



DCY

GreenStar Rate Controller Dry

OPERATOR'S MANUAL GreenStar Rate Controller Dry OMPFP11902 ISSUE L1 (ENGLISH)

CALIFORNIA
Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

If this product contains a gasoline engine:

⚠ WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

The State of California requires the above two warnings.

Additional Proposition 65 Warnings can be found in this manual.

John Deere Ag Management Solutions

Printed in U.S.A.



OMPFP11902

Introduction

www.StellarSupport.com

NOTE: Product functionality may not be fully represented in this document due to product changes occurring after the time of printing. Read the latest Operator's Manual and Quick Reference Guide prior to operation. To obtain a copy, see your dealer or visit www.StellarSupport.com

OUO6050,0000FB1 -19-10AUG10-1/1

Foreword

READ THIS MANUAL carefully to learn how to operate and service your system correctly. Failure to do so could result in personal injury or equipment damage. This manual and safety signs on your machine may also be available in other languages. (See your John Deere dealer to order.)

THIS MANUAL SHOULD BE CONSIDERED a permanent part of your system and should remain with the system when you sell it.

MEASUREMENTS in this manual are given in both metric and customary U.S. unit equivalents. Use only correct replacement parts and fasteners. Metric and inch fasteners may require a specific metric or inch wrench.

RIGHT-HAND AND LEFT-HAND sides are determined by facing in the direction of forward travel.

WRITE PRODUCT IDENTIFICATION NUMBERS (P.I.N.) in the Specification or Identification Numbers section. Accurately record all the numbers to help in tracing

the components should it be stolen. Your dealer also needs these numbers when you order parts. File the identification numbers in a secure place off the machine.

WARRANTY is provided as part of John Deere's support program for customers who operate and maintain their equipment as described in this manual. The warranty is explained on the warranty certificate which you should have received from your dealer.

This warranty provides you the assurance that John Deere will back its products where defects appear within the warranty period. In some circumstances, John Deere also provides field improvements, often without charge to the customer, even if the product is out of warranty. Should the equipment be abused, or modified to change its performance beyond the original factory specifications, the warranty will become void and field improvements may be denied.

JS56696,000065A -19-28JUL09-1/1

Contents

Page	Page
Safety	Bin Chaining 35-4
Recognize Safety Information 05-1	Reports and Totals
Understand Signal Words 05-1	Reports and Totals 40-1
Follow Safety Instructions 05-1	Diagnostics
Practice Safe Maintenance 05-2	Spreader Diagnostics 45-1
Handle Electronic Components and Brackets Safely 05-2	Hardware/Software Readings 45-1
Wear Protective Clothing 05-3	Switchbox Readings 45-1
Operate Safely 05-3	Delivery System Readings 45-2
Read and Understand MSDS 05-3	System Voltages Readings 45-2
Handle Agricultural Chemicals Safely 05-4	Working Parameters Readings 45-3
Dispose of Waste Properly 05-4	Switches/Status Readings 45-3
Safety Signs	Flow Control Test 45-4
Unexpected Conveyor Speed Detected 10-1	Spreader Check Test 45-5
Unexpected Spinner Speed Detected 10-1	Bin Cleanout 45-6
Diagnostic Tests or Calibration Procedures 10-1	Control Valve Test 45-7
Rate Controller Dry Overview	Switch Box Controller
System Overview 15-1	Switch Box 50-1
Component Overview and Compatibility 15-2	System Speed Signal
GreenStar Rate Controller Dry 15-2	System Speed Signal 55-1
Spreader Setup	Supplemental Information
Implement Setup 20-1	37-Pin Connectors 60-1
System Setup 20-2	Connector Information for Adapter Harness 60-2
Control Valve Calibration Number Tuning 20-4	Recommended Wire Sizes 60-2
Recommended Initial Control Valve Calibration Numbers 20-5	Driver Outputs Table 60-2
Alarm Setup 20-6	Troubleshooting
Rate Smoothing Setup 20-6	Rate Controller Dry Troubleshooting 65-1
Product Setup	Rate Controller Dry Trouble Codes 65-2
Product Information 25-1	GreenStar Rate Controller Switch Box Trouble Codes 65-3
Product Bin Setup 25-2	
Bin Chaining 25-3	
Product Summary 25-3	
Calibration	
Calibrate CFR 30-1	
Calibrate PWM Limits 30-3	
Spreader Operation	
Rate Controller Dry — Main Page 35-1	
Bin Level Indicator 35-1	
Rate Control 35-2	
Bin Operation 35-3	

Original Instructions. All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

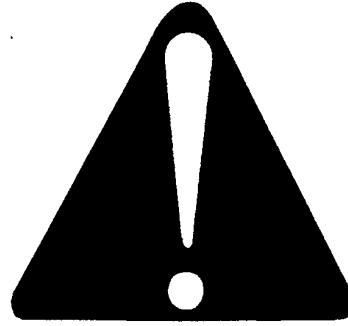
COPYRIGHT © 2011
DEERE & COMPANY
Moline, Illinois
All rights reserved.
A John Deere ILLUSTRATION © Manual

Safety

Recognize Safety Information

This is a safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.



T81388 —UN—07DEC88

DX,ALERT -19-29SEP98-1/1

Understand Signal Words

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.



TS187 —19—30SEP88

DX,SIGNAL -19-03MAR93-1/1

Follow Safety Instructions

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your John Deere dealer.

There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this operator's manual.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.



TS201 —UN—23AUG88

If you do not understand any part of this manual and need assistance, contact your John Deere dealer.

DX,READ -19-16JUN09-1/1

Practice Safe Maintenance

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet, and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.



TS218 —UN—23AUG88

DX,SERV -19-17FEB99-1/1

Handle Electronic Components and Brackets Safely

Falling while installing or removing electronic components mounted on equipment can cause serious injury. Use a ladder or platform to easily reach each mounting location. Use sturdy and secure footholds and handholds. Do not install or remove components in wet or icy conditions.

If installing or servicing a RTK base station on a tower or other tall structure, use a certified climber.

If installing or servicing a global positioning receiver mast used on an implement, use proper lifting techniques and wear proper protective equipment. The mast is heavy and can be awkward to handle. Two people are required when mounting locations are not accessible from the ground or from a service platform.



TS249 —UN—23AUG88

DX,WW,RECEIVER -19-24AUG10-1/1

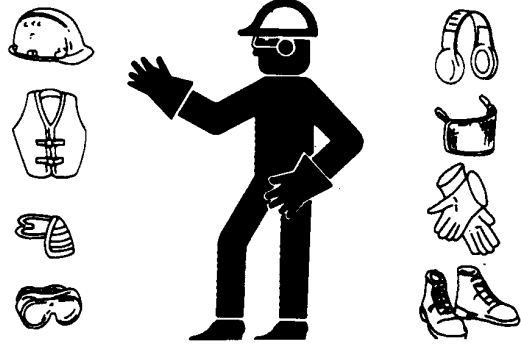
Wear Protective Clothing

Wear close fitting clothing and safety equipment appropriate to the job.

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



TS206 —UN—23AUG88

DX,WEAR -19-10SEP90-1/1

Operate Safely

Never allow children on or near machine.

Before operating, make sure air has been bled from wing-fold hydraulic system.

Be sure area around machine is clear before raising or lowering machine frame or wings.

Do not operate close to a ditch or creek.

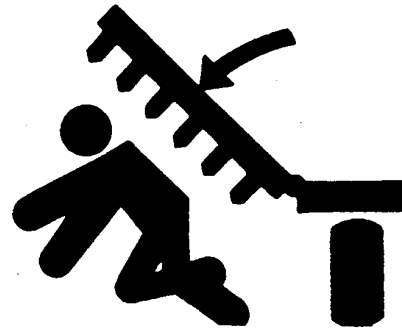
Do not operate with wings folded.

Slow down when turning and traveling over rough ground.

Always shut off tractor and shift to PARK or set brakes when leaving tractor. Remove key when leaving tractor unattended.

Always have tractor stopped on level ground when raising or lowering wings.

Operate machine from tractor seat only.



N39547 —UN—06OCT88

If chemicals are used, follow manufacturer's recommendations for handling and storage.

Tow machine behind a properly equipped tractor only.

JS56696,000065B -19-28JUL09-1/1

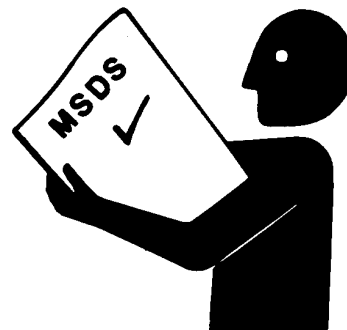
Read and Understand MSDS

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Follow all recommended procedures.

(See your John Deere dealer for MSDS's on chemical products used with John Deere equipment.)



TS1132 —UN—26NOV90

JS56696,0000661 -19-28JUL09-1/1

Handle Agricultural Chemicals Safely

Chemicals used in agricultural applications such as fungicides, herbicides, insecticides, pesticides, rodenticides, and fertilizers can be harmful to your health or the environment if not used carefully.

Always follow all label directions for effective, safe, and legal use of agricultural chemicals.

Reduce risk of exposure and injury:

- Wear appropriate personal protective equipment as recommended by the manufacturer. In the absence of manufacturer's instructions, follow these general guidelines:
 - Chemicals labeled **'Danger'**: Most toxic. Generally require use of goggles, respirator, gloves, and skin protection.
 - Chemicals labeled **'Warning'**: Less toxic. Generally require use of goggles, gloves, and skin protections.
 - Chemicals labeled **'Caution'**: Least toxic. Generally require use of gloves and skin protection.
- Avoid inhaling vapor, aerosol or dust.
- Always have soap, water, and towel available when working with chemicals. If chemical contacts skin, hands, or face, wash immediately with soap and water. If chemical gets into eyes, flush immediately with water.
- Wash hands and face after using chemicals and before eating, drinking, smoking, or urination.
- Do not smoke or eat while applying chemicals.
- After handling chemicals, always bathe or shower and change clothes. Wash clothing before wearing again.
- Seek medical attention immediately if illness occurs during or shortly after use of chemicals.
- Keep chemicals in original containers. Do not transfer chemicals to unmarked containers or to containers used for food or drink.



A34471

- Store chemicals in a secure, locked area away from human or livestock food. Keep children away.
- Always dispose of containers properly. Triple rinse empty containers and puncture or crush containers and dispose of properly.

TS220 —UN—23AUG88

A34471 —UN—11OCT88

DX,WW,CHEM01 -19-24AUG10-1/1

Dispose of Waste Properly

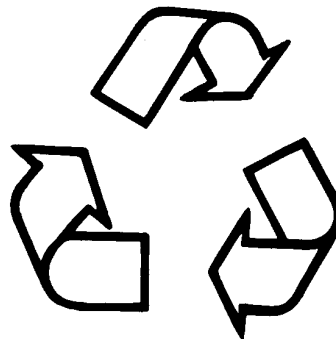
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.



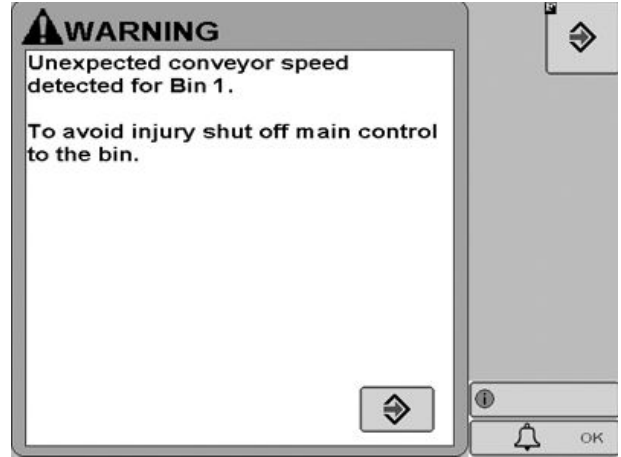
TS1133 —UN—26NOV90

DX,DRAIN -19-03MAR93-1/1

Safety Signs

Unexpected Conveyor Speed Detected

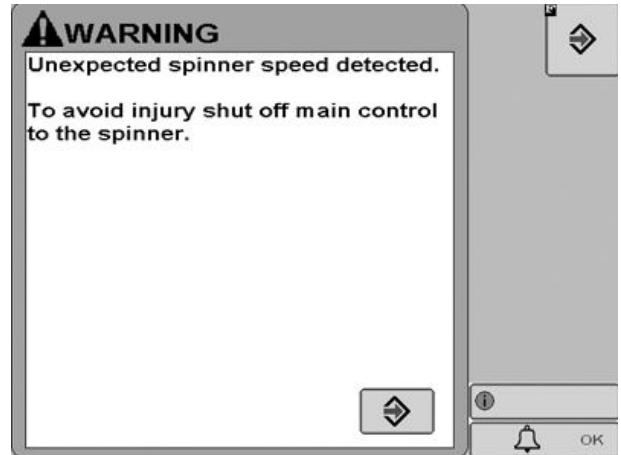
This message will be displayed when the commanded speed of specified conveyor is zero/stopped, but movement has been detected for more than five seconds.



CZ76372.000031B -19-14JUL11-1/1

Unexpected Spinner Speed Detected

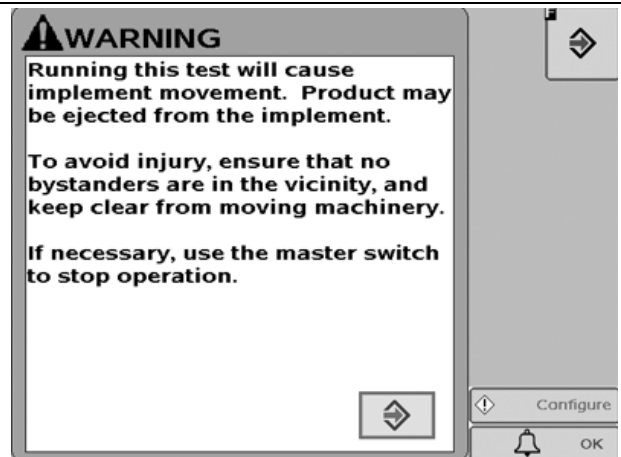
This message will be displayed when the commanded speed of the spinner is zero/stopped, but movement has been detected for more than ten seconds.



CZ76372.000031F -19-14JUL11-1/1

Diagnostic Tests or Calibration Procedures

This message will be displayed when any diagnostic test or calibration procedure is selected that will discharge product.



CZ76372.000031C -19-14JUL11-1/1

Rate Controller Dry Overview

System Overview

The GreenStar™ Rate Controller Dry system controls product application on pull-type spreaders and self-propelled spreaders. It is designed to turn the implement on and off according to coverage, boundary, and GPS location to work seamlessly with Swath Control Pro.

NOTE: See GreenStar 2630 operator's manual for further details on Swath Control Pro.

The system is comprised of the following hardware components:

- GreenStar 2630 Display Only
- Rate Controller Dry FlexBox.
- Foot Switch.
- Rate Controller Dry Wiring Harnesses.
- Switch Box Controller (optional).
- GreenStar cab harness.
- StarFire GPS Receiver (optional).

The Rate Controller Dry controls hydraulic oil flow to hydraulic motors based upon display settings, vehicle speed, foot switch status, signals from speed sensors, and the status of switches on the optional Switch Box Controller.

GreenStar is a trademark of Deere & Company

The Switch Box Controller (SBC) monitors the status of ten switches plus a master switch and broadcasts the switch messages to the Rate Controller Dry. The master switch is hard-wired to the Rate Controller Dry. This allows the operator to manually enable/disable bins or the spinner rather than rely solely upon the display for these settings. The master switch permits the operator to shut off all bins on the Rate Controller Dry. The master switch on the switch box serves the same purpose as the foot switch and only one of the two is required for system operation.

In order for the system to control product application under normal operating conditions, the following conditions must be met:

- Implement and Product Setup must be complete.
- Master switch must be on.
- Bin switch must be on and assigned to a bin (if Switch Box is present).
- Operator must have turned on the respective bin on the display.
- Spinner must be on.
- Swath Control must have commanded the bin to be on (if applicable) or Swath Control Pro is deactivated.
- Vehicle speed must be greater than 0.5 km/h (.3 mph).

CZ76372,00002E8 -19-29AUG11-1/1

Component Overview and Compatibility

The following component configurations are compatible with the Rate Controller Dry. See 37-Pin Connector Tables at the end of the manual for additional pin out information.

Control Valves

- Control Valve types: Fast (Servo/Motorized) and PWM (Proportional).
- Control Valves that require 12 V power to open.
- Control Valves that require less than 2.5 amps of current. (For Control Valves requiring more than 2.5 amps, a boost box is needed. See your John Deere Dealer.)

• Fast Close (Servo) Control Valves

The Fast Close Control Valve serves as the rate control valve and completely closes when it is necessary to stop product flow. To start product flow once again, the fast close valve opens and quickly ramps flow back up to achieve the target application rate.

• PWM Close Control Valves

The PWM Close Control Valve serves as the rate control valve and completely closes when it is necessary to stop product flow. To start product flow once again, the PWM close valve opens and quickly ramps flow back up to achieve the target application rate. Performance of PWM valves is slightly better than performance of Fast (Servo) valves due to the immediate responsiveness of PWM valves.

Conveyor Speed Sensor

A speed sensor is required for each configured bin/conveyor and is used to monitor the conveyor speed for rate control.

The sensor can be powered by 5 V or 12 V and must provide a frequency-based square wave signal with

respect to the conveyor speed. The sensor must pull the signal to Ground to create the lower portion of the square wave and the controller will pull the signal up to 5V when the sensor is not in the active state, completing the square wave.

Conveyor speed sensors are available in several styles including optical encoders and gear tooth sensors.

Spinner Speed Sensor

A speed sensor is required for the spinner if the speed will be controlled by the controller (i.e., Control Valve Type is not "None"). If the spinner speed will not be controlled by the controller then the sensor is optional. The sensor is used to monitor the spinner speed for automatic or manual speed control.

The sensor can be powered by 5 V or 12 V and must provide a frequency-based square wave signal with respect to the spinner speed. The sensor must pull the signal to Ground to create the lower portion of the square wave and the controller will pull the signal up to 5V when the sensor is not in the active state, completing the square wave.

Spinner speed sensors usually are magnetic pickup sensors that sense bolt heads or gear teeth.

Bin Level Switch (Optional)

A Bin Level Switch is used to alert the operator of low bin status.

The optical switch senses the presence or absence of product in the bin. When the bin level switch output voltage is low, product is absent and the bin is nearly empty.

A Bin Level Switch is required for bin chaining.

CZ76372,0000320 -19-13JUL11-1/1

GreenStar Rate Controller Dry

To access the Rate Controller Dry main page, select the menu button followed by the Rate Controller Dry button. Each Rate Controller Dry is identified by the controller serial number and implement name once the setup procedure has been completed.

NOTE: The Rate Controller Dry icon will appear upon power up after the harness is installed and the Rate Controller Dry is connected.

A Status bar indicates progress while the controller is loading.

PC8663 —UN—05AUG05



Menu Button

PC13638 —UN—06JUL11



CZ76372,0000321 -19-13JUL11-1/1

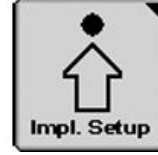
Spreader Setup

Implement Setup

PC13261 —UN—21APR11

Select Setup menu button to enter GreenStar Rate Controller Dry setup.

NOTE: Master switch must be off to change most settings or values.



Implement Setup Softkey

CZ76372,00002EA -19-13JUL11-1/2

Select the Implement tab to enter implement setup.

NOTE: Switchbox switch numbers (I) are only available if a switchbox is connected.

Implement Selection

1. Select desired Implement Type (pull-behind spreader or self-propelled spreader) from the drop-down menu (A).
2. Select Implement Name from drop-down (B).

If no Implement Name has been added yet:

1. Select New (C).
2. Type new name on keypad.
3. Select enter.

If Implement Name needs to be revised:

1. Select implement name to be revised from drop-down.
2. Select Rename (D).
3. Type new name on keypad.
4. Select enter.

If Implement Name is no longer needed:

1. Select implement name to be deleted from drop-down.
2. Select Remove (E).
3. Accept pop-up notification.

NOTE: If Rate Controller Dry is not used but remain connected, check Disable this GDC check box to eliminate connection to display for Documentation, Swath Control, and controller warnings.

NOTE: A maximum of three implement configurations/names can be saved per controller.

NOTE: Rename does not affect System tab, Alarm tab, and Rates tab previously configured. Existing calibrations remain valid.

NOTE: Implement Name must be defined before the System tab, Alarm tab, and Rates tab are enabled.

Implement Setup

PC13260 —UN—21APR11

- | | |
|---------------------------------|---------------------------------------|
| A—Implement Selection Drop-down | F—Disable This GDC Checkbox |
| B—Implement Name Drop-down | G—Number of Bins Drop-down |
| C—New Implement Button | H—Bin Numbers |
| D—Rename Implement Button | I—Associated Switchbox Switch Numbers |
| E—Remove Implement Button | |

Bin Selection

For the current implement, select the Number of Bins in the drop-down (G).

This is the maximum number of bins for multibin configuration, regardless of whether all bins are in use.

CZ76372,00002EA -19-13JUL11-2/2

System Setup

Select System tab to enter system setup.

NOTE: Please refer to the COMPATIBILITY section for components compatible with the Rate Controller Dry.

NOTE: The spinner and each bin must be set up before using.

NOTE: Switchbox switch numbers (I) are only available if a switchbox is connected.

Select the button for the bin or spinner that needs to be configured.

- A—Bin 1 System Button
- B—Bin 2 System Button
- C—Bin 3 System Button
- D—Bin 4 System Button
- E—Spinner Setup Button
- F—Control Valve Type
- G—Control Valve Calibration
- H—Sensor Calibration
- I— Switchbox Number

Implement	System	Alarms	Rates	
	Control Valve Type F	Control Valve Calibration G	Sensor Calibration H	Switchbox I
Bin 1 Sys A	PWM Close	5023	180	1
Bin 2 Sys B	PWM Close	5023	180	2
Bin 3 Sys C	---	---	---	3
Bin 4 Sys D	---	---	---	4
Spinner Setup E	None	5203	---	10

System Setup

PC13262 —JUN—21APR11

Continued on next page

CZ76372.00002EB -19-14JUL11-1/3

Bin Setup

1. Select the Control Valve Type.
2. For Fast Close valves, enter the Control Valve Calibration Number.

Refer to Control Valve Calibration Number Tuning section of this operator's manual to make adjustments to Control Valve Calibration Number. A common value to begin with is 5023.

NOTE: Selecting PWM Close for Control Valve Type changes the Control Valve Calibration input to a button. Select the button to enter PWM Settings.

Conveyor Speed Sensor Calibration Number must be entered before PWM Limits button becomes active.

For PWM valves, select the PWM Settings button. Enter the Control Valve Calibration Number, Coil Frequency, and then High and Low Limit.

Refer to manufacturer's recommendation for PWM Coil Frequency. Common values are 122 or 50 Hz

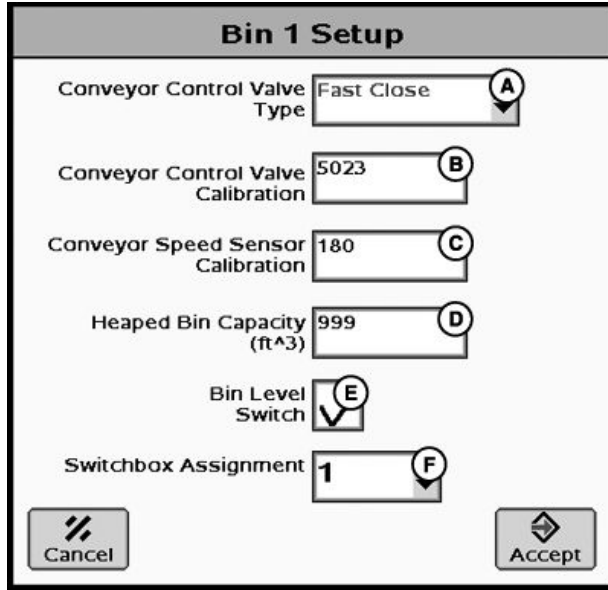
3. Enter the Conveyor Speed Sensor Calibration Number
This varies by spreader manufacturer, common values range from 30 to 360 pulses per revolution.

4. Enter the Heaped Bin Capacity
This is the maximum volume of product that bin can contain when completely loaded. A value larger than actual value is recommended if exact value is unknown. This value is only used to determine how full the bin is.

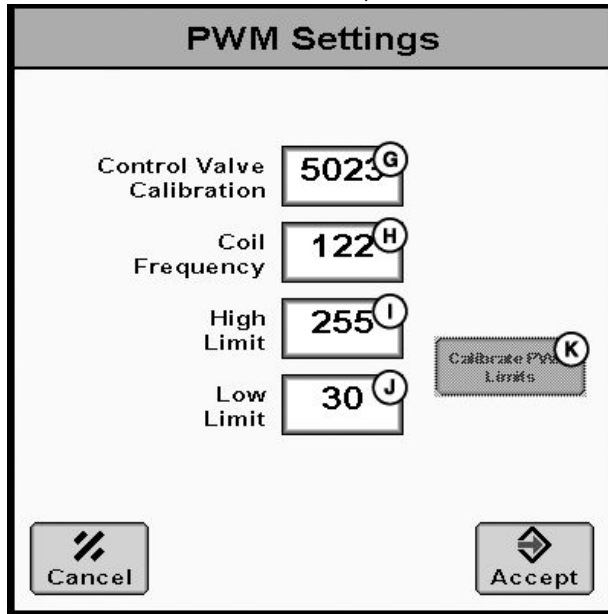
5. Select the check box if a Bin Level Switch is present.
6. If a switch box is present, select a switch number to assign to the bin.
7. If Bin 2 is currently being configured, indicate if it is a micronutrient bin by checking the box at the bottom of the screen.

NOTE: Bin 1 cannot be set up as a micronutrient bin, Bin 2 has the option to be set up as a micronutrient bin, and Bins 3 and 4 are always setup as micronutrient bins.

8. Select the Accept button when all required information is complete.



Bin Setup



PWM Settings

- | | |
|---|-----------------------------------|
| A—Control Valve Type Drop-down | G—Control Valve Calibration Input |
| B—Control Valve Calibration Input | H—Coil Frequency Input |
| C—Conveyor Speed Sensor Calibration Input | I—High Limit Input |
| D—Heaped Bin Capacity Input | J—Low Limit Input |
| E—Bin Level Switch Check Box | K—Calibrate PWM Limits Button |
| F—Switchbox Assignment Drop-down | |

PC13263 —UN—21APR11

PC13633 —UN—27JUN11

Continued on next page

CZ76372,00002EB -19-14JUL11-2/3

Spinner Setup

Select the button for Spinner Setup.

1. Select the Control Valve Type.
Refer to Control Valve Calibration Number Tuning section of this operator's manual to make adjustments.
For PWM valves, select the PWM Settings button. Enter the Control Valve Calibration Number, Coil Frequency, and then High and Low Limit.
Refer to manufacturer's recommendation for PWM Coil Frequency. Common values are 122 or 50 Hz.
2. For Fast Close valves, enter the Control Valve Calibration Number.
3. The Spinner Speed Sensor Installed checkbox is enabled only when Control Valve Type "None" is selected. Otherwise the box is checked and disabled. This allows the user to indicate a speed monitor is installed on an uncontrolled spinner.
4. Enter the Spinner Speed Sensor Calibration Number.
This is the number of bolt heads sensed in a revolution. Common values are 2 or 4.
5. If a switch box is present, select a switch number to assign to the spinner.
6. Select the Accept button when all required information is complete.

Spinner Setup

- A—Control Valve Type Drop-down
- B—Control Valve Calibration Input
- C—Spinner Speed Sensor Calibration Input
- D—Switchbox Assignment Drop-down

CZ76372.00002EB -19-14JUL11-3/3

Control Valve Calibration Number Tuning

The control valve calibration number is set up in the following format **XXYZ**.

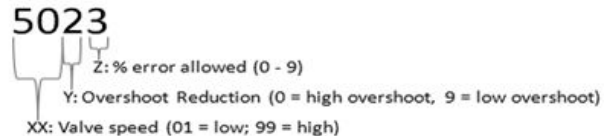
The numbers work similar for all control valve types in spinner and conveyor configurations.

XX adjusts how fast the valve reacts to error between target and actual speeds. If the control is too slow, increase this value. If the control is too fast or fluctuates constantly, reduce this value. Input range is 1-99. Typical values are between 25-75.

Y adjusts overshoot when controlling to a speed change. If the system overshoots the target, increase this number. If control is slow reacting to a speed change, reduce this number. Input range is 0-9. Typical values are between 2-4.

XX and **Y** can affect each other when changed. Adjusting one value may require a change to the other. It is best to

PC13634 —UN—27JUN11



Control Valve Calibration Number Tuning

adjust the **XX** value first to ensure that the system is quick to react. Then change **Y** value as needed.

Z adjusts control deadband. It represents the error (% of target conveyor/spinner speed) allowed when reaching a target speed. To make the controller more responsive to errors, lower the value. To make the controller more accepting of errors, increase the value. If oscillation or chasing of the target speed occurs, increase this number. The input range is between 0-9. Typical starting value is 3.

CZ76372.00002EC -19-13JUL11-1/1

Recommended Initial Control Valve Calibration Numbers

Manufacturer	Model	Bin/Spinner	Valve Type	Initial Number
BBI	Triad	Main 1	Fast (servo)	5023
BBI	Triad	Micro 2	Fast (servo)	1535
BBI	Triad	Micro 3	Fast (servo)	1535
BBI	Endurance	Main 1	Fast (servo)	5023
BBI	MagnaSpread	Main 1	Fast (servo)	5023
Force Unltd.	AgForce	Spinner	PWM	5013
Force Unltd.	AgForce	Main 1	PWM	5023
Force Unltd.	Duo-Force	Main 2	PWM	3023
Force Unltd.	Tri-Force	Micro 3	PWM	3023
Force Unltd.	Quad-Force	Micro 4	PWM	5023
Force Unltd.	AgForce	Spinner	Fast (servo)	5003
Force Unltd.	AgForce	Main 1	Fast (servo)	5033
Force Unltd.	Duo-Force	Main 2	Fast (servo)	5023
Force Unltd.	Tri-Force	Micro 3	Fast (servo)	5023
Force Unltd.	Quad-Force	Micro 4	Fast (servo)	7503
New Leader	G4 - Single	Spinner	PWM	2503
New Leader	G4 - Single	Bin 1	Fast (servo)	5043
New Leader	G4 - MultiApplier	Bin 2	Fast (servo)	5043
New Leader	G4 - MultiBin	Bin 3	Fast (servo)	5043
New Leader	G4 - MultiBin	Bin 4	Fast (servo)	5043

CZ76372,0000333 -19-13JUL11-1/1

Alarm Setup

Implement	System	Alarms	Rates																			
		<table border="1"> <thead> <tr> <th>Application Rate (% +/- of Target Rate)</th> <th>Low Bin Level (%)</th> <th>Bin Level Switch</th> </tr> </thead> <tbody> <tr> <td>Bin 1 Alarm A</td> <td>E 20</td> <td>F 20</td> <td>G None</td> </tr> <tr> <td>Bin 2 Alarm B</td> <td>20</td> <td>20</td> <td>None</td> </tr> <tr> <td>Bin 3 Alarm C</td> <td>20</td> <td>20</td> <td>None</td> </tr> <tr> <td>Bin 4 Alarm D</td> <td>20</td> <td>20</td> <td>None</td> </tr> </tbody> </table>	Application Rate (% +/- of Target Rate)	Low Bin Level (%)	Bin Level Switch	Bin 1 Alarm A	E 20	F 20	G None	Bin 2 Alarm B	20	20	None	Bin 3 Alarm C	20	20	None	Bin 4 Alarm D	20	20	None	
Application Rate (% +/- of Target Rate)	Low Bin Level (%)	Bin Level Switch																				
Bin 1 Alarm A	E 20	F 20	G None																			
Bin 2 Alarm B	20	20	None																			
Bin 3 Alarm C	20	20	None																			
Bin 4 Alarm D	20	20	None																			
		Spinner Speed (% +/- of target RPM) H	Alarm? I 10																			

Alarm Setup

Bin 1 Alarms

Alarm?

Application Rate (% +/- of Target Rate) **J** 20 **K**

Low Bin Level (%) **L** 20 **M**

Bin Level Switch **N**

Bin 1 Alarms

- A—Bin 1 Alarm
- B—Bin 2 Alarm
- C—Bin 3 Alarm
- D—Bin 4 Alarm

- E—Application Rate (% +/- of Target Rate)
- F—Low Bin Level (%)
- G—Bin Level Switch
- H—Spinner Speed Alarm

- I—Spinner Speed (% +/- of Target RPM)
- J—Application Rate Alarm
- K—Application Rate (% +/- of Target Rate)
- L—Low Bin Level Alarm
- M—Low Bin Level (%)
- N—Bin Level Switch

Select Alarms tab to enter alarm setup.

The Application Rate Alarm (E), Low Bin Level Alarm (F) and Bin Level Switch Alarm (G) are all displayed on the Alarms tab.

Select the Bin buttons (A - D) to set up the alarms for each bin.

Mark the check boxes to enable each alarm, and enter a percentage value to trigger the alarm.

CZ76372.00002ED -19-13JUL11-1/1

Rate Smoothing Setup

To enable Rate Smoothing mark the checkbox for the bin and enter Rate Smoothing percentage.

To enable Speed Smoothing mark the checkbox for the spinner and enter Speed Smoothing percentage.

Smoothing shows the actual rate/speed as the target rate/speed when the actual rate/speed is within the user-defined percentage. Smoothing percentage range is 3-15% and system defaults to 3%.

Implement	System	Alarms	Display Smoothing
Rate Smoothing			
Bin 1	<input checked="" type="checkbox"/>	<input type="text" value="3"/>	%
Bin 2	<input checked="" type="checkbox"/>	<input type="text" value="4"/>	%
Bin 3	<input checked="" type="checkbox"/>	<input type="text" value="5"/>	%
Bin 4	<input checked="" type="checkbox"/>	<input type="text" value="6"/>	%
Speed Smoothing			
Spinner	<input checked="" type="checkbox"/>	<input type="text" value="7"/>	%

CZ76372.00002EE -19-13JUL11-1/1

Product Setup

Product Information

PC13274 —UN—02MAY11

Select Product Setup softkey and then Product Information tab



Product Setup Softkey

BA31779,00002FE -19-05DEC11-1/2

1. Select a Product from the Product Name drop down or press the New button to create a product.

NOTE: A limit of ten products can be created on the controller.

2. Select the Product Type.

3. Select the Application Units.

4. Enter Product Density, Spread Width, Target Spinner Speed, and Spinner Frame.

NOTE: Spread Width and Spinner Speed for the vehicle are based on the lowest numbered, enabled bin. Usually Bin 1.

5. If using prescriptions, select Map-Based as the Rate Mode. Otherwise select Predefined or Manual.

6. If Predefined is selected, enter desired rates in the three rate entry boxes (L, M, and N).

7. If Manual is selected, a Manual Rate Change Increment must be entered.

On the Main page, the rate can be adjusted with plus (+) and minus (-) buttons. The value entered for the Manual Rate Change Increment increases or decreases the rate with each button press.

A rate change of 0 may be used. This disables the +/- buttons in the rate popup for any bin using the current product.

Product Information

- | | |
|-------------------------------|-------------------------------|
| A—Product Name Drop-down | H—Rate Mode Drop-down |
| B—New Button | I— Spread Width Entry |
| C—Rename Button | J— Target Spinner Speed Entry |
| D—Remove Button | K—Spinner Frame Entry |
| E—Product Type Drop-down | L—Predefined Rate 1 |
| F—Application Units Drop-down | M—Predefined Rate 2 |
| G—Product Density Entry | N—Predefined Rate 3 |

PC14238 —UN—06DEC11

BA31779,00002FE -19-05DEC11-2/2

Product Bin Setup

1. Enable each bin that is applying product by placing a check in the box (C) next to the Bin Setup button (D). Uncheck any bins that are not currently in use.

Disabled bins are not controlled and do not produce product documentation information or warnings.

2. Select the Bin Setup button (D) for the bin being configured.
3. On the Bin Product Setup popup, select the predefined Product Name (H) from the drop-down list.
4. Enter the Feed Gate Opening (I). This value is critical and must be accurate. This value does not control the feed gate opening.
5. Enter the Conveyor Feed Rate or CFR (J) for the conveyor. This value is quoted from most manufacturers and is the amount of product dispensed in 1 revolution of the conveyor pulley if the gate height were set at 1 inch (or 1 cm if using metric).

If the CFR is unknown, select the Calibrate CFR (K) button. See the Calibration section of this Operators Manual for more information.

- | | |
|---------------------------------|---------------------------|
| A—Bin Chaining On/Off Drop-down | G—CFR Info |
| B—Bin Chaining Order Drop-down | H—Product Name Drop-down |
| C—Bin Enable/Disable Checkbox | I—Feed Gate Opening Entry |
| D—Bin Setup Button | J—CFR Entry |
| E—Product Name Info | K—Calibrate CFR Button |
| F—Feed Gate Opening Info | |

Product Bin Setup

Bin 1 Product Setup

PC13275—UN—04MAY11

PC13276—UN—04MAY11

CZ76372.00002FF -19-13JUL11-1/1

Bin Chaining

Bin Chaining allows spreading with two main bins to be switched from one bin to another with minimal effort. This allows the operator to spread a single product easily using two bins.

When using Documentation, this creates one as-applied map from the two main bins.

Bin Chaining requires 2 main bins, and both with the same product. Bin Chaining does not work with microbins.

The first bin to empty must contain a bin level sensor.

1. Select Bin Chaining Type:

- Auto — Controller automatically switches bins when bin level switch is activated.
- Manual — User is notified when bin level switch is activated and user switches bins manually.

PC13277 —UN—05MAY11



Bin Chaining

- Off — Bin Chaining Off
2. Select Bin Chaining Order:
 - 1 to 2 — Bin 1 is emptied before switching to bin 2.
 - 2 to 1 — Bin 2 is emptied before switching to bin 1.


Resetting Bin Chaining

Bin chaining resets to original bin once the vehicle stops and bin level sensor is covered.

CZ76372,0000301 -19-13JUL11-1/1

Product Summary

The Product Summary tab displays the product information for each bin. Use this page to verify that all information is set as desired.

Product Information	Product Bin Setup	Product Summary			
	Bin 1	Bin 2	Bin 3	Bin 4	
Bin Enabled	Enabled	Enabled	Disabled	Disabled	
Product Name	Urea	Urea			
Product Density (lb / cu. ft)	65.0	65.0			
CFR (cu. ft./rev)	0.2500	0.2500			
Feed Gate Opening (in)	2.0	2.0			
Rate Mode	Manual	Manual			
Spinner Frame (in)	5.0			520	
		RPM			
Spread Width (ft)	70.00	Values are based on: Bin 1, Urea			

Product Summary

PC13278 —UN—05MAY11

CZ76372,0000300 -19-13JUL11-1/1

Calibration

Calibrate CFR

PC13612 —UN—13MAY11

Select Calibration softkey to configure Spreader calibration values.



Calibration Softkey

CZ76372,0000310 -19-14JUL11-1/3

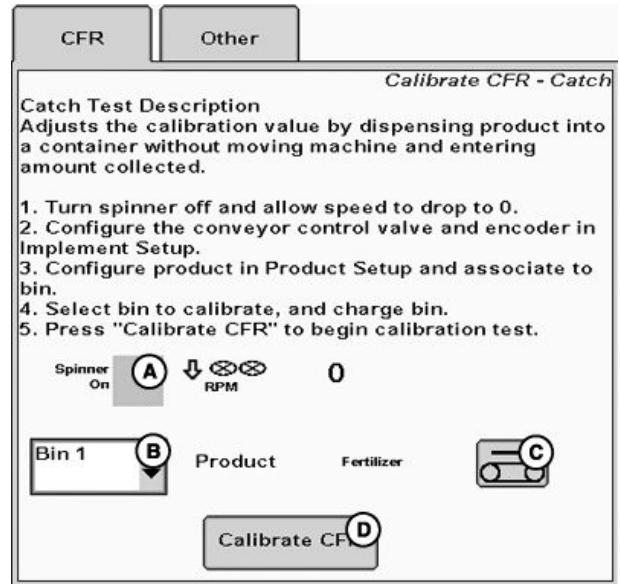
Adjust the CFR calibration value by dispensing product into a container without moving the machine and entering amount collected.

1. Select CFR tab.
2. Turn off spinner and allow speed to drop to 0.
3. Configure the conveyor control valve and encoder in Implement Setup.
4. Configure product in Product Setup and associate bin.
5. Select bin to calibrate, and charge bin.

NOTE: Ensure to charge bin before beginning calibration. Product must be ready to dispense at start of test.

6. Press "Calibrate CFR" to begin calibration test.

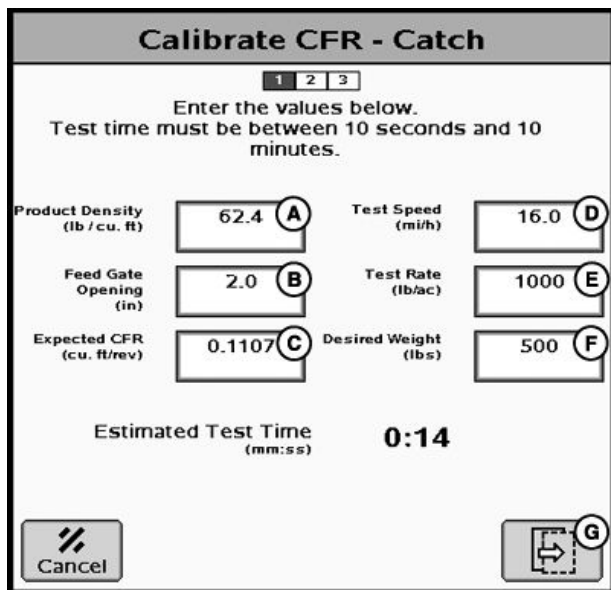
A—Spinner Enable Check Box **C**—Bin Charge Button
B—Bin Selection Drop Down **D**—Calibrate CFR Button



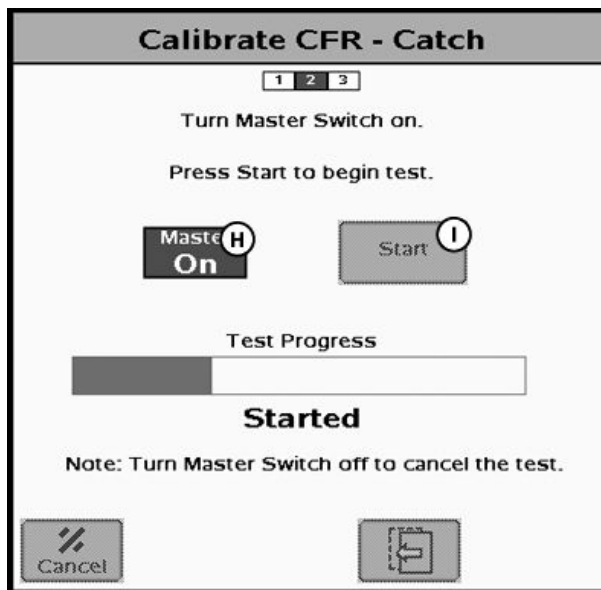
PC13292 —UN—30JUN11

Continued on next page

CZ76372,0000310 -19-14JUL11-2/3



PC13621 —UN—09JUN11



PC13622 —UN—09JUN11

1. Enter calibration test parameters. Test time must be between 10 seconds and 10 minutes.

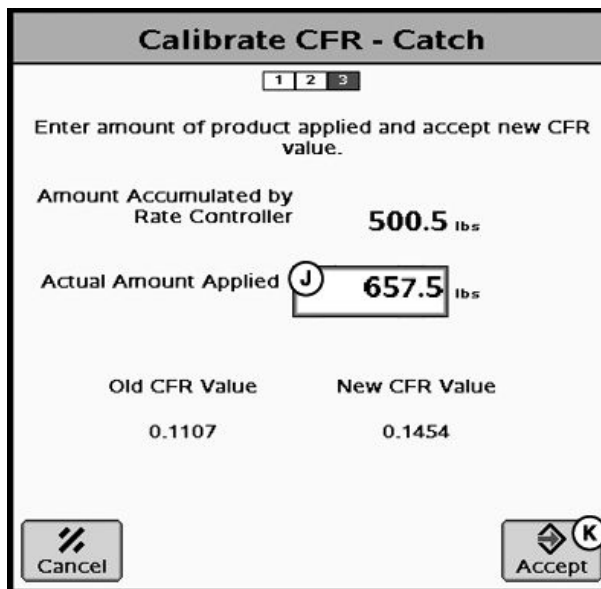
NOTE: Use conditions in this test that are comparable to normal operation. Larger dispense volumes result in longer, but more accurate, calibration tests.

NOTE: Values for Product Density, Feed Gate Opening, or Expected CFR are populated for the product in the currently selected bin. Changes to these values are saved if new CFR value is accepted at end of test.

2. Select Next button.
3. Turn Master Switch On.
4. Press Start button to begin test.

NOTE: Turn Master Switch OFF at any time to cancel test.

5. Once test is complete, enter amount of product applied.
6. Select accept to save new CFR value or select Cancel to use old CFR value.



PC13623 —UN—09JUN11

- | | |
|---------------------|-------------------------|
| A—Product Density | G—Next Button |
| B—Feed Gate Opening | H—Master On Indicator |
| C—Expected CFR | I—Start Button |
| D—Test Speed | J—Actual Amount Applied |
| E—Test Rate | K—Accept Button |
| F—Desired Weight | |

Calibrate PWM Limits

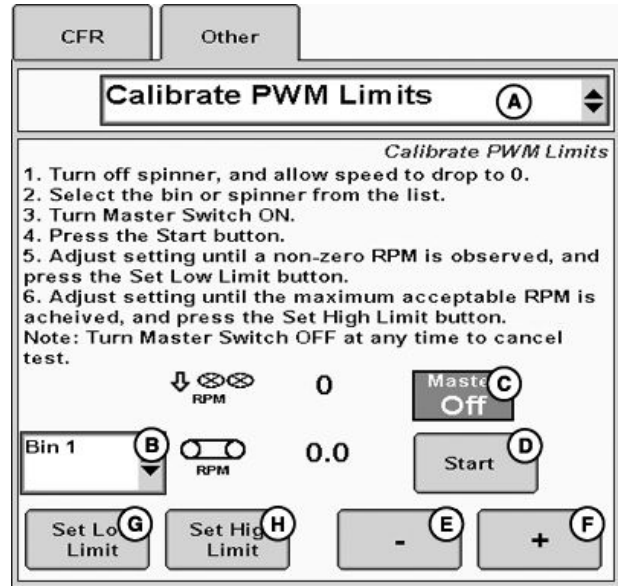
1. Select Other tab.
2. Select Calibrate PWM Limits from drop-down
3. Turn off spinner, and allow speed to drop to 0.
4. Select the bin or spinner from the list.
5. Turn Master Switch ON.
6. Press Start Button.
7. Adjust setting using + and - buttons until a non-zero RPM is observed. Press the Set Low Limit button.

NOTE: Tap the + and - buttons until the slowest possible RPM value is achieved.

8. Adjust setting until the maximum acceptable RPM is achieved, and press the Set High Limit button.

NOTE: Turn Master Switch OFF at any time to cancel test.

- | | |
|------------------------------|-------------------------|
| A—Calibration Type Drop Down | E— - Button |
| B—Valve Selection Drop Down | F— + Button |
| C—Master Switch Indicator | G—Set Low Limit Button |
| D—Start Button | H—Set High Limit Button |



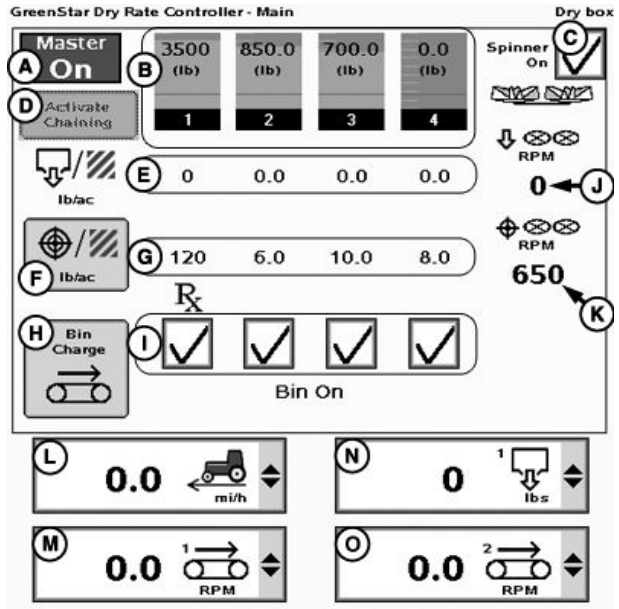
PC13293 —JUN—13MAY11

CZ76372.0000311 -19-14JUL11-1/1

Spreader Operation

Rate Controller Dry — Main Page

- A—Master Switch Indicator
- B—Bin Level Indicators
- C—Spinner Check Box
- D—Activate Chaining Button
- E—Actual Rates
- F—Target Rate Button
- G—Target Rates
- H—Bin Charge Button
- I— Bin Check Boxes
- J— Spinner Actual Speed
- K—Spinner Target Speed
- L—O— Information Drop Downs



Main Page

BA31779,00002FB -19-02DEC11-1/1

Bin Level Indicator

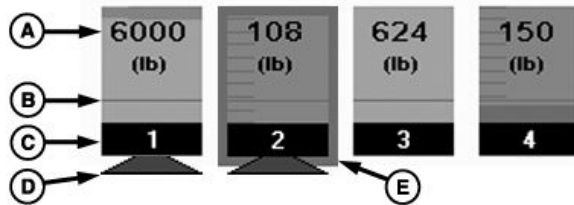
The Bin Level Indicator displays the estimated amount of product remaining in each bin.

The maximum level of each indicator is based on Heaped Bin Capacity entered in Implement Setup and Density of the product assigned to the bin in Product Setup.

The bar graph is orange when the amount of product is above the Low Level Indicator, and turns red once the amount drops below. Adjust low level indicator in Alarm Setup

If a bin is equipped with a Bin Level Sensor, and the sensor indicates a low level, a thick red line appears around the Bin Level Indicator.

PC13295 —UN—12MAY11



- A—Estimated Product Remaining
- B—Low Level Indicator
- C—Bin Number
- D—Bin Applying Indicator
- E—Bin Level Sensor Indicator

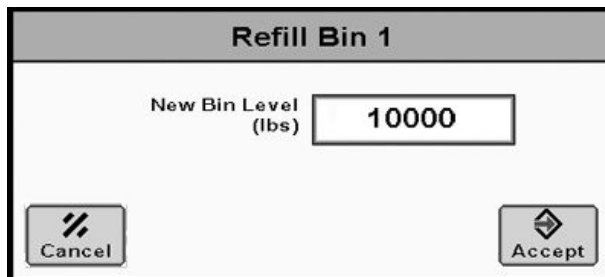
CZ76372,0000312 -19-13JUL11-1/2

Refilling Bin

Pressing one of the Bin Level Indicators displays the Refill Bin window.

Enter the estimated weight of product in the bin.

Press Accept to save new bin level.



PC13296 —UN—11MAY11

CZ76372,0000312 -19-13JUL11-2/2

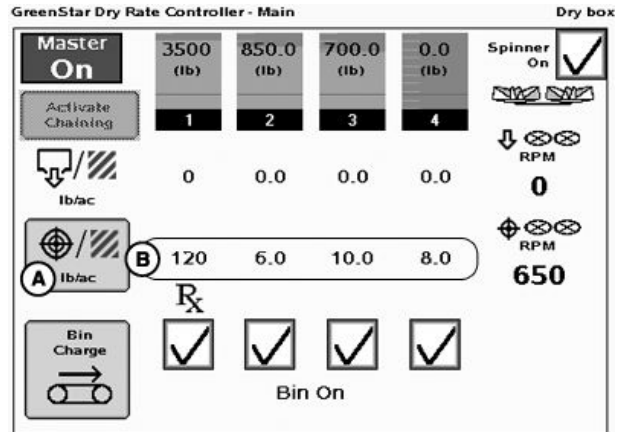
Rate Control

Select the Target Rate button to display the Set Target Rate window.

If Map Based is selected as the Rate Mode for the product in a bin, a Rx symbol is displayed above the bin check box.

A—Target Rate Button

B—Target Rates



PC14235—UN—02DEC11

BA31779,00002FC -19-05DEC11-1/2

Manual Rate

Enter the desired rates in the boxes for each bin.

Use the + and - buttons to increment the rate. The increment value is entered in Product Setup.

Predefined Rate

Three buttons for each bin appear showing the predefined Target Rate on the button. The current active target rate button is highlighted.

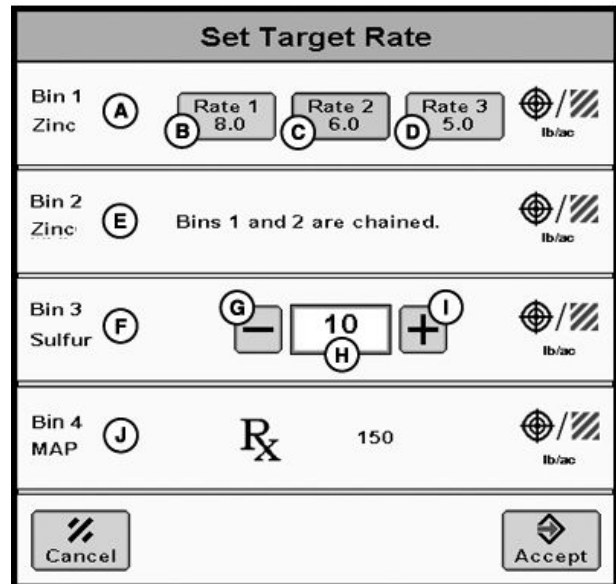
Map Based Rate

If Map Based is selected as the Rate Mode for the product in a bin, the rate from the prescription is displayed with a Rx symbol.

NOTE: Ensure prescription is selected in GreenStar Documentation.

Bins 1 and 2 are chained (E) will appear if Bin Chaining is active.

NOTE: Configure Rate Mode in Product Setup.



PC14233—UN—30NOV11

A—Predefined Rate
 B—Rate 1
 C—Rate 2
 D—Rate 3
 E—Bins 1 and 2 are Chained

F—Manual Rate
 G—Decrease Rate
 H—Rate Entry Box
 I—Increase Rate
 J—Prescription Rate

BA31779,00002FC -19-05DEC11-2/2

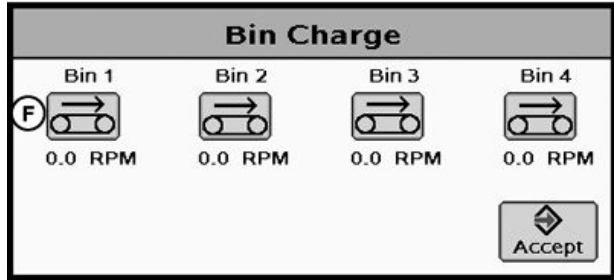
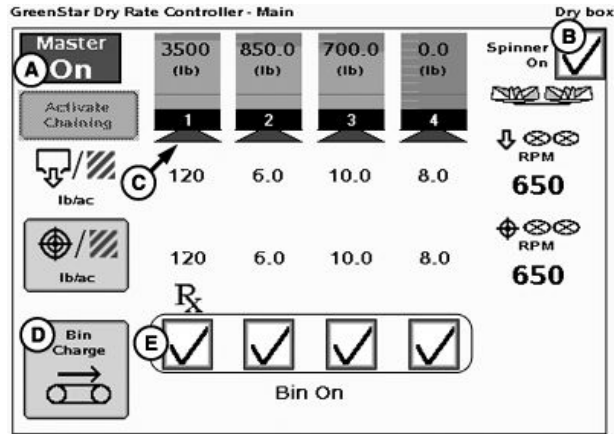
Bin Operation

1. Press the Bin Charge button (D) to display the Bin Charge window.
2. Press and Hold the Bin Charge button (F) on the Bin Charge popup window to turn conveyor and move product to the spinner. Press Accept when done.

NOTE: Bin Charge runs the conveyor at 25 RPM.

CAUTION: Always check for bystanders before starting spinner. Failure to do so may cause injury to you or others.

3. Turn on Spinner and all Bins that are dispensing product by using check boxes on screen.
If using a Switchbox, *both* switches and check boxes must be used to turn spinner and bins on. Only one of the two need to be used to turn spinner and bins off.
4. Turn on Master Switch.
5. Once vehicle ground speed exceeds minimum speed (0.5 kph / 0.3 mph), the controller starts the conveyor.
6. Bins applying product are marked with a green triangle under the Bin Level Indicator.



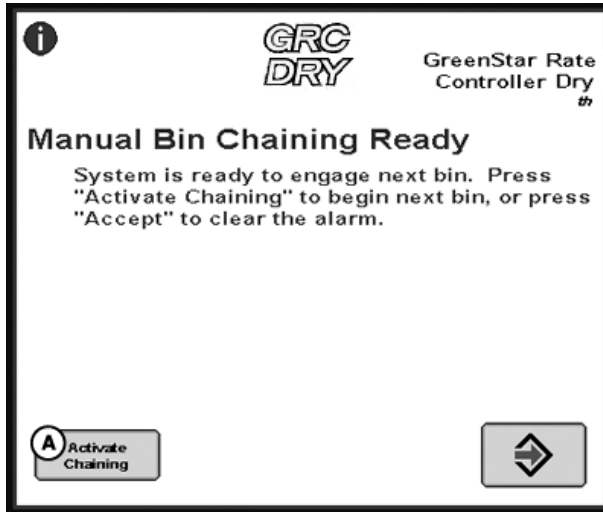
- A—Master Switch Indicator
- B—Spinner Check Box
- C—Bin Applying Indicator
- D—Bin Charge Button
- E—Bin On Check Box
- F—Bin Charge Button

PC14236 —UN—05DEC11

PC14237 —UN—05DEC11

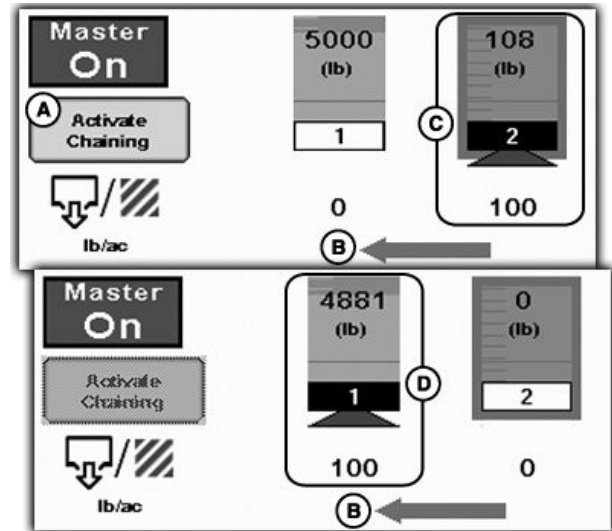
BA31779,00002FD -19-07DEC11-1/1

Bin Chaining



Manual Bin Chaining Alarm

PC13610—UN—06JUL11



Main Page — Bin Chaining

PC13611—UN—09JUN11

A—Activate Chaining Button

B—Bin Chaining Arrow

C—Bin 2 Applying

D—Bin 1 Applying

For information on setting up Bin Chaining, see Product Setup section of this operator's manual.

The Bin Chaining Arrow indicates the order that bins empty. It remains in place as long as Bin Chaining is enabled.

If the Bin Chaining Type is set as Auto, the Rate Controller Dry automatically switches bins when the Bin Level Sensor indicates a low level.

If the Bin Chaining Type is set to Manual:

1. The user is prompted with a notification to change bins when the Bin Level Sensor is activated.
2. If this message is canceled, the Activate Chaining button becomes enabled on the Main page.
3. Press the Activate Chaining button to switch bins.

CZ76372,0000315 -19-13JUL11-1/1

Reports and Totals

Reports and Totals

PC13279 —UN—05MAY11

Select the Reports and Totals softkey to show the totals stored on the controller.



Totals Softkey

CZ76372,0000303 -19-13JUL11-1/4

Current

The Current tab displays totals for the currently selected implement.

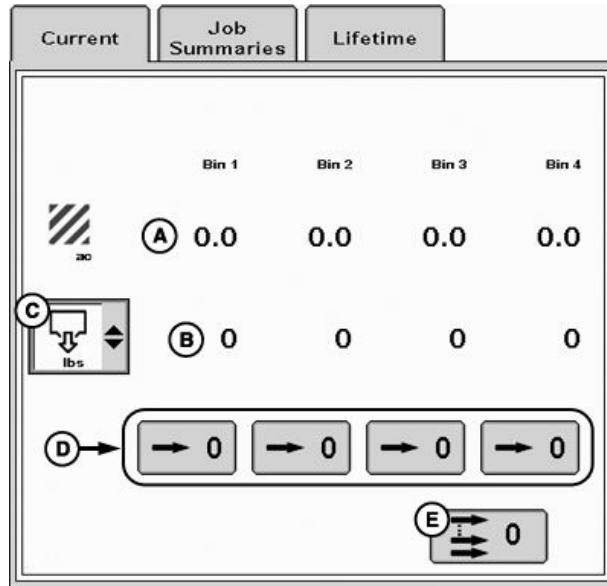
Use the Units drop-down (C) to change units.

Clear totals for individual bins using the Bin Zero button (D).

Clear totals for all bins using the Implement Zero button (E).

A—Area
B—Total Applied
C—Units Selection

D—Clear Bin Totals
E—Clear Implement Totals



Current Totals

PC13280 —UN—06MAY11

Continued on next page

CZ76372,0000303 -19-13JUL11-2/4

Job Summaries

The job summaries page keeps track of totals by user-defined jobs (A). Only values for the currently selected job summary are incremented.

Job summaries are stored on the controller. The controller can store up to 6 different jobs for each configuration.

To create a new job follow these steps:

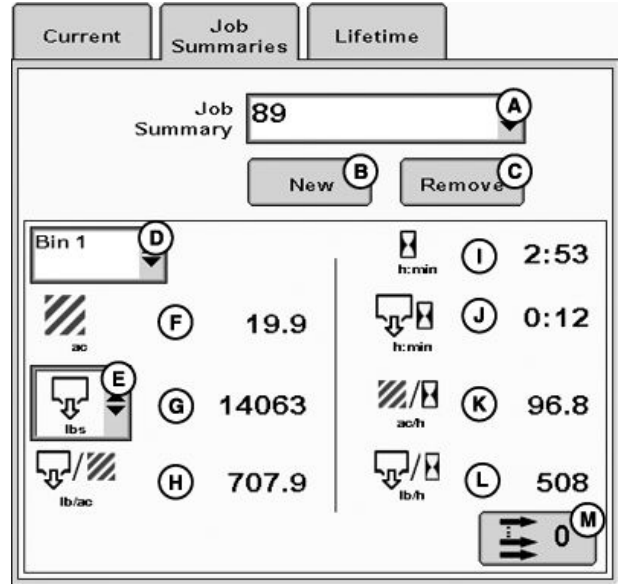
1. Select the New button (B) and a keypad appears.
2. Type in a name for the current job on the key pad.
3. Select Enter.

Jobs that are no longer needed may be deleted by selecting the job (A) and pressing the remove button (C).

Use the Bin Selection drop-down to view the separate totals for each bin.

Change units by using the Unit Selection drop-down (E).

Totals can be reset to zero by pressing the zero button (M).



Job Summaries

- A—Job Summary Selection
- B—New Button
- C—Remove Button
- D—Bin Selection
- E—Unit Selection
- F—Area
- G—Total Applied
- H—Average Applied per Area
- I— Total Time
- J— Application Time
- K—Average Area per Hour
- L—Average Applied per Hour
- M—Clear Job Totals

CZ76372,0000303 -19-13JUL11-3/4

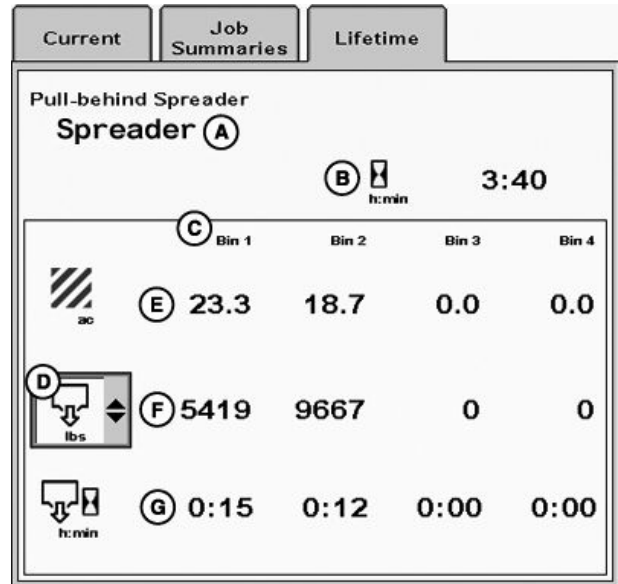
PC13281 —UN—06MAY11

Lifetime

The lifetime tab keeps track of all totals for the lifetime of the implement selected (A).

Change units by using the Unit Selection drop-down (D).

- A—Implement Name
- B—Total Time
- C—Bins
- D—Unit Selection
- E—Area
- F—Total Applied
- G—Application Time



Lifetime

CZ76372,0000303 -19-13JUL11-4/4

PC13282 —UN—29JUN11

Diagnostics

Spreader Diagnostics

Select the Diagnostics button on the right-hand side to enter the diagnostics page.

Diagnostics is split in to two sections, Readings (A) and Tests (B).

Select either tab, and select a reading or test from the drop-down (C).

A—Readings Tab
B—Tests Tab

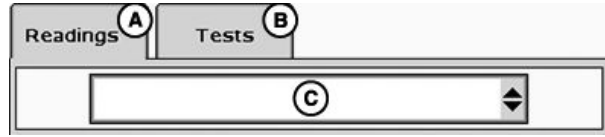
C—Drop-down Menu

PC13283 —UN—11MAY11



Diagnostics

PC12249 —UN—14SEP09



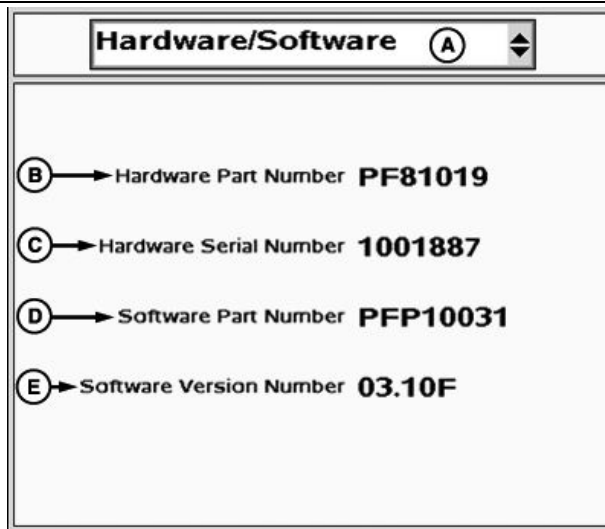
Diagnostics Tabs

CZ76372,0000305 -19-23JUN11-1/1

Hardware/Software Readings

A—Readings Selection Drop-down Menu
B—Hardware Part Number
C—Hardware Serial Number

D—Software Part Number
E—Software Version Number



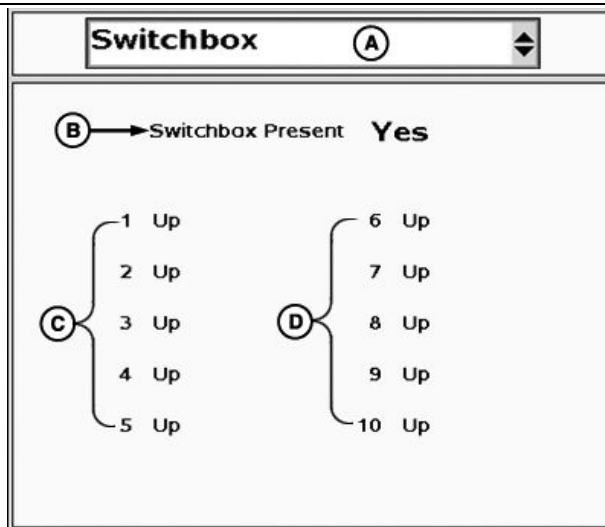
PC12606 —UN—12MAY10

CZ76372,0000306 -19-23JUN11-1/1

Switchbox Readings

A—Readings Selection Drop-down Menu
B—Switchbox Present Status

C—Switches 1 Through 5 Status on Switchbox
D—Switches 6 Through 10 Status on Switchbox



PC12251 —UN—06OCT09

CZ76372,0000307 -19-13JUL11-1/1

Delivery System Readings

PWM Duty Cycle—This number represents the current position of the PWM Close Control Valve. The number is between the current High and Low Limit settings while operating.

- | | |
|-------------------------------------|--------------------|
| A—Readings Selection Drop-down Menu | E—Control Valve |
| B—Bin Selection Drop-down Menu | F—Motor Speed |
| C—Speed Sensor | G—Application Rate |
| D—Flow Rate | H—PWM Duty Cycle |

PC13284 —UN—10MAY11

CZ76372,0000308 -19-13JUL11-1/1

System Voltages Readings

NOTE: If Valve Power is not connected, Valve Power shows "None".

- | | |
|-------------------------------------|-----------------|
| A—Readings Selection Drop-down Menu | G—Valve Power |
| B—ECU Power | H—Valve 1 Power |
| C—Sensor 1 Power | I—Valve 2 Power |
| D—Sensor 2 Power | J—Valve 3 Power |
| E—Sensor 3 Power | K—Valve 4 Power |
| F—Sensor 4 Power | |

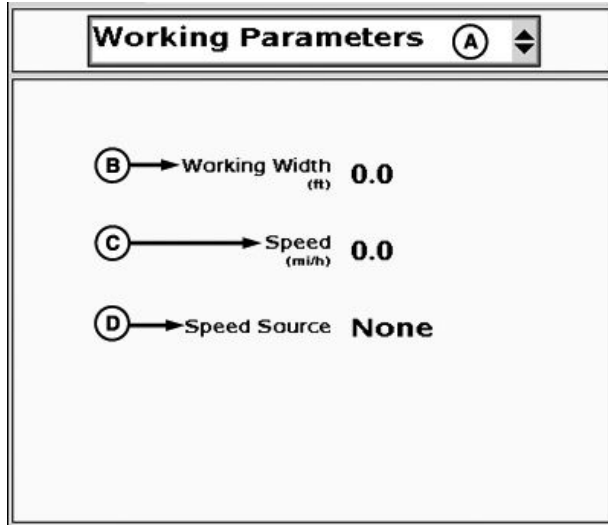
PC12255 —UN—06OCT09

CZ76372,000030A -19-13JUL11-1/1

Working Parameters Readings

A—Readings Selection
Drop-down Menu
B—Working Width

C—Speed
D—Speed Source



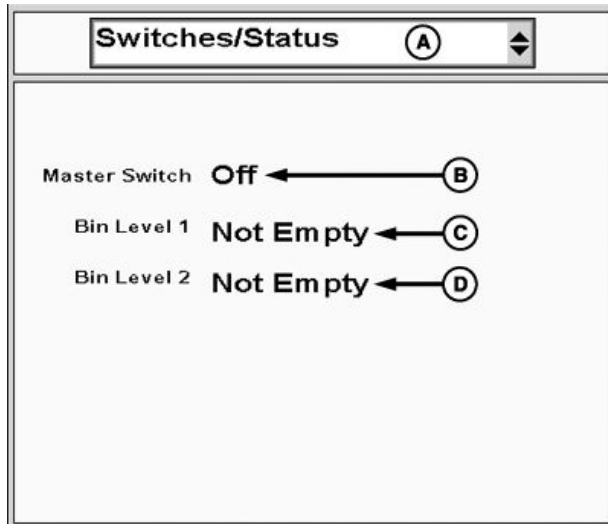
PC12256—UN—06OCT09

CZ76372.000030B -19-13JUL11-1/1

Switches/Status Readings

A—Readings Selection
Drop-down Menu
B—Master Switch Status

C—Bin Level 1 Switch Status
D—Bin Level 2 Switch Status



PC13285—UN—10MAY11

CZ76372.0000309 -19-13JUL11-1/1

Flow Control Test

The operator can run a Flow Control Test to ensure that control valves are functioning properly.

NOTE: Turn Master Switch OFF at any time to cancel test.

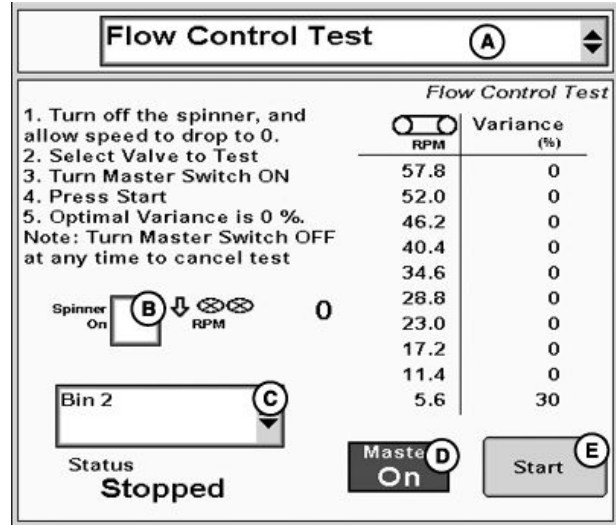
To begin test:

1. Select Flow Control Test from the tests drop-down menu.
2. Turn off spinner, and allow speed to drop to 0.
3. Select Valve to Test.
4. Turn the Master Switch ON.
5. Select Start button on the screen.

The valve is tested across the entire range of control. The results are displayed in the RPM / Variance table on the screen.

If the system does not control speed accurately, there are a few things to look for and adjust. A high variance number in the desired RPM range indicates inaccurate rate control.

- Ensure to enter the correct calibration value for the control valve type (or a similar valve type) that is being used. This value is a starting point and can be tuned to your specific system.
- The lower the Variance (%), the better the Rate Controller Dry is able to control at a desired RPM. There are a few issues that might cause the variance on the test to be inconsistent:
 - Improper tuning of valve calibration value. See section on valve calibration tuning



Flow Control Test

- A—Tests Drop-down Menu
- B—Spinner On Check Box
- C—Control Valve Selection Drop-down Menu
- D—Master Switch Indicator
- E—Start Configuration Test Button

- Incorrect speed sensor calibration. Ensure the correct number of pulses per revolution are entered
- Noisy speed signal. Ensure belt, spinner or rollers turn freely and are not scraping or chattering during the test
- System operating parameters (ie. tractor speed, etc.) may need to be adjusted to increase performance at certain levels.

PC13286 —UN—10MAY11

CZ76372.000030C -19-13JUL11-1/1

Spreader Check Test

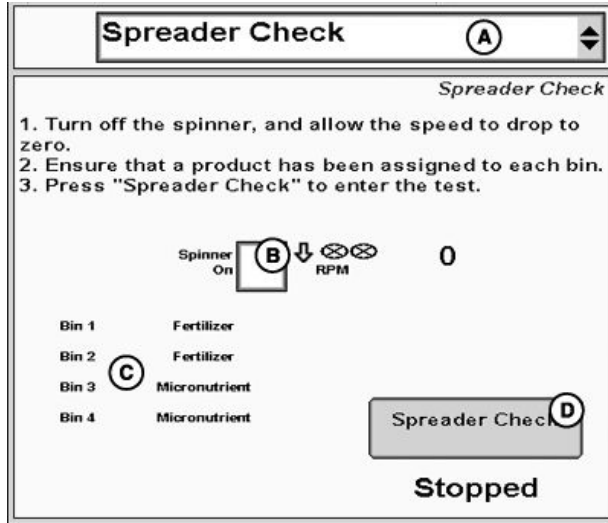
The operator can run a Spreader Check Test to ensure that control valves are functioning properly.

NOTE: Turn Master Switch OFF at any time to cancel test.

To begin spreader check test:

1. Select Spreader Check from the tests drop-down menu.
2. Turn off spinner, and allow speed to drop to 0.
3. Ensure that a product has been assigned to each bin.
4. Press "Spreader Check" button to enter test.

A—Tests Drop-down Menu **C**—Bin Product Assignments
B—Spinner Enable Check Box **D**—Spreader Check Button



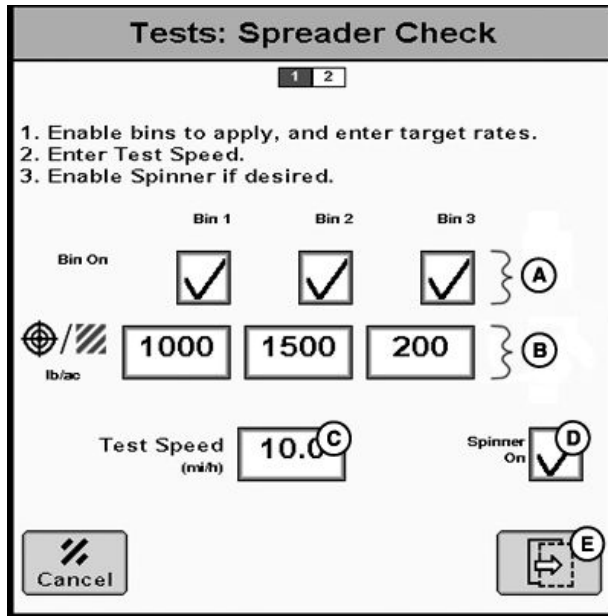
PC13287—UN—30JUN11

Spreader Check

CZ76372,000030D -19-13JUL11-1/3

5. Enable bins to apply, and enter target rates.
6. Enter Test Speed.
7. Enable Spinner if desired.
8. Press Next button.

A—Bin Enable Check Boxes **D**—Spinner Check Box
B—Target Rate Entries **E**—Next Button
C—Test Speed Entry



PC13288—UN—10MAY11

Continued on next page

CZ76372,000030D -19-13JUL11-2/3

9. Turn Master Switch ON.

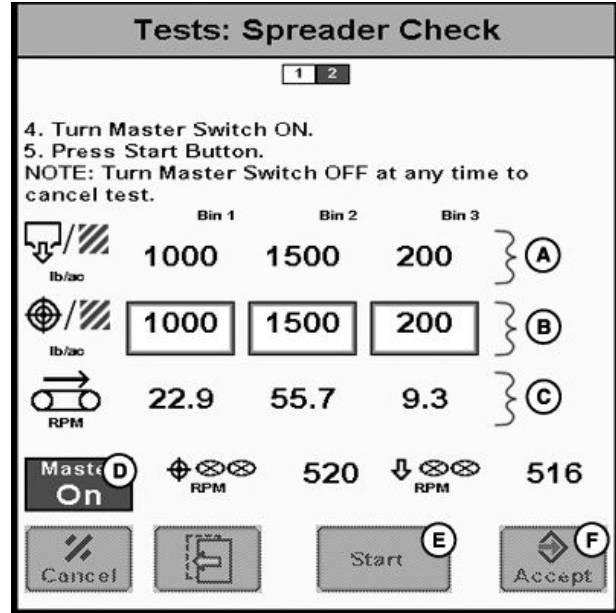
10. Press Start Button

NOTE: Turn Master Switch OFF at any time to cancel test.

NOTE: The operator may adjust rates while the test is running.

A—Actual Rates
B—Target Rate Entries
C—RPM's

D—Master Switch Indicator
E—Start Test Button
F—Accept Button



PC13289—UN—10MAY11

CZ76372.000030D -19-13JUL11-3/3

Bin Cleanout

1. Turn off spinner, and allow speed to drop to 0.

2. Select bins to be cleaned out.

3. Turn Master Switch ON.

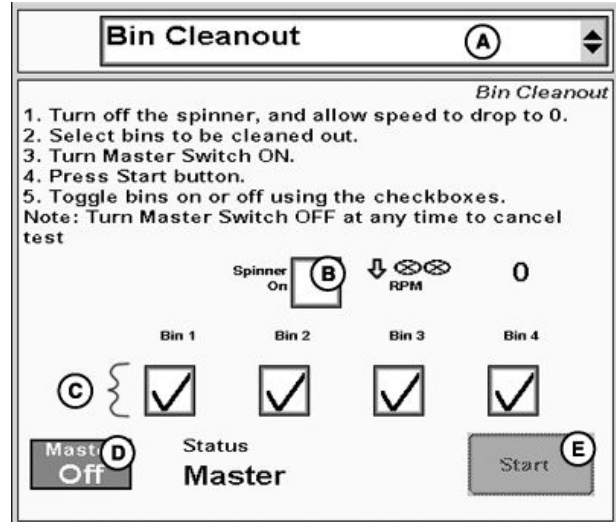
4. Press Start Button.

5. Toggle bins on or off using check boxes.

NOTE: Turn Master Switch OFF at any time to cancel test.

A—Tests Drop-Down Menu
B—Spinner Enable Check Box
C—Bin Enable Check Boxes

D—Master Switch Indicator
E—Start Button



PC13290—UN—30JUN11

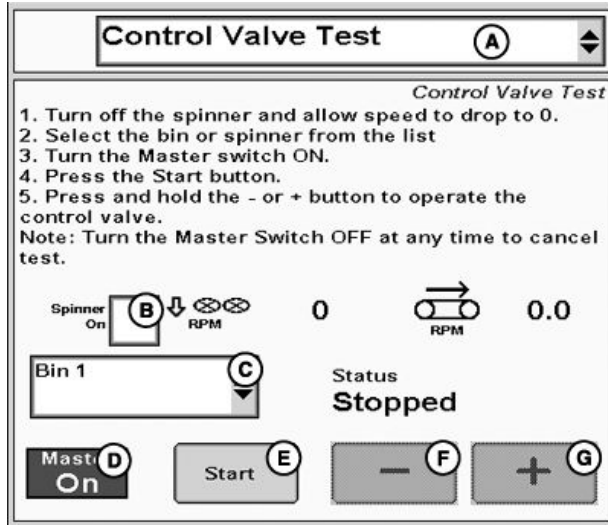
CZ76372.000030E -19-13JUL11-1/1

Control Valve Test

1. Turn off spinner, and allow speed to drop to 0.
2. Select bin or spinner from list.
3. Turn Master switch ON.
4. Press Start button.
5. Press and hold - or + button to operate control valve.

NOTE: Turn Master Switch OFF at any time to cancel test.

- | | |
|-------------------------------------|---------------------|
| A—Test Drop-Down Menu | E—Start Test Button |
| B—Spinner Enable Check Box | F— - Button |
| C—Control Valve Selection Drop Down | G— + Button |
| D—Master Switch Indicator | |



PC13291 —UN—30JUN11

CZ76372.000030F -19-13JUL11-1/1

Switch Box Controller

Switch Box



Switch Box Controller (Optional)

The purpose of the Optional Switch Box Controller (SBC) is to allow the operator to manually enable or disable individual control valves rather than rely solely upon the display for these settings.

The master switch permits the operator to shut off all of the conveyor control valves. The master switch on the switch box serves the same purpose as the foot switch, and only one of the two is required for system operation.

Each switch controls control valves assigned to it during System Setup procedure. Even if the master switch and individual switches are on, control valves must still be armed with the display in order to activate.

See SYSTEM SETUP for further details.

NOTE: More than one control valve can be assigned to the same switch number.

CZ76372.0000316 -19-30JUN11-1/1

PC9470—UN—16OCT06

System Speed Signal

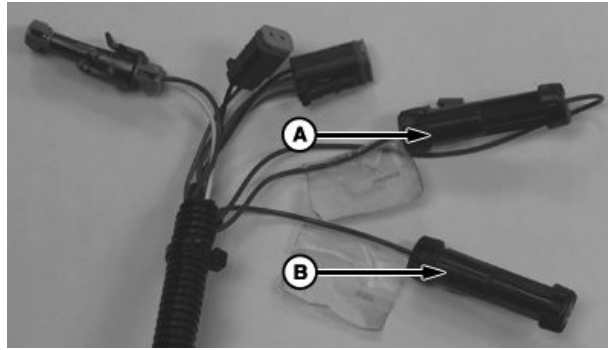
System Speed Signal

The Rate Controller Dry System requires an approved speed signal.

If the vehicle has no John Deere GPS receiver, the Rate Controller Dry can utilize a speed source (radar or wheel speed) on CAN or CCD Bus. If no speed source is available, it will be necessary to install a radar or GPS based speed sensor.

Use corresponding connector to interface to the radar or GPS speed source.

A—Radar Speed Source Input **B**—GPS Speed Source Input



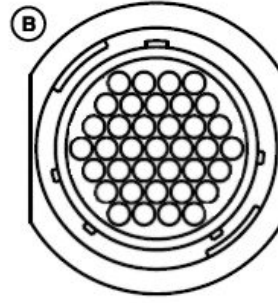
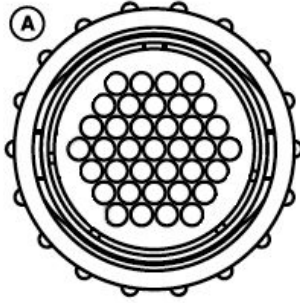
GreenStar Harness

PC18637 —UN—01JUL11

CZ76372,0000317 -19-05JUL11-1/1

Supplemental Information

37-Pin Connectors



A—Connector 1

B—Connector 2

Connector 1		Connector 2	
PIN #	FUNCTION	PIN #	FUNCTION
1	Valve Ground	1	Future Use
2	Valve Ground	2	Meter #3 Speed Sensor Signal
3	Valve Power	3	Meter #4 Speed Sensor Signal
4	Driver 1	4	Power - 5V Sensor
5	Driver 2	5	Power - 5V Sensor
6	Driver 3	6	Ground - 5V Sensor
7	Driver 4	7	Ground - 5V Sensor
8	Driver 5	8	Future Use
9	Driver 6	9	Future Use
10	Driver 7	10	Future Use
11	Driver 8	11	Future Use
12	Driver 9	12	Bin Level Switch #4 Signal
13	Driver 10	13	Bin Level Switch #3 Signal
14	Future Use	14	Ground - 5V Sensor
15	Driver 16	15	Bin Level Switch #2 Signal
16	Driver 15	16	Future Use
17	Driver 14	17	Future Use
18	Driver 13	18	Future Use
19	Driver 12	19	Future Use
20	Driver 11	20	Future Use
21	Ground - 5V Sensor	21	Ground - 12V Sensor
22	Power - 5V Sensor	22	Power - 12V Sensor
23	Meter #2 Speed Sensor Signal	23	Future Use
24	Future Use	24	Ground - 5V Sensor
25	Power - 5V Sensor	25	Spinner Speed Sensor Signal
26	ECU Power (12V)	26	Power - 12V Sensor
27	ECU Ground	27	Ground - 12V Sensor
28	Meter #1 Speed Sensor Signal	28	Future Use
29	Ground - 5V Sensor	29	Bin Level Switch #1 Signal
30	Power - 5V Sensor	30	Future Use
31	Future Use	31	Future Use
32	Future Use	32	Power - 5V Sensor
33	Future Use	33	Power - 5V Sensor
34	Power - 5V Sensor	34	Future Use
35	Future Use	35	Future Use
36	Valve Power	36	Future Use
37	Valve Power	37	Future Use

PC13624—JUN—13JUN11

CZ76372.0000318 -19-27JUN11-1/1

Connector Information for Adapter Harness

Description	John Deere Service Part Number
Mating Connector to Connector 1 (Plug)	
37-pin Connector Body (Receptacle)	57M9834
Cable Clamp for 37-pin Connector Body	57M9870
Terminal Pin (14-18 guage / 0.8 - 2.0 mm ²)	R77464
Mating Connector to Connector 2 (Receptacle)	
37-pin Connector Body (Plug)	57M9833
Cable Clamp for 37-pin Connector Body	57M9870
Terminal Socket (14-18 guage / 0.8 - 2.0 mm ²)	R77465

Connector Information

NOTE: Ensure proper crimp tools are used when assembling a harness.

CZ76372,000033A -19-13JUL11-1/1

Recommended Wire Sizes

Minimum Recommended Wire Size—Metric (mm ²)					
Length (mm)	Current (amp)				
	0.5	1.0	1.5	2.0	2.5
1000	0.8	0.8	0.8	0.8	0.8
2500	0.8	0.8	0.8	0.8	0.8
5000	0.8	0.8	0.8	0.8	1.0
7500	0.8	0.8	0.8	1.0	2.0
10000	0.8	0.8	1.0	2.0	2.0
15000	0.8	1.0	2.0	3.0	3.0

Minimum Recommended Wire Size—SAE (gauge)					
Length (in.)	Current (amp)				
	0.5	1.0	1.5	2.0	2.5
39	18	18	18	18	18
98	18	18	18	18	18
197	18	18	18	18	16
295	18	18	18	16	14
394	18	18	16	14	14
591	18	16	14	12	12

CZ76372,0000330 -19-27JUN11-1/1

Driver Outputs Table

Driver 1	Bin 1 (-)
Driver 2	Bin 1 (+) / PWM
Driver 3	Bin 2 (+) / PWM
Driver 4	Bin 2 (-)
Driver 5	
Driver 6	Bin 3 (-)
Driver 7	Bin 3 (+) / PWM
Driver 8	Bin 4 (+) / PWM

Driver 9	Bin 4 (-)
Driver 10	
Driver 11	
Driver 12	
Driver 13	
Driver 14	
Driver 15	Spinner (+) / PWM
Driver 16	Spinner (-)

CZ76372,000031E -19-27JUN11-1/1

Troubleshooting

Rate Controller Dry Troubleshooting

Bin or Spinner Speed not stopping when turned OFF

- Ensure the speed feedback wires for each bin and spinner are properly connected to the correct controller inputs (see 37-pin Connectors wiring pin outs)
- Ensure the valve signal wires for each bin and spinner are properly connected from the controller to the valve
- For PWM valve:
 - Unplug valve power connection. If system remains operating, valve is sticking. Try loosening valve from block.
- For Fast valve:
 - Unplug the valve and check voltage coming from controller is +/- 12 VDC.

Bin or Spinner performance is erratic, too slow, or overshoots desired speed

- Ensure operating speed range is not too low. May need to reduce gate height or increase vehicle speed to improve controllability.
- Control Valve Calibration value is not tuned properly. See Control Valve Calibration Tuning section and perform Flow Control tests to confirm performance.

Bin or Spinner desired speed is not achievable

- Ensure adequate hydraulic flow is going to the valves. Check SCV flow rates and/or PTO pump speed.
- Check valve max operating speed using Flow Control tests and ensure the system is capable of the desired speeds. If not, gate height may need to be increased to slow the desired speeds down accordingly.

CZ76372.000032E -19-13JUL11-1/1

Rate Controller Dry Trouble Codes

Fault Code Number	Description
GDC 158.03	System voltage is above 15.5V for 5 seconds.
GDC 158.04	System voltage is below 10.0V for 5 seconds.
GDC 628.12	Re-programming.
GDC 629.12	Internal fault (Watchdog reset).
GDC 630.13	System needs to be configured/calibrated.
GDC 639.14	CAN in bus-off.
GDC 3509.03	Sensor Supply Voltage 1 above 5.2V for 2 seconds.
GDC 3509.04	Sensor Supply Voltage 1 below 4.8V for 2 seconds.
GDC 3510.03	Sensor Supply Voltage 2 above 5.2V for 2 seconds.
GDC 3510.04	Sensor supply voltage 2 below 4.8V for 2 seconds.
GDC 3511.03	Sensor Supply Voltage 3 above 5.2V for 2 seconds.
GDC 3511.04	Sensor Supply Voltage 3 below 4.8V for 2 seconds.
GDC 3512.03	Sensor Supply Voltage 4 above 5.2V for 2 seconds.
GDC 3512.04	Sensor supply voltage 4 below 4.8V for 2 seconds.
GDC 520237.31	Tank Level Sensor 1 indicates empty tank.
GDC 520238.31	Tank Level Sensor 2 indicates empty tank.
GDC 520239.31	Tank Level Sensor 3 indicates empty tank.
GDC 520716.00	The system is detecting meter movement while the control valve is commanded closed.
GDC 520716.01	The system is detecting zero meter speed while the control valve is commanded open.
GDC 520716.16	The system is operating above the user-defined maximum application rate.
GDC 520716.18	The system is operating below the user-defined minimum application rate.
GDC 520723.31	Tank Level Sensor 4 indicates empty tank.
GDC 520724.17	Tank 2 volume has fallen below the operator designated minimum level.
GDC 520725.17	Tank 3 volume has fallen below the operator designated minimum level.
GDC 520728.17	Tank 4 volume has fallen below the operator designated minimum level.
GDC 520729.00	The system is detecting spinner movement while the control valve is commanded closed.
GDC 520729.01	The system is detecting zero spinner speed while the control valve is commanded open.
GDC 520729.16	The spinner is operating above the user-defined maximum spinner speed.
GDC 520729.18	The spinner is operating below the user-defined minimum spinner speed.
GDC 520729.31	Product Application attempted with no spinner speed.
GDC 523346.00	The system is detecting meter movement while the control valve is commanded closed.
GDC 523346.01	The system is detecting zero meter speed while the control valve is commanded open.
GDC 523346.16	The system is operating above the user-defined maximum application rate.
GDC 523346.18	The system is operating below the user-defined minimum application rate.
GDC 523393.00	The system is detecting meter movement while the control valve is commanded closed.
GDC 523393.01	The system is detecting zero meter speed while the control valve is commanded open.
GDC 523393.16	The system is operating above the user-defined maximum application rate.
GDC 523393.18	The system is operating below the user-defined minimum application rate.
GDC 523394.00	The system is detecting meter movement while the control valve is commanded closed.
GDC 523394.01	The system is detecting zero meter speed while the control valve is commanded open.
GDC 523394.16	The system is operating above the user-defined maximum application rate.
GDC 523394.18	The system is operating below the user-defined minimum application rate.
GDC 523418.17	Tank 1 volume has fallen below the operator designated minimum level.
GDC 523823.00	The maximum speed threshold for applying product has been exceeded.
GDC 523935.06	Output driver over current or short to ground.
GDC 523966.31	Operator has Limp Home Mode enabled.

CZ76372,000031A -19-13JUL11-1/1

**GreenStar Rate Controller Switch Box
Trouble Codes**

Fault Code Number	Description	Recommended Initial Action
SBC 000168.03	Switched Supply Voltage High	System voltage is above 15.5 V. for 5 seconds.
SBC 000168.04	Switched Supply Voltage Low	System voltage is below 10.0 V. for 5 seconds.
SBC 000628.02	Controller Memory Corrupted	Contact dealer.
SBC 000628.12	Controller Unit Programming	Wait until GreenStar Rate Control Switch Box has finished programming. If programming is hung up, contact dealer
SBC 000629.12	Controller Unit Fault	Contact dealer.
SBC 000639.14	CAN Communication Error	CAN Bus problem or GreenStar Rate Controller Switch Box has a CAN Bus error. Contact dealer.
SBC 523910.02	Controller Memory Corrupted	Contact dealer.
SBC 524058.02	Master Switch Conflict	Master switch digital inputs are not in a valid state. Contact dealer.

CZ76372,000032F -19-13JUL11-1/1

Index

	Page		Page
A			
Adapter Harness			
Connector Information	60-2	GPS Receiver	15-1
Alarm		I	
Settings	20-6	Implement Setup	20-1
B			
Bin Chaining	25-3	M	
Activate	35-4	Main Harness	
C		Pinout	60-1
Calibration		O	
CFR	30-1	Operation	
Control Valves	20-4	Bin Chaining	35-4
PWM Limits	30-3	Bin Level Indicator	35-1
CFR	30-1	Bins	35-3
Component Overview and Compatibility		Main Page	35-1
Bin Level Switch	15-2	Rate Control	35-2
Control Valves	15-2	Refill Bins	35-1
Speed Sensors	15-2	P	
Control Valves		Prescriptions	35-2
Calibration	20-4	Product Setup	25-1
PWM		Summary	25-3
Calibrate	30-3	Products	
Recommended Settings	20-5	Bin Setup	25-2
Tuning	20-4	Information	25-1
Controller		Summary	25-3
Operation	15-1	R	
D		Rate Controller Dry	15-2
Diagnostics		Operation	15-1, 35-3
Rate Controller Dry		Overview	15-1
Trouble Codes	65-2	Switch Box	
Readings	45-1	Trouble Codes	65-3
Delivery System	45-2	Trouble Codes	65-2
Hardware/Software	45-1	Troubleshooting	65-1
Switchbox	45-1	Rate Smoothing	20-6
Switches/Status	45-3	Rates	35-2
System Voltages	45-2	Prescriptions	35-2
Working Parameters	45-3	Readings	
Switch Box		Delivery System	45-2
Trouble Codes	65-3	Hardware/Software	45-1
Tests	45-4	Switchbox	45-1
Bin Cleanout	45-6	Switches/Status	45-3
Control Valve	45-7	System Voltages	45-2
Flow Control	45-4	Working Parameters	45-3
Spreader Check	45-5	Recommended Wire Sizes	60-2
Driver Outputs Table	60-2	Reports	40-1
F			
Flexbox	15-1		

Continued on next page

Page

S

Setup	
Alarms.....	20-6
Bin Chaining.....	25-3
CFR.....	30-1
Product Information.....	25-1
Product Summary	25-3
Products	
Bins	25-2
Rate Smoothing	20-6
Speed Smoothing	20-6
Speed Signal	55-1
Speed Smoothing.....	20-6
Spreader	
Alarms.....	20-6
Implement Setup.....	20-1
Operation	35-1, 35-3
Rate Smoothing	20-6
Speed Smoothing	20-6
System Setup.....	20-2
Starfire Receiver	
GPS Receiver	15-1
Supplemental Information	
Adapter Harness	
Connector Information.....	60-2
Driver Outputs Table	60-2
Main Harness.....	60-1
Recommended Wire Sizes	60-2
Swath control.....	15-1
Switch Box Controller	50-1
Switchbox Controller	
Readings.....	45-1
System	
Overview	15-1
Speed Signal.....	55-1
System Setup	20-2

T

Tests	
Bin Cleanout	45-6
Control Valve.....	45-7
Flow Control.....	45-4
Spreader Check	45-5
Totals	40-1
Troubleshooting	
Common Problems	65-1
Rate Controller Dry	65-1
Trouble Codes.....	65-2
Switch Box	
Trouble Codes.....	65-3

V

Vehicle speed	15-1
---------------------	------

John Deere Service Literature Available

Technical Information

Technical information can be purchased from John Deere. Some of this information is available in electronic media, such as CD-ROM disks, and in printed form. There are many ways to order. Contact your John Deere dealer. Call **1-800-522-7448** to order using a credit card. Search online from <http://www.JohnDeere.com>. Please have available the model number, serial number, and name of the product.

Available information includes:

- **PARTS CATALOGS** list service parts available for your machine with exploded view illustrations to help you identify the correct parts. It is also useful in assembling and disassembling.
- **OPERATOR'S MANUALS** providing safety, operating, maintenance, and service information. These manuals and safety signs on your machine may also be available in other languages.
- **OPERATOR'S VIDEO TAPES** showing highlights of safety, operating, maintenance, and service information. These tapes may be available in multiple languages and formats.
- **TECHNICAL MANUALS** outlining service information for your machine. Included are specifications, illustrated assembly and disassembly procedures, hydraulic oil flow diagrams, and wiring diagrams. Some products have separate manuals for repair and diagnostic information. Some components, such as engines, are available in separate component technical manuals
- **FUNDAMENTAL MANUALS** detailing basic information regardless of manufacturer:
 - Agricultural Primer series covers technology in farming and ranching, featuring subjects like computers, the Internet, and precision farming.
 - Farm Business Management series examines "real-world" problems and offers practical solutions in the areas of marketing, financing, equipment selection, and compliance.
 - Fundamentals of Services manuals show you how to repair and maintain off-road equipment.
 - Fundamentals of Machine Operation manuals explain machine capacities and adjustments, how to improve machine performance, and how to eliminate unnecessary field operations.



TS189 —UN—17JAN89



TS191 —UN—02DEC88



TS224 —UN—17JAN89



TS1663 —UN—10OCT97

DX.SERVLIT -19-31JUL03-1/1

John Deere Service Keeps You on The Job

John Deere Is At Your Service

CUSTOMER SATISFACTION is important to John Deere.

Our dealers strive to provide you with prompt, efficient parts and service:

- Maintenance and service parts to support your equipment.
- Trained service technicians and the necessary diagnostic and repair tools to service your equipment.



TS201 — UN—23AUG88

CUSTOMER SATISFACTION PROBLEM RESOLUTION PROCESS

Your John Deere dealer is dedicated to supporting your equipment and resolving any problem you may experience.

1. When contacting your dealer, be prepared with the following information:

- Machine model and product identification number
- Date of purchase
- Nature of problem

2. Discuss problem with dealer service manager.

3. If unable to resolve, explain problem to dealership manager and request assistance.

4. If you have a persistent problem your dealership is unable to resolve, ask your dealer to contact John Deere for assistance. Or contact the Ag Customer Assistance Center at 1-866-99DEERE (866-993-3373) or e-mail us at www.deere.com/en_US/ag/contactus/.

DX,IBC,2 -19-02APR02-1/1

