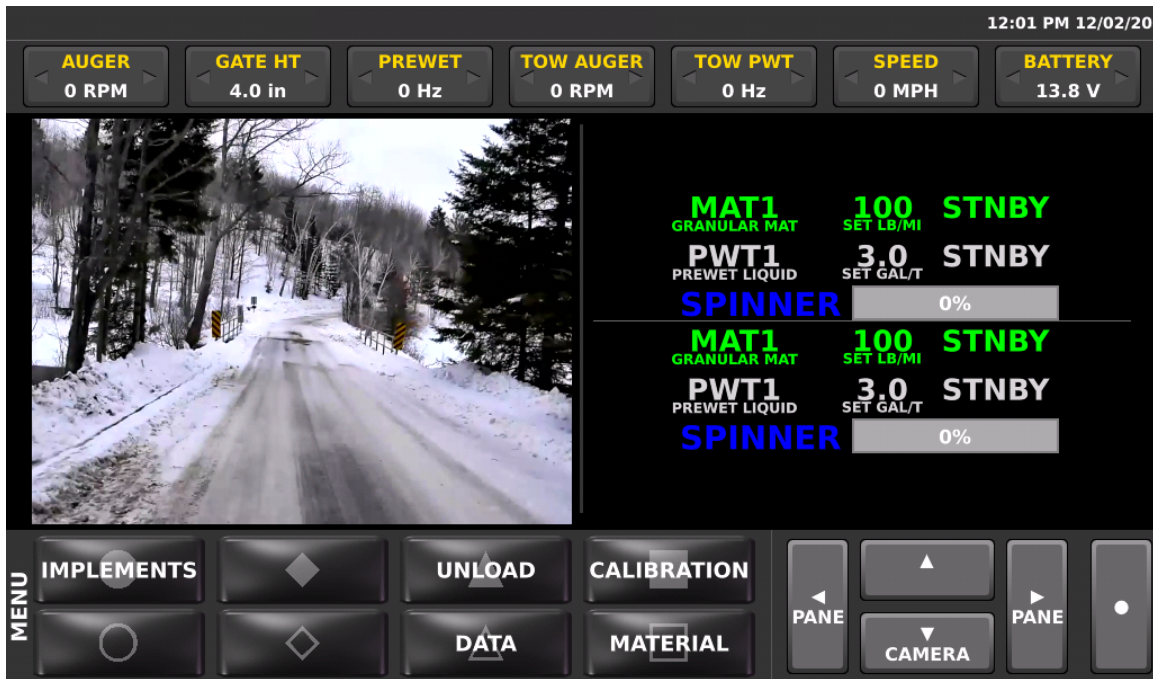


SSC6100

Spreader Control

Operation Manual



Firmware Version
0.78



Table of Contents

Table of Contents	i
Features and Controls	1
LCD Screen	1
Operator Interface	2
The Operation Screen	2
Navigation Controls	3
Soft Switch Panes	4
Header Bar	5
Data Items	6
Left Window Area	7
Right Window Area	7
Startup and Shutdown	8
Startup	8
Driver ID	8
ESTOP	10
Shutdown	10
Backlighting and Speaker Volume	11
Tutorials Menu	12
Menu Controls	12
Video Controls	12
Spreading Modes	12
Standby	12
Blast	13
Loop Modes	13
Operating Modes	14
Spreader On / Off	14
Implements	15
Materials Menu	16
Spreading Modes	17
No Application Mode	17
Granular / Prewet Application Mode	17
Prewet / Spray Bar Application Mode	19
Direct Liquid Application Mode	20
Simultaneous Granular / Prewet / Direct Application Mode	21
Directional Spinner Mode	23
Tow Plow Granular Mode	24

Tow Plow Direct Liquid Application Mode	25
Dust Control Mode	26
Herbicide Mode	27
Unload Materials	28
Simulated Speed	29
Temperature Compensation	29
Joystick Operation.....	30
Patrol Commander® Ultra Joysticks.....	30
CommandAll® Single Joystick	30
General Joystick Operation	31
PreCise®MRM ARC Air and Road Temperature	34
Cameras.....	34
Auxiliary Modes	35
Aux Power Mode	35
Distance Measure	36
Data Menu	37
Current Totals	37
Season Totals	37
Error Log	38
Clearing Totals and Logs	38
PreCise®MRM Over-the-Air Communications	38
Cell Status	38
GPS Status	38
Spreader Error Conditions	39
Range Error	39
Feedback Error	39
Feedback Error / Open Loop	40
Low Material	40
Low Liquid	40
Low Battery Voltage.....	40
Directional Spinner Feedback Error.....	40
System Errors and Warnings.....	41
Pop-up Errors	41
Header Bar Errors and Warnings	46
Joystick Error Codes	50
Diagnostic Menu.....	51
Licensing and Source Code Availability	52
Appendix A – GNU General Public License, Version 2	53

Appendix B - Data Items complete listing56
FORCE America Contact Information.....60

Features and Controls

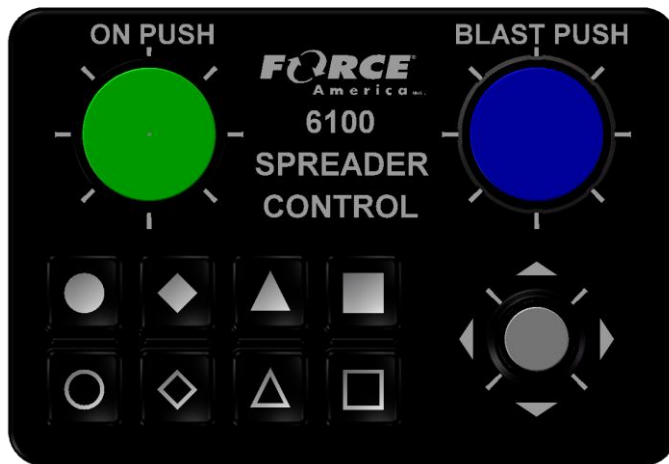
LCD Screen



The main system component of the 6100 is the 10" LCD touchscreen which displays operating parameters, optional camera views and allows selection and adjustment of the various operating modes.

It also features two USB ports on the lower right surface that can be used for system upgrades, saving and loading calibration settings, as well driver identification. The locations of these are shown by the red USB symbols.

Operator Interface

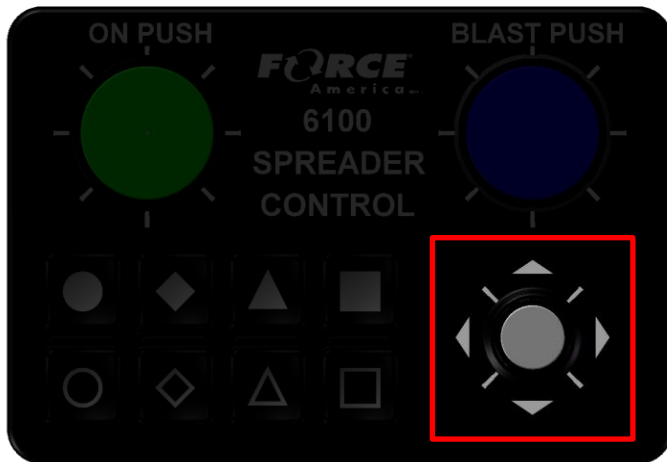
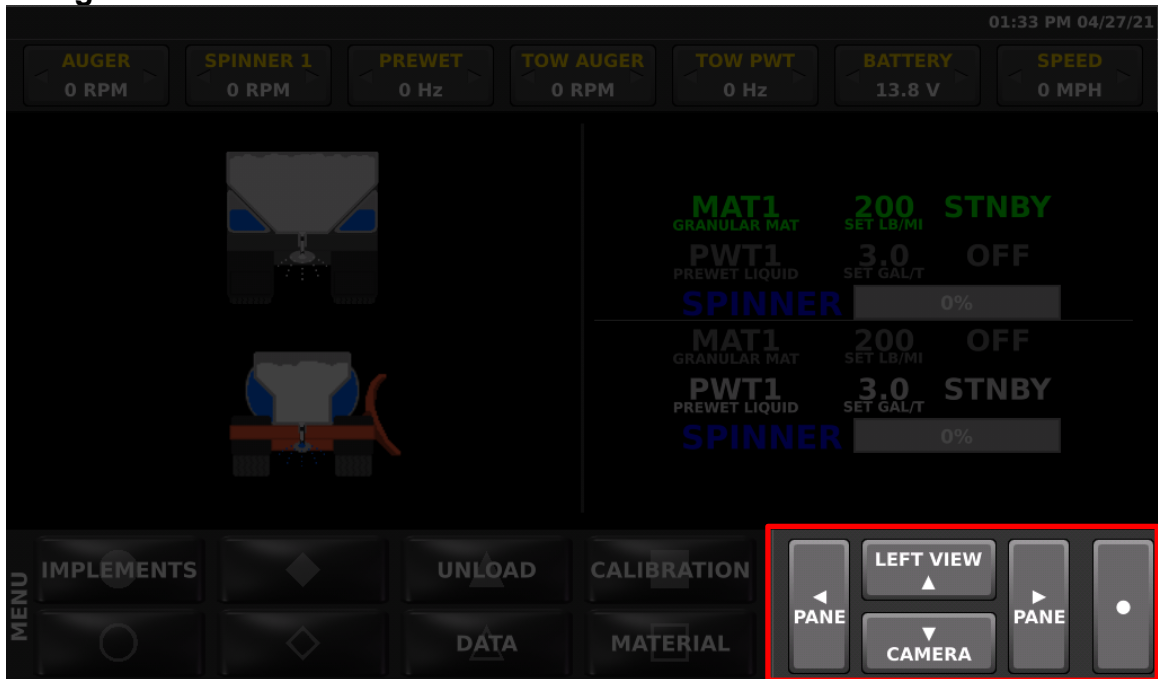


The Operator Interface provides controls for many functions of the SSC6100 control system. It is designed to provide ergonomic and tactical controls while operating the vehicle. The specific functions of the knobs, joystick, and pushbuttons for each operating mode are described in the associated sections of this manual.

The Operation Screen

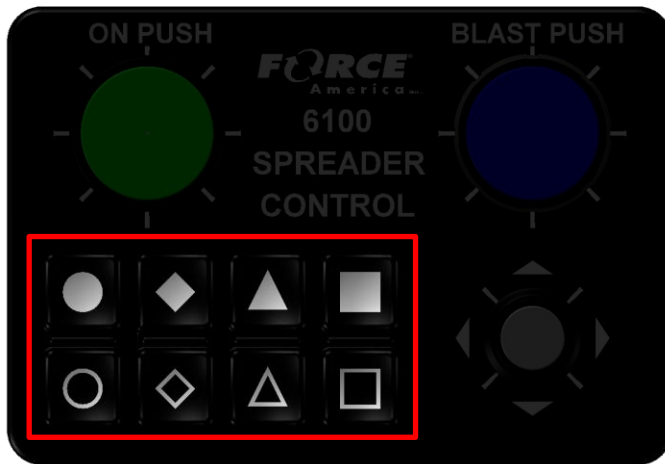
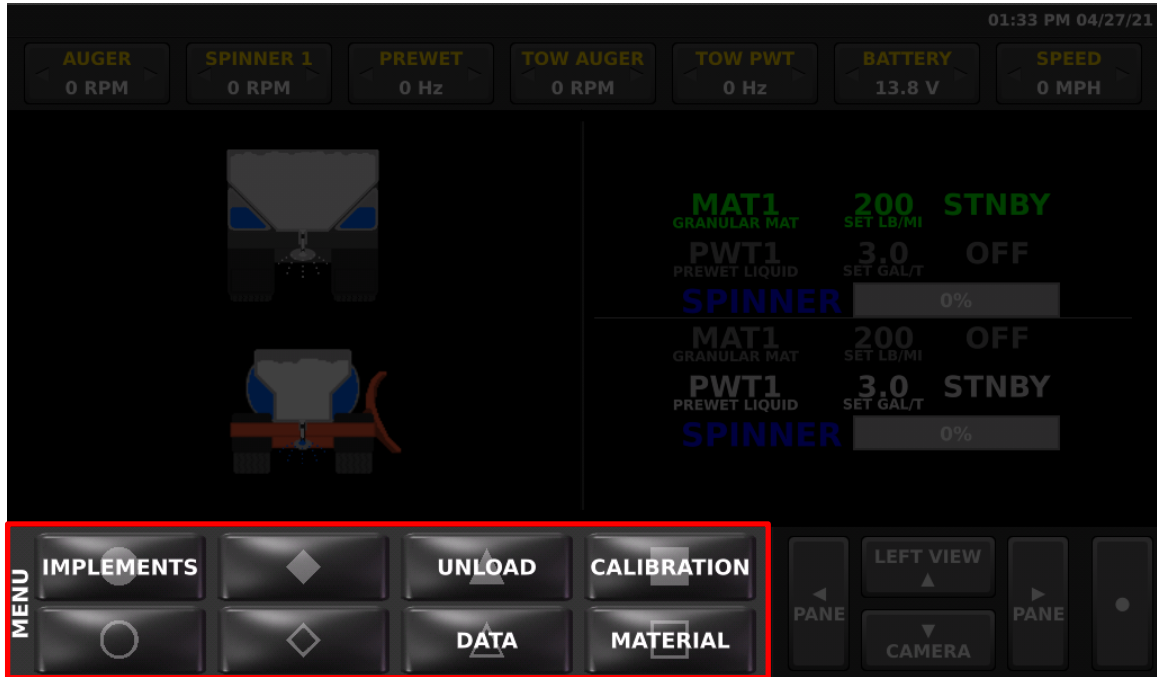
The Operation Screen is the main screen of the SSC6100, and provides controls for all of the system functions as well as access to the Data, Calib, Unload, and Material Selection menus. It is divided into six distinct areas described below.

Navigation Controls



The touch screen navigation controls area and Nav Stick joystick provides a way to change between views on the screen, select panes of Soft Switches, and make adjustments to settings. The up, down, left, right, and select functions can be done using Nav Stick on the operator interface or also with the touchscreen on the display.

Soft Switch Panes



The touchscreen soft switch pane area and the associated buttons on the operator interface provides access to an array of various switch functions. The name of the current pane is displayed on the lower left corner of the screen.

The left and right navigational controls scroll between the available panes of Soft Switches. The individual Soft Switches can be operated either by touching the Soft Switch button on the screen or pressing the associated button on the operator interface. Soft Switches that toggle a function Off and On indicate when the function is On by showing the button text in Green.

The number of and types of soft switch panes varies with each configuration of the system. Each section of this manual will describe the function of each of the Soft Switches on their associated switch pane(s).

Header Bar



The Header Bar appears across the top of the screen. System Time and Date will be displayed on the right side of the Header Bar. The time is set automatically, including any Daylight Savings Time changes your time zone supports.

The header bar also can show system status, warning, and error messages. If two or more system status messages are active, the messages will sequence through each one.



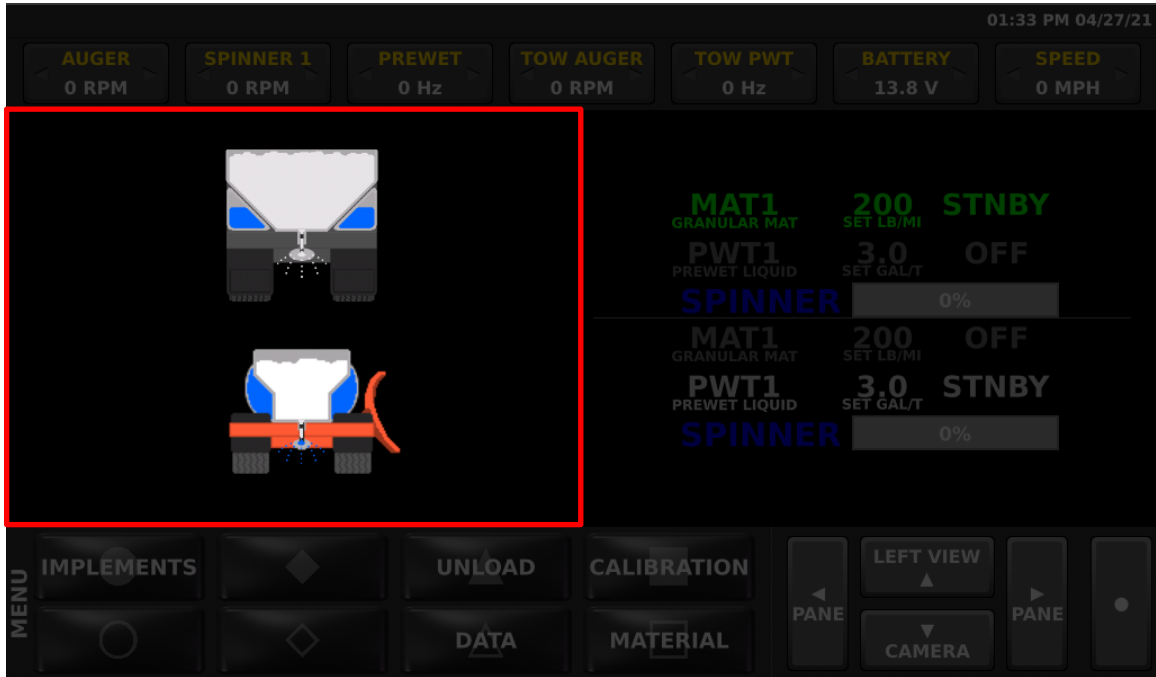
For more information on specific warnings or errors see Header Bar Errors and Warnings on page 46.

Data Items



Directly below the header bar is a row of data items that can be customized to show a number of different types of information. Tap the left or right triangles to choose what information is displayed on each item. For a list of all the available data items and their description, see Appendix B - Data Items complete listing on page 56.

Left Window Area



The left window can display a variety of information depending on how the system is configured. By default, it displays an image of the currently active spreader system on the vehicle. If enabled, this window can also display road and air temperature, a joystick guide if applicable, and camera images. Pressing up on the Nav Stick, or the up arrow on the Nav Stick Pushbutton will cycle through the possible options for this window. Pressing down on the Nav Stick, or the down arrow on the Nav Stick Pushbutton will cycle through camera images, if equipped.

Right Window Area



The right window by default displays spreader rate information. If enabled, this window can also display camera images. Pressing down on the Nav Stick Pushbutton, or the down arrow on the Nav Stick will cycle through camera images, if equipped. If the spreader power switch is off, the spreader screen will display "Spreader Off".

Startup and Shutdown

Startup



The 6100 automatically powers up with the vehicle dash key ignition. As the system boots, it will display a splash screen with a bar graph that tracks the boot progress until it is ready for operation.

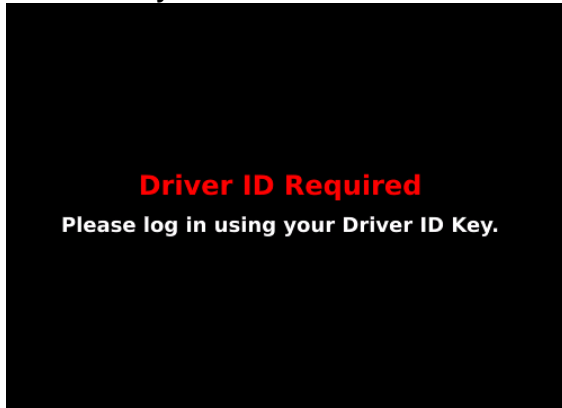
Driver ID

If Driver ID mode is enabled, the SSC6100 will require the user to log in before the system will operate the spreader features. Joystick functions can still be operated without logging in.

Spreader material and usage data is recorded for the currently logged in driver. Be sure to use the LOGOUT button on the MENU Softswitch pane when finished to ensure that all data is recorded under the correct driver.

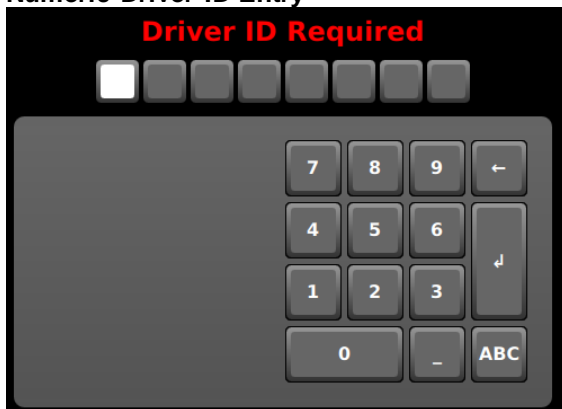
Three methods of identification are supported depending on which one has been selected in Calibration.

Driver ID Key

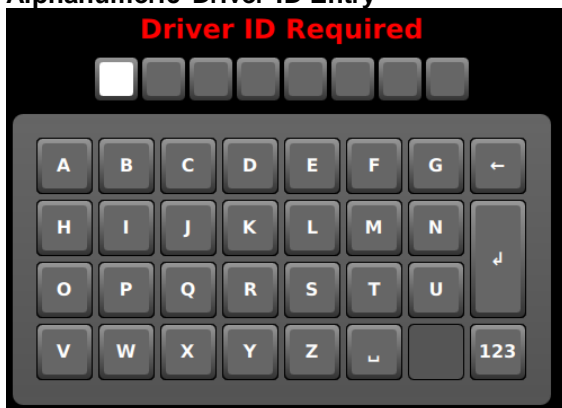


This method requires a USB driver key to log in to the system. Insert a pre-programmed USB Driver ID Key into either of the USB ports on the lower right side of the screen. Additional driver ID keys can be programmed in the Calibration menu. See the SSC6100 Calibration manual for more information.

Numeric Driver ID Entry



Alphanumeric Driver ID Entry



For the Numeric or Alphanumeric Driver ID modes, enter your numeric Driver ID using the on-screen keypad and press the Enter button.

Pressing the ABC or 123 button toggles the entry screen between letters and numbers. The Underscore button may also be used as part of the password text.

ESTOP



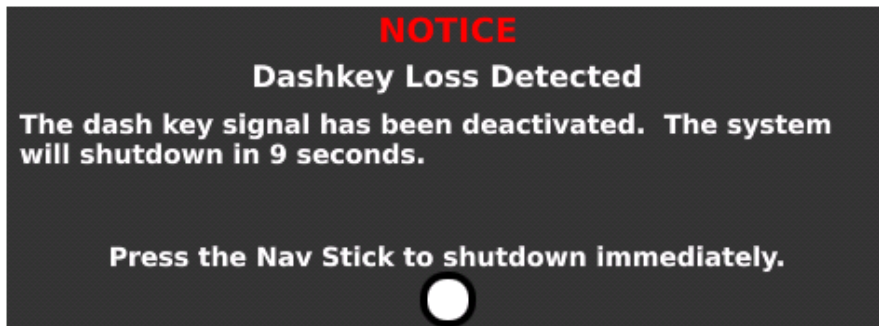
The SSC6100 has an emergency stop feature that is activated by pressing the red ESTOP pushbutton located near the Operator Interface control. When ESTOP is activated the screen shows the red Emergency Stop Activated message and a buzzer sounds. In addition, all outputs are immediately shut off, the system enters Standby mode, and if the system is configured with a Low Oil PTO or diverter valve, these will be shut off as well.

To cancel the ESTOP, rotate the red ESTOP pushbutton clockwise and let it pop back out. After ESTOP mode is cleared, follow the ESTOP Cleared, System Reactivating warning message to ensure that the vehicle is clear of personnel before pressing the Nav Stick to reactivate the system outputs.



To reduce the risk of death or injury, ensure that all personnel are clear from moving machinery before activating outputs.

Shutdown



The 6100 automatically begins a shutdown process when power is no longer detected from the key switch. A built-in timer prevents the system from shutting down during engine starting.

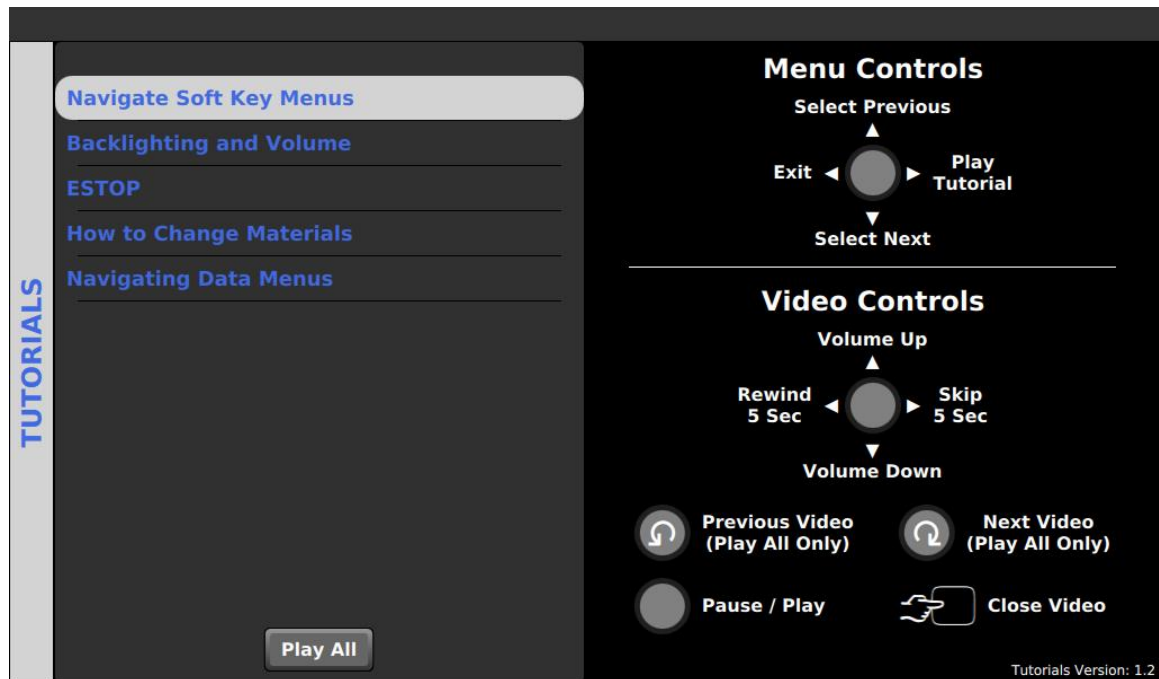
Pressing the Nav Stick Pushbutton will bypass the timer and immediately start the shutdown process.

Backlighting and Speaker Volume



The intensity of the LCD backlighting and volume of the speaker can be adjusted on the UTIL Soft Switch pane. As the speaker volume is adjusted, the speaker sounds a tone to show how loud or soft the setting is.

Tutorials Menu



The Tutorials Menu allows you to watch various tutorials on how the spreader control operates. To access the Tutorials Menu, scroll to the MENU Soft Switch pane and press the Tutorials Soft Switch.

Menu Controls

Use the Navigation Control Up and Down to select a tutorial. Navigation Control Right or pressing the Nav Stick will play the tutorial. You can also have all tutorial videos play in sequence by pressing the Play All button on screen. To exit the Tutorial Menu, use the Navigation Control Left direction.

Video Controls

While watching a tutorial video, you can raise the volume with Navigation Control Up and lower the volume with Navigation Control Down. Pressing the Navigation Control will pause the video or start it playing again if its already paused. Navigation Control Right will skip ahead in the video by 5 seconds and Navigation Control Left will rewind the video 5 seconds. If Play All is pressed, Twisting the Navigation Control Clockwise will skip to the next video and twisting the Navigation Control Counterclockwise will return to the previous. If Play All was not pressed, twisting the Navigation Control in either direction will close the video. You can also tap the screen to close any tutorial that is playing.

Spreading Modes

Standby

Standby mode is generally used to start and stop the spreader at specific points on the route. The SSC6100 system starts up in Standby mode with all the spreader outputs deactivated.

Pressing the Green knob on the Operator Interface toggles spreader in and out of Standby mode. The Actual rates shown on the screen will read "STNBY" to indicate when the spreader is in Standby mode. When the system is out of Standby and the vehicle is moving, the actual rates will be displayed in this area.



To reduce the risk of death or injury, ensure that all personnel are clear from moving machinery before activating outputs.

Note that some menus and functions require that the 6100 to be in standby mode for them to be accessed. Check to make sure the spreader is in Standby mode if you are having difficulty accessing a certain function.

Blast

Blast is a spreader feature that is generally used to run the outputs at a higher than normal rate in order to “Blast” a portion of road with extra material. Blast is activated by pressing the Blue knob.

Depending on the calibration settings, the blast mode may be set up to operate on a timer or distance function that keeps the blast active for a certain amount of time or distance. The blast mode in this case can be cancelled by pressing the Blue knob a second time.

When Blast is activated, the granular row will display the word “BLAST” instead of the material name.

Note that activating blast while the vehicle is not moving will activate the outputs.



To reduce the risk of death or injury, ensure that all personnel are clear from moving machinery before activating outputs.

Loop Modes

The SSC6100 can apply most materials in one of three loop modes:

Closed-Loop Mode

Closed-Loop Mode is the default operating mode for spreading material. It uses the vehicle speed and sensors on the material outputs to measure actual rates and apply adjustments on the fly to increase material application accuracy. Outputs will automatically start and stop with the vehicle.

Open-Loop Mode

Open-Loop Mode uses vehicle speed and a calculation to control the material outputs. Because it doesn't use a feedback sensor it is not as accurate as Closed Loop. Outputs will automatically start and stop with the vehicle.

Manual Mode

Manual Mode does not vary its output rate with vehicle speed. Instead, granular or prewet liquid material is applied at a constant rate. Materials spread in manual mode are spread less accurately than in open-loop or closed-loop mode. Outputs do not start and stop with the vehicle.

Operating Modes

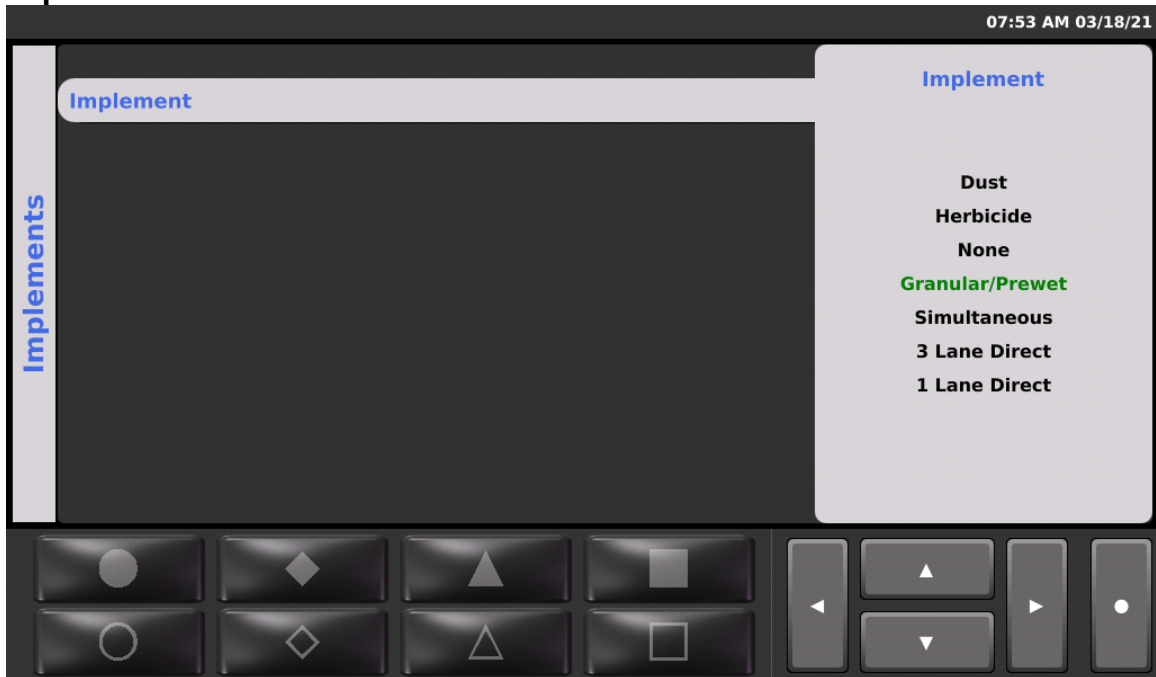
Spreader On / Off



The 6100 system operates many aspects of the hydraulic system including joystick and spreader functions. For off-season use where the spreader controls are not required, a Spreader Power rocker switch can be used to remove the spreader functions from the operation screen and prevent outputs from being activated.

This switch is located near the operator interface controls. When this spreader switch is off, the operation screen appears as shown.

Implements



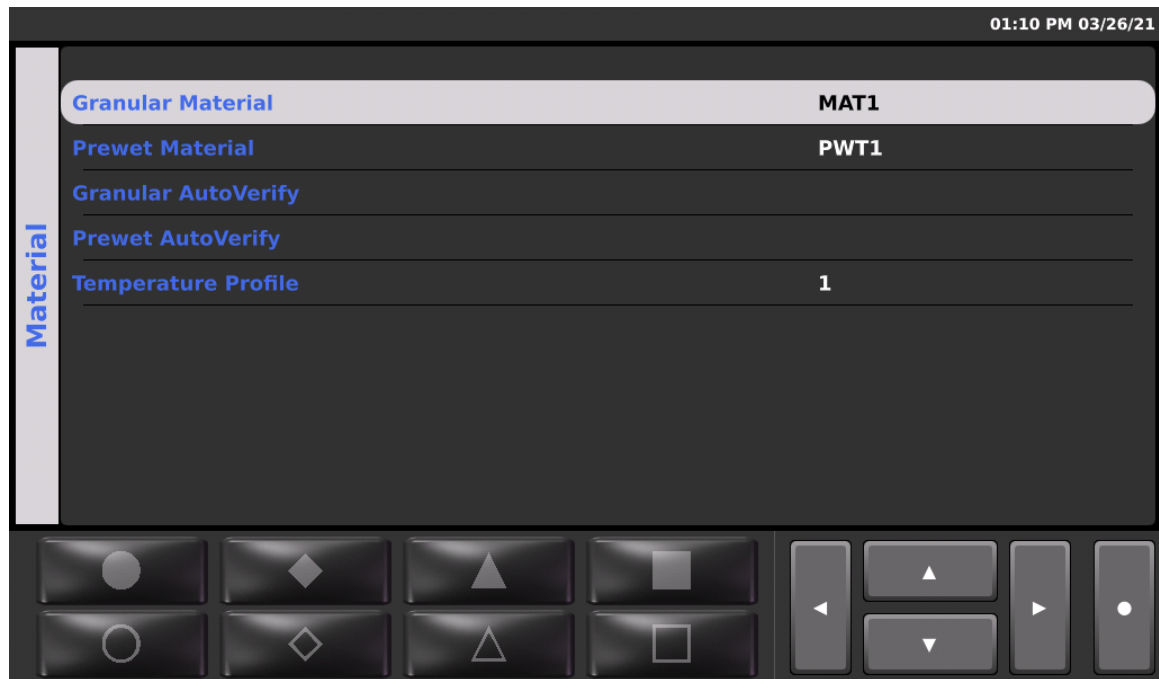
The SSC6100 system can optionally be configured to operate multiple types of equipment allowing the vehicle to be tailored for spreading various materials or performing seasonal work. These configurations are called Implements.

If your system supports multiple configurations there will be an Implements button on the MENU Soft Switch pane. Press this button to choose between the available Implement configurations using the Nav Stick controls

Note that the system must be in standby and the vehicle speed must be less than 5 MPH, including Simspeed.

Each system is custom programmed at the factory to fit the specific needs of each vehicle. For changes to the implements or how they behave, please contact a FORCE America Representative for assistance.

Materials Menu



The Material Selection Menu allows you to choose between different materials for each of the spreading modes. The list of available materials is configured and calibrated for each mode in the Calibration settings.

To access the Materials Menu and make changes, scroll to the MENU Soft Switch pane and press the Material Soft Switch. Use the Navigation Up and Down Controls to select a material and press the Nav Stick to enter the menu.

Note that if the material you wish to select is not visible, exit the Material menu and select a different Implement using the Implement menu.

Choose the desired material by name and press the Nav Stick button to select and activate that material.

If temperature compensation mode is enabled, a Temperature Profile menu will allow selection between one of three optional compensation profiles.

Exit the Material menu using the Navigation Control Left direction.

Spreading Modes

No Application Mode



Selecting an Implement type of "None" is generally used to disable seasonal functions and prevent accidental activation of hydraulic functions. In this mode, the spreader functions will not run, but Joystick functions will still operate normally.

Granular / Prewet Application Mode



This mode applies granular material with the option to apply prewet.

The green text contains information about the granular material, its set rate, and its actual output rate. The granular rate is adjusted using the Green knob on the Operator Interface.

The white text contains information about your prewet material, its set rate, and its actual output rate. The Prewet rate is adjusted by rotating the Nav Stick knob, if applicable. If the prewet system is configured for gravity feed, no rates will be displayed. When the Prewet Soft Switch is off, this line is grayed out and shows “OFF” for the actual rate.

The blue text and bar graph shows the relative spinner speed in percentage. The spinner speed is adjusted using the Blue knob on the Operator Interface.

Granular and Prewet Soft Switches

The GRAN Soft Switch pane controls the granular functions. It may have additional options available depending on how the system is configured. The following table describes each option.

SPINNER REVERSE	Reverses the rotational direction of the spinner
CLEAR JAM	Momentarily reverses the auger to attempt to clear a jam. The auger reverses only for as long as the button is held.
GRANULAR MANUAL	Toggles granular manual mode Off and On
CROSS LEFT / RIGHT	Toggles between a left and right cross conveyor direction
AUGER REVERSE	Toggles the direction of the auger to spread material in the opposite direction.
PREWET MANUAL	Toggles the Prewet manual mode material Off and On
PREWET	Toggles the Prewet output Off and On

Adjustable Gate Mode

The granular system can be set up to use an adjustable gate mode. In this mode, the height of the conveyor gate can be varied to cover a wider range of spreading rates. For accurate spreading, it is important that the SSC6100 spreader control gate setting matches the actual height of the gate.

Note that spreading with an incorrect gate height will result in inaccurate material rates and inaccurate material usage data.

To remind users to check the gate height, a “Check Gate Setting” pop-up message box appears whenever the material is changed. Press the Nav Stick pushbutton to clear the message box and then use the Gate Height menu option to enter the correct gate height for the current gate setting on the conveyor.

Two Position Gate Mode

For additional assurance that the correct gate height is set, the SSC6100 can be configured to use a two position gate with sensors. In this mode, each material is set in calibration to use an either “low” or “high” gate setting. When a material is selected, electrical sensors on the gate confirm whether the gate is in the correct position. If it is in the wrong position for the selected

material, an "INCORRECT GATE HEIGHT" header bar warning appears. Adjust the gate to the correct position to clear the warning.

Skip Mode

Skip sanding is a method where the spreader control outputs automatically toggle Off and On at a set distance interval. If the system is configured to allow for skip sanding, the UTIL Soft Switch pane will have a button to enable Skip mode.

When Skip Mode is activated and the outputs are in the Off state., the granular row will display the word "SKIP" instead of the actual application rate.

SKIP MODE	Toggles the Skip Sanding Mode Off and On
-----------	------------------------------------------

Prewet / Spray Bar Application Mode



This mode applies granular / prewettered material with the option to apply prewet liquid directly through a spray bar.

The green text contains information about the granular material, its set rate, and its actual output rate. The granular rate is adjusted using the Green knob on the Operator Interface.

The white text contains information about your prewet material, its set rate, and its actual output rate. The Prewet rate is adjusted by rotating the Nav Stick knob, if applicable. If the prewet system is configured for gravity feed, no rates will be displayed. When the Prewet Soft Switch is

off, this line is grayed out and shows “OFF” for the actual rate. Disabling the Prewet Soft Switch will also disable Spray Bar.

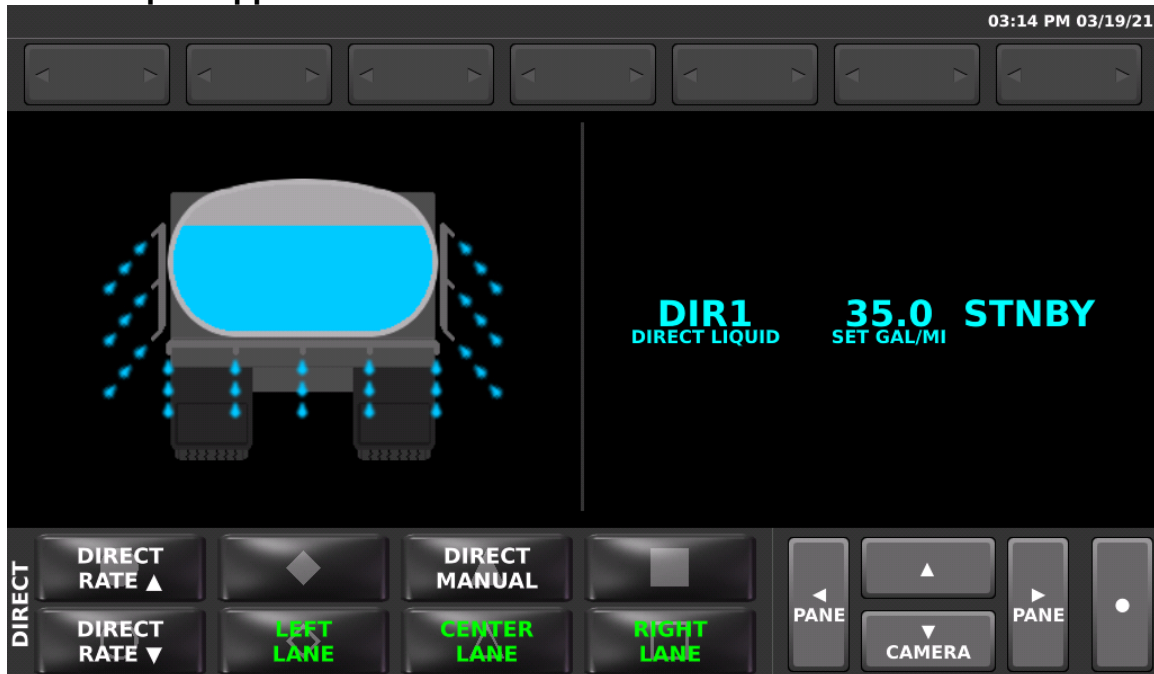
When the Granular Soft Switch is off, the top line will show “OFF” for the actual rate. Prewet can only be active if Spray Bar is enabled.

Granular, Prewet and Spray Bar Soft Switches

The LIQUID Soft Switch pane controls the Spray Bar functions. It may have additional options available depending on how the system is configured. The following table describes each option.

SPRAY BAR	Toggles the Spray Bar output Off and On
GRANULAR	Toggles the Granular output Off and On
PREWET MANUAL	Toggles the Prewet manual mode material Off and On
PREWET	Toggles the Prewet output Off and On

Direct Liquid Application Mode



Direct Liquid Application mode is used to apply liquid deicing material directly to the pavement.

The light blue text contains information about your direct material, its set rate, and its actual output rate. The output rate per lane mile is set using the Direct Rate increase and decrease Soft Switches on the DIRECT Soft Switch pane.

If the direct application system is configured for 3 lane operation, the active lanes are selected using Soft Switches. The vehicle graphic shows which lanes are active with liquid droplets.

Direct Liquid Soft Switches

The DIRECT Soft Switch pane controls the direct liquid functions. It may have additional options available depending on how the system is configured. The following table describes each option.

DIRECT RATE INC	Increases the direct liquid rate
DIRECT MANUAL	Toggles direct manual mode Off and On
DIRECT RATE DEC	Decreases the direct liquid rate
LEFT LANE	Toggles the Left lane Off and On
CENTER LANE	Toggles the Center lane Off and On
RIGHT LANE	Toggles the Right lane Off and On

Simultaneous Granular / Prewet / Direct Application Mode

The screenshot displays the control interface for Simultaneous Granular / Prewet / Direct Application Mode. The top right corner shows the time '03:32 PM 03/19/21'. The main display area is divided into two sections. On the left is a diagram of a truck with blue liquid being applied to the lanes. On the right is a data panel with the following information:

- MAT1** GRANULAR MAT: 200 SET LB/MI, STNBY
- PWT1** PREWET LIQUID: 3.0 SET GAL/T, STNBY
- DIR1** DIRECT LIQUID: 35.0 SET GAL/MI, STNBY
- SPINNER**: 30%

The bottom control panel includes the following buttons:

- DIRECT RATE ▲
- DIRECT RATE ▼
- DIRECT MANUAL
- DIRECT
- LEFT LANE
- CENTER LANE
- RIGHT LANE
- PANE
- CAMERA
- PANE

Simultaneous Granular / Direct application mode allows both the granular / prewet system and the direct liquid system to operate at the same time.

The green text contains information about the granular material, its set rate, and its actual output rate. The granular rate is adjusted using the Green knob on the Operator Interface.

The white text contains information about your prewet material, its set rate, and its actual output rate. The prewet rate is adjusted by rotating the Nav Stick knob. When the Prewet Soft Switch is off, this line is grayed out and shows "OFF" for the actual rate.

The light blue text contains information about your direct material, its set rate, and its actual output rate. The output rate is set using the Direct increase and decrease Soft Switches on the DIRECT Soft Switch pane.

If the direct application system is configured for 3 lane operation, the active lanes are selected using Soft Switches. The vehicle graphic shows which lanes are active with liquid droplets.

The blue text and bar graph shows the relative spinner speed in percentage. The spinner speed is adjusted using the Blue knob on the Operator Interface.

Granular and Prewet Soft Switches

The GRAN Soft Switch pane controls the granular functions. It may have additional options available depending on how the system is configured. The following table describes each option.

SPINNER REVERSE	Reverses the rotational direction of the spinner
CLEAR JAM	Momentarily reverses the auger to attempt to clear a jam. The auger reverses only for as long as the button is held.
GRANULAR MANUAL	Toggles granular manual mode Off and On
CROSS LEFT / RIGHT	Toggles between a left and right cross conveyor direction
AUGER REVERSE	Toggles the direction of the auger to spread material in the opposite direction.
PREWET MANUAL	Toggles the Prewet manual mode material Off and On
PREWET	Toggles the Prewet output Off and On

Direct Liquid Soft Switches

The DIRECT Soft Switch pane controls the direct liquid functions. It may have additional options available depending on how the system is configured. The following table describes each option.

DIRECT RATE INC	Increases the direct liquid rate
DIRECT MANUAL	Toggles direct manual mode Off and On
DIRECT RATE DEC	Decreases the direct liquid rate
LEFT LANE	Toggles the Left lane Off and On
CENTER LANE	Toggles the Center lane Off and On
RIGHT LANE	Toggles the Right lane Off and On

Directional Spinner Mode



Directional spinner is an option for granular systems that adds the ability to position a spinner that can be used to aim the granular material to the left or right. It uses a position sensor to show the relative position of the spinner on screen as a yellow triangle under the spinner speed.

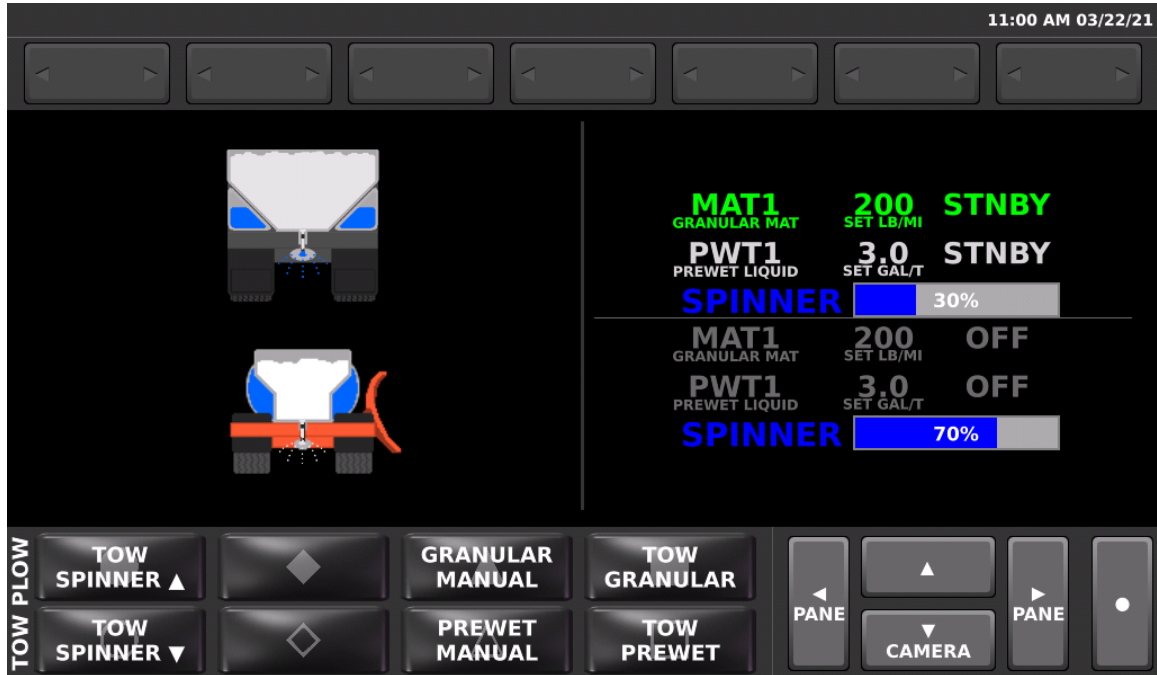
Granular and Prewet Soft Switches

The UTIL2 Soft Switch pane provides controls for positioning the spinner.

SPINNER LEFT	Shifts the spinner toward the left
SPINNER RIGHT	Shift the spinner toward the right

The rest of the spreader functions operate the same as for Granular / Prewet mode.

Tow Plow Granular Mode



Granular Tow Plow mode allows the application of granular material from an attached tow plow while spreading material from the truck. The granular and prewet rates for the tow plow will be set to the same rates as the truck. See the section on Granular / Prewet Application Mode for information on adjusting these settings.

The tow plow spinner has an optional separate setting controlled by soft switches and a spinner bar graph / percentage graphic on the screen.

Tow Plow Granular Soft Switches

The TOW PLOW Soft Switch pane controls the tow plow granular functions that are separate from the truck settings. It may have additional options available depending on how the system is configured. The following table describes each option.

TOW SPINNER INC	Increases the Tow Plow spinner speed
GRANULAR MANUAL	Toggles the Tow Plow granular manual mode Off and On
TOW GRANULAR	Toggles the Tow Plow granular material Off and On
TOW SPINNER DEC	Decreases the Tow Plow spinner speed
PREWET MANUAL	Toggles the Tow Plow Prewet manual mode Off and On
TOW PREWET	Toggles the Tow Plow Prewet material Off and On

Tow Plow Direct Liquid Application Mode



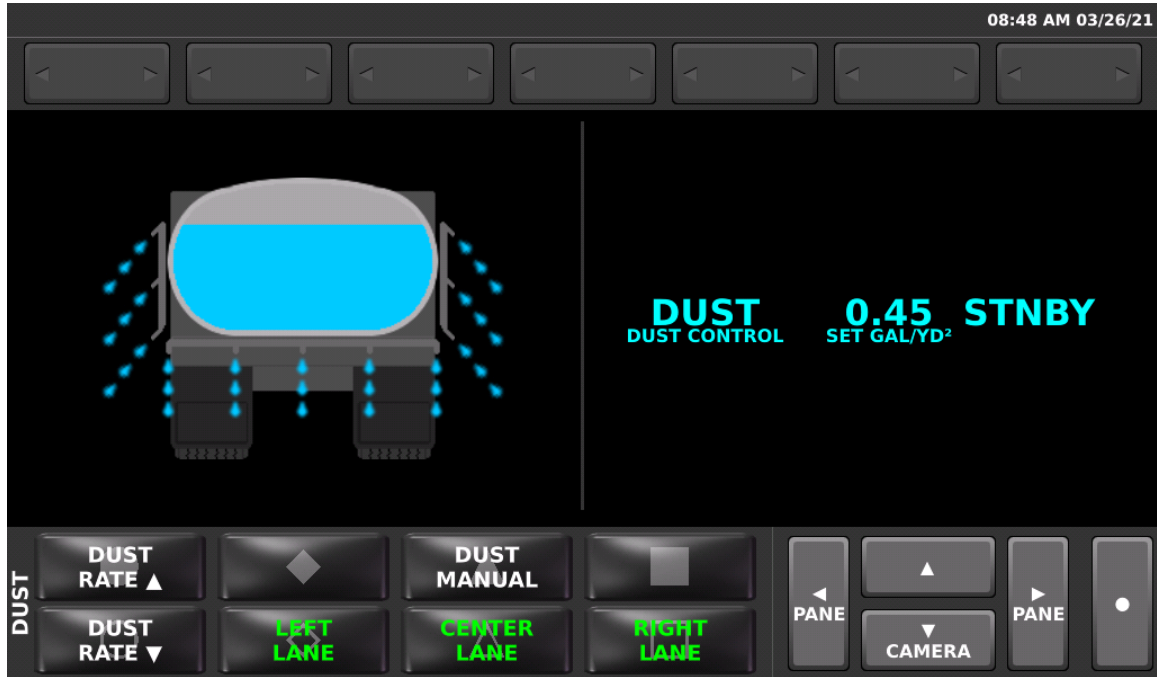
Direct Liquid Application Tow Plow mode allows the application of liquid material from an attached tow plow while spreading material from the truck. The liquid rate and lanes are separately controlled from the truck.

Tow Plow Direct Liquid Soft Switches

The TOW PLOW Soft Switch pane controls the tow plow direct liquid functions that are separate from the truck settings. The following table describes each option.

DIRECT RATE INC	Increases the Tow Plow direct liquid rate
DIRECT MANUAL	Toggles the Tow Plow direct manual mode Off and On
TOW DIRECT	Toggles the Tow Plow direct material Off and On
DIRECT RATE DEC	Decreases the Tow Plow direct liquid rate
LEFT LANE	Toggles the Tow Plow left lane Off and On
CENTER LANE	Toggles the Tow Plow center lane Off and On
RIGHT LANE	Toggles the Tow Plow right lane Off and On

Dust Control Mode



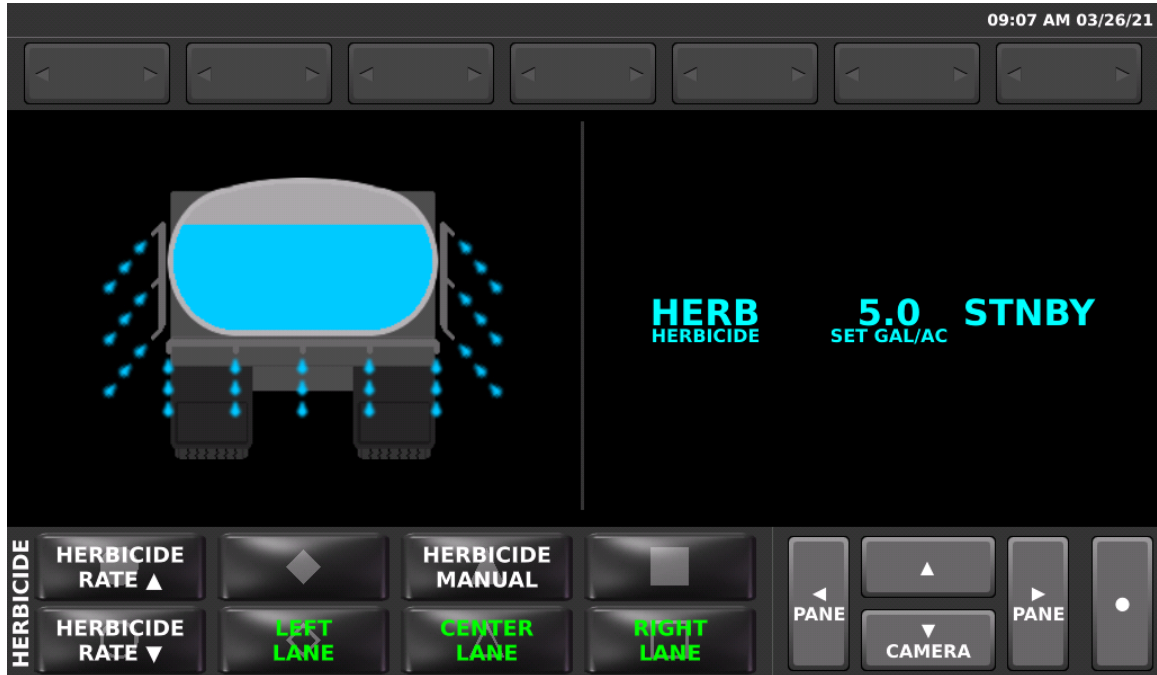
Dust control allows for applying dust control liquids based on an area calculation. Multiple lanes are optionally supported.

Dust Control Soft Switches

The DUST Soft Switch pane controls the dust control liquid functions. It may have additional options available depending on how the system is configured. The following table describes each option.

DUST RATE INC	Increases the dust control liquid rate
DUST MANUAL	Toggles dust manual mode Off and On
DUST RATE DEC	Decreases the dust control liquid rate
LEFT LANE	Toggles the Left lane Off and On
CENTER LANE	Toggles the Center lane Off and On
RIGHT LANE	Toggles the Right lane Off and On

Herbicide Mode



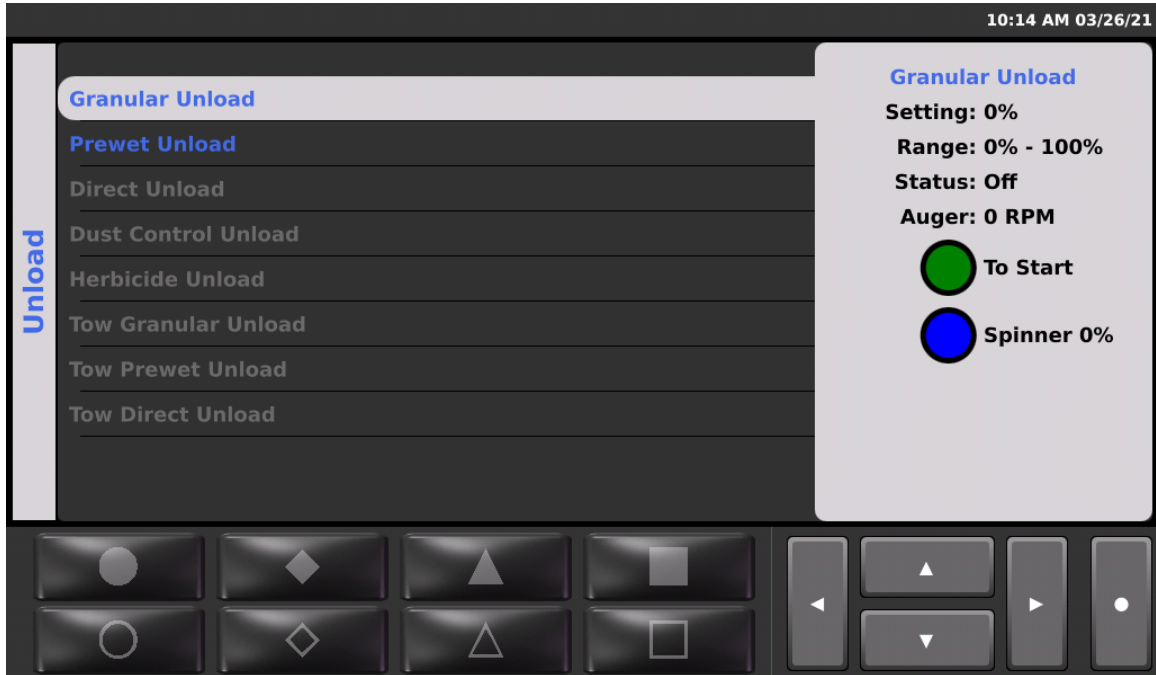
Herbicide mode allows for applying herbicides based on an area calculation. Multiple lanes are optionally supported.

Herbicide Soft Switches

The HERBICIDE Soft Switch pane controls the herbicide functions. It may have additional options available depending on how the system is configured. The following table describes each option.

HERBICIDE RATE INC	Increases the herbicide control liquid rate
HERBICIDE MANUAL	Toggles herbicide manual mode Off and On
HERBICIDE RATE DEC	Decreases the herbicide control liquid rate
LEFT LANE	Toggles the Left lane Off and On
CENTER LANE	Toggles the Center lane Off and On
RIGHT LANE	Toggles the Right lane Off and On

Unload Materials



The SSC6100 provides a means of unloading leftover material by manually running the associated hydraulic function at a set speed. If enabled, the Unload menu is accessed from the MENU Soft Switch pane by pressing the Unload button.

Once inside the menu, the available materials that can be unloaded will show in blue text. To unload materials that are grayed out, exit the Unload menu and use the Implement menu to select the implement that contains the desired material.

Choose the material to unload using the Up / Down Navigation Controls and press the Nav Stick button to select it. This will bring up the unload menu for that material. Use the Up / Down Navigation Controls to adjust the material output percentage. For granular systems with a spinner, the blue knob can be used to adjust the spinner speed.

Pressing the Green knob will toggle the system in and out of Standby to start and stop the material output. Unload cannot be started if the vehicle is moving and will display "Truck Moving" on the status screen.



To reduce the risk of death or injury, ensure that all personnel are clear from moving machinery before activating outputs.

Simulated Speed



If enabled, the SSC6100 can simulate a ground speed signal instead of using the actual speed signal from the vehicle. When activated, the simulated speed overrides the vehicle speed unless the actual vehicle speed exceeds 5 MPH.

To use Simulated Speed, scroll to the UTIL Soft Switch Pane. By default, the Simulated speed will be off and display SIMSPEED ON for the upper Soft Switch button. Pressing this button activates Simulated Speed at the starting speed of 1. When activated, the right most data item on the screen displays the current Simulated Speed setting.

The desired speed can then be adjusted up and down using the SIMSPEED Increase or Decrease buttons. Setting the Simulated speed to zero or driving the vehicle above 5 MPH deactivates Simulated Speed.

Temperature Compensation

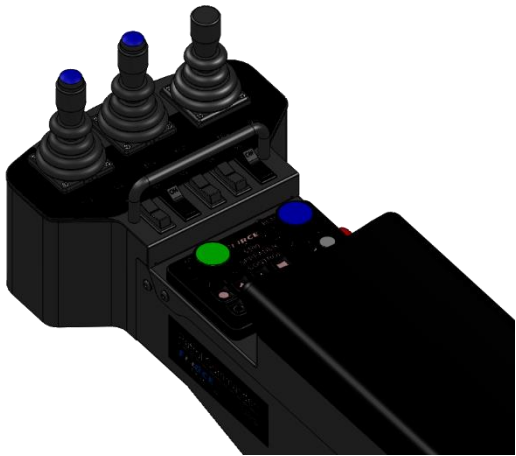
If equipped with a road temperature sensor the SSC6100 Spreader control can be configured to perform compensation for Granular and Prewet materials based on road temperature.

To use temperature compensation, first select the desired compensation profile (1 – 3) in the material menu. Scroll to the UTIL2 Soft Switch pane and press the T-COMP Soft Switch to toggle Temperature Compensation mode Off and On.

NOTE: The temperature compensation mode can cause seemingly sporadic adjustments to the Granular and Prewet set rates based on the temperature of the pavement. The base application rate is still set with the Operator Interface dials, but temperature compensation will cause the actual set rate to fluctuate on the screen.

Joystick Operation

Patrol Commander® Ultra Joysticks



The multi-joystick Patrol Commander® Ultra option is available in 3, 4, and 5 joystick variations. Joysticks are fully proportional and available in both single and dual axis styles. Optional gated joysticks can be used for dual-axis functions that need to be operated independently of one another. Each joystick features a configurable momentary pushbutton switch on the handle. In addition to the joystick, there are five rocker switches that can be configured for different functions and operations.

The control also features five rocker switches that can be configured for different functions and operations.

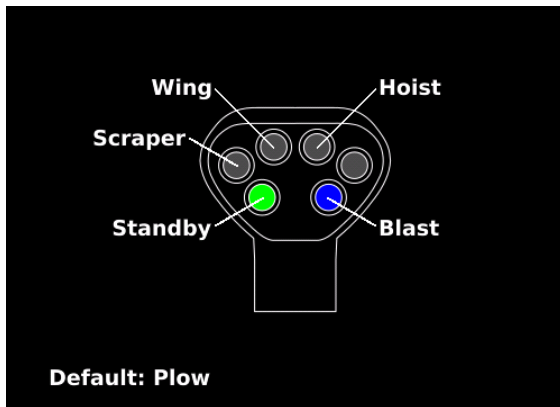
The specific functions of each joystick systems are custom configured at the factory for each vehicle application. Backlit text below each joystick indicates the name of the functions.

CommandAll® Single Joystick



The CommandAll® Single option features a single joystick with up to six pushbutton-selected functions as well as a trigger switch. The main joystick provides fully proportional control of the

selected function. In addition to the joystick, there are five rocker switches that can be configured for different functions and operations.



The specific functions of each joystick systems are custom configured at the factory for each vehicle application. An on-screen guide of these functions can be brought up by pressing the Navigational Control "LEFT VIEW" or joystick Up direction until the joystick guide is displayed.

The buttons may also be programmed to operate multiple functions at the same time. The button modes listed below are dependent on how the system is configured.

Default Function

This is the function that the joystick operates when no buttons are pressed.

Alternate Function

Pressing and holding an alternate function button causes the joystick to operate the selected alternate function.

Combo Functions

Buttons can be optionally programmed to operate multiple functions at the same time using the proportional joystick.

General Joystick Operation

In addition to the normal proportional operation of the functions controlled by the joystick(s), there are several optional programmed functions that may be configured for each system. Below is a list of those functions and how they behave.

Spreader functions

Joystick pushbuttons can be programmed to operate various spreader functions such as Standby, Blast, etc. Pressing a programmed joystick button acts the same way that it does when that function is activated normally.

Hydraulic float functions

Certain hydraulic functions can be setup with a float mode. Activating the float requires operating the function with the joystick at over 90% position. To cancel an active float, operate the function at least 10% in the up direction. Cancelling float is not timed and always happens immediately.

Float enable switch

In some applications, the hydraulic float may be configured with an enable switch. This switch will need to be in the On position to activate float. Setting a float enable switch to Off will cancel any active float modes.

Float delay

If the float has a delay feature set in calibration, it will be necessary to hold the joystick in the 90% or greater position for at least the delay time before the float becomes active. Once float is active it is indicated by a brief blink of the backlighting text for the floating function.

Float adjustable pressure

If the system is configured with an adjustable float pressure system, the UTIL2 Soft Switch pane will have "FLOAT UP" and "FLOAT DN" Soft Switches that can be used to vary the amount of float pressure applied to the function. When active, the percentage of float pressure is shown in a Data Item at the top of the screen.

Joystick Interlock

Critical functions may be setup with an interlock controlled by the pushbutton of a Patrol Commander® Ultra joystick or the trigger on the CommandAll® Single joystick. Interlocked functions will not operate until the joystick interlock has been activated. The Patrol Commander® Ultra system uses amber backlit text to indicate that it is interlocked and unable to operate functions.

Activate the interlock by pressing the button with the joystick in the center position. Press and hold the button while shifting the joystick to operate the function. The joystick text turns green to indicate that the joystick is live. The interlock will remain active if the button is released for as long as the joystick is not in the center position unless the interlock time is set to zero.

Unless a joystick has been configured to have an interlock timeout in calibration, returning the joystick to center without holding the button will cancel the interlock. For systems that have an interlock timer, the interlock will remain active without the need to hold the button for the set interlock time. During this interlock time it is not necessary to press the button to operate the joystick.

Hoist Limit

When the system is configured with a Hoist Limit function a sensor on the hoist prevents the hoist from being raised beyond a certain height. The hoist can always be lowered regardless of the hoist limit state. In most cases a hoist limit switch or certain mode controls when this feature is enabled. When enabled and the hoist limit point is reached, "HOIST LIMIT" appears on the header bar.

Joystick Disable

If a system is equipped with a joystick enable/disable switch, the switch will act like a joystick pushbutton interlock. When the switch is in the ON position, the joystick text will be green and it will be able to run functions. When the switch is in the OFF position, the joystick is unable to run functions and its text will either be amber or have no backlighting depending on its version.

Alternate function

Patrol Commander® Ultra Joysticks can also be optionally programmed to operate more than one function. The alternate function can be selected either by the joystick pushbutton, or with one of the rocker switches. The primary and alternate functions will be shown on the backlit text for the joystick.

Auto-recall

Several functions can be programmed to operate simultaneously with a single press of a joystick button. This is useful for repetitive operations or for situations that might require rapid recall of a set of functions.

Press the assigned Auto-Recall pushbutton to activate. If an Auto-Recall timer is set, the functions will recall for a set period of time and then stop.

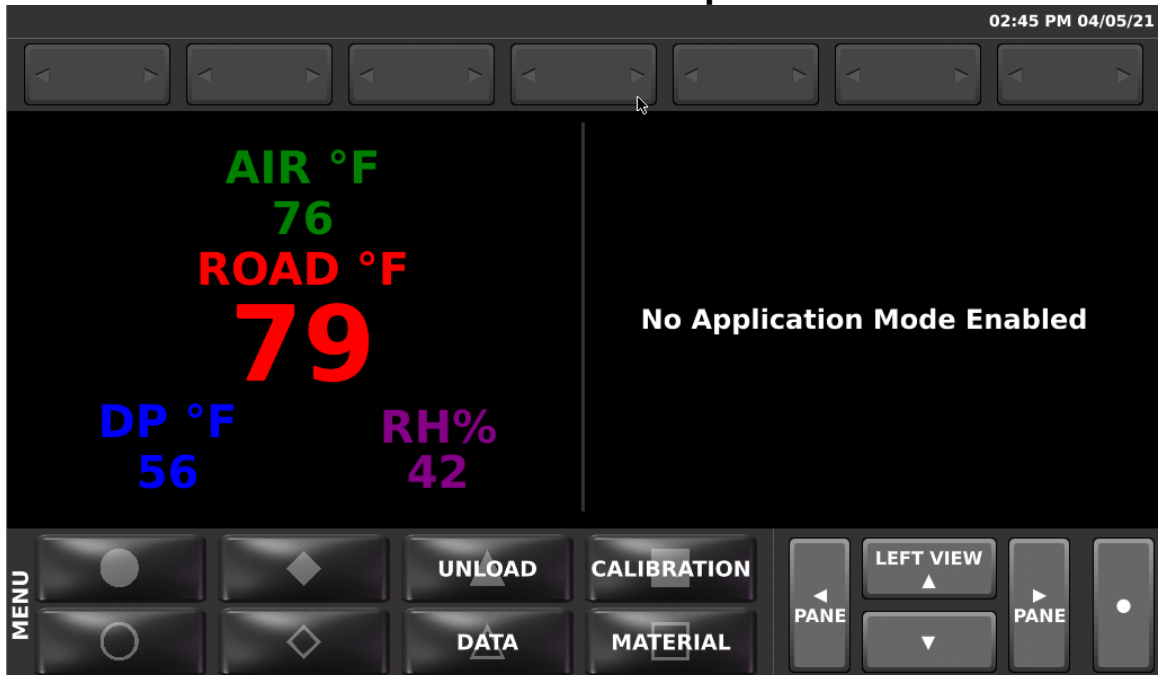


To reduce the risk of death or injury, ensure that all personnel are clear from moving machinery before activating Auto Recall.

Non-Proportional Functions

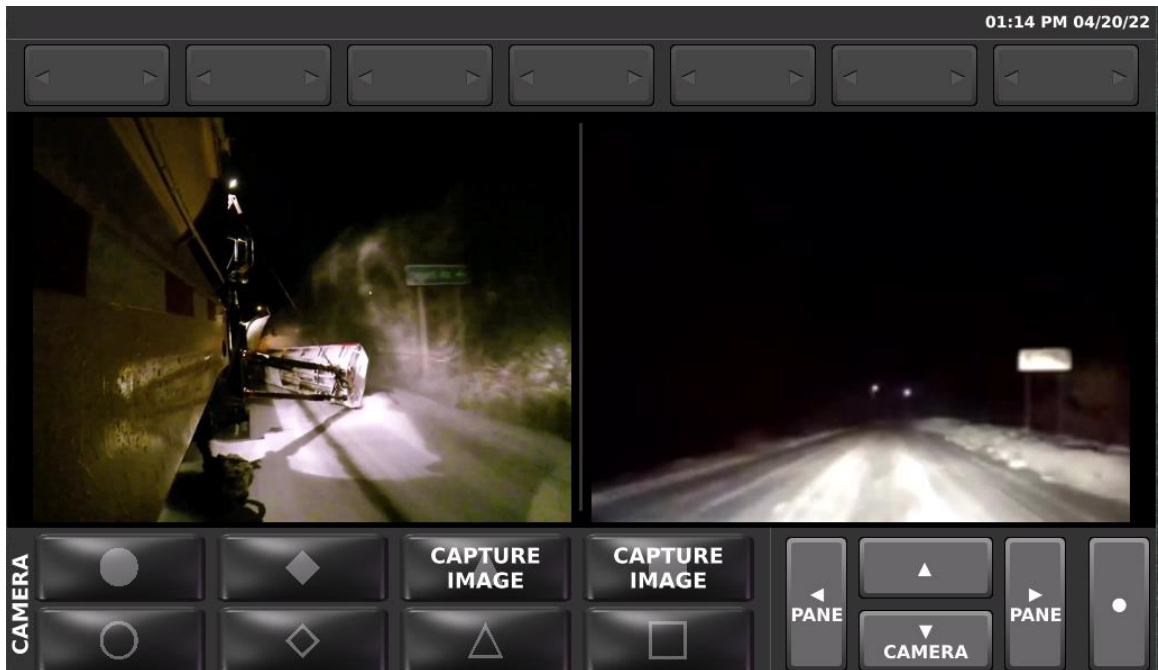
Pushbuttons and switches may be programmed to operate certain hydraulic functions. These functions will operate for as long as the button or switch is held active.

PreCise®MRM ARC Air and Road Temperature



For systems equipped with a PreCise®MRM ARC sensor, pressing the Navigational Control "LEFT VIEW" up direction can bring up a view that shows the current Road Temperature, Air Temperature, Dew Point and Relative Humidity.

Cameras



The SSC6100 can support up to three different video camera inputs and various display options on the screen. A single live video from one of the cameras can be selected to show on the left screen. Also, two live cameras can be selected to show on the left and right screens

simultaneously. Finally, the system can be programmed to activate a single full screen video image from Camera 3 based on a trigger signal.

If cameras are enabled, the Navigational Controls down direction will have “CAMERA” text on it. Pressing this control will cycle through the various enabled camera options, starting with the single views on the left screen and then through the dual views on the left and right screens (if Dual Camera mode is enabled). After cycling through all the available camera options, the screen will be returned to the normal operating screen.

Triggered camera views may be optionally programmed to automatically bring up a particular camera view when an event occurs, such as shifting the vehicle into reverse, or operating a particular joystick function. These triggers will override manually selected camera options and display the programmed camera view.

If manual image capture is enabled, the “CAMERA” pane will populate. When the associated camera is displaying, a soft key for “CAPTURE IMAGE” will appear underneath it. If automatic image capture is enabled, dual camera mode will be disabled to allow for background image capture without displaying the image feed.

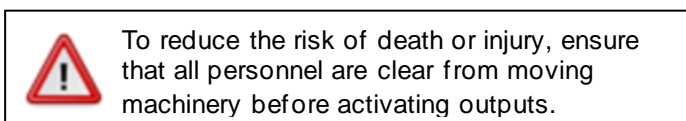
Auxiliary Modes

Aux Power Mode



The Aux Power option allows the use of hydraulic flow from the Auger circuit to be used to power hydraulic tools and other functions. When enabled in Calibration, the AUX Soft Switch Pane provides the ability to enable this function.

The percentage of oil flow is controlled using the Green knob on the Operator Interface. Pressing the Green knob starts and stops the oil flow using the Standby function. To exit Aux Power mode, put the system into standby and then press the Aux Power Soft Switch.



Aux Mode Soft Switches

The AUX Soft Switch pane contains a Soft Switch to enable the Aux Power mode.

AUX POWER	Toggles the Aux Power mode Off and On
-----------	---------------------------------------

Distance Measure



When enabled, the SSC6100 can perform a distance measuring function by using the ground speed signal from the vehicle. The distance traveled by the vehicle is shown with an option to reset the distance value and start a new measurement.

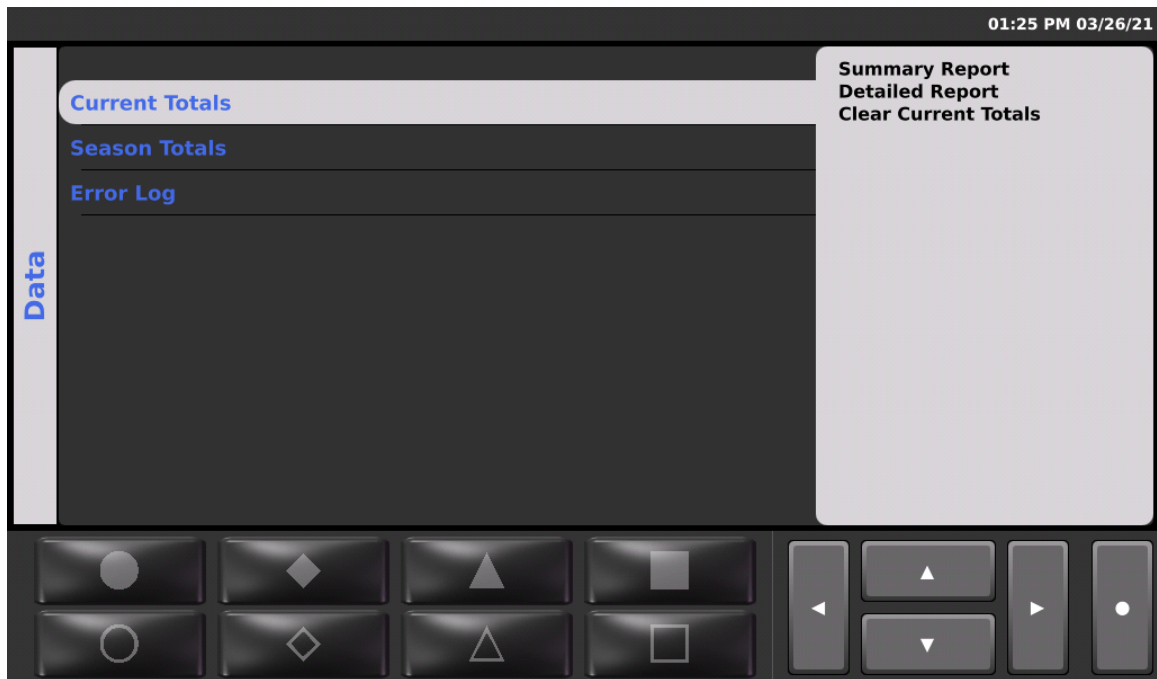
To measure a distance, drive the vehicle to the starting location. Using the Navigation Controls, scroll to the UTIL2 pane and press the MEASURE DISTANCE Soft Switch button. When activated, the rightmost data item on the screen displays the current traveled distance. Drive the vehicle along the path to be measured, noting the distance traveled.

To zero out a measured distance, press the RESET DISTANCE Soft Switch.

To exit Distance Measurement mode, press the MEASURE DISTANCE Soft Switch.

Note that distance measurement is not accessible if Simulated Speed is active.

Data Menu



The Data Menu allows you to view, export, and clear data totals and error logs collected during the SSC6100 system's operation.

To access the Data Menu, put the system into Standby mode, scroll to the MENU Soft Switch pane, and press the Data Soft Switch. Use the Navigation Up and Down Controls to select a report and press the Nav Stick to view, export it to a USB FLASH drive, or clear them.

NOTE: The export function is grayed out unless a USB FLASH drive is inserted into one of the USB ports.

Current Totals

This menu contains totals for all of the material options that have been used since the totals were last cleared. Current totals are similar to a trip odometer on a car in that they are often used to record route data and are usually reset on a new route.

Season Totals

This menu contains all of the options available for the recorded data totals since its initial setup or last clear date. Season totals are similar to an odometer on a car in that they record data over a long period of time and are rarely reset.

For the Current Totals and Season Totals menus, there are two report styles to choose from:

Summary Reports are a quick way to examine the data totals for granular, prewet, and direct systems. It displays material totals for each granular, prewet, and direct material, as well as summarized system and unload times. When the system is used with a tow plow these totals also reflect the items related to the tow plow application.

Detailed Reports are a thorough look at each granular material and its operating totals with each prewet and direct simultaneous materials. The Detailed Report also splits out each direct material and any simultaneous application individually. Each granular and direct material is drilled down

within subsections for distance, displacement, time, blast time, blast distance, system distance and time, and unload time.

This report will only reflect the totals related to item applied during the operation of the standard truck feature and does not include totals from the tow plow feature.

Error Log

This menu contains the options available for interacting with the spreader control error log. The spreader control error log contains the various operation errors that have occurred with the system since last cleared. These error descriptions are time stamped with time and date that they occurred on. These logs can be useful in troubleshooting.

Note that pressing the Nav Stick button exits the viewing of any of the reports.

Clearing Totals and Logs

The Clear function in the totals and error log menus is used to clear the reports and reset them to zero.

The Clear Current Totals function may be configured in calibration to require a password. Follow the password entry menu to clear the totals.

Season Totals always require the Calibration access password or supervisor key to clear. Follow the password entry menu to enter a password or insert a USB supervisor key into one of the USB ports. Clearing Season totals does not affect Current totals.

PreCise®MRM Over-the-Air Communications

The SSC6100 has a built-in GPS receiver and a two-way cellular radio that can be optionally used with the PreCise®MRM Asset Tracking system for vehicle location and material usage reporting. This system operates in the background and generally does not require user intervention.

The header bar does contain two indicators that reflect the status of these system components when the PreCise®MRM system is enabled:

Cell Status



The cell status is indicated by this icon on the header bar, located to the left of the time and date. Green indicates that the on-board cell radio is enabled.

For systems that use an external PreCise®MRM communications device, the icon will be in a Gold color. If for some reason communications with the external device are not established, this icon will have an X through it.

GPS Status



To the left of the cell status icon is another header bar icon that shows the status of the GPS receiver. A green icon indicates that a valid GPS signal has been found and the vehicle location can be tracked. Red text with a line through the icon indicates that the GPS receiver is attempting to acquire a valid signal.

It can take up to a few minutes for the system to acquire a GPS signal after starting up. GPS generally requires an unobstructed light of sight between the back panel of the SSC6100 and the sky in order to receive signals from satellites in outer space. If a valid GPS signal takes an

excessively long time or is unable to be acquired, it may be necessary to relocate the screen in the vehicle cab so it can get an unobstructed view of the sky.

Spreader Error Conditions

Range Error

Range errors occur when the granular or liquid system has been running at full speed for more than 5 seconds and has been unable to reach the set rate. To indicate a Range error, the actual rate is shown in red text and the words "RANGE ERROR" appear below.

Possible Cause	Solution
The conveyor gate height is too low (granular only).	Increase the gate height
The truck is traveling too fast for the application rate.	Decrease the vehicle speed
The application rate is too high for the truck speed.	Decrease the application rate
Liquid flow restriction (liquid only).	Check flowmeter, filters, and nozzles for obstructions
The hydraulic system capacity is inadequate.	Verify the performance of the hydraulic system
System incorrectly calibrated.	Verify the feedback sensor and material calibration values

Feedback Error

If any closed loop system is not receiving any rate information from the feedback sensor while the output is active, the associated output will gradually ramp up to full speed. During this time, the actual rate will read zero. If the output runs for more than 10 seconds without any feedback, a feedback error will occur, which is indicated with a red "?" for the actual rate with the words "FEEDBACK ERROR" below.

Possible Cause	Solution
The auger/conveyor is not moving (granular only)	Ensure that engine is running, PTO is engaged (if equipped) and hydraulic oil flow is present Clear the auger/conveyor jam
Liquid feedback sensor contaminated and unable to rotate freely (liquid only)	Clean feedback sensor
Liquid valve closed or obstructed flow	Open shutoff valve or remove obstructions

(liquid only)	
Feedback sensor wiring disconnected, damaged, or electrical connections are corroded	Inspect wiring and connections, repair as necessary
Faulty feedback sensor	Temporarily swap with a known good sensor. Replace sensor if defective

Feedback Error / Open Loop

After a feedback error has occurred for more than 5 seconds, the system will switch to open loop mode. This is indicated with the word "OPEN" for the actual rate and the words "FEEDBACK ERROR" below.

Open Loop mode allows the function to operate without the feedback sensor, but in a less-accurate way. See the Open-Loop Mode section on page 13 for more information.

Note that open loop mode is intended for situations where the feedback sensor is not functioning. If the function is physically jammed or otherwise obstructed there will be no actual material application until the obstruction is cleared.

Low Material

If the system is equipped with a low material sensor on the auger or conveyor, this can be used to indicate when the hopper is running low on material. The conveyor will continue to operate, but the material usage may stop accumulating depending on the calibration setting.

The low material condition is indicated on the screen by changing the actual rate to red text and displaying the words "LOW MATERIAL" below.

Low Liquid

When equipped with a low liquid sensor, the system can indicate when the liquid tank is running low of liquid.

Depending on the calibration setting, the liquid output may be shut off to protect the pump components. In this case the word "OFF" will replace the actual rate. In either case, the words "LOW LIQUID" will be displayed below the actual rate.

Low Battery Voltage

When the battery voltage is below 10 Volts a warning will become active.

Directional Spinner Feedback Error

A system that has a directional spinner uses an electrical feedback sensor to measure the spinner position. If this sensor fails, the screen displays blinking red triangles for the spinner position.

System Errors and Warnings

Pop-up Errors

The SSC6100 can display error windows during its operation to inform you of error conditions in your spreader system. The table below describes the error windows that can occur, possible causes, and their solutions.

Error Text	Meaning / Troubleshooting
<p>Serial Event Queue Full Error The serial event queue is full. The oldest data will be deleted to make room for new data. Connect a PreCise MRM device.</p>	<p>The system is not communicating with the external AVL device. Correct the communication error with the PreCise MRM device. The stored data will then be transferred.</p>
<p>Upgrade Failed The previous system upgrade has failed.</p>	<p>The upgrade file may be corrupt or there may be a problem with the USB FLASH drive. Try downloading a new upgrade file and/or use a different FLASH drive.</p>
<p>Arm Power Short A short circuit has been detected on the joystick arm.</p>	<p>Inspect the wire harness from the hub to the joystick arm for damage. Try isolating CAN modules in the arm by unplugging them one at a time.</p>
<p>Hub Output Overload One or more of the hub outputs is overloaded.</p>	<p>Isolate the overloaded output by turning off or disconnecting them one by one. Correct short circuits or add relays to the overloaded output(s) to increase current capacity as needed.</p>
<p>PreCise MRM Authentication Error The system is unable to authenticate with the external PreCise MRM device. Event logging data will be stored onboard the 6100.</p>	<p>Check that the external PreCise MRM® device is connected, powered, and running a recent version of firmware</p>
<p>External J1939 Communication Error The system is not reading any valid J1939 messages</p>	<p>Verify that the SSC6100 Hub J1939 connection and harness is intact and connected to the correct bus on the vehicle</p>
<p>Improper Shutdown Detected Verify that constant power is properly connected and maintained during the entire shutdown process.</p>	<p>Ensure that the main power connections to the hub have a connection directly to battery. If the vehicle is equipped with a battery disconnect switch, ensure that the SSC6100 controller has completed its shutdown process before opening the battery disconnect switch.</p>
<p>ESTOP Cleared, System Reactivating To reduce the risk of death or injury, ensure all personnel are clear from moving machinery.</p>	<p>Note that system components may begin moving after the ESTOP button is released. Make sure all personnel are away from anything that might move before re-activating the ESTOP switch.</p>

Error Text	Meaning / Troubleshooting
<p>Check Gate Setting Ensure your gate height setting matches the height of the vehicle's gate.</p>	<p>This is a reminder message that occurs when materials are changed in a system that uses an adjustable gate. For accurate spreading, the actual gate height on the conveyor needs to match the gate setting in the SSC6100 control.</p>
<p>Incorrect Two Position Gate Height The gate height for the current material does not match the selected setting. Please adjust the gate or select override.</p>	<p>Adjust the auger gate to the proper position. If problem persists, verify the assembly and wiring of the sensors.</p>
<p>Two Position Gate Sensor Error The system is detecting both sensors as active. Please fix the sensor or select override.</p>	<p>Both the gate position sensors are active. Gate position expects only one sensor to be active at the same time. Check the mechanical sensors and wiring and correct the situation.</p>
<p>Direct Feedback Error Direct liquid feedback has been lost. In order to prevent damage to the direct pump the system has been put into standby.</p>	<p>No feedback pulses are being received from the direct flowmeter. Clean feedback sensor. Open shutoff valve or remove obstructions. Inspect wiring and connections, repair as necessary. Temporarily swap with a known good sensor. Replace sensor if defective.</p>
<p>Direct Low Liquid The direct liquid tank is low. In order to prevent damage to the direct pump the system has been put into standby.</p>	<p>The liquid level sensor is not detecting liquid in the tank. Refill liquid tank. Inspect liquid level sensor wiring and connections, repair as necessary. Replace sensor if defective.</p>
<p>Tow Plow Direct Feedback Error Tow plow direct liquid feedback has been lost. In order to prevent damage to the tow plow direct pump the system has been put into standby.</p>	<p>No feedback pulses are being received from the direct flowmeter on the tow plow system. Clean feedback sensor. Open shutoff valve or remove obstructions. Inspect wiring and connections, repair as necessary. Temporarily swap with a known good sensor. Replace sensor if defective.</p>

Error Text	Meaning / Troubleshooting
<p>Tow Plow Direct Low Liquid The tow plow direct liquid tank is low. In order to prevent damage to the tow plow direct pump the system has been put into standby.</p>	<p>The liquid level sensor is not detecting liquid in the tow plow system tank.</p> <p>Refill liquid tank.</p> <p>Inspect liquid level sensor wiring and connections, repair as necessary.</p> <p>Replace sensor if defective.</p>
<p>Dust Control Feedback Error Dust control feedback has been lost. In order to prevent damage to the dust control pump the system has been put into standby.</p>	<p>No feedback pulses are being received from the dust control flowmeter.</p> <p>Clean feedback sensor.</p> <p>Open shutoff valve or remove obstructions.</p> <p>Inspect wiring and connections, repair as necessary.</p> <p>Temporarily swap with a known good sensor. Replace sensor if defective.</p>
<p>Dust Control Low Liquid The dust control liquid tank is low. In order to prevent damage to the dust control pump the system has been put into standby.</p>	<p>The liquid level sensor is not detecting liquid in the tank.</p> <p>Refill liquid tank.</p> <p>Inspect liquid level sensor wiring and connections, repair as necessary.</p> <p>Replace sensor if defective.</p>
<p>Herbicide Error Herbicide feedback has been lost. In order to prevent damage to the herbicide pump the system has been put into standby.</p>	<p>No feedback pulses are being received from the herbicide flowmeter.</p> <p>Clean feedback sensor.</p> <p>Open shutoff valve or remove obstructions.</p> <p>Inspect wiring and connections, repair as necessary.</p> <p>Temporarily swap with a known good sensor. Replace sensor if defective.</p>
<p>Herbicide Low Liquid The herbicide liquid tank is low. In order to prevent damage to the herbicide pump the system has been put into standby.</p>	<p>The liquid level sensor is not detecting liquid in the tank.</p> <p>Refill liquid tank.</p> <p>Inspect liquid level sensor wiring and connections, repair as necessary.</p> <p>Replace sensor if defective.</p>

Error Text	Meaning / Troubleshooting
Operator Interface Comm Error	<p>Disconnected or damaged CAN cable between hub and joystick arm assembly.</p> <p>Disconnected Operator Interface connection inside joystick arm assembly.</p> <p>Defective Operator Interface module.</p>
20 Port Valve N Comm Error	<p>The Valve Module has not been configured in calibration.</p> <p>The currently selected Implement does not match the system on the vehicle and connected to the system.</p> <p>Disconnected or damaged CAN cable between hub and valve enclosure.</p> <p>Defective valve module.</p>
10 Port Valve N Comm Error	<p>The Valve Module has not been configured in calibration.</p> <p>The currently selected Implement does not match the system on the vehicle and connected to the system.</p> <p>Disconnected or damaged CAN cable between hub and valve enclosure.</p> <p>Defective valve module.</p>
MPJC Device N Comm Error	<p>The MPJC joystick module has not been configured in calibration.</p> <p>Disconnected or damaged CAN cable between hub and joystick arm assembly.</p> <p>Disconnected MPJC joystick module connection inside joystick arm assembly.</p> <p>Defective MPJC joystick PCB module.</p>
CommandAll Device N Comm Error	<p>The CommandAll® Single joystick module has not been configured in calibration.</p> <p>Disconnected or damaged CAN cable between hub and joystick arm assembly.</p> <p>Disconnected MPJC joystick module connection inside joystick arm assembly.</p> <p>Defective Single joystick PCB module.</p>


Error Text	Meaning / Troubleshooting
<p>IGrip Error The IGrip is reporting a malfunction. Joystick will not work. Release the joystick or replace the joystick.</p>	<p>Disconnected or damaged CAN cable between hub and joystick arm assembly.</p> <p>Disconnected iGrip joystick module connection inside joystick arm assembly.</p> <p>Defective iGrip joystick assembly.</p>
<p>IGrip Interlock Error The IGrip is reporting stuck interlock. Release the joystick or replace the joystick.</p>	<p>The joystick has failed and is reporting an incorrect position.</p> <p>The joystick was being held during system startup.</p>
<p>Direct Module N Comm Error</p>	<p>Disconnected CAN cable.</p> <p>Broken or pinched CAN cable.</p> <p>The Direct Module has not been configured.</p> <p>The implement selected in the Implements menu is not the one connected to the system.</p>
<p>IM04 Device N Comm Error</p>	<p>Disconnected CAN cable.</p> <p>Broken or pinched CAN cable.</p> <p>The Direct Module has not been configured.</p> <p>The implement selected in the Implements menu is not the one connected to the system.</p>
<p>Hub Device Comm Error</p>	<p>Partially connected or damaged cable between display and hub.</p> <p>Defective hub assembly.</p>
<p>Firmware Upgrade Required The selected HW Config requires firmware version “minimum firmware from config” or higher. The HW Config File has not been imported.</p>	<p>A greater firmware version is required to support the features in the current hardware configuration. Upgrade the SSC6100 to the indicated firmware version or higher.</p>
<p>Stuck Momentary Switch The momentary switch for <i>Switch Name</i> is stuck on.</p>	<p>The indicated switch was active on startup.</p>

Error Text	Meaning / Troubleshooting
<p>Invalid Driver ID The Driver ID Key just used is invalid.</p>	<p>The key used to login was not of the correct type.</p> <p>The Driver ID key used to login has become corrupted.</p>
<p>Validation Failure The selected HW Config file is not valid. The file will not be imported.</p>	<p>The hardware configuration file contains information that the spreader control cannot interpret.</p> <p>Request and install an updated hardware config file or reinstall a previously working hardware config file.</p>
<p>Fatal System Error A Fatal System Error has occurred that will prevent the system from operating. Please select a recovery option.</p>	<p>An operational or calibration setting has been set to an invalid value. Consult your FORCE America representative or choose one of the available menu options to recover the system.</p>

Header Bar Errors and Warnings

The SSC6100 displays certain errors and warnings in the header bar. If more than one error or warning is active at the same time, the header bar will cycle through all the active messages.

Header Bar Text	Meaning
<p>CAMERA SHORT FAULT</p>	<p>A short circuit was detected on one or more camera power output lines.</p> <p>Unplug cameras from the Hub one by one to isolate the problem, repair as necessary.</p>
<p>HUB OUTPUT OVERLOAD</p>	<p>One or more of the hub outputs is overloaded.</p> <p>Isolate the overloaded output by turning off or disconnecting them one by one. Correct short circuits or add relays to increase current capacity as needed.</p>
<p>J1708/1939 POWER SHORT</p>	<p>A short circuit was detected on the power output line on the J1708/1939 connector.</p> <p>Check for short circuits in the wiring and ensure that devices connected to this connector do not exceed the maximum current capacity.</p>

<p>ESTOP ACTIVE</p>	<p>The ESTOP pushbutton is engaged.</p> <p>Check to ensure the entire area around the vehicle is free of personnel. Rotate the ESTOP button clockwise to release the button and engage the system outputs.</p> <div data-bbox="769 394 1305 512" style="border: 1px solid black; padding: 5px;">  <p>To reduce the risk of death or injury, ensure that all personnel are clear from moving machinery</p> </div>
<p>J1939 COMMUNICATION ERROR</p>	<p>The system is unable to receive J1939 information.</p> <p>Check the speedometer calibration settings and connections to the vehicle CAN bus.</p>
<p>T-COMP ERROR</p>	<p>A problem with the road temperature sensor is preventing temperature compensation mode.</p> <p>Diagnose the Road Temperature sensor and correct issues.</p>
<p>OIL TEMP</p>	<p>The temperature of the oil in the system is above safe limits.</p> <p>Allow the system to cool. Check for conditions that cause excessive heat to be generated within the hydraulic system.</p>
<p>OIL LEVEL</p>	<p>The level of the oil is below safe limits.</p> <p>Add oil as necessary. Check the system for hydraulic leaks that can lower oil level over time.</p>
<p>LOW BATTERY VOLTAGE</p>	<p>The battery power is less than 10 Volts.</p> <p>Check the battery supply.</p>
<p>LOW FILTER BYPASS</p>	<p>The oil filter's bypass valve has been activated.</p> <p>Allow the system oil temperature to reach normal operating conditions. If the problem persists, replace the low pressure return oil filter.</p>
<p>HIGH FILTER BYPASS</p>	<p>The oil filter's bypass valve has been activated.</p> <p>Allow the system oil temperature to reach normal operating conditions. If the problem persists, replace the high pressure system oil filter.</p>

BODY UP	<p>The dump body of the vehicle is currently hoisted in the up position.</p> <p>Lower the hoist.</p>
SLOW DOWN	<p>The vehicle is moving faster than the speed limit set in calibration.</p> <p>Reduce vehicle speed.</p>
GATE SENSOR ERROR	<p>Both the gate position sensors are active.</p> <p>Gate position expects only one sensor to be active at the same time. Check the mechanical sensors and wiring and correct the situation.</p>
INCORRECT GATE HEIGHT	<p>The gate's position does not match the position set in calibration for the selected material.</p> <p>Set the gate to the correct position. Ensure that the gate is fully shifted into position.</p>
TWO POSITION GATE OVERRIDE	<p>Reminder that a Gate Sensor Error or Incorrect Gate Height Error was overridden.</p>
IGRIP JOYSTICK OFF CENTER	<p>The system is unable to communication with the iGrip joystick.</p> <p>Check wiring to the joystick. Try swapping in a known good joystick. Replace defective components.</p>
IGRIP JOYSTICK INTERLOCK	<p>The safety interlock on the iGrip joystick is stuck in the active state.</p> <p>Ensure that the joystick handle is not being gripped while the system is powered up. Try swapping a known good joystick. Replace defective components.</p>
IGRIP JOYSTICK ERROR	<p>The iGrip joystick was off-center when the 6100 started.</p> <p>Restart the system without shifting the joystick. Try swapping a known good joystick. Replace defective components.</p>
JOYSTICK INTEGRITY	<p>The redundant integrity voltage check of a joystick is outside allowable limits.</p> <p>Check joystick connection to the circuit board inside the control arm. Try swapping a known good joystick. Replace joystick as needed.</p>

<p>JOYSTICK RANGE</p>	<p>A joystick voltage is operating outside of its acceptable range.</p> <p>Check joystick connection to the circuit board inside the control arm. Try swapping a known good joystick. Replace joystick as needed.</p>
<p>JOYSTICK OFF CENTER</p>	<p>A joystick was off-center when the 6100 started.</p> <p>Restart the system without shifting the joystick. Try swapping a known good joystick. Replace defective components.</p>
<p>JOYSTICK PUSHBUTTON</p>	<p>A joystick's pushbutton registered in the active state when the 6100 started.</p> <p>Restart the system without pressing the button. Try swapping a known good joystick. Replace defective components.</p>
<p>JOYSTICK NORMALIZATION</p>	<p>A joystick has invalid normalization values.</p> <p>This may occur if a joystick has been replaced. Re-normalize the joystick using the joystick normalization tool inside the calibration menu. Replace joystick if this does not correct the issue.</p>
<p>BACKLIGHT COMMUNICATION</p>	<p>Communication with the joystick backlighting board has been lost.</p> <p>Ensure that the 5th joystick backlighting PCB is connected to the main circuit board. Try swapping known good circuit boards. Replace defective components.</p>
<p>TRANSFERRING DIAGNOSTIC LOG</p>	<p>A diagnostic log is actively being transmitted.</p> <p>Wait for the transmission to complete.</p>
<p>OTA UPGRADE AVAILABLE</p>	<p>An Over-The-Air firmware update is available.</p> <p>The firmware update can be started from within the Calibration menu or dismissed to continue using the current firmware.</p>

Joystick Error Codes

The SSC6100 system can broadcast the following beep codes when a joystick related error occurs. A “long” beep is a tone that lasts for 2 seconds, followed by 2 seconds of silence. A short beep is a tone that lasts for ½ second, followed by ½ second of silence.

Number of Beeps	Possible Cause	Solution
Solid	CAN Communication between the 6100 and the transmitter board has been lost.	Verify the integrity of the CAN cable connecting the 6100 to the joystick assembly.
7 Short	The joystick that is blinking is operating outside of its acceptable range.	Contact a FORCE America Representative for a replacement joystick.
9 Short	<p>The joystick was off-center at startup.</p> <p>The joystick’s pushbutton was pressed on startup.</p> <p>The joystick’s normalization values are incorrect.</p>	<p>Verify that the joystick is not off-center.</p> <p>Verify that the joystick’s pushbutton is not pressed.</p> <p>Renormalize the joystick. See “Joystick Normalization” in the SSC6100 Calibration Manual (M0136) for more information.</p>
15 Short	Communication with the joystick backlighting board has been lost.	Verify the connection between the joystick backlighting board and the joystick input board.

Diagnostic Menu

For the purpose of troubleshooting and monitoring system states, the SSC6100 provides the option to enable a diagnostic menu from within the calibration settings. This allows real-time monitoring of various system and module signals.

When enabled, a DIAGNOSTIC Soft Switch on the UTIL2 Soft Switch pane will be present until the system is shut down and restarted. Pressing the Soft Switch will open the diagnostic menu and display menus for all the available system details. The following list shows the basic information that can be found in these menus. Contact your FORCE America® representative for more information on interpreting the various information as it pertains to your situation.

PreCiseMRM

This menu displays information about the built-in cellular communications system, including GPS signal information. There are also utilities to send diagnostic log information that can be used by FORCE® America support personnel to assist in troubleshooting.

ARC Wireless Sensor

If the system is setup with a wireless ARC sensor, this menu displays information about the current state and communications of the sensor.

Modules

This menu displays information about all the CAN connected modules on the system. Each connected module will have its own sub-menu of module information that includes input and output states as well as voltage levels, serial numbers, and firmware versions.

J1939

This menu displays information about the J1939 vehicle features. The vehicle gear and speed statuses will be displayed representing whether the system is receiving J1939 messages for those fields.

Licensing and Source Code Availability

The SSC6100 Spreader Control contains software licensed under the GNU Public License (GPL) version 2. A copy of the GPL Version 2 has been provided for you in Appendix A – GNU General Public License, Version 2 on page 53.

For instructions on how to obtain a copy of any source code made publicly available via the GPL, you may send your request in writing to the address below:

FORCE America, Inc.
OSS Management
1601 Airport Road
Waukesha, WI 53188, USA

The SSC6100 Spreader Control is based in part on the work of the Qt Framework (<https://www.qt.io/>).

Appendix A – GNU General Public License, Version 2

The following license describes your rights to the software licensed under the GNU General Public License, Version 2 included with your SSC6100 Spreader Control.

GNU GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.

c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

Appendix B - Data Items complete listing

Data Item	Function	Requirement
(BLANK)	Displays a blank data item.	Always available.
AUGER 0 RPM	Displays the auger sensor's revolutions per minute.	Granular must be enabled on the base truck or the attached implement.
AUGER FWD 0%	Displays the duty cycle percentage being applied to the auger forward output.	Granular must be enabled on the base truck or the attached implement.
AUGER REV 0%	Displays the duty cycle percentage being applied to the auger reverse output.	The auger reverse output must be enabled on the base truck or the attached implement and Auger Reverse must be enabled in
SPINNER x 0 RPM	Displays Spinner revolutions per minute for each of the enabled spinners in the system.	Granular and the primary spinner must be enabled on the base truck or the attached implement.
SPINNER x 0%	Displays the duty cycle percentage being applied to each of the spinner outputs enabled in the system.	Granular and the primary spinner must be enabled on the base truck or attached implement.
CROSS x 0%	Displays the duty cycle percentage being applied to each of the cross conveyor outputs.	Granular and the primary cross auger must be enabled on the base truck or the attached implement.
PREWET 0 Hz	Displays the prewet sensor's output frequency in hertz.	Granular and prewet must be enabled on the base truck or the attached implement.
PREWET 0%	Displays the duty cycle percentage being applied to the prewet output.	Granular and prewet must be enabled on the base truck or the attached implement.
DIRECT 0 Hz	Displays the direct liquid sensor's output frequency in hertz.	Direct must be enabled on the base truck or the attached implement.
DIRECT 0%	Displays the duty cycle percentage being applied to the direct output.	Direct must be enabled on the base truck or the attached implement.

Data Item	Function	Requirement
DUST CTRL 0%	Displays the duty cycle being applied to the dust control output.	Dust control must be enabled as an implement.
HERBICIDE 0%	Displays the duty cycle being applied to the herbicide output.	Herbicide must be enabled as an implement.
TOW AUGER 0 RPM	Displays the tow plow auger sensor's revolutions per minute.	Tow plow granular must be enabled on the attached tow plow implement.
TOW AUGER 0%	Displays the duty cycle being applied to the tow plow auger output.	Tow plow granular must be enabled on the attached tow plow implement.
TOW SPNR 0%	Displays the duty cycle being applied to the tow plow spinner output.	Tow Plow granular must be enabled on the attached tow plow implement.
TOW PWT 0 Hz	Displays the tow plow prewet sensor's output frequency in hertz.	Tow plow granular and tow plow prewet must be enabled on the attached tow plow implement.
TOW PWT 0%	Displays the duty cycle being applied to the tow plow prewet output.	Tow plow granular and tow plow prewet must be enabled on the attached tow plow implement.
TOW DIR 0 Hz	Displays the tow plow direct liquid sensor's output frequency in hertz.	Tow plow direct must be enabled on the attached tow plow implement.
TOW DIR 0 %	Displays the duty cycle percentage being applied to the tow plow direct output.	Tow plow direct must be enabled on the attached tow plow implement.
AIR TEMP 32 F	Displays the current air temperature as measured by the temperature sensor.	Temperature Sensor must be set to ARC Wired, ARC Wireless, Roadwatch, or Vaisala in Calibration.
ROAD TEMP 32 F	Displays the current road temperature as measured by the temperature sensor.	Temperature Sensor must be set to ARC Wired, ARC Wireless, Roadwatch, or Vaisala in Calibration.

Data Item	Function	Requirement
HUMIDITY 37%	Displays the current relative humidity as measured by the temperature sensor.	The Temperature Sensor must be set to ARC Wired or ARC Wireless in Calibration.
DEW POINT 32 F	Displays the current dew point temperature.	The Temperature Sensor must be set to ARC Wired or ARC Wireless in Calibration.
PRESSURE 1 0 PSI	Displays the pressure measured by the listed Pressure Transmitter.	A pressure transmitter must be defined in the Hardware Configuration File and connected to the appropriate valve module.
GATE HT 4.0 in	Displays the gate height as set in the Material Selection menu.	Gate Mode must be set to Adjustable Gate in Calibration.
VALVE POS 0.0 V	Displays the current position of the directional spinner position actuator as measured by its sensor.	Directional Spinner must be enabled on the base truck or the attached implement.
BATTERY 13.8 V	Displays the amount of voltage supplied to the SSC6100 system from the vehicle battery.	Always available.
TIME 3:53 PM	Displays the current time.	Always available.
SPEED 0 MPH	Displays the current speed of the vehicle as measured by the speedometer sensor.	Always available.
SIM SPEED 0 MPH	Displays the current speed of the vehicle as set by the Set Sim Speed menu item.	Sim Speed must be enabled in Calibration.
DISTANCE 0 FT	Displays the distance traveled since the distance measure operation was started.	Distance Measure must be enabled and Sim Speed disabled in Calibration.
FLOAT 100%	Displays the output setting that the adjustable power float will be run at when it is active.	The hardware configuration file must contain an adjustable power float.

Data Item	Function	Requirement
CPU TEMP 35 C	Displays the operating temperature of the main system processor.	Diagnostic mode must be enabled in Calibration

FORCE America Contact Information

Should you encounter problems with your SSC6100 system that are not documented in this Operation Manual or the SSC6100 Calibration Manual, please contact your local FORCE America Sales Representative for assistance.

For company and product information, please contact FORCE America at:

Phone: 1-888-99FORCE (1-888-993-6723)

Website: <http://www.forceamerica.com>

E-mail: info@forceamerica.com



Document No: M0137-F
Released: 01/29/2025
Copyright © 2025 FORCE America Inc.