

# CS 550i, 551i/150RC

## Spreader and Joystick Controller Calibration Manual



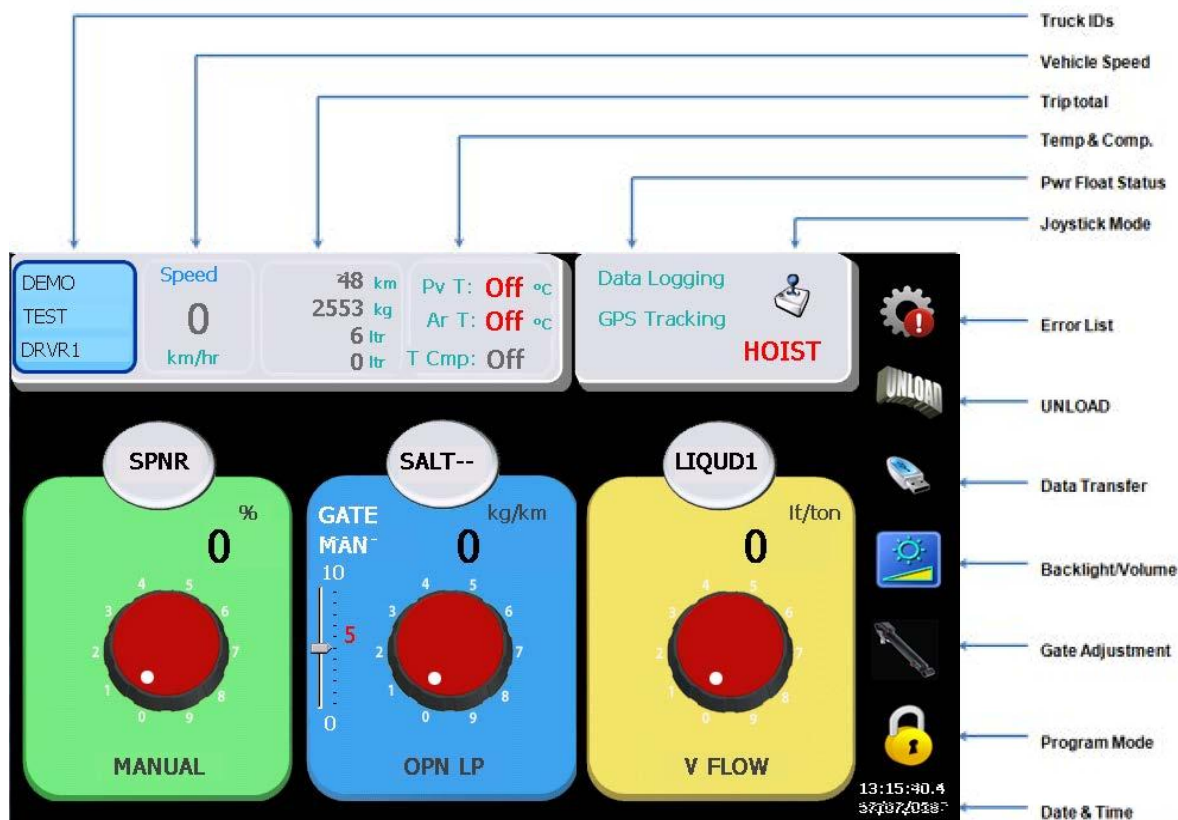
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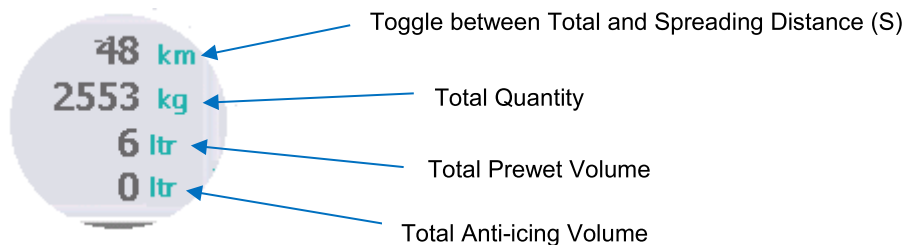
Please check for updates at: [www.boschrexroth.ca/compu-spread](http://www.boschrexroth.ca/compu-spread)

# 1 Operator Screen Layout



SPNR	SALT - -	LIQUID1
Spinner Label	Solid Name	Liquid Name
Spread Width %	Gate Mode/Solid Rate	Liquid Rate
Spinner Setpoint	Gate Position/Conv Set.	Liquid Setpoint
Spinner Mode	Conveyor Mode	Liquid Mode
Pause Button	Blast Button	Reverse Button

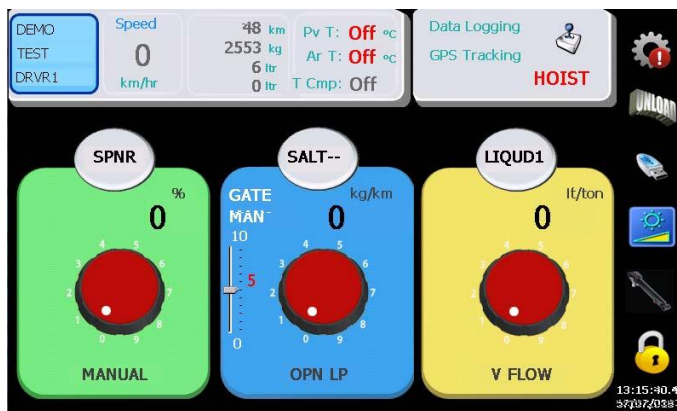
## Trip Summary






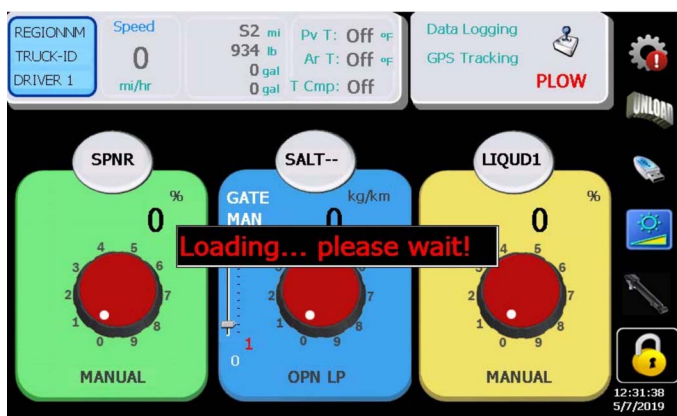
## 2 Programming Mode

All symbols on the right of the screen require a tap and hold for >1 second.

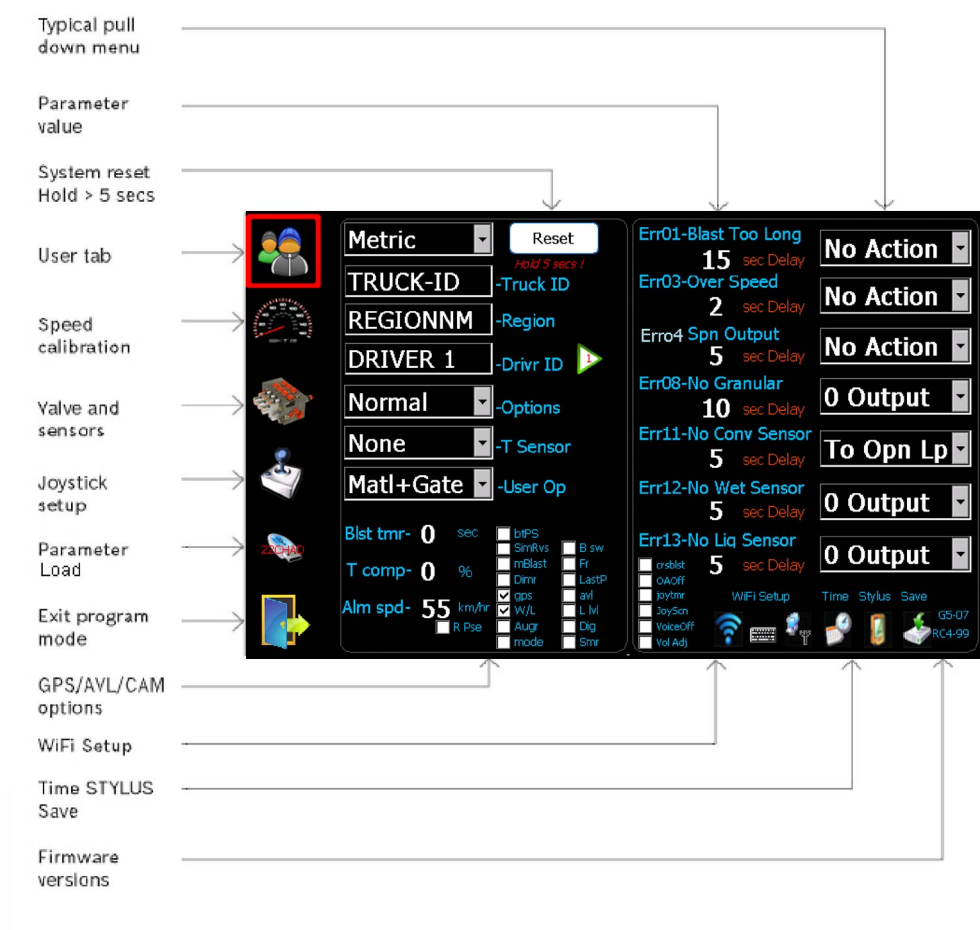


Note: A valid PROGRAMMING USB key must be on the USB port. The PROGRAMMING USB key is for programming (v82 or newer), and the LOG DATA USB key is only for retrieving data.

Press  symbol to enter into programming mode.



### 3 Program Screen Layout

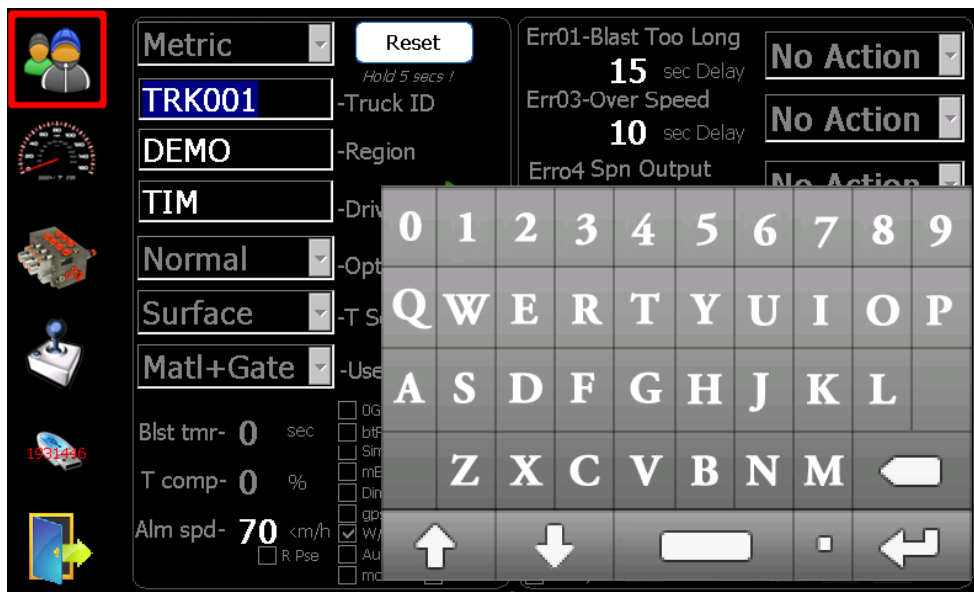


Note: Due to the compact nature of these screens, the use of a selection tool like a stylus is recommended.


## 4 Changing Fields

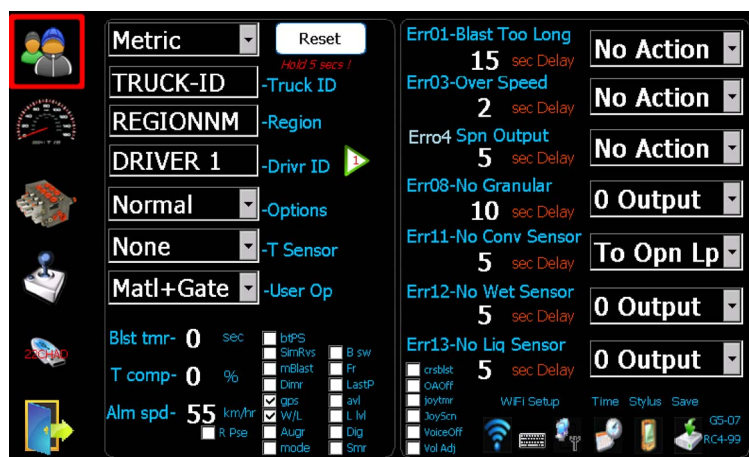
Note: Due to the compact nature of these screens, the use of a selection tool like a stylus is recommended.

When selecting an item without a pull-down selection menu, a keypad is required. This keypad is used to enter text or numeric values. The example shown is "TRUCK-ID".



## 5 Initial Set-up

1. Set the units to imperial (LBS/Mile) or metric (Kg/Km).
2. Set the TRUCK ID.
3. Set the REGION NAME.
4. Set the DRIVER ID (optional), 4 driver IDs allowed.  
*Note: Configuring 4<sup>th</sup> driver ID to 'USER' enables operators to enter user defined driver ID on operator screen.*
5. Set the type of Temperature Sensor (optional).
6. Set the Options – see Advanced Features on page 14 (optional).
7. Set the items that the user has access to (optional).
8. Set Blast Timer, 0-timer disabled (optional). This should be set less than Err01 delay.
9. Set Percentage of Temp. compensation when there is a 3 degree change (optional).
10. Set the vehicle speed alarm (optional).
11. Select AVL or GPS tracking (optional).
12. Set WIFI/TIME/STYLUS (if required). Note:  only applies to changes to **Date/Time/WiFi/Stylus**.



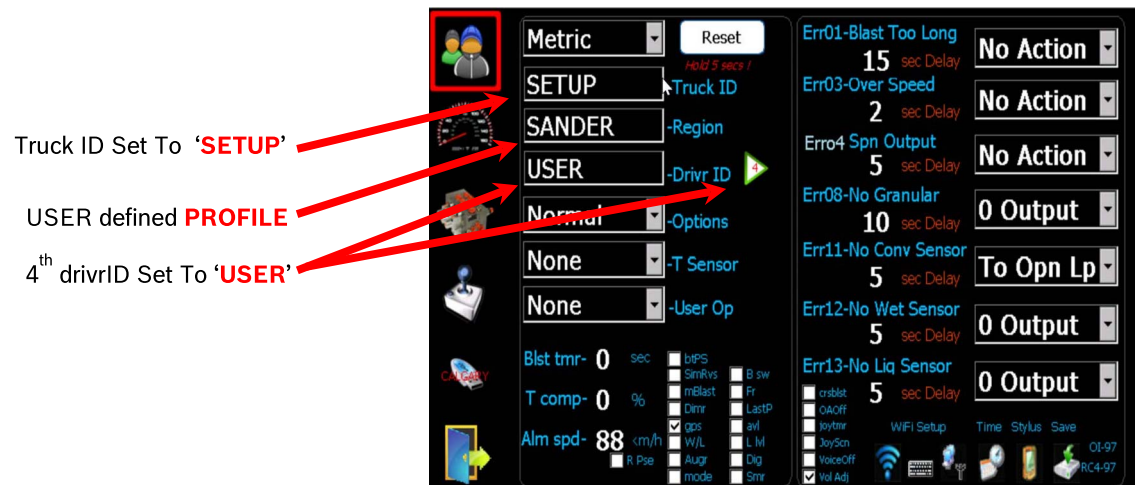
The default error configuration values will work well for most applications, no changes required.

## 6 Selectable Profiles

### 6.1 Set-up

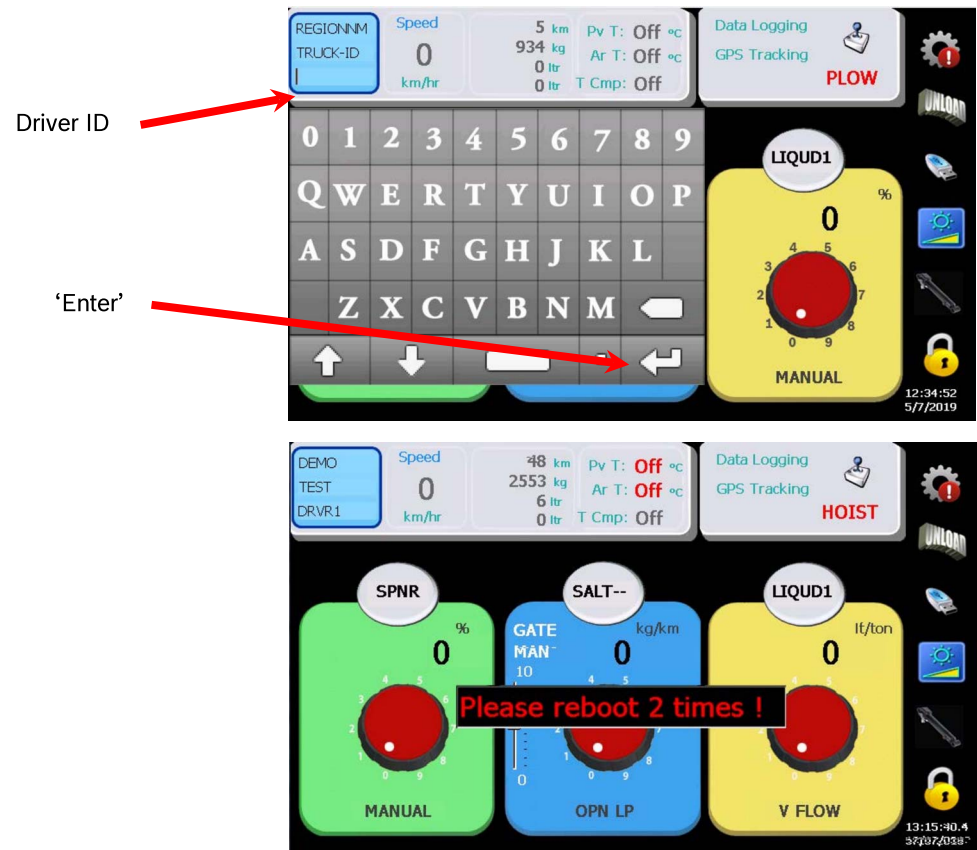
Different profiles for the truck can be set up and saved for later use. Each profile can have a unique name such as 'Sander' with its own settings and calibration. **Warning:** truck must be wired to match different configurations, make sure wired properly before changing.

- 1 Set Truck ID to 'SETUP'
- 2 Enter a name for the profile in Region
- 3 Using the green selector arrow, set the 4<sup>th</sup> Driver ID to 'USER'
- 4 Calibrate the system
- 5 Exit to Operator screen
- 6 Save the profile to USB
- 7 Repeat these steps to set up other profiles
- 8 Change both Truck ID and Region to the desired names that are different from all the user configured profile names




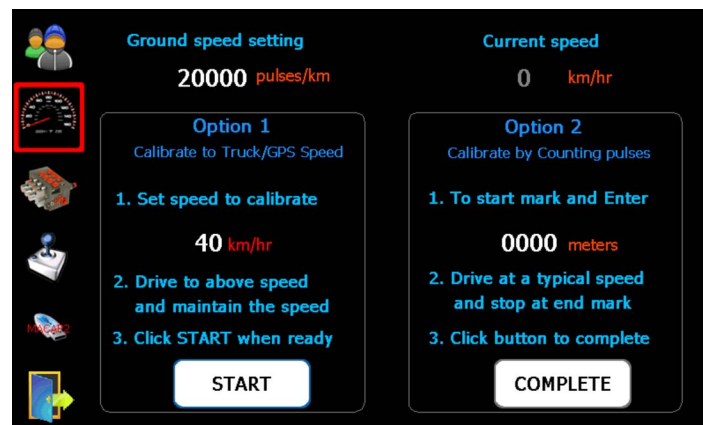
### 6.2 Selecting a profile

- 1 Click on the Driver ID field on the Operator screen, keypad will pop up.
- 2 Enter the name of the profile needed such as 'Sander' or 'Anti Ice'
- 3 Press 'Enter'
- 4 REBOOT SYSTEM TWO TIMES for changes to take effect.

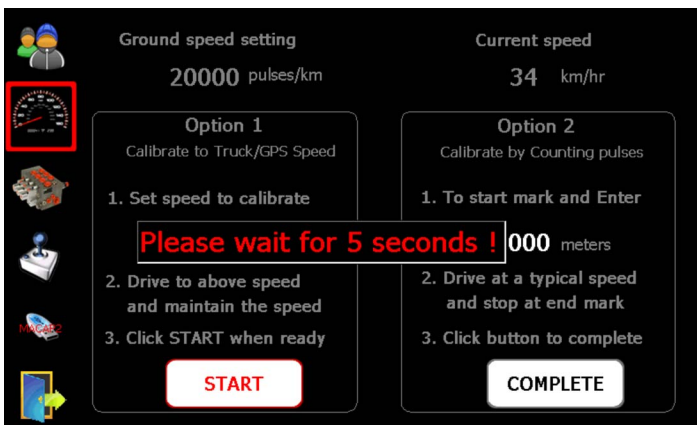


## 7 Ground Speed Calibration

1. Select  symbol to enter into the ground speed calibration screen.
2. Choose which calibration option best suits your situation.
3. Follow the instructions on the screen.




4. Press Start when the vehicle speed is steady. Note: Speed is best calibrated between 20-25 MPH for the best accuracy.



5. Once calibration is complete, verify the speed by driving the vehicle through its speed range and verify if the controller matches the speedometer.

## 8 Valve Nulling – Conv/Spn/Prewet/Norm

1. Select  symbol to enter into the calibration screen.
2. Select the appropriate mode:  
**Spinner** – Auto, PPS, Manual (*default*), Half Lane, One Lane  
**Conveyor/Auger** – Auto, Open LP, Man-Spd, Manual (*default*), SQM  
**Prewet** – Off, Fixed, V-Flow (*default*), Manual, Manual-SPD, Return Oil  
**Gate** – Manual (*default*), Read Back, Auto  
**Norm** (Anti-icing) – Off (*default*), 1 Boom, 3 Boom, Manual %
3. Set correct conveyor sensor pulses/rev if Closed loop is selected.
4. Ensure the hopper is empty, and the truck is safe to operate.
5. Start the engine to achieve adequate oil flow.

If the Auto mode is selected for **Conveyor**, Auto mode for **Spinner**, V-Flow or Return Oil mode for **Prewet**, and 1Boom or 3 Boom is selected for **Norm** (Anti-icing) it is strongly recommended to run **Auto Null**. For manual mode please skip **6.1** and follow **6.2** Manual Nulling instructions.

### 8.1 Auto Nulling

1. Press “Auto Null” to start. This procedure will automatically ramp up output to the selected motor then ramp down again capturing the both “Min” and “Max” speed values

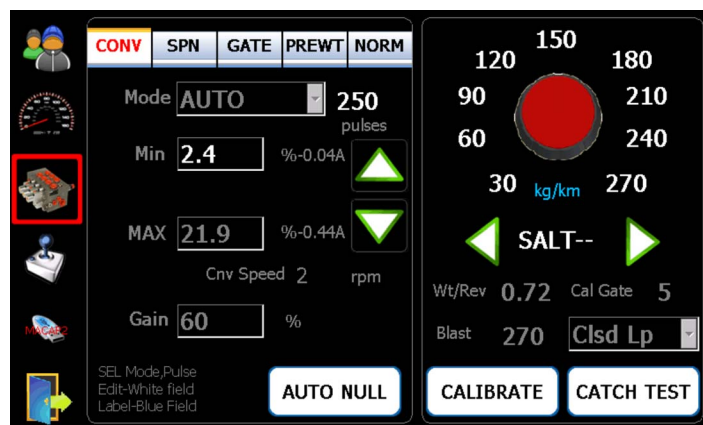
and storing them as a saved calibration. Note: This feature can only be used with motors with speed or flow feedback (i.e. Conveyor/ Auger, Prewet, Anti-icing, etc.).

2. Please check the “Min” null value to verify it is minimum. (Ex. 1,2,3 RPM)



## 8.2 Manual Nulling

1. Press “Min” value field to pop up the UP/DN arrows and enter into edit mode.
2. Use up and down arrows to adjust speed so that the motor just begins to turn
3. Press the “Min” value field again to end the edit mode and accept the value
4. Do the same for “Max” except adjust the motor to a safe maximum speed or until the RRM readout stops to increase.
5. Forward Gain and Blast settings can also be adjusted
6. Repeat this procedure for all the vehicle motors (i.e. Conveyor/Auger, Spinner, Prewet, Anti-icing, etc.).

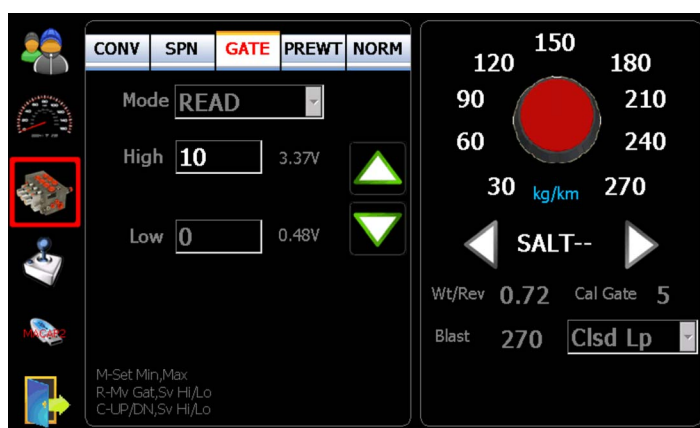




## 9 Gate Calibration

1. Select the Gate tab.
2. Select the appropriate mode of gate operation :
  - Manual** - Enter max height, and no further calibration required.
  - Read back** - Press **High** value field to enter into edit mode
    - Move the gate to its max opening
    - Press **High** value field to end mode and save the value
    - Repeat the same procedure for **Low** value
  - Note:** *A Gate Position Sensor required for Read back.*
  - Auto** - Press **High** value field to enter into edit mode
    - Press Up/Down buttons to move the gate to max opening
    - Press **High** value field to end mode and save the value
    - Repeat the same procedure for **Low** value

*Note: A gate cylinder with a position Sensor required.*



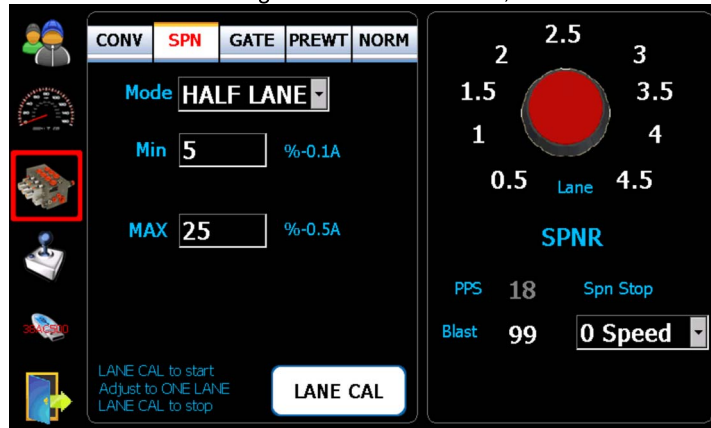
## 10 Lane Calibration

Note: The conveyor and spinner motor sizes and flow rates should be chosen as to limit the number of lanes the system can actually cover before lane calibration takes place.

### 10.1 Half Lane Calibration

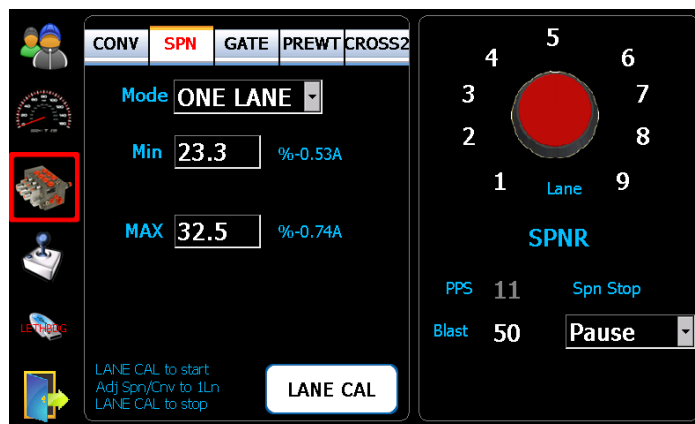
1. Tap on the “valve” symbol and **SPN** tab to enter into spinner calibration.
2. Select “Half Lane” from the Mode dropdown.
3. Press “Lane Cal” Button.
4. Spinner will begin to output, and arrows will appear to allow you to increase/decrease the speed. You may also turn the center knob to activate the conveyor.
5. Use the arrows to set the desired speed to spread material to half a lane width.

6. Press “Lane Cal” again to save calibration, and turn off the conveyor if on.



## 10.2 One Lane Calibration

7. Tap on the “valve” symbol and **SPN** tab to enter into spinner calibration.
8. Select “One Lane” from the Mode dropdown.
9. Press “Lane Cal” Button.
10. Spinner will begin to output, and arrows will appear to allow you to increase/decrease the speed. You may also turn the center knob to activate the conveyor.
11. Use the arrows to set the desired speed to spread material to one lane width.
12. Press “Lane Cal” again to save calibration, and turn off the conveyor if on.

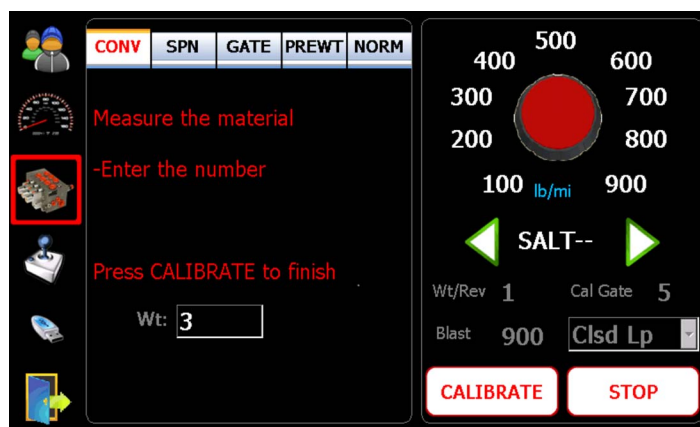
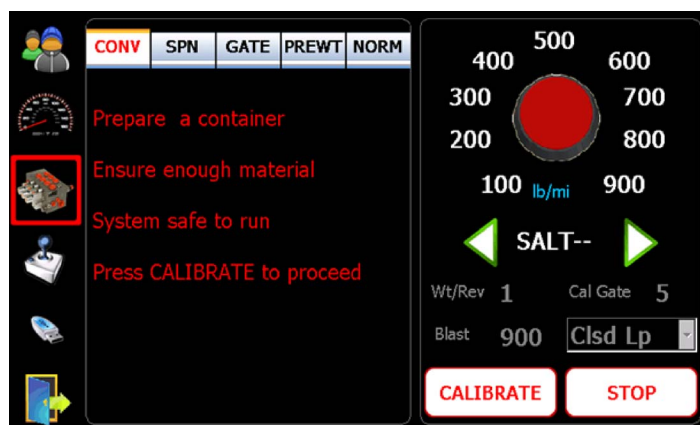


# 11 Material Calibration


## Solid Material Calibration

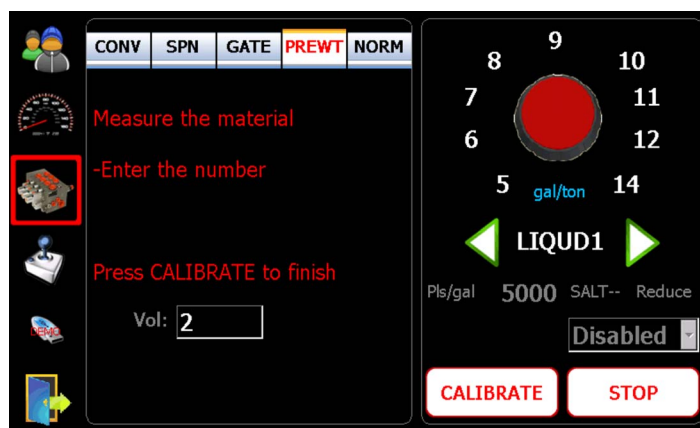
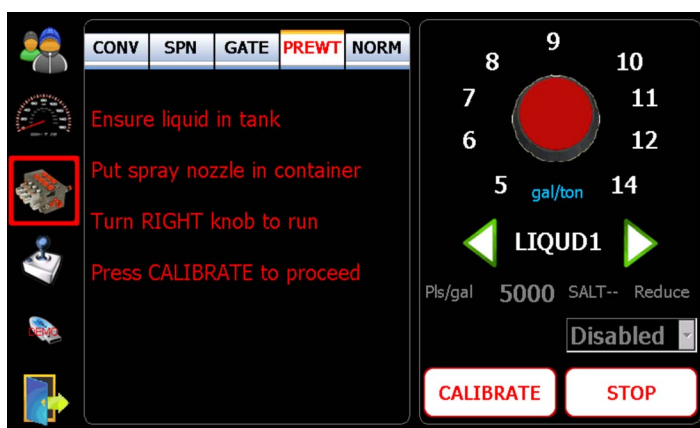
13. Tap on the “valve” symbol and **CONV** tab to enter into solid calibration.
14. Place an adequate catch container under the spreader discharge chute.
15. Make sure that sufficient material in the hopper and the system is safe to run.
16. Set gate position:
  - Manual** - Change CAL Gate to match actual gate position
  - Readback** - Adjust actual gate position on the truck
  - Auto** - Set to a desired gate position for calibration
17. Press “CALIBRATION” button to proceed.
18. Turn CONV Knob and/or SPN Knob to run.
19. Stop when desired amount is reached.
20. Weigh the material and enter the value.
21. Press “CALIBRATION” Button to complete.

Note: Press “STOP” button to stop the process anytime during calibration.




### Liquid Material Calibration (Prewet or Anti-icing)

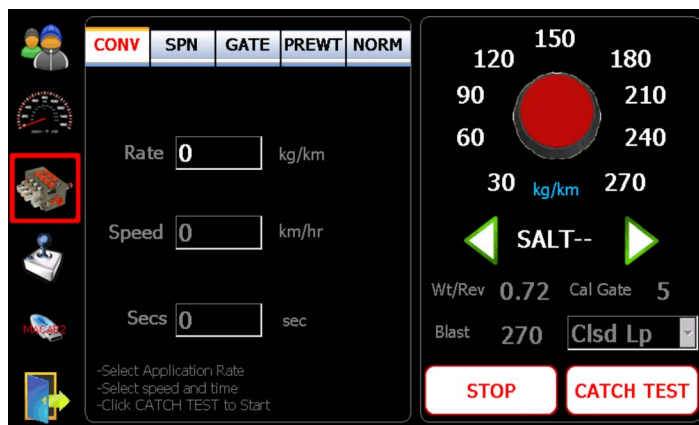
1. Tap on  symbol and **PREWET/NORM** tab to enter into liquid calibration.
2. Place an adequate catch container under the liquid spray nozzle.
3. Make sure that sufficient liquid in the tank and the system is safe to run.
4. Press “CALIBRATION” button to proceed.
5. Turn PREWET Knob to run.
6. Stop when desired amount is reached.
7. Measure the liquid volume and enter the value.
8. Press “CALIBRATION” Button to complete.



## 12 Material Catch Test

1. Tap on  symbol to enter into the material calibration screen.
2. Place an adequate catch container under the spreader discharge chute.
3. Press “CATCH TEST” button to start, and enter the desired rate, speed and duration (seconds) using on-screen keypad.
4. Press “CATCH TEST” button to begin material dispensing (hydraulics must be active).
5. When dispensing is stopped, weigh the material and enter the value.
6. Press “CATCH TEST” button again to end.
7. A wt/rev will be calculated and displayed on the bottom right of the screen.
8. Repeat this procedure for all solid materials (use the green left and right arrows to select material types).
9. Rates can be adjusted by tapping the rate and editing the value with the keypad.
10. These same procedures apply to pre-wet and liquid. Note: Granular spread rate is defaulted to 2000 lbs/Mile.


Note: The material names can be changed by tapping on the text “SALT - -” and using the keypad to edit.

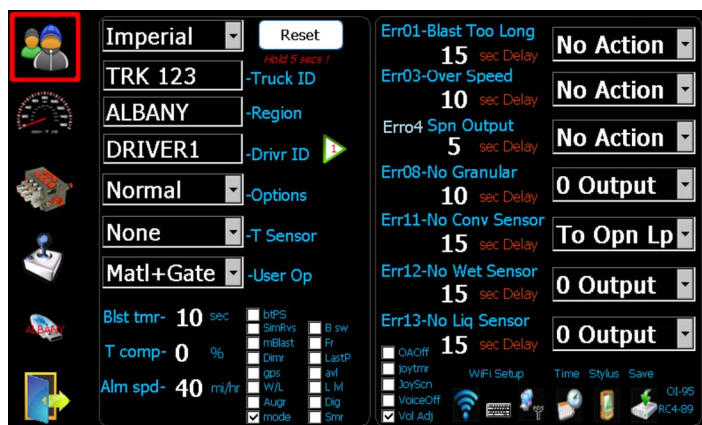


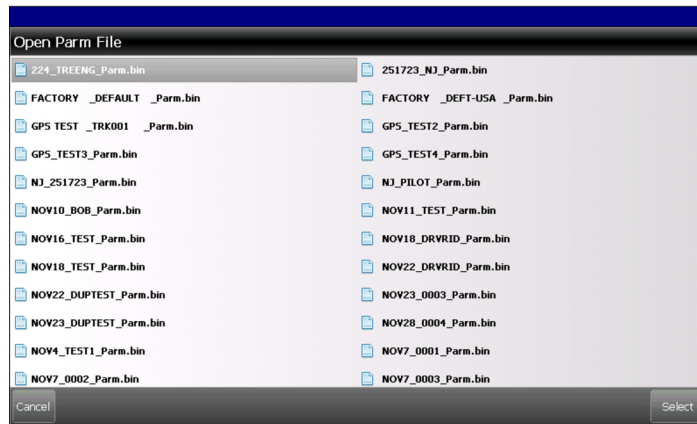


## 13 Load Parameters

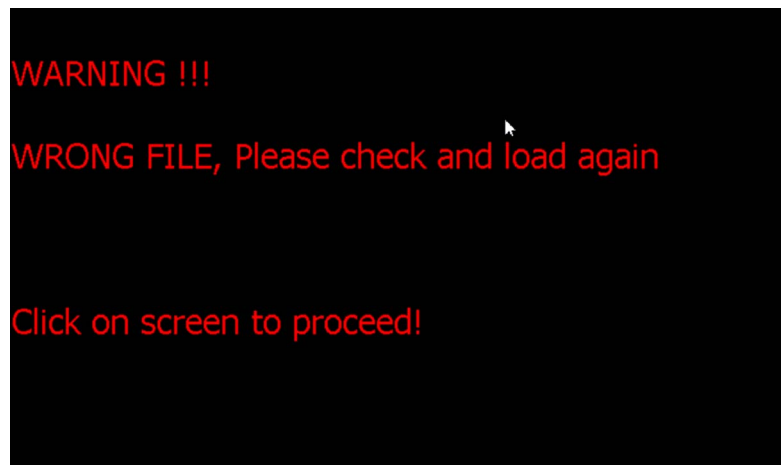
The operation requires an USB PROGRAM key. It allows end users to load parameters from an existing file on the USB stick.

1. Ensure an USB PROGRAM key inserted
2. Tap on  USB symbol.
3. Select a file to load from the popup file window.
4. Click on the "Select" or "Cancel" button to select or cancel.  
Then the popup file window would close, and red "Load" text shows up on the USB symbol if a file is selected.
5. Tap on the Door Symbol to exit to the operation mode.
6. Turn the unit off, and on again for the new parameter to take effect.

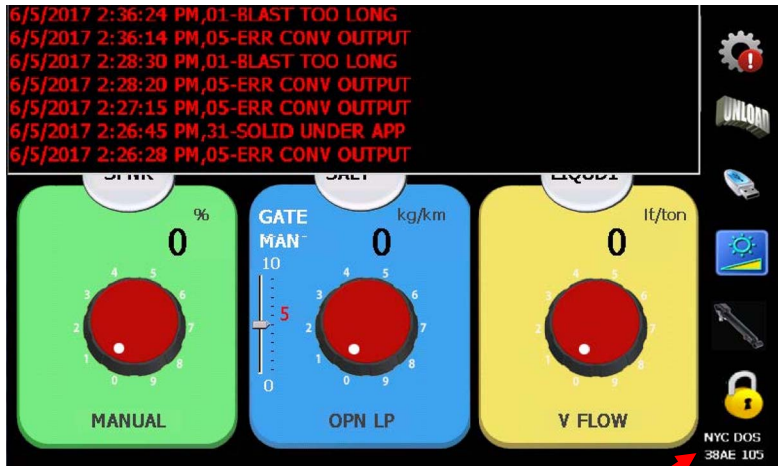




If a wrong file is selected (550 standard, 550 lite) an error message will pop up.




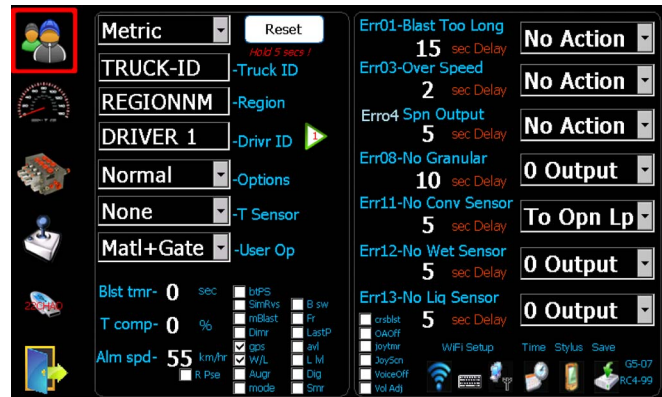
To check the parameter file loaded by clicking on the 'gear' icon when the truck is stationary.



Parameter file name loaded previously

## 14 Advanced Features

Tap on  symbol to enter into the user calibration screen. This series of drop-down menus allow the adjustment of special features of the 550 system.



System Reset – Press and hold the Reset button for 5 seconds.

**WARNING: All parameters except WiFi/Stylus will be reset to factory defaults.**

**Temperature Sensors** – Roadwatch, Surface Patrol, High Sierra

**System Options** – Normal, Pattern, Air Gate, Liquid+, Cross Conv, Spinner Reverse, Conveyor Reverse

**User Options** – MATERIAL and or GATE (operators allowed to adjust without a programming key).

**Blast Timer** – Blast turns off automatically when time out



**Speed alarm** – alarm will sound when the set speed is exceeded.

**Temp Comp** – Temp compensation, per three degree change

### **Check Marks:**

**btPS** – Set spreader to PAUSE mode at power up

**SimRvs** – Enable simulated anti-icing in 'Spinner Reverse' mode

**mBlast** – Option to set Blast to momentary action

**Dimr** – Screen auto dimmer

**GPS/AVL** – GPS tracking, require a serial cable (R987376776) and a GPS receiver Puck (R987380745), or AVL interface.

**W/L** – Prewet and Anti-icing operation interlock with an asymmetrical valve

**Auger** – Once checked the gate change is disabled

**mode** – Allow operators to change modes without using a PROGRAM key

**B sw** – Enable external boom switches (**AUX pin3-R, pin4-C, pin5-L**)

**Fr** – French version

**LastP** – Remember the last knob positions at power up.

**L lvl** – Use MAT change input as liquid level detection.

**Dig** – Disable remote Pause/Blast, and use them as digital inputs

**smr** – summer mode, allow operators to change all functions to MANUAL modes without using a PROGRAM key

**crsblst** - Enables the cross conveyor to blast with the main conveyor

**OAOff** – Disable Over Application Error Messages

**joytmr** – Enable joystick blast timer

**JoyScn** – Operator screen defaults to joystick screen.

**VoiceOff** – Turn off voice readout for spreader functions.

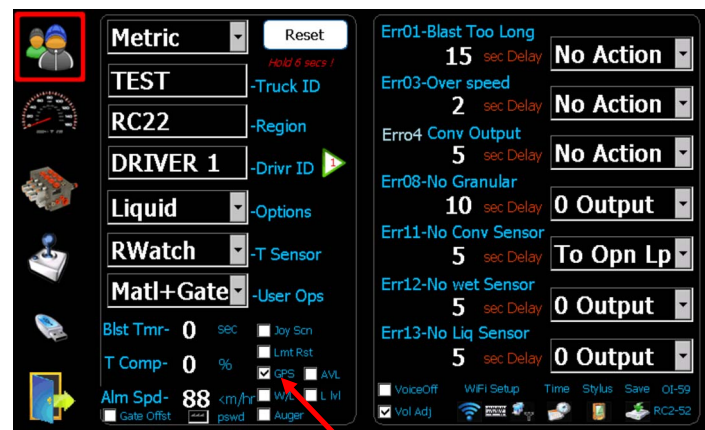
**VolAdj** – Allow operators to adjust volume without programming key

**R Pse** - Disables the pause button on the Operator screen

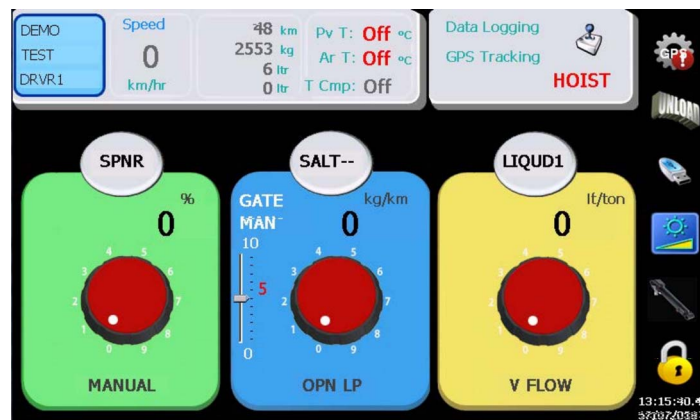
## 15 GPS Options and WiFi Data Transfer

### 15.1 GPS – Passive GPS Tracking



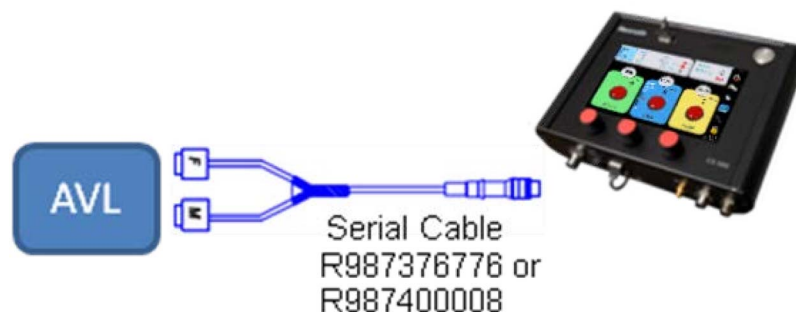


GPS tracking

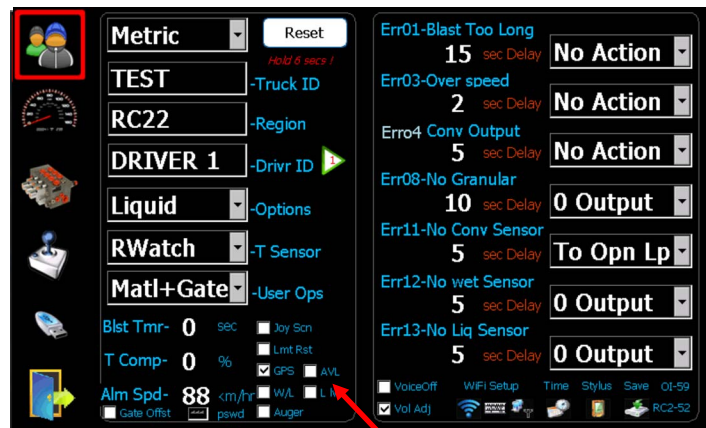


'GPS' displayed if Satellites are locked

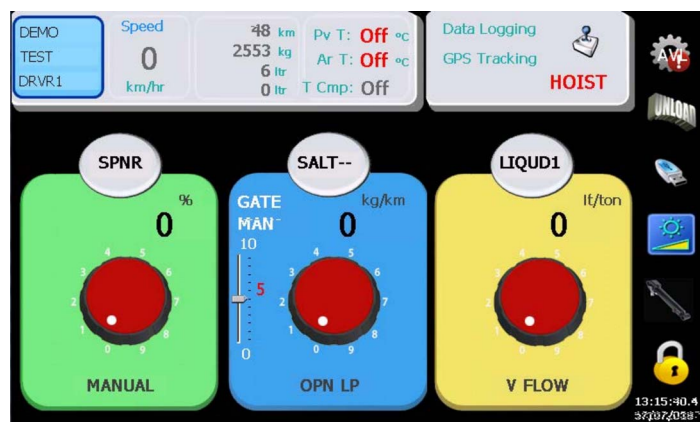
## 15.2 AVL – Active Vehicle Locating Interface



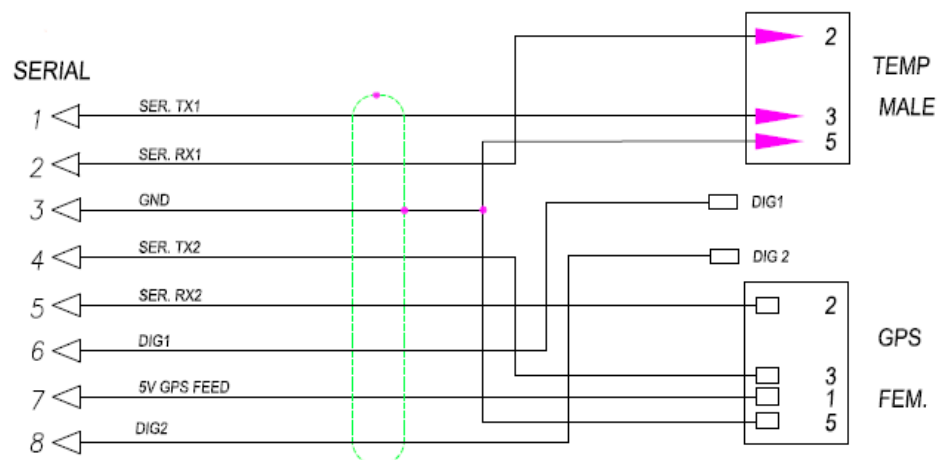
Note: AVL vendor needs to decide which cable to use



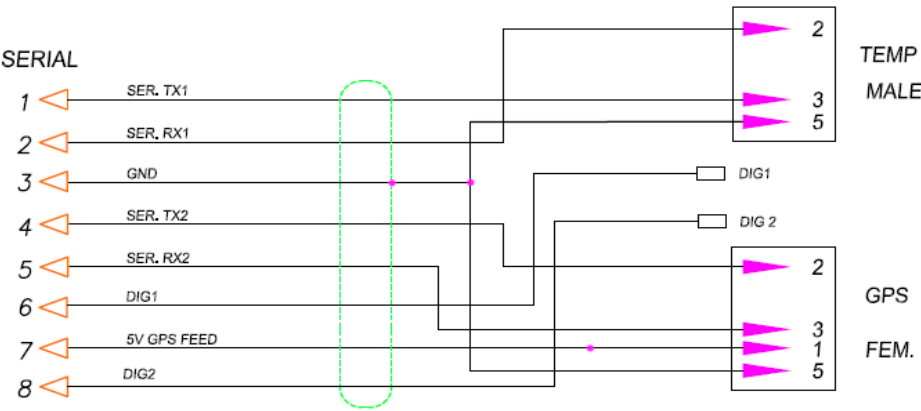
AVL Interface



'AVL' displayed if the interface is OK.



**Serial cable PN: R987376776**




**Serial cable PN: R987400008**

### 15.3 550 WiFi Setup

If equipped with WiFi option make sure an internal or external antenna is connected before setting it up. Similar to standard PC there are two parts that need to be set up, Wireless Connection and Network Settings.



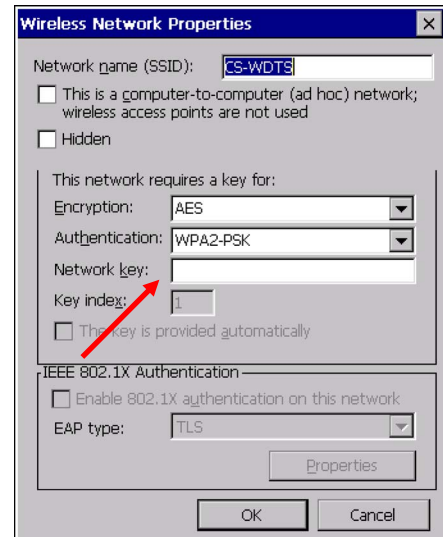
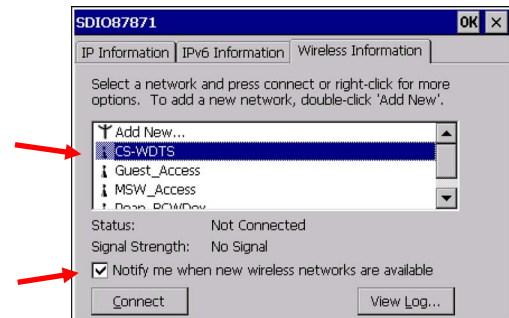
When the WiFi network  icon is pressed, the following window will pop up:

The WiFi setup is almost identical to standard Windows:

- Select the Wireless Information tab at the top
- Uncheck 'Notify me...' to stop this window from popping up every time the system starts up.
- Select the network you wish to use
- Click on 'Connect'
- Enter 'network key'

**Note:** Only one preferred network can be stored at a time, or this will cause a conflict. If a preferred network already exists, please ensure you have firmware version 6 or higher installed and do the following:

- Close the Wifi setup dialogs shown on the right so you are back to the setup screen.
- Press and hold the WiFi network icon for 5 seconds, and this will clear any preferred networks.
- Now you can perform the WiFi setup.



When the 'IP Address/Name Server' icon is pressed the Following window will open up:



icon is pressed the Following window



GSPI86861(WiFi Setup), click this icon ONLY to configure IP Address and name servers if it is required.

SDIO87872(Future connection, **NOT USED**)

AX88772B1(Ethernet, **NOT USED**)

For each 550i controller a unique static IP address needs to be assigned, record all the IP addresses for setting up in the WiFi Desktop Program.

**'Marvell SDIO8787 Wireless Card' Settings** [OK] [X]

IP Address | Name Servers

An IP address can be automatically assigned to this computer. If your network does not automatically assign IP addresses, ask your network administrator for an address, and then type it in the space provided.

☐ Obtain an IP address via DHCP  
☒ Specify an IP address

IP Address: 192.168.2.201  
 Subnet Mask: 255.255.255.0  
 Default Gateway: 192.168.2.254


To connect the controllers to a DNS/WINS network, click on the Name Servers tab and input values. (consult to IT department for correct settings)

**'Marvell SDIO8787 Wireless Card' Settings** [OK] [X]

IP Address | Name Servers

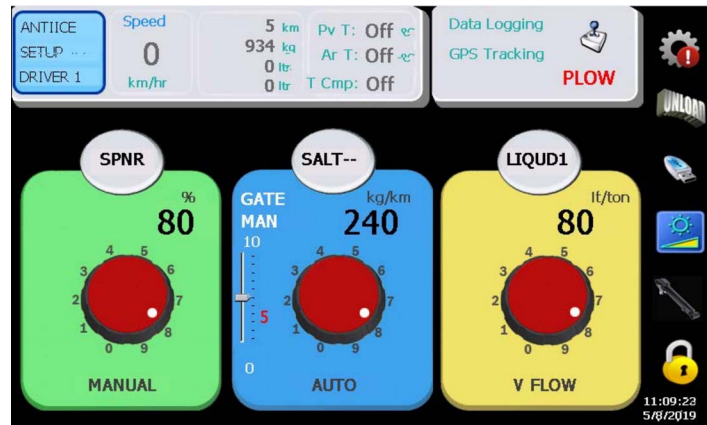
Name server addresses may be automatically assigned if DHCP is enabled on this adapter. You can specify additional WINS or DNS resolvers in the space provided.

Primary DNS: . . .  
 Secondary DNS: . . .  
 Primary WINS: . . .  
 Secondary WINS: . . .

**Note:** Any changes to **WiFi/ Network settings/ Time/Stylus** recalibration need to be saved by clicking the  save icon on the bottom of the screen.

If multiple preferred networks were configured by accident, pressing save will delete all set up networks and a dialog will pop up stating they were deleted. You will have to reconfigure the Wifi network settings.

**Note:** Since WiFi Transfer loads all parameter and log files it is necessary to remove all unused data files. Here are two steps:



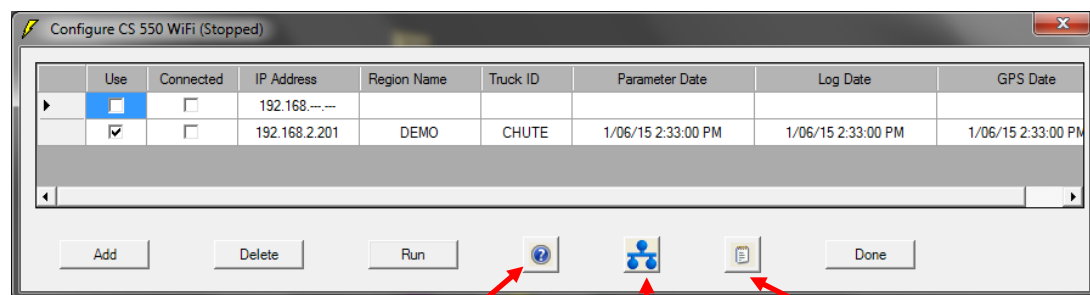
A PROGRAM key is required for this operation

-Adjust 3 knobs to position 8

-Press&Hold USB icon for 20 seconds

## 15.4 550 WiFi Data Transfer Program

When the 550 Desktop software is installed an icon is created on the desktop for the WiFi Program.



Version No  
Simple Instruction

IP configuration  
Of the computer

Display  
Cs550WiFi.log

- Add the IP addresses of all the 550 controllers to the list
- Check/Uncheck 'Use' to enable/Disable any individual 550 controller connection
- Click on 'Run' to start up the program (the program continuously searching 550 controllers within the WiFi coverage, connecting, and downloading both parameter and log data as well as GPS data if the GPS tracking option is selected).

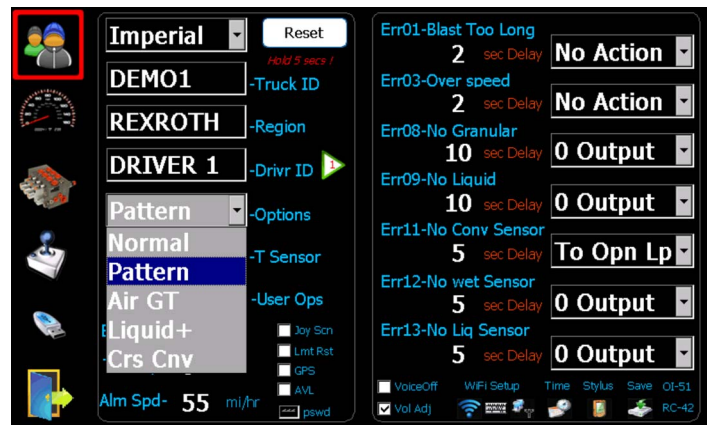
- Click on 'Done' to minimize the WiFi Desktop program.

## 16 Optional Modes and Operation

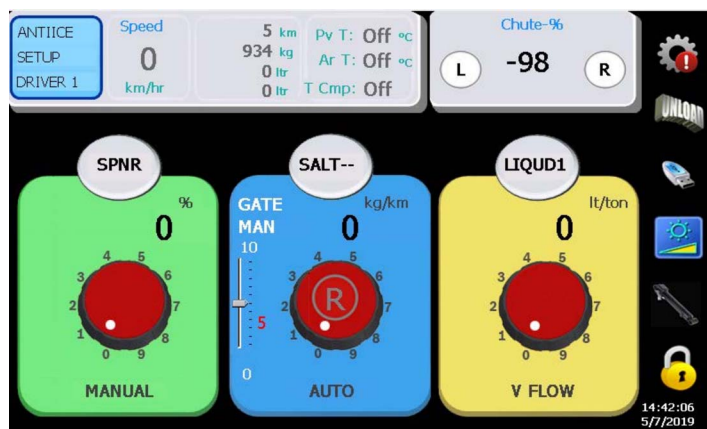
### 16.1 Pattern Mode - Chute Control

This mode requires a hydraulic valve and a hydraulic cylinder. It controls the direction of a chute by moving the chute LEFT or RIGHT on the operator screen.

1. Select the **Pattern** mode under "Options" menu from USER screen.



2. Click 'L' and 'R' buttons on operator screen to move chute to the Middle position
3. Click on the value of 'Chute-%' to record the position with an USB PROGRAM key





## 16.2 Air Gate Mode

This mode allows a two position gate control with an air cylinder for two different materials, like SAND and SALT. It provides a digital output signal (0, 12V) to toggle between two materials and two calibrated gate positions. When gate position changes the 550 controller also automatically set the gate position to the correct calibrated gate position for the material.

1. Select the **Air Gate** mode under “Options” menu from USER screen.
2. Click buttons on operator screen to turn on/off Air Gate.

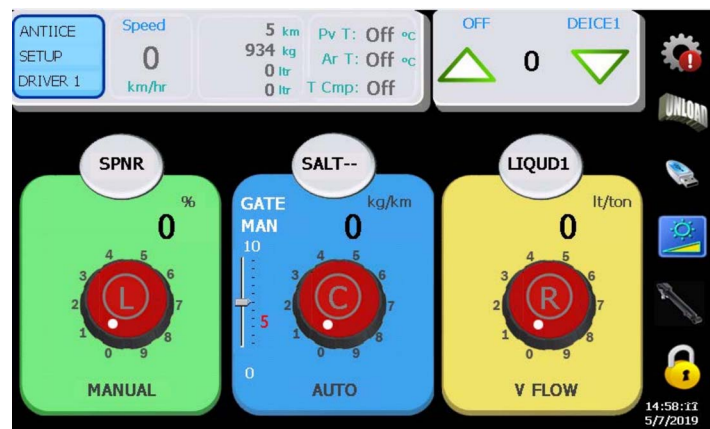
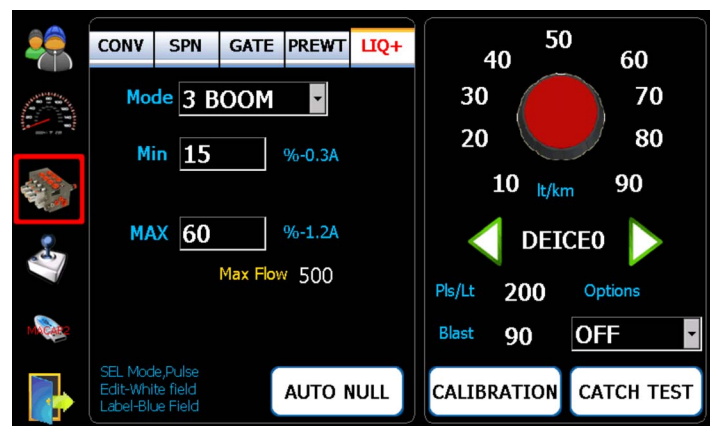
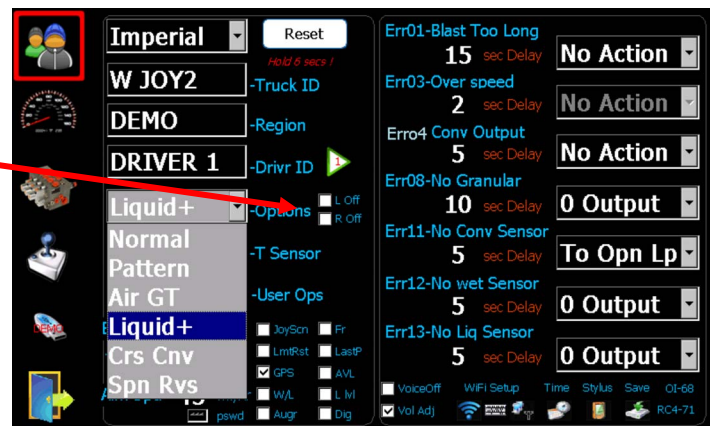


## 16.3 Liquid+ Mode (Solid+Prewet+3 Boom Anti-ice)

This mode allows a 550 controller to run both Solid, Prewet and Anti-icing operations simultaneously on a single screen.

1. Select the Liquid+ under “**Options**” menu from the screen.
2. Click on Valve icon and then click on **LIQ+** tab, and select “3 BOOM”.
3. Set the min and max value as defined in the valve nulling procedure (on page 8).
4. Calibrate all Prewet and Anti-icing materials to be used.
5. Click **L, C, R** buttons on operator screen to turn on/off each boom.

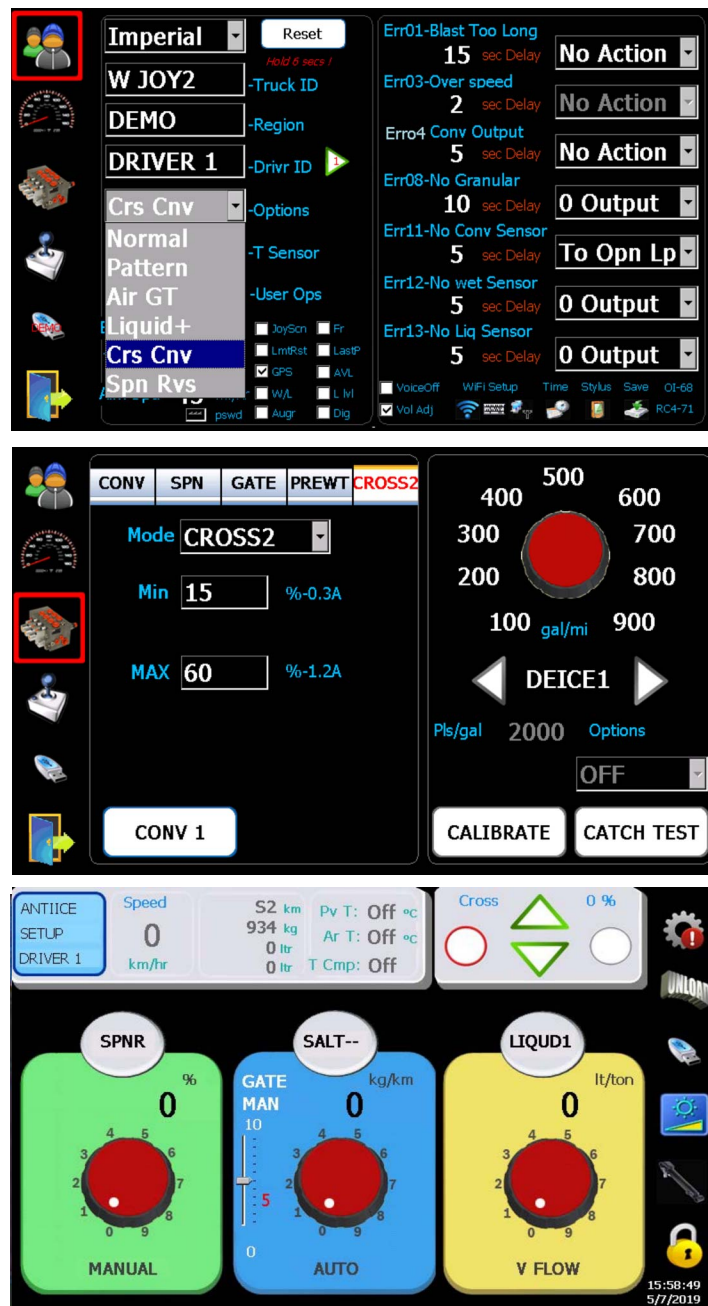
Option to  
disable Left  
or Right  
boom



## 16.4 Cross Conveyor

This mode provides two proportional outputs to manually control a Left and a Right cross conveyor.

1. Select the **Crs Conv** under “Options” menu from the USER screen.
2. Click on Valve icon and then click on **CROSS2** tab.
3. Set the min and max values as defined in the valve nulling procedure (page 8).
4. Click ‘CONV1’ to toggle to ‘CONV2’, and repeat the step 3



## 16.5 Spinner Reverse Mode

This mode allows end users to control a Spinner in either forward or reverse direction by providing two proportional spinner outputs. With RC firmware version 98 and lower. The operator can press the **R** button on screen to reverse the spinner direction. The controller ramps down from the current direction and ramps up to the opposite direction.

**Note:** As of RC firmware version 99 and higher, reverse is triggered by an external switch and not by tapping on screen. Also with this version, output G12 from the controller is ON when system is Paused, and OFF when not paused.

1. Select the **Spn Rvs** under “Options” menu from the USER screen.
2. System assumes the same Min&Max for Spinner reverse output
3. Click ‘R’ button to select spinner forward or reverse operation



## 16.6 Spinner & Conveyor Reverse Mode

This mode allows end users to control both a Spinner and a conveyor in either forward or reverse direction by providing dual proportional outputs for each of them. When pressing

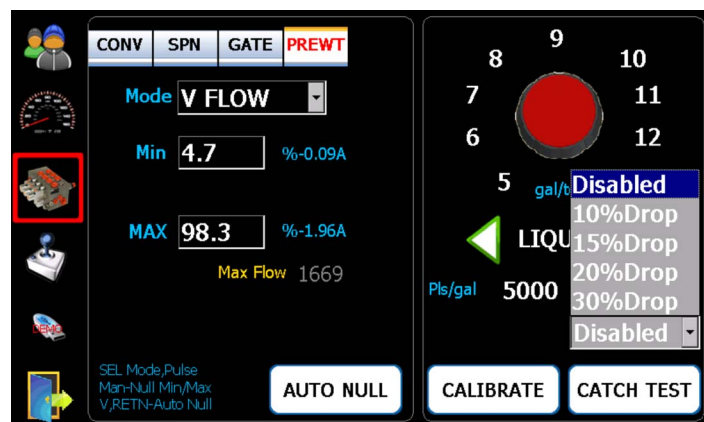
the **R** button to reverse the spinner or conveyor direction the controller ramps down from the current direction and ramps up to the opposite direction.



## 16.7 Solid Reduction for Pre-wet

This feature helps to save salt usage when prewet is turned on. End users are able to define a percentage of salt rate reduction in material configuration.

Select the **Prewet** tab, and click on the reduction pull-down menu

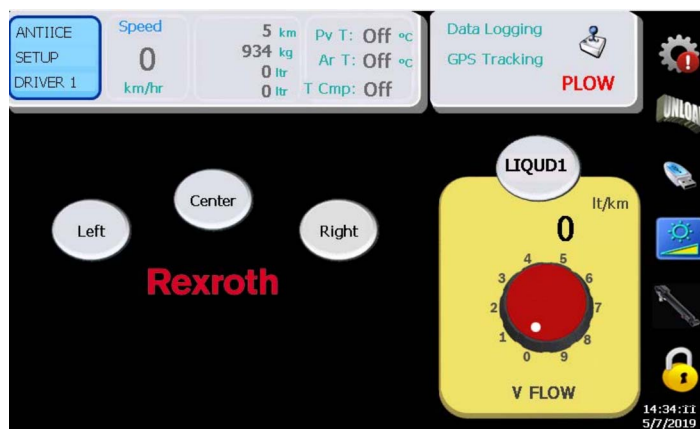
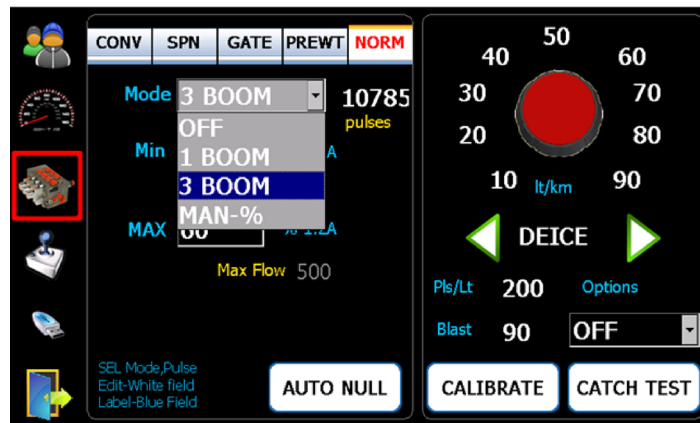
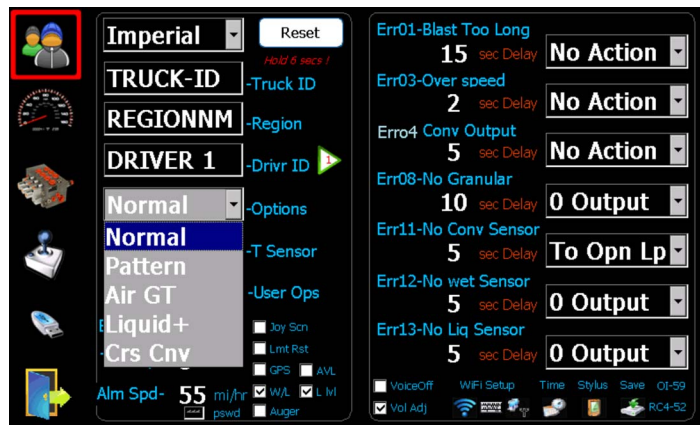




## 16.8 Dedicated 3 Boom Anti-ice

This mode sets a 550 controller to dedicated Anti-ice controller. When this mode is selected/saved the controller needs to be turned off, and turned back on to initialize.

1. Select **Norm** under the “Options” menu from the USER screen.
2. Click on Valve icon and then click on **NORM** icon, and select “3 BOOM”.



## 17 Optional Modes & Operation– 550Lite

The 550 Lite is a cost effective version of standard 550. It supports the following optional functions:

**Liquid** – Anti-icing

**Reverse** – Same as the standard 550 Reverse function

**GS12V** – Enable a ground speed triggered digital output for custom use

**Air Gate** – Same as standard 550, see 13.2 on page 21

**Spn Rvs** – Same as standard 550, see 13.5 on page 25

Only one of the above functions can be configured for the system.

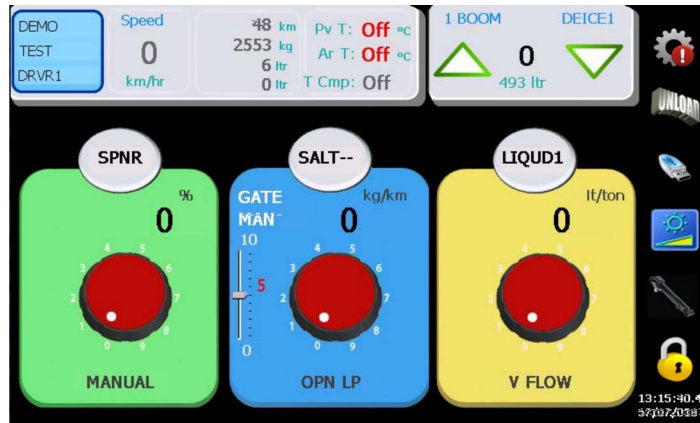
### 17.1 Liquid – 1 Boom Anti-icing

This mode allows Conveyor, Spinner, Prewet and Anti-icing to run simultaneously.

1. Select the **Liquid** mode under “Options” menu.
2. Click on Valve icon and then click on **NORM** icon, and select “3 BOOM”.



3. Press Up and Down buttons on operator screen to adjust Anti-icing rates



Same as the standard 550, see 13.8.

## 17.2 Liquid – Dedicated 3 Boom Anti-icing

Same as the standard 550, see 13.8.

# 18 Error Codes

The following error messages are user configurable, both timeouts and controller actions.

Error Description	#	Suggested Solution
ERROR_BLAST_TOO_LONG	1	Turn off blast/time too short
ERROR_DEICE_BLST_TOO_LONG	2	Turn off blast/time too short
ERROR_OVERSPEED	3	Slow down or raise gate
ERROR_SPIN_PROP	4	Check cables, replace coil
ERROR_CONV_PROP	5	Check cables, replace coil
ERROR_CROSS1_PROP	6	Check cables, replace coil
ERROR_CROSS2_PROP	7	Check cables, replace coil
ERROR_NO_MATL_DETECT	8	Load material, check sensor
ERROR_NO_LIQ_DETECT	9	Load material, check sensor



ERROR_NO_GROUNDSPEED	10	Check cable/sensor
ERROR_NO_CONVEYOR	11	Check cable/sensor
ERROR_NO_LIQUID	12	Check cable/sensor
ERROR_NO_DEICE	13	Check cable/sensor

The following Errors are warning messages, and not user configurable.

**Error 20** - Output Non-Zero. This is a safety function to prevent the controller from accidentally sending an unexpected output when the controller is turned on, or when the user leaves programming mode and enters normal operation mode. The outputs will be kept at zero until the error condition is removed. To recover, set the application rates to zero or exit Blast mode.

**Error 22** - BB3 System Error. This is an unrecoverable error in the RC controller. Try rebooting the controller to see if it goes away, otherwise report the failure to Bosch Rexroth. This error can also occur if an attempt is made to run a joystick without having an RCE controller present.

**Error 23** - This is a communication failure between the RC controller and the display. It will show up in the logging history in the RC controller after the display is re-connected.

**Error 24** - RCE communication failure. This is a communication failure between the RC controller and the RCE controller in a system with a joystick. It will automatically shut down the joysticks. The status of this communication can also be monitored using the display item called DIG which is available by double-tapping on the gear icon while in normal operation mode. The item called DIG at the bottom right corner of the display should normally be zero. It will be E0 if this error occurs.

**Error 25** - Joystick 1 communication failure. This will shut down the joystick outputs, and will show up as a 40 in the live DIG display item.

**Error 26** - Joystick 2 communication failure. This will shut down the joystick outputs, and will show up as a 80 in the live DIG display item.

**Error 27** - No Gate Sensor. Gate sensor failure, most likely caused by cable break. This will force the gate control into Manual.

**Error 28** - Gate Position is Zero. This will occur only if the gate position is zero while in gate read-back mode. The conveyor will not be allowed to move until this is fixed.

**Error 29** - No Ground Speed Simulation. This is just an information message to indicate that ground speed simulation mode has been stopped.

**Error 30** - Under-Application: Spinner. The spinner cannot meet the desired RPM setpoint. This should not happen in manual mode, but could happen if the spinner is in PPS mode and the ground speed is high.

**Error 31** - Under-Application: Conveyor. The conveyor cannot meet the desired RPM setpoint. Caused by too high application rate or too high ground speed or incorrect calibration.

**Error 32** - Under-Application: Pre-Wet. The pre-wet pump cannot meet the desired flow setpoint. Caused by too high application rate or too high ground speed or incorrect calibration.

**Error 33** - Under-Application: Anti-Ice. The anti-ice pump cannot meet the desired flow setpoint. Caused by too high application rate or too high ground speed or incorrect calibration.

**Error 37** - Calibration: Ground-Speed Pulses Too Low. Calculated pulses per km is too low during calibration. Possibly caused by no sensor feedback, or try recalibrating the ground speed sensor.

**Error 38** - Spinner Maximum RPM Too Low. During auto nulling, the calculated maximum RPM was too low, most likely caused by no sensor feedback.

**Error 39** - Conveyor Maximum RPM Too Low. During auto nulling, the calculated maximum RPM was too low, most likely caused by no sensor feedback.

**Error 40** - Pre-Wet Maximum Hz Too Low. During auto nulling, the calculated maximum Hz was too low, most likely caused by no sensor feedback.

**Error 41** - Anti-Ice Maximum Hz Too Low. During auto nulling, the calculated maximum Hz was too low, most likely caused by no sensor feedback.

**Error 42** - Wrong Spinner Control Mode. An attempt was made to perform auto nulling of a spinner while it was in manual.

**Error 43** - Wrong Conveyor Control Mode. Not Used.

**Error 44** - Wrong Pre-Wet Control Mode. An attempt was made to perform auto nulling, or volume calibration, of a pre-wet pump while it was in manual.

**Error 45** - Wrong Anti-Ice Control Mode. An attempt was made to perform auto nulling, or volume calibration, of an anti-ice pump while it was in manual. This error could also be caused by an I/O conflict between a cross conveyor mode and the anti-ice pump output, in which case the anti-ice pump will be disabled.

**Error 46** - Wrong Cross-Conveyor Mode. An attempt was made to go into Reverse while this output was being used by a cross-conveyor mode. The Reverse command will be ignored in this case. Could also be caused by attempting to use gm/sq.m. mode while there was an I/O conflict with a Cross-Conveyor CA mode, in this case gm/sq.m. mode will not be allowed. Could also be caused by attempting to use closed-loop gate control while in Cross-Conveyor US mode or Liquid-Plus mode, in which case the gate control will be forced into gate readback mode.

**Error 47** - Wt. per Revolution Too Low. During conveyor weight calibration, the calculated weight per revolution was too low, most likely caused by typing in zero for the weight.

**Error 48** - Wt. per Revolution Too High. During conveyor weight calibration, the calculated weight per revolution was too high, most likely caused by no conveyor sensor feedback.

**Error 49** - Pre-Wet Pulses per Gallon Too Low. During calibration of pre-wet volume output, the pulses/gal was too low, most likely caused by no flow sensor feedback.

**Error 50** - Pre-Wet Pulses per Gallon Too Hi. During calibration of pre-wet volume output, the pulses/gal was too high, most likely caused by typing in zero for the volume.

**Error 51** - Anti-Ice Pulses per Gallon Too Low. During calibration of anti-ice volume output, the pulses/gal was too low, most likely caused by no flow sensor feedback.

**Error 52** - Anti-Ice Pulses per Gallon Too Hi. During calibration of anti-ice volume output, the pulses/gal was too high, most likely caused by typing in zero for the volume.

**Error 53** - Spinner mm at zero RPM too Low. During calibration of the relationship between spinner RPM and spinner spread width, a value of 0 mm at zero RPM was used.

**Error 54** - Spinner mm per RPM too Low. During calibration of the relationship between spinner RPM and spinner spread width, a value of maximum spread width was used that was less than the mm at zero RPM.

**Error 55** - Gate Movement Too Low. During calibration of gate maximum and minimum position, the difference between minimum and maximum height was less than 1 inch.

**Error 57** - Gate at Calibration Too Low. While calibrating the weight per revolution for a specific material, the gate position at calibration was specified to be zero.

**Error 58** - Spinner PPR Too Low. A value of zero was used for spinner pulses per revolution.

**Error 59** - Conveyor PPR Too Low. A value of zero was used for conveyor pulses per revolution.

**Error 60** - Spinner Output Range Too Low. The difference between maximum and minimum spinner nulling values was less than 5%.

**Error 61** - Conveyor Output Range Too Low. The difference between maximum and minimum conveyor nulling values was less than 5%.

**Error 62** - Cross Conveyor 1 Output Range Too Low. The difference between maximum and minimum cross conveyor nulling values was less than 5%.

**Error 63** - Cross Conveyor 2 Output Range Too Low. The difference between maximum and minimum cross conveyor nulling values was less than 5%.

**Error 64** - Pre-Wet Output Range Too Low. The difference between maximum and minimum pre-wet nulling values was less than 5%.

**Error 65** - Anti-Ice Output Range Too Low. The difference between maximum and minimum anti-ice nulling values was less than 5%.

**Error 66** - Joystick 1 Output Range Too Low. The difference between maximum and minimum joystick nulling values for one of the six outputs was less than 5%.

**Error 67** - Joystick 2 Output Range Too Low. The difference between maximum and minimum joystick nulling values for one of the six outputs was less than 5%.


**Error 68** - Theoretical Maximum Conveyor RPM Too High. Based on the specified application rate setpoints, and the maximum ground speed, the maximum theoretical conveyor RPM required has been calculated to be more than twice the actual conveyor capacity, which will lead to serious under-application problems. The actual controller RPM setpoint will be clamped at this value to prevent the controller from becoming unstable, and the conveyor should be re-calibrated to determine the source of the problem.

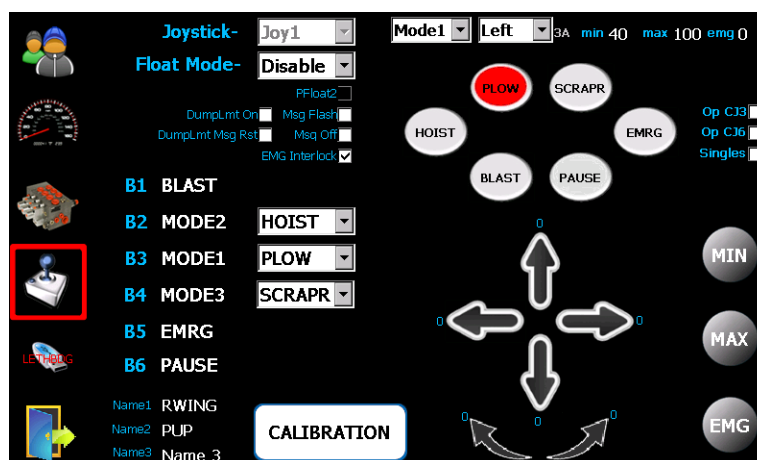
**Error 69** - Theoretical Maximum Pre-Wet Hz Too High. Based on the specified application rate setpoints, and the maximum ground speed, the maximum theoretical pre-wet pump flow required has been calculated to be more than twice the actual pump capacity, which will lead to serious under-application problems. The actual pump flow setpoint will be clamped at this value to prevent the controller from becoming unstable, and the pre-wet pump should be re-calibrated to determine the source of the problem.

**Error 70** - Theoretical Maximum Anti-Ice Hz Too High. Based on the specified application rate setpoints, and the maximum ground speed, the maximum theoretical anti-ice pump flow required has been calculated to be more than twice the actual pump capacity, which will lead to serious under-application problems. The actual pump flow setpoint will be clamped at this value to prevent the controller from becoming unstable, and the anti-ice pump should be re-calibrated to determine the source of the problem.

## 19 Joystick Calibration

### 19.1 Solenoid Nulling

1. Start vehicle and achieve full pump flow.
2. Tap on  Joystick symbol.



3. Press “CALIBRATION” button and press a mode button on the joystick to select a desired mode to adjust.
4. Move the joystick slightly until the hydraulic actuator moves slowly – press “Min” while the stick is deflected.
5. Move the joystick until the actuator moves at a safe maximum speed – press “Max”.
6. Repeat this for all axis', directions and modes.

**LmtRst** – Dump limit warning disappears once acknowledged

Press “CALIBRATION” button again to save all changes.

## 19.2 Emergency (Panic Button) – If configured

1. Select the desired mode on the joystick and pull the joystick in the direction that the emergency button should activate.
2. Press the round “EMG” button while the stick is deflected.

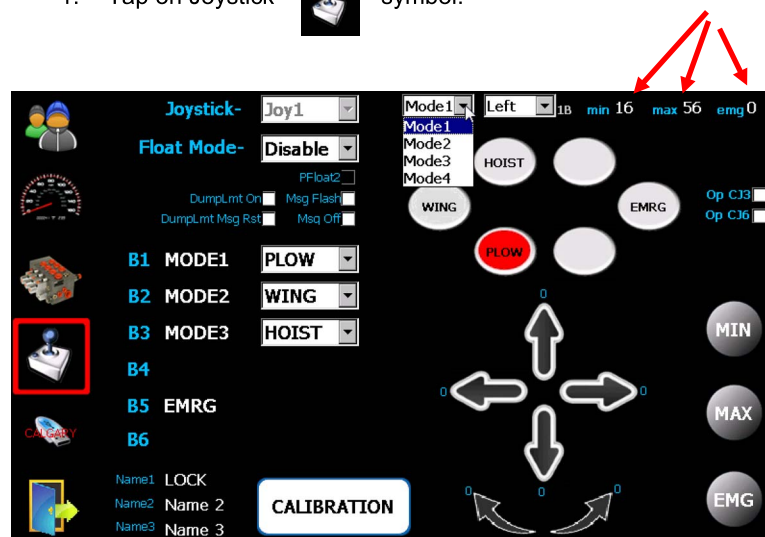
Any mode or direction can be assigned to Panic Button. In operation mode when the Panic button is pushed in conjunction with the Deadman trigger, the selected function(s) will activate simultaneously.

All the mode names and special functions will be configured by the factory. Only solenoid nulling may be required.

## 20 Joystick Min/Max/Emg Set-up

Aside from the standard calibration described in the previous section, values can be entered directly using the following method:

1. Tap on Joystick  symbol.



2. Select the joystick direction for which you want to enter values.
3. Press 'Min' on the top right corner to enter a percentage value.
4. Follow this procedure for 'Max' and 'Emg'
5. Exit calibration screen to save new values.

## 21 Advanced Joystick Set-up

### 21.1 Power Float

If equipped, the Power Float mode can also be edited.

**Resetting** - Re-engages float when the joystick is returned to neutral.

**Non-resetting** - The button must be pushed to re-enable the float after the stick is deflected.

#### Check Marks:

**PFloat2**– Display if the 2<sup>nd</sup> Power float ON or not

**DumpLmt On** – Option to turn ON/OFF Dump Limit Function

**Msg Flash** – Option to flash dump limit message

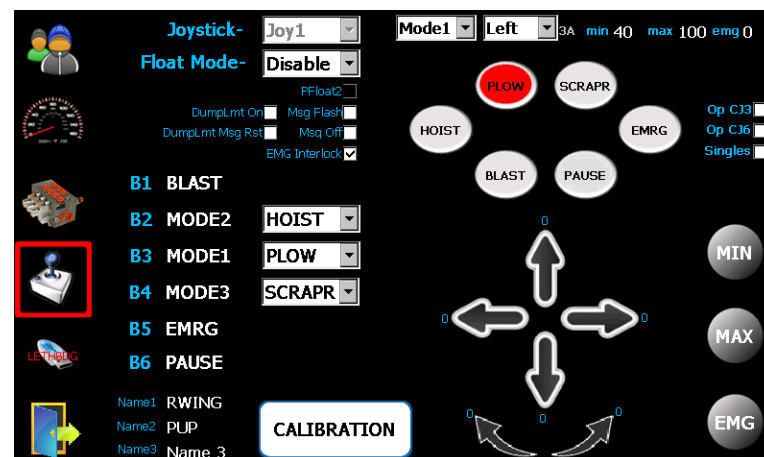
**Msg Off** – Option to disable dump limit message

**DumpLmt Msg Rst** – Only show message on rising edge

**Op CJ3, Op CJ6** – Optional CJ style 2-Axis 3 or 6 button joystick

**Singles**- If using the CS154 single stick joysticks

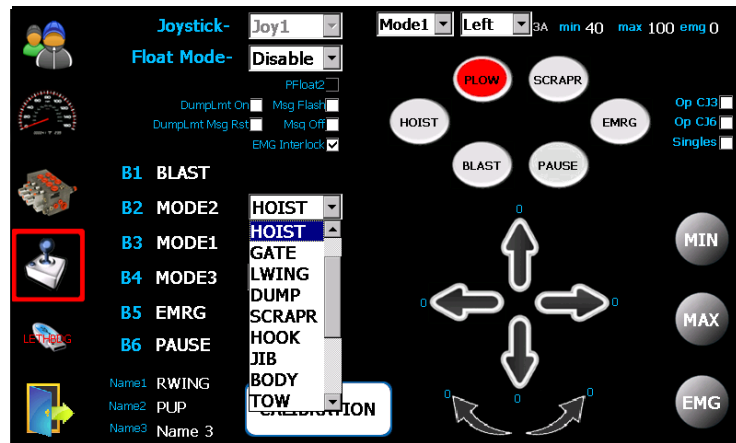
**EMG Interlock**-Pause spreader when Emrg pressed to give more flow to attachments



### 21.2 Mode Names

All the joystick button names and function will be preset by the factory. The joystick button names can be edited via the pull-down selection menus.

B1 is at the bottom left location and the buttons count up clockwise.



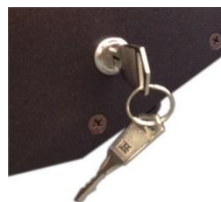
Note: Editing mode names does not re-allocate outputs on the valve cable. They are fixed and defined in the valve layout for a specific system.

## 22 CS-150RC Standalone Setup

Start vehicle and achieve full pump flow.



Front mount key switch



Side mount key switch



### 22.1 Multi-Axis Single Stick

1. Turn PGM key to program
2. Select MODE
3. Move joystick to minimum desired output and PRESS **MIN**
4. Move joystick to maximum desired output and PRESS **MAX**
5. Repeat step 2-4 for all the modes and functions
6. Turn off the PGM key to save the settings

### 22.2 Dual Sticks

1. Turn PGM key to program
2. Move joystick to minimum desired output and PRESS **MIN**
3. Move joystick to maximum desired output and PRESS **MAX**
4. Repeat step 2-3 for all the modes and functions
5. Turn off the PGM key to save the settings

## 23 Warning

This glass LCD touch screen display has been extensively tested and validated against its intended use. This glass could crack and break if the display is dropped on to a hard surface or receives substantial impact. If the glass chips or cracks, discontinue use and contact Bosch Rexroth Canada to have it replaced - do not touch or attempt to remove the broken glass. Any misuse/abuse causing damage, whether intended or not, will become the sole responsibility of the owner/buyer which will render the warranty of this product, void.

## Notes: