OPERATORS MANUAL FOR CS-230 CLOSED LOOP CONTROLLER

Model CS-230 Operators Manual

- User Friendly
- Simplicity in front face controls layout
- Menu options added or removed as required
- Detented spread width and application rate knobs
- Blast function
- Stationary unload feature
- Auger/Conveyor reverse and pause functions
- Remote pause and blast feature

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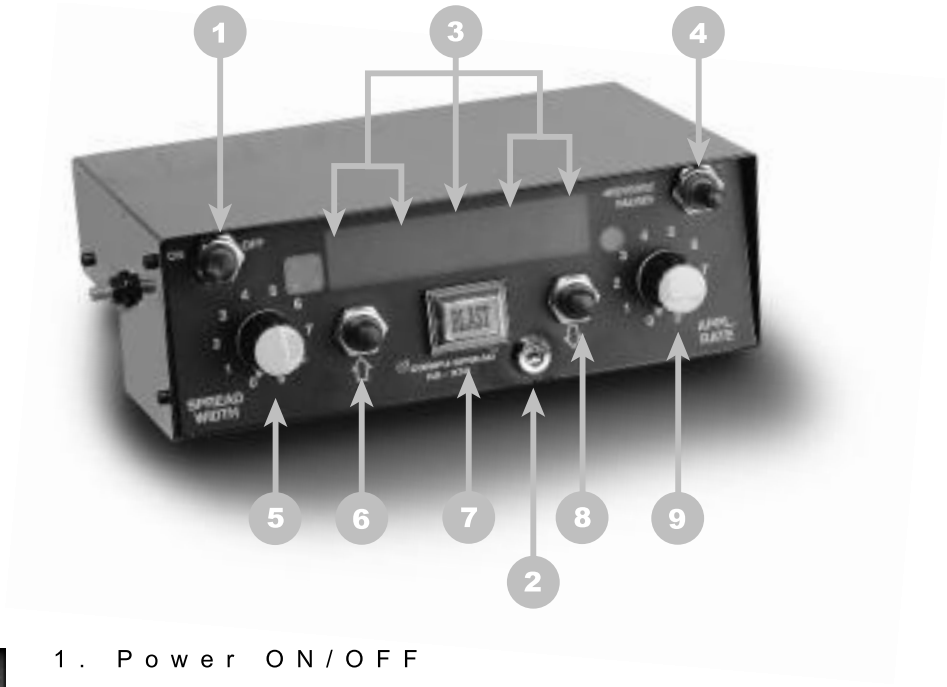
F U N C T I O N A L P U R P O S E

The CS-230 spreader control system is designed to simplify the once complicated operation of older control consoles. The operator now simply selects a desired application rate and spread width and the CS-230 will make the necessary adjustments to maintain uniform material application relative to truck speed.

By doing this the operator no longer needs to concern himself with spreader operation, he may now focus his attention on the operation of plow equipment and driving responsibilities. The front console layout has been designed to reflect the traditional layout of a manual spreader control block, thus allowing an easy transition for understanding and operating the CS-230 control functions.

INTRODUCTION TO THE FRONT FACE CONTROLS

NOTE: This section pertains to driver activated operations only. For Calibration and data logging, please refer to module 6C in the Compu-Spread manual.



1. Power ON/OFF

Turns the control unit on and off. The digital display will light up when the switch is in the ON position.

2. Programming Key

Used only to modify parameter values in programming mode. Not required in operational mode.

3. Digital Readout

The digital display (depending on the program installed) will display all critical controller menu screens.

4. Reverse / Pause

This toggle switch, when moved to the left, will reverse the rotating direction of the auger. When moved to the right, it will pause the Spinner and Auger / Conveyor circuit.

5. Spread Width

Controls the width of the spread pattern, by increasing or decreasing the speed of the spinner motor.

6. Increment Up

This allows you to achieve two functions:

- To move up through the various menu displays available.
- To increase the numeric value displayed on the right of the screen.

  eg. LD > SALT

  If the arrow symbol is flashing you can use the increment up button to change the load type to one of the three other available loads.

7. BLAST

This illuminated button allows you to achieve two functions:

- When the truck is running you may press BLAST to go to a higher than selected Application Rate.
- BLAST may be used when the truck is stationary to give access to change the numeric value of a function that is displayed on the left of the screen.

8. INCREMENT DOWN

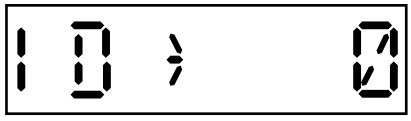
This allows you to achieve two functions. Both of these functions are the reverse of Item 6 “INCREMENT UP”.

9. APPLICATION RATE

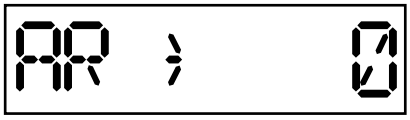
Allows you to select the weight per distance of travel required for each specific material. eg. 100 kg/km or 100 lbs/mi.

INTRODUCTION TO THE DISPLAY MENU

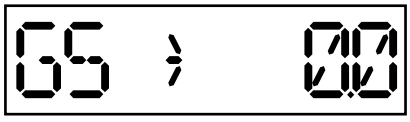
Note: Below are all the displays that are available. However, depending on the program installed when the controller was commissioned, some or all of the displays may be programmed not to appear.



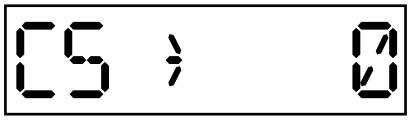
ID - Driver Identification Number. Initially, upon power up, the user will be prompted to enter an ID#. An ID# is usually only required when operating in GTS logging mode. If an ID# is required, use the increment up/increment down buttons to select your number. Lock it in by pressing BLAST. To exit the ID screen, when no ID is required, press BLAST.



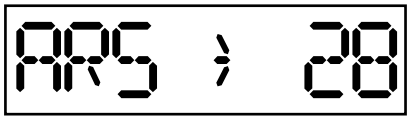
AR - Actual Application Rate. This shows the current rate of application. If the truck is stopped or there is no spreading activity, the application rate (AR) should display 0.



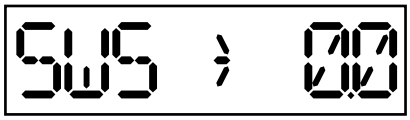
GS - Ground Speed. Displays actual truck speed. This value should match the truck speedometer reading.



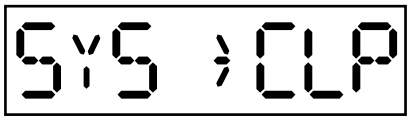
CS - Conveyor Speed. This is the speed, in R.P.M., that the conveyor speed sensor is measuring. Usually the sensor is measuring the motor speed not the gearbox or chain reduced speed of the conveyor drive roll.



ARS - Application Rate Selected (kg/km or lbs/mile). This will continuously display the selected application rate regardless of truck operation.



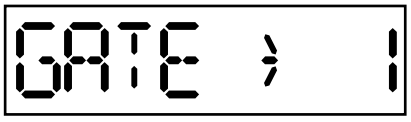
SWS - Spread Width Selected. This displays the selected spinner speed as a percentage of maximum allowable speed.



SYS - System Operation Mode either:

- CLP - closed loop
- OLP - open loop
- MAN - manual

NOTE: Box should be operating in CLP (closed loop mode) at all times.

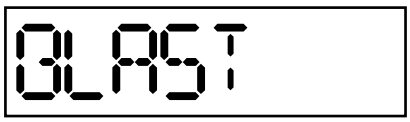


GATE - Gate position setting, range 1-10

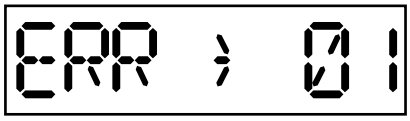
Load - Type of material load. Will display preprogrammed name of a particular material. For example:

- salt
- sand
- mix
- calc.

Unload - This is used to designate the stationary unloading of material.



BLAST - This flashing word will appear while in the BLAST Mode.



ERR - The self-diagnostics of the CS-230 will announce on the screen any detected control problems via the ERR display plus a two digit number that identifies the problem. Error number designation is covered later in this manual. See page 12.

NOTE 1: Not all of these displays need to be left available for operator use. Many are useful only at calibration or troubleshooting and can be confusing if left available during regular operation. Therefore, the readout display can be customized to fit requirements for all applications. The module 6C covers “Readout Display Selection” in the Calibration section.

NOTE 2: The display will always return to the AR display each time the CS-230 is switched on regardless of the last display used.

This on-screen symbol notifies you that you can alter the value of the presently displayed item. If the display is constantly ON you cannot alter that particular function without taking further steps.

If this symbol is blinking on and off you are now able to change the value of that displayed item using the up and down increment buttons.

This section of the display gives a numeric value to the item presently existing to the left of the display. eg. AR 100 This could mean the Actual Application Rate at that time is 100 kg/km or 100 lbs/mile.

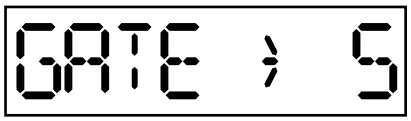
O P E R A T I O N

I N I T I A L O P E R A T I O N S T E P S

These steps should be taken or checked prior to setting out on each spreading route.

1. Use Power ON/OFF toggle to ensure power is on. A lighted display will signify power is on.

2. Increment up to the Display



The indicated value must match the physical gate opening. eg. if the gate is open 5 inches or at setting 5 then the CS-230 readout should also read 5.

NOTE: for auger application, this value should always remain at the setting 5.

If the value on the CS-230 does not match the physical gate opening, follow these simple steps:

A. Press the BLAST button to give access to change the numeric value.

Symbol should now be flashing

B. Use the up or down increment buttons to enter a value that matches the gate opening.

C. When selected simply push BLAST again to lock in the new value. The symbol as shown will no longer flash.

WARNING: An incorrect gate opening can cause spreading control error in the range of 1000%. Therefore, it is critical to match the CS-230 readout with the actual physical gate position.

INITIAL OPERATION STEPS CONTINUED

3. Increment Up to LOAD

The Load name must match the actual load that you are spreading. eg. If you are spreading salt, the word SALT must appear as load name.

NOTE: To change this valve simply press BLAST so that the arrow symbol flashes. Press the arrow up or down button to change the load name.

WARNING: An incorrect load setting in the CS-230 that doesn't match the actual assigned name of the physical truck load can cause a control accuracy error in excess of 25%. Therefore, this is a critical step in spreading control accuracy.

4. Increment down to the desired display. We suggest selecting ARS (Application Rate Selected) or AR (Actual Rate). AR being the most useful as this screen is constantly monitoring actual material being dispensed onto the road surface .

Initial Operation steps are now complete.

O P E R A T I N G A D J U S T M E N T S

Usually set at the actual start of the spreading route.

1. APPLICATION RATE

Adjustment should be set to the application rate required for the existing weather conditions.

When a selection is made the value of that selection, measured in lbs./mile or kg/km, will appear on the screen. This value will remain on the screen if you have, in Step 4, selected to view ARS. However, if you selected to view AR, the selected value will appear on the screen for only a few seconds and then return to 0. Only when the truck is moving will the value move from 0 to show the actual rate being spread.

NOTE: At any time, truck stopped or travelling, you can select another spread rate.

2. SPREAD WIDTH

Set the spread width selector to the desired spread pattern.

NOTE: This setting may be changed at any time. However, the spinner speed is best adjusted while the truck is spreading so that the operator can see the resulting width of the spread pattern.

SPECIAL CONDITION OPERATING

STATIONARY UNLOAD

This is the function of dumping off the remaining material after a route has been completed. To run the conveyor and off-load this material, follow these steps:

A. Toggle on box power if necessary

B. Press the increment up button until Readout displays:

C. Press BLAST. The readout, shown above, will blink to indicate the truck is unloading.

D. Press the increment up button to activate auger/conveyor discharge. As necessary via the up or down increment buttons increase or decrease conveyor discharge speed.

NOTE: To reach higher conveyor speeds the truck must be throttled off idle and held at a higher R.P.M.

E. Use the spread width selector to set the spinner speed, if the spinner is required to run.

F. To shut off the conveyor when the box is empty, press BLAST.

NOTE: At any time during stationary unload, the process wil automatically stop if the truck is put into gear and moved.

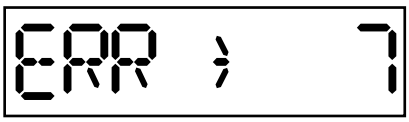
B L A S T

To temporarily increase the spread rate higher than selected with the APPL. RATE selector, you can press the BLAST button.

- The conveyor (not the spinner) will speed up instantly to give a higher spread rate.
- While BLAST is left ON, the display will show BLAST blinking ON and OFF.
- When the increased rate is no longer required, press BLAST again to instantly return to the selected spread rate.

NOTE: BLAST has no effect on spinner speed.
BLAST will not operate when the truck is stationary.

If BLAST is forgotten and left in the ON position, an alarm will sound and the screen will display



To stop the alarm and clear the screen, press either the up or down increment buttons.

At this time press the BLAST again to shut off this function.

The BLAST function should only be used when necessary. Never continuously run in BLAST mode.

A U G E R R E V E R S E

This usually only applies to trucks equipped with augers as opposed to trucks with conveyors.
The purpose of REVERSE is to reverse the auger to free up any obstruction caused by oversized foreign material caught in the auger.

- Reverse can be activated when the truck is stationary or mobile.
- Reverse is activated by the reverse toggle and must be held activated to keep the auger reversing. To stop the auger release the REVERSE toggle.

A U G E R / C O N V E Y O R P A U S E

Switched in the right hand direction, this function will pause the spinner and auger / conveyor until switched back to the center position.

T R O U B L E S H O O T I N G

E R R O R S I G N A L S

The CS-230 system has a self-diagnostic system that will notify the operator when the system is not being controlled in the requested manner.The operator is notified of a problem in two ways:

1. An audible alarm will be activated. This can be temporarily deactivated by pressing the increment up or increment down buttons. However, the alarm will return if the problem is not corrected.

2. The screen will display ERROR numbers as shown under Error Number List. See pages 12 to 14.

The 2 digit number represents a particular error. Please see pages 12 and 13.

NOTE: It is critical to monitor any reoccurring errors as this information can now be recorded (see page 16) and forwarded to service thus making diagnosis of problems that much easier.

T R O U B L E S H O O T I N G G U I D E

NOTE: In the event that an ERROR number occurs, the operator must acknowledge the error by pushing the increment up or down button.

Symptoms	Probable Cause	Corrective Action
Error: 00 The conveyor/auger is running when vehicle is stopped.	• Valve spool jammed open.	• Remove and inspect. Replace if necessary. See Module 4A.
	• Stray ground speed signal.	• Check "GS" in the operation menu. If ground speed is present, check sensor or connection point. Recalibrate ground speed.
	• Minimum conveyor null to high.	• See Parameter 81. Lower the value.
Error: 01 The conveyor/auger is stopped when vehicle is running.	• Faulty conveyor speed sensor.	• Test system Parameter 70. If no signal from sensor replace or repair.
	• Hydraulic/Mechanical	• Check for system pressure and flow. Check hoses, pumps, motors and gearboxes for leaks and proper operation. Check oil level in reservoir. Check shafts and chains.
	• Electrical	• Check cables and solenoids; repair or replace if required. Check CS-230 output amps; replace or repair as required.

Symptoms	Probable Cause	Corrective Action
Error: 02 Vehicle speed is too high for selected application rate.	• Under spreading; driving too fast, wrong gate setting.	• Reduce vehicle speed or increase gate setting or select a lower application rate.
	• Sensor malfunction.	• Test in Parameter 70. Repair or replace if required.
	• Low hydraulic oil flow.	• Increase value of Parameter 82. • Check for worn drive pin on conveyor sensor. • Check hydraulic pump output.
	• Incorrect sensor type selected.	• Change sensor type. See Parameter 88.
Error: 03 Material application rate error. The material per revolution of conveyor/auger motor is too large or too small.	• Improper gate setting.	• Increase gate setting if amount too small. Decrease gate setting if amount is too large.
	• P25 is set too high or too low.	• Adjust Parameter 25.
Error: 07 The Blast Function was on too long.	• Blast was left on too long.	• Turn Blast off sooner.
	• Error setting time out too short.	• Adjust Parameter 54 according to desired duration.
Error: 08 Blown fuse or high/low voltage conditions exists.	• Blown output fuse.	• Replace with 4.5 amp fast blow fuse.
	• Burnt traces.	• Return CS-230 to supplier for repair.
	• Low vehicle voltage.	• Check vehicle voltage. • Check ground connection.
Error: 09 Material detection error.	• No material detected in hopper.	• Return to yard for reload.
	• Faulty pressure sensor.	• Test sensor; repair or replace as required.
Error: 99 Low battery condition/eprom change warning.	• Internal battery power is low.	• Return to supplier for repair.
	• Original eprom has been replaced with another version.	• Reset CS-230 to factory settings. See Parameter 59.

Symptoms	Probable Cause	Corrective Action
CS-230 will not turn on.	• Poor power connection.	• Check power and ground connections.
	• Defective power cable.	• Test, repair or replace power cable.
CS-230 turns on, but has no display.	• Poor power connection.	• Check power and ground connections. • Reset Parameter 59.
Unable to maintain application rate.	• Conveyor/auger nulling too low.	• Recalibrate Parameters 81 and 82.
	• Incorrect conveyor/auger sensor pulses per revolution.	• Check Parameter 20.
Truck moves but conveyor/auger lags.	• Not enough signal gain for conveyor valve solenoid.	• Check Parameter 26. Increase value if required.
CS-230 stays on regardless of the power switch setting.	• Improper cable connection.	• Ensure power cable is connected to the 12V + GSS connector and the valve cable is connected to the valves + CSS connector on the back of the CS-230.

T R O U B L E S H O O T I N G C H A R T

S T E P 1 Check Operator Fault Log

- Collect information from the operator
- See what action the operator noted as being abnormal

S T E P 2 Perform Visual Inspection

- Perform visual walk-around inspection
- Check the general condition of the complete system.
- Look for loose electrical of hydraulic connections, leaks, fluid levels, etc.
- Record but DO NOT fix faults.
- Troubleshoot the system and verify the cause of fault.

S T E P 3 Prepare Unit for Troubleshooting

- Increase and maintaining engine RPM above the critical flow limit for your system.
- Engage pump drive
- Turn on all accessories, lights, etc. that the operator uses during normal spreading

NOTE: You may have to alter engine RPM in order to simulate conditions before and during the described fault.

S T E P 4 Review System Operation

- Review the operation of a correctly functioning system for comparison purposes.

S T E P 5 Confirm Operator Set-up Adjustments

- Reset if necessary

S T E P 6 Confirm Operator Fault

- Simulate, where possible, the conditions "Before" and "During" the fault listed on the Operator Fault Log

S T E P 7 Repair System and Retest

- Perform the adjustments or repairs as identified in Step 6 and then retest the system

O P E R A T O R F A U L T L O G

TRUCK IDENTIFICATION NUMBER _____

FAULT _____

DATE _____

TIME _____

	CONDITIONS BEFORE FAULT	CONDITIONS DURING FAULT
ENGINE RPM		
TRANSMISSION GEAR		
VEHICLE SPEED		
SYSTEM OPERATION MODE		
GATE POSITION OR SETTING		
LOAD SETTING		
SPREAD WIDTH SWITCH SETTING		
SPINNER ACTION		
APPLICATION RATE SWITCH SETTING		
"ARS" APPLICATION RATE SELECTED		
"AR" ACTUAL APPLICATION RATE		

OTHER INFORMATION _____

CAUSE OF FAULT _____

SOLUTION _____