

CS610 Anti-Ice Controller

User Manual



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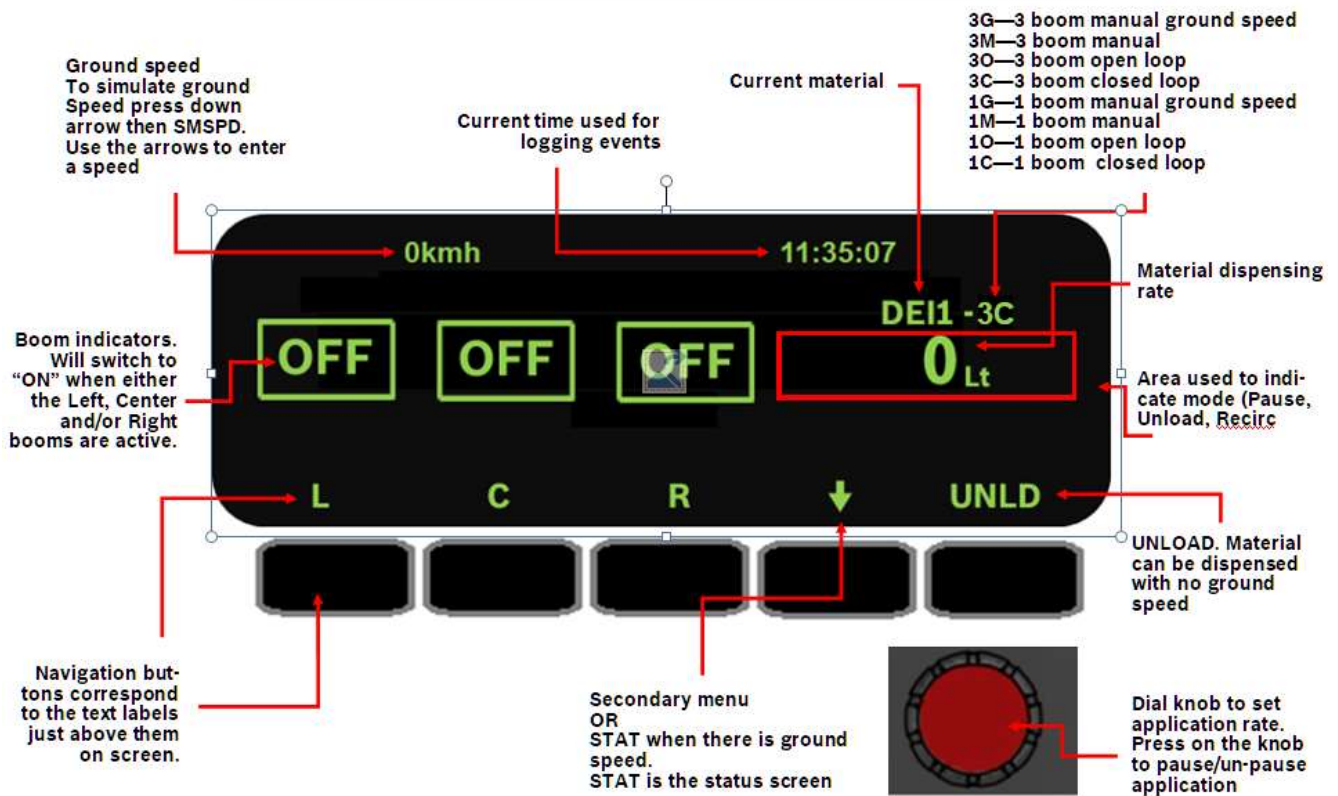
1 LAYOUT

CS 610 is anti-icing programmable controller, which can operate in manual, closed or open loop mode, for the controlled application of liquids used in snow and ice control.



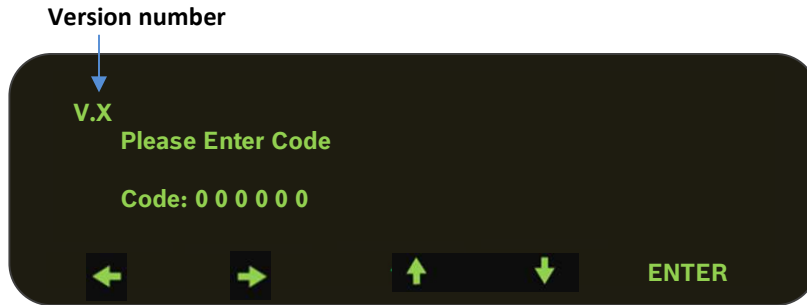
2 MAIN MENUS

When truck is stopped or no ground speed signal comes in, the screen will look like as below if configured for 3 boom mode (standard):



3 AUTHORIZATION VERIFICATION

To set up the CS-610, either a security USB or a password is needed according to the setting of feature LOCK, this is to prevent unauthorized personnel from making adjustments to the system. Once press the 'SETUP', it goes to the screen to require a security USB key or the input of the password. If it is password verification, the screen will look like that:



The most right digit stays bright while the rests are dim, pressing keypad of left or right arrow to choose digit and up/down arrow to change character (This also applies to the settings of other features). After that, press **ENTER** to confirm the input. The default password is 000000, user can change this password once in the setup screen.

4 SYSTEM CONFIGURATION

If the password is correct or program key is present, the setup screen will show on:

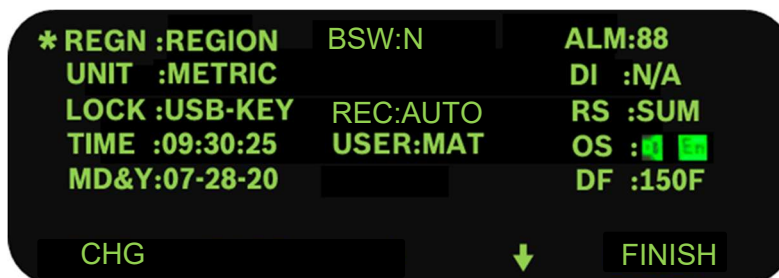


Press Up/down arrow to navigate to the different feature and the symbol * will mark the active line in front. Press **ENTER** to edit/select settings and some may also have a sub menu **CHG** to do edit (see example of the editing of REGN below).

Press **NPAGE** to go to the next screen and **PPAGE** to the former one.

4.1 Setting the Region Name and Truck ID

REGN: To edit the REGION and TRUCK name



Press **↓** to switch between region and truck name. Press **CHG** to start to edit region or truck name, Then press **FINSH** button to quit editing.

4.2 Setting the UNIT

UNIT: To choose the system unit, metric or imperial.

4.3 Authorization method

LOCK: A valid programing key or six characters password can be chosen to verify the access to the setup.

4.4 Setting the Time

TIME: Clock time is formatted as: Hour: Minute: Second

4.5 Setting the Date

Date: is formatted as Month: Day: Year

4.6 Use External Boom Switches

N: Use on controller boom buttons Y: Use external boom switches

4.7 Recirculation mode

REC: Choose from the following modes:

AUTO --- Recirculate will automatically come on when unit is paused.

MAN --- Operator must press button on screen to recirculate.

OFF --- No recirculation.

MODE: Standard or Air Gate.

4.8 User Option

USER: This option determines whether truck driver is allowed to change the material or not.

N/A --- operator is not allowed to change material.

MAT --- operator is allowed to change material.

4.9 Alarm Speed

ALM: This is the ground speed at which a waring will be displayed on the screen. The "Alarm Speed" is not activated when the spread rate is zero or the controller is in the Pause mode.

4.10 Liquid level detection

DI: This option determines whether the truck will have liquid level detection or not


N/A --- Liquid level detection disabled.

L-D --- Liquid level detection enabled.

4.11 Setting Dither Frequency

Two options: 66 and 150 Hz

4.12 Setting Beeping and Language

: Enable/disable beeping as feedback to touch pad press.

EN: Default language is English and can switch to French.

4.13 Default Setting and Season Reset

RS: system parameters can be reset to factory defaults or season totals can be reset to zero.

SUM: reset season totals

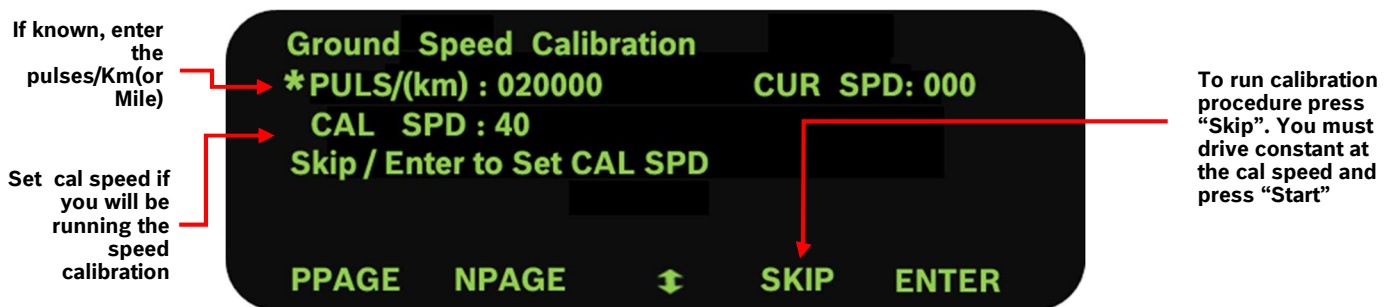
PAR: reset parameters to factor defaults
A text page will come out to confirm the action.

5 GROUND SPEED CALIBRATION

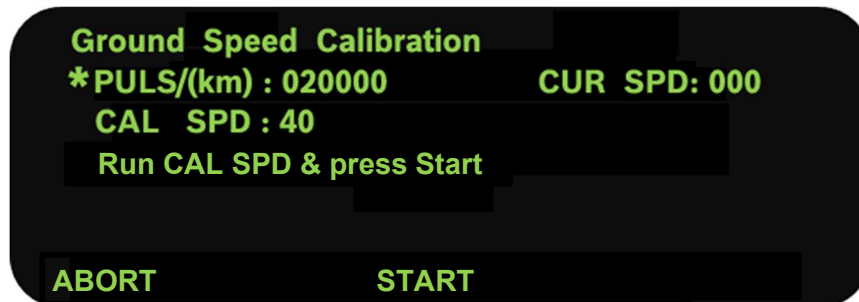
There are two ways to do the speed calibration.

If the resolution is known, just manually input the pulses per KM or Mile.

The other way is to set up the predetermined speed as the speed that truck will run more often. Follow the hints on the screen and allow the system to finish the speed calibration by itself.



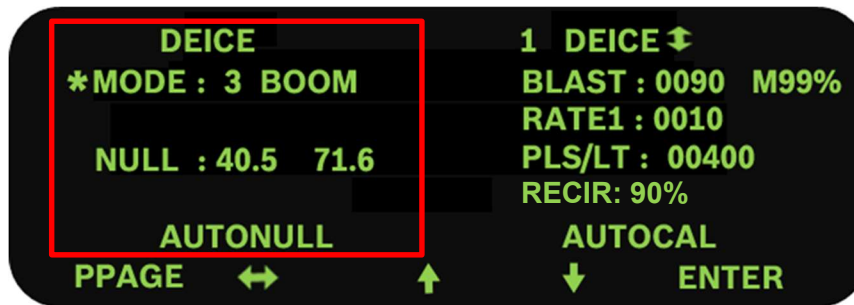
After the predetermined speed is set up, it jumps to the following screen and text message "Run CAL SPD & press START" will flash.



Hold the vehicle speed which is indicated on the vehicle's speedometer to the CAL SPD before press **START**. After 5 seconds, the system will record the pulse resolution automatically. The speed calibration is completed now.

6 HYDRAULIC VALVE CONFIGURATION

The left side of screen is to set up the valves configuration.



6.1 Mode

There are eight anti-ice modes. Only closed loop modes can be “Auto nulled”.

--- Manual Mode

This mode allows the driver to manually control the application rate. Each setting on the Conveyor Dial is a percentage of maximum null setting. There are 9 configurable application rate settings. The display will show “M” beside material name on the operation screen.

--- Ground speed dependent manual

In addition to manual mode operation, this mode will utilize ground speed to determine whether to output or not. With no ground speed, there is no output.

--- 1 boom open loop

This mode utilizes the ground speed sensor only to regulate the amount of material that will be dispensed off the vehicle. There are 9 configurable application rate settings available. The display will show “O” on the screen. This is just for a single output.

--- 1 boom closed loop

This mode utilizes both the flow meter and ground speed sensors to regulate the amount of material that will be dispensed off the vehicle. There are 9 configurable application rate settings available. The display will show “C” on the screen. This is just for a single output.

--- 3 boom Manual Mode

This mode allows the driver to manually control the application rate. Each setting on the Conveyor Dial is a percentage of maximum null setting. There are 9 configurable application rate settings. The display will show “M” beside material name on the operation screen. This mode will allow the operator selection of any combination of three outputs.

--- 3 boom ground speed dependent manual

This mode will utilize ground speed to determine whether to output or not. With no ground speed, there is no output. This mode will allow the operator selection of any combination of three outputs.

--- 3 boom open loop

This mode utilizes the ground speed sensor only to regulate the amount of material that will be dispensed off the vehicle. There are 9 configurable application rate settings available. The display will show “O” on the screen. This is just for a single output. This mode will allow the operator selection of any combination of three outputs.

--- 3 boom closed loop

This mode utilizes both the flow meter and ground speed sensors to regulate the amount of material that will be dispensed off the vehicle. There are 9 configurable application rate settings available. The display will show “C” on the screen. This is just for a single output. This mode will allow the operator selection of any combination of three outputs.

6.2 Null

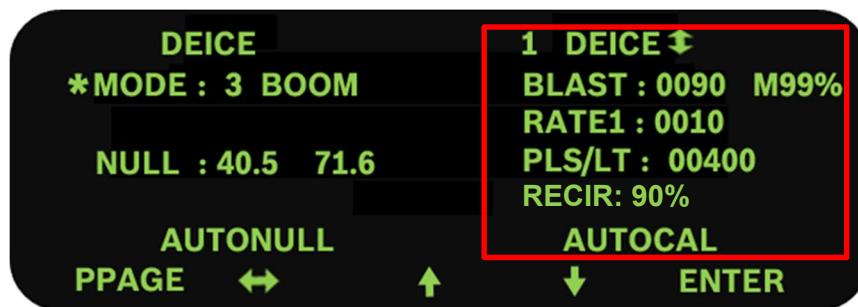
1. Press **ENTER** to null manually and it starts with minimal value immediately
2. Use up and down arrows to adjust speed so that the motor just begins to turn
3. Press **↔** to end “Min” value editing and switch to the maximum value
4. Do the same for “Max” except adjust the motor to a safe maximum speed or until the RRM readout stops to increase.

6.3 Autonulling

The nulling of the solenoids for minimum and maximum values can also be accomplished automatically. Press the **ENTER** to start and the text “Autonulling” will flash on the screen during procedure. Autonull will end after recording the nulling values.

7 MATERIAL CONFIGURATION

There are four materials for liquid. Within the valves configuration page, the right side is for the corresponding material configuration.



Using **↔** or **↓** move from DEICE configuration to material configuration.

7.1 Material Name

Press **ENTER** to choose different liquid material.



Use up/down arrow to view each material's settings and press **FINISH** to select the material. If **CHG** is pressed, system will start to edit the material name which is consist of 4 characters.

After finish editing the material name then press **DONE**.

7.2 BLAST RATE

BLAST: This is not applicable to the CS610.

7.3 APPLICATION RATES

RATE: There are 9 settings of the application rate for each material when the conveyor works in open or close loop.

Press **ENTER** and then **up/down** arrow to browse the rate setting values, and press **CHG** to edit the current rate value.

7.4 PLS/LT or PLS/GAL

Enter the pluses per liter or gallon if known.

Note: This number will automatically be generated as a result of the weight calibration process (Autocal) or input manually.

7.5 RECIRCULATE

Enter percentage of output when recirculation is running.

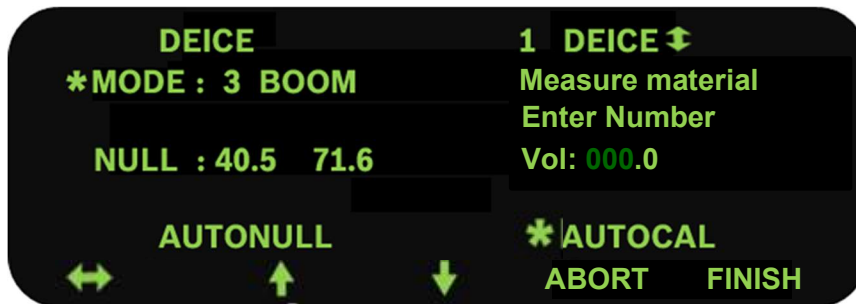
7.6 AUTOCAL

Here is the place to do the material calibration.

1. Place an adequate catch container under the spreader discharge chute.
2. Make sure that sufficient material in the hopper and the system is safe to run.
3. Set gate position.
4. Press **ENTER** to proceed.
5. Turn CONV knob to run.
6. Press **FINISH** when desired amount is reached.



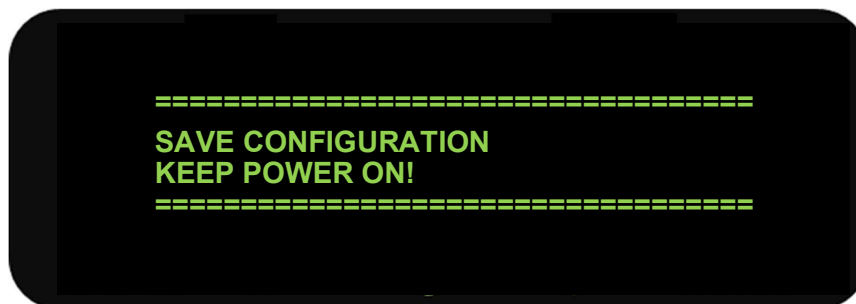
After press **FINSH**, it will go to the page to input the material weight to calculate the WT/REV and the result will be displayed on the screen.



8 DATA SAVING/LOADING/DISPLAYING

8.1 Save parameters to system

All the changes made on parameters will be updated and saved after press **EXIT** on the setup screen, system will also give a text message screen as below.



8.2 Display the trip and season totals

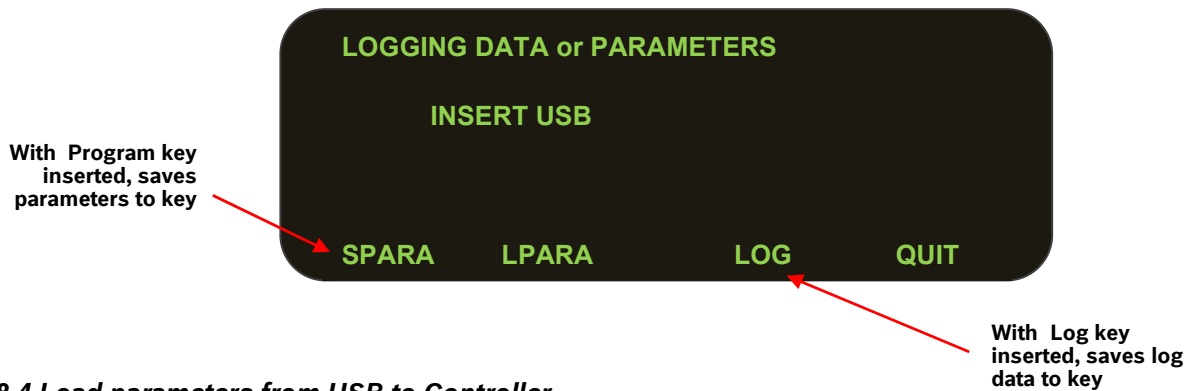
When truck is stopped, Press **TOTAL** to display trip and season totals.



Press **RESET** will go to clear the TRIP TOTALS, while SEASON TOTALS can only be cleared in the setup screen.

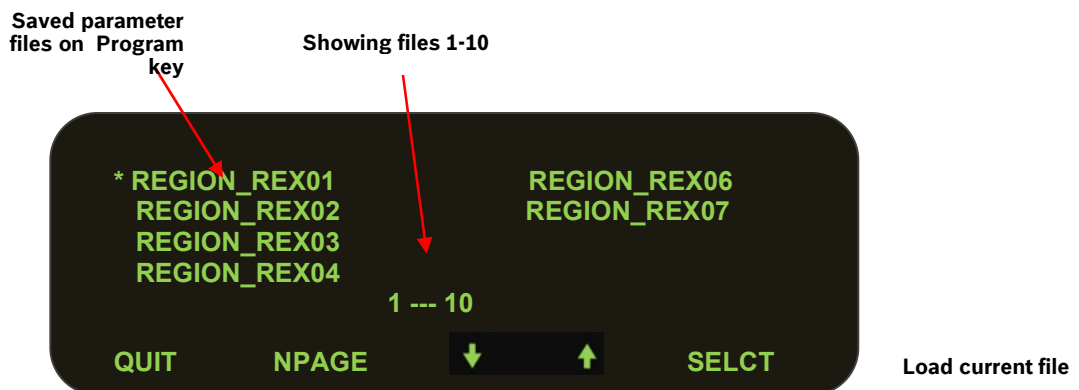
8.3 Save parameters to USB

Press **DATA**, insert program key and follow the hints on screen. Once “USB FOUND” appears, press **SPARA** will save all parameters on the USB with file name including region and truck names.

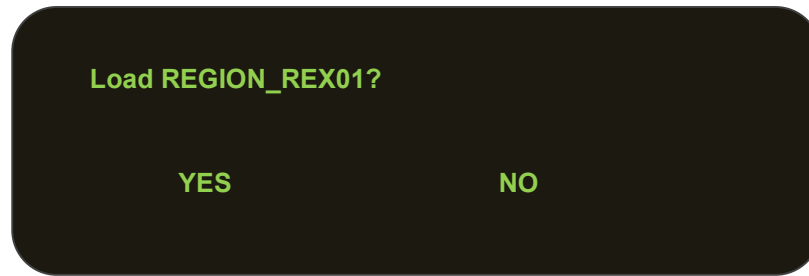


8.4 Load parameters from USB to Controller

It is also possible to load saved parameters from USB to controller on the screen. By pressing **LPARA**, It will list all the parameters files on the USB.



Use up/down arrow to navigate and press **SELECT** to load the desired parameter file.



Once confirmed all the parameters will be refreshed in the memory. To save the loaded parameters, it needs to enter the setup screen and exit normally.

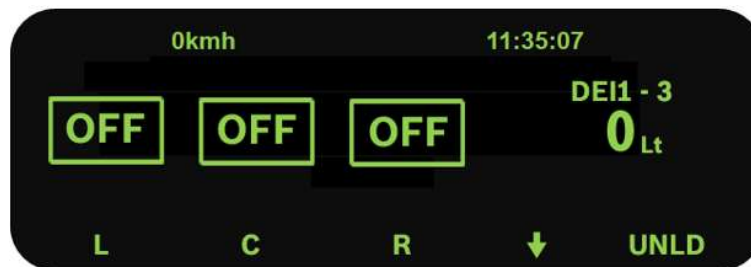
8.5 Save logging data to USB

When truck is stopped, Press **TOTAL** first, then press **DATA**, insert log key and follow the hints on screen. Except save/load parameters between USB and controller, Press **LOG** can also save all spreading log on the USB with file name including region and truck names. The text "SAVING..." will be gone after system saving the spreading log on the USB and clear it on the controller.

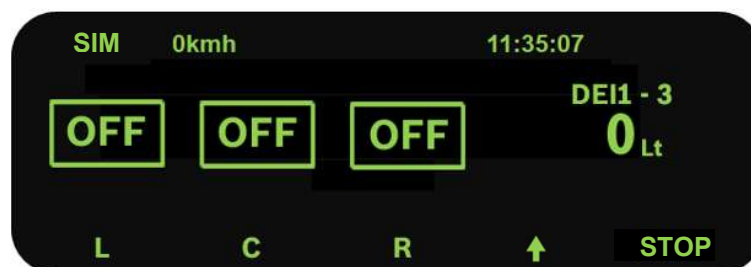
9 SUB Menus

9.1 SPEED SIMULATION

When truck is stopped, press **↓** go to the screen as below.



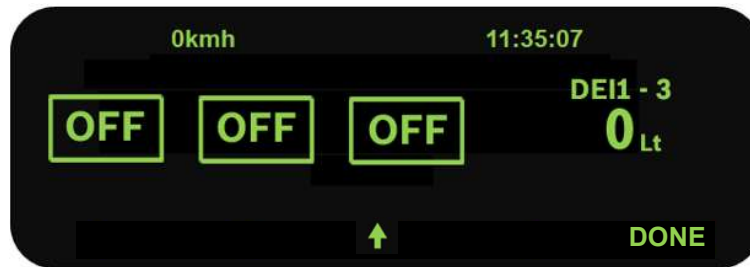
Press **SMSPD** to enter the screen of speed simulation.



- Make sure that the vehicle is stationary (ground speed = 0)
- Press UP and DOWN buttons to adjust simulated ground speed.
- Under the simulation mode, the system still counts the spreading information into log, so please clear that by resetting screen totals and retrieving logging data with USB.

9.2 Material change

Press the down arrow, then press once more to enter the sub, sub menu. If ←MAT is there, Press it to enter the material change screen.



Press **SOLID** to change solid material.

A reminder screen of the calibrated gate of new solid material will last for 5 seconds.

10 ERROR MESSAGES

A beep will come on for 4 seconds when an error occurs, then goes off. Some error codes show on the screen first and come back on 3 minutes later if it is not resolved, while others stay on the screen until power cycle or resolved.

Error Messages	Suggested Solution	Cycle power Needed?
BLAST2LONG	Turn off blast	No
OVERSPEED	Slow down, reset max speed	No
SPIN OUTPUT	Check cables, replace coil	Yes
COIL SHORT	Check cables, replace coil	Yes

11 UNLOAD

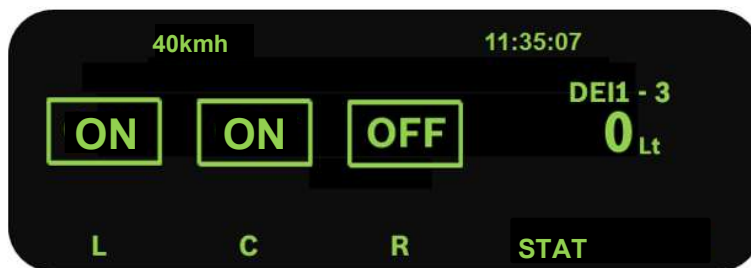
Press **UNLD** to unload and the text “UNLOADING” shows on the screen. (Note: The vehicle must be stationary.)



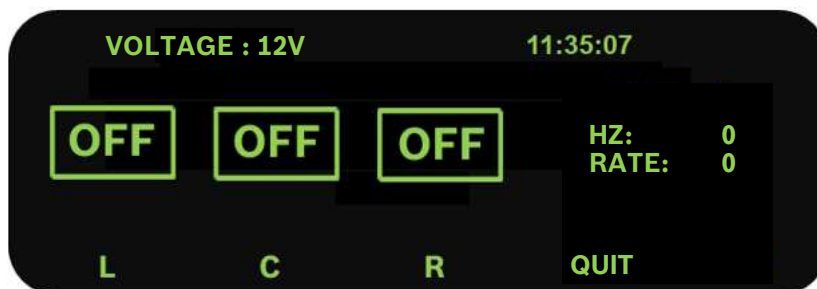
Turn the dials until the desired speed is achieved. Press **QUIT** to exit unload mode. Moving the vehicle will suspend the unload process. It will automatically resume when the truck is stopped again.

12 SPREADING SCREEN

When truck is moving, system will display spreading screen.



Press **STAT** will go to the diagnosis screen which displays the power voltage, actual flow meter frequency and rate.



13 PAUSE/RECIRCULATE

If recirculation is disabled in setup:

Press down the encoder knob to pause and press again to resume spreading. If paused when unit shut down, it will be paused on next boot.

If recirculation is manual in setup:

With no ground speed, press the down arrow on the operator screen, then press RECIR to enable recirculation. When there is ground speed, it will disable recirculation. It will then need to be re-enabled the same way.

If recirculation is auto in setup:

Whenever the pause button is pressed, recirculation is enabled. When the system is un-paused, it resumes normal spreading.

Remote pause optional by connecting a momentary switch to the digital inputs on the sensor cable. It can be activated/deactivated in parallel either from the knobs or remote switches.

14 UPDATE FIRMWARE

Copy the latest bin file to the root directory of USB Program Key and rename it to Rexroth2.bin, plug it into the USB port and then power on the controller, it will upgrade firmware automatically. Unplug the USB stick once “Verified” shown on the screen. If “Verified failed” appears, copy the bin file to a blank USB and try again.

15 LOGGING REPORT

15.1 Import the logging data to computer

Once logging data is saved on the USB memory stick (see section 8.3), it can be viewed on the computer with an Excel tool (CS530_Datalog.xlsm).

Press the button “Import Log Data” will check to see if a USB log key is present. If so, then truck data files will be read into and displayed at Data zone. A new dialog window will pop up to indicate the completion of import. The original log files will be deleted on the USB stick.

Region	Truck	Date	Start Time (secs)	Solid Material	Total Time (secs)	Total Distance (ml)	Spread Distance (ml)	Total Solid (lb)
TOROTO	TUCK03	03-08-2017	08:59:46	MAT4	00:57:25	42.81	42.67	4101
TOROTO	TUCK03	03-08-2017	09:57:11	SAND	00:09:53	5.83	5.74	1117
TOROTO	TUCK03	03-08-2017	10:31:52	MIXD	00:01:42	1.03	1.00	117
TOROTO	TUCK04	03-08-2017	10:33:51	MIXD	00:35:31	23.06	23.01	3005
WELLND	TUCK01	03-08-2017	08:59:46	MAT4	00:57:25	42.81	42.67	4101
WELLND	TUCK01	03-08-2017	09:57:11	SAND	00:09:53	5.83	5.74	1117
WELLND	TUCK01	03-08-2017	10:31:52	MIXD	00:01:42	1.03	1.00	117
WELLND	TUCK02	03-10-2017	09:04:24	MIXD	00:23:14	11.80	11.78	1551
WELLND	TUCK02	03-10-2017	09:27:38	MAT4	00:09:29	5.09	5.05	477
BURLIN	TUCK01	03-08-2017	08:59:46	MAT4	00:57:25	42.81	42.67	4101
BURLIN	TUCK01	03-08-2017	09:57:11	SAND	00:09:53	5.83	5.74	1117
BURLIN	TUCK01	03-08-2017	10:31:52	MIXD	00:01:42	1.03	1.00	117
BURLIN	TUCK02	03-08-2017	10:33:51	MIXD	00:35:31	23.06	23.01	3005

15.2 Select Report

All the logging data will be displayed in the data zone. It is also possible to select the logging data involving multiple trucks under a region.

When selecting data, if option **All Data** is selected and no specific truck is selected, then all the trucks in that region will be used. Further filtered report can be done by selecting truck name, date and time when **Specific** is selected.

- To select start and end of the date and hours

The screenshot shows the CS530 Logging V3.0 interface. At the top, there is a title bar with 'CS530 Logging' and 'V3.0'. Below this is a control panel with several sections:

- Import Log Data:** A button on the left.
- REGION:** A dropdown menu with options: TOROTO, WELLND, BURLIN, MAKHAM. 'TOROTO' is selected.
- TRUCK:** A text input field containing 'TUCK03' and 'TUCK04'.
- Filter Options:** Two radio buttons: 'All Data' (unselected) and 'Specific' (selected).
- Date and Time Selection:** 'From' and 'To' buttons, followed by date and time pickers. 'From' is set to 3/7/2017 and 'To' is set to 4/13/2017. Both have 'Midnight' selected in the time dropdown.
- Buttons:** 'Delete Truck' and 'Display Truck' buttons.

Below the control panel is a data table with the following columns: Region, Truck, Date, Start Time (secs), Solid Material, Total Time (secs), Total Distance (mi), Spread Distance (mi), and Total Solid (lb). The table contains 18 rows of data for various trucks and regions.

Region	Truck	Date	Start Time (secs)	Solid Material	Total Time (secs)	Total Distance (mi)	Spread Distance (mi)	Total Solid (lb)
TOROTO	TUCK03	03-08-2017	08:59:46	MAT4	00:57:25	42.81	42.67	4101
TOROTO	TUCK03	03-08-2017	09:57:11	SAND	00:09:53	5.83	5.74	1117
TOROTO	TUCK03	03-08-2017	10:31:52	MIXD	00:01:42	1.03	1.00	117
TOROTO	TUCK04	03-08-2017	10:33:51	MIXD	00:35:31	23.06	23.01	3005
WELLND	TUCK01	03-08-2017	08:59:46	MAT4	00:57:25	42.81	42.67	4101
WELLND	TUCK01	03-08-2017	09:57:11	SAND	00:09:53	5.83	5.74	1117
WELLND	TUCK01	03-08-2017	10:31:52	MIXD	00:01:42	1.03	1.00	117
WELLND	TUCK02	03-10-2017	09:04:24	MIXD	00:23:14	11.80	11.78	1551
WELLND	TUCK02	03-10-2017	09:27:38	MAT4	00:09:29	5.09	5.05	477
BURLIN	TUCK01	03-08-2017	08:59:46	MAT4	00:57:25	42.81	42.67	4101
BURLIN	TUCK01	03-08-2017	09:57:11	SAND	00:09:53	5.83	5.74	1117
BURLIN	TUCK01	03-08-2017	10:31:52	MIXD	00:01:42	1.03	1.00	117
BURLIN	TUCK02	03-08-2017	10:33:51	MIXD	00:35:31	23.06	23.01	3005

- Specific** allows to choose records within a selected timing frame

15.3 View Report

The logging reports will be displayed on the sheet called "Report" by clicking on 'Display Truck' after choosing the criteria at the above section. For example, here you can select region "Toronto" and truck "TUCK03".

CS530 Logging v3.0

Import Log Data

REGION

TOROTO

WELLND

BURLIN

MAKHAM

TRUCK

TUCK03

TUCK04

All Data

Specific

From 3/7/2017 Midnight

To 4/13/2017 Midnight

Delete Truck

Display Truck

Region	Truck	Date	Start Time (secs)	Solid Material	Total Time (secs)	Total Distance (ml)	Spread Distance (ml)	Total Solid (lb)
TOROTO	TUCK03	03-08-2017	08:59:46	MAT4	00:57:25	42.81	42.67	4101
TOROTO	TUCK03	03-08-2017	09:57:11	SAND	00:09:53	5.83	5.74	1117
TOROTO	TUCK03	03-08-2017	10:31:52	MIXD	00:01:42	1.03	1.00	117
TOROTO	TUCK04	03-08-2017	10:33:51	MIXD	00:35:31	23.08	23.01	3005
WELLND	TUCK01	03-08-2017	08:59:46	MAT4	00:57:25	42.81	42.67	4101
WELLND	TUCK01	03-08-2017	09:57:11	SAND	00:09:53	5.83	5.74	1117
WELLND	TUCK01	03-08-2017	10:31:52	MIXD	00:01:42	1.03	1.00	117
WELLND	TUCK02	03-10-2017	09:04:24	MIXD	00:23:14	11.80	11.78	1551
WELLND	TUCK02	03-10-2017	09:27:38	MAT4	00:09:29	5.09	5.05	477
BURLIN	TUCK01	03-08-2017	08:59:46	MAT4	00:57:25	42.81	42.67	4101
BURLIN	TUCK01	03-08-2017	09:57:11	SAND	00:09:53	5.83	5.74	1117
BURLIN	TUCK01	03-08-2017	10:31:52	MIXD	00:01:42	1.03	1.00	117
BURLIN	TUCK02	03-08-2017	10:33:51	MIXD	00:35:31	23.08	23.01	3005

Main Data Report

•Click **Display Truck** will go to Report Sheet

Region	Truck	Date	Start Time (secs)	Solid Material	Total Time (secs)	Total Distance (ml)	Spread Distance (ml)	Total Solid (lb)
TOROTO	TUCK03	03-08-2017	08:59:46	MAT4	00:57:25	42.81	42.67	4101
TOROTO	TUCK03	03-08-2017	09:57:11	SAND	00:09:53	5.83	5.74	1117
TOROTO	TUCK03	03-08-2017	10:31:52	MIXD	00:01:42	1.03	1	117
SubTotal					01:09:00	49.67	49.41	5335

Main_Data **Report**

15.4 Delete Truck

Truck data or region can be cleaned by clicking “delete Truck”. Warning message will pop out to confirm the operation.

The screenshot shows the CS530 Logging V3.0 interface. A 'Delete Truck' dialog box is open, displaying a warning: "Warning: The selected truck will be deleted!". Below the warning, it says "Press 'Yes' to proceed or 'No' to cancel." and has two buttons: "Yes" and "No".

The background interface includes a table with the following columns: Region, Truck, Date, Start Time (secs), Solid Material, Total Time (secs), and Total Distance (m). The table contains data for various trucks and regions, including TOROTO, WELLND, BURLIN, and MAKHAM.

Region	Truck	Date	Start Time (secs)	Solid Material	Total Time (secs)	Total Distance (m)
TOROTO	TUCK03	03-08-2017	08:59:46	MAT4	00:57:25	42.81
TOROTO	TUCK03	03-08-2017	09:57:11	SAND	00:09:53	5.83
TOROTO	TUCK03	03-08-2017	10:31:52	MIXD	00:01:42	1.03
TOROTO	TUCK04	03-08-2017	10:33:51	MIXD	00:35:31	23.06
WELLND	TUCK01	03-08-2017	08:59:46	MAT4	00:57:25	42.81
WELLND	TUCK01	03-08-2017	09:57:11	SAND	00:09:53	5.83
WELLND	TUCK01	03-08-2017	10:31:52	MIXD	00:01:42	1.03
WELLND	TUCK02	03-10-2017	09:04:24	MIXD	00:23:14	11.80
WELLND	TUCK02	03-10-2017	09:27:38	MAT4	00:09:29	5.09
BURLIN	TUCK01	03-08-2017	08:59:46	MAT4	00:57:25	42.81
BURLIN	TUCK01	03-08-2017	09:57:11	SAND	00:09:53	5.83
BURLIN	TUCK01	03-08-2017	10:31:52	MIXD	00:01:42	1.03
BURLIN	TUCK02	03-08-2017	10:33:51	MIXD	00:35:31	23.06