

**OPERATIONS AND
PROCEDURES
MANUAL FOR CS-230
AND ACCESSORIES**



- GPS Compatibility.
- User friendly, with advanced programming options to meet your needs.
- Automatic calibrations.
- Real time related data-logging.
- Infrared communication via hand held remote.
- Compatible with Lotus, Excel and other database software.
- Self diagnostics with audible and visual alarm.
- Manual control, a feature which self-initiates and cannot be overridden by operators.
- Two way interaction with pre-wetting, temperature sensors and other auxiliary systems.

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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 allows all hydraulics to be mounted out of the cab. Its principles of operation are “closed loop”, meaning there are feedback sensors detecting auger/conveyor R.P.M. as well as Ground Speed. In doing so the operator simply selects a desired application rate and the CS-230 automatically makes the necessary adjustments to ensure uniform and accurate material application. No longer is the driver constantly making adjustments to compensate for varying speed conditions leaving the operator to focus his attention on driving responsibilities as it should be.

Basic Technologies continues to provide the latest innovative material metering solutions to the material application equipment industry. The first to bring you infra-red communication capability and now the first to bring you G.P.S. capability.

S P E C I F I C A T I O N S

E L E C T R I C A L

- | | |
|-----------------------|--|
| Operating Voltage | <ul style="list-style-type: none">• Minimum operating Voltage 8.35 VDC• Maximum Operating Voltage 28 VDC |
| Operating Current | <ul style="list-style-type: none">• 0 - 4.5 Amps• Fused Protection at 4.5 Amps (Fast Blow) |
| Operating Temperature | <ul style="list-style-type: none">• Control System: -39°C to 55°C
-38°F to 130°F |
| Ground Speed Signal | <ul style="list-style-type: none">• 3 Volt Peak to Peak Ground Referenced at 5Hz NPN or PNP Input• 0.9 Volt Peak Ground Referenced at 5Hz Hall Effect Input |
| Output Driver | <ul style="list-style-type: none">• Pulse Width Modulated• Dither Frequency Adjustable from 100Hz to 340Hz |



D I M E N S I O N A L

- | | |
|---------------|---|
| Mounting Stud | <ul style="list-style-type: none">• M6X1 (metric) |
| Width | <ul style="list-style-type: none">• 9 inches (23cm) |
| Height | <ul style="list-style-type: none">• 3.15 inches (8cm) |
| Depth | <ul style="list-style-type: none">• 7.1 Inches (18cm) |

**CONTROL UNIT
INSTALLATION****P r e p a r a t i o n**

Ensure all system components have been supplied as per your purchase order and packing slip.

Visually inspect components for damage or incorrectly supplied material.

I n s t a l l i n g

Refer to CS-230 Electronic Installation and commissioning drawing for connection relationship of control system components and associated cable interface.

For further information regarding system components please see Module 2A installation and commissioning manual.

M o u n t i n g L o c a t i o n

Always select a mounting location that allows easy operator accessibility. Typical mounting locations include pedestal and dash mounting between operator and passenger seats. Ensure CS-230 does not interfere with existing dashmount accessories, as well, allow clearance for cables to prevent unnecessary stress from incorrect cable routing.

NOTE: Mounting bracket P/N 121980 can be supplied to simplify installation. This bracket is mounted to studs on either side of CS-230 which can then be welded or bolted to pedestal or dash as required.

C a b l e R o u t i n g

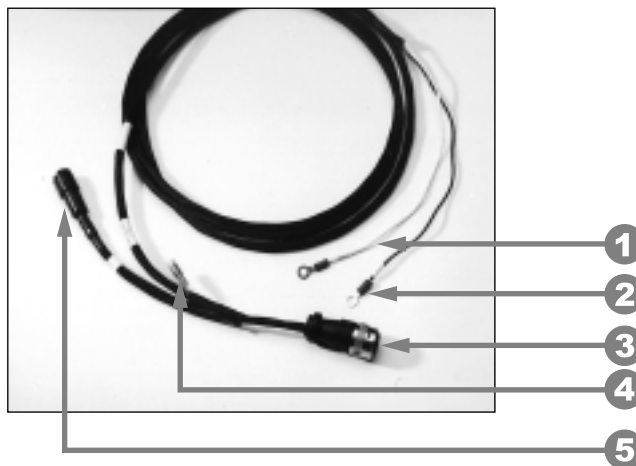
Ensure grommets are always used in new or existing floor or cab wall openings. Cables to be secured via plastic ties and mounting brackets away from moving parts and areas of extreme heat (engine exhaust system).

**CS - 230 C A B L E A N D
W I R I N G
I N F O R M A T I O N**

C a b l e I d e n t i f i c a t i o n

Refer to CS-230 Wiring Diagram see page 3.2 for clarification. This information is useful during installation and trouble shooting system problems.

Power and Ground Speed Cable P/N 101155



1. Connect black lead to a good negative ground location (preferably battery ground).
2. Connect white lead to +12 volt supply.
3. Connect to CS-230 as labelled.
4. Gear/Material Multi Function Input
If truck is equipped with 2 speed axle connect 2 speed rear end cable extension P/N 102271 here. Splice the end of cable in parallel with wire that energizes the rear axle solenoid.
If truck is not equipped with a 2 speed axle this input may be used as a material detection/material selection input. For automatic material selection, connect cables P/N 144010 or P/N 144020 (depending on liquid system supplied — refer to module 10A pre-wetting systems).
5. Connection for Ground Speed Option A or B please see CS-230 Installation and commissioning drawing, page 3.1.

Cable Identification
Continued

Power and Ground Speed Cable Including P/N 101155 and Electronic speed adaptor cable P/N 011923. **OPTION A**



1. Connect pulse wire (as labelled) to the wire supplying the pulse signal to the speedometer.
2. Connect ground wire (as labelled) with the ground wire on the speedometer.

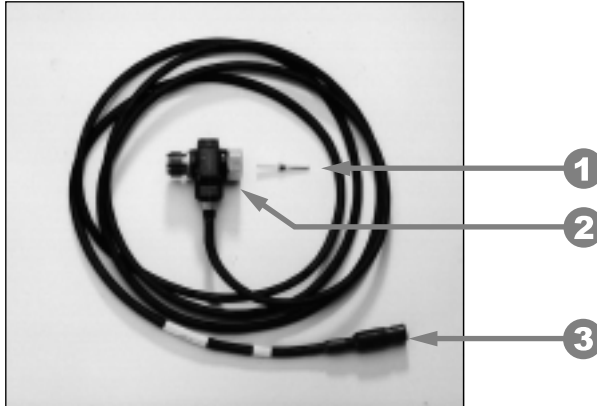
NOTE: Vehicles equipped with computerized engines and transmissions require special considerations therefore, **always contact the truck manufacturer before installation.**

Ensure connections are of good quality preferably located inside cab area if possible to reduce the possibilities of corrosion.

Cable Identification
Continued

Mechanical Ground Speed Sensor and Installation OPTION B

P/N 017948 7/8 -18 Threaded connection option



1. Square Drive key included with cable.
2. Install inline with the existing speedometer cable. Depending on manufacturer this may be done at either the transmission or speedometer location.
3. Connect to input on Power and Ground speed cable as labelled.



P/N 102791 5/8" - 18 Threaded connection option for G.M. Trucks



P/N 016475 1" - 18 threaded connection option

Cable Identification
Continued



Valve cable P/N 102273

1. Connect to CS-230 as labelled
2. Connect conveyor/auger lead to conveyor/auger valve section.
3. Connect spinner lead to spinner valve section.

NOTE: Due to different flow requirements for the auger and spinner functions, always ensure cables are connected to the appropriate coils. If connected incorrectly performance of functions may not be satisfactory.

4. Connection for Conveyor feedback signal see CS-230 installation and commissioning drawing.



Valve cable P/N 101154 includes optional auger reverse connection.

1. Auger reverse connection

NOTE: All other connections as above.

Optional Remote Pause and Blast cable kit, including an on-off-(on) toggle switch and a 3 meter (10 foot) cable, P/N 144025. See CS-230 Installation and Commissioning Drawing, page 3.1. Cable and toggle switch can be used to remotely operate the pause and blast functions.

**AUGER / CONVEYOR
SENSOR
INSTALLATION
OPTIONS**

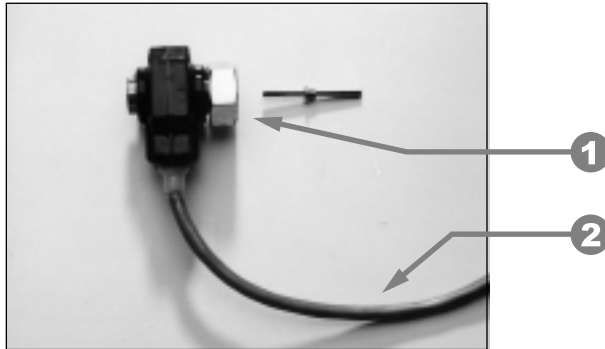
S e n s o r I n s t a l l a t i o n

Always ensure the sensor is mounted to the fastest rotating shaft. Never install directly on the main conveyor shaft.

For typical conveyor speed sensor mounting, please refer to 'Conveyor Sensor Installation' drawings pages 8.1 to 8.3.

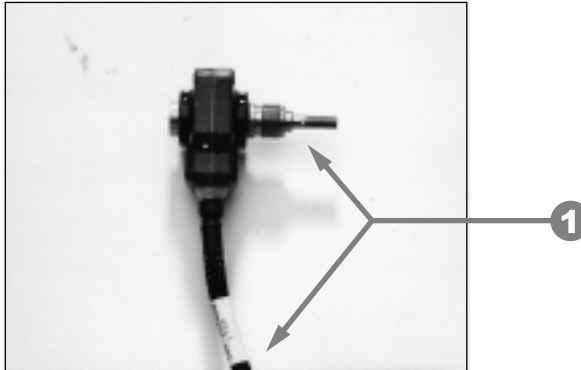
The two sensors shown below can be found on the CS-230 electronic installation and commissioning drawing, page 3.1 under Auger Feedback Option B-Gearbox Mount Sensor.

NOTE: Both sensors shown here are 16 pulses per revolution.



P/N 016503 Conveyor Sensor

- 1. See sensor installation drawing for installation guidelines
- 2. Connect to conveyor input lead as labelled on valve cable.



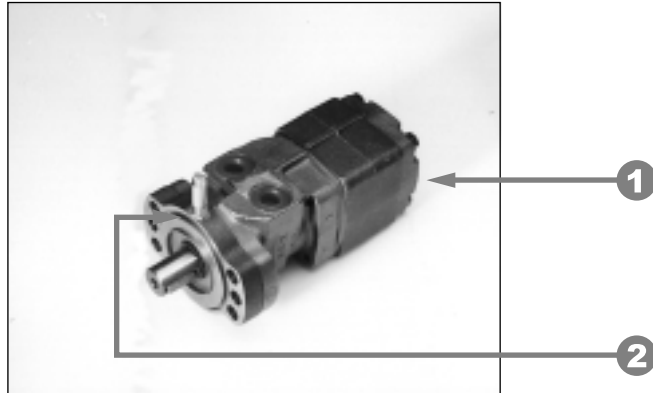
P/N 103468 Conveyor Sensor

- 1. See above information.

S e n s o r I n s t a l l a t i o n
C o n t i n u e d

White Hydraulics, Roller Stator motor with built in sensor Option A as per 'CS-230 installation and Commissioning' drawing, page 3.1.

NOTE: White motor sensor shown here 50 pulses per revolution.



White motor complete with speed sensor option.

1. For correct motor sizing always consult your nearest Basic Technologies location. Basic will not be responsible for performance problems due to incorrect conveyor motor sizing.
2. Conveyor feedback sensor location on motor.



Sensor P/N 112249 for White motor.

NOTE: For proper installation of replacement feedback sensor consult your nearest Basic Technologies location.

S e n s o r I n s t a l l a t i o n
C o n t i n u e d

White Motor sensor Interface cables

Two interface cables are available. Shown is our standard interface cable P/N 124213 that adapts to the standard sensor as above.

Also available from White is the above sensor with a 24 inch cable and 3 pin Weather Pack Connector. For adaptation to this Weather Pack connector we also have available an interface cable, P/N 134149 (Not shown).

NOTE: Interface cables supplied by Basic come complete with built in overload protection for feedback sensor.



1. Connect to White Motor sensor.
2. Connect to conveyor input lead as labelled on valve cable.

HYDRAULIC VALVE ASSEMBLIES

Spinner and Auger /
Conveyor Assemblies

Following are the most common valve assemblies used to provide actuation of spinner and auger/conveyor functions only. A wide range of valve configurations are available to control additional functions. Please review module 4 for further information regarding valve models and configurations.

A photograph has been supplied to aid in the identification of existing valve assemblies, as well, to show standard configurations available for immediate delivery.



MP18 Valve Assembly

Valve P/N122185 for gear pump applications, as assembly is equipped with unloader inlet. Valve is of cast iron construction to deter salt corrosion. Pressure compensation for both spinner and auger/conveyor functions standard.



Inlet - Closed Center

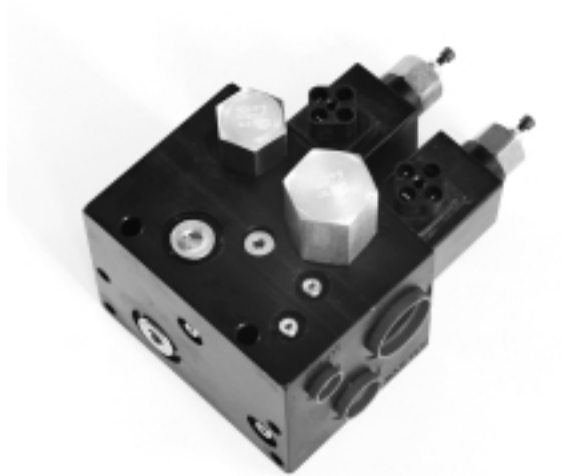
Valve P/N122419 for closed center variable displacement piston pump applications. In this case the unloader inlet has been removed in favour of the closed centre inlet as shown. Functionality and construction as per P/N122185. In this case the pump supplying the valve assembly is a closed center, variable displacement piston pump (see Module 3 for pump information).

Spinner and Auger/
Conveyor Assemblies
Continued



Model CS-SCB-0F-A3

Valve P/N148646 for gear pump applications assembly is equipped with unloader inlet. Valve is manifold arrangement utilizing proportional cartridge valves for spinner and auger/conveyor functions. Anodized aluminum construction, compact in size and pressure compensation for both spinner and auger/conveyor functions standard.



Model CS-SCB-CV-A3

Valve P/N 148647 for closed center variable displacement piston pump applications, in this case unloader inlet has been removed. Again functionality and construction as per P/N 148646, only the pump supplying the valve assembly is a closed center variable displacement piston pump (see Module 3 for pump information).

Spinner and Auger/
Conveyor Assemblies
Continued

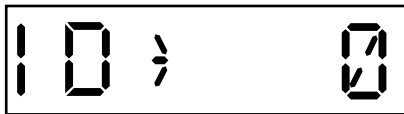
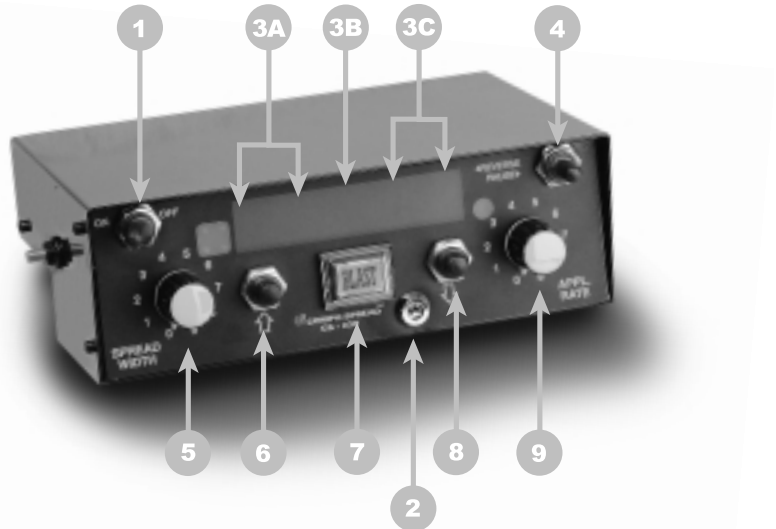


Model CS-SCB-0F-ENCL-A4

Enclosure Assembly P/N148650 includes valve assembly P/N148646, mounted in Nema 12 enclosure for further protection. Again this configuration is available for immediate delivery. Other configurations are available. Please contact your nearest Basic Technologies location for assistance.

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

In the "OPERATORS INSTRUCTIONS" manual, the function of the face controls are described as they are for operators. However, when the CS-230 is entered into the "Calibration" or "Program mode", these controls take on new functions as described in the following.



1 . P O W E R O N / O F F

This toggle powers up the CS-230 whether in the program or operating mode.

Initially upon power up, the user will be prompted to enter an ID#. An ID# is only required when operating in GTS logging mode, see parameter 62 for clarification on page 44. If an ID# is desired, use the increment up/increment down buttons to select and lock in by pressing the BLAST. To exit the ID screen press BLAST.

NOTE: It is recommended that this menu display be removed when not operating in GTS mode, in parameter 55, see page 42 for clarification.

2 . P R O G R A M M I N G K E Y

To enter into programming mode, insert key and rotate 90° counterclockwise.

NOTE: For past users of our CS-110 systems be advised that unlike the CS-110 powering on or off in the program mode for the CS-230 has NO EFFECT on the calibration values already entered.



3 . D I G I T A L R E A D O U T

3A. This portion of the display will show:

- a. the parameter number e.g. "P1" as shown
- b. by pressing the INCREMENT UP button, the entire display will change to a description of what that parameter number controls. e.g. Display on Screen is "P1>28"

Press the INCREMENT UP button

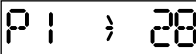
The display changes to AP RATE

Therefore the display P1 is the application rate for position one (1) on the APPL.RATE knob.



3B. This symbol in the display announces if you have or have not entered into a particular parameter. If you have not entered the parameter the symbol will be a steady on display, while if you have entered a parameter this symbol will be blinking on and off. To enter or exit a parameter, press BLAST.

3C. This part of the display will show the numeric value (up to four digits) that has been assigned to that particular parameter.

eg. 

If you press the INCREMENT DOWN button you will see P1 defined as "AP RATE". Therefore, 28 is the application rate selected in lbs/mile or kg/km.



4. R E V E R S E / P A U S E

The reverse toggle switch performs two functions:

1. System defaulting.
2. Scrolling/item selection.



5. S P R E A D W I D T H

This knob is used to select the tens digit of any two digit parameter number. e.g. 20, 30, 40, etc.



6. I N C R E M E N T U P B U T T O N

This button serves two functions.

A. Can be pressed to give a definition to any parameter number presently displayed on the screen.

B. Can be pressed to increase the numeric value entered into any parameter number providing you have pushed BLAST prior to entering a particular parameter.



7 . B L A S T

This can be pressed to enter and exit any selected parameter number so that the numeric value of that parameter can be adjusted. When you press BLAST to enter a parameter, the symbol as shown in 3b will blink. When you press BLAST to exit a parameter, the symbol as above will remain on.



8 . I N C R E M E N T D O W N B U T T O N

This is the reverse function to Item 5



9 . A P P L I C A T I O N R A T E

This knob is used to select the unit digit of any two digits parameter number. e.g. 1, 12, 24, 36, etc.

**I N T R O D U C T I O N T O
P R O G R A M M I N G T H E
C S - 2 3 0**

As previously stated and defined, the controls on the front face of the CS-230 take on new functions while in the programming mode. In the following steps we will outline the general procedure to program the CS-230. From that point we will proceed to outline the specific steps to do all levels of programming and calibrating.



1. Toggle "ON" the power ON/OFF switch.
A user ID# may be entered at this point or press the BLAST button to bypass.

2. Insert the Program Key into the key slot located on the CS-230 front panel between the BLAST and increment down button. Turn the key 1/4 turn to enter the "Program Mode".

NOTE: a. In the program mode you cannot remove the key. You must turn the key back to the operating mode to remove it.
b. Turning the power on or off at any time in the program will not cause any changes to the program settings.



3. Use the SPREAD WIDTH and APPL.RATE knobs to select the parameter number you wish to enter. Each parameter controls some function in this manual. Alternatively you can use the INCREMENT UP button to get a description of the parameter that you have previously selected with the two control knobs.

- e.g.
- set Spread Width knob to 3
 - set Appl.Rate knob to 5
 - screen will display

P35 } 1

- press the increment up button
- screen will display

SP STOP

This then is the parameter that determines if the spinner (SP) should stop or continue to run if the truck is stopped.

**S P E C I F I C
P R O G R A M M I N G
O P E R A T I O N**

P r e l i m i n a r y O p e r a t i o n
b e f o r e C o m m e n c i n g
C a l i b r a t i o n

Prior to calibrating a CS-230 the following procedures must be followed to activate the CS-230. These steps are critical in assuring base values have been set correctly, thus eliminating concerns for calibration errors.

1. Toggle ON the CS-230 Power.
2. Ensure both Spread Width and APPL.RATE knobs are set at zero.
3. Use the programming key to enter the program mode.
4. In programming mode select parameter 59 using rotary switches.

NOTE: The system initialization (parameter reset) operation will instruct the operator **when** the system has been successfully defaulted.

- A. Press BLAST button to activate.

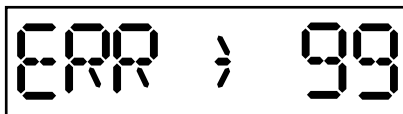
NOTE: Arrow will start blinking.

- B. Toggle the Reverse/Pause switch to left position (reverse) momentarily, then release.

NOTE: Arrow will stop blinking. At this point the program resets all parameter values and checks to ensure all values are reset to factory defaults.

- C. When the arrow resumes blinking, the box has been successfully defaulted. Press BLAST again and resume commissioning.

You have now set the CS-230 to all the basic parameter values. You may now proceed to change and modify this generic program to suit your application.



Error 99 = Software Checksum not Verified

An error 99 will occur when the E-Prom has been upgraded (daughter board has been removed), or when an internal program fault/low battery condition occurs.

When the box is powered on, the program performs a checksum analysis

P r e l i m i n a r y O p e r a t i o n
 b e f o r e C o m m e n c i n g
 C a l i b r a t i o n C o n t i n u e d

on the programmable parameters. If the value found does not match the value last stored in memory, an Error 99 will occur.

5. Resetting Error 99 Condition if it occurs

A. When the box is powered on, the display will show Error 99 with no audible alarm, but the arrow symbol will blink, requiring operator acknowledgement. Press BLAST and note the arrow symbol stops blinking.

B. i. In programming mode select parameter 59 using rotary switches.

ii. Press BLAST.

NOTE: Arrow will begin blinking.

iii. Toggle the Reverse/Pause switch to the left position (reverse) momentarily, then release.

NOTE: Arrow will stop blinking. At this point the programming resets all parameter values and checks to ensure all values are reset to factory defaults.

C. When arrow symbol resumes blinking, press BLAST and turn and remove program key.

NOTE: The display will still indicate an Error 99 as being present.

D. Toggle the box OFF and ON to re-initialize checksum analysis to confirm operation.

NOTE: If the Error 99 remains, a problem exists with the controller. Please consult the factory for further assistance.

6. Select Parameter 58 TRUCK I.D. This parameter sets the CS-230's truck identification number to match the number of the truck to be controlled. There are 4 digits available so truck numbers from 1 to 9999 can be entered. Change as necessary to reflect the truck number.

7. Select Parameter 56 CLOCK. This parameter sets the CS-230's 24 hour clock to hours and minutes. Change as necessary to reflect the correct time.

8. Select Parameter 57 CALENDAR. This parameter sets the CS-230's calendar to the month and day. Change as necessary to reflect the correct month and day.

9. Select Parameter 61 YEAR. This parameter sets the CS-230 year. Change as necessary to reflect the correct year.

10. Select Parameter 50 SYSTEM UNITY. This parameter determines the units of measure that the CS-230 will operate in. Either Metric units (kg & km), which is the factory default, or Imperial units (lbs & miles). The numeric value "0" = Metric, "1" = Imperial. Change as necessary to reflect the units of measure applicable to your area.

S o l e n o i d N u l l i n g

This is the process of ensuring that hydraulic valve manufacturing variances (tolerances) are compensated for to provide optimum control accuracy. This procedure must be performed with full pump flow. This requires the engine operating at a normal operating R.P.M., normally about 2000 R.P.M.

- A. Select Parameter 81 MINIMUM CONVEYOR NULL.
- B. Press the BLAST button to activate.
- C. Using the Increment UP and DOWN buttons, adjust the conveyor speed. Your setting will be between 30.0 and 45.0, dependent on each application, should be such that the conveyor JUST STOPS.
- D. Press the BLAST button to deactivate and save value as set.
- E. Select Parameter 82 MAX. CONVEYOR NULL.
- F. Press the BLAST button to activate.
- G. Using the Increment UP and DOWN buttons adjust the conveyor to its maximum R.P.M. Normal settings will occur between 75.0 and 80.0. Again this will be system dependent.

NOTE: Since it is difficult to determine by sight and sound alone when the conveyor is at the max R.P.M., you can use the REVERSE toggle during this operation to change the screen reading to R.P.M. to assist in finding top speed.

- H. After setting the max null in PAR. 82 return briefly to PAR.81 to double check if the min. null setting is still at the point of conveyor just stopping.
- I. Select Parameter 83 MINIMUM SPINNER NULL.
- J. Press the BLAST button to activate.
- K. Using the Increment UP and DOWN buttons, adjust the spinner speed. Your setting will be between 35.0 and 40.0, dependent on each application should be such that the spinner JUST STOPS.
- L. Select Parameter 84 MAXIMUM SPINNER NULL.
- M. Press the BLAST button to activate.
- N. Using the Increment UP and DOWN buttons, adjust the spinner speed. Your setting will be between 45.0 and 55.0, dependent on each application. Should be such that the spinner operates at a safe speed.

NOTE: In the case of the spinner the maximum speed that can be reached is usually unsafe for spinner operation. Therefore, this value should be set down to a safe level. This is usually around 45.0 to 55.0.

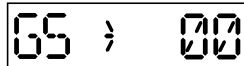
- O. After setting Parameter 84 return briefly to Parameter 83 to be sure the set value is still where the spinner JUST STOPS.

**G r o u n d S p e e d
C a l i b r a t i o n P r o c e d u r e**

The CS-230 has been designed to make calibration as easy as possible. You must keep in mind that to achieve accuracy of control, the CS-230 needs to have a complete picture of all conditions pertaining to the vehicle it is installed in. Therefore, there is a large amount of information required by the CS-230. By utilizing a carefully designed automated calibration process to assist you the CS-230 will be easy to calibrate with this manual.

NOTE: If you have the CS-Caliprompter, an optional device for the CS-230, you will find calibration becomes so simple no manual is needed at all. The CS-Caliprompter word/sentence prompts you through the entire calibration process such that nothing is missed or confused.

1. Toggle ON the CS-230 power.
2. Ensure both SPREADWIDTH and APPL.RATE knobs are set at zero.
3. In operating mode use the increment button to select ground speed display



4. Drive the truck to an area where you can safely drive the vehicle and observe the ground speed display. If the display remains at zero you must configure your ground speed sensor input (parameter 87).

NOTE: For configuration of your ground speed sensor input parameter 87 see page 51.

5. Use the programming key to enter the program mode.
6. Select parameter 41 "Gear Used At Groundspeed Calibration."

NOTE: For single gear range shifters or automatic transmission trucks you may skip this step.

This parameter is used when a two speed differential truck is to be controlled by the CS-230.

If the truck has a two speed differential or a HI-LOW speed range on the shifter, you must calibrate ground speed twice; once for each of the two gear ranges.

The values in this parameter are: 0 for low range and 1 for high range.

Remember for two speed range shifters the following steps must be done twice after prior selecting the range you are calibrating in.

Ground Speed
Calibration Procedure
Continued

7. Select and enter parameter 40 "Speed Driven at Groundspeed Calibration." Press the BLAST button to activate. Use the UP and DOWN increment buttons to enter the truck speed in miles/hour or km/hour at which you will drive the truck for calibration. Exit this parameter by pressing the BLAST button again.

NOTE: You should select a speed that is clearly delineated on your truck speedometer and that you can easily drive and hold for approximately 10-15 seconds. eg. 20 km/hr or 10 mi/hr.

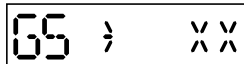
8. Select parameter 42 "Auto Groundspeed Calibration." DO NOT press BLAST at this time.

9. Drive the truck to an area where you can safely maintain the speed you entered into parameter 40 for approximately 10-15 seconds. With the truck held travelling at the selected speed, press the BLAST button while parameter 42 is selected.

10. At this point, the symbol located in the centre of the screen will be flashing and the numeric value at the right of the screen will be fluctuating above and below the truck travelling (selected) speed. These fluctuations will narrow down to the selected speed. When the fluctuations have generally narrowed on to the selected speed, press the BLAST button to lock in the speed calibration and to exit this parameter.

11. Exit the program mode by turning and removing the program key.

12. Use the INCREMENT UP button to select the screen display ground speed.



Check to see if the screen display accurately matches the speed displayed by the truck speedometer throughout the normal working speed ranges.

NOTE: The groundspeed display is dampened and will show a lag in keeping up with the speedometer displayed screen changes.

13. If the screen displayed speed follows the truck speedometer with a constantly high or low value:

- A. Re-enter the program mode
- B. Enter parameter 43. Use the increment Up or Down buttons to slightly change the existing value. If the screen display is constantly above the truck speedometer reading, raise the value in parameter 43, while for consistent low readings, lower the value.
- C. Return to operating mode to see if both speeds now match. Usually you can match speeds with only the original calibration steps or one or two adjustments of parameter 43.

NOTE: If the following procedures fail to make a speed match then it is possible the groundspeed sensor employed is of a different type than the CS-230 is set to recognize. To compensate for this condition enter parameter 87 "Groundspeed Input Configuration".

C o n v e y o r C a l i b r a t i o n

1. Toggle ON the CS-230 power
2. Ensure both SPREAD WIDTH and APPL.RATE knobs are set to zero.
3. Use the programming key to enter the program mode.
4. Select parameter 52 "System Gate Setting" Press the BLAST button to activate. Use the UP and DOWN increment buttons to enter the actual gate opening to be used during calibration. Exit this parameter by pressing the BLAST button again.

- NOTE:**
- A. For auger applications you may leave this setting at the default value of 5.
 - B. On gated conveyors it is important to measure the actual gate opening in inches between one and ten inches and enter that value. Alternatively the gate openings can be 0-10 units of any measure. However, each unit must be equal and the maximum number of units or the maximum opening must be represented by 10.
 - C. Take the time to correspond the physical gate opening measurement with the selected gate pin or hole setting. Record these values. It may be necessary to relocate some of these holes to ensure linear measurement between physical gate settings; therefore, allowing accurate discharge of selected material regardless of gate setting.

5. Select parameter 23 "Material Selection". Press the BLAST button to activate. Use the UP and DOWN increment buttons to enter the actual material to be calibrated.

Each material can be assigned a name, or any four letter designation. To change material names use parameter 90 to 93. See page 52 and 53 for details on configuring names.

- eg. 1 = SAND
- 2 = SALT
- 3 = MIX
- 4 = _ _ _ _

Conveyor Calibration
Continued

For each material used you must follow a complete conveyor calibration. Therefore, if you spread four different materials you must do four conveyor calibrations, while if you spread only one material, then one calibration procedure is all you require. Each material can be calibrated using its own specific gate setting.

- eg. Material 1 (SAND) uses gate 3
- Material 2 (SALT) uses gate 7

NOTE: Prior to continuing to the next step in conveyor calibration you must start the truck engine and **MUST NOT** shut-off the truck engine OR THE CS-230 POWER until the last step has been completed.

If power is lost to the CS-230 before the following steps are completed the resultant calibration is void and these steps must be repeated.

6. Select parameter 21 "Starting Load" Press the BLAST button to activate. Use the UP and DOWN increment buttons to enter the starting loaded truck weight.

To arrive at the loaded truck weight, load the truck box with material to be calibrated. Take the truck to a truck scale and obtain total loaded weight in lbs. or kgs. Since you can only enter a four digit number you must divide this weight by 10.

- eg. loaded truck weight 37,250 lbs., enter the value 3725.

7. Select parameter 24 "Auto Conveyor Calibration". Before entering this parameter the truck should be returned to the material location because commencement of calibration will cause conveyor off-loading of the material.

Press BLAST to start calibration. At this time the conveyor will run off material. Activate SPREAD WIDTH knob to disperse material if necessary.

- NOTE:**
1. To run material off at a higher speed, throttle the truck idle R.P.M. up to approximately 2000 R.P.M.
 2. DO NOT RUN TRUCK TO EMPTY. This will cause the conveyor to run empty leading to false calibration values. To arrive at true calibration values, you should run the calibration procedure for 10-15 minutes. Press BLAST again to end calibration.

C o n v e y o r C a l i b r a t i o n
C o n t i n u e d

8. Select parameter 22 "End Truck Weight". After again weighing truck on a truck scale and dividing the weight by 10, press the BLAST button to activate. Use the UP and DOWN increment buttons to enter the final truck weight.

eg. Truck weight 35,380 lbs., enter the value 3538.

NOTE: At this point, conveyor calibration is complete and it is safe to shut-off power to the CS-230.

NOTE: You may, at this time, select parameter 25 "Material Per Revolution" to get the weight in lbs. or kg. of material discharged through the set gate opening per revolution of the sensor. Usually, this sensor is reading the R.P.M. of the motor prior to a gearbox or chain-sprocket reduction to the conveyor shaft.

At this point, the truck is commissioned to base values and it is recommended that parameter 60 "Reset Logged Information" be defaulted. If moving on to "advanced programming," then this procedure is not required to be performed at this point.

By performing the following procedure, you ensure all unrelated logged data will be removed from the memory of the controller.

1. In programming mode select parameter 60 using rotary switches.
2. Press BLAST. Note: Arrow will begin blinking.
3. Toggle the Reverse/Pause switch to the left position (reverse) and maintain for 5 seconds and then release.
4. Press BLAST and remove programming key.

**ADVANCED
PROGRAMMING**

In the preceding section; "System Calibration and Commissioning" we covered all the necessary steps to be taken to ensure your CS-230 controlled spreading accurately on a particular truck. There are a number of additional parameters that you can adjust to control the spreading operation to suit your own particular needs. At present these parameters have pre-set generic program or "DEFAULT VALUES". You may choose to accept these or to customize them as you wish. Listed are those parameters that are most likely to require some modifications, with some notes and /or ideas to assist in changing.

**Application Rate
Settings Parameters
00 - 09**

These are the spread rates you can select with the APPL.RATE knob.

NOTE: You can program a complete set of spread rates for each knob position for each material LOAD. When the operator selects a different load (eg. SAND to SALT) a complete new spread range will automatically be set to the control knob.

eg. Salt spreading range may be set from only 50 to 500 lbs/mi.

Knob Setting:	Value:
1	50
2	100
3	150
4	200
5	250
6	300
7	350
8	400
9	500

while sand may be spread in a range from 200 to 1000 lbs/mi.

Knob Setting:	Value:
1	200
2	300
3	400
4	500
5	600
6	700
7	800
8	900
9	1000

To set these different ranges, select parameter 23 and enter the material you are setting the range for. Then select parameter 01 to 09 and enter the rates you require. Then repeat the procedure with parameter 23 and parameters 01-09 for each material load.

NOTE: At any time you can set any or all the APPL.RATE knob positions to 0 lbs/mi or kg/km for any particular material. Thus, instead of a selection of 9 spread rates for a particular material you may have as few as one.

S p r e a d W i d t h
S e t t i n g s
P a r a m e t e r s 1 0 - 1 9

These control the spinner speeds. The default program values are usually quite acceptable providing the solenoids were properly nulled as outlined previously in the manual. However, if you require special higher or lower speeds, just select the appropriate parameter from 10-19 and increase or decrease the speed as needed.

S p i n n e r S t o p o r
N o S t o p
P a r a m e t e r 3 5

The spinner can be set to run continuously if the SPREADWIDTH knob is set higher than position 0 regardless of the motion or non-motion of the truck itself. Alternatively, the spinner can be set to stop whenever the truck stops. This adjustment can be done in parameter 35.

S c r e e n d i s p l a y
S e l e c t i o n
P a r a m e t e r 5 5

With this parameter you can select your choice of the menu of items to be left on the screen during operation mode. The default program leaves all items on the screen. Many of these are useful only to mechanics and may be confusing OR even misleading if left available to operators.

To make your selection of items to be viewed, select parameter 55. Each menu item is assigned numeric values. To select the desired menu displays, simply select the displays required and add the numeric values. The total will be the number entered in this parameter.

SCREEN CODE	DESCRIPTION	ASSIGNED VALUE	NOTE
CS-230	No Display Required	0	No use to Operators
AR	Actual Application Rate	1	Required by some Operators
GS	Ground Speed	2	Little use to Operators
CS	Conveyor Speed	4	No use to Operators
ARS	Application Rate Knob Selection	8	Needed by Operators
SWS	Spread Width Setting	16	No use to Operators
SYS	System Operating Mode	32	Good for troubleshooting

Screen display
Selection
Parameter 55
Continued

SCREEN CODE	DESCRIPTION	ASSIGNED VALUE	NOTE
GATE	Gate Opening	64	Needed by Operators
LOAD	Load Material	128	Needed by Operators
UNLOAD	Stationary Unload	256	Little use to Operators/
I.D.	Driver Identification	512	ONLY Required with G.T.S.

eg. To select AR, GS, GATE, LOAD, and UNLOAD.
 $1 + 2 + 64 + 128 + 256 = 451$

Enter 451 into parameter 55. Now you will view only those selected items and the 3 fixed screen items. Note: each time you return to the operating mode or re-power on the CS-230, you will always initially see the AR display. Press the increment UP button once and that display will be lost until the next time the CS-230 is powered on.

Factory Programmed
Parameters

Parameters not yet covered by this manual are not considered normally necessary to adjust and in some cases, may be detrimental to system operation if adjusted incorrectly. These are listed in the following for you to consider if you need to make adjustments in these areas.

PARAMETER IDENTIFICATION

PARAMETER LISTING

Parameter	Description
00-09	Application rate settings
10-19	Spread width settings
20	Conveyor speed sensor pulses/rev
21	Start amount for conveyor calibration
22	End amount for conveyor calibration
23	Material selection
24	Auto-conveyor-calibration
25	Material spread/rev. of the conveyor motor
26	Minimum (forward) conveyor speed
27	Ramp blast
28	Maximum blast output
29	Ramp reverse
30	Maximum reverse output
31	Ramp unload
32	Maximum unload output
35	Spinner stop/no stop
40	Speed driven for ground speed calibration
41	Gear used for ground speed calibration
42	Auto-ground speed-calibration
43	Ground speed sensor pulses/meter
44	Maximum ground speed in open loop control
45	Overspeed alarm
50	System units (unity) setting
51	System control setting
52	System gate setting
53	System error setting: Severity code
54	System error setting: Time-out
55	System display select
56	System time set
57	System date set
58	System truck ID number
59	System initialize with default values
60	System reset logged information
61	System year set
62	G.T.S. setting
63	G.T.S. error setting: severity code
64	G.T.S. error setting: time-out
67	Gear/Material Input Select
81	Minimum current setting of conveyor valve
82	Maximum current setting of conveyor valve
83	Minimum current setting of spinner valve
84	Maximum current setting of spinner valve
85	Minimum current setting of conveyor reverse valve
86	Maximum current setting of conveyor reverse valve
87	Ground speed input configuration
88	Conveyor speed input configuration
89	Display intensity
90	Set material name: Load 1
91	Set material name: Load 2
92	Set material name: Load 3
93	Set material name: Load 4
99	Software Version

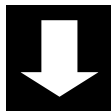
NOTE: After performing advanced programming you must reset parameter 60 "Reset Logged Information" see page 25 for further details.

In the following pages a detailed explanation has been added to further assist you in understanding each individual Parameter.

To assist in programming the controller, the functional description of each individual parameter is available by simply pressing the INCREMENT UP button. By pressing the INCREMENT DOWN button, the units of measure are displayed.



or



INCREMENT UP

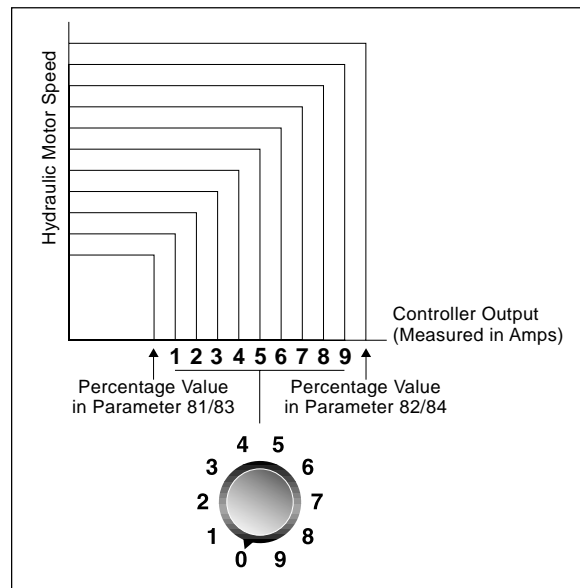
INCREMENT DOWN

From here on, whenever these graphical interfaces are shown the description that follows represents the actual controller display.

**Parameter 00-09:
Application Rate
Settings**

These parameters determine the application rate called for each position of the “APPL.RATE” control knob. When the system is configured as a closed loop system, the parameter value is shown in [kilograms/kilometre] or [pounds/mile] depending on the system unity setting (parameter 50). When the system is configured as an open loop, or manual system, the parameter value shown is the actual percent between your calibrated operation window. Note: For further information see figure 1.

FIGURE 1



NOTE: Applicable to both APPL.RATE and SPREADWIDTH when operating in Open Loop and/or Manual.

“AP RATE”



— “KGS/KM” or “LBS/MILE” or “PERCENT” (depending on configuration)



— Closed Loop:

Minimum value: 0 Lbs/Mi or 0 kgs/km

Maximum value: 9999 Lbs/Mi or 2816 kgs/km

Parameter 00-09:
Application Rate
Settings Continued

Open Loop or Manual:

Minimum value: 0.0 [%]

Maximum value: 100.0 [%]

Material 1: Closed loop: [Lbs/Mi or kgs/km]
Open loop: [%]
Manual: [%]

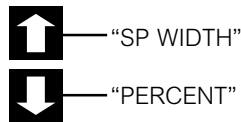
Material 2: Closed loop: [Lbs/Mi or kgs/km]
Open loop: [%]
Manual: [%]

Material 3: Closed loop: [Lbs/Mi or kgs/km]
Open loop: [%]
Manual: [%]

Material 4: Closed loop: [Lbs/Mi or kgs/km]
Open loop: [%]
Manual: [%]

Parameter 10-19:
Spread Width
Settings

1. These parameters determine the speed which the material spreader disk spins for each position of the "SPREAD WIDTH" control knob. The parameter value shown is the actual percent between your calibrated operation window. See figure 1, page 31 for clarification.

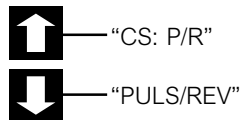


Minimum value: 0.0 [%]

Maximum value: 100.0 [%]

Parameter 20:
Conveyor Speed
Sensor Pulses/Rev.

1. This parameter value represents the pulses generated from the conveyor speed sensor per revolution of the conveyor sensor. Note: Please refer to sensor specifications for details. Refer to page 51.



Minimum value: 1 [Pulses/Rev]

Maximum value: 1000 [Pulses/Rev]

Default value: 16 [Pulses/Rev]

**Parameter 21: Start
Amount for Conveyor
Calibration**

This parameter is the actual weighed value of the vehicle (in kgs or lbs depending on unity setting in parameter 50), before beginning an automatic conveyor or auger calibration procedure with parameter 24.



“CAL LOAD”



“KGS” or “LBS”

Minimum value: 0 Lbs or 0 kgs

Maximum value: 9999 Lbs or 4535 kgs

Default value: 1000 [Lbs]

NOTE: This is the weight of the vehicle when loaded with the pre-selected material i.e. SAND, SALT or MIX.

**Parameter 22: End
Amount for Conveyor
Calibration**

This parameter is the actual weighed value of the vehicle (in kgs or Lbs depending on unity setting in parameter 50), after completing an automatic conveyor or auger calibration procedure with parameter 24.



“END LOAD”



“KGS” or “LBS”

Minimum value: 0 Lbs or 0 kgs

Maximum value: XXXX Lbs or kgs (this value must be less than parameter 21)

**Parameter 23:
Material Selection**

This parameter allows the selection of material used when starting an automatic calibration procedure with parameter 24.

Note: Each individual material name consists of four alphabetical characters which are user defineable. Refer to parameters 90 through 93 on pages 52 and 53.



“MATERIAL”



“NUMBER”

Default value: 1 = SAND
 2 = SALT
 3 = MIX
 4 = _ _ _ _

**Parameter 24:
Auto-Conveyor
Calibration**

This parameter performs an auto-conveyor calibration, determining the material spread per revolution of the conveyor motor. Before pressing the BLAST button, make sure that the value of parameter 21 corresponds with the amount of material loaded in the truck, and that the value of parameter 23 corresponds with the type of material in the truck. After pressing the BLAST button, the conveyor motor output is increased until it reaches its maximum. The display on the controller shows the conveyor motor speed in RPM. Pressing the BLAST button again deactivates the output. During this process the CS-230 has counted the number of revolutions in the period between activating and deactivating the BLAST button.

To complete the auto-conveyor calibration procedure, enter the weighted value of the vehicle as outlined in parameter 22. Refer to parameter 22 on page 25. The CS-230 will now automatically calculate the amount of material spread per revolution of the conveyor motor. Refer to parameter 25 on page 25.



“CAL-CONV”



“LOAD: X (Applicable material)”

**Parameter 25:
Material Spread per
Revolution of the
Conveyor Motor**

This parameter determines the amount of material spread per revolution of the conveyor motor. The value of this parameter is automatically calculated upon completion of an auto-conveyor calibration procedure.

It is also possible to manually adjust this value when not utilizing the proper weigh scale procedure. The value of this parameter also depends on the material selected in parameter 23.



LOAD/REV



KGS/REV or LBS/REV

Minimum value: 0.10 Lbs/Rev or 0.05 kgs/Rev

Maximum value: 99.99 Lbs/Rev or 45.35 kgs/Rev

Default value: 0.50 Lbs/Rev or 0.23 kgs/Rev (for each material)

**Parameter 26:
Minimum (forward)
Conveyor Speed**

This parameter sets the initial gain sent to the valve controlling the conveyor motor. This allows immediate response of the conveyor valve to reduce initial hydraulic lag upon start up. Upon detecting a ground speed signal, the output of the controller is increased to the percent value.



MIN CONV



PERCENT

Minimum value: 0.0 [%]

Maximum value: 100.0 [%]

Default value: 10.0 [%]

**Parameter 27:
Ramp Blast**

The value in this parameter determines the rate at which the conveyor output is increased to maximum, or decreased from maximum when the BLAST button is pressed or released.



RAMP BL



PERC/SEC

Minimum value: 0.0 [%/s]

Maximum value: 400.0 [%/s]

Default value: 200.0 [%/s]

**Parameter 28:
Maximum Blast Output**

This parameter sets the maximum output to the conveyor valve when the BLAST button is pressed. Since the controller supports four selectable materials the BLAST maximum can be set for each material.



MAX BLA



LOAD:X (Applicable material)

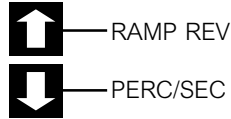
Minimum value: 0.0 [%]

Maximum value: 100.0 [%]

Default value: 100.0 [%]

**Parameter 29:
Ramp Reverse**

The value in this parameter determines the rate at which the conveyor output is increased or decreased when REVERSE is activated or deactivated.



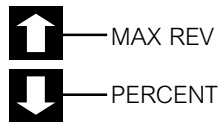
Minimum value: 0.0 [%/s]

Maximum value: 100.0 [%/s]

Default value: 10.0 [%/s]

**Parameter 30:
Maximum Reverse
Output**

The value in this parameter sets the maximum output to the conveyor valve when REVERSE is activated.



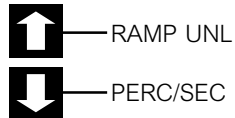
Minimum value: 0.0 [%]

Maximum value: 100.0 [%]

Default value: 100.0 [%]

**Parameter 31:
Ramp Unload**

The value in this parameter determines the rate at which the conveyor output is increased or decreased when UNLOAD is activated or deactivated.



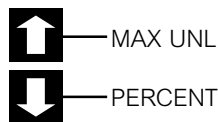
Minimum value: 0.0 [%]

Maximum value: 100.0 [%]

Default value: 10.0 [%]

**Parameter 32:
Maximum Unload
Output**

The value in this parameter determines the maximum output to the conveyor motor when UNLOAD is activated.



Minimum value: 0.0 [%]

Maximum value: 100.0 [%]

Default value: 100.0 [%]

**Parameter 35:
Spinner Stop/No Stop**

This parameter determines whether the spinner will continue running or not, when the truck comes to a complete stop.



SP STOP



STOP or NO STOP

Minimum value: 0 (spinner does not stop when truck stops)

Maximum value: 1 (spinner stops when truck stops)

Default value: 1

**Parameter 40:
Speed Driven for
Ground Speed
Calibration**

The value in this parameter is set to the ground speed that will be used while performing an automatic ground speed calibration procedure.



CALSPEED



KM/HR or MLS/HR

Minimum value: 000.0 KM/HR

Maximum value: 150.0 KM/HR

Default value: 10.0 KM/HR

**Parameter 41:
Gear Used for Ground
Speed Calibration**

The value in this parameter allows selection of the gear (low or high) used when performing an automatic ground speed calibration procedure.



CAL GEAR



LOW or HIGH

Minimum value: 0 (Low)

Maximum value: 1 (High)

Default value: 0 (Low)

**Parameter 42:
Auto-Ground Speed
Calibration**

This parameter is used to perform an auto-calibration to synchronize the controller ground speed to actual ground speed.



CAL-GS



GEAR: 0 (Low) or GEAR: 1 (High)

**Parameter 43:
Ground Speed Sensor
Pulses / Meter**

The value in this parameter is calculated by the CS-230 when an auto-calibration procedure is performed, and represents the number of pulses generated by the sensor after the vehicle has travelled one meter. The value is dependant on the gear selected with parameter 41.



GS: P/M



GEAR: 0 (Low) or GEAR: 1 (High)

Minimum value: 0

Maximum value: 200

Default value: 16 (Low gear) 32 (High gear)

**Parameter 44:
Maximum Ground
Speed in Open Loop
Control**

The value set in this parameter defines the maximum ground speed for which full rate application will be achieved (based on the selected application rate).



MAXSPEED



KM/HR or MLS/HR

Minimum value: 000.0 [KM/HRS]

Maximum value: 150.0 [KM/HRS]

Default value: 48.0 [KM/HRS]

**Parameter 45:
Maximum Speed Alarm
Setting**

The value of this parameter allows the selection of a speed at which the audible and visual warning alarms will occur. When alarm condition occurs the display will flash the text "SLOWDOWN."



SPEED BZ



KM/HR or MLS/HR

Minimum value: 0.0 (No alarm)

Maximum value: 150 [KM/HR]

Default value: 0.0 [KM/HR]

**Parameter 50:
System Units (Unity)
Setting**

The value of this parameter allows the selection of either metric or imperial units.



UNITY



KGS/KM or LBS/MILE

Minimum value: 0 (metric)

Maximum value: 1 (imperial)

Default value: 0

**Parameter 51:
System Control
Setting**

This parameter selects the type of system control. The modes of operation are either manual, open loop or closed loop.



CONTROL



SYS: CLP

Closed loop operation utilizes both ground speed and conveyor speed feedback sensors for precision metering of material. Value: 0

SYS: OLP

Open loop operation utilizes a ground speed feedback sensor to achieve an approximate metered rate based on ground speed. Value: 1

SYS: MAN

Manual operation does not utilize any feedback devices. Value: 2

Minimum value: 0

Maximum value: 2

Default value: 0 (Closed loop)

**Parameter 52:
System Gate Setting**

The value of this parameter allows for the selection of the gate setting during the auto-calibration procedure. It is selectable for calibrating each material.



GATE



LOAD X (Applicable material)

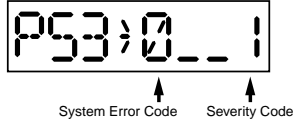
Minimum value: 1

Maximum value: 10

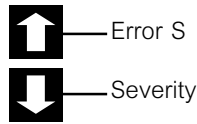
Default value: 5

**Parameter 53:
System Error Setting:
Severity Code**

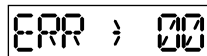
With this parameter a desired action (severity code) will be attributed to each possible system error. Therefore, when there is an error condition, the user can select how the controller will function. When this parameter is selected the digital readout will show the following.



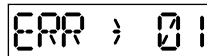
In the above example, 0 (zero) represents the system error code and 1 (one) represents the severity code. After selecting BLAST, the system error code can be selected by toggling the REVERSE/PAUSE switch in the REVERSE (left) direction. To adjust the severity code for the error selected, use the increment UP/DOWN buttons.



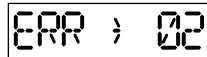
E r r o r C o d e s



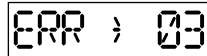
Vehicle is stopped, but the conveyor/auger motor is still running.



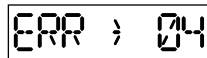
Vehicle is still moving, but the conveyor/auger is stopped.



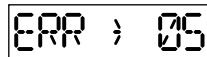
Vehicle speed is too high for the selected application rate.



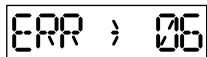
Material application rate error.
Parameter #25 - the amount of material per revolution of the conveyor/auger motor is too large or too small.



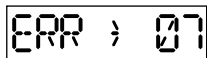
Material calibration is incorrect.



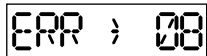
Ground speed signal is out of range.
Parameter #43 - the number of pulses for ground speed is too high or too low.



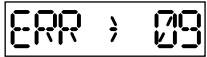
Ground speed calibration is incorrect.



The BLAST function was on too long.



There is a blown fuse, or a high or low voltage condition exists.



Material detection error.

Parameter 53:
System Error Setting:
Severity Code
Continued

S e v e r i t y C o d e D e s c r i p t i o n s

0 = All outputs go immediately to 0% until the error is acknowledged by activating the increment UP/DOWN buttons.

1 = All outputs freeze at the level they were at when the error was initiated until the error is acknowledged by activating the increment UP/DOWN buttons.

2 = All outputs go to 0% until the error is acknowledged. Upon acknowledgement by activating the increment UP/DOWN buttons the controller goes to manual operation mode.

3 = Disregard the error and the control continues its normal operation. CAUTION: Only intended for non-critical errors such as error 07; BLAST on too long.

4 = All outputs go to 0% until the error is acknowledged. Upon acknowledgement by activating the increment UP/DOWN buttons the controller goes to open loop operation mode.

Minimum value: 0

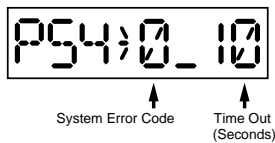
Maximum value: 4

Default value: 0

Parameter 54:
System Error Setting:
Time-out

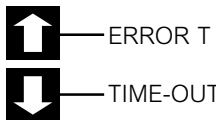


This parameter allows the selection of the time-out value from when the system error is recognized by the controller, to when the operator will be notified. When this parameter is selected the digital readout will show the following:



Reverse/Pause switch for selection of error code

In the above example 0 (zero) represents the system error code and 10 (ten) represents the time-out. After selecting BLAST, the system error code can be selected by toggling the REVERSE/PAUSE switch in the REVERSE (left) direction. To adjust the time-out value for the error selected, use the increment UP/DOWN buttons.



Minimum value: 0

Maximum value: 60

Parameter 54:
System Error Setting:
Time-out Continued

Time-out Value

The time-out value determines how long an error situation must be active (in seconds) before the CS-230 takes any actions depending on the corresponding severity code.

Default value: Error 00: 10 [sec]
 Error 01: 10 [sec]
 Error 02: 30 [sec]
 Error 03: 0 [sec]
 Error 04: 0 [sec]
 Error 05: 0 [sec]
 Error 06: 0 [sec]
 Error 07: 30 [sec]
 Error 08: 10 [sec]
 Error 09: 5 [sec]

Parameter 55:
System Display
Select

This parameter allows the selection of the desired menu displays when in operational mode.



Minimum value: 0

Maximum value: 1023

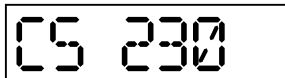
Default value: 1023 (all menu displays selected)

Select the menu displays in column one as required and add the numerical value in the second column and enter that value into this parameter.

Column 1	Column 2
<input checked="" type="checkbox"/> AR - Measured application rate.	Value 1
<input checked="" type="checkbox"/> GS - Measured ground speed.	Value 2
<input type="checkbox"/> CS - Measured conveyor speed.	Value 4
<input type="checkbox"/> ARS - Application rate setting.	Value 8
<input type="checkbox"/> SWS - Spread width setting.	Value 16
<input type="checkbox"/> SYS - System mode setting.	Value 32
<input checked="" type="checkbox"/> GATE - Gate setting.	Value 64
<input checked="" type="checkbox"/> LOAD - Material name.	Value 128
<input checked="" type="checkbox"/> UNLOAD - Stationary unload.	Value 256
<input type="checkbox"/> DRIVER ID - Driver identification number.	Value 512

eg. If only AR, GS, GATE, LOAD and UNLOAD are selected, add the corresponding value in column 2 which equals 451.

NOTE: If a value of zero is entered in this parameter the display menu will only show CS-230.



Parameter 56:
System Time Set

This parameter sets the actual time. The digital read-out will show the actual hours and minutes in 24-hour format.



TIME



HRS/MIN

Minimum value: 00.00 [HRS/MIN]

Maximum value: 23.59 [HRS/MIN]

Parameter 57:
System Date Set

This parameter sets the actual date. The digital read-out will show the actual month and day.



DATE



MON/DAY

Minimum value: 01.01 [MONTH/DAY]

Maximum value: 12.31 [MONTH/DAY]

Parameter 58:
System Truck
ID Number

With this parameter it is possible to enter a truck ID number, to identify the controller with it's respective vehicle.



TRUCK-ID



NUMBER

Minimum value: 0

Maximum value: 9999

Default value: 0

Parameter 59:
System Initialized
with Factory
Default Values

This parameter allows the reset of all user-definable parameters to the factory default values. See page 18 for explicit instructions.



INIT-DEF



DEFAULT

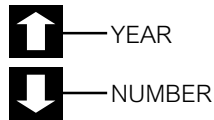
Parameter 60: System
Reset Logged
Information

This parameter allows the reset of all data logged information including the seasons totals.



Parameter 61:
System Year Set

This parameter sets the actual year. The digital read-out will show the actual year.



Minimum value: 0

Maximum value: 9999

NOTE: This parameter is only available in series 5 or 6 version software. Confirm version by selecting parameter 99 as outlined earlier in this manual.

Parameter 62:
System Data
Logging Mode

This parameter allows the selection between standard data logging format and Global Tracking System (G.T.S.) format. The Compu-Spread standard format is an event-based structure that attributes spreading data to time/date information. G.T.S. format is an event-based structure that attributes spreading data to positional, as well as time/date information.



Minimum value: 0: Standard logging

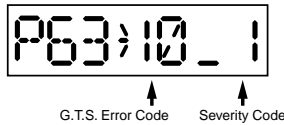
Maximum value: 1: G.T.S. logging

Default value: 0

NOTE: Must have Compu-Spread Global Tracking System (G.T.S.) to utilize G.T.S. logging format otherwise this setting MUST remain at zero.

**Parameter 63:
G.T.S. Error Setting
Severity Codes**

With this parameter a desired action (severity code) will be attributed to each possible G.T.S. error. Therefore where there is an error condition, the user can select how the controller will function. When this parameter is selected the digital readout will show the following:

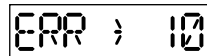


Reverse/Pause Switch for selection of Error Code

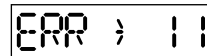
In the above example, 10 (ten) represents the G.T.S. error code and 1 (one) the severity code. After selecting BLAST, the G.T.S. error code can be selected by toggling the REVERSE/PAUSE switch in the REVERSE (left) direction. To adjust the severity code for the error selected, use the increment UP/DOWN buttons.



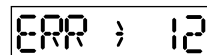
E r r o r C o d e s



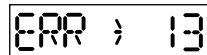
No communication with Intelligent Memory Card (IMC).



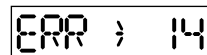
No G.P.S. signal (no communication with the GPS receiver or antenna).



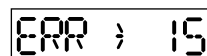
No communication with the CS-230.



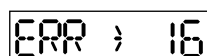
I.M.C. memory is full.



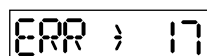
I.M.C. verification error.



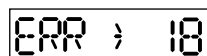
Reserved for future use.



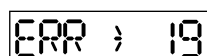
Reserved for future use.



Reserved for future use.



Reserved for future use.



Reserved for future use.

Parameter 63:
G.T.S. Error Setting
Severity Codes
Continued

S e v e r i t y C o d e D e s c r i p t i o n s

0 = All outputs go immediately to 0% until the error is acknowledged by activating the increment UP/DOWN buttons.

1 = All outputs freeze at the level they were at when the error was initiated until the error is acknowledged by activating the increment UP/DOWN buttons.

2 = All outputs go to 0% until the error is acknowledged. Upon acknowledgement by activating the increment UP/DOWN buttons the controller goes to manual operation mode.

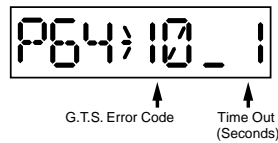
3 = Disregards the error and the control continues its normal operation. CAUTION: Only intended for non-critical errors such as error 07; BLAST on too long.

Minimum value: 0
Maximum value: 3

NOTE: Must have Compu-Spread Global Tracking System (G.T.S.) to utilize G.T.S. Error Setting Severity Codes.

Parameter 64:
G.T.S. Error
Setting Timeout

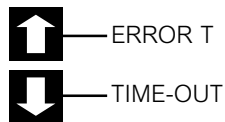
This parameter allows the selection of the time-out value from when the G.T.S. error is recognized by the controller, to when the operator will be notified. When this parameter is selected the digital readout will show the following:



Reverse/Pause switch for selection of error code.

In the above example 10 (Ten) represents the G.T.S. error code and 1 (One) represents the time-out. After selecting BLAST, the G.T.S. error code can be selected by toggling the REVERSE/PAUSE switch in the REVERSE (left) direction.

To adjust the time-out value for the error selected, use the increment UP/DOWN buttons.

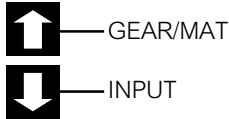


Minimum value: 0
Maximum value: 60

NOTE: Must have Compu-Spread Global Tracking System (G.T.S.) to utilize G.T.S. Error Setting Timeout.

**Parameter 67:
Gear / Material
Input Select**

This parameter sets the mode of operation for the auxiliary input found on the P1 (12V + G.S.S.) cable.



Minimum value: 0
Maximum value: 5
Default value: 0

**G e a r / M a t e r i a l I n p u t
F u n c t i o n a l D e s c r i p t i o n s**

0 = If the truck is equipped with a two speed rear axle this must be set at zero. This allows for ground speed calibrations at low and high ratio settings.

1 = Material detection setting for detection of material flow on the conveyor/auger.

2 = When this function is selected and the auxiliary input is active, the controller will change to LOAD 1 application rates regardless of prior load selection.

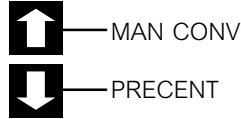
3 = When this function is selected and the auxiliary input is active, the controller will change to LOAD 2 application rates regardless of prior load selection.

4 = When this function is selected and the auxiliary input is active, the controller will change to LOAD 3 application rates regardless of prior load selection.

5 = When this function is selected and the auxiliary input is active, the controller will change to LOAD 4 application rates regardless of prior load selection.

**Parameter 70:
Manual Conveyor**

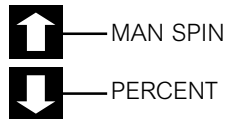
This parameter allows manual control of the conveyor/auger motor. After pressing the BLAST button, pressing the UP or DOWN buttons will increase/decrease the speed of the conveyor/auger motor. The output value is shown in [%] of full scale. By toggling the REVERSE/PAUSE switch to the reverse (left) direction, the conveyor/auger motor RPM will be displayed. This parameter is typically used for troubleshooting purposes.



Minimum value: 0.0 [%]
Maximum value: 100.0 [%]
Default value: 0.0 [%]

**Parameter 71:
Manual spinner**

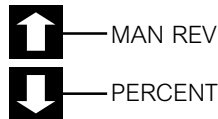
This parameter allows manual control of the spinner motor. After pressing the BLAST button, pressing the UP or DOWN buttons will increase/decrease the speed of the spinner motor. The output value is shown in [%] of full scale. This parameter is typically used for troubleshooting purposes.



Minimum value: 0.0 [%]
Maximum value: 100.0 [%]
Default value: 0.0 [%]

**Parameter 72:
Manual Reverse**

With this parameter it is possible to manually control the conveyor motor (reverse coil). After pressing the BLAST button, pressing the UP or DOWN buttons will increase/decrease the reverse speed of the conveyor/auger motor. The output value is shown in [%] of full scale. This parameter is typically used for troubleshooting purposes.



Minimum value: 0.0 [%]
Maximum value: 100.0 [%]
Default value: 0.0 [%]

**Parameter 80:
Dither Frequency**

This parameter sets the dither frequency of the output solenoid. The parameter value is shown in [Hz].

NOTE: Confirm with manufacturers data sheet regarding dither frequency.



DITHER



HZ

Minimum value: 100.0 [Hz]

Maximum value: 340.0 [Hz]

Default value: 100.0 [Hz]

**Parameter 81:
Minimum Current
Setting of
Conveyor/Auger Valve**

This parameter sets the minimum current output signal to the conveyor/ auger valve. The parameter value is shown in [%] of full scale.



MIN CONV



PERCENT

Minimum valve: 00.0 [%]

Maximum value: XX.X [%] (Determined by the % value of parameter 82)

Default value: 0.0 [%]

**Parameter 82:
Maximum Current
setting of
Conveyor/Auger Valve**

This parameter sets the maximum current output signal to the conveyor/ auger valve. The parameter value is shown in [%] of full scale



MAX CONV



PERCENT

Minimum value: XX.X [%] (Determined by the % value of parameter 81)

Maximum value: 100.0 [%]

Default value: 75.0 [%]

Parameter 83:
Minimum Current
Setting of Spinner
Valve

This parameter sets the minimum current output signal to the spinner valve. The parameter value is shown in [%] of full scale.



MIN SPIN



PERCENT

Minimum value 0.0 [%]

Maximum value: XX.X [%] (Determined by the % value of parameter 84)

Default value: 0.0 [%]

Parameter 84:
Maximum Current
Setting of spinner
Valve

This parameter sets the maximum current output signal to the spinner valve. The parameter value is shown in [%] of full scale.



MAX SPIN



PERCENT

Minimum value: X.X [%] (Determined by the % value of parameter 83)

Maximum value: 100.0 [%]

Default value: 50.0 [%]

Parameter 85:
Minimum Current
Setting of Conveyor/
Auger Reverse Coil

This parameter sets the minimum current output signal to the conveyor/ auger reverse coil. The parameter value is shown in [%] of full scale.



MIN REV



PERCENT

Minimum value: 00.0 [%]

Maximum value: XX.X [%] (Determined by the % value of parameter 86)

Default 00.0 [%]

**Parameter 86:
Maximum Current
Setting of Conveyor/
Auger Reverse Coil**

This parameter sets the maximum current output signal to the conveyor/ auger reverse coil. The parameter value is shown in [%] of full scale.



MAX REV
PERCENT

Minimum value: XX.X [%] (Determined by the % value of parameter 85)

Maximum value: 100.0 [%]

Default value: 50.0 [%]

**Parameter 87:
Ground Speed Input
Configuration**

This parameter allows the selection of the input configuration for the ground speed on the controller.



GSP TYPE
SENSOR

Minimum value: 0

Maximum value: 2

Default value: 0

0 - NPN type sensor

1 - PNP type sensor

2 - HALL effect type sensor

**Parameter 88:
Conveyor Speed Input
Configuration**

This parameter allows the selection of the input configuration for the conveyor speed on the controller.



CSP TYPE
SENSOR

Minimum value: 0

Maximum value: 2

Default value: 0

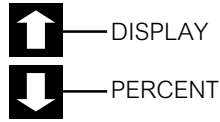
0 - NPN type sensor

1 - PNP type sensor

2 - HALL effect type sensor

**Parameter 89:
Display Intensity**

This parameter sets the intensity of the LED display.



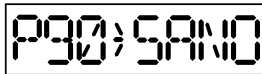
Minimum value: 10 [%]
Maximum value: 90 [%]
Default value: 50 [%]

**Parameter 90:
Material
Identification
Load 1**

This parameter allows material identification for LOAD 1. The material name can consist of up to four alphabetical characters.



Default: sand



↑
Material Name



Reverse/Pause Switch for selection of character position.

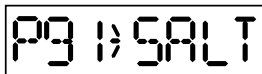
After selecting BLAST the character can be changed by using the increment UP/DOWN buttons. To change character position, toggle the REVERSE/PAUSE switch in the REVERSE (left) direction.

**Parameter 91:
Material
Identification
Load 2**

This parameter allows material identification for LOAD 2. The material name can consist of up to four alphabetical characters.



Default: salt



↑
Material Name

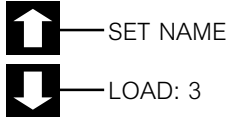


Reverse/Pause Switch for selection of character position.

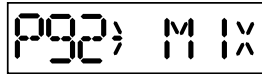
After selecting BLAST the character can be changed by using the increment UP/DOWN buttons. To change character position, toggle the REVERSE/PAUSE switch in the REVERSE (left) direction.

Parameter 92:
Material
Identification
Load 3

This parameter allows material identification for LOAD 3. The material name can consist of up to four alphabetical characters.



Default: mix



↑
Material Name



Reverse/Pause Switch for selection of character position.

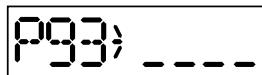
After selecting BLAST the character can be changed by using the increment UP/DOWN buttons. To change character position, toggle the REVERSE/PAUSE switch in the REVERSE (left) direction.

Parameter 93:
Material
Identification
Load 4

This parameter allows material identification for LOAD 4. The material name can consist of up to four alphabetical characters.



Default _ _ _ _



↑
Material Name



Reverse/Pause Switch for selection of character position.

After selecting BLAST the character can be changed by using the increment UP/DOWN buttons. To change character position, toggle the REVERSE/PAUSE switch in the REVERSE (left) direction.

Parameter 99:
Software Version

This parameter displays the software version installed in the controller.



VERSION



NUMBER

Versions Available

- Series 2 Software Version Number 2.3
- Series 5 Software Version Number 5.5
- Series 5 Software Version Number 5.6 (Max Speed Alarm)
- Series 5 Software Version Number 5.5 (French with Max Speed Alarm)
- Series 6 Software Version Number 6.3

**CS - 230 OPTIONAL
ACCESSORIES**

**Ground Speed
Simulator**



F u n c t i o n a l P u r p o s e

Basic Technologies' Ground Speed Simulator P/N 016527 is designed to assist you in both calibration and trouble shooting. The simulator provided with the standard Sure Seal connector can be interfaced with the existing wire harness very easily. Simply disconnect your ground speed extender cable or your conveyor speed extender cable and plug the simulator in. Turn on the on/off switch and select the desired speed required by adjusting the speed control potentiometer.

**Ground Speed
Amplifier**



F u n c t i o n a l P u r p o s e

Basic Technologies' Ground Speed Amplifier P/N 132713 is designed to amplify low level signals developed by magnetic sensors. Commonly used in applications where electronic engine control modules (ECU) are present.

**CS - 230 AND
ACCESSORIES
SPARE PARTS
SUMMARY**

The following is a summary of all components and parts associated with the CS-230. Included in this section will be a list of all cables, sensors and replacement parts that will aid in identifying and reordering of spares as required.

NOTE: Please contact your closest Basic Technologies location if further assistance is required with identification or clarification on replacement parts.

C S - 2 3 0 S p a r e P a r t s

1. Replacement CS-230 boxes
 - A. CS-230 Microprocessor Version 6.3 Package, use P/N 141402
2. CS-230 Microprocessor Mounting bracket, use P/N 121980
3. CS-230 replacement fuse, use P/N 126377.
Fuse is a 4.5 Amp Fast-Blo
4. CS-230 replacement On-Off switch, use P/N 108787
5. CS-230 replacement On-Off switch Boot, use P/N 108789
6. CS-230 replacement key model 1101, use P/N 007659

CS - 230 TROUBLE SHOOTING GUIDE

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

S y m p t o m s	P r o b a b l e C a u s e	C o r r e c t i v e A c t i o n
<p style="text-align: center;">E r r o r : 0 0</p> <p>The conveyor/auger is running when vehicle is stopped.</p>	<ul style="list-style-type: none"> • Valve spool jammed open. • Stray ground speed signal. • Minimum conveyor null to high. 	<ul style="list-style-type: none"> • Remove and inspect. Replace if necessary. See Module 4A. • Check "GS" in the operation menu. If ground speed is present, check sensor or connection point. Recalibrate ground speed. • See Parameter 81. Lower the value.
<p style="text-align: center;">E r r o r : 0 1</p> <p>The conveyor/auger is stopped when vehicle is running.</p>	<ul style="list-style-type: none"> • Faulty conveyor speed sensor. • Hydraulic/Mechanical • Electrical 	<ul style="list-style-type: none"> • Test system Parameter 70. If no signal from sensor replace or repair. • 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. • Check cables and solenoids; repair or replace if required. Check CS-230 output amps; replace or repair as required.

S y m p t o m s	P r o b a b l e C a u s e	C o r r e c t i v e A c t i o n
<p style="text-align: center;">E r r o r : 0 2</p> <p>Vehicle speed is too high for selected application rate.</p>	<ul style="list-style-type: none"> • Under spreading; driving too fast, wrong gate setting. • Sensor malfunction. • Low hydraulic oil flow. • Incorrect sensor type selected. 	<ul style="list-style-type: none"> • Reduce vehicle speed or increase gate setting or select a lower application rate. • Test in Parameter 70. Repair or replace if required. • Increase value of Parameter 82. • Check for worn drive pin on conveyor sensor. • Check hydraulic pump output. • Change sensor type. See Parameter 88.
<p style="text-align: center;">E r r o r : 0 3</p> <p>Material application rate error. The material per revolution of conveyor/auger motor is too large or too small.</p>	<ul style="list-style-type: none"> • Improper gate setting. • P25 is set too high or too low. 	<ul style="list-style-type: none"> • Increase gate setting if amount too small. Decrease gate setting if amount is too large. • Adjust Parameter 25.
<p style="text-align: center;">E r r o r : 0 4</p> <p>Material calibration is incorrect.</p>	<ul style="list-style-type: none"> • Incorrect calibration procedure. 	<ul style="list-style-type: none"> • Recalibrate conveyor/auger.
<p style="text-align: center;">E r r o r : 0 5</p> <p>Ground speed signal is out of range.</p>	<ul style="list-style-type: none"> • Ground speed on the CS-230 follows speedometer too high or low. • Faulty ground speed sensor. • Low ground speed signal form sending unit. • Improper gear setting selected for calibration. 	<ul style="list-style-type: none"> • Adjust Parameter 43 one or two values up or down. • Test ground speed sensor; repair or replace. • Install ground speed amplifier. Consult truck manufacturer for correct connection location. • Check and adjust Parameter 41.

Symptoms	Probable Cause	Corrective Action
<p>Error: 06 Ground speed calibration is incorrect.</p>	<ul style="list-style-type: none"> • Incorrect ground speed calibration procedure. • Incorrect sensor type selected. 	<ul style="list-style-type: none"> • Recalibrate ground speed. • Change sensor type. See Parameter 87.
<p>Error: 07 The Blast Function was on too long.</p>	<ul style="list-style-type: none"> • Blast was left on too long. • Error setting time out too short. 	<ul style="list-style-type: none"> • Turn Blast off sooner. • Adjust Parameter 54 according to desired duration.
<p>Error: 08 Blown fuse or high/low voltage conditions exists.</p>	<ul style="list-style-type: none"> • Blown output fuse. • Burnt traces. • Low vehicle voltage. 	<ul style="list-style-type: none"> • Replace with 4.5 amp fast blow fuse. • Return CS-230 to supplier for repair. • Check vehicle voltage. • Check ground connection.
<p>Error: 09 Material detection error.</p>	<ul style="list-style-type: none"> • No material detected in hopper. • Faulty pressure sensor. 	<ul style="list-style-type: none"> • Return to yard for reload. • Test sensor; repair or replace as required.
<p>Error: 99 Low battery condition/eprom change warning.</p>	<ul style="list-style-type: none"> • Internal battery power is low. • Original eprom has been replaced with another version. 	<ul style="list-style-type: none"> • Return to supplier for repair. • Reset CS-230 to factory settings. See Parameter 59.

S y m p t o m s	P r o b a b l e C a u s e	C o r r e c t i v e A c t i o n
CS-230 will not turn on.	<ul style="list-style-type: none"> • Poor power connection. • Defective power cable. 	<ul style="list-style-type: none"> • Check power and ground connections. • Test, repair or replace power cable.
CS-230 turns on, but has no display.	<ul style="list-style-type: none"> • Poor power connection 	<ul style="list-style-type: none"> • Check power and ground connections. • Reset Parameter 59.
Unable to maintain application rate.	<ul style="list-style-type: none"> • Conveyor/auger nulling too low. • Incorrect conveyor/auger sensor pulses per revolution. 	<ul style="list-style-type: none"> • Recalibrate Parameters 81 and 82. • Check Parameter 20.
Truck moves but conveyor/auger lags.	<ul style="list-style-type: none"> • Not enough signal gain for conveyor valve solenoid. 	<ul style="list-style-type: none"> • Check Parameter 26. Increase value if required.
Ground Speed Simulator will not work.	<ul style="list-style-type: none"> • Improper ground speed input configuration. 	<ul style="list-style-type: none"> • Check Parameter 87. Set to 0 or 1. If set to 2, the simulator will not work