Jammed seed in speed belt. 2. Excessive debris in the speed belt. 3. Possible speed belt damage.
6238-12	Speed Belt Encoder Error
	Row #__ is detecting a pinned seed between the speed belt and the housing.
	Check seed belt for pinned seeds or debris.
6239-05	Speed Belt Open Circuit
	SRM at the indicated row number unable to detect speed belt drive (STM).
	1. Open circuit in harness connection to STM. 2. Speed belt drive (STM) device failure.
6240-16	Speed Belt Driver Temp
	Row #__ is missing data due to an overburdened CPU.
	This code is logged only, with no popup.
6241-07	Speed Belt Rate Error
	Row #__ is detecting a mismatch in timing between the seed side and the belt side.
	Check belt for debris build up.
6242-08	Fragment Detected
	Row #__ is detecting an obstruction near the seed sensor in the speed belt.
	Check belt for debris.
6243-08	Speed Belt Double
	Row #__ has an actual speed belt motor duty that is significantly higher than the planter average.
	Check for damage or debris.
6244-08	Seed Pinned
	Row #__ has an actual speed belt motor duty that is significantly lower than the planter average.
	Check for damage or debris.
6245-07	Back Legging Debris
	Check harnessing between the planter controller and row modules.
	Cycle power to clear.
6246-12	Speed Belt CPU
	Check harnessing between the planter controller and devices on the Aux CAN bus.
	Cycle power to clear.
6247-08	Speed Belt Timing Error
	Speed belt (STM) at the indicated row number is detecting a mismatch in timing between the flight side and seed side of the belt.
	1. Excessive debris in the speed belt. 2. Possible speed belt damage.

6248-08	Wedged Seed
	Compressor Installed (through installation of PDP, Pneumatic Closer/Cleaner) and the pressure transducer (Analog In 08) senses voltage > **4.8 V**.
	Voltage above normal or shorted to PWR.
	Check harnessing for damage and proper connections.
6270-16	Duty Cycle High
	Compressor Installed (through installation of PDP, Pneumatic Closer/Cleaner) and the pressure transducer (Analog In 08) senses voltage less than **0.2 V**.
	Open Circuit or shorted to GND.
	Check connections and harness for damage.
6271-18	Duty Cycle Low
	Planter is equipped with PDP and AN09 senses voltage above **4.8 V**.
	Shorted to PWR.
	Check connections and harness for damage.
63012	Planter CAN Offline
	Check harnessing between the planter controller and row modules. Cycle power to clear. If problem persists, contact dealer.
63032	Auxiliary CAN Offline
	Check harnessing between the planter controller and devices on the auxiliary CAN bus. Cycle power to clear. If problem persists, contact dealer.
63042	Implement CAN Offline
	Check harnessing between the planter controller and tractor. Cycle power to clear. If problem persists, contact dealer.
6404-03	Carrier Height Sensor
	Not Detected Or Shorted To Ground. Ensure sensor is plugged in.
	Check harness for damage.
6404-04	Carrier Height Sensor
	Short to PWR.
	Check harness for damage.
6405-03	Steering Wheel Angle Sensor
	Not Detected Or Shorted To Ground. Ensure sensor is plugged in.
	Check harness for damage.
6405-04	Steering Wheel Angle Sensor
	Short to PWR.
	Check harness for damage.
6408-03	Pneumatic Tank Pressure Transducer
	Planter UCM analog input connected to the compressor tank pressure sensor is detecting an above normal voltage.
	1. Harness connection to compressor tank pressure sensor is shorted to PWR. 2. Compressor tank pressure sensor device failure.
6408-04	Pneumatic Tank Pressure Transducer
	Planter UCM analog input connected to the compressor tank pressure sensor is detecting a below normal voltage.
	1. Compressor tank pressure sensor not connected. 2. Harness connection to compressor tank pressure sensor open circuit or shorted to ground. 3. Compressor tank pressure sensor device failure.
6409-03	PDP Pressure Sensor
	Planter UCM analog input connected to the Pneumatic Down Pressure (PDP) sensor detecting an above normal voltage.
	1. Harness connection to Pneumatic Down Pressure (PDP) sensor is shorted to PWR. 2. Pneumatic down pressure (PDP) sensor device failure.

6409-04	PDP Pressure Sensor
	Planter UCM analog input connected to the Pneumatic Down Pressure (PDP) sensor detecting a below normal voltage.
	1. Pneumatic down pressure (PDP) sensor not connected. 2. Harness connection to Pneumatic Down Pressure (PDP) sensor open circuit or shorted to ground. 3. Pneumatic down pressure (PDP) sensor device failure.
6413-04	Planter Battery Voltage Low
	Planter UCM analog input connected to the planter battery detecting a below normal voltage.
6434-03	Vacuum Sensor 1
	Planter UCM analog input connected to vacuum sensor 1 is detecting an above normal voltage.
	1. Harness connection to vacuum sensor is shorted to PWR. 2. Vacuum sensor device failure.
6434-04	Vacuum Sensor 1
	Planter UCM analog input connected to vacuum sensor 1 is detecting a below normal voltage.
	1. Vacuum sensor not connected. 2. Harness connection to vacuum sensor open circuit or shorted to ground. 3. Vacuum sensor device failure.
6442-03	Vacuum Sensor 2
	Planter UCM analog input connected to vacuum sensor 2 is detecting an above normal voltage.
	1. Harness connection to vacuum sensor is shorted to PWR. 2. Vacuum sensor device failure.
6442-04	Vacuum Sensor 2
	Planter UCM analog input connected to vacuum sensor 2 is detecting a below normal voltage.
	1. Vacuum sensor not connected. 2. Harness connection to vacuum sensor open circuit or shorted to ground. 3. Vacuum sensor device failure.
6443-03	Toolbar Position Sensor
	Planter UCM analog input connected to the toolbar position sensor is detecting an above normal voltage.
	1. Harness connection to the toolbar position sensor is shorted to PWR. 2. Toolbar position sensor device failure.
6443-04	Toolbar Position Sensor
	Planter UCM analog input connected to the toolbar position sensor is detecting a below normal voltage.
	1. Toolbar position sensor not connected. 2. Harness connection to the toolbar position sensor open circuit or shorted to ground. 3. Toolbar position sensor device failure.
6444-03 (2160 model planters)	Carrier Height Sensor
	Planter UCM analog input connected to the carrier height sensor is detecting an above normal voltage.
	1. Harness connection to the carrier height sensor is shorted to PWR. 2. Carrier height sensor device failure.
6444-03 (2150S model planters)	Left-hand subframe (offset bar) position sensor
	Planter UCM analog input connected to the left-hand subframe position sensor is detecting an above normal voltage.
	1. Harness connection to the left-hand subframe position sensor is shorted to PWR. 2. Left-hand subframe position sensor device failure.

6444-04 (2160 model planters)	Carrier Height Sensor
	Planter UCM analog input connected to the carrier height sensor is detecting a below normal voltage.
	1. Carrier height sensor not connected. 2. Harness connection to the carrier height sensor open circuit or shorted to ground. 3. Carrier height sensor device failure.
6444-04 (2150S model planters)	Left-hand subframe (offset bar) position sensor
	Planter UCM analog input connected to the left-hand subframe position sensor is detecting a below normal voltage.
	1. Left-hand subframe position sensor not connected. 2. Harness connection to the left-hand subframe position sensor open circuit or shorted to ground. 3. Left-hand subframe position sensor device failure.
6445-03 (2160 model planters)	Steering Wheel Angle Sensor
	Planter UCM analog input connected to the steering wheel angle sensor is detecting an above normal voltage.
	1. Harness connection to the steering wheel angle sensor is shorted to PWR. 2. Steering wheel angle sensor device failure.
6445-03 (2150S model planters)	Right-Hand Subframe (offset bar) Position Sensor
	Planter UCM analog input connected to the right-hand subframe position sensor is detecting an above normal voltage.
	1. Harness connection to the right-hand subframe position sensor is shorted to PWR. 2. Right-hand subframe position sensor device failure.
6445-04 (2160 model planters)	Steering Wheel Angle Sensor
	Planter UCM analog input connected to the steering wheel angle sensor is detecting a below normal voltage.
	1. Steering wheel angle sensor not connected. 2. Harness connection to the steering wheel angle sensor open circuit or shorted to ground. 3. Steering wheel angle sensor device failure.
6445-04 (2150S model planters)	Right-Hand Subframe (offset bar) Position Sensor
	Planter UCM analog input connected to the right-hand subframe position sensor is detecting a below normal voltage.
	1. Right-hand subframe position sensor not connected. 2. Harness connection to the right-hand subframe position sensor open circuit or shorted to ground. 3. Right-hand subframe position sensor device failure.
6446-03	Row Cleaner Pressure Sensor
	Planter UCM analog input connected to row cleaner down pressure sensor is detecting an above normal voltage.
	1. Harness connection to the row cleaner down pressure is shorted to PWR. 2. Row cleaner down pressure sensor device failure.
6446-04	Row Cleaner Pressure Sensor
	Planter UCM analog input connected to the row cleaner down pressure sensor is detecting a below normal voltage.
	1. Row cleaner pressure sensor not connected. 2. Harness connection to the row cleaner down pressure open circuit or shorted to ground. 3. Row cleaner down pressure sensor device failure.
6447-03	Row Closer Pressure Sensor
	Planter UCM analog input connected to row closer pressure sensor is detecting an above normal voltage.
	1. Harness connection to the row closer pressure is shorted to PWR. 2. Row closer pressure sensor device failure.

6447-04	Row Closer Pressure Sensor
	Planter UCM analog input connected to the row closer down pressure sensor is detecting a below normal voltage.
	1. Row closer pressure sensor not connected. 2. Harness connection to the row closer pressure open circuit or shorted to ground. 3. Row closer pressure sensor device failure.
6448-03	Row Cleaner Pressure Sensor
	Planter UCM analog input connected to the cleaner lift pressure sensor is detecting an above normal voltage.
	1. Harness connection to the row cleaner lift pressure sensor is shorted to PWR. 2. Row cleaner lift pressure sensor device failure.
6448-04	Row Cleaner Pressure Sensor
	Planter UCM analog input connected to the cleaner lift pressure sensor is detecting a below normal voltage.
	1. Row cleaner lift pressure sensor not connected. 2. Harness connection to the row cleaner lift pressure open circuit or shorted to ground. 3. Row cleaner lift pressure sensor device failure.
6459-03	Hitch Lock Pressure Sensor
	Planter UCM analog input connected to hitch lock pressure sensor is detecting an above normal voltage.
	1. Harness connection to the hitch lock pressure sensor is shorted to PWR. 2. Hitch lock pressure sensor failure.
6459-03 (2150S model planters)	Subframe (offset bar) Downforce Pressure Sensor
	Planter UCM analog input connected to subframe downforce pressure sensor is detecting an above normal voltage.
	1. Harness connection to the subframe downforce pressure sensor is shorted to PWR. 2. Subframe downforce pressure sensor failure.
6459-04	Hitch Lock Pressure Sensor
	Planter UCM analog input connected to hitch lock pressure sensor is detecting an below normal voltage.
	1. Hitch lock pressure sensor not connected. 2. Harness connection to the hitch lock pressure sensor is shorted to GND. 2. Hitch lock pressure sensor failure.
6459-04 (2150S model planters)	Subframe (offset bar) Downforce Pressure Sensor
	Planter UCM analog input connected to subframe downforce pressure sensor is detecting an below normal voltage.
	1. Subframe downforce pressure sensor not connected. 2. Harness connection to the subframe downforce pressure sensor is shorted to GND. 2. Subframe downforce pressure sensor failure.
6460-03	Liquid System Pressure Sensor
	Planter UCM analog input connected to the liquid system pressure sensor detecting and above normal voltage.
	1. Harness connection to the liquid system pressure sensor is shorted to PWR. 2. Liquid system pressure sensor device failure.
6460-04	Liquid System Pressure Sensor
	Planter UCM analog input connected to the liquid system pressure sensor is detecting a below normal voltage.
	1. Liquid system pressure sensor not connected. 2. Harness connection to the liquid system pressure open circuit or shorted to ground. 3. Liquid system pressure sensor device failure.
6462-03	Wing Down Force Pressure Sensor
	Planter UCM analog input connected to the wing down force pressure sensor is detecting an above normal voltage.
	1. Harness connection to the wing down force pressure sensor is shorted to PWR. 2. Wing down force pressure sensor device failure.

6462-04	Wing Down Force Pressure Sensor
	Planter UCM analog input connected to the wing down force pressure sensor detecting a below normal voltage.
	1. Wing down force pressure sensor not connected. 2. Harness connection to the wing down force pressure open circuit or shorted to ground. 3. Wing down force pressure sensor device failure.
6479-03 (2160 model planters)	Left Steering Track Sensor
	The planter UCM analog input connected to the left steering track sensor is detecting an above normal voltage.
	1. Left steering track sensor not connected. 2. Harness connection to the left steering track sensor is shorted to PWR. 3. Left steering track sensor device failure.
6479-04 (2160 model planters)	Left Steering Track Sensor
	The planter UCM analog input connected to the left steering track sensor is detecting a below normal voltage.
	1. Harness connection to the left steering track sensor is shorted to ground. 2. Left steering track sensor device failure.
6480-03 (2160 model planters)	Right Steering Track Sensor
	The planter UCM analog input connected to the right steering track sensor is detecting an above normal voltage.
	1. Right steering track sensor not connected. 2. Harness connection to the right steering track sensor is shorted to PWR. 3. Right steering track sensor device failure.
6480-04 (2160 model planters)	Right Steering Track Sensor
	The planter UCM analog input connected to the right steering track sensor is detecting a below normal voltage.
	1. Harness connection to the right steering track sensor is shorted to ground. 2. Right steering track sensor device failure.
65007	High Case Drain Pressure
	Planter UCM digital input connected to the case drain pressure switch does not detect a switch contact closure to ground. The UCM stops all hydraulic motors to prevent blown motor seals.
	1. Case drain hydraulic line blocked or not connected properly to tractor. 2. Normally closed case drain pressure switch not connected. 3. Open circuit in case drain pressure switch harness or connector 4. Case drain pressure switch device failure. After problem is fixed, hydraulic motors can be restarted by pressing the "Planter Systems" button.
6501-01	Hitch Lock Pressure Low
	Planter UCM analog input connected to hitch lock pressure sensor indicating hitch lock not properly charges with Nitrogen. Hitch lock may not be able to lock.
	1. Hitch lock has lost its nitrogen charge. 2. Hitch lock cylinder leaking. 3. Hitch lock pressure sensor failure.

SYSTEM INFORMATION

"System Information" screen

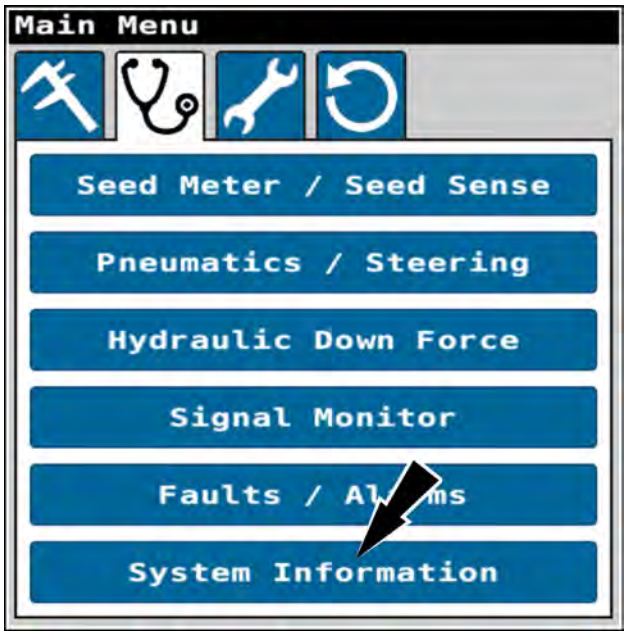
The “System Information” screen provides the following categories of information about your software and planter:

- Software version
- Universal Control Module (UCM) information
- Planter type

Press the “main menu” button on the home screen.

Select the “Diagnostics” tab.

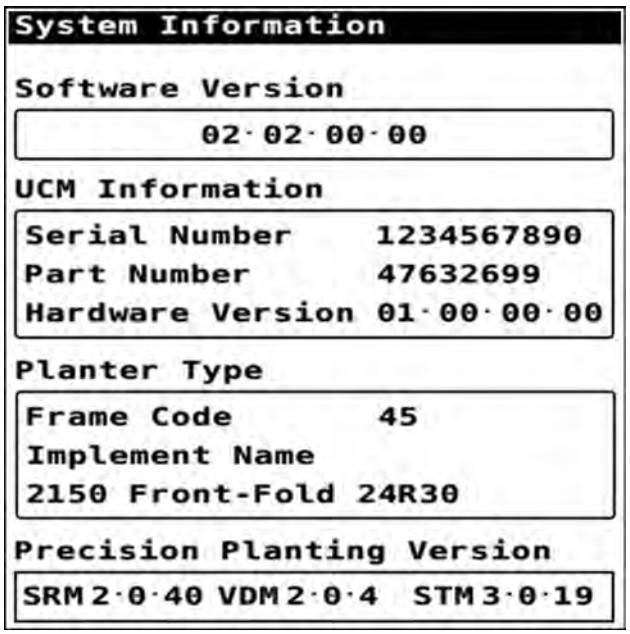
Press the “System Information” menu option.



RAPH23PLM1126BA 1

The “System Information” screen appears, giving the information about your planter and software.

NOTE: *On 2160 47R15 model planters this screen includes the Processing and Connectivity Module (PCM) and the Universal Control Module (UCM) version numbers.*



RAPH22PLM0885BA 2

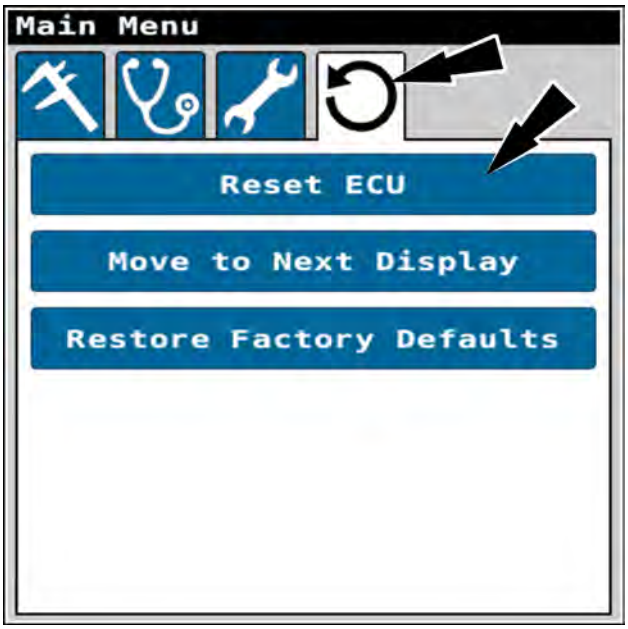
RESET

Reset ECU

In the unlikely event of an electronic malfunction, you can reset the planter Electronic Control Unit (ECU). This restarts the ECU software.

Press the “main menu” button on the home screen.

From the reset tab, select “Reset ECU.”



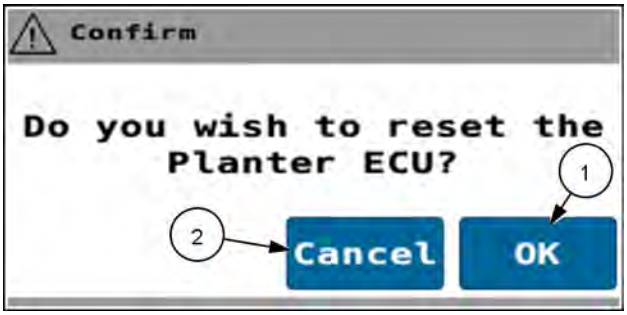
RAPH23PLM1059BA 1

A confirmation dialog appears.

The confirmation dialog states, “Do you wish to reset the planter ECU?”

Press the “OK” button **(1)** to remove and reload the object pool. After you press the “OK” button, the object pool temporarily clears. Then the planter controller loads a new object pool with your configurations and calibrations still intact.

Press the “Cancel” button **(2)** to cancel the reset action.



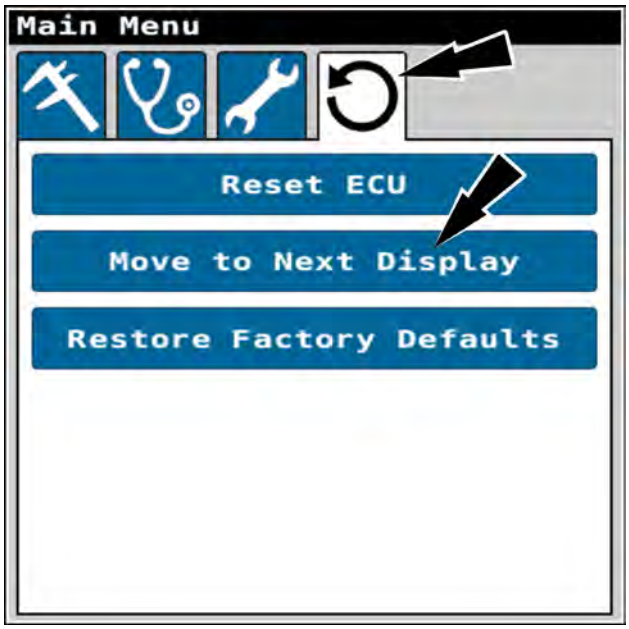
RAIL20PLM1215AA 2

Move to next display

In tractors with dual displays, you can move the planter object pool to the Universal Terminal (UT) in the opposite display. This action preserves any custom settings and work conditions.

Press the “main menu” button on the home screen.

From the reset tab, select “Move to Next Display.”



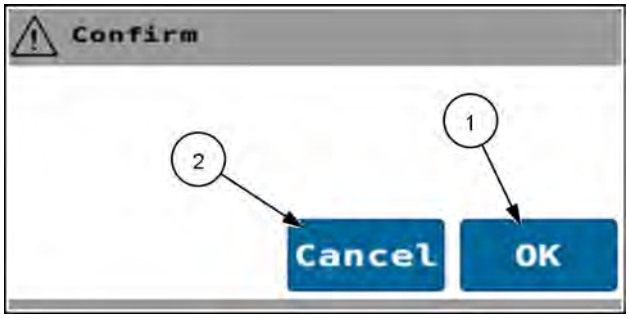
RAPH23PLM1059BA 1

A confirmation dialog appears.

Press the “OK” button **(1)** to move the planter object pool to the other display. After you press the “OK” button, the object pool clears. Then the planter controller loads the object pool with your settings and work conditions still intact.

Press the “Cancel” button **(2)** to cancel the reset action.

NOTE: *If you perform this action in a tractor with only one display, the object pool clears initially, then reloads into the same display. The settings and work conditions remain intact.*



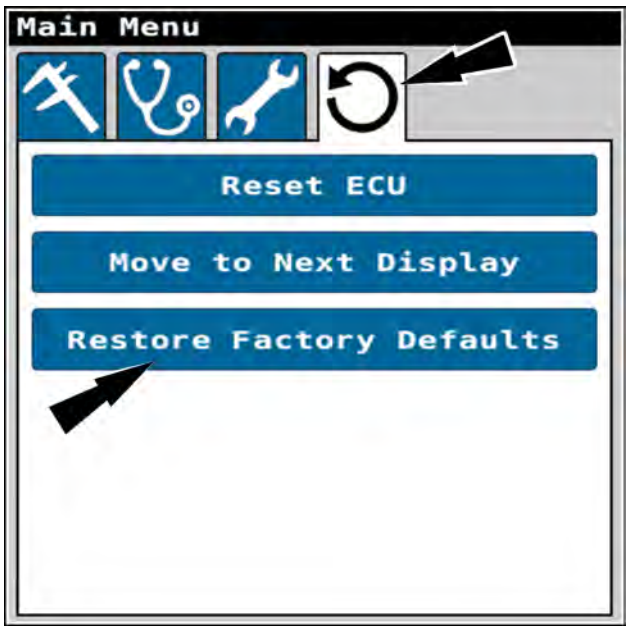
RAPH23PLM0202AA 2

Restore factory defaults

In the unlikely event of an electronic malfunction, you can restore the planter Electronic Control Unit (ECU) to factory defaults. This restarts the ECU software and removes all of your configurations and calibrations.

Press the “main menu” button on the home screen.

From the reset tab, select “Restore Factory Defaults.”



RAPH23PLM1059BA 1

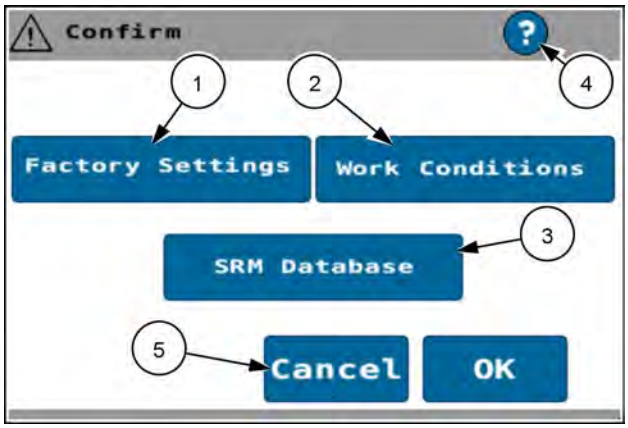
A confirmation dialog appears.

The confirmation dialog contains three selections that organize the affected settings:

- Factory Settings **(1)**
- Work Conditions **(2)**
- SRM Database **(3)**

You can press the help button **(4)** to see information about resetting the planter.

Press the “Cancel” button **(5)** any time to cancel the reset and return to the “Main Menu” screen.



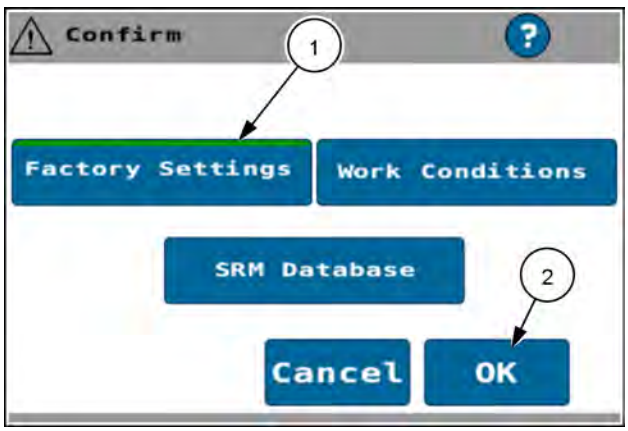
RAPH23PLM1060BA 2

Factory settings

Resetting the factory settings restores factory default settings and user calibrations. However, resetting the factory settings does not affect the frame calibration.

Press the “Factory Settings” button. A green selection indicator **(1)** appears on the button.

Press the “OK” button **(2)**.



RAPH23PLM1061BA 3

Press the “OK” button to remove and reload the object pool. After you press the “OK” button, the planter restarts. Then the planter controller loads a new object pool with the factory default settings.

If needed for future planting operations, perform all configurations and calibrations. See chapter “PLANTER SETUP” for more information.

RAPH23PLM1062BA 4

The planter restarts. An information screen appears.

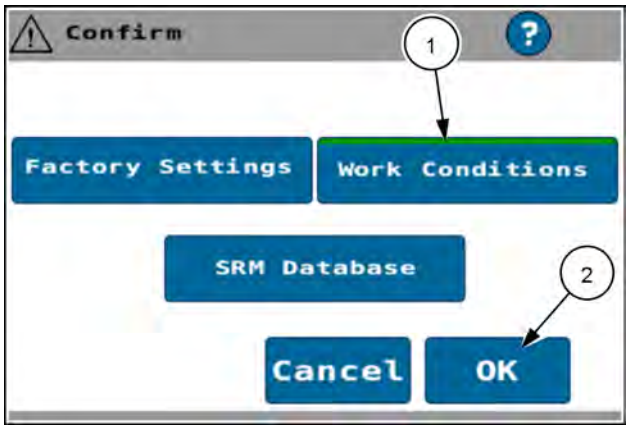
RAPH22PLM0863BA 5

Work conditions

Resetting the work conditions sets all parameters in each work condition to default values. This deletes any custom work conditions.

Press the “Work Conditions” button. A green selection indicator **(1)** appears on the button.

Press the “OK” button **(2)**.



RAPH23PLM1063BA 6

Press the “OK” button to remove all work conditions and replace them with software defaults. After you press the “OK” button, the planter restarts. Then the planter controller loads a new object pool with the work conditions configured to defaults.

RAPH23PLM1062BA 7

The planter restarts. An information screen appears.

RAPH22PLM0863BA 8

Single Row Module (SRM) database

NOTICE: *If you attempt to reset the SRM database when there is a wake-up circuit break, the planter will be unable to plant until you repair that circuit. This is because the sequencing of the row units is unknown after removing the stored SRM database information. The wake up circuit is necessary to perform the sequencing process. Consult your CASE IH dealer if you are unsure of what this procedure does.*

NOTE: *Do not use the SRM database procedure if the following alarms are active on the machine:*

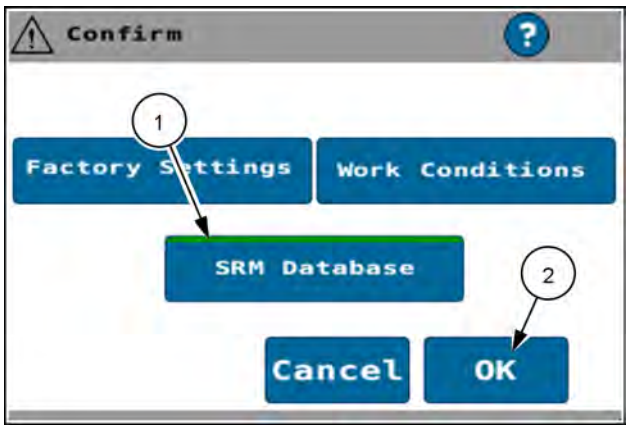
- 6103-12
- 6104-12
- 6105-12
- 6106-12
- 6107-12

Resetting the SRM database removes all stored information on the Universal Contol Module (UCM) related to data stored about the SRM's. This can resolve sequencing issues or data corruption in the UCM.

Press the "SRM Database" button. A green selection indicator **(1)** appears on the button.

Press the "OK" button **(2)**.

Press the "OK" button to remove all SRM database information and replace it with software defaults. After you press the "OK" button, the planter restarts. Then the planter controller loads a new object pool with the SRM database configured to defaults.



RAPH23PLM1064BA 9

RAPH23PLM1062BA 10

The planter restarts. An information screen appears.

RAPH22PLM0863BA 11

Factory default settings

The following tables give the factory default settings in the software. See “Restore factory defaults” (**5-67**) for information about restoring the factory defaults.

The following acronyms are used in this section:

Down Force (DF)

Single Row Module (SRM)

Advanced Seed Information (ASI)

Pneumatic Down Pressure (PDP)

Power Distribution Module (PDM)

General

Category	Parameter	Default
Connection		
	Drawbar	2160 planters
	Semi mount	2150/2150S planters
	Drawbar	2150/2150S planters
	Drawbar	2140 planters
	3-pt rigid mount	2130 planters
	Drawbar	2120 planters
	3-pt rigid mount	2110 planters
Geometry		
	Center offset	Per frame type
	Row width	Per frame type
	Row width Adjustment (all row enabled)	Same as row width (splitter planters)
	Row width Adjustment (split row enabled)	2X row width (splitter planters)
	Split-row mode	Non-split row mode
	Bar distance	Per frame type
	Number of sections, liquid	Per frame type
	Number of rows per section, liquid	Per frame type
	Number of drives, seed	Per frame type
	Number of rows per drive, seed	Per frame type
	Precision Farming X-offset	Per frame type
	Implement Y offset	0
	Implement Y offset direction	0
Down force		
	DF manual down force	0
	Minimum applied force	**-204 kg** (**-450 lb**)
	Maximum applied force	**295 kg** (**650 lb**)
	DF cylinder rod diameter	**16.00 mm** (**0.63 in**)
	DF cylinder head diameter	**31.75 mm** (**1.25 in**)

Category	Parameter	Default
Implement setup adjustments		
	Gauge wheel DF graph scale	Normal: **23 kg** (**50 lb**)
		Wide: **45 kg** (**100 lb**)
	Net applied DF graph	Normal: **68 kg** (**150 lb**)
		Wide: **295 kg** (**650 lb**)
	Ground contact graph scale	Normal: 80%
		Wide: 0%
	Good ride graph scale	Normal: 80%
		Wide: 0%
	Gauge wheel downforce alarm	Min: 60%
		Max: 25%
	Net applied force alarm	Lift: 60%
		Down: 25%
	Ground contact alarm	15%
	Good ride alarm	15%
Area counters		
	Season area counter	retain
	Farm area counter	0
	Field area counter	0
	Life time area	retain
ASI		
	ASI warning level	Normal
	ASI crop type	Corn
	ASI data to show	Population
Frame calibration		
	Start plant height	Blank
	Stop plant height	Blank
	Limited raise height	Blank
	Rasied height	Blank
Vacuum control		
	Target	Defined in work condition
	Step size	**25 mm H_2O** (**1 in H_2O**)
	Alarm percent	20%
Bulk fill control		
	Target	Defined in work condition
	Step size	100
	Alarm percent	20%
Alternator control		
	Target	2000
	Step size	100
	Alarm percent	20%
Liquid control		
	Target	Defined in work condition
	Step size	**47 L/ha** (**5 gal/ac**)
	Alarm percent	20%
Seed control		
	Manual rate targets	Defined in work condition
	Step size	**0.4 ksds/ha** (**1.0 ksds/ac**)
	Alarm percent	20%
Closer control	Set point	**138 kPa** (**20 psi**)
Cleaner down	Set point	**172 kPa** (**25 psi**)
Cleaner lift	Set point	**172 kPa** (**25 psi**)
Cleaner mode	Mode	Float
DF control	Light/Standard/Heavy/Custom	Standard
PDP down pressure control	Set point	**45 kg** (**100 lb**)

Category	Parameter	Default
Jump start		
	Jump start speed	**1.6 km/h** (**1 mph**)
	Jump start duration	3
	Jump start delay	3
	Jump start cancel	5
Distance calibration	Cal Value	blank
Work condition	Work condition	None
Gains		
	Alternator controller	1
	Bulk fan controller	2
	Vacuum fan controller(s)	12
	Cleaner controller up/down	15
	Closer controller down	15
	Liquid controller	3
	Wing Down Force	20
	Subframe Down Force - proportional	1
	Subframe Down Force - integral	0
	Subframe Down Force - derivative	0
Load cells		
	Cal value	Blank
Subframe Calibration		Blank
Row alarms		Enabled
Stop plant beeps		3

Work condition

Parameter	Default
Agitate percentage	35%
Linked drives	All Rate Drives Selected
Rate 1 (seed)	0
Rate 2 (seed)	0
Seeds per disk	0
Speed belt factor	1.5
Vacuum rate	**508.0 mm H_2O** (**20.0 in H_2O**)
Bulk fill rate	**3000 RPM**
Seed product delay start	0.05 seconds
Seed product delay stop	0.05 seconds
Rate 1 (liquid)	**34 L/ha** (**3 g/ac**)
Rate 2 (liquid)	**56 L/ha** (**5 g/ac**)
Cal value	242
Cal factor	80.00%
Liquid product delay start	2.0 seconds
Liquid product delay stop	2.0 seconds

Bar distance

See “MEASUREMENT SETUP” screen (**3-17**) for the default bar measurement values.

Wing down force

See “Wing down force control setup” (**4-154**) for the default wing down force values. The default alarm is set to 20% for all models.

Subframe down force (2150S only)

See “Subframe down force control setup: 2150S planters” (**4-157**) for the default subframe (offset bar) down force values. The default alarm is set to 20%.

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Dealer's stamp

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Availability of some models and equipment builds varies according to the country in which the equipment is being used. For exact information about any particular product, please consult your Case IH dealer.

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