RADION 8140

USER GUIDE

Automatic Sprayer Control
Software Version 1.05

TeeJet® TECHNOLOGIES

A Subsidiary of Spraying Systems Co.®

Safety Information

TeeJet Technologies is not responsible for damage or physical harm caused by failure to adhere to the following safety requirements. As the operator of the vehicle, you are responsible for its safe operation. The Radion 8140 in combination with any assisted/auto steering device is not designed to replace the vehicle's operator. Do not leave a vehicle while the Radion 8140 is engaged. Ensure the area around the vehicle is clear of people and obstacles before and during engagement. The Radion 8140 is designed to support and improve efficiency while working in the field. The driver has full responsibility for the quality and work related results. Disengage or remove any assisted/auto steering device before operating on public roads.

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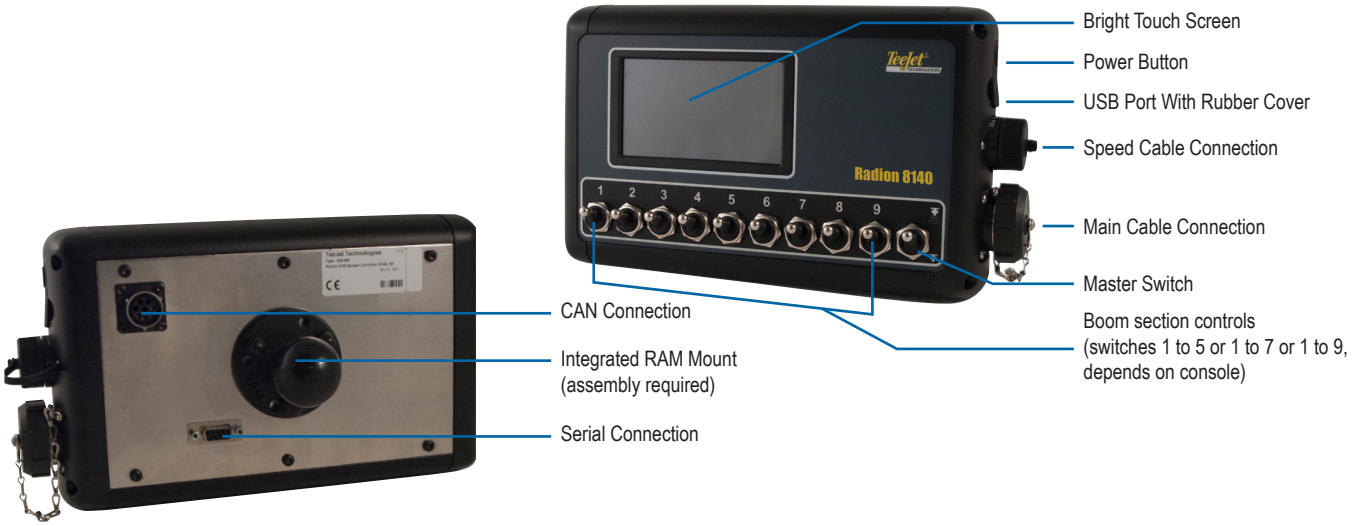
#1 POWER ON, SWITCHES



Power On/Off Button

On – Press the POWER button to power on the console. Upon power up, the Radion will begin its start up sequence. Once start up is complete, the Operation screen appears.

Off – Press the POWER button. On the confirmation screen to acknowledge shut down mode, press **Yes** to power off the console.

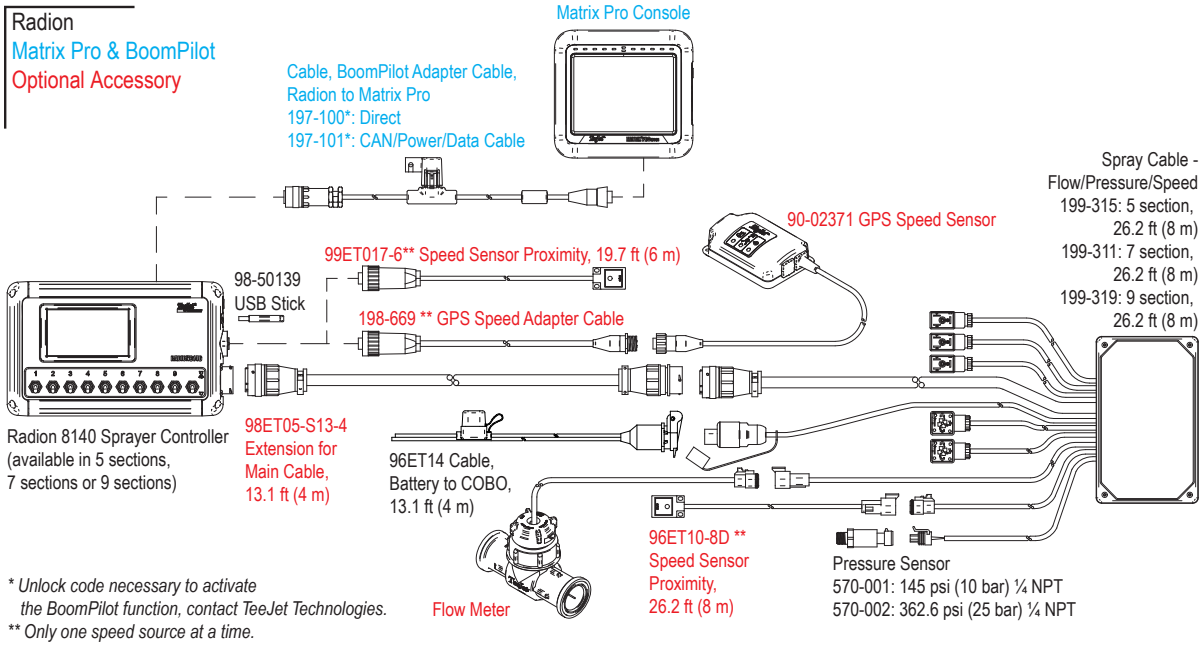
WARNING! Wait 10 seconds before restarting the console.

Boom Sections & Switches

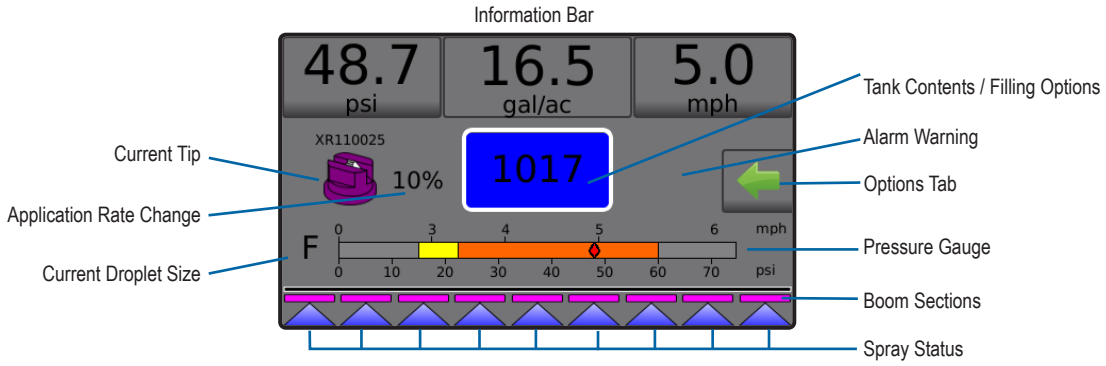
The console operates with nine (9), seven (7) or five (5) section switches (depending on console model) and one (1) Master Switch. Each section switch is associated with one of up to the same number of sections on the boom and illustrated on the Operation screen.

- ► Switches – control individual boom sections
  - ◄On – Flip the switch up
  - ◄Off – Flip the switch down
- ► Master Switch – opens/closes the main product valves and enables/disables power to individual boom section on/off switches

Figure 1: System Diagram



#2 OPERATION SCREEN



- ▶ Information Bar – displays application rates and selectable information
- ▶ Current Tip – displays current tip and accesses five (5) preset tip types
- ▶ Application Rate Change – displays rate changes (if in Automatic regulation mode)
- ▶ Tank – displays remaining tank contents and accesses filling options
  - ◀Filling – establishes actual/desired tank material/density
- ▶ Alarm Warning – displays active alarm conditions
- ▶ Options Tab – accesses the Operation menu
  - ◀Displays Home button, Close Menu button, regulation modes and target rate options
- ▶ Pressure Gauge – displays current pressure range compared with recommended pressure range
  - ◀Droplet Size – displays selected droplet size
- ▶ Boom Sections – displays configured boom sections
  - ◀Spray Status – displays active/inactive for section

Operation Menu

The Options Tab is always available on the Operation screen. This tab accesses the Operation menu where the Home button, regulation modes and target rate options display.

Operation menu buttons	
	Home
Auto Reg / Man Reg	Change between automatic/manual regulation modes
Automatic regulation mode	
5%	Target rate boost percent increase
5%	Target rate boost percent decrease
0%	Return to target rate
Manual regulation mode	
	Regulation valve manual open
	Regulation valve manual close
	Close menu

Figure 2: Options Tab – Automatic Mode

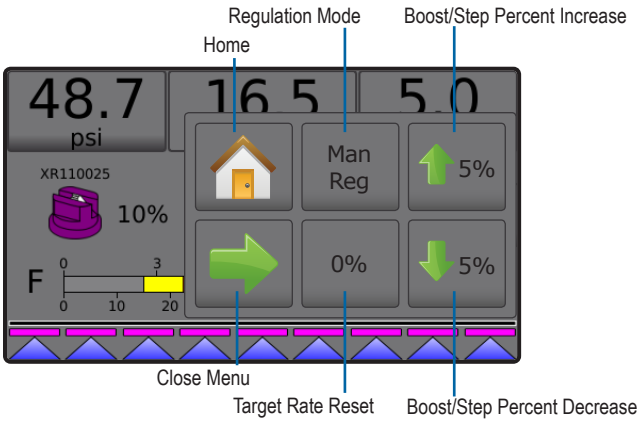
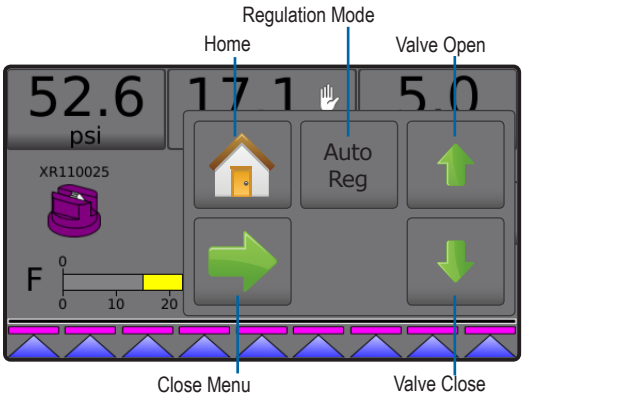


Figure 3: Options Tab – Manual Mode

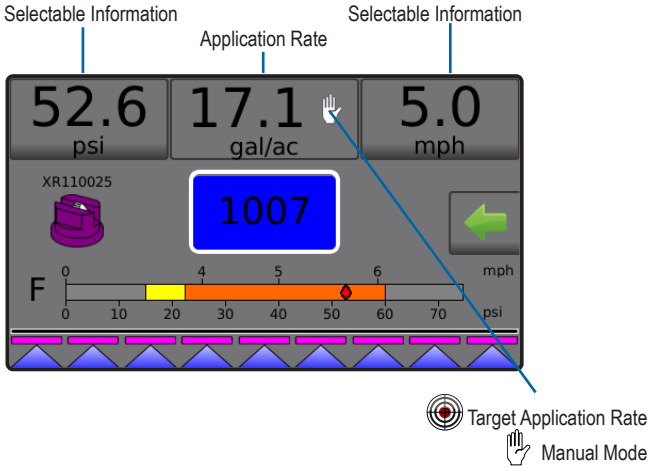


Information Bar

The information bar displays:

- Application Rate – displays the actual application rate or target application rate and accesses the preset target application rates options menu.
- Selectable Information – displays user-selected information including volume applied, flow rate, flow pressure, speed, total area applied and job number.

Figure 4: Information Bar



Regulation Modes

Automatic Regulation Mode will automatically adjust the application rate based on the current speed in reference to the target rate. The target rate can be adjusted using the Boost/Step Percent Increase/ Decrease buttons 5% / 5% on the Operation menu. Preset Application Rates define up to three (3) target rates for product being applied per hectare/acre. These can be toggled using the Application rate section on the Information bar on the Operation screen.

Manual Regulation Mode will retain an established regulation valve setting regardless of speed. The regulation valve setting can be adjusted using the Regulation Valve Open/Close buttons on the Operation menu.

1. From the Operation screen, press the OPTIONS tab to display the Operation menu.
2. Select from:
   - **Auto Reg** to change from Manual Regulation Mode to Automatic Regulation Mode:
   - **Man Reg** to change from Automatic Regulation Mode to Manual Regulation Mode:

NOTE: The Regulation button displays the regulation mode that may be selected not the active regulation mode.

Figure 5: Regulation options: Automatic / Manual

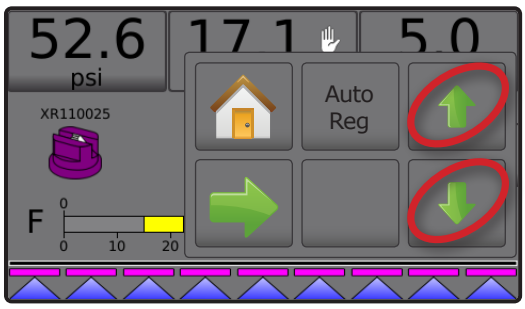
Manual Regulation Mode

Manual Regulation Mode will retain an established regulation valve setting regardless of speed.

To open/close the valve:

1. From the Operation screen, press the OPTIONS tab to display the Operation menu.
2. Press the Regulation Valve Open/Close buttons to manually turn the valves on/off.
3. Press the Close Menu button.

Figure 6: Manual Regulation Mode



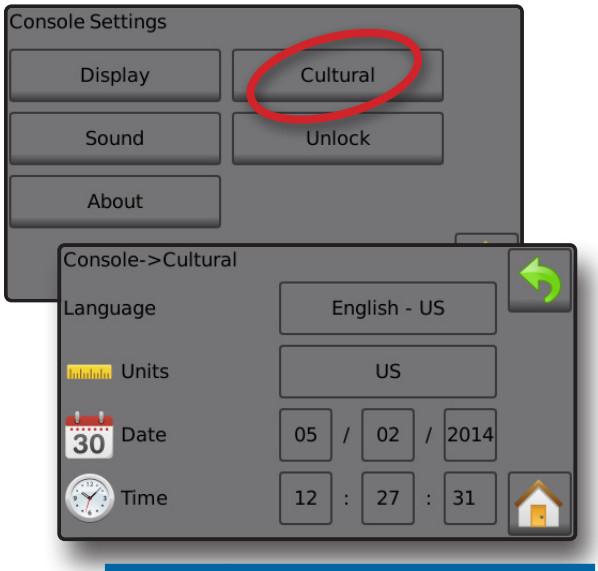
#3 GO TO HOME

1) SET UP THE LOCAL CULTURAL SETTINGS

Cultural configures language, units, date and time settings.

1. From the Home screen, press the CONSOLE button.
2. Press **Cultural**.
3. Select from:
   - ▶ Language – defines the system language
   - ▶ Units – defines the system measurements
   - ▶ Date – establishes the date
   - ▶ Time – establishes the time
4. Press RETURN arrow to return to the main Console settings screen.

Figure 7: Cultural Options



Code	Language
cs	Czech
da	Danish
de-DE	German
en-GB	English (international)
en-US	English (USA)
es-ES	Spanish (Europe)
es	Spanish (Central/South America)
fr-FR	French
hu	Hungarian
it-IT	Italian
nl	Dutch
pl	Polish
pt-BR	Portuguese (Brazil)
ru	Russian
sk	Slovak

NOTE: Some languages listed may not be available on the console.

2) SET UP THE JOB PARAMETERS

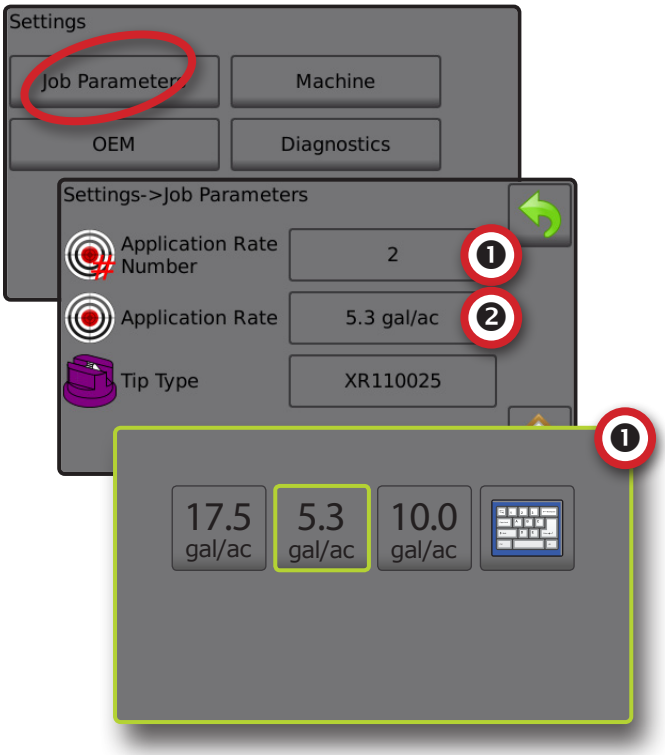
Job Parameters configures the target application rate settings and current tip. Selections are also active on the Operation screen.

1. From the Home screen, press the SETTINGS button.
2. Press **Job Parameters**.
3. Press a setting value to adjust settings as needed.
   - ◀ Target Application Rate Number – specifies up to three (3) target application rate presets from which to select
   - ◀ Target Application Rate – defines the target rate of product to apply for the selected number (these settings will be the same for all active jobs)
   - ◀ Tip Type – selects the current tip type from the five (5) tip presets
4. Press the RETURN arrow to return to the main Settings screen.

Establish preset target application rates

1. From the Home screen, press the SETTINGS button.
2. Press **Job Parameters**.
3. Select Application Rate Number 1 ❶.
4. Select an application rate ❷ to be associated with number 1.
5. Repeat steps 3 and 4 for Application Rate Numbers 2 and 3.

Figure 8: Establish Preset Target Application Rate 2



3) SET UP THE MACHINE

Machine configures machine settings. Options include Filling, Operation, Implement Parameters, Calibrations and Alarms.

1. From the Home screen, press the SETTINGS button.
2. Press **Machine**.
3. Select from:
   - ► Filling – establishes the amount of actual and desired material in the tank and the density of that material
   - ► Operation – establishes application rate step, speed source, simulated speed and minimum speed
   - ► Implement Parameters
     - ◄ Section Configuration – sets the number of tips on the boom which determines the spraying width during application
     - ◄ Tip Preset Setup – establishes options for up to five (5) tips including series, capacity, low/high pressure limits, reference flow and reference pressure
     - ◄ Regulation Parameters – adjusts valve calibration and tip spacing and selects a regulation mode
   - ► Calibrations – establishes either manual/automatic settings of the Implement Speed Sensor, Flow Sensor, Liquid Pressure Sensor, Fill Flow Sensor and Tank Level Sensor
   - ► Alarms – establishes alarms on/off and sets their trigger levels
4. Press RETURN arrow to return to the main Settings screen.

Figure 9: Machine

Operation

1. From the Home screen, press the SETTINGS button.
2. Press **Machine**.
3. Press **Operation**.
4. Press setting value to adjust settings as needed:
   - ◄ Application Rate Step – the percent of increase/decrease boost of the active application rate at which the product is applied
   - ◄ Speed Source – selects whether to base the machine speed on input from the CAN, an Implement or a Simulated source
   - ◄ Simulated Speed – establishes a speed for using the Simulated Speed Source
   - ◄ Minimum Speed – establishes the minimum forward speed at which the system should automatically switch the main valve off
5. Press RETURN arrow to return to the Machine screen.

Figure 10: Operation

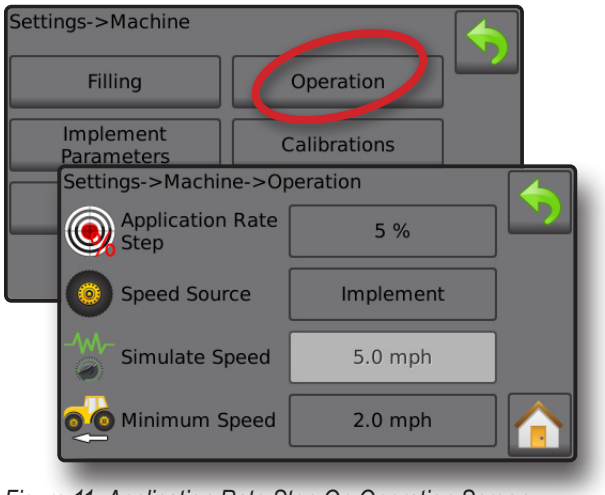
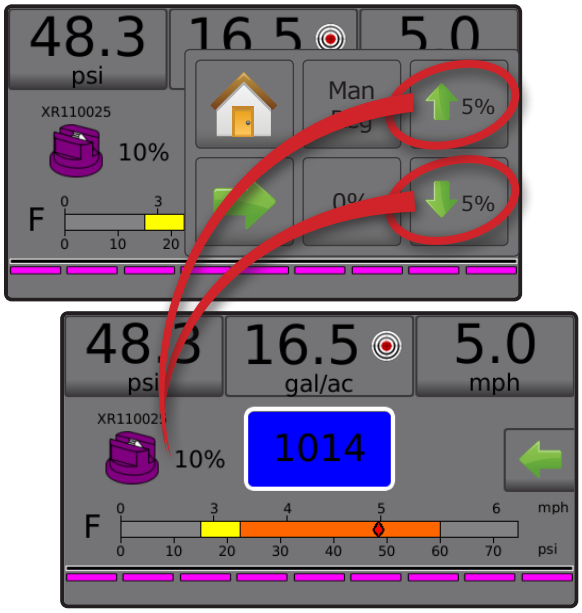


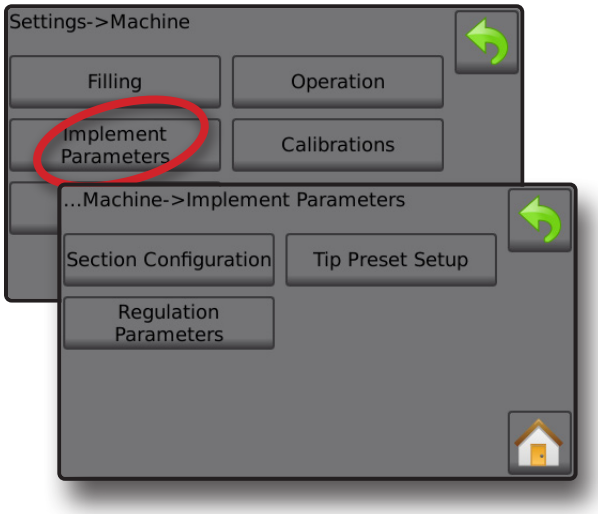
Figure 11: Application Rate Step On Operation Screen



Implement Parameters

1. From the Home screen, press the SETTINGS button.
2. Press **Machine**.
3. Press **Implement Parameters**.
4. Select from:
   - ▶ Section Configuration – sets the number of tips on the boom which determines the spraying width during application
   - ▶ Tip Preset Setup – where up to five (5) sets of tip options can be established to set the tip series, capacity, low/high pressure limit, reference flow and reference pressure
   - ▶ Regulation Parameters – where adjustments to the valve calibration, tip spacing and regulations mode can be established
5. Press RETURN arrow to return to the Machine screen.

Figure 12: Implement Parameters



Section Configuration

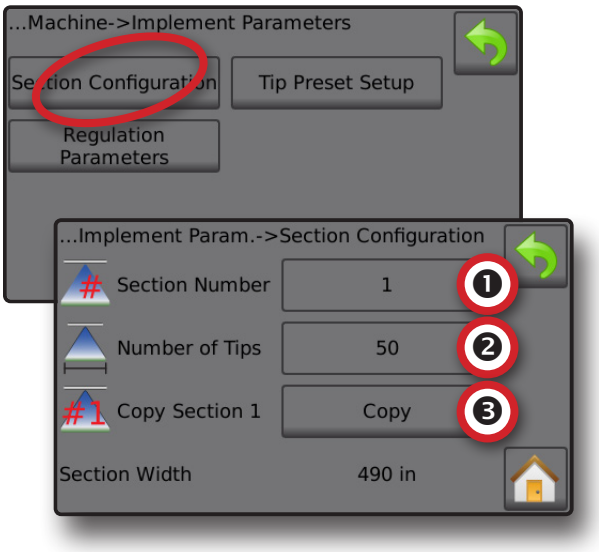
Section Configuration sets the number of tips on the boom which determines the spraying width during application.

1. From the Home screen, press the SETTINGS button.
2. Press **Machine**.
3. Press **Implement Parameters**.
4. Press **Section Configuration**.
5. Press setting value to adjust settings as needed:
   - ◀Section Number – establishes the current section number to which changes can be made. Sections are numbered from left to right while facing in the machine forward direction
   - ◀Number of Tips – establishes the number of tips in the current section number
   - ◀Copy Section – sets all Number of tips counts to the same count for all boom sections based upon the current Section number
   - ◀Section Width – displays the width for the current section
6. Press RETURN arrow to return to the Implement Parameters screen.

Establish Number of Tips

1. From the Home screen, press the SETTINGS button.
2. Press **Machine**.
3. Press **Implement Parameters**.
4. Press **Section Configuration**.
5. Select Section Number ❶.
6. Set the number of tips ❷ for the selected section number.
7. Repeat steps 5 and 6 for additional Section Numbers as available.
8. OPTIONAL: If all sections have the same number of tips, press **Copy** ❸ to set all sections to the current number of tips.

Figure 13: Establish Number of Tips



Tip Preset Setup

Tip Preset Setup establishes up to five (5) sets of tip options setting the tip type, capacity, low/high pressure limit, reference flow and reference pressure.

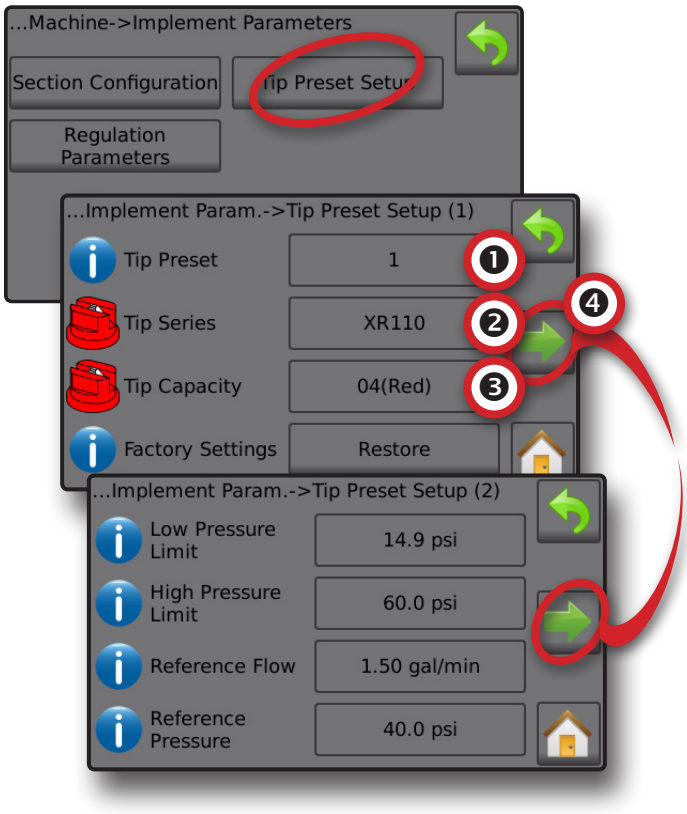
NOTE: Settings on both screen 1 and screen 2 are specific to the currently selected Tip Preset Number.

1. From the Home screen, press the SETTINGS button.
2. Press **Machine**.
3. Press **Implement Parameters**.
4. Press **Tip Preset Setup**.
5. Press setting value to adjust settings as needed:
   - ◀Tip Preset (Number)
   - ◀Tip Series
   - ◀Tip Capacity
   - ◀Factory Settings
   - ◀Low Pressure Limit
   - ◀High Pressure Limit
   - ◀Reference Flow
   - ◀Reference Pressure
6. Press RETURN arrow to return to the Implement Parameters screen.

Establish tip presets

1. From the Home screen, press the SETTINGS button.
2. Press **Machine**.
3. Press **Implement Parameters**.
4. Press **Tip Preset Setup**.
5. Select Tip Preset Number 1 ❶.
6. Select Tip Series ❷.
7. Select Tip Capacity ❸.
8. Repeat steps 5, 6 and 7 for Tip Preset Numbers 2 to 5.
9. OPTIONAL: Press NEXT PAGE arrow ❹ to adjust the settings for Low Pressure Limit, High Pressure Limit, Reference Flow and Reference Pressure. Each of these settings are specific to the current tip preset number.

Figure 14: Establish Tip Presets

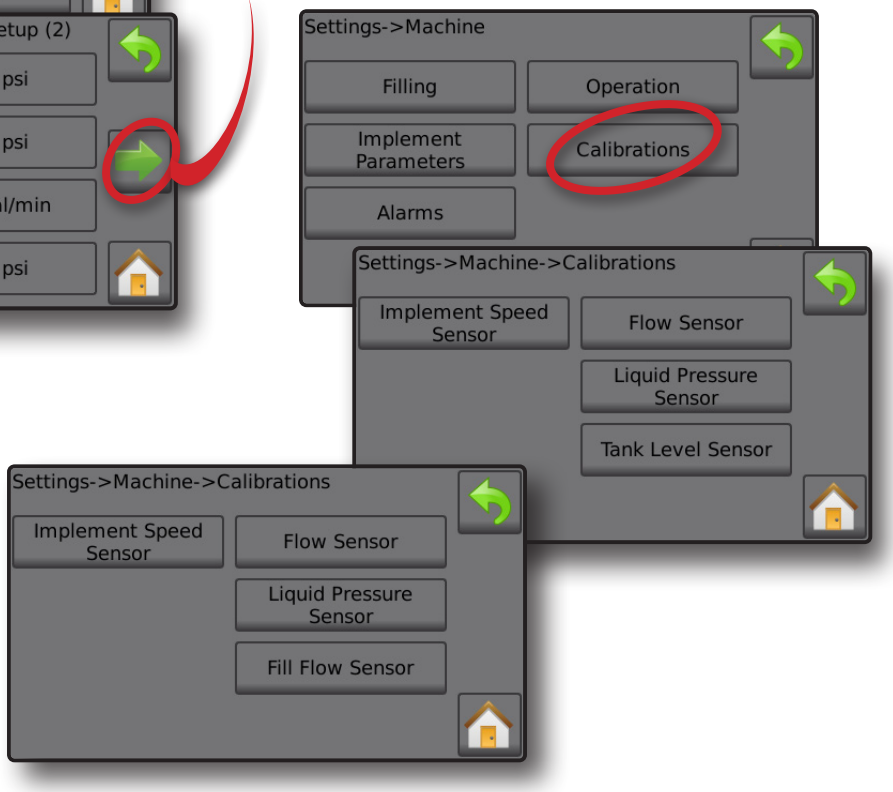


Calibrations

For detailed instructions on sensor calibrations, see the Sensor calibrations section of this guide.

1. From the Home screen, press the SETTINGS button.
2. Press **Machine**.
3. Press **Calibrations**.
4. Select from:
   - ▶ Implement Speed Sensor – establishes the wheel pulses over a specified distance
   - ▶ Flow Sensor – establishes the pulses per liter through the Flow Sensor
   - ▶ Liquid Pressure Sensor – establish the maximum pressure limit and no pressure calibration for the Liquid Pressure Sensor
     - ◀Calibrate each option in the following order:
       - ❶ No Pressure
       - ❷ Maximum Pressure
   - ▶ Fill Flow Sensor – establishes the pulses per liter through the Fill Flow Sensor
   - ▶ Tank Level Sensor – establishes the empty, minimum and maximum levels for the tank and calibrates the tank shape
     - ◀Calibrate each option in the following order:
       - ❶ Empty Tank
       - ❷ Minimum Tank Level
       - ❸ Maximum Tank Level
       - ❹ Tank Shape
5. Press the RETURN arrow to return to the Machine screen.

Figure 15: Calibrations – Tank Level Sensor and Fill Flow Sensor



SETTINGS MENU STRUCTURE

- **Job Parameters**
  - *Application Rate Number*
  - *Application Rate*
  - *Tip Type*
- Implement Speed Sensor
  - *Calibration Number*
  - *Automatic Calibration*
- *Flow Sensor
  - *Calibration Number*
  - *Low Flow Limit*
  - *High Flow Limit*
  - *Automatic Calibration*
- *Liquid Pressure Sensor
- No Pressure
  - *No Pressure Calibration*
- Maximum Pressure
  - *Maximum Pressure*
  - *Reference Pressure*
  - *Automatic Calibration*
- *Fill Flow Sensor
  - *Calibration Number*
  - *Automatic Calibration*
- *Tank Level Sensor
- Empty Tank
  - *Automatic Calibration*
- Minimum Tank Level
  - *Minimal Tank Level*
  - *Automatic Calibration*
- Maximum Tank Level
  - *Maximum Tank Level*
  - *Automatic Calibration*
- Tank Shape
  - *Maximum Tank Level*
  - *Start Calibration*
- Import/Export Calibrations

- **Machine**
- Filling
  - *Actual Content*
  - **Full Tank*
  - *Density Type*
  - *Density Factor*
  - *Desired Content*
  - *Automatic Filling*
- Operation
  - *Application Rate Step*
  - *Speed Source*
  - *Simulate Speed*
  - *Minimum Speed*
- Implement Parameters
- Calibrations
- Alarms
  - *Minimum Tank Content*
  - *Flow/Pressure Cross Check*
  - *Section Output Low*

- Section Configuration
  - *Section Number*
  - *Number Of Tips*
  - *Copy Section*
  - *Section Width*
- Tip Preset Setup
  - *Tip Preset*
  - *Tip Series*
  - *Tip Capacity*
  - *Factory Settings*
  - *Low Pressure Limit*
  - *High Pressure Limit*
  - *Reference Flow*
  - *Reference Pressure*
- Regulation Parameters
  - *Course Value Calibration*
  - *Fine Value Calibration*
  - *Tip Spacing*
  - *Regulation Mode*

- **OEM**
- Sensor Presence
  - *Flow Sensor*
  - *Liquid Pressure Sensor*
  - *Fill Flow Sensor*
  - *Tank Sensor*
- Implement Parameters
  - *Number of Sections*
  - *Circulation*
- Valve Setup
  - *Regulation Valve Type*
  - *Section Valve Type*
  - *Section Valve Behaviour*
- Tank Setup
  - *Maximum Tank Content*
  - *Minimum Tank Content*
  - *Automatic Filling*
  - *Automatic Filling Offset*
- Regulation Details
  - *Minimum Regulation Pressure*
  - *Maximum Regulation Pressure*
  - *Regulation Valve Time*
  - *Minimum Regulation Voltage*
  - *Regulation Deadband*
  - *Regulation Valve Capacity*
  - *Regulation Start Delay*
  - *Manual Regulation Speed*
  - *Restrictor Plate Flow*
- Clear Totals
  - *Area Counter*
  - *Volume Counter*
  - *Time Counter*
  - *Clear All Total Counters*
- Import/Export Calibrations

- **Diagnostics**
- Test Inputs
  - *Implement Wheel Sensor*
  - *Tractor Wheel Sensor*
  - *Supply Voltage*
  - *Flow Sensor*
  - *Fill Flow Sensor*
  - *Liquid Pressure Sensor*
  - *Tank Level Sensor*
  - *Remote Master Signal*
  - *Master Switch*
  - *Section Switches*
- Test Outputs
  - *Liquid Valve Pwm Duty Cycle*
  - *Master Valve*
  - *Fill Valve*
  - *Section Number*
  - *Section Valve State*
  - *All Sections Off*
- Test Boompilot
  - *Connection*
  - *Mode*
  - *Section Input*
- Alarm Log
- Save Alarm Log

OEM menu is password protected.

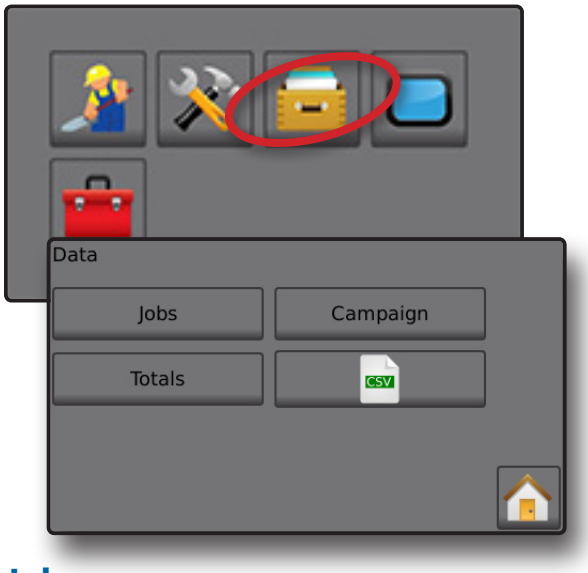
**Menu settings directly related to fitted OEM equipment.*

#4 START NEW JOB OR CONTINUE JOB

The Data option, provides an overview of various system counters including job counters, campaign counters and total counters. From Data options screens, export as either PDF or CSV reports.

1. From the Home screen, press the DATA button
2. Select from:
   - ► Jobs – displays, deletes and reports on job information
   - ► Campaign – displays and deletes campaign information
   - ► Totals – displays all counter information
   - ► CSV – compiles a CSV report of counters for all jobs, and for the campaign and console totals, then saves reports to a USB drive

Figure 16: Data Management Options



Jobs

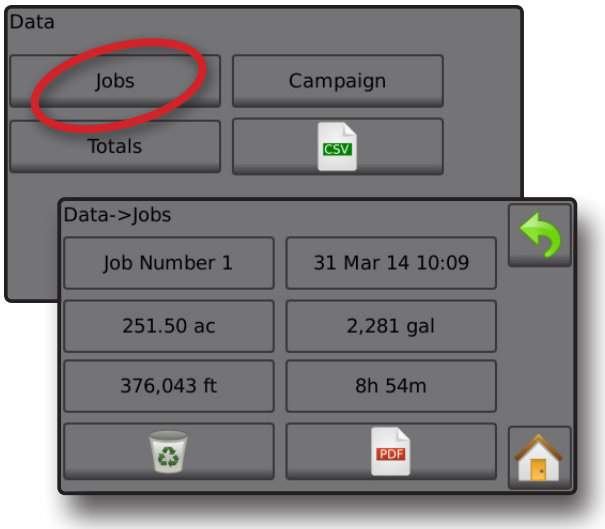
One of up to ten (10) jobs may be selected to view job information. The current job, displayed/active on the Operation screen, may be exported as a PDF report.

Job information includes:

- ◄Job number of information displayed
- ◄Current date
- ◄Applied area
- ◄Volume of material applied
- ◄Distance traveled
- ◄Time traveled

1. From the Home screen, press the DATA button.
2. Press **Jobs**.
3. Press **Job Number** to view information for a different job.
   - ◄Enter any number to display another job
4. Press RETURN arrow to return to the main Data screen.

Figure 17: Job Data



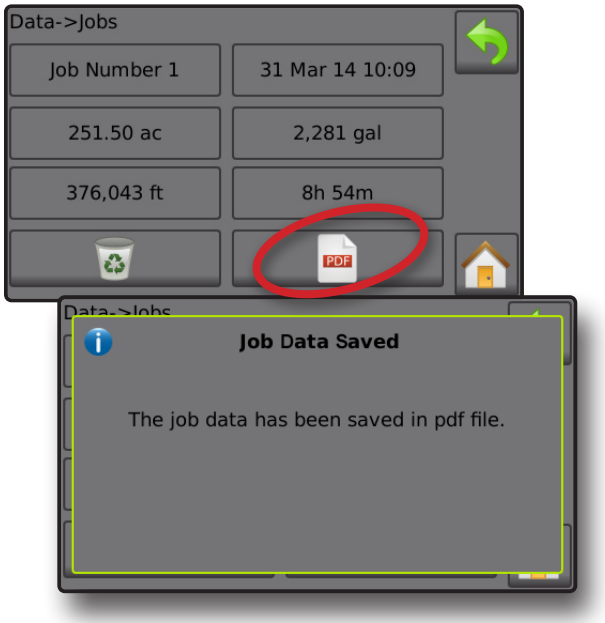
Job Data Report

The PDF button compiles active job information to be exported as a PDF report.

1. From the Home screen, press the DATA button.
2. Press **Jobs**.
3. Select the job from which to create a report.
4. Insert USB drive into the console and wait for PDF button to activate.
5. Press PDF button.
6. Press RETURN arrow to return to the main Data screen.

NOTE: The PDF icon is not available for selection (grayed out) until a USB drive is inserted properly.

Figure 18: Job Data Report



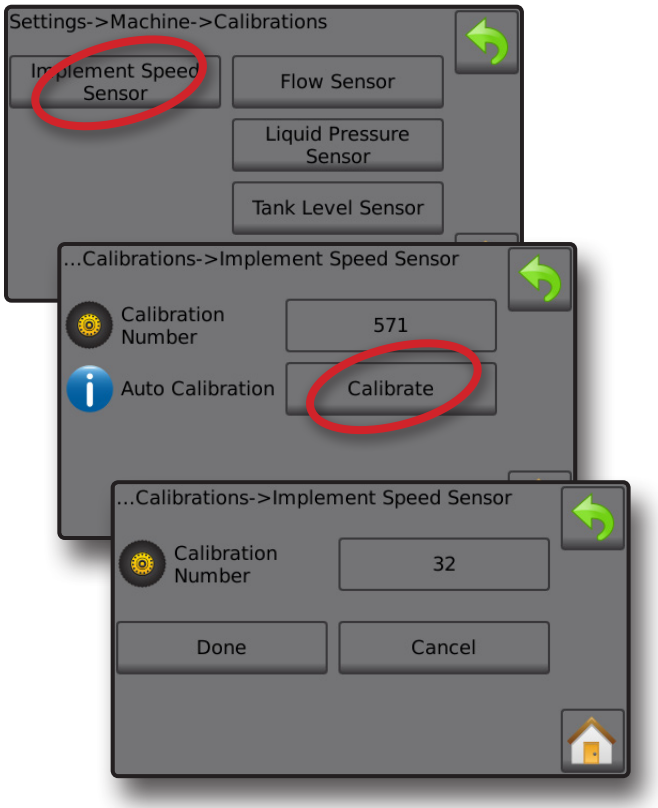
SENSOR CALIBRATIONS

Implement Speed Sensor

The Implement Speed Sensor establishes the wheel pulses over a specified distance. Establish the value manually or automatically calibrate the value.

- ► Calibration Number –
  - ◄Automatic Calibration will determine the number of pulses counted while driving 300 feet (100 meters in metric mode) and convert the calibration number to the correct units.
  - ◄Manual Calibration, enter the calibration number in pulses per 300 feet (100 meters in metric mode)
- ► Automatic Calibration – establishes the pulses using the automatic calibration function.

Figure 19: Implement Speed Sensor



Implement Speed Sensor automatic calibration

1. Press **Calibrate** to start an automatic sensor calibration.
2. Drive a distance of 300 feet (100 meters in metric mode).
3. Press **Done** when complete.

To cancel the calibration, press **Cancel**, RETURN arrow or the Home button.

The counted wheel pulses will be displayed during the automatic calibration.

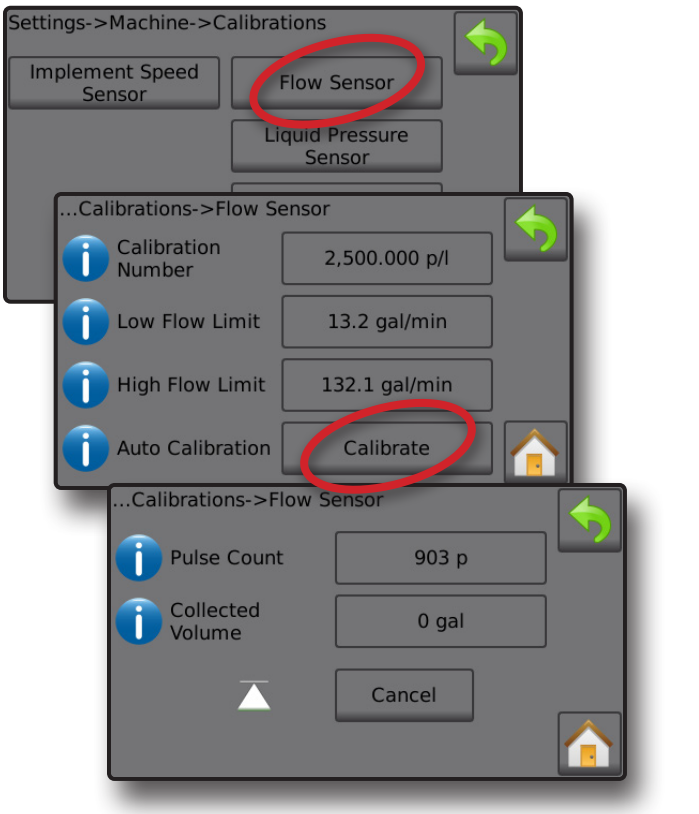
Flow Sensor

The Flow Sensor establishes the pulses per liter. Establish the value manually or automatically calibrate the value.

- ► Calibration Number – enter the amount of pulses counted while running 1 liter of water through the Flow Sensor. Use Automatic Calibration to calculate pulses automatically. Manual Calibration establishes the calibration and limits based on user-entered values.
- ► Low Flow Limit – enter the Flow Sensors low limit value.
- ► High Flow Limit – enter the Flow Sensors high limit value.
- ► Automatic Calibration – establishes the calibration and limits if the number of pulses per liter for the flow meter is unknown or to make sure the value is correct.
- ► Pulse Count – shows the number of pulses during calibration. Minimum of 10 pulses needed to do a calibration.
- ► Collected Volume – enter the volume passed through the Flow Sensor during the calibration. Once encoded – a new Flow Sensor calibration value is calculated.
- ► Master Switch Status / Cancel – shows if the Master Switch is off or on .

  Press the **Cancel** to cancel the calibration and return to the Flow Sensor screen.

Figure 20: Flow Sensor



Flow Sensor Automatic Calibration

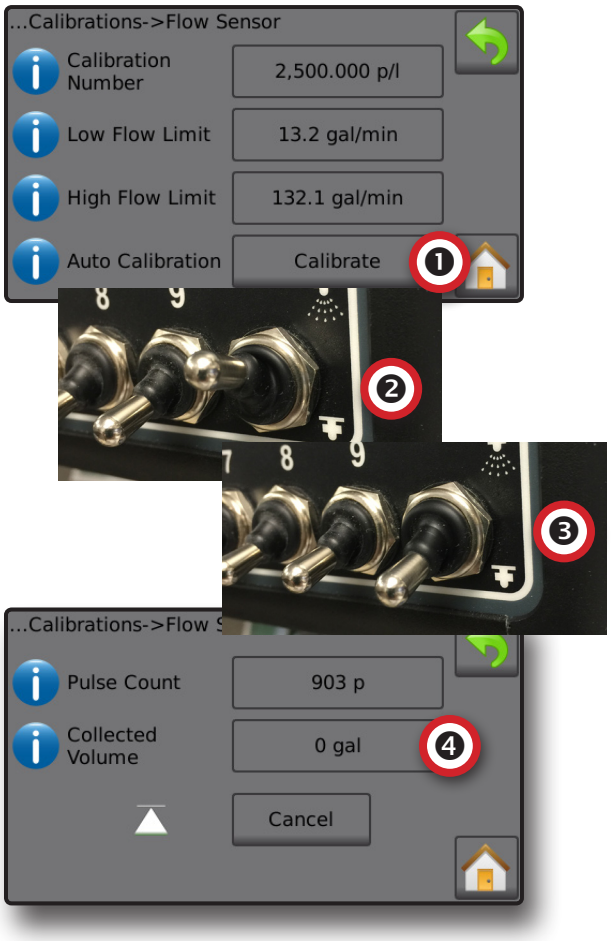
1. Press **Calibrate** ❶ to enter Automatic Calibration mode.
2. Prepare to collect the 'medium' via the Flow Sensor (minimum 25.0 gallons / 100 liters).
3. Make sure the controller is in manual mode and flow is not regulated down.
4. Turn on the Master Switch ❷ to start flow and calibration.

   ◀Pulses counted display during the automatic calibration
5. Once at the minimum 25.0 gallons / 100 liters has distributed, turn off Master Switch ❸ to stop calibration.
6. Press the Collected Volume value ❹.
7. Enter the precise volume which passed through the Flow Sensor during the calibration.

Once encoded, a new Flow Sensor calibration value is calculated.

To cancel the calibration, press **Cancel**, RETURN arrow or the Home button .

Figure 21: Automatic Calibration



Liquid Pressure Sensor

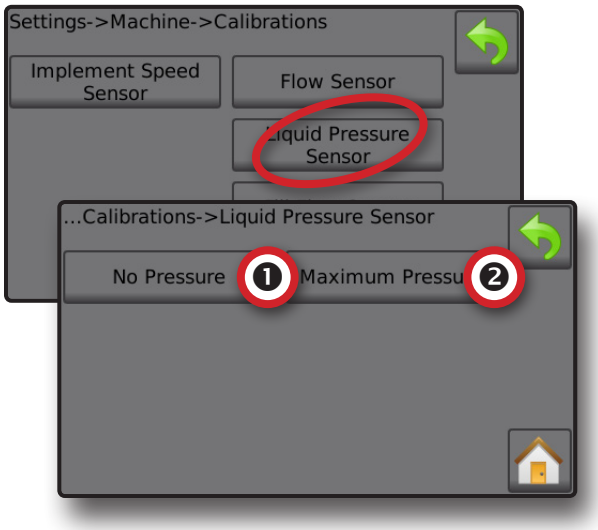
The Liquid Pressure Sensor settings establish the maximum pressure limit and no pressure calibration for the Liquid Pressure Sensor.

1. From the Home screen, press the SETTINGS button .
2. Press **Machine**.
3. Press **Calibrations**.
4. Press **Liquid Pressure Sensor**.
5. Calibrate each option in the following order:

   ❶ No Pressure

   ❷ Maximum Pressure
6. Press RETURN arrow to return to the Calibrations screen.

Figure 22: Liquid Pressure Sensor



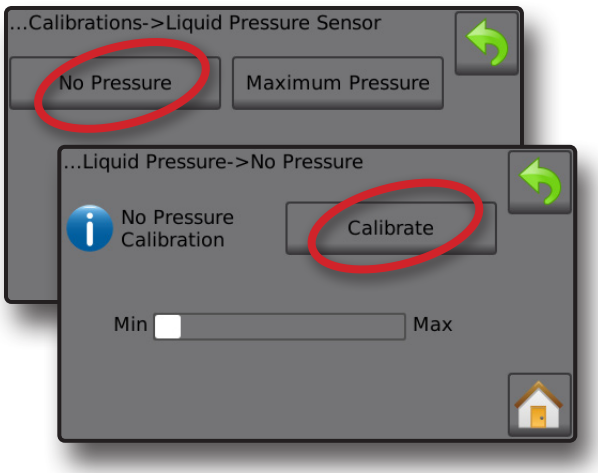
❶ *No Pressure*

Liquid Pressure Sensor->No Pressure establishes the calibration while **NO** pressure is applied to the Liquid Pressure Sensor.

1. Remove all pressure from the system.
2. Press **Calibrate** to record a new calibration value and finalize the calibration.

NOTE: Manual calibration is not available.

Figure 23: Liquid Pressure Sensor->No Pressure

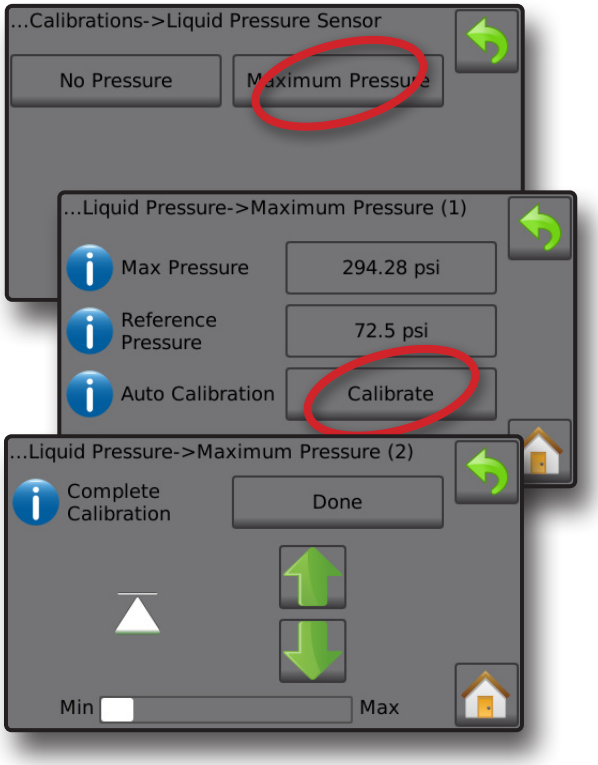


❷ *Maximum Pressure*

Liquid Pressure Sensor->Maximum Pressure establishes the maximum allowed pressure limit for the Liquid Pressure Sensor. The Automatic Calibration is based on the recommended maximum pressure level and a tested reference pressure level.

- ▶ Maximum Pressure – enter the maximum allowed pressure limit for the Liquid Pressure Sensor. Use Automatic Calibration to calculate the maximum pressure automatically.
- ▶ Reference Pressure – enter the pressure value used as reference for the actual Liquid Pressure Sensor calibration. The reference pressure can be changed, but not while in the calibration mode.
- ▶ Automatic Calibration – if the maximum pressure is not known, or to make sure the value is correct, automatic calibration establishes the calibration.
- ▶ Complete Calibration – apply constant reference pressure to the sensor. Press "Done" when complete.
- ▶ Master Switch Status / Pressure Adjustment – Shows if the Master Switch is off or on . Press the UP/DOWN arrows to increase/decrease the pressure until reaching and maintaining the reference pressure.
- ▶ Minimum/Maximum Pressure Bar – illustrates the change in pressure from minimum to maximum.

Figure 24: Liquid Pressure Sensor->Maximum Pressure



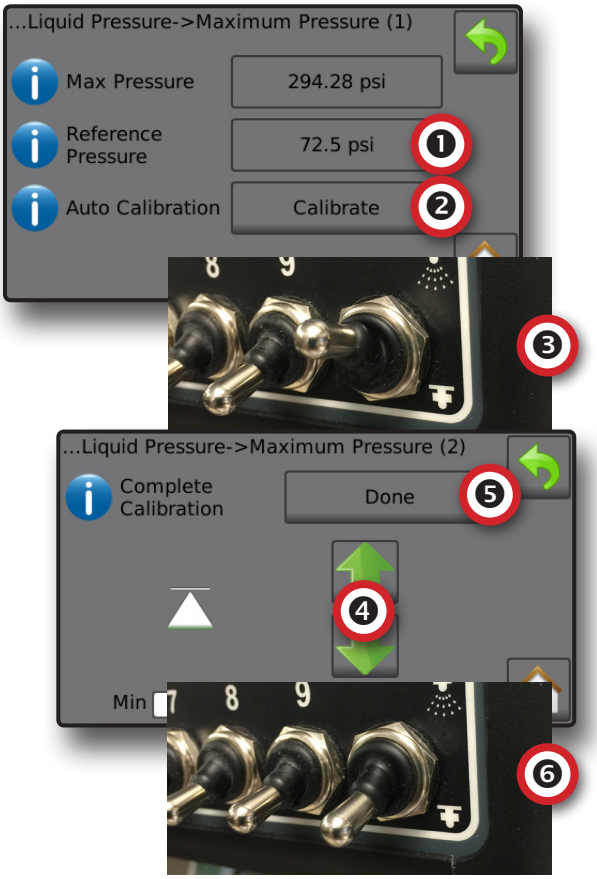
Maximum pressure automatic calibration

IMPORTANT: Make sure all section valves are open before opening the Master valve; otherwise, the pressure could build and damage the system.

1. Press the Reference pressure value ❶.
2. Enter the pressure value used as reference for the actual Liquid Pressure Sensor calibration.
3. Press **Calibrate** ❷ to start an automatic calibration of the sensor.
4. Turn on Master Switch ❸.
5. Press the UP/DOWN arrows ❹ to increase/decrease the pressure until reaching and maintaining the reference pressure.
6. Apply constant reference pressure to the sensor.
7. Press **Done** ❺ when complete.
8. Turn off Master Switch ❻ to stop calibration.

To cancel the calibration, press the RETURN arrow or the Home button .

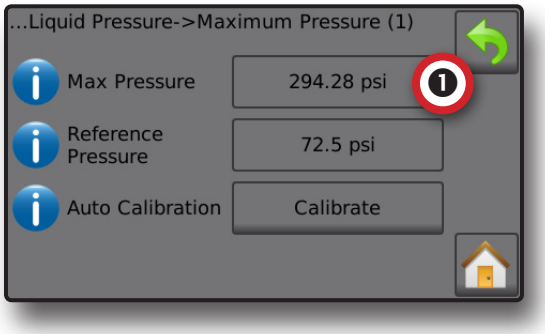
Figure 25: Automatic Maximum Pressure



Maximum pressure manual calibration

1. Press the Maximum Pressure value ❶.
2. Enter the maximum allowed pressure limit for the Liquid Pressure Sensor.

Figure 26: Manual Maximum Pressure

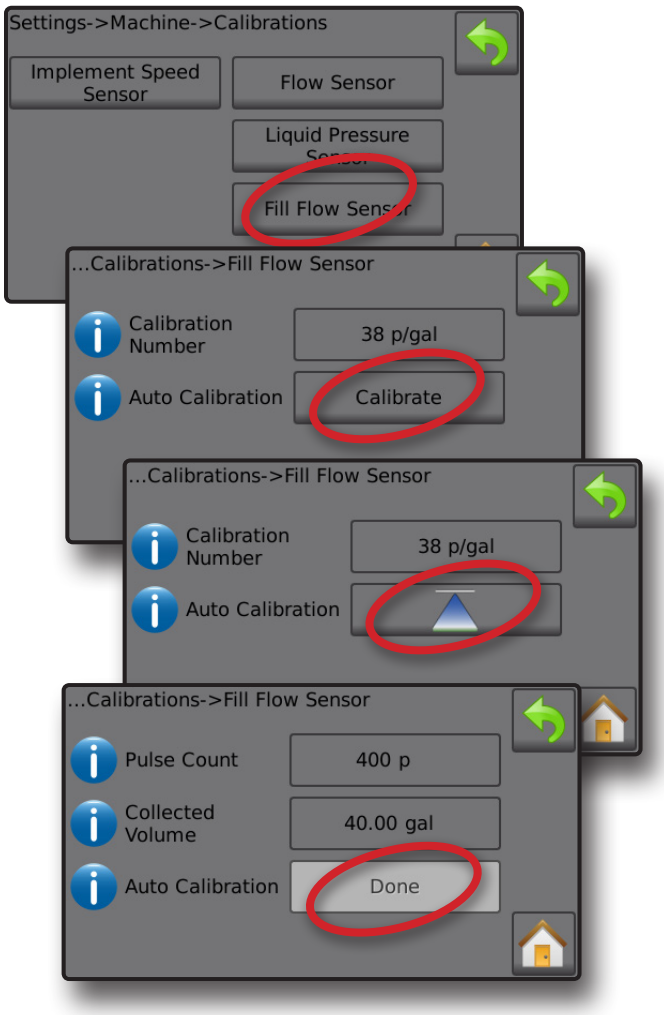


Fill Flow Sensor

The Fill Flow Sensor establishes the pulses per liter. The Fill Flow value can be established manually or automatically calibrated.

- ▶ Calibration Number – enter the amount of pulses counted while running one (1) gallon or one (1) liter of water through the Fill Flow Sensor. Use Automatic Calibration to calculate the pulses automatically. Manual Calibration establishes the calibration and limits based on user entered values.
- ▶ Automatic Calibration – establishes the calibration if the number of pulses per liter for the Fill Flow Meter is unknown, or to make sure the value is correct.
- ▶ Pulse Count – number of pulses calculated during automatic calibration.
- ▶ Collected Volume – enter the collected volume.
- ▶ Automatic Calibration Done – to complete the automatic calibration, press "Done" when collected volume has been entered.

Figure 27: Fill Flow Sensor



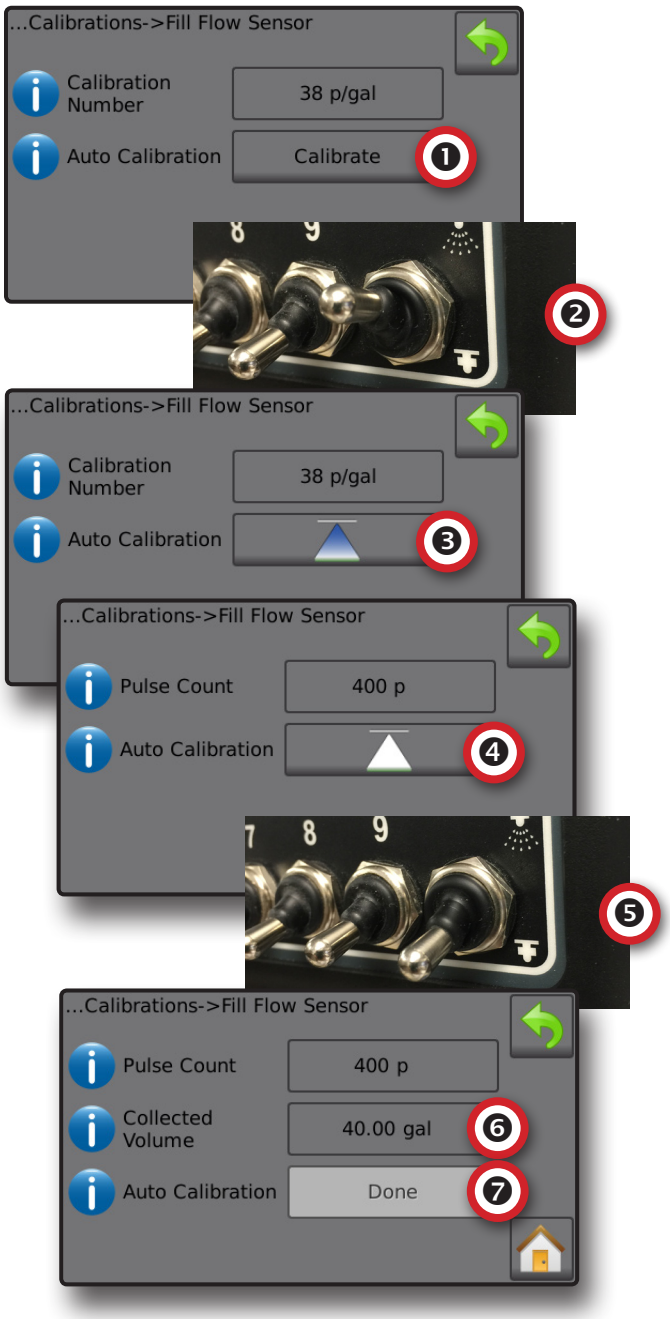
Fill Flow Sensor Automatic Calibration

1. Press **Calibrate** ❶ to enter automatic calibration mode.
2. Prepare to collect the 'medium' via the Fill Flow Sensor (minimum of 25 gallons or 100 liters).
3. Turn on Master Switch ❷ to start flow.
4. Press START CALIBRATION button ❸.

   ◀Pulses counted display during automatic calibration
5. Once the desired amount has distributed, press the STOP CALIBRATION button ❹.
6. Turn off the Master Switch ❺.
7. Press the Collected Volume value ❻.
8. Enter the precise volume passed through the Fill Flow Sensor during the calibration.
9. Press **Done** ❼ to complete the automatic calibration.

To cancel the calibration, press RETURN arrow or the Home button.

Figure 28: Fill Flow Sensor Automatic Calibration



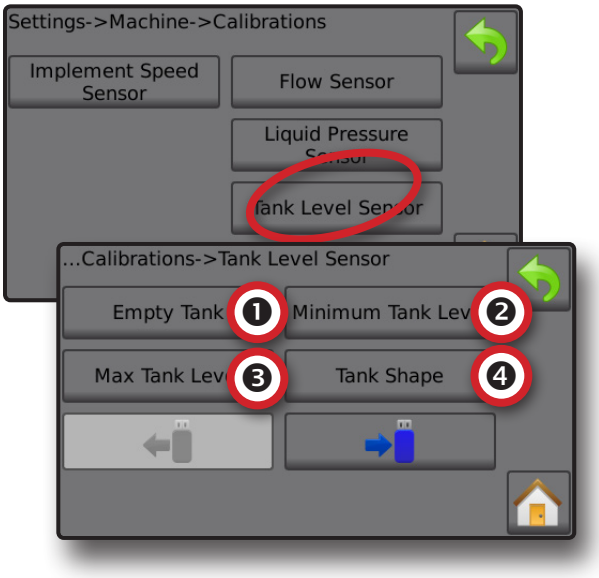
Tank Level Sensor

Tank Level Sensor establishes the empty, minimum and maximum levels for the tank and calibrates the tank shape. Tank Level Sensor calibration settings can be exported to a USB drive and recalled for future use.

NOTE: Manual calibration is not available for any Tank Level Sensor calibrations.

1. From the Home screen, press the SETTINGS button .
2. Press **Machine**.
3. Press **Calibrations**.
4. Press **Tank Level Sensor**.
5. Calibrate each option in the following order:
   - ❶ Empty Tank
   - ❷ Minimum Tank Level
   - ❸ Maximum Tank Level
   - ❹ Tank Shape
6. Press RETURN arrow to return to the Calibrations screen.

Figure 29: Tank Level Sensor



❶ *Empty Tank – Automatic Calibration*

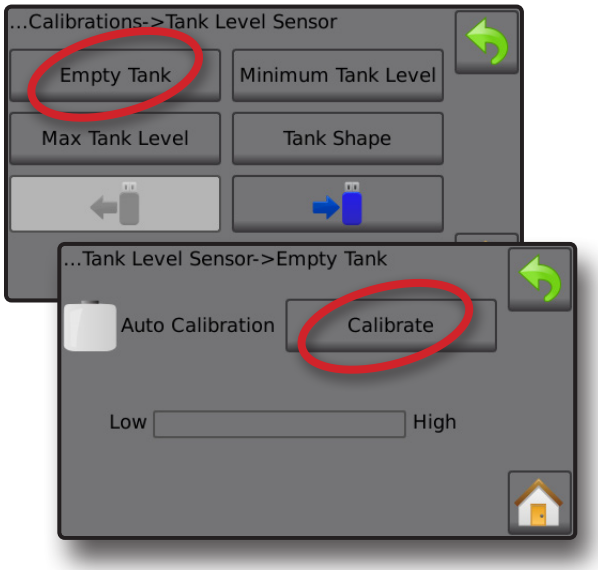
Empty Tank establishes the empty tank value.

IMPORTANT: The tank should be completely empty.

1. Press **Calibrate** to record a new calibration value and finalize the calibration.

◀The low-high graph should be empty

Figure 30: Tank Level Sensor – Empty Tank



❷ *Minimum Tank Level – Automatic Calibration*

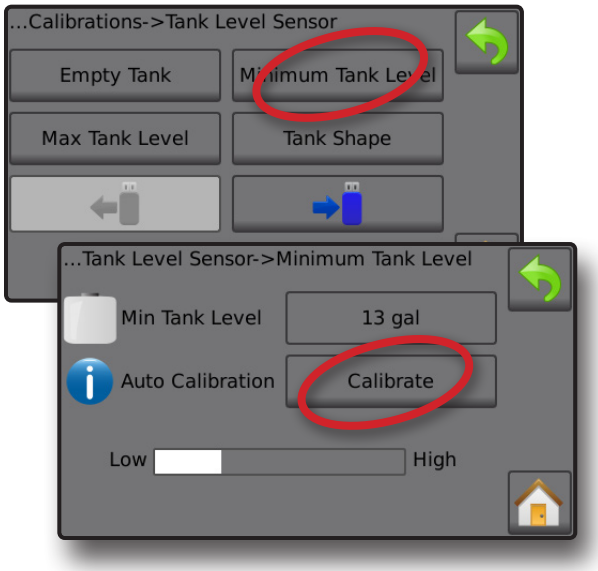
Minimum Tank Level establishes the minimum level of water on the tank sensor.

IMPORTANT: Make sure the tank is filled with the contents displayed on the screen. The amount displayed is established in Settings->OEM->Tank Setup->Minimum Tank Content.

1. Press **Calibrate** to record a new calibration value and finalize the calibration.

◀The low-high graph should display approximately 5% full

Figure 31: Tank Level Sensor – Minimum Tank Level



❸ *Maximum Tank Level – Automatic Calibration*

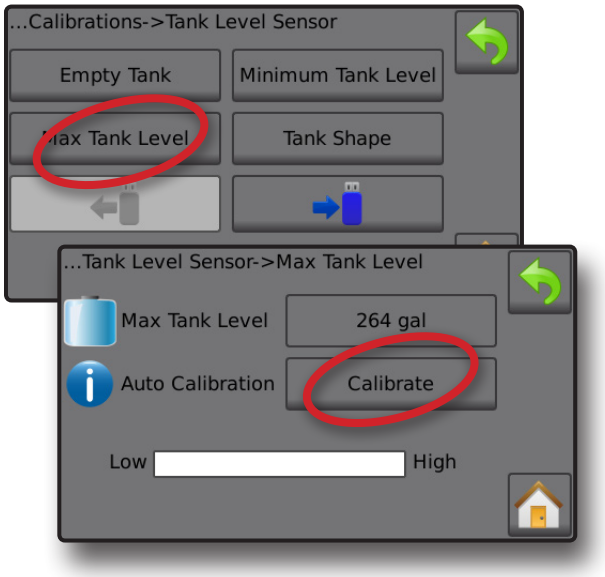
Maximum Tank Level establishes the maximum level of water on the tank sensor.

IMPORTANT: Ensure the tank is filled with the contents displayed on the screen. The amount displayed is established in Settings->OEM->Tank Setup->Maximum Tank Content.

1. Press **Calibrate** to record a new calibration value and finalize the calibration.

◀The low-high graph should display 100% full

Figure 32: Tank Level Sensor – Maximum Tank Level



❹ *Tank Shape – Automatic Calibration*

Tank Shape establishes the tank shape.

1. Flip Master Switch to start calibration.

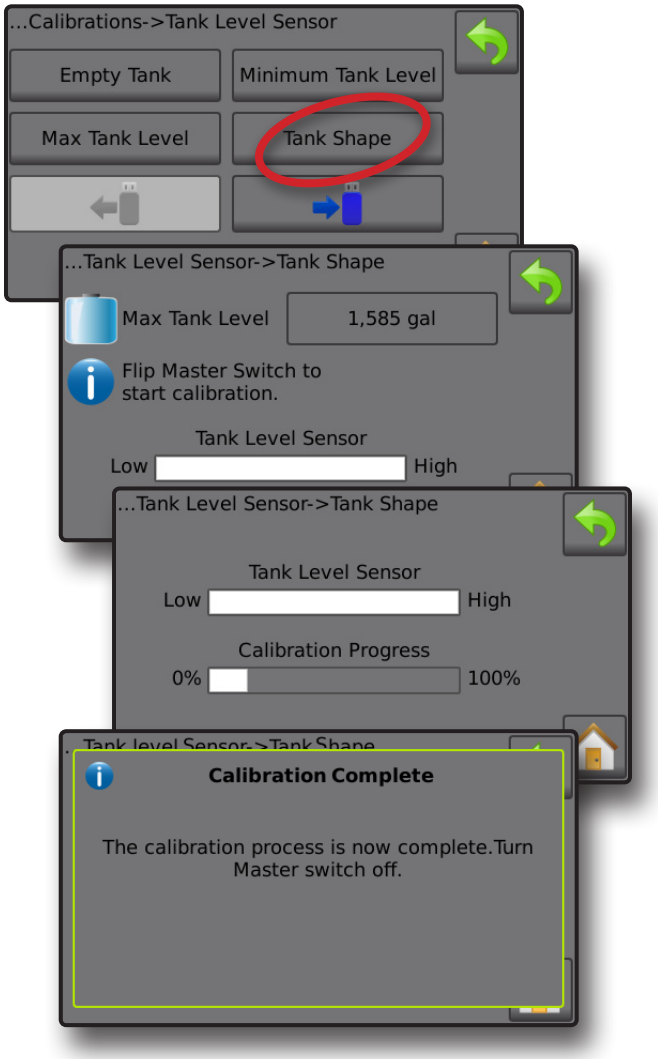
   ◀Tank Level Sensor graph will go from high to low as the calibration proceeds

   ◀When Calibration Progress graph reaches 100%, calibration will record a new calibration value and finalize the calibration

To pause the calibration process, flip the Master Switch.

To cancel the calibration, press RETURN arrow or press the Home button.

Figure 33: Tank Level Sensor – Tank Shape



Import / Export

Tank Level Sensor calibration settings can be exported to USB drive and recalled for future use.

NOTE: The Import/Export buttons are not available for selection and are grayed out until a USB drive is inserted properly.

To import the calibration settings:

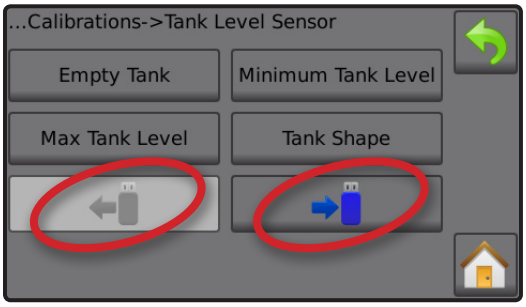
1. Insert USB drive.
2. Press IMPORT button.

To export the calibration settings:

1. Insert USB drive.
2. Press EXPORT button.

NOTE: Only one (1) tank calibration settings file can be saved on a USB drive at one time. If there is an existing file it will be overwritten.

Figure 34: Tank Level Sensor – Import/Export

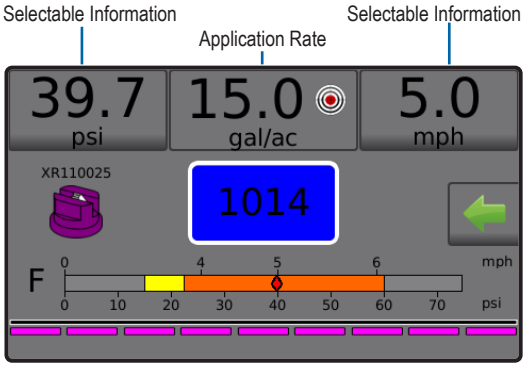


OPERATION SCREEN

INFORMATION BAR

The information bar displays user selected information and application rate information.

Figure 35: Information Bar



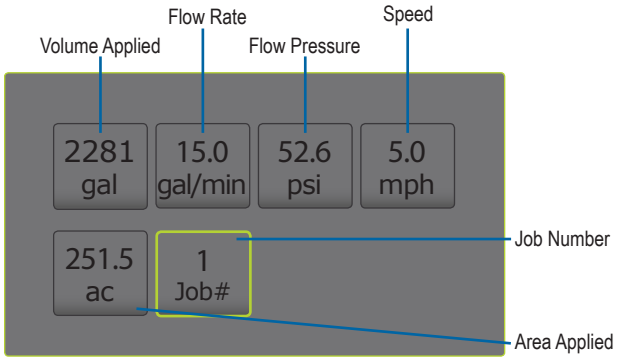
Selectable Information

Selectable Information displays user-selected information.

1. Press either the left or right Selectable Information section.
2. Select one (1) of six (6) available options to display for each side (options depend upon equipment in use).
   - ► Volume Applied – displays volume applied for the current job number
   - ► Flow Rate – displays current flow rate
   - ► Flow Pressure – displays current flow pressure
   - ► Speed – displays vehicle speed
   - ► Area Applied – displays applied area for the selected job number
   - ► Job Number – displays the current job number

Figure 36: Selectable Information

Figure 37: Selectable Information Options



Selecting a Job Number

One of up to ten (10) jobs may be selected to view job information.

1. From the Operation screen, press the OPTIONS tab.
2. Press the HOME button.
3. From the Home screen, press the DATA button.
4. Press **Jobs**.
5. Press **Job Number** to select current job number.
6. Press the HOME button.
7. From the Home screen, press the OPERATION button.

Figure 38: Selecting a Job Number

Application Rate

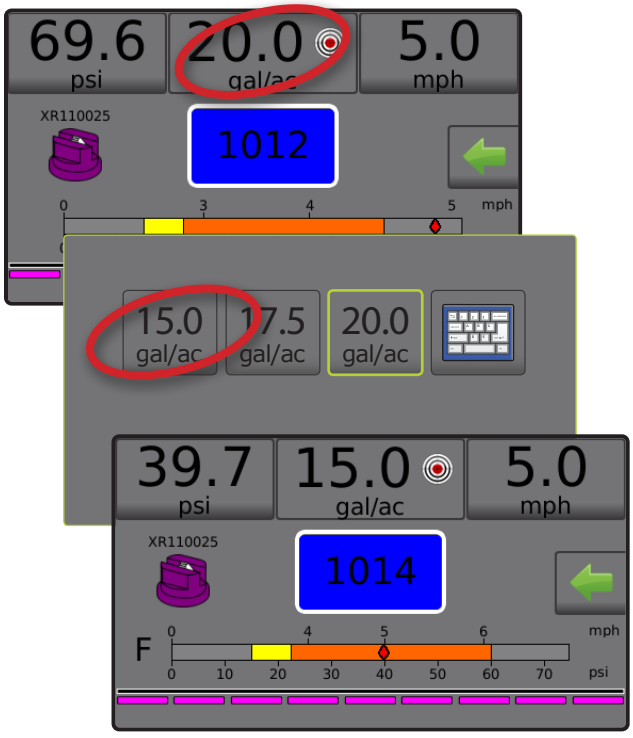
Application rate displays or give access to:

- ► Application Rate – while applicaiton is active, displays the actual application rate
- ► Target Application Rate – while application is inactive, displays the target rate of product to apply.
  - ◄Automatic Regulation Mode – Target application rate symbol will be active
    Use the Boost/Step Percent Increase/Decrease buttons 5% / 5% to adjust the target application rate
  - ◄Manual Regulation Mode – manual regulation symbol will remain active
- ► Preset Target Application Rates Options Menu – defines the target rate of product to apply for the selected number. These settings will be the same for all active jobs. Range is 0 to 700.6 gallons/acre / 6,554 liters/hectare.

Select Target Applicaiton Rate

1. Press the Application rate section.
2. Select one (1) of up to three (3) preset application rates.

Figure 39: Select Target Applicaiton Rate



Change Preset Target Application Rate

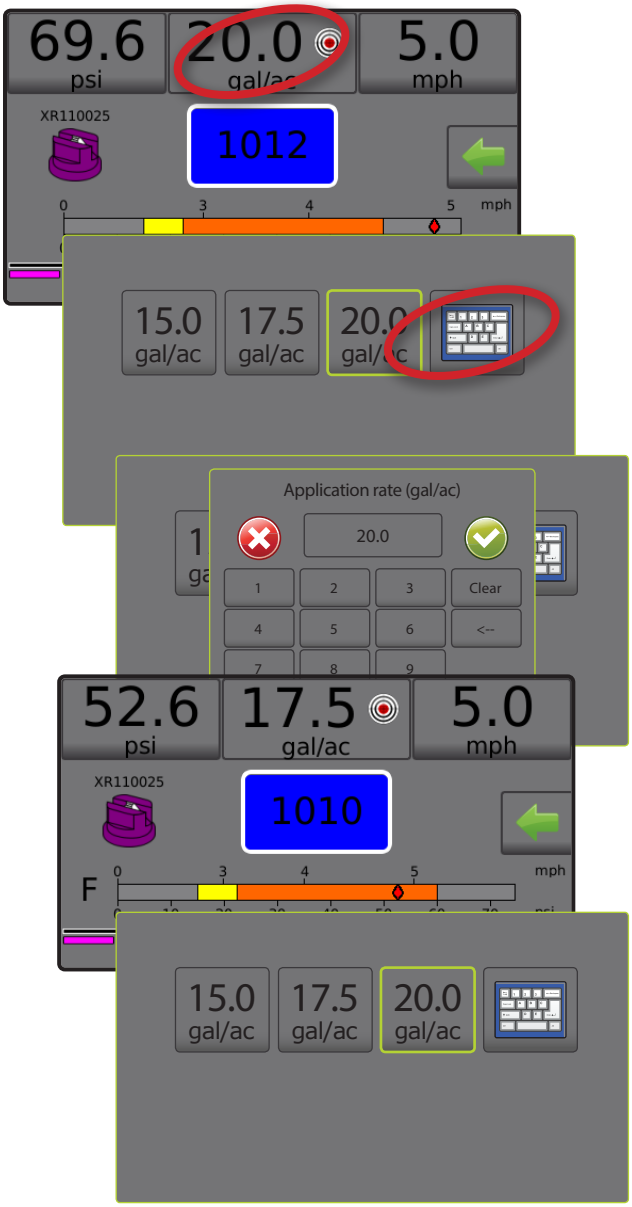
The selected target rate can be changed either on the Operation screen or in Settings->Job Parameters.

Operation

1. Press the Application Rate section.
2. Select the target applicaiton rate to be changed.
3. Press KEYBOARD button .
4. Select an application rate.

NOTE: Value must be between 0 and 700.6 gallons/acre / *6,554 liters/ hectare.*

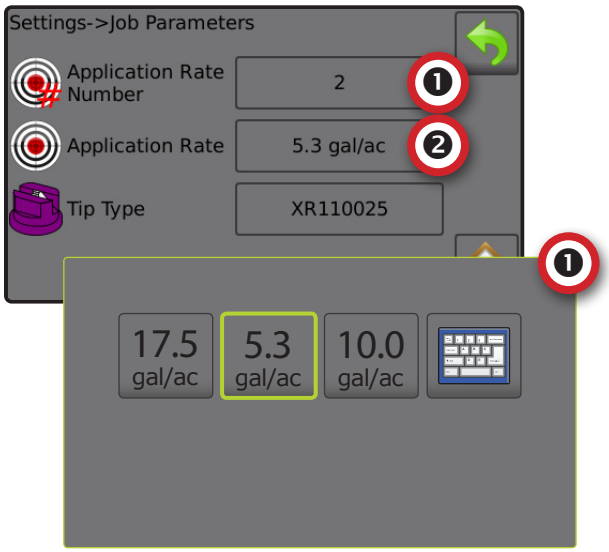
Figure 40: Application Rate Number



Settings

1. From the Home screen, press the SETTINGS button.
2. Press **Job Parameters**.
3. Select Application Rate Number 1 ❶.
4. Select an application rate ❷ to be associated with number 1.
5. Repeat steps 3 and 4 for Application Rate Numbers 2 and 3.

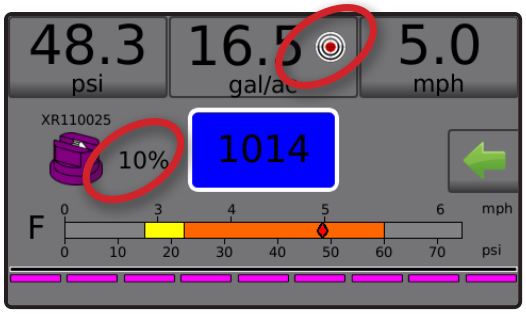
Figure 41: Establish Preset Target Application Rate 2



Target Rate Percentage Increase/Decrease

Target rate boost/step percent increase/decrease buttons increase/decrease the application target rate per the established percentage set in the Settings->Machine->Operation setup screen under Application Rate Step.

Figure 42: Target Rate Boost/Step Percent



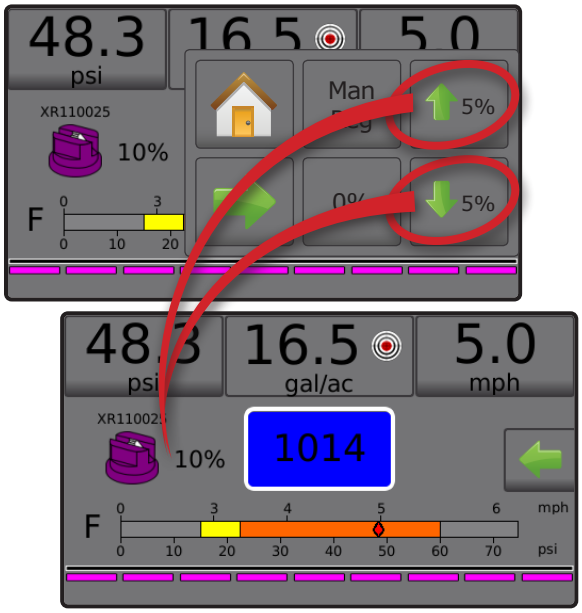
Increase/Decrease Percentage

1. From the Operation screen, press the OPTIONS tab to display the Operation menu.
2. Press the Boost/Step Percent Increase/Decrease buttons 5% / 5% to adjust application rates.
3. Press the Close Menu button.

Return to Preset Target Rate

1. From the Operation screen, press the OPTIONS tab to display the Operation menu.
2. Press **0%** to return to the preset target rate.
3. Press the Close Menu button.

Figure 43: Application Rate Step

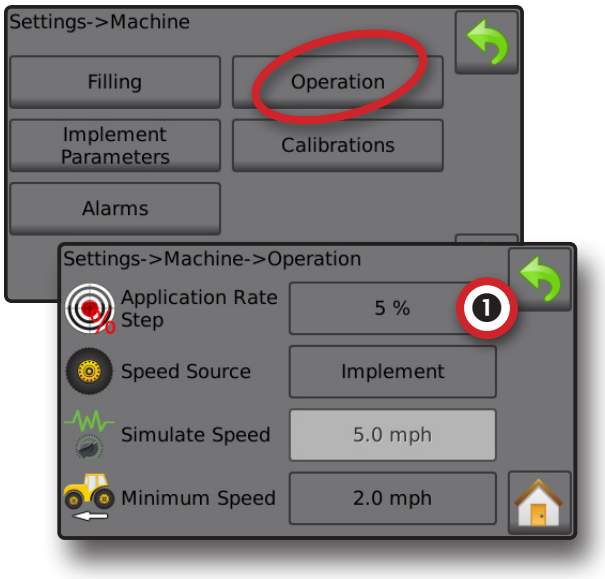


Change Application Rate Step

Application Rate Step is the percent of increase/decrease boost of the active application rate at which the product is applied. Range is 1 to 20%.

1. From the Home screen, press the SETTINGS button.
2. Press **Machine**.
3. Press **Operation**.
4. Press Application Rate Step value ❶.
5. Select an application rate step.
6. Press RETURN arrow to return to the Machine screen.

Figure 44: Operation



TIP SELECTION

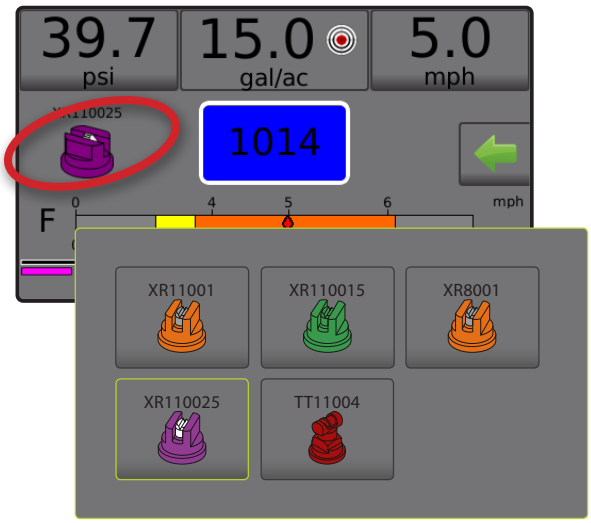
Tips must be preset to be available for current tip selection. Presets allow saving of up to five (5) tips for quick recall.

Selecting the Current Tip

1. From the Operation screen, press the CURRENT Tip to display the Preset Tip menu.
2. Select a tip type from among five (5) tip presets.

NOTE: Current tip can also be selectable on the Settings->Job Parameters screen.

Figure 45: Tip Type on Operation Screen

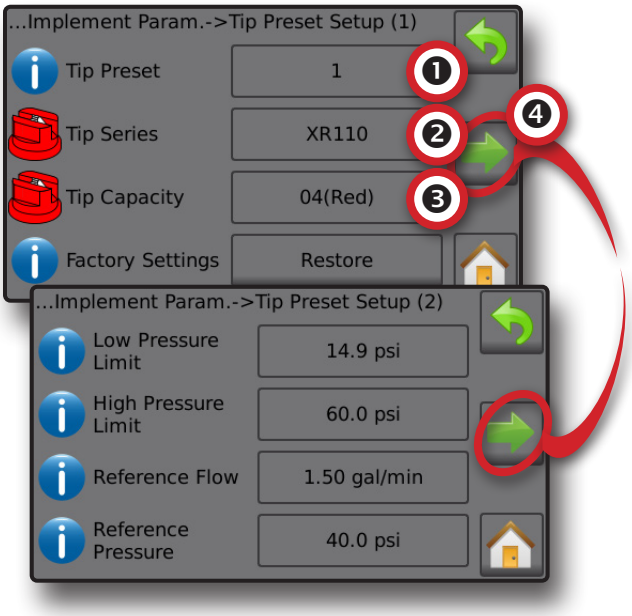


Presetting Tips

Tip Preset Setup establishes up to five (5) sets of tip options setting the tip type, capacity, low/high pressure limit, reference flow and reference pressure. For more information see Settings->Machine->Implement Parameters->Tip Preset Setup.

1. From the Home screen, press the SETTINGS button.
2. Press **Machine**.
3. Press **Implement Parameters**.
4. Press **Tip Preset Setup**.
5. Select Tip Preset Number 1 ❶.
6. Select Tip Series ❷.
7. Select Tip Capacity ❸.
8. Repeat steps 5, 6 and 7 for Tip preset numbers 2 to 5.
9. OPTIONAL: Press NEXT PAGE arrow ❹ to adjust the settings for Low Pressure Limit, High Pressure Limit, Reference Flow and Reference Pressure. Each of these settings are specific to the current tip preset number.

Figure 46: Establish Tip Presets



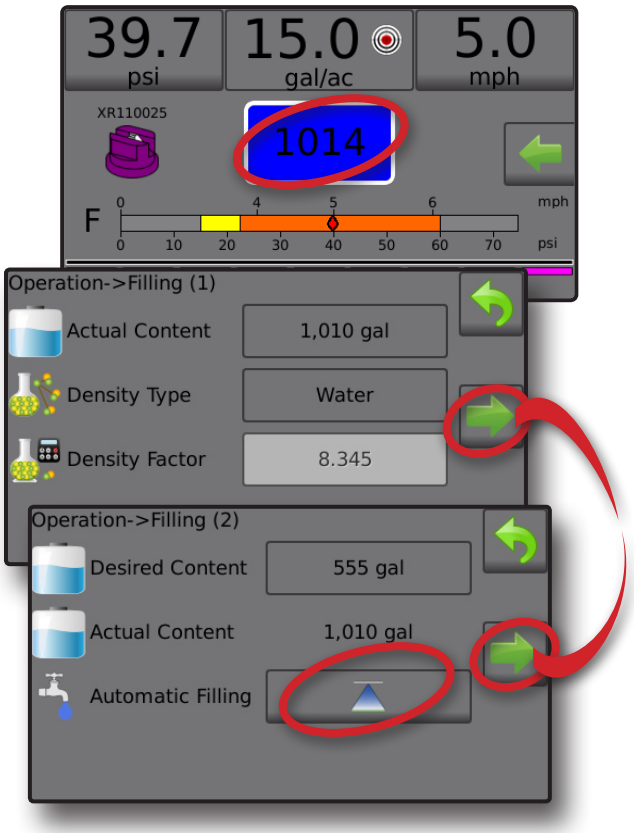
TANK

Tank displays or give access to:

- ► Actual Content – displays the current volume of content in the tank. Manual adjustment is directly relate to OEM fitted equipment. The volume cannot be manually adjusted if a Tank Sensor is active.
- ► Tank Filling – establishes the amount of actual and desired material in the tank and the density of that material. Options displayed directly relate to OEM fitted equipment. Different options will be available depending upon if a Tank Sensor or Fill Flow Sensor is active. See Settings->Machine->Filling for additional information.

1. Press TANK 100.
2. Press setting value to adjust settings as needed:
   - ◄Actual Content (unavailable when Tank Sensor is active)
   - ◄Full Tank (unavailable when Tank Sensor or Fill Flow Sensor is active)
   - ◄Density Type
   - ◄Density Factor (available when Density Type is Fertilizer)
   - ◄Desired Content (available when Tank Sensor or Fill Flow Sensor is active)
   - ◄Automatic Filling (available when Tank Sensor or Fill Flow Sensor is active)
3. Press RETURN arrow to return to the Operation screen.

Figure 47: Tank Filling

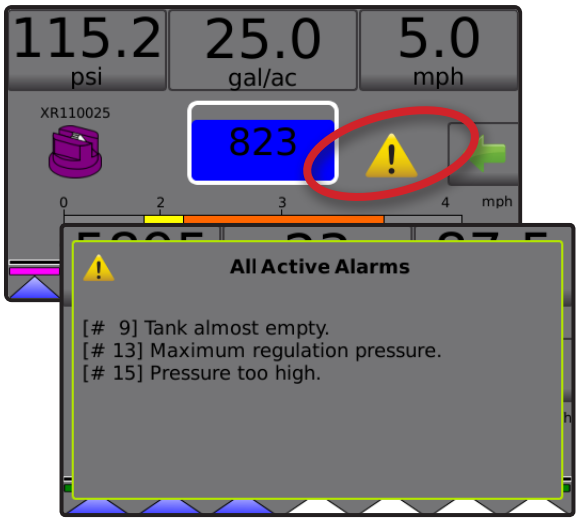


ALARM WARNING

If there is an active alarm, an Alarm Warning icon will appear next to the Tank. For a list of Alarm message codes see Appendix C – Alarm configurations.

1. Press ALARM WARNING icon to display a list all active alarms.

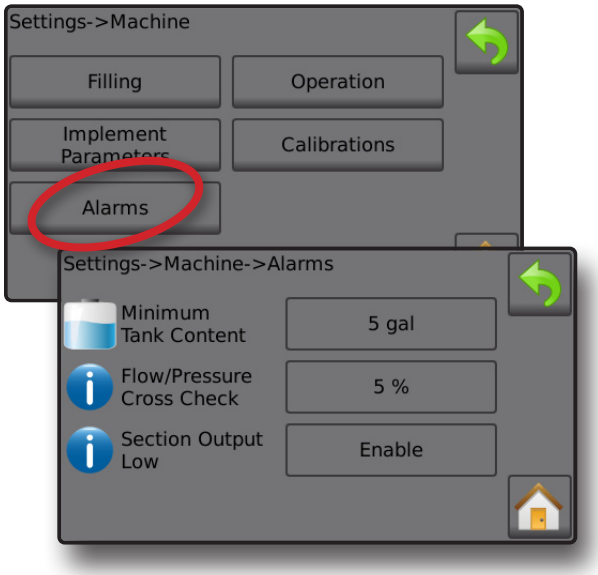
Figure 48: Active Alarm Warning List



Set Up Alarms

1. From the Home screen, press the SETTINGS button.
2. Press Machine.
3. Press Alarms.
4. Press setting value to adjust settings as needed:
   - ◄Minimum Tank Content
   - ◄Flow/Pressure Cross Check (alarm active only when both a Flow Sensor and Liquid Pressure Sensor are active)
   - ◄Section Output Low
5. Press RETURN arrow to return to the Machine screen.

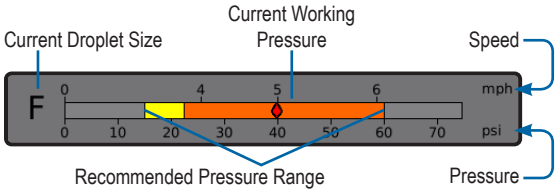
Figure 49: Alarms



PRESSURE GAUGE

The Pressure Gauge displays current pressure compared with the recommended pressure range. Pressure sensor options are used to enter the sensor manufacturer maximum pressure rating and to set high and low user-determined pressure alarms.

Figure 50: Pressure gauge example



Recommended Pressure Range

Displays the recommended pressure range for the selected tip. The pressure range will change depending upon the selected tip, target application rate (including boost/step percent increase/decrease) and working speed.

IMPORTANT! Always refer to the recommended pressure range as failure to do so may result in uneven spray patterns.

Current Working Pressure

Displays the current working pressure.

NOTE: This pressure range should not exceed the recommended pressure range.

IMPORTANT! Always refer to the recommended tip pressure values when setting tip pressure.

Current Droplet Size

A single tip can produce different droplet size classifications at different pressures. The colors displayed in the recommended pressure range are directly associated with the current droplet sizes. The droplet size displays as one (1) of eight (8) classification categories.

Table 1: Droplet Size Chart

Category	Symbol	Colour code
Extremely Fine	XF	Violet
Very Fine	VF	Red
Fine	F	Orange
Medium	M	Yellow
Coarse	C	Blue
Very Coarse	VC	Green
Extremely Coarse	XC	White
Ultra Coarse	UC	Black

BOOM SECTIONS & SWITCHES

The console operates with nine (9), seven (7) or five (5) section switches (depending on console model) and one (1) Master Switch. Each section switch is associated with one of up to the same number of sections on the boom and illustrated on the Operation screen.

- ▶ Switches – control individual boom sections
  - ◀On – Flip the switch up
  - ◀Off – Flip the switch down
- ▶ Master Switch – opens/closes the main product valves and enables/disables power to individual boom section on/off switches
  - ◀Cannot be activated outside of the Operation screen
- ▶ Boom Sections Spray Status – displays the status of the section switches in association to the master switch. Number of sections shown is established in Settings-> OEM-> Implement Parameters.
  - ◀Section On, Master Switch On – spray is blue
  - ◀Section Off, Master Switch On – spray is white
  - ◀Master Switch Off – spray not shown

Figure 51: Master Switch, 9 Section Switches

Figure 52: Boom sections

ALARM CONFIGURATIONS

Code	Message / Condition	Possible Solution	Console Path
1	No Flow Pulses	Check Flow Sensor from test menu. Check components and programming steps related to flow.	Settings->Diagnostics->Test Inputs (1)->Flow Sensor
2	Low Liquid Pressure	Check Flow Sensor from test menu. Check components and programming steps related to flow.	Settings->Machine->Implement Parameters->Tip Preset Setup (2) Or Settings->Machine->Calibrations Or Settings-> Diagnostics->Test Inputs (2)->Liquid Pressure Sensor
4	Calibration Error	Check components and programming steps related to implement or process registering a calibration error.	Settings->Machine->Calibrations - Check Sensors
5	Density Not Equal To Water (1 Kg/L Or 8.34 Lb/Gal)	Select Water for tank contents or change fertilizer density No.. Check components and programming steps related to content.	Operation->Filling (1) Or Settings->Machine->Filling (1)
6	Below Minimum Speed	Increase speed. Check components and programming steps related to speed.	Settings->Machine->Operation Or Settings->Machine-> Calibrations->Implement Speed Sensor
7	Pressure Based	Check components and programming steps related to implement or process registering a pressure error.	Settings->Diagnostics->Test Inputs Or Settings-> Machine-> Implement Parameters->Tip Preset Setup (2)
8	Low Flow	Increase speed. Check or clean tips. Check components and programming steps related to flow.	Settings->Diagnostics->Test Inputs Or Settings-> Machine-> Implement Parameters->Tip Preset Setup (2)
9	Tank Almost Empty	Refill tank. Check all components and programming steps related to contents.	Operations->Tank->Filling (1) Or Settings->Machine-> Filling (1) And (2) Or Settings->Machine-> Alarms-> Minimum Tank Contents
10	Target Rate Impossible To Reach	Select a new target rate. Use larger tips. Check components and programming steps related to rates.	Operation->Target Rates Or Settings->Job Parameters
11	Actual Rate Too High	Select a lower target rate. Check components and programming steps related to rates.	Operation->Target Rates Or Settings->Job Parameters
12	Minimum Regulation Pressure	Check components and programming steps related to pressure.	Settings->Machine->Implement Parameters-> Regulation Parameters
13	Maximum Regulation Pressure	Check components and programming steps related to pressure.	Settings->Machine->Implement Parameters-> Regulation Parameters
14	Pressure Too Low	Check components and programming steps related to pressure.	Settings->Machine->Implement Parameters-> Tip Preset Setup (2)
15	Pressure Too High	Check components and programming steps related to pressure.	Settings->Machine->Implement Parameters-> Tip Preset Setup (2)
16	Pressure/Flow Check	Check components and programming steps related to flow.	Settings->Diagnostics->Test Inputs Or Settings-> Machine-> Calibrations
19	Liquid Pressure Too Low	Check Flow Sensor from test menu. Check components and programming steps related to pressure.	Settings->Machine->Implement Parameters-> Tip Preset Setup (2) Or Settings->Machine-> Calibrations Or Settings->Diagnostics->Test Inputs (2)-> Liquid Pressure Sensor
20	Liquid Pressure Too High	Check Flow Sensor from test menu. Check components and programming steps related to pressure.	Settings->Machine->Implement Parameters->Tip Preset Setup (2) Or Settings->Machine->Calibrations
21	No Speed Signal	Check components and programming steps related to speed.	Settings->Machine->Calibrations->Implement Speed Sensor
31	Work Not Possible		
34	Save Error	Insert or reset a USB device if saving to a USB port.	
36	Can Speed Missing	Check GNSS source for power/satellite reception. If no GNSS source, change speed source. Check components and programming steps related to speed.	Settings->Machine->Operation->Speed Source
45	Boompilot Unit Not Responding	Check BoomPilot for power. Test BoomPilot under test menu.	Settings->Diagnostics->Test Boompilot
46	Boompilot Unit In Manual Mode	Current operation mode is different than standard operation. If this is undesired, change mode to automatic under test menu.	Settings->Diagnostics->Test Boompilot
47	Not All Sections On	Current operation mode is different than standard operation. If this is undesired, check section switches are flipped up (ON). Check sections under test menus. Configure sections. Check components and programming steps related to power.	Settings->Diagnostics->Test Outputs (2) Or Settings-> Diagnostics->Test Inputs (3)->Section Switches Or Settings-> Machine->Implement Parameters->Section Configuration
49	Section Output Failure	Check components and programming steps related to sections.	Settings->Diagnostics->Test Outputs (2)
50	Master Output Failure	Check Master Switch if flipped up (ON). Check all components and programming steps related to Master Switch.	Settings->Diagnostics->Test Inputs (3)->Master Switch
51	Fill Valve Output Failure	Check fill valve under test menus. Check components and programming steps related to fill valve.	Settings->Diagnostics->Test Outputs (2)->Fill Valve
52	Low Supply Voltage	Check voltage supply under Diagnostics.	Settings->Diagnostics->Supply Voltage

RADION 8140
USER GUIDE

#1 POWER ON

#2 OPERATION SCREEN

#3 GO TO HOME

1) SET UP THE LOCAL CULTURAL SETTINGS

2) SET UP THE JOB PARAMETERS

3) SET UP THE MACHINE

1) Operation
2) Implement Parameters
3) Verify Sensor Calibrations

#4 START NEW JOB OR CONTINUE JOB

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