

AC110™ Rate/Section Controller Quick Reference Guide

This Quick Reference Guide provides information on how to set up, calibrate, and use the AC110 rate/section controller. AC110 works with your Outback S3™ to provide application control, with the following benefits:

- Single product, liquid and anhydrous, constant rate control
- Automatic section control for up to ten sections
- Onscreen display of sections w/ section override
- Simple calibration
- Support for eDriveTC™, eDriveX™, and standalone
- External report viewer
- Reduced cab clutter
- Interface kits for the following Raven and TeeJet rate/section control systems:
 - Raven 440/450/460
 - Raven 4400/4600
 - TeeJet 854/844E

This Quick Reference Guide covers the following topics:

- “AC110 Setup and Calibration” on page 2
- “Using Rate/Section Control” on page 14
- “S3 Jobs and the AC110” on page 19

AC110 Setup and Calibration

Before using AC110 rate/section control functionality on your S3 you must first set up and calibrate your system via the S3 interface. Setup and calibration involves the following:

- Flow (rate) setup and calibration
- Flow control setup
- Section setup

You perform AC110 setup and calibration via the Vehicle screen of the S3 (Figure 1). With AC110 installed the Vehicle screen displays the Flow Setup, Flow Control, and Section Setup buttons.

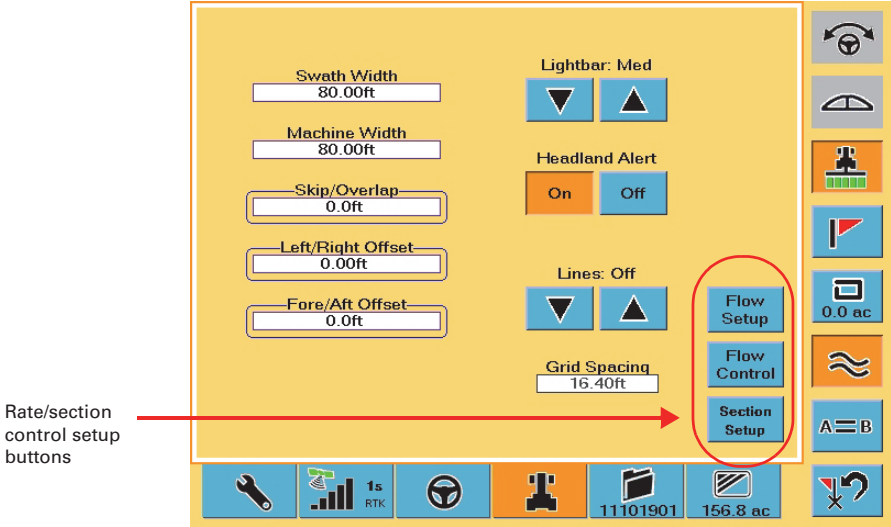


Figure 1: S3 Vehicle tab with rate/section control buttons

Both flow control and section control have simple on/off controls (Enabled: Yes/No buttons) that allow you to enable or disable the rate control and section control functionality. Once you enable the functionality you can then perform the necessary setup and calibration.



Flow Setup

Use the Flow Setup screen (Figure 2) to set flow parameters as well as to calibrate flow. See “Flow Calibration” on page 6 for instructions on performing flow calibration.

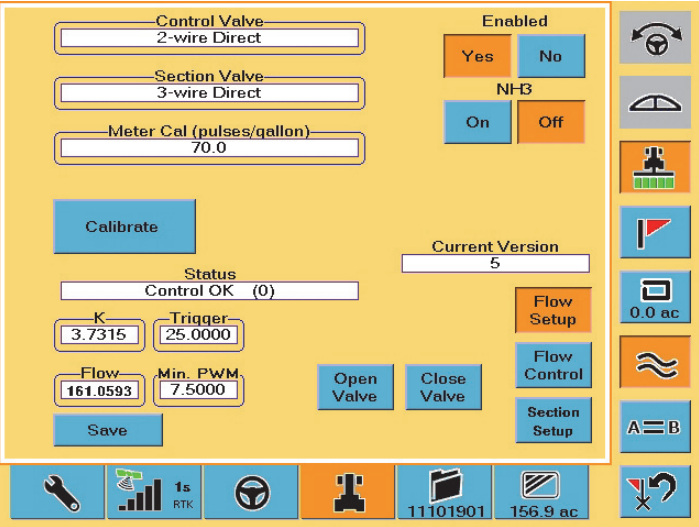


Figure 2: Flow Setup screen

Before you begin flow setup review the screen item descriptions in Table 1 below:

Table 1: Flow Setup screen item descriptions

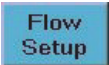
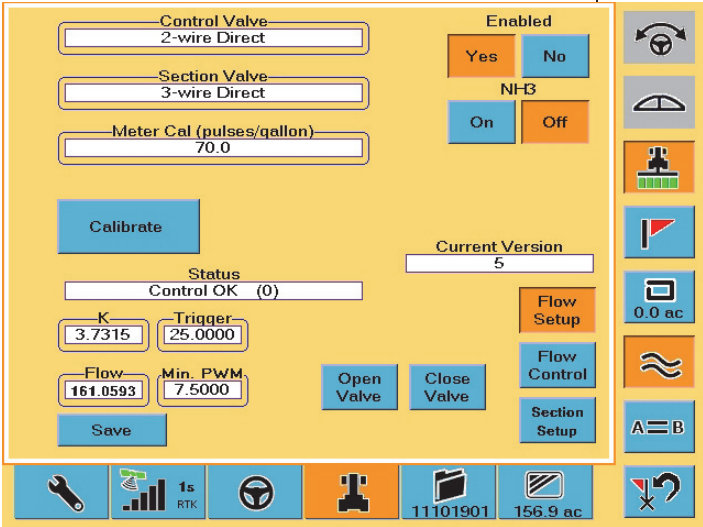
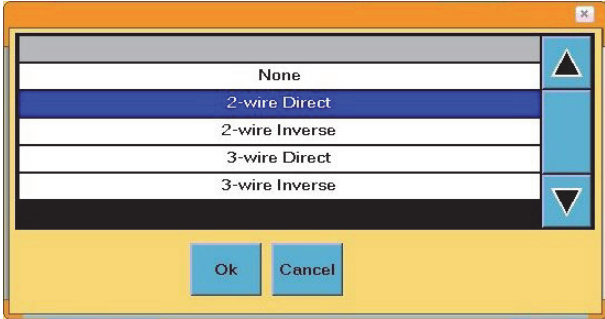
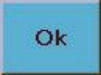
Screen Item	Name	Description
Enabled Yes No	Enabled buttons	Press Yes to enable the Flow Setup screen buttons/fields and enable rate control functionality on the S3. Pres No to disable the Flow Setup screen buttons/fields and disable rate control functionality on the S3.
NH3 On Off	NH3 (anhydrous ammonia) buttons	Set to On for NH3 control. Rate will be in lbs nitrogen/acre (US) or kgs nitrogen/hectare (metric). Volume remaining in tank will be lbs or kgs of NH3. Set to Off to set any other liquid as the application liquid.
Control Valve 2-wire Direct	Control Valve field	Identify the wiring going to the regulating valve and determine if there are 2 or 3 wires. Most sprayers will be 2-wire unless plumbed by-pass (flow diverted back to tank), in which case it may be 2-wire inverse. A good way to check is to open the valve and if pressure increases, the correct valve has been selected.
Section Valve 3-wire Direct	Section Valve field	Identify the wiring going to boom valves—most will be 3-wire Direct.
Meter Cal (pulses/gallon) 70.0	Meter Cal field	Locate the meter calibration tag or stamp on the flow meter and the corresponding calibration value. - For Raven systems, divide the calibration number by 10 and enter this number. <i>Example: If 169 is the calibration value, enter 16.9.</i> - For TeeJet meters, enter the number as is. Note: Many TeeJet meters list the calibration value in pulses/liter. It may be easier to change the units of measure in the S3 to metric, enter the meter calibration, and then change units of measure back to US.

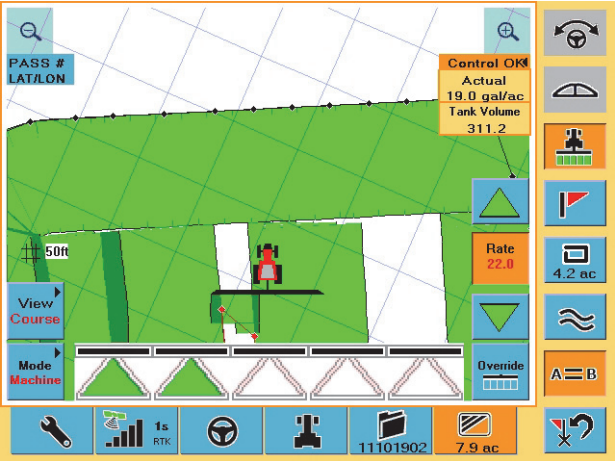


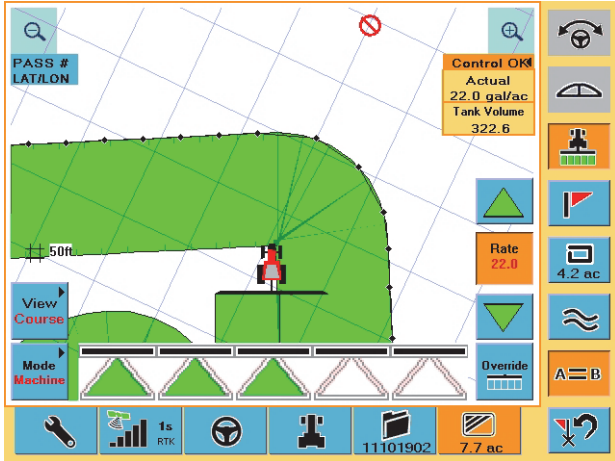
Table 1: Flow Setup screen item descriptions (continued)

Screen Item	Name	Description
 	Open Valve/Close Valve buttons	Useful in manually opening and closing the regulating valve to identify if an incorrect Control Valve option was selected or if a cable is not connected.

To perform flow control setup complete the following steps:

Step	Screen Item (when applicable)
1. On the Vehicle tab of the S3 press the Flow Setup button. The Flow Setup screen appears.	
	
2. Make sure flow control is enabled (make sure the Yes button is selected for Enabled).	
3. Press the Control Valve field. The Control Valve list appears.	
	
4. Select an item in the list and press Ok .	

Step	Screen Item (when applicable)
	
4. Make an initial pass around your desired boundary to set it in the S3. AC110 automatically turns off booms when approaching a field boundary or no-spray zone.	

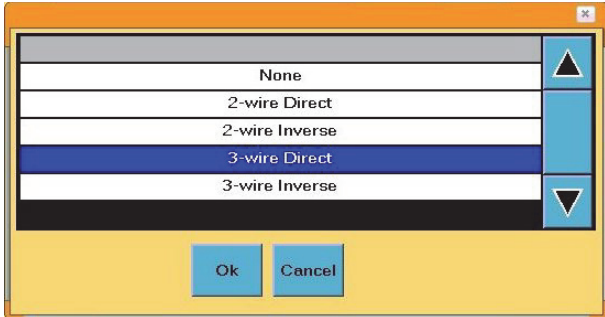
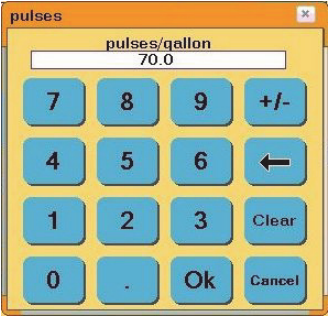
Step	Screen Item (when applicable)
2. Press New Job in the Getting Started window or press New on the Job screen, and then begin driving your field. AC110 will begin application when: • Apply button is ON • Ground speed is detected • AC110 recognizes that boom sections are in an unapplied area Note: The Section Status bars and Section icons at the bottom of the screen indicate mode (auto or forced on/off) and spray status (spraying or not spraying). See Table 5 on page 14 for more information on the Section Status bars and Section icons. Also see Table 6 on page 16 for sample scenarios and what the Section Status bars and Section bars indicate in those scenarios.	New JobNew
	
3. Using the Map screen as a guide, press the Apply button to enable spraying.	

Creating Field Boundaries and No Spray Zones

For help creating field boundaries and no-spray zones, refer to the Outback S3 User Guide. This section provides a brief overview of using field boundaries and no-spray zones with AC110.

To create field boundaries and no-spray zones:

Step	Screen Item (when applicable)
1. Start a standard AC110 Job (see “Beginning a Basic Spray Job Using AC110” on page 19).	
2. On the S3 press the Perimeter button. The Perimeter window appears.	0.0 ha
3. Set the desired boundary settings: • Select “Include” to set a field boundary • Select “Exclude” to set a no-spray zone	

Step	Screen Item (where applicable)
5. Press the Section Valve field. The Section Valve list appears.	Section Valve3-wire Direct 
6. Select an item in the list and press Ok .	Ok
7. Press the Meter Cal field. The Meter Cal window appears.	Meter Cal (pulses/gallon)70.0 
8. Enter a value and press Ok .	Ok
9. Optional: If you selected an incorrect Control Valve option or if a cable is not connected you can identify the problem using the Open Valve and Close Valve buttons: • Press the Open Valve button to manually open the valve • Press the Close Valve button to manually close the valve	Open ValveClose Valve

Flow Calibration

After you perform flow setup you should calibrate the flow. You perform flow calibration from the Flow Setup screen (Figure 3).

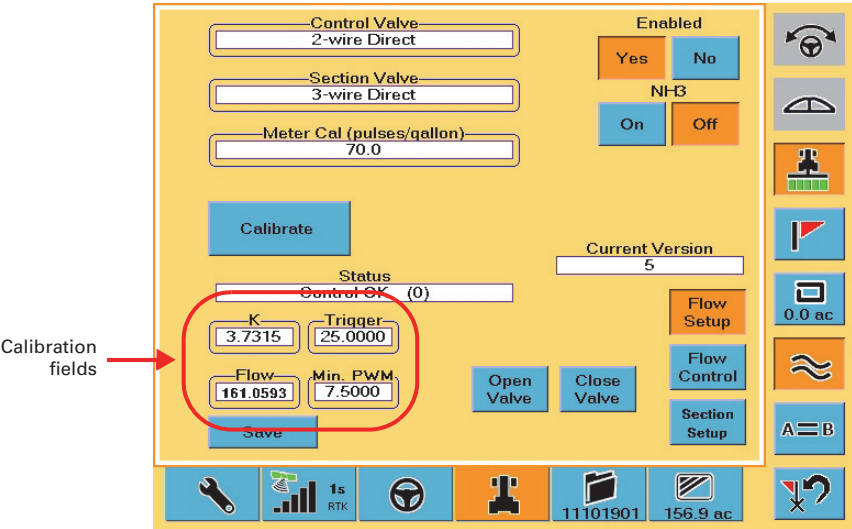
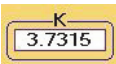
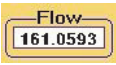
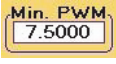


Figure 3: Flow Setup screen - calibration fields

Before calibrating the flow review the screen item descriptions in Table 2 below:

Table 2: Flow Setup screen item descriptions for calibration

Screen Item	Name	Description
	K field	Gain, or how fast the system attempts to hit the target rate.
	Trigger (l/min) field	How soon before the target rate the system switches to fine control.
	Flow (l/min) field	Distance between (range) high flow and low flow.
	Min PWM field	Minimum current needed to get the valve to move.

Note: The four calibration fields described in Table 2 are blank before calibration and are populated when calibration is complete (successful).

You can perform calibration with the vehicle parked or moving. Perform the following before calibrating the flow:

- Make sure the tank is clean with several hundred gallons of water.
- Unfold the booms and move the vehicle to a safe location.
- Make sure the vehicle is running at the operating RPM used for spraying.

During the calibration process the system will open and close the regulating valve several times.



S3 Jobs and the AC110

This section describes how to use jobs on the S3 with AC110 functionality.

Job Types

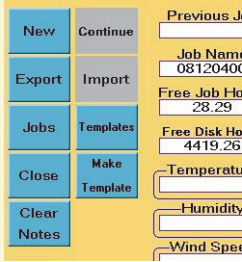
Outback S3 with AC110 supports four types of jobs:

- **Standard job** - The simplest way to use AC110 is to start a job in the S3 and begin spraying. AC110 will generate an as-applied record of spray activity.
- **Job with field boundary (include)** - AC110 allows you to create a no-spray boundary by creating a field boundary in S3. After making an initial spray pass around the field boundary, AC110 will create a no-spray zone around the field boundary.
- **Job with no-spray zones (exclude)** - AC110 allows you to create no-spray zones within a job. This is a useful feature for areas such as waterways, well heads, and other no-spray areas. Set the no-spray zones in the S3 and drive around the no-spray zone while spraying. AC110 will create a no-spray zone within the area sprayed around and turn off any boom sections that enter the no-spray zones.
- **Job with field boundary and no-spray zones** - For complete control, you can generate both a field boundary and up to eight no-spray zones for a job. Simply use the field boundary and no-spray zone menus on the S3 and spray around the areas that are not to be sprayed.

Beginning a Basic Spray Job Using AC110

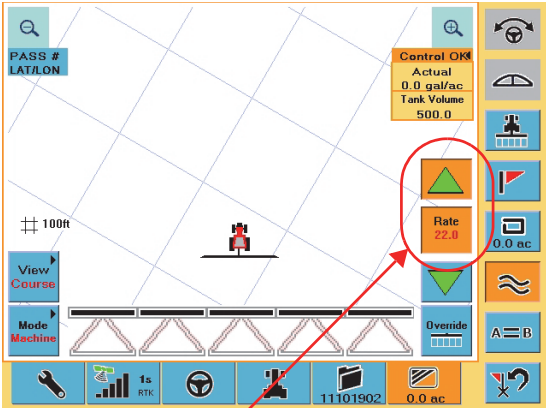
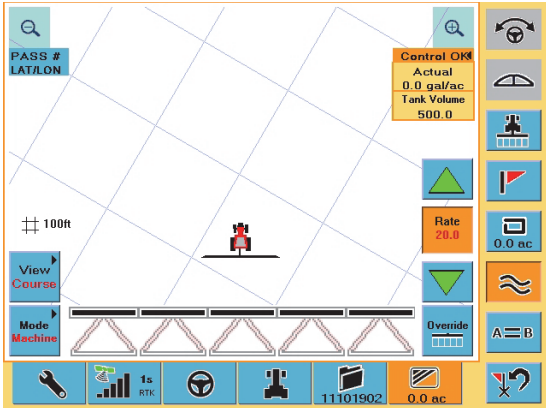
Before beginning a job, configure basic job settings. See “Section Setup” on page 11 for configuration instructions.

To begin a basic spray job:

Step	Screen Item (when applicable)
1. After powering on the S3 and pressing Accept, the Getting Started screen appears with the following options: • New Job: Begins a new job. • Continue Job: Continues a previous job. • List Jobs: Displays a list of jobs. <i>or</i> If you are already on another S3 screen, press the Job tab to display the Job screen.	 Getting Started window  Job buttons on Job screen

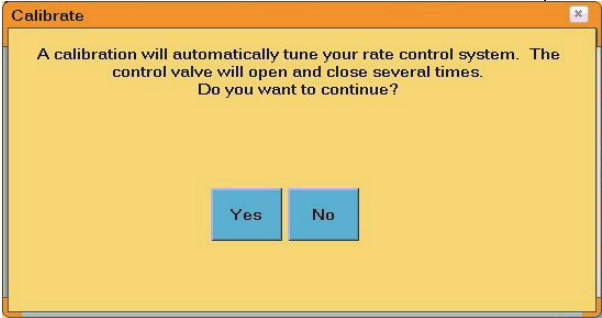
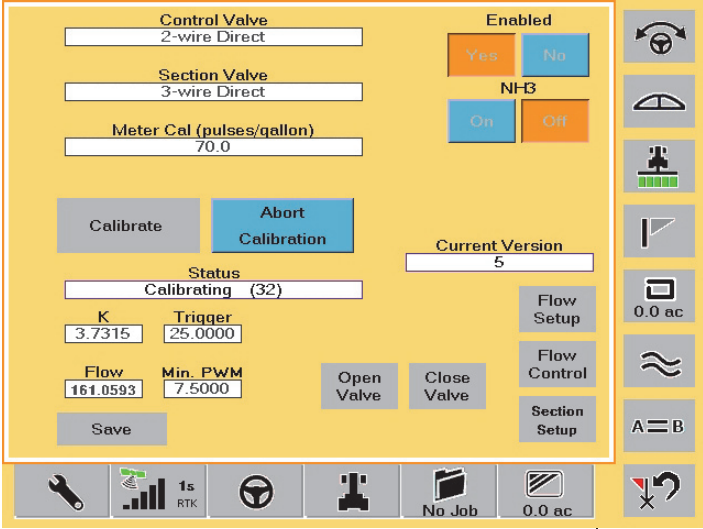


To use rate/section control complete the following steps:

Step	Screen Item (where applicable)
1. Press the Map tab to display the Map screen.	
2. Toggle the Rate button to select the rate to apply. When you press the Rate button the new target rate appears on the button.	
3. Press the Apply button (set it to ON) and begin driving. The actual rate appears in the upper right of the screen.	 
	
4. To increase or decrease the selected target rate incrementally press the Up or Down arrow buttons.	 
 The rate displayed on the Rate button changes and the Up/Down arrow button you pressed changes color. In this example the Up arrow button color and the rate displayed on the Rate button show the target rate was increased to 22.0.	
5. To override individual sections press the appropriate Section icons. The Section Status bars change from Auto (black bar) to Off (red outline) to On (green bar) and back to Auto.	
- Auto: turns sections On and Off based on previously applied areas - Off: section remains Off even if in an unapplied area - On: section remains On even if in a previously applied area	
6. To toggle all sections between an Auto state and forced On state press the Override button.	
7. If you need to turn off all sections at any time press the Apply button.	 



To perform flow calibration complete the following steps:

Step	Screen Item (where applicable)
1. Make sure you are on the Flow Setup screen and then press the Calibrate button. The Calibrate window appears.	
	
2. Press Yes . The calibration process starts and may take up to 10 minutes. During calibration: - The Abort Calibration button appears to the right of the Calibration button. Press the Abort Calibration button to stop the calibration process. - All other buttons/fields on the screen are gray (unavailable). - The Status field displays “Calibrating” and a number counting up to indicate calibration progress.	
	
3. Once calibration is complete the text “Calibration Success” appears in the Status field.	



Flow Control Setup

Use the Flow Control screen (Figure 4) to set flow control parameters.

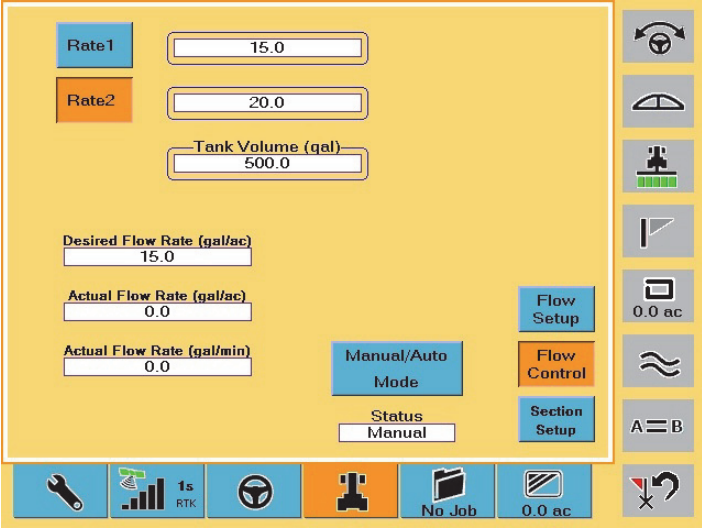


Figure 4: Flow Control screen

Before you begin flow control setup review the screen item descriptions in Table 3 below:

Table 3: Flow Control screen item descriptions

Screen Item	Name	Description
Rate115.0 Rate220.0 Rate buttonsRate fields	Rate 1 button and field Rate 2 button and field	Enter a predefined rate. You can change this number on the fly during application. Enter a second predefined rate. You can change this number on the fly during application. Note: Pressing a Rate button and pressing a Rate field represent two different functions. - Pressing a Rate button makes that rate the default rate in use and displayed on the Map screen. On the Map screen you can toggle between the two rates by pressing the rate buttons. See "Section Setup" on page 11 for information on changing the rate from the Map screen. - Pressing a Rate field displays the Desired Flow Rate window, allowing you to adjust the flow rate.
Tank Volume (gal)500.0	Tank Volume field	Enter the volume of product in the tank. You will need to adjust this value after each load. While spraying, the S3 subtracts from this value what has been applied and this current volume appears on the Map screen. Refer to the Rate status area in Table 5 on page 14 for information on remaining tank volume.
Actual Flow Rate (gal/ac)0.0 Actual Flow Rate (gal/min)0.0	Actual Flow Rate fields	Non-editable fields that display the actual flow rate calculated from the flow meter.



Table 6: AC110 Map screen scenarios (continued)

Map Screen	Scenario
	Spraying enabled (Apply button pressed) Auto mode enabled ("Rate" and rate value appear on Rate button, Section Status bars are black for three middle sections) Two outer sections manually turned off (Section icons pressed) - Section Status bars red indicate manual off - Section icons: red outline indicates manual mode, white interior indicates no spraying Spraying occurring in three middle sections (Section icons are green) Actual rate and current tank volume displayed in upper right of screen Actual rate above Target rate
	Spraying enabled (Apply button pressed) Auto mode enabled ("Rate" and rate value appear on Rate button, Section Status bars are black for three right sections) Two left sections manually forced on (Section icons pressed) - Section Status bars green indicate forced on - Section icons: green outline indicates manual mode, green interior indicates spraying Spraying occurring in two left sections (Section icons are green) Actual rate and current tank volume displayed in upper right of screen Actual rate above Target rate
	Spraying enabled (Apply button pressed) Auto mode enabled ("Rate" and rate value appear on Rate button, Section Status bars are black for all sections) No spraying occurring in all sections (Section icons are white, implement in previously sprayed area - see Headland icon at top middle of Map screen) Actual rate and current tank volume displayed in upper right of screen



Use Table 6 to familiarize yourself with the elements of the Map screen related to rate/section control functionality.

Table 6: AC110 Map screen scenarios

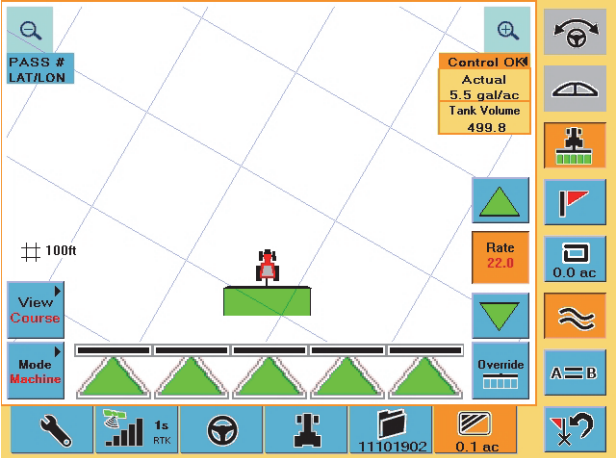
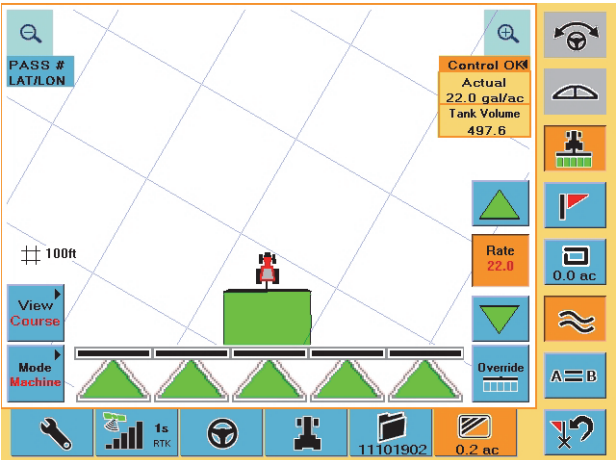
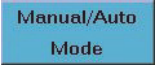
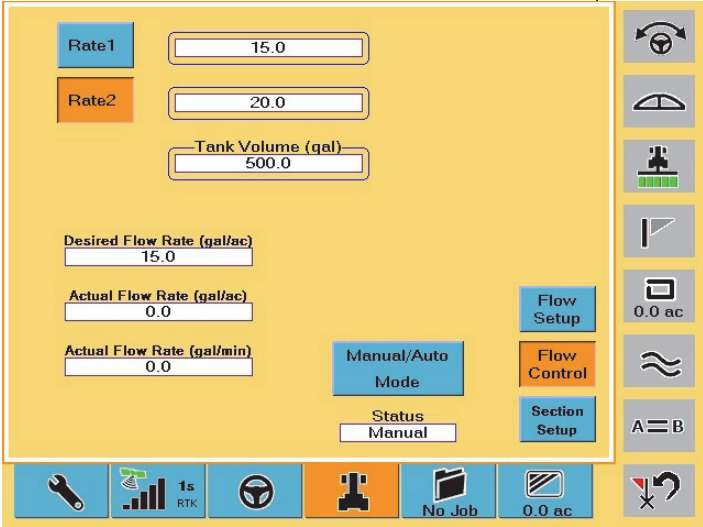
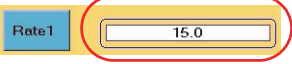
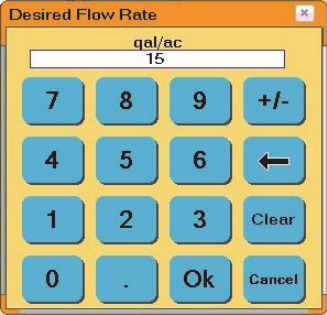
Map Screen	Scenario
	Target rate manually increased to 22.0 (Up arrow is pressed and Rate button displays new target rate) Auto mode enabled ("Rate" and rate value appear on Rate button, Section Status bars are black) No spraying (Apply button is not pressed, Section icons are white)
	Spraying enabled (Apply button pressed) Auto mode enabled ("Rate" and rate value appear on Rate button, Section Status bars are black) Spraying occurring in all sections (Section icons are green) Actual rate and current tank volume displayed in upper right of screen
	Spraying enabled (Apply button pressed) Auto mode enabled ("Rate" and rate value appear on Rate button, Section Status bars are black) Spraying occurring in all sections (Section icons are green) Actual rate and current tank volume displayed in upper right of screen Target rate reached (Actual rate is equal to Target rate on Rate button)

Table 3: Flow Control screen item descriptions (continued)

Screen Item	Name	Description
	Manual/Auto Mode button	Toggles between: - Manual mode where the control valve is forced open and closed using the Up and Down buttons on the Map screen - Auto mode

To perform flow control setup complete the following steps:

Step	Screen Item (where applicable)
1. On the Vehicle tab of the S3 press the Flow Control button. The Flow Control screen appears.	
	
2. Press the Rate 1 field. The Desired Flow Rate window appears for Rate 1.	
	
3. Enter a flow value and press Ok .	
4. Repeat steps 2 and 3 for Rate 2.	



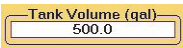
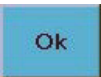
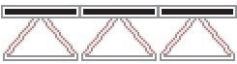
Step	Screen Item (where applicable)
5. Press the desired Rate button (Rate 1 or Rate 2) to make that rate the default rate in use. An orange button indicates the selected button. In the figure to the right Rate 2 is the selected rate.	
6. Press the Tank Volume field. The Tank Volume window appears.	
7. Enter the tank volume and press Ok .	
	



Table 5: Map screen item descriptions for rate/section control (*continued*)

Screen Item	Name	Description
 	Rate button	Press the Rate button to select the rate to apply (toggle between Rate 1 and Rate 2). When you first display the Map screen the rate indicated on the Rate button correlates to the Rate button (Rate 1 or Rate 2) you pressed on the Flow Control screen. See “Flow Control Setup” on page 8 for more information on the Rate buttons of the Flow Control screen. Note: If the actual rate is +/- 20% or more from the target rate a red exclamation point is displayed on the Rate button.
        Before rate change After rate change Manual mode	Up and Down Arrow buttons	If rate control is enabled press the Up and Down arrows to increase/decrease the target rate in 1 gallon or 10 liter increments. When you press either button to change the rate: • That button changes color to indicate you increased/decreased the rate • The rate displayed on the Rate button increments/decrements Note: You enable rate control by pressing Yes in the Enable area of the Flow Setup screen). See “Flow Setup” on page 3 for more information on enabling/disabling rate control. In Manual mode press the Up and Down arrows to force the control valve open (Up arrow) or closed (Down arrow).
   <i>The figures to the left only represent some of the possible combinations of different color Section Status bars and Section icons.</i>	Section Status bars (horizontal bars above the triangles) Section icons (triangles)	Each Section icon (triangle) represents one section. For example, if there are 6 sections then six Section icons (triangles) appear at the bottom of the Map screen. For each section triangle there is a horizontal bar (Section Status bar) above it that indicates the section status. Each Section Status bar can be one of three colors: • Black (Auto mode) • Green (manually forced ON) • Red (manually forced OFF) Each Section icon can have different colors for the outline of the triangle and the interior of the triangle: • Outline white (Auto mode) • Outline green or red (Manual mode) • Interior green (manually forced ON - spraying) • Interior white (Auto mode - no spraying) • Interior red (manually forced OFF - no spraying) Note: See Table 6 on page 16 for an overview of how different AC110 scenarios are represented on the Map screen (including the different colors of the Section Status bars and Section icons).
	Override button	Press the Override button to toggle all sections between an Auto state and forced On (opens all section valves) state.



Using Rate/Section Control

When using rate/section control you can:

- Increase or decrease the Target rate incrementally
- Override individual sections
- Toggle all sections between an Auto state and forced On state
- Turn off all sections at any time
- Change the rate while operating

After you set your rate/section control parameters you work with rate/section control via the Map screen (Figure 6).

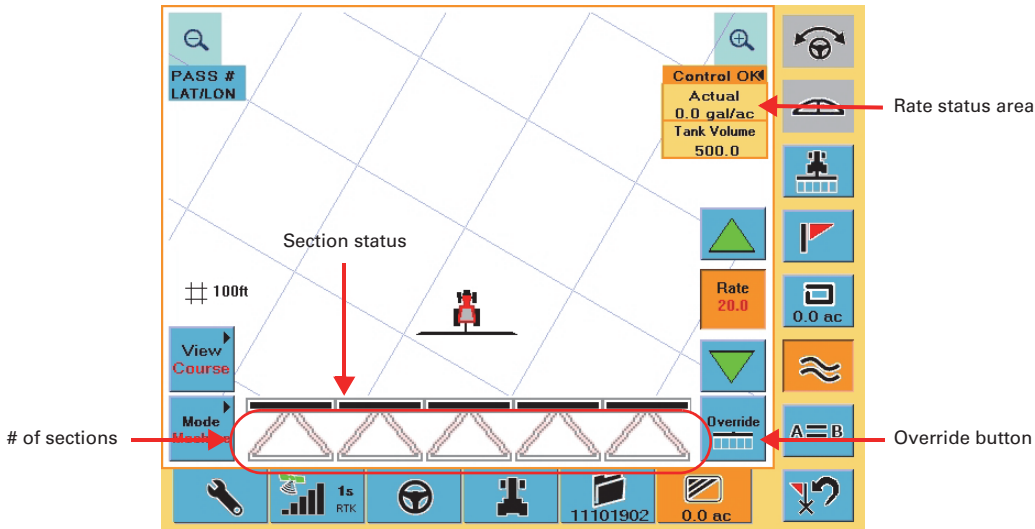


Figure 6: Map screen showing rate/section control

Note: When AC110 is connected and powered on, the Machine Width field on the Vehicle screen is read-only. When AC110 is powered off, the Machine Width field is editable. This allows the S3 to store the settings for rate and section control, but also allows you to change the machine width for other uses.

Before you begin using rate/section control review the screen item descriptions in Table 5 below:

Table 5: Map screen item descriptions for rate/section control

Screen Item	Name	Description
	Rate status area	The rate status area displays the following information: • Actual - actual spray rate • Tank Volume - volume remaining in tank



Section Setup

Use the Section Setup screen (Figure 5) to set section control parameters.

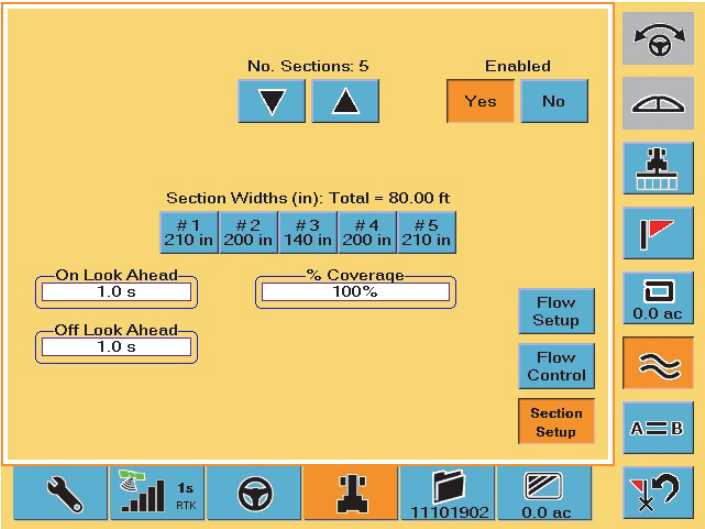


Figure 5: Section Setup screen

Before you begin section setup review the screen item descriptions in Table 4 below:

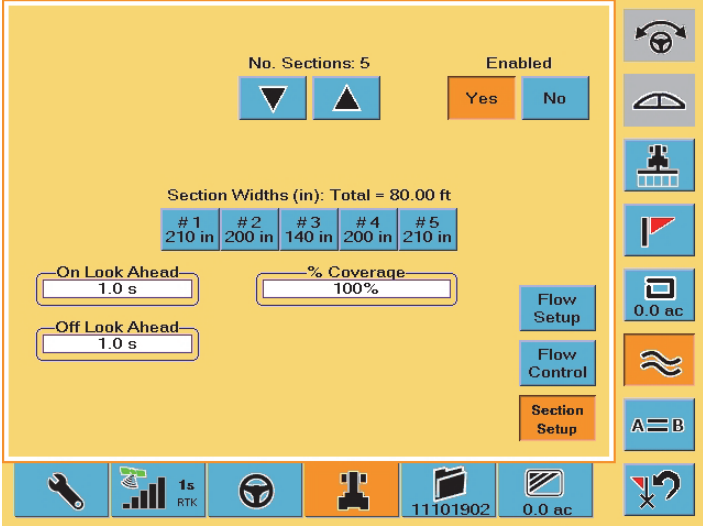
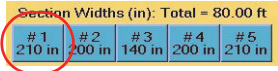
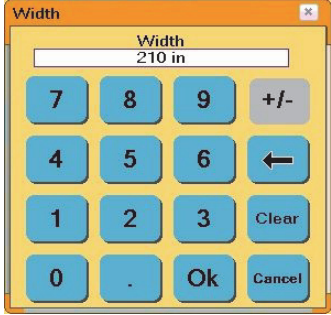
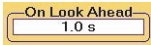
Table 4: Section Setup screen item descriptions

Screen Item	Name	Description
	Enabled buttons	Press Yes to enable the Section Setup screen buttons/fields and enable section control functionality on the S3. Press No to disable the Section Setup screen buttons/fields and disable section control functionality on the S3.
	No. Sections buttons	Select the number of sections.
	Section Widths buttons	Enter the section width for each section (up to ten sections, one button for each section).
	On Look Ahead field	Enter the number of seconds needed to open the boom valves and build pressure ahead of an unapplied area. Increase the number to turn on sooner.
	Off Look Ahead field	Enter the number of seconds needed to close the boom valves ahead of a previously applied area. Increase the number to turn off sooner.
	% Coverage field	Enter the percentage of the boom section that must enter or exit a previously applied area before AC110 will turn it off or on.

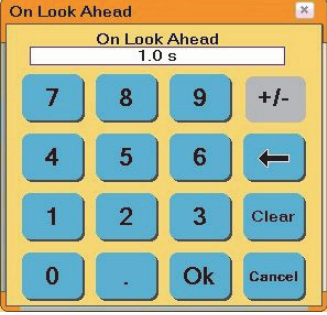
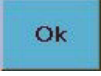
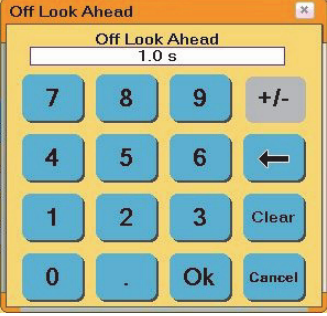
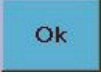
To perform section setup complete the following steps:

Step	Screen Item (where applicable)
1. On the Vehicle tab of the S3 press the Section Setup button. The Section Setup screen appears.	



Step	Screen Item (where applicable)
	
2. Make sure section control is enabled (make sure the Yes button is selected for Enabled).	
3. Press the No. Sections buttons (up or down) to select the number of sections. As you press these buttons the number of Section Widths buttons corresponding to the number above the No. Sections buttons appear/disappear in real time.	
4. Press the first Section Width button. The Width window appears.	
	
5. Enter a width value and press Ok .	
6. Repeat steps 3 and 4 for each additional Section Width button.	
7. Press the On Look Ahead field. The On Look Ahead window appears.	



Step	Screen Item (where applicable)
	
8. Enter an on look ahead value and press Ok .	
9. Press the Off Look Ahead field. The Off Look Ahead window appears.	
	
10. Enter an off look ahead value and press Ok .	
11. Press the % Coverage field. The % Coverage window appears.	
	
12. Enter a % coverage value and press Ok .	
13. To test the sections were set up correctly press the Apply button (set it to ON, orange) and then override individual sections or press the Override button to override all sections. See Table 5 on page 14 for more information on the Override button and other AC110-related Map screen features.	

