

# Rexroth - 440RC Solid De-icer Controller Short Form Configuration & Setup Manual

The Drive & Control Company



**TABLE OF CONTENTS**

**TABLE OF CONTENTS ----- 1**

**1 OVERVIEW-----2**

**2 CONFIGURATION AND SETUP SECTION-----3**

    2.1 Configuration and setup process-----3

    2.2 Making changes to settings-----3

**3 System configuration -----3**

**4 Sensors and valves configuration-----4**

    4.1 Calibrating the gate “Read Back” Sensor. -----5

    4.2 Selecting the Road Temp Sensor-----6

    4.3 Calibrating the ground speed sensor-----6

        4.3.1 Overview -----6

        4.3.2 Driving the vehicle over a measured distance. -----7

        4.3.3 Auto-calibration using a hand held GPS unit -----8

        4.3.4 Auto-calibration using the GPS provider’s ground speed signal. -----8

        4.3.5 Auto-calibration using the vehicle’s speedometer. -----8

        4.3.6 The auto calibration Procedure-----9

        4.3.7 Verification of ground speed.----- 10

**5 Material Setup configuration ----- 11**

    5.1 Naming the Materials ----- 11

    5.2 Calibration Procedure ----- 11

    5.3 Gate setting for calibration----- 11

    5.4 Automatic Calibration of Solids----- 12

    5.5 Verifying Calibration with simulated ground speed----- 13

    5.6 Automatic Calibration of Liquids----- 14

**6 Error configuration ----- 16**

    6.1 Operational Errors ----- 16

    6.2 Input and Output Errors ----- 16

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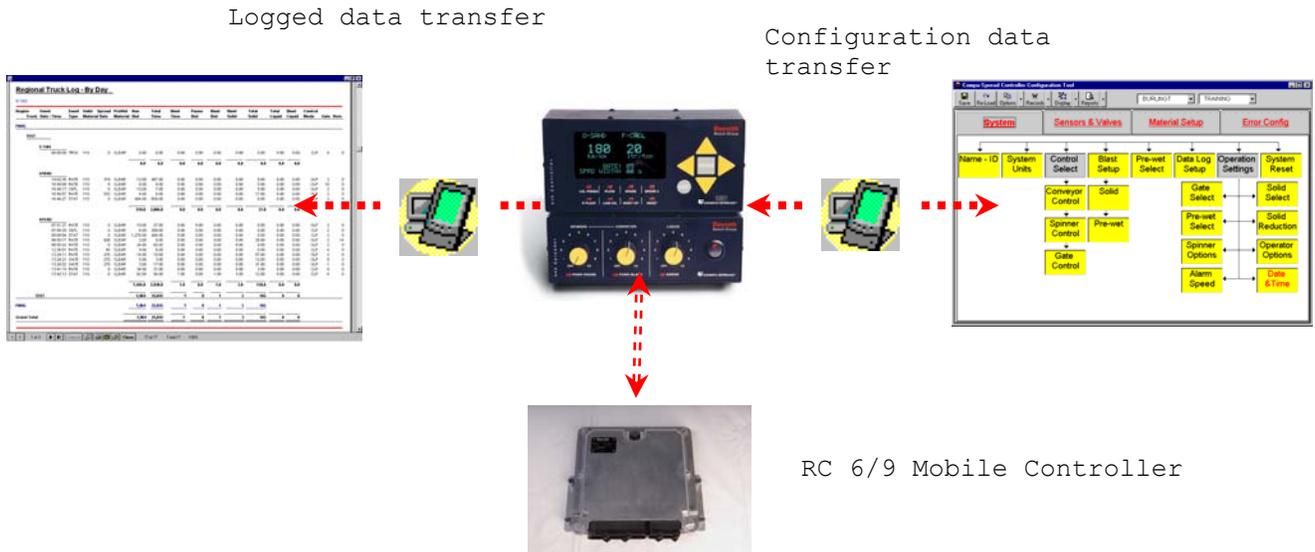
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# 1 OVERVIEW

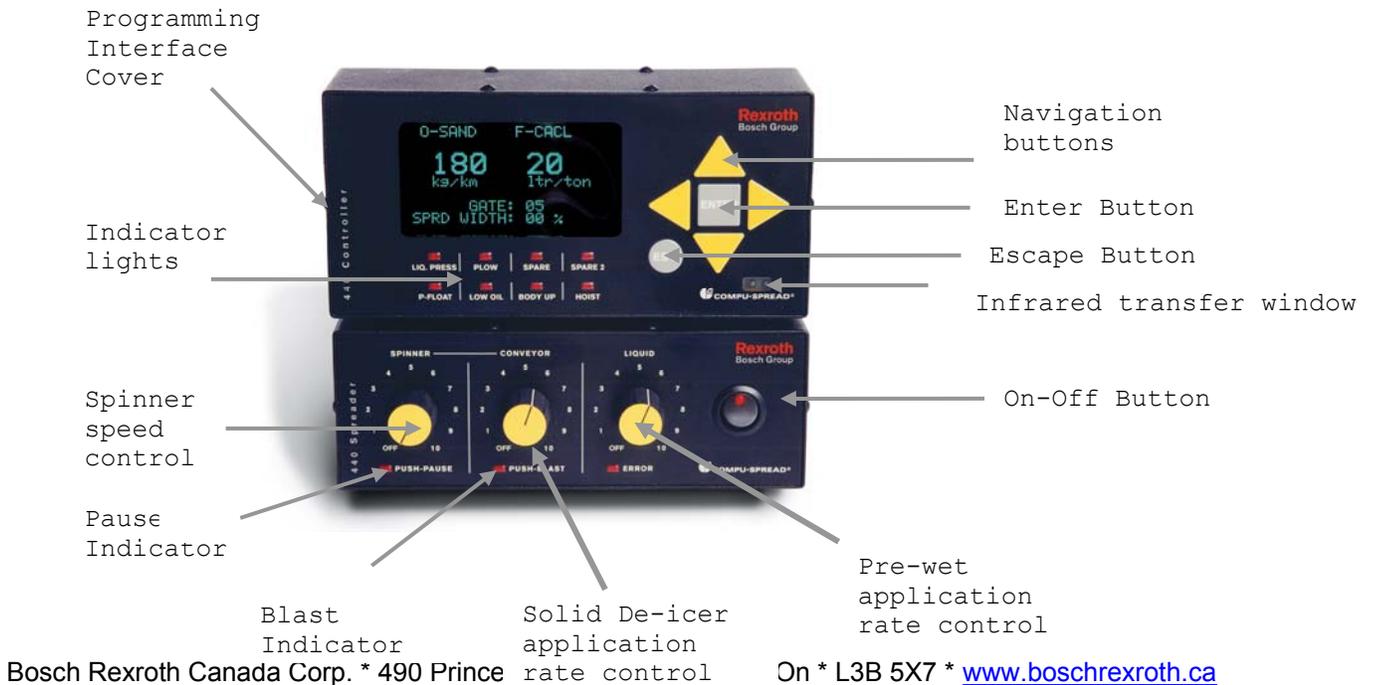
The logged data can be downloaded via Palm Pilot technology to the computer-based software.

Configuration data can be transferred via the Palm Pilot technology both to the computer as well as from the computer back to the CS-440RC.

The system can be configured directly into the CS-440RC in the vehicle or a standard configuration can be generated in the computer software and transferred to the CS-440RC. This technique saves time, as much of the configuration data is the same for all vehicles and in this manner configuring only needs to be done once.



## CS-440RC FRONT LAY OUT



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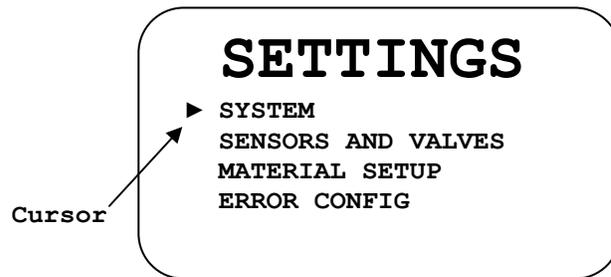
## 2 CONFIGURATION AND SETUP SECTION

This section is a reference guide for those experienced in the process of configuring and setting up a CS-440RC system

### 2.1 Configuration and setup process

To set up the CS-440RC a programming key is needed, this is to prevent unauthorized personnel from making adjustments. Make sure only authorized staff has access to the key.

Insert the key and turn same ¼ turn, the following screen will appear:



Using the navigation button move the cursor to the area to be configured and press the Enter button.

### 2.2 Making changes to settings

Use the right or left navigation button to move the cursor under the number or letter to be changed.

Use the up or down navigation buttons to change the number or letter.

Once the changes have been made, press the Enter button.

Press the Escape button to return to previous screen.

## 3 System configuration

Enter SYSTEM

1. Enter NAME-ID
  - A. Name the Region
  - B. Identify the truck
2. Enter SYSTEM UNIT  
Select the Units of Measurement
3. Enter Control Mode
  - A. Enter CONVEYOR  
Select the Mode of Control
  - B. Enter SPINNER  
Select the Mode of Control
  - C. Enter GATE  
Select the Mode of Control

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4. Enter BLAST MODE
  - A. Enter SOLID  
Select the Mode of Control
  - B. Enter PREWET  
Select the Mode of Control
5. Enter PREWET MODE  
Select the Mode of Control
6. Enter PASSWD+SIMSPD+LIQ  
Select the Mode of Control
7. Enter OPERATION SETTING
  - A. Enter OPERATOR OPTIONS
    - A1. If NONE is selected:  
Enter GATE SETTING  
Set the operational gate setting desired  
Enter SOLID SELECT  
Set the Material desired  
Enter PREWET SELECT  
Set the Pre-wetting liquid desired
    - A2. If MATerial is selected  
Enter GATE SETTING  
Set the operational gate setting desired  
Enter PREWET SELECT  
Set the Pre-wetting liquid desired
    - A3. If GATE is selected  
Enter SOLID SELECT  
Set the Material desired  
Enter PREWET SELECT  
Set the Pre-wetting liquid desired
    - A4. If MATerial + GATE is selected  
Enter PREWET SELECT  
Set the Pre-wetting liquid desired
    - A5. If MATerial + GATE + MODE is selected  
Do not set any other options
  - B. Enter SOLID REDUCTION  
Set the spread rate reduction as desired
  - C. Enter SPINNER OPTIONS  
Set the Mode of Spinner "STOP AT" desired
  - D. Enter ALARM SPEED  
Set the speed at which the alarm is to be activated
  - E. Enter DATE & TIME  
Set the Minutes, Hour, Date, Month and Year

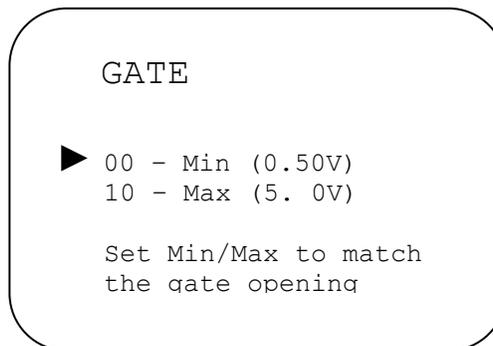
#### **4 Sensors and valves configuration**

Enter SENSORS & VALVES

1. Enter CONVEYOR SETUP
  - A. Enter CONVEYOR SENSOR  
Set the pulses per revolution for the conveyor speed sensor
  - B. Enter AUTO NULLING  
Complete the Auto Nulling process
  - C. Enter VALVE SETTINGS
    - C1. Set the Forward Gain desired
    - C2. Set the rates desired while spreading in the manual mode  
The rates are a percentage of conveyor speed and the default settings are normally acceptable.

- C3. Set MAX OUTPUT Blast rate desired  
If BLAST is operated in the MAX OUTPUT Mode the spread rate is a percentage of conveyor speed and this can be adjusted here to suit.
- 2. Enter SPINNER SETUP
  - A. Enter SPINNER SENSOR  
Set the pulses per revolution if this option is in use
  - B. Enter AUTO NULLING  
Complete the Auto Nulling process if the spinner is equipped with a speed sensor
  - C. Enter VALVE SETTINGS
    - C1. Complete the Minimum and Maximum Nulling procedure
    - C2. Adjust the percentage of spinner speed settings if desired,  
The rates are a percentage of spinner speed and the default settings are normally acceptable.
    - C3. If the system is equipped with a Positive Placement System  
Enter the spinner maximum RPM  
Enter the PPS factor
- 3. Enter the PREWET SETUP
  - A. Enter SPINNER SENSOR  
Set the pulses per revolution if this option is in use
  - B. Enter AUTO NULLING  
Complete the Auto Nulling process  
Note: remove spray bar nozzles before nulling
- 4. Enter the GATE SETUP  
If a gate read back sensor is installed and this mode of gate control has been selected, complete the Read Back Sensor calibration.

#### 4.1 Calibrating the gate "Read Back" Sensor.



Setting the MIN calibration:

1. Close the Hopper gate to its minimum opening
2. Measure this opening
3. Using the navigation buttons, move the cursor to the "00 Min" option and press the enter button.
4. Use the right or left navigation button to move the cursor under the number to be changed.
5. Using the up or down navigation buttons change the setting to match the gate opening
6. Note: the Volts reading will change to reflect the actual reading from the sensor.
7. Once the numbers have been changed to match the gate opening, press the enter button.

Setting the Max calibration:

1. Open the Hopper Gate to its maximum opening
2. Measure this opening
3. Using the navigation buttons, move the cursor to the "10 Max" option and press the enter button.
4. Use the right or left navigation button to move the cursor under the number to be changed.
5. Using the up or down navigation buttons change the setting to match the gate opening
6. Note: the Volts reading will change to reflect the actual reading from the sensor.
7. Once the numbers have been changed to match the gate opening, press the enter button.

Press the Escape button twice to return to the first screen.

With a gate cylinder.

1. Use the down arrow to the bottom of the screen to move the gate down then follow steps 3-7 on the MIN calibration
2. Use the up arrow to the top of the screen to move the gate up then follow steps 3-7 on the MAX calibration

#### 4.2 *Selecting the Road Temp Sensor*

Select the desired make of Temperature Sensor to be used.

#### 4.3 *Calibrating the ground speed sensor*

##### 4.3.1 *Overview*

The CS-440RC Controller determines ground speed by monitoring the pulses it receives from the ground speed sensor mounted in the vehicle transmission. This sensor is the same sensor providing the vehicle's odometer with the necessary input for the odometer to have the ability to indicate speed and distance.

In order for the CS-440RC to have the ability to calculate ground speed and distance it must first be accurately calibrated. The process of calibration tells the CS-440RC exactly how many pulses per KM or Mile it will receive from the transmission mounted sensor.

The process of calibration needs to be completed for each vehicle, as each vehicle's system is not exactly the same. Discrepancies may occur due to sensor mounting differences, tire sizes differences etc. thus calibrating each vehicle independently is the only way of ensuring accuracy.

There are a number of methods for calibrating the ground speed input and each method may result in varying levels of accuracy. Listed below are the most common techniques which may be used, the accuracy level for each technique is reflected in the numbering with number one (1) being the most accurate.

1. Driving the vehicle over a measured distance. By measuring out the distance of one (1) KM for metric system users or one (1) Mile for Imperial system users and driving the vehicle over this measured distance allows the CS-440RC to count the pulses it receives over this distance. This pulse count can then be entered into the "Pulses per KM/Mile screen and once this value has been entered the CS-440RC ground speed is properly calibrated.

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2. Auto-calibration to a hand held GPS unit. By driving the vehicle at a predetermined speed using a handheld GPS unit as the speed indicator. Using a hand held GPS unit will result in greater accuracy than using the vehicle speedometer. The accuracy level is only as accurate as the GPS Unit's calibration. During the calibration process the CS-440RC will determine the pulses per KM or Mile; this count will be reflected on the "Speed input" screen once the auto calibration process has been completed.
3. If the vehicle is equipped with a GPS system, auto-calibration to the GPS provider's ground speed signal. By driving the vehicle at a predetermined speed using the GPS provider's ground speed signal as the speed indicator. The accuracy level is only as accurate as the GPS system's calibration. During the calibration process the CS-440RC will determine the pulses per KM or Mile; this count will be reflected on the "Speed input" screen once the auto calibration process has been completed.
4. Auto-calibration to the vehicle's speedometer. By driving the vehicle at a predetermined speed using the vehicle's speedometer as the speed indicator. The accuracy level is only as accurate as the speedometer calibration. During the calibration process the CS-440RC will determine the pulses per KM or Mile; this count will be reflected on the "Speed input" screen once the auto calibration process has been completed.

#### 4.3.2 *Driving the vehicle over a measured distance.*

Accurately measure out a distance of one (1) KM or one (1) Mile on a low traffic volume section of road and mark the starting and end point with clearly visible markers.

Drive the vehicle to the starting point and stop with the vehicle's front bumper in line with the marker.

On the CS-440RC, press the Escape button. (The programming key is not needed for this).

With the cursor arrow pointing at "Transaction screen", press "Enter"

The top line of the transaction screen will reflect "XXXXX KM/Mile Total Dist Traveled"

Press the Escape button to leave the Transaction screen and press the Escape button again to reenter the

With the cursor arrow pointing at "Transaction screen", press "Enter"

The top line will now read "XXXXX Pls Total dist. Traveled",

Press the Enter button to reset all values to Zero (0)

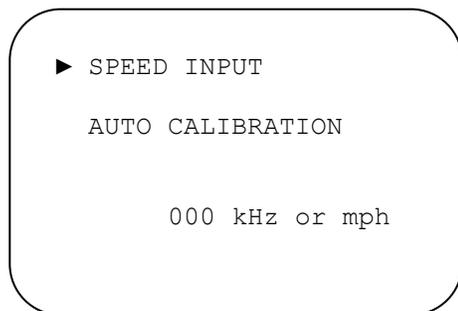
Drive the vehicle over the measured KM/Mile and stop with the front bumper in line with the End point marker.

On the CS-440RC, press the Escape button. (The programming key is not needed for this).

With the cursor arrow pointing at "Transaction screen", press "Enter"

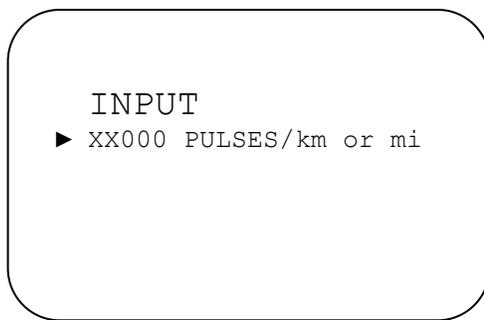
The top line will now read "XXXXX Pls Total dist. Traveled", write down the number of pulses indicated.

Insert the programming key and Select "SENSORS AND VALVES", and select "GRND SPD SENSOR", the following screen will appear:



With the cursor arrow pointing at "Speed input" Press Enter and the following screen will appear:

Press the Enter button to enter the SPEED INPUT phase.



Using the left or right navigation button, move the cursor under the number to be changed.

Using the up or down navigation button, enter the correct pulses per KM/Mile.

Once all the numbers have been changed, press the enter button.

#### 4.3.3 Auto-calibration using a hand held GPS unit

Follow the auto calibration procedure below, hold the vehicle speed to the speed indicated on the hand held GPS unit.

#### 4.3.4 Auto-calibration using the GPS provider's ground speed signal.

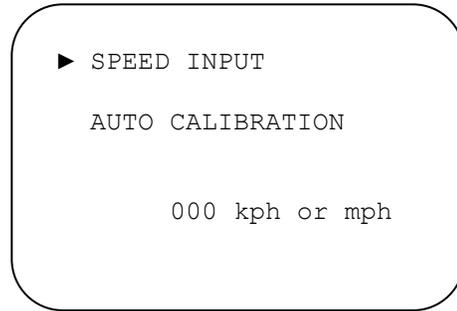
Follow the auto calibration procedure below, hold the vehicle speed to the speed indicated on the GPS provider's system. Note: cell phone communication with the GPS provider will be necessary.

#### 4.3.5 Auto-calibration using the vehicle's speedometer.

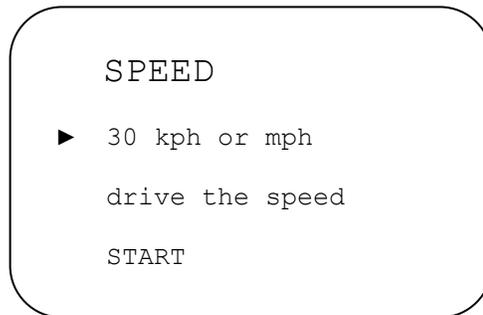
Follow the auto calibration procedure below, hold the vehicle speed to the speed indicated on the vehicle's speedometer.

#### 4.3.6 The auto calibration Procedure

Select "SENSORS AND VALVES", and select "GRND SPD SENSOR", the following screen will appear:



Using the navigation button move the cursor to the "AUTO CALIBRATION" and press the enter button, the following screen will appear:

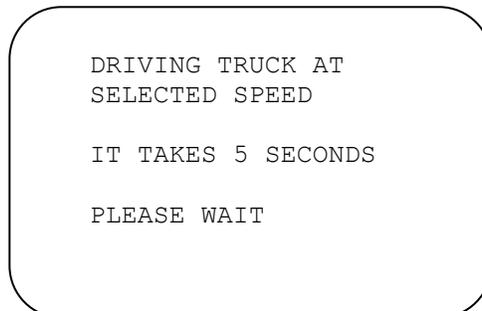


Press 'ENTER' and set the speed at which you will be driving during the calibration process.

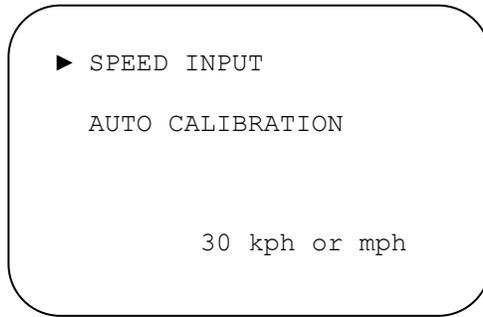
Use the right or left navigation button to move the cursor under the number to be changed, use the up or down navigation buttons to set the speed. Once the speed has been set, press the Enter button.

Use the down navigation button to move the cursor to the "START" position.

Drive the vehicle at the speed entered above, once the vehicle is steady at this speed press the Enter button and the following screen will appear:



Hold the vehicle speed steady while this screen is on the display, once this screen disappears and returns to the previous screen, the calibration is complete.



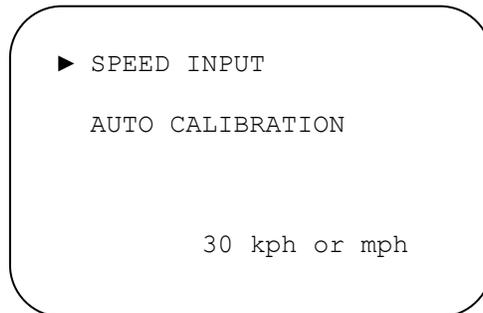
The speed at which you are driving will now be reflected on the screen in the lower, right hand corner.

*4.3.7 Verification of ground speed.*

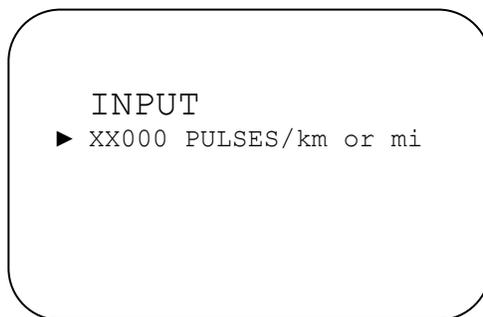
If ground speed verification is carried out, for example using a hand held GPS navigator and the ground speed is found to be inaccurate, an adjustment in the pulses per KM or Mile can be made on the "SPEED INPUT" screen to correct this.

During the verification process the following screen would be on the display.

While driving the vehicle, the vehicle speed reading on this screen is compared to the GPS speed reading.



If the speed calibration is off, Press the Enter button to enter the SPEED INPUT phase.



Using the left or right navigation button, move the cursor under the number to be changed.

Using the up or down navigation button, change the pulses per kilometer or mile as required to correct the inaccuracy.

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Once all the numbers have been changed, press the enter button.

Press the Escape button three (3) times to return to the first screen.

## 5 Material Setup configuration

### 5.1 Naming the Materials

Enter MATERIAL SETUP

1. Enter SOLID 1

A. Name the material – remove any dashes behind the name to maintain clean print outs.

B. Set the spread rates desired

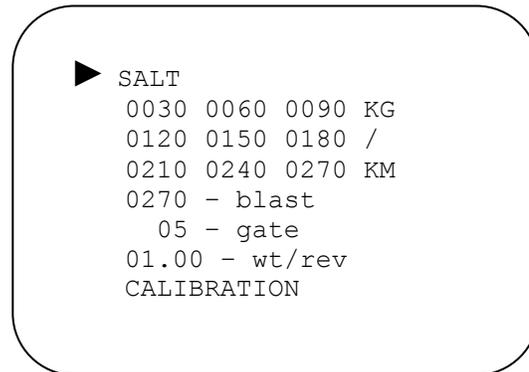
C. Set the Blast Rate desired if BLAST is operated in Closed Loop

D. Set the Gate setting in use during calibration, the normal operating gate setting is recommended. See section 5.3

E. Complete the Automatic Calibration process.

### 5.2 Calibration Procedure

Select "MATERIAL SETUP", select the desired solid, the following screen will appear:



### 5.3 Gate setting for calibration

**Manual gate** - Enter the GATE setting to be used during the calibration procedure.

**Gate readback** - Move the hopper gate and the controller will change it automatically after the calibration process.

**Closed loop gate** (hydraulic cylinder) - Enter the gate position the calibration is to be performed at, and the gate will move automatically to that position.

#### 5.4 Automatic Calibration of Solids

Select "MATERIAL SETUP" and select desired solid, the following screen will appear:

```
▶ SALT
  0030 0060 0090 KG
  0120 0150 0180 /
  0210 0240 0270 KM
  0270 - blast
      05 - gate
  01.00 - wt/rev
  CALIBRATION
```

Use the down navigation button to move the cursor to "CALIBRATION" and press the enter button. The following screen will appear:

```
SYSTEM WILL RUN!

▶ START
```

NOTE: THE SCREEN MESSAGE IS A WARNING THAT THE SYSTEM WILL RUN DURING THE CALBRATION PROCESS, MAKE SURE ALL PERSONNEL IS CLEAR OF MOVING PARTS.

Operate the truck engine at 1500 RPM to ensure good hydraulic oil flow.

Material will be discharging from the vehicle during the calibration process, a means of collecting this material will be necessary.

Use the down navigation button to move the cursor to "START" and press the enter button. The following screen will appear:

```
SYSTEM RUNNING!

SELECT NORMAL RATE.
CHECK THE MATERIAL
BEING SPREAD

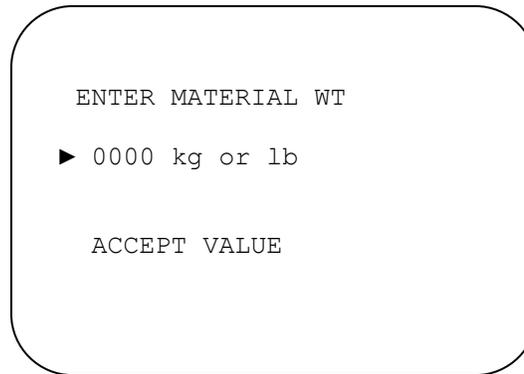
▶ ENTER TO STOP
```

Set the Conveyor button to 3

The system will now be running and material is discharging from the vehicle.

Allow the system to run for several minutes.

Press the enter button to stop the calibration process. The following screen will appear:



Weigh the material discharged from the vehicle during the calibration process.

Press the Enter button and using the right/left navigation arrows move the cursor under the number to be changed.

Using the Up/Down navigational arrow, enter the weight of the material. Once the proper weight has been entered, press the Enter button

Using the Down navigational arrow, move the cursor to "ACCEPT VALUE"

Press the Enter button again to confirm acceptance of the weight value, the screen will return to the starting screen.

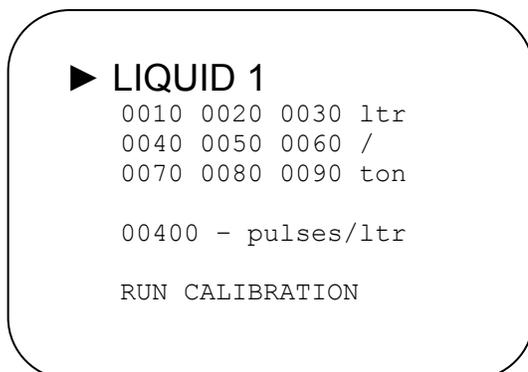
### 5.5 Verifying Calibration with simulated ground speed

Obtain a material catch container with a known volume and weight capacity. The higher the capacity , the more accurate it will be. Calculate the time required to fill the box with a specific rate and vehicle speed.

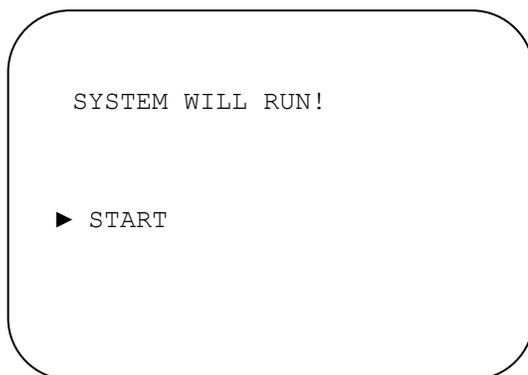
1. Place the catch box under the chute
2. Set the simulated ground speed to the determined speed –
  - a. press enter then escape and release both at the same time
  - b. use the up arrow button to increase the speed by 5km/mile increments.
  - c. Press escape to see the status screen and monitor the speed
3. Pause the unit by pushing the spinner dial
4. Set the conveyor rate
5. increase the engine RPM to 1500 to achieve good hydraulic flow
6. Un-pause the conveyor and time the discharge
7. Pause the conveyor when the time has elapsed.
8. If the box is low, change the wt/rev value lower. If it has overflowed then change the value higher.
9. Repeat the test until the container fills
10. Cycle the CS-440 power to stop the speed simulation

## 5.6 Automatic Calibration of Liquids

Select "MATERIAL SETUP" select desired MATERIAL A and press Enter, the following screen will appear:



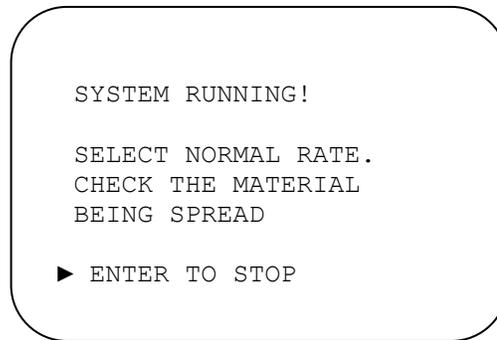
Use the down navigation button to move the cursor to "RUN CALIBRATION" and press the enter button. The following screen will appear:



Note: the screen message is a warning that the system will run during the calibration process, make sure all personnel is clear of moving parts. Operate the truck engine at 1500 RPM to ensure good hydraulic oil flow.

Liquid will be discharging from the spray bar during the calibration process, a means of collecting this material will be necessary.

Use the down navigation button to move the cursor to "START" and press the enter button. The following screen will appear:

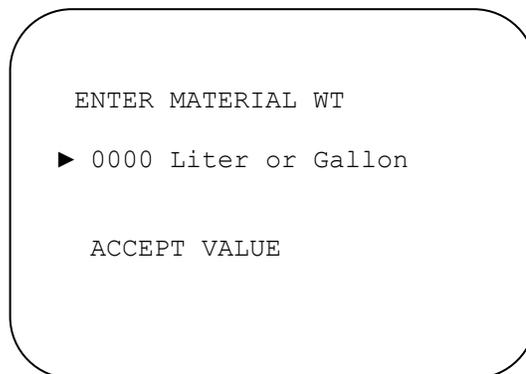


Set the Pre-wet application rate button to 3

The system will now be running and material is discharging from the vehicle.

Allow the system to run until the CALIBRATED catch pail is almost full

Press the enter button to stop the calibration process. The following screen will appear:



Check the volume in the CALIBRATED catch pail and enter this value into the controller.

Press the Enter button and using the right/left navigation arrows move the cursor under the number to be changed.

Using the Up/Down navigational arrow, enter the volume of the material.

Once the proper volume has been entered, press the Enter button

Using the Down navigational arrow, move the cursor to “ACCEPT VALUE”

Press the Enter button again to confirm acceptance of the weight value, the screen will return to the starting screen.

## **6 Error configuration**

### *6.1 Operational Errors*

1. Enter OPERATION errors
  - A. Enter UNDER APPLICATION  
Set the Time delay desired before the alarm is activated for this error
  - B. Enter ACTION  
Set the desired Action for the system to enter into after the operator acknowledges the alarm
  - C. Repeat the above for each of the Operation errors

### *6.2 Input and Output Errors*

1. Enter INPUTS AND OUTPUTS errors  
Complete the above for each of the Inputs and Outputs error