

CS660/CS661 Spreader Controller

Calibration Manual



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Bosch Rexroth Canada Corp. reserves the right to revise this information at any time and for any reason and reserves the right to make changes at any time, without notice or obligation, to any of the information contained in this piece of literature. The information shown in this manual features the latest version of software as of publication; therefore, some features shown will not exist on older versions of software in use by some customers.

Please check for updates at: www.boschrexroth.ca/cs

1 Setup Screen Layout

Four steps to set up the system:

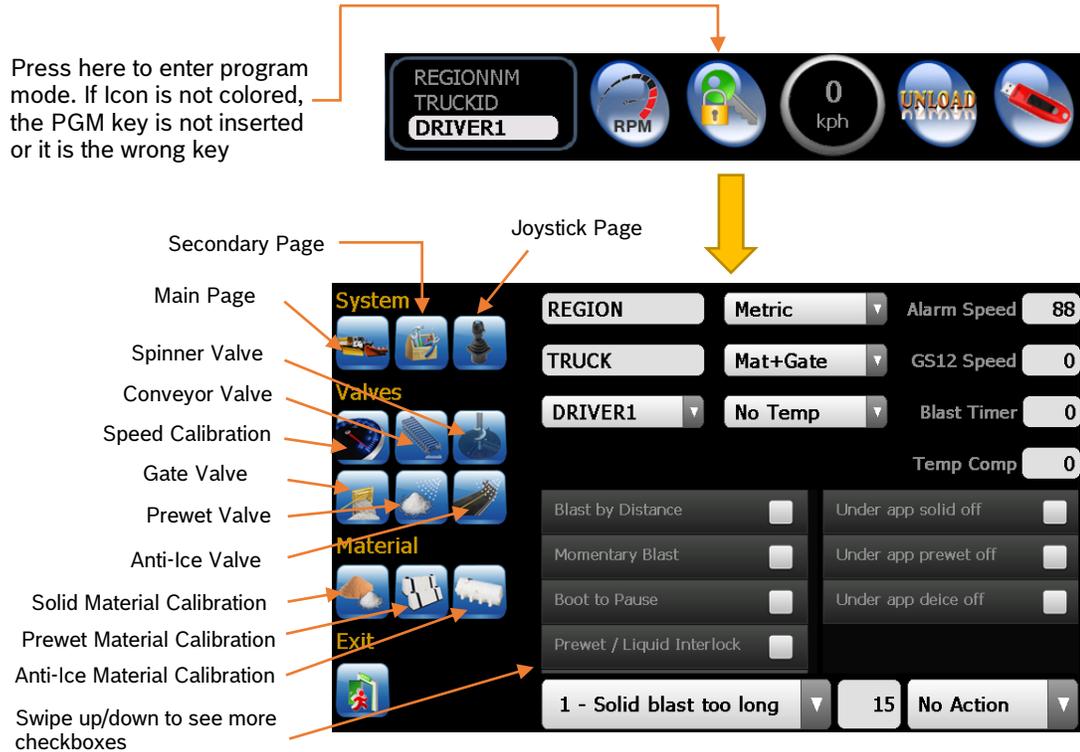
- **System** – Truck Info, operation options, operator access level, temp sensor, error severity
- **Sensors & Valves** – Configure all sensors, and valve settings
- **Materials** – Set up, and calibrate all solid and liquid materials
- **Joystick** – If joystick function is enabled set up and calibrate all modes and axis

The image displays a comprehensive setup screen layout for the Bosch Rexroth system, organized into four main columns: System, Tools, Joystick, and Material. A central menu screen on the left provides navigation to these categories. Red arrows indicate the flow from the menu to the specific setup screens.

- System Column:**
 - System:** Overview of truck and driver information, including Region, Metric, Alarm Speed, TRUCK, Mat+Gate, GS12 Speed, DRIVER1, No Temp, Blast Timer, and Temp Comp.
 - Speed:** Automatic and Manual Speed Calibration screens for setting speed in km/h or pulses/km.
 - Gate:** Manual Mode settings for gate positions, including Maximum and Minimum values.
 - Solid Material:** Setup for Solid Material, including Selected Material, Blast Mode, and calibration parameters.
 - Pre-Wet Material:** Setup for Pre-Wet Material, including Selected Material, Reduce, and calibration parameters.
- Tools Column:**
 - Parameters:** Factory Default, Parameters, Sync Profiles, and I/O Mapping settings.
 - Conveyor:** Conveyor settings, including Auto Null, Manual Null, and output parameters.
 - Pre-Wet Valve:** Pre-Wet Valve settings, including Auto Null, Manual Null, and output parameters.
 - Pre-Wet Material:** Setup for Pre-Wet Material, including Selected Material, Reduce, and calibration parameters.
- Joystick Column:**
 - Joystick:** Joystick configuration screen for Mode 2, Left, and Right settings.
 - Spinner:** Spinner settings, including Lane Calibration, Manual Null, and output parameters.
 - Anti-Ice Valve:** Anti-Ice Valve settings, including Auto Null, Manual Null, and output parameters.
 - Anti-Ice Material:** Setup for Anti-Ice Material, including Selected Material, Blast Mode, and calibration parameters.
- Material Column:**
 - Solid Material:** Setup for Solid Material, including Selected Material, Blast Mode, and calibration parameters.
 - Pre-Wet Material:** Setup for Pre-Wet Material, including Selected Material, Reduce, and calibration parameters.
 - Anti-Ice Material:** Setup for Anti-Ice Material, including Selected Material, Blast Mode, and calibration parameters.

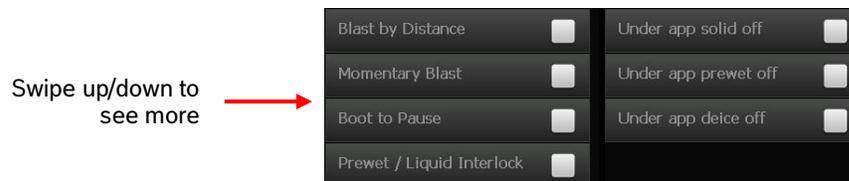
2 Set up for Basic Operation

To enter Programming mode from the operator screen, press the program mode icon with the USB Program key inserted.



2.1 System Configuration

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 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 Option Checkboxes in this manual
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 auxiliary options (check boxes)



Blast by Distance – Operator can enter a distance for blasting

Momentary Blast – Operator must hold blast button down

Boot to Pause – Automatically pause the system on boot

Prewet / Liquid Interlock - Prewet and Anti-icing operation interlock with an asymmetrical valve

IoT Tracking – Enable AVL interface (default is GPS)



4 Knob Console – Enable external 4 knob console

Equal Rates – Define only start and end rate as well as increment

CRS Blast ON – Turn on cross conveyor blast

Save Last Knob – Remember the knob positions when powering off then on again

Voice Disabled – Turn off voice feedback

Volume Adjust – Allow operator to adjust volume

Default Joy Screen – Always show joystick screen

Enable Profiles – Enable the use of profiles

Depressurize – Release pressure when decoupling hydraulics

The intention is to send output to external valve to bleed off system pressure. You must have the Low Oil Override output configured, and the Depressurize checkbox checked. The operator would press the depressurize button and while doing this stroke the joystick in all directions to bleed all lines for easier disconnection of quick couplers.

If 'Depressurization' option is checked and 'Low oil Ov' output is configured the speed indicator becomes the depressurization button when vehicle is stationary.

Button ON → Low Oil Ov output HI

Button OFF → Low Oil Ov output LO

French – Change the device language to French

Automatic Recirculate – Keeps deice circulating while not being output

Manual Recirculation

- Simple functionality with Recirc button (3rd knob) works in all cases w/wo ground speed (RECIRC displayed on screen)
- When RECIRC is ON, closes all booms, and Recirc output ON and pump ON

Auto Recirculation

- Recirc output activates ONLY on Pause with ground speed (RECIRC displayed on screen)
- Without ground speed Recirc button (3rd knob) is active for Manual Recirculation – will turn off when ground speed is present and activates ONLY on Pause
- When RECIRC is ON, closes all booms, and Recirc output ON and pump ON

Symmetry – Enable mode for lane-controlled output for both width & direction

This mode uses a cylinder (hydraulic or electric) with position feedback to divert the application of solid material on the road to a defined far right, far left or any position in between. In the real world, the truck can put down material up to three lane widths. Within this band, there is a width control (user selectable) from .5, 1, 2, 2.5, 3 lanes. This control is accomplished by varying the spinner output.

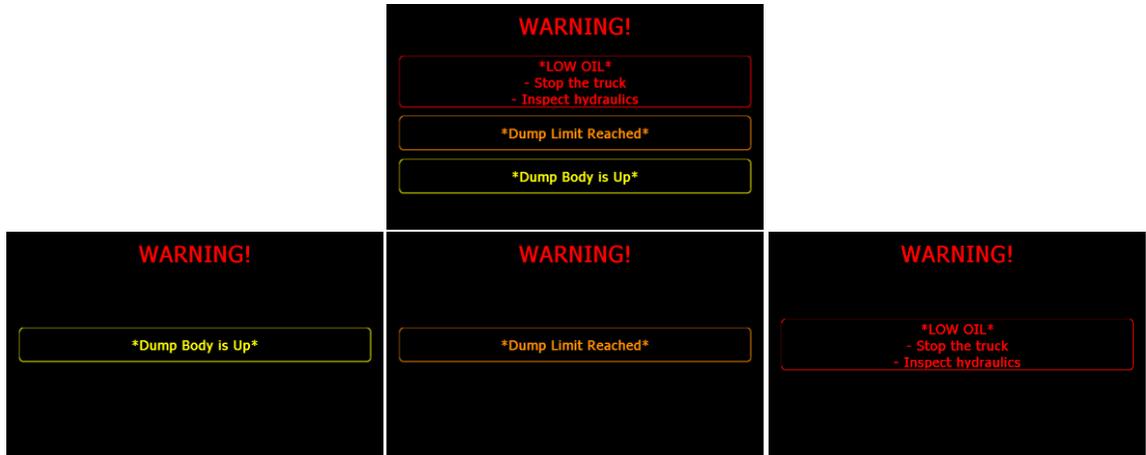
Spinner Reverse/Air Gate Button – Enable on screen Spinner Reverse and Air gate buttons

Remote Pause Only – Pause only from external input

Electric Prewet – Enable electric prewet amplifier/motor

Full Screen Low Oil/Dump Limit/Body Up Msg – Enable the Full Screen Warning Message

When this option is enabled the warning messages for Low Oil, Dump Limit and Body Up will be displayed on full screen until the warning is rectified. For the Body Up warning the full screen message will flash and for the other 2 warnings the message will stay until the warnings are rectified. If all 3 warnings are triggered then all the messages will be displayed together and for each individual warning the respective message alone will be displayed.



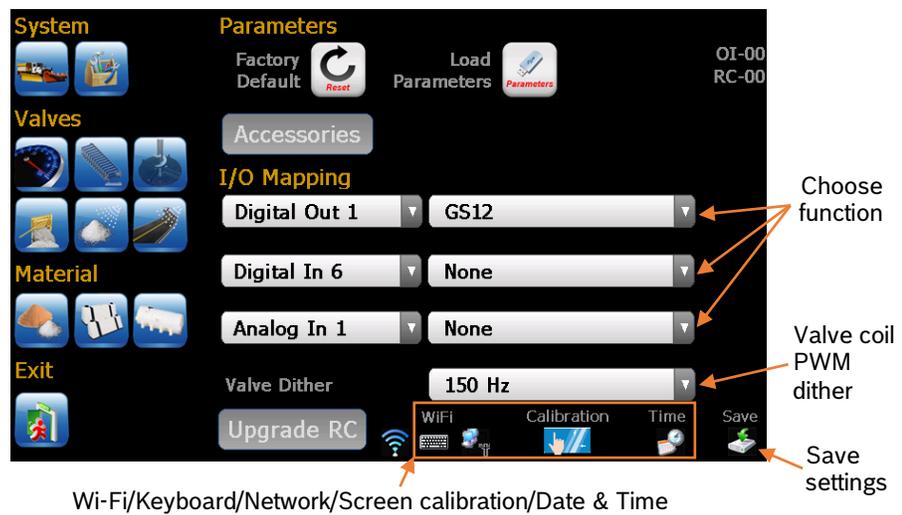
Under app solid off – Turn off solid under application warnings

Under app prewet off – Turn off prewet under application warnings

Under app deice off – Turn off deice under application warnings

- Press the secondary options icon  to access additional setup parameters. All additional IOs can be set up by using the drop-down menus in the I/O mapping section. The drop-down fields on the left let you pick an input or output (digital or analog), and the drop down directly to the right is the function of that I/O port. For example, you can select “Analog In 2” on the left, and on the right, you can select “Temperature” to assign that controller input to be connected to a temperature sensor. Refer to the Special Features with IO mapping section.

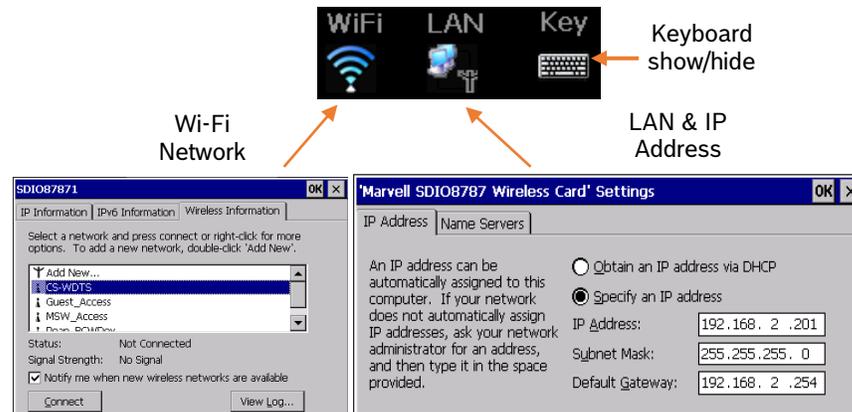
Note: the RC controller wiring must match what is chosen here.



Set Wi-Fi/Network/Screen Calibration/Date & Time (if required).

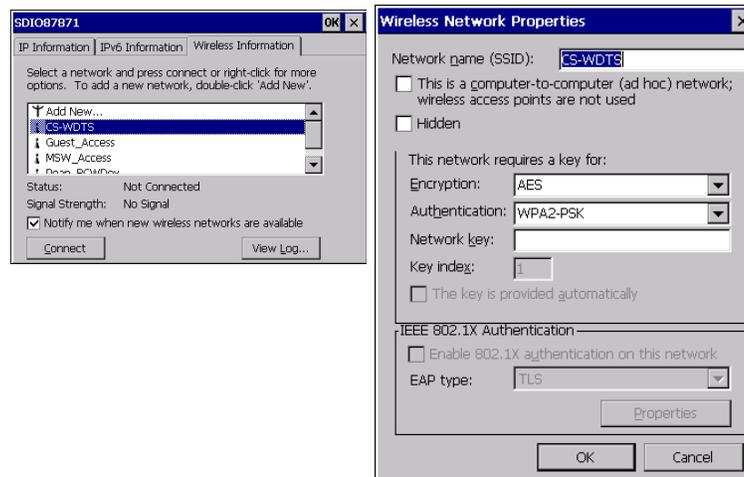
Note: “Save settings” only applies to these items (Wi-Fi, Screen Calibration, Time).

13. Click on Wi-Fi network  icon to set up WI-FI connection.

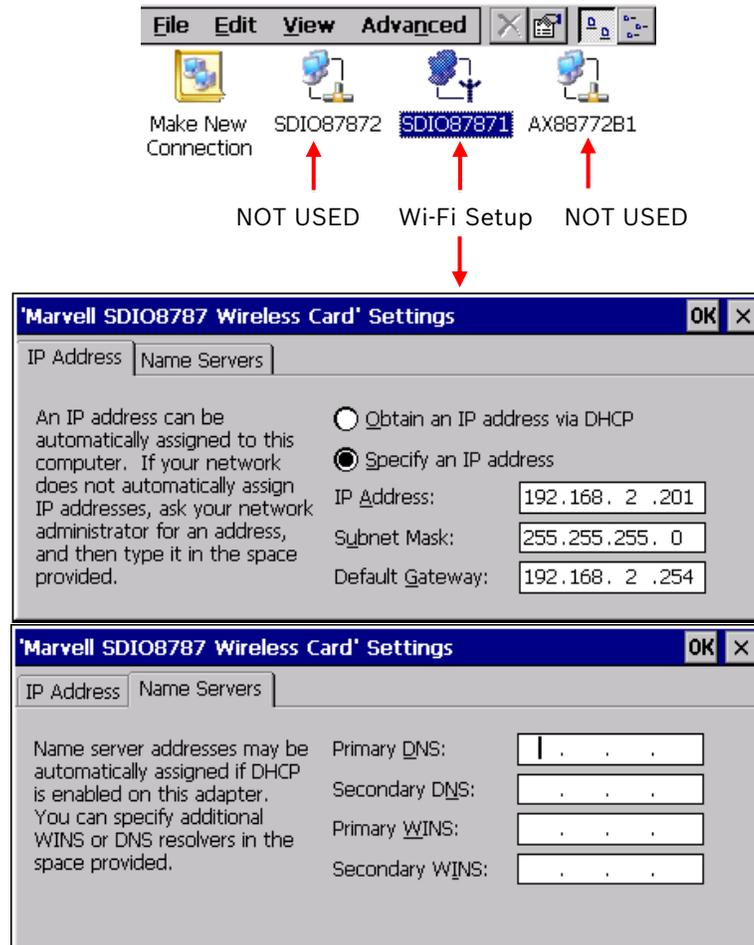


The Wi-Fi setup is almost identical to standard Windows.

- Uncheck 'Notify me...' to stop this window from popping up every time the system starts up.
- Click 'Connect' and enter Network key.



Click on LAN & IP address icon  to configure LAN and assign an IP address.



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 Wi-Fi setup dialogs shown on the right so you are back to the setup screen.
- Press and hold the Wi-Fi network icon for  5 seconds to clear any preferred networks.
- Now you can perform the Wi-Fi setup.

Note: Any changes to Wi-Fi/ Network settings/ Time/Screen recalibration need to be saved by clicking the save icon  on the bottom of the screen.

2.2 Input and Output Configuration

To configure appropriate inputs or outputs press the additional options icon to set up I/O Mapping.

Note: the RC controller wiring must match what is chosen here.



Configurable IO Options

Digital Inputs (DigIn1-8, CANIO DigIn1-8)

- Material Detect
- Material Change (1↔3 or 2↔4)
- Boom Left
- Boom Center (Sim)
- Boom Right
- Dual Spinner (Double Rate)
- Spinner Reverse
- Conveyor Reverse
- Spreader Off (spn+conv+prewet)
- DLA Off
- CRS (Cross Conveyor ON/OFF)
- Re-circulation
- Flush
- Body Up
- Plow Down
- Wing Down
- Gate In
- Low Oil
- Pause
- Blast
- Liquid Level
- L-R
- Dump Limit
- Air Gate
- PTO Enable
- Vehicle Reverse
- Reactivate
- Enable J1A
- Enable J1B
- Enable J3A
- Enable J3B
- Enable J5A
- Enable J5B
- PTO Override
- Mode Change
- Profile Change
- Reactivate w Prox

Digital Inputs (Aux DigIn1-8)

- L1 – 4 (Light Outputs, 2.2A)
- L5 – 8 (Light Outputs, 3.5A)

Digital Out

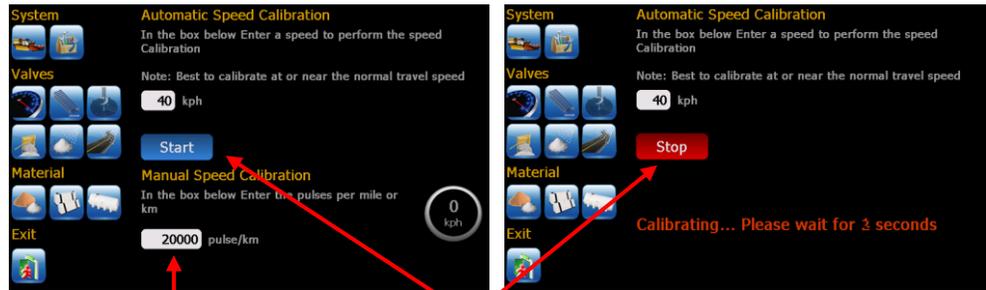
- GS12 – When there is ground speed
- Pause – When spreading paused
- ConveyorReverse – When Reverse Button being pushed
- Boom Left
- Boom Center
- Boom Right
- Low Oil Override
- Recirc

Analog In

- Temperature
- Pressure
- Low Oil
- Position
- Servo

2.3 Ground Speed Calibration

1. Select speed icon  to enter the ground speed calibration screen.
2. Choose which calibration option best suits your situation. Automatic or manual.



Enter number manually

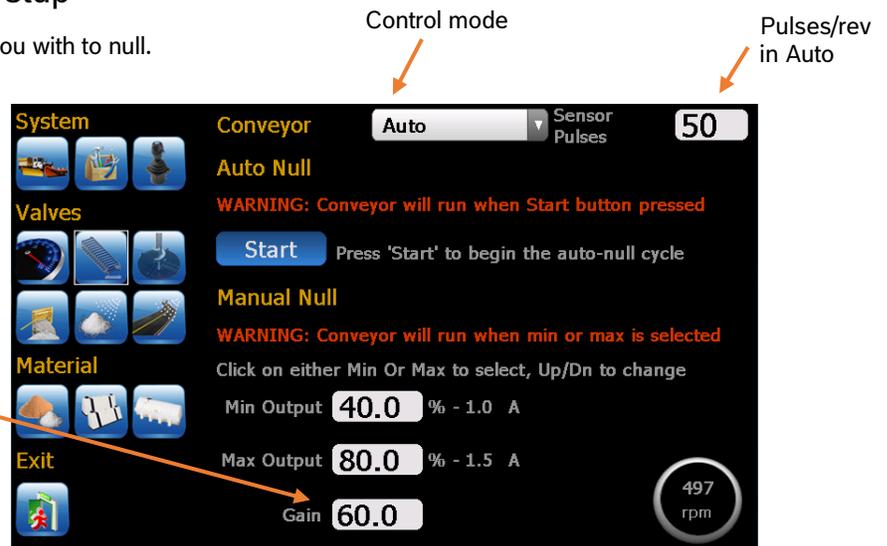
Follow instructions for speed calibration

Note: Highly recommended to use the typical vehicle speed during spreading. And a more accurate real time GPS speed is preferred for more precise speed calibration.

2.4 Valve & Sensor Setup

1. Tap the icon for the function you wish to null.

An extra “push” to overcome the friction of a heavy load on the conveyor when starting from 0 speed



2. Select the control mode:
 - **Spinner** – Manual (*default*), Half Lane, One Lane
 - **Conveyor/Auger** – Auto (*default*), Open LP, Man-Spd, Manual
 - **Prewet** – Off, Fixed, V-Flow (*default*), Manual, Manual-SPD, Return Oil, Open Loop
 - **Anti-Icing** (Anti-icing) – Off (*default*), 1 Boom, 3 Boom, Manual %

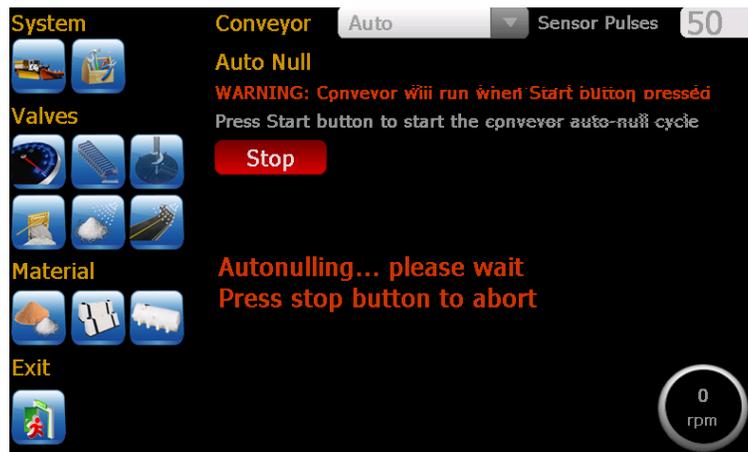
Set correct conveyor sensor pulses/rev if Auto is selected.

3. Ensure the hopper is empty, and the truck is safe to operate.
4. Start the engine to achieve adequate oil flow.

Note: If the Auto mode is selected it is strongly recommended to run Auto Null.

Auto Nulling

1. Press “Start” to begin. This procedure will automatically ramp up the conveyor motor speed and then ramp down to capture both “Min” and “Max” speed values and storing them as a saved calibration.



Note: This feature can only be used with motors with speed sensor. It takes about 30-60s to complete.

2. Calibrated values will be shown in the Min output & Max output text boxes
3. Please check the “Min” null value to verify it is minimum. (< 5RPM). Do this by pressing on the Min output value (conveyor will start to turn). Press again to stop.

Manual Nulling

1. Press “Min” value field to pop up the UP/DN arrows and enter 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” to adjust the motor to a safe max speed or until the RRM readout stops to increase.
5. Forward Gain and Blast settings can also be adjusted



2.5 Material Setup & Calibration

2.5.1 Solid Material Setup

Tap on the solid material icon  to configure materials desired. It allows to set up to 4 different solid materials, and 9 application rates and a blast rate for each material.

Material Names:
 Select name from list
 Click to popup keypad
 Enter to save

Solid Rates:
 Setpoints for 9 conveyor
 knob positions

Unit of Solid Rate:
 Kg/km or Lb/mi

Cal Gate:
 Gate position used for
 material calibration



2.5.2 Solid Material Calibration – Manual or Readback Gate

1. Prepare a container to catch material discharged
2. Make sure that sufficient material in the hopper and the system is safe to run.
3. Press ‘START’ to proceed and follow the instruction on the screen

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

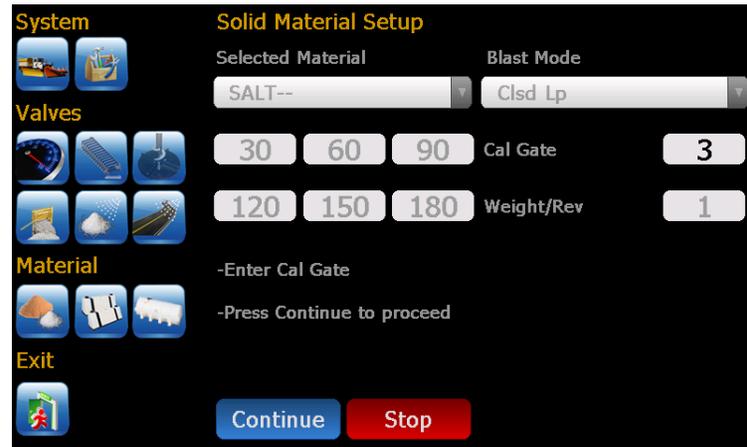
STEP 1

Ensure system safe to run

Manual Gate:
 Manually adjust gate &
 enter the gate position

Readback Gate:
 Manually adjust gate (no
 need to enter)

Continue to next step
Stop to abort



STEP 2

Dial to 2nd or 3rd position for
 decent conveyor speed

Continue to next step
Stop to abort



STEP 3:

Recommend to discharge minimum 100kg or 220lbs material (more for better resolution)

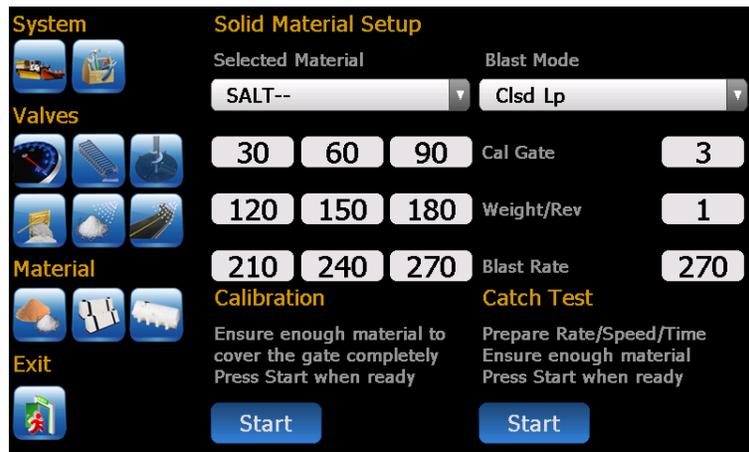
Enter weight of the material collected

Continue to next step
Stop to abort



Complete!

When the material calibration ends the Wt/Rev at the calibrated gate position is refreshed.



2.5.3 Solid Material Calibration – Auto Gate

1. Prepare a container to catch material discharged.
2. Make sure that sufficient material in the hopper and the system is safe to run.
3. Press 'START' to proceed and follow the instruction on the screen.

Note: Auto Gate operation has two calibration points, Wt/Rev at Gate position 1 and 3. Simply follow steps on screen to go through the calibration process.

STEP 1:

Ensure system safe to run

Make sure the Conveyor and Gate cylinder has been correctly set up and calibrated

Start to proceed



STEP 2:

Continue if you have a container ready and sufficient material always above the gate opening throughout the calibration process

Continue to next step
Stop to abort



STEP 3:

Controller automatically move the gate to position 1

Continue to next step
Stop to abort



STEP 4:

Recommend discharging minimum 100kg or 220lbs material (more for better resolution)

Enter weight of the material collected

Continue to next step
Stop to abort



STEP 5:
 Controller automatically move the gate to position 3
Continue to next step
Stop to abort



STEP 6:
 Recommend to discharge minimum 100kg or 220lbs material (more for better resolution)
 Enter weight of the material collected
Continue to next step
Stop to abort



Complete!
 When the material calibration ends both Wt/Revs at calibrated gate position 1 and 3 are refreshed.



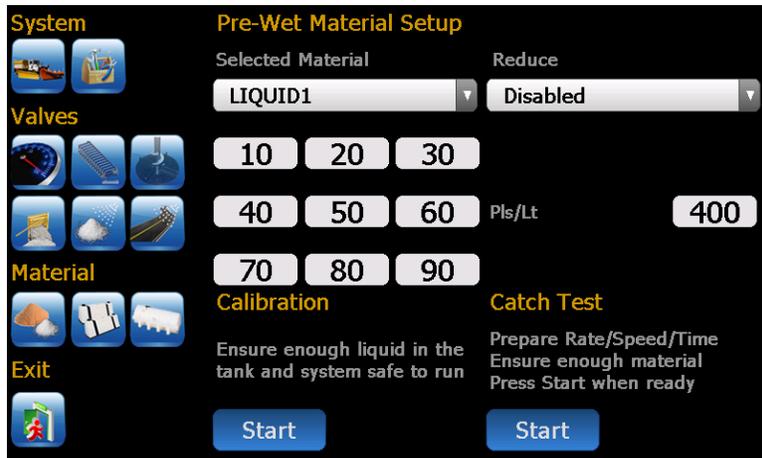
2.5.4 Prewet and Anti-icing Material Setup

Tap on the prewet material icon or  anti-ice material icon to  configure materials desired. It supports 4 prewet and 4 anti-ice materials, and 9 application rates and a blast rate for each material.

Material Names:
 Select name from list
 Click to popup keypad
 Enter to save

Unit of Prewet Rate:
 Liter/Ton
 Gallon/Ton

Unit of Anti-ice Rate:
 Liter/Lane.Km
 Gallon/Lane.mi



2.5.5 Prewet and Anti-icing Material Calibration

1. Prepare a container to catch liquid discharged
2. Make sure sufficient liquid in the tank and the system is safe to run
3. Press 'START' to proceed and follow the instruction on the screen

STEP 1
 Ensure system safe to run

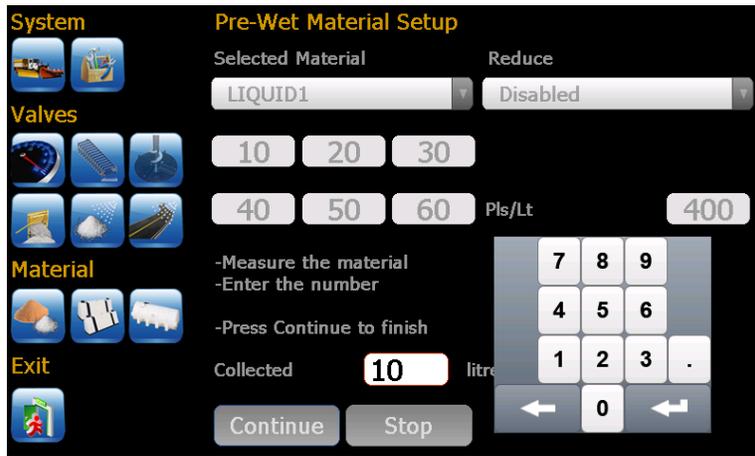
Continue if you have a container ready and sufficient liquid throughout the calibration process



STEP 2
 Dial to 2nd or 3rd position for decent flow



STEP 3
Discharge more liquid for better calibration accuracy



2.6 Material Catch Test

2.6.1 Solid Material Catch Test

1. Tap on solid, prewet or anti-icing icon to enter the material calibration screen.
2. Place an adequate catch container under the spreader discharge chute.

STEP 1
Enter desired rate speed
Duration
Press 'Continue'



STEP 2
Measure material
Enter the value
Press 'Continue'



3. A wt/rev (kg/rev or lb/rev) will be calculated and displayed on the bottom right of the screen.
4. Repeat this procedure for all solid materials (use the left and right arrows to select material types).

2.6.2 Liquid Material Catch Test

These same procedures apply to pre-wet and liquid. The unit of calibrated value is pulses/liter or pulses/gallon.

3 Set up for Additional Feature Functions

3.1 Conveyor Reverse

This feature supports bi-directional conveyor operation. It requires a digital input to toggle the direction of the conveyor motor. Once an input is configured for 'ConveyorReverse' the following proportional outputs are automatically mapped:

- Junction Box **V1-B** → Conveyor Forward
- Junction Box **V1-A** → Conveyor Reverse



A digIn (Junction Box or CANIO board)



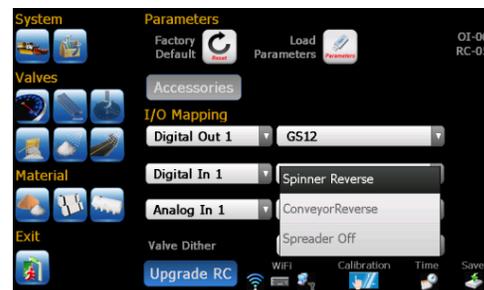
'R' – Forward, 'R' - Reverse

Note: When setting up conveyor valve only forward output needs to be trimmed since both Conveyor forward and Reverse outputs share the same Min & Max null values.

3.2 Spinner Reverse

This feature supports bi-directional spinner operation. It requires a digital input to toggle the direction of the spinner motor. Once an input is configured for 'SpinnerReverse' the following proportional outputs are automatically mapped:

- Junction Box **V2-B** → Spinner Forward
- Junction Box **V2-A** → Spinner Reverse



A digIn (Junction Box or CANIO board)



'R' – Forward, 'R' - Reverse

3.3 Conveyor & Spinner Reverse

This feature supports bi-directional spinner operation. It requires two digital inputs to toggle the direction of the spinner and conveyor motors. Once an input is configured for 'SpinnerReverse' the following proportional outputs are automatically mapped:

- Junction Box **V1-B** → Conveyor Forward
- Junction Box **V1-A** → Conveyor Reverse
- Junction Box **V2-B** → Spinner Forward
- Junction Box **V2-A** → Spinner Reverse



2 digIn (Junction Box or CANIO board)

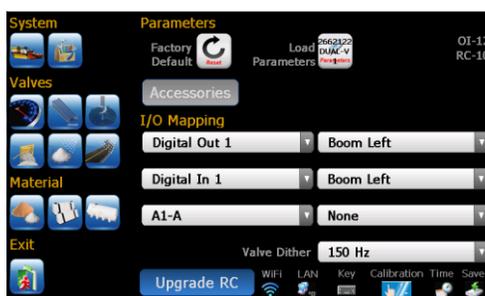


'R' – Forward, 'R' - Reverse

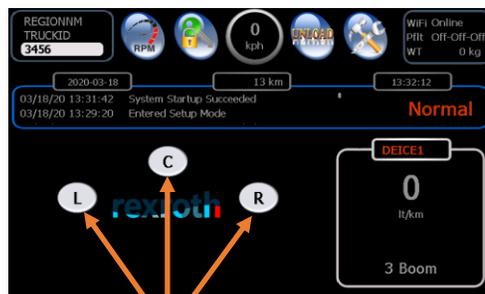
3.4 3Boom Anti-ice (DLA)

This configuration is a dedicated 3 Boom Anti-ice system. It requires 3 digital inputs (junction box or CANIO board) and 3 digital outputs for boom control.

To configure valve outputs, it is highly recommended to use AUTONULL.



All booms must be open for nulling



Button color is RED when boom is open 

3.5 Dual Spinner

This feature supports a single or dual spinner operation. It requires a digital input to switch on/off dual spinner function.



A digIn (Junction Box or CANIO board)



'D' – Single Spn, 'D' – Dual Spn

3.6 Air Gate

This feature supports air gate operation. It requires a digital input to monitor the air cylinder position. When the input status changes the controller switch between 1st and 3rd solid and prewet materials and set operation gate position to calibrated gate position for the material selected.



A digIn (Junction Box or CANIO board)



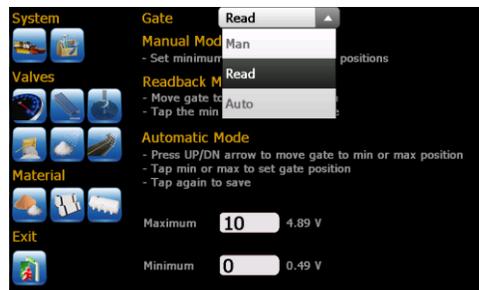
Toggle 1st ↔ 3rd materials & calibrated gates

3.7 Gate Readback and Automatic Gate

Gate Readback

It requires a gate sensor to measure the current gate position.

Sensor → A2-A (Junction box)



Steps to set up

- Move gate to max opening
- Press Max value to highlight
- Record sensor position
- Set max gate height
- Press Max value again to save

- Move gate to min opening
- Press Min value to highlight
- Record sensor position
- Set min gate height
- Press Min value gain to save

Automatic Gate

It requires a gate cylinder with a sensor to measure the gate position.

Sensor → A2-A (Junction box)



Steps to set up

- Up/Down to move gate to max
- Move gate to max opening
- Press Max value to highlight
- Record sensor position
- Set max gate height
- Press Max value again to save

- Up/Down to move gate to min
- Move gate to min opening
- Press Min value to highlight
- Record sensor position
- Set min gate height
- Press Min value gain to save

3.8 Lane Control

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

1. Tap on the “spinner” icon to enter spinner menu, and select “Half Lane” or “One Lane”
2. Press “Start” Button.
3. 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.

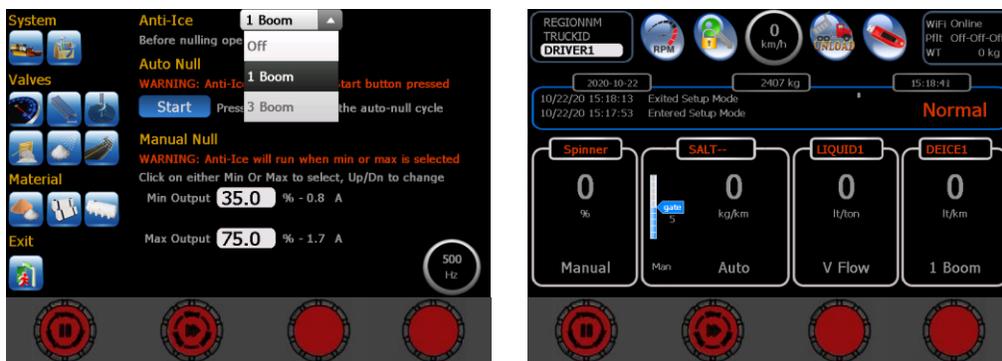
- Use the arrows to set the desired speed to spread material to half lane or one lane width.



- Press “Stop” to end the calibration and save calibration value.

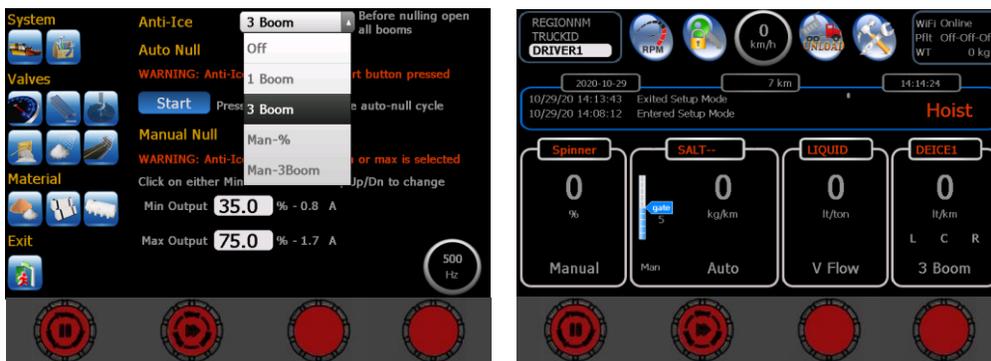
3.9 (4 knob) Spreader + Anti-ice

This configuration utilizes a 4 knob console, and control a spreader (spinner, conveyor, pretwet) and a 1boom anti-ice simultaneously.



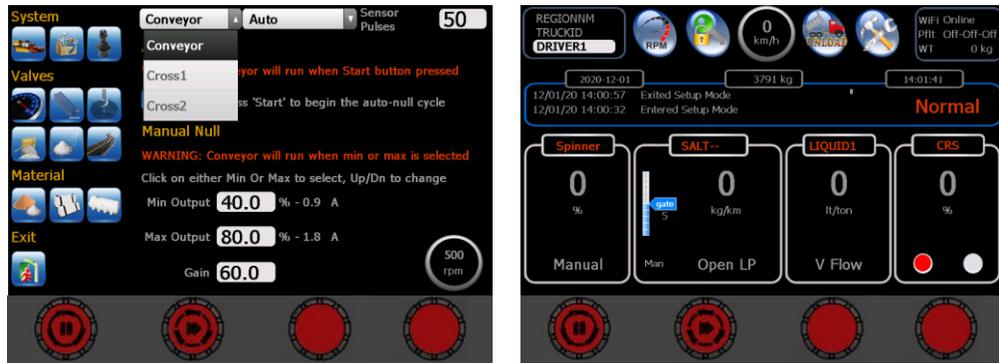
This configuration utilizes a 4 knob console, and controls a spreader (spinner, conveyor, pretwet) and a 3boom anti-ice simultaneously. It requires 3 digital inputs (junction box or CANIO board) and 3 digital outputs for boom control.

To configure valve outputs, it is highly recommended to use AUTONULL functions with sensors.



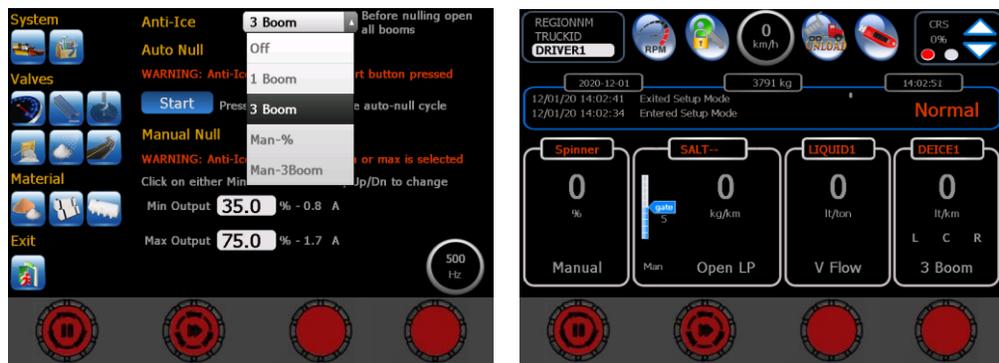
3.10 (4 knob) Spreader + Cross Conveyor

This configuration utilizes a 4 knob console and controls a spreader and a cross conveyor simultaneously. It requires a digital input to switch cross conveyor direction (Left ↔ Right).



3.11 (4 knob) Spreader + 3Boom Anti-ice + Cross Conveyor

This configuration utilizes a 4 knob console and controls a spreader + a cross conveyor + 3boom anti-ice systems simultaneously. It requires 4 digital inputs for controlling booms and cross conveyor direction.



4 Set up Profiles

Profiles allow the operator quick selection of different system configurations. One example could be a profile called “Standard” used for typical spreading operation and another called “DLA” for dedicated anti-icing applications. These are only examples and any configuration made in settings can be saved as a profile.

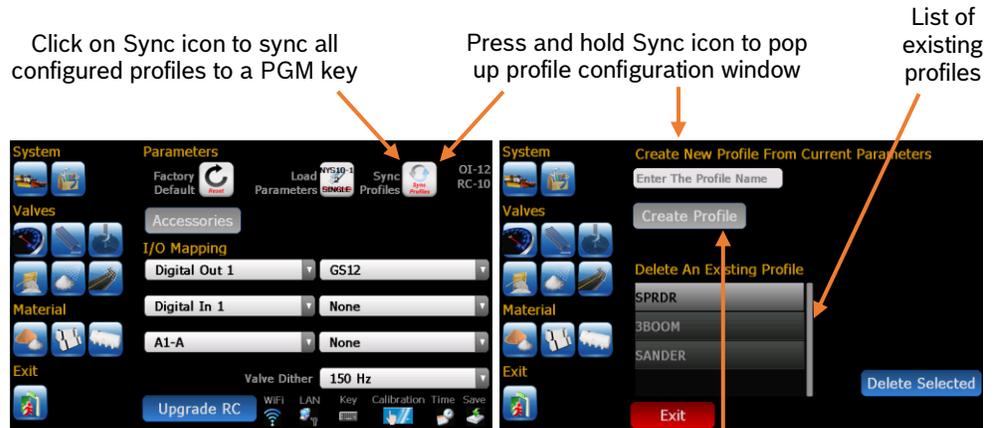
STEP 1 Check ‘Enable profiles’ and set 4th Driver to ‘USER’ (see screens below).



Check ‘Enable profiles’

Configure 4th driver to ‘USER’

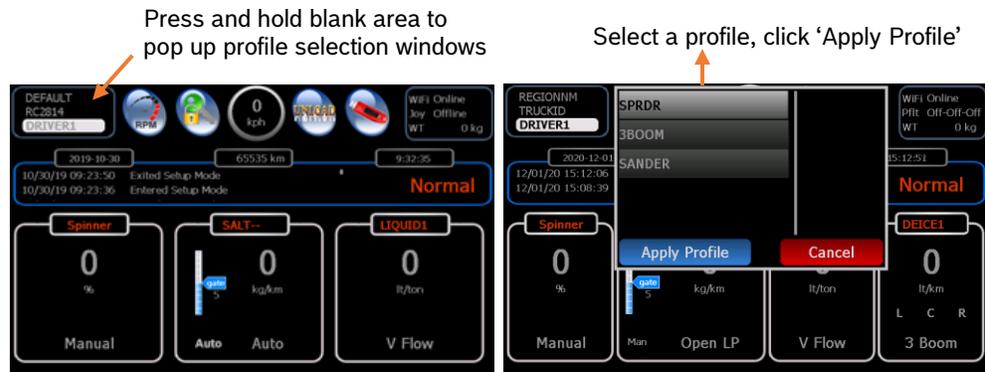
STEP 2 Press the toolbox icon  to display all additional system options.



Note: Set system up as desired before creating profile

Press to enter a new profile name, then press create profile.

Operator can select a profile on operator screen without a PGM key when the vehicle is stationary.



5 Set up Joystick Operation

A typical spreader system with joystick option consists of the following components:



Once the joystick function is configured the joystick icon would be displayed under **SYSTEM**:

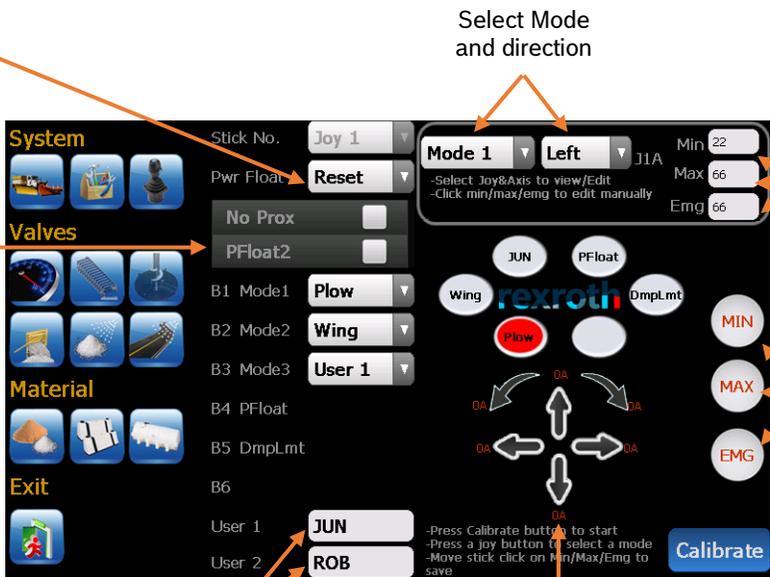


Click on the icon to pop up joystick configuration screen to calibrate all modes and axis configured.

Disable—power float OFF
Reset—Pfloat needs to be re-activated once the output is OFF.
Non Rst – Pfloat automatically re-activated once stick returns to neutral.

OPTION LIST

No Prox—No prox sensor
PFloat2 –2nd P.ftt On/Off
DmpLmt—On/Off
Emg Interlock– Puts conveyor in pause once EMG button is pressed pushed
Msg Flash – Flash message when dump limit prox is triggered
Msg Rst – Message disappears once acknowledged till it is triggered again
Msg Off – Msg disabled



Manually adjust Min/Max/Emg values for each mode & direction

CALIBRATION
 Deflect stick to a desired speed & click each button to save setpoint

Click to START

Configure custom joystick mode names

Mode, direction, output current for axis deflected in RED in calibration mode

Solenoid Nulling

1. Press “Calibration” button and press a mode button on the joystick to select a desired mode to adjust.
4. Deflect joystick slowly until the hydraulic actuator moves – 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.
7. While in calibration users also have option to double click on any direction arrow to pop up fine tuning screen, or click on “Stop” button again to save all changes.



6 Set Up Error Messages

Error Messages	#	Suggested Solution
01-BLAST TOO LONG	1	Blast held too long
02-LIQ BLST TOO LONG	2	Liquid blast held too long
03-OVER SPEED	3	Slow down, reset max speed
04-ERR SPN OUTPUT	4	Check cables, check coil
05-ERR CONV OUTPUT	5	Check cables, check coil
06-ERR CRS1 OUTPUT	6	Check cables, replace coil
07-ERR CRS2 OUTPUT	7	Check cables, replace coil
08-NO GRANULAR DET	8	Load material, check sensor
09-NO LIQUID DET	9	Load material, check sensor
10-NO GROUND SPEED	10	Check cable/sensor
11-NO CONV FEEDBACK	11	Check cable/sensor
12-NO WET FEEDBACK	12	Check cable/sensor
13-NO LIQ FEEDBACK	13	Check cable/sensor

Warning Messages	#	Suggested Solution
21-UNLOAD NOT ALLOWED	21	Vehicle needs to be stationary
22-SYSTEM ERROR !!!	22	Reboot, or re-flash
23-NO RC,CHK FUSE/CONNECTION	23	Comm failure between display and RC
24-LIQUID BOOM OPERATION ERROR	24	Need at least one boom to work
25-NO JOY1,CHK CONNECTION	25	Comm failure between RC and Joy 1
26-NO JOY2,CHK CONNECTION	26	Comm failure between RC and Joy 2
27-NO GATE POS SENSOR	27	Check gate sensor, cable break
28-GATE CLOSED	28	Gate closed in READBACK mode
29-NO SIMULATE	29	Speed Simulation mode stopped
30-SPN UNDER APP	30	Spinner not able to reach desired RPM
31-SOLID UNDER APP	31	Rate or spd too hi, incorrect calib
32-PREWET UNDER APP	32	Rate or spd too hi, incorrect calib
33-LIQ UNDER APP	33	Rate or spd too hi, incorrect calib
37-GND SPD CALIBRATION	37	Too few or no pulses, recalibrate
38-SPINNER CALIBRATION	38	Bad or no sensor
39-CONVEYOR CALIBRATION	39	Bad or no sensor
40-PREWET CALIBRATION	40	Too few pulses, or sensor failed
41-LIQ CALIBRATION	41	Too few pulses, or sensor failed
42-SPN CAL: WRONG CTRL MODE	42	Auto null not allowed for MAN mode
43-CNV CAL:WRONG CTRL MODE	43	Auto-null or calibration not allowed
44-PREWET CAL:WRONG CTRL MODE	44	Auto-null or calibration not allowed
45-LIQ CAL:WRONG CTRL MODE	45	Check Anti-icing or CrsCnv modes
46-CRS CNV CAL:WRONG MODE	46	Check Cross-Conv mode setting
47-CALIBRATION ERROR	47	Check sensor, recalibrate
48-CALIBRATION ERROR	48	Check sensor, recalibrate
49-CALIBRATION ERROR	49	Check sensor, recalibrate
.	.	
70-CALIBRATION ERROR	70	Check sensor, recalibrate
71-NO SPIN FEEDBACK	71	If no sensor, set to manual Check feedback sensor and cable
72-SPN OVER APP	72	Reduce spinner rate or lower ground speed
73-PREWET ANTI-ICING CHG FORBIDDEN	73	
74-NO CHUTE POS SENSOR	74	Check chute sensor and cable
83-WARNING: LOW OIL	83	Safely stop vehicle, check oil level
84-WARNING: DUMP LIMIT	84	Dump body has reached limit, Lower to clear
84-WARNING: AUTO RAISE	84	Body is auto raising for specified time.
85-WARNING: BODY UP	85	Dump body has reached up sensor, Lower to clear

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

Error 21 – Unload Not Allowed. Vehicle needs to be stationary to activate UNLOAD function.

Error 22 - System Error. This can be caused by loading a wrong parameter file or wrong firmware file. Default and reboot, or re-flash the RC to see if it clears the error, otherwise report to Bosch Rexroth.

Error 23 - Communication failure between the RC controller and the display. Check display fuse and inspect all CAN bus connections.

Error 24 – All booms are closed. Need at least one boom open to run liquid pump.

Error 25 - Joystick 1 communication failure. This will shut down the joystick outputs. Check if joystick connection inside the armrest is loose, otherwise report to Bosch Rexroth.

Error 26 - Joystick 2 communication failure. This will shut down the joystick outputs. Check if joystick connection inside the armrest is loose, otherwise report to Bosch Rexroth.

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 and Automatic gate modes. The conveyor will not be allowed to move until the gate is detected open.

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

Error 30 – Spinner Under Application. Desired RPM cannot be achieved. Check spinner min/max outputs and recalibrate spread width.

Error 31 – Solid Under Application. Desired RPM cannot be achieved. Possibly caused by too high application rate or too high ground speed or incorrect calibration.

Error 32 – Prewet Under Application. Desired pre-wet flow cannot be achieved. Caused by too high application rate or too high ground speed or incorrect calibration.

Error 33 – Liquid Under Application. 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 – Ground Speed Calibration. 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 Calibration Error. During auto nulling, the calculated maximum RPM was too low, most likely caused by no sensor feedback.

Error 39 - Conveyor Calibration Error. 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 – Liquid Calibration Error. During auto nulling, the calculated maximum Hz was too low, most likely caused by no sensor feedback.

Error 42 – Spinner Wrong Control Mode, Auto-Null not allowed

Error 43 – Conveyor Wrong Control Mode, Auto-Null not allowed

Error 44 – Prewet Wrong Control Mode, Auto-Null not allowed

Error 45 – Liquid Wrong Control Mode, Auto-Null not allowed

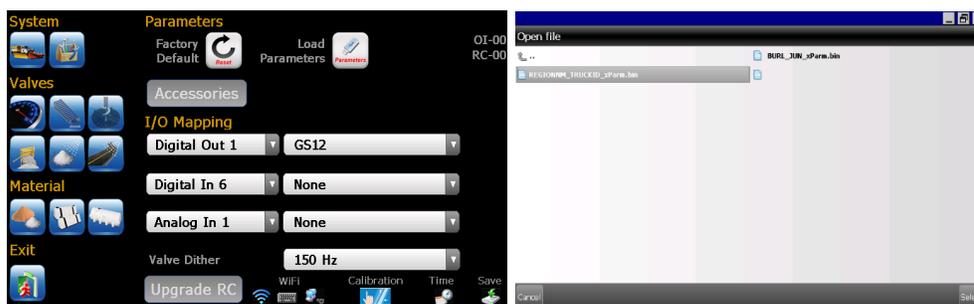
Error 47 – 70 Calibration Error. Check sensor or cable, recalibrate

7 Load / Retrieve Parameters and Clear Historical Error Messages

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

Load and Retrieve parameters

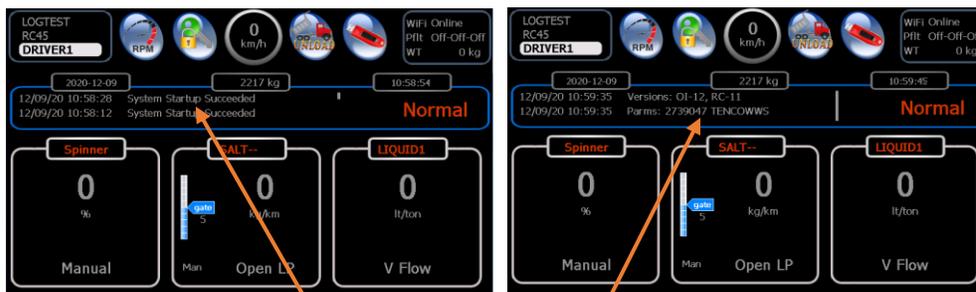
1. Tap on toolbox icon  to pop up tool window in PROGRAM mode
2. Tap on Load Parameters
3. Select a file from the popup file window to load
4. Click on the “Select” or “Cancel” button to select or cancel
5. With joystick option users would be given option to keep existing joystick setup
6. Tap “OK” to reboot
7. Turn the unit off, and on again for the new parameters to take effect



To retrieve the parameters, click on USB icon  on the operator screen with a PGM key inserted.

Clear Historic Error Messages

With a PROGRAM key users can also clear all the historic error messages on operator screen.



Press & hold anywhere in msgbox to clear

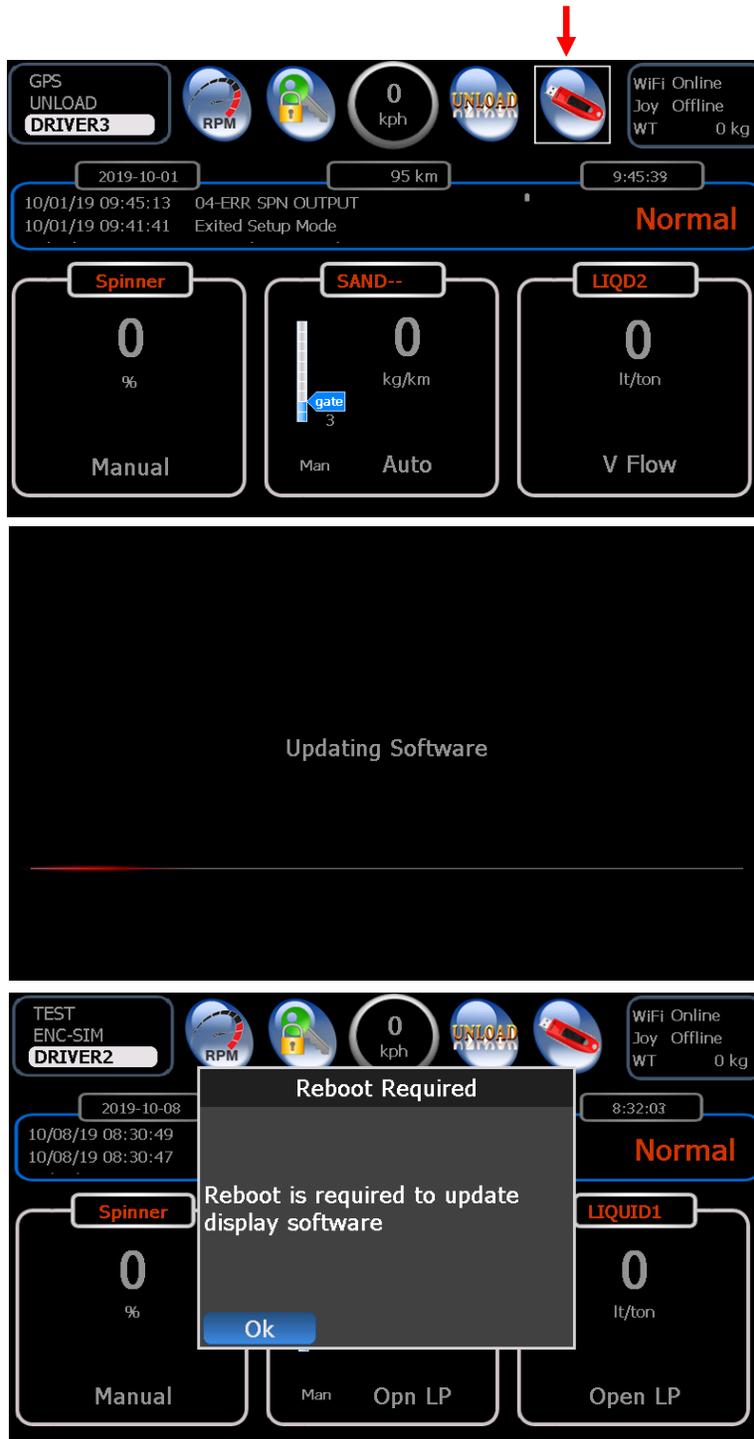
Bottom of the screen shows firmware versions and parameter file last loaded

8 660 Firmware Upgrade

Display firmware update

It requires a PROGRAM key to upgrade the display firmware. Contact Rexroth on instruction to download latest display firmware.

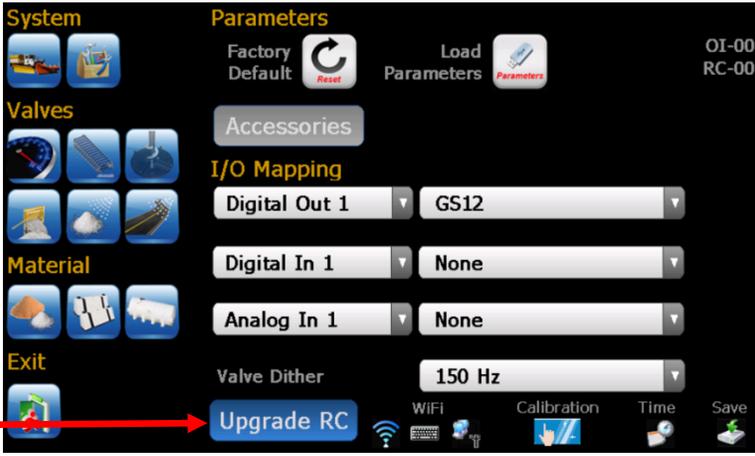
- Place firmware on PGM key
- Insert the key
- Press & Hold USB icon 5 secs



Mobile Controller (RC) firmware update

It requires a PROGRAM key to upgrade the mobile Controller (RC) firmware. Contact Rexroth on instruction to download latest RC firmware.

Place firmware on PGM key
Insert the key
Switch to PROGRAM mode
Click on toolbox icon
Click on **'Upgrade RC'** to start



System Parameters
Factory Default Reset Load Parameters Parameters OI-00 RC-00
Valves Accessories
I/O Mapping
Digital Out 1 GS12
Digital In 1 None
Analog In 1 None
Valve Dither 150 Hz
Exit Upgrade RC WiFi Calibration Time Save

Scanning devices in system
Wait for scan to finish

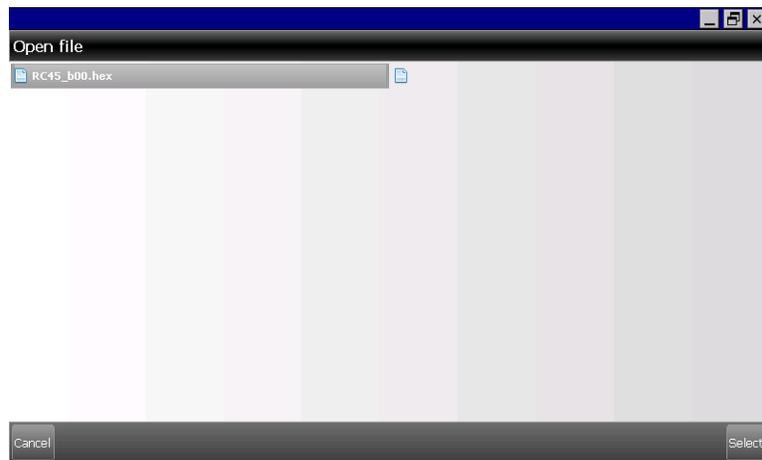


System Upgrade RC Firmware
Scanning for devices
65% - 15s
Device to update Scan for devices
Do not restart while upgrade is in progress
Start

Select the device found
Click on **'Start'** to proceed



System Upgrade RC Firmware
Select a device
100% - 25s
Device to update Found 1 device
Found 1 device
RC4-5/30 (SN 00017754)
Do not restart while upgrade is in progress
Start



Choose firmware on USB stick

Click on **'Select'** to proceed



Upon completion

Click on **'OK'** and **Reboot**

