



GreenStar™ Rate Controller



JOHN DEERE

OPERATOR'S MANUAL

GreenStar™ Rate Controller

OMPFP23424 ISSUE B4 (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.



John Deere Ag Management Solutions

PRINTED IN U.S.A.

Introduction

Foreword

THANK YOU for purchasing a John Deere product.

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

THIS MANUAL SHOULD BE CONSIDERED a permanent part of your product and should remain with the product 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 the machine or implement will travel when going forward.

WRITE PRODUCT IDENTIFICATION NUMBERS (P.I. N.) in the Operator's Manual. Accurately record all the numbers to help in tracing the product should it be stolen. Your dealer also needs these numbers when you order parts. File a backup of the identification numbers in a safe location off the machine or away from the product.

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 or statement 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.

If you are not the original owner of this product, it is in your interest to contact your local John Deere dealer to inform them of this unit's serial number. This will help John Deere notify you of any issues or product improvements.

John Deere Technical Information Bookstore

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

CZ76372,000071F-19-08OCT19

Serial Number: _____

JS56696,0000C4C-19-03FEB17

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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.

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Safety

Recognize Safety Information



T81389—UN—28JUN13

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.

DX,ALERT-19-03OCT22

Follow Safety Instructions



TS201—UN—15APR13

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.

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

DX,READ-19-01AUG22

Understand Signal Words



▲ WARNING

▲ CAUTION

TS187—19—30SEP88

DANGER; The signal word DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING; The signal word WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION; The signal word CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. CAUTION may also be used to alert against unsafe practices associated with events which could lead to personal injury.

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.

DX,SIGNAL-19-05OCT16

Practice Safe Maintenance



TS218—UN—23AUG88

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 away 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.

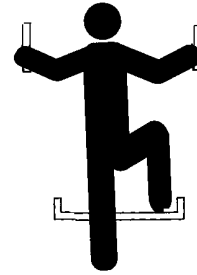
On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

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

Falling while cleaning or working at height can cause serious injury. Use a ladder or platform to easily reach each location. Use sturdy and secure footholds and handholds.

DX,SERV-19-28FEB17

Use Steps and Handholds Correctly



T133468—UN—15APR13

Prevent falls by facing the machine when getting on and off. Maintain 3-point contact with steps, handholds, and handrails.

Use extra care when mud, snow, or moisture present slippery conditions. Keep steps clean and free of grease or oil. Never jump when exiting machine. Never mount or dismount a moving machine.

DX,WW,MOUNT-19-12OCT11

Handle Electronic Components and Brackets Safely



TS249—UN—23AUG88

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.

DX,WW,RECEIVER-19-24AUG10

Use Electronic Display Properly

Electronic displays are secondary devices intended to

aid the operator in performing field operations, increase comfort and provide entertainment. Displays offer a wide range of functionality, are used in many different machine system applications and can be used with other secondary devices such as handheld electronic devices.

A secondary device is any device that is not required to operate your machine for its primary use. The operator is always responsible for safe operation and control of the machine.

To prevent injury while operating the machine:

- Position the display according to the installation instructions. Ensure that the device is secured and does not obstruct the driver's view or interfere with the machine operating controls.
- Do not become distracted by the display. Stay alert. Pay attention to the machine and surrounding environment.
- Do not change settings or access any functions that require prolonged use of the display controls while machine is moving. Stop the machine in a safe location and place in park position before attempting such operations.
- Never set the volume so high that you cannot hear outside traffic and emergency vehicles.

To promote safe operation, certain functions of displays may be disabled unless the machine movement is restricted and/or has been placed in the park position. Overriding this safety feature may violate applicable law and can result in damage, serious injury, or death.

Only use available display functionality when conditions permit you to do so safely and in accordance with instructions provided. Always observe safe driving rules, state, or local laws and traffic regulations when using any secondary device.

DX,ELEC,DISPLAY-19-13JAN15

Operate Guidance Systems Safely

Do not use guidance systems on roadways. Always turn off (disable) guidance systems before entering a roadway. Do not attempt to turn on (activate) a guidance system while transporting on a roadway.

Guidance systems are intended to aid the operator in performing field operations more efficiently. The operator is always responsible for the machine path. Guidance systems do not automatically detect or prevent collisions with obstacles or other machines.

Guidance Systems include any application that automates machine steering. This includes, but may not be limited to, AutoTrac™, iGuide™, iTEC™ Pro,

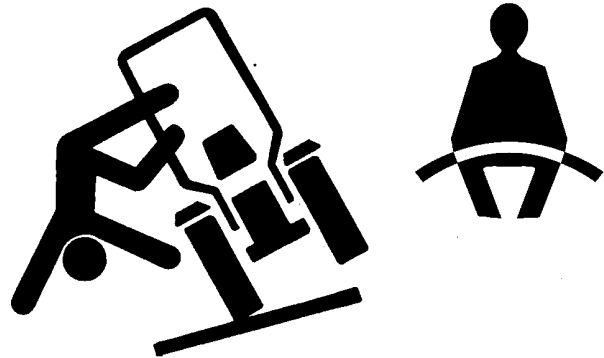
AutoTrac™ Turn Automation, AutoTrac™ Universal (ATU), RowSense™, and Machine Sync.

To prevent injury to the operator and bystanders:

- Never get on or off a moving machine.
- Verify the machine, implement, and guidance system are set up correctly.
 - If using iTEC™ Pro or AutoTrac™ Turn Automation, verify accurate boundaries have been defined.
 - If using Machine Sync, verify the follower's home point is calibrated with sufficient space between the machines.
- Remain alert and pay attention to the surrounding environment.
- Take control of the steering wheel, when necessary, to avoid field hazards, bystanders, equipment, or other obstacles.
- Stop operation if poor visibility conditions impair your ability to operate the machine or identify people or obstacles in the machine path.
- Consider field conditions, visibility, and machine configuration when selecting machine speed.

JS56696,0000ABC-19-20DEC17

Use Seat Belt Properly



TS1729—UN—24MAY13

Avoid crushing injury or death during rollover.

This machine is equipped with a rollover protective structure (ROPS). USE a seat belt when you operate with a ROPS.

- Hold the latch and pull the seat belt across the body.
- Insert the latch into the buckle. Listen for a click.
- Tug on the seat belt latch to make sure that the belt is securely fastened.
- Snug the seat belt across the hips.

Replace entire seat belt if mounting hardware, buckle, belt, or retractor show signs of damage.

Inspect seat belt and mounting hardware at least once a

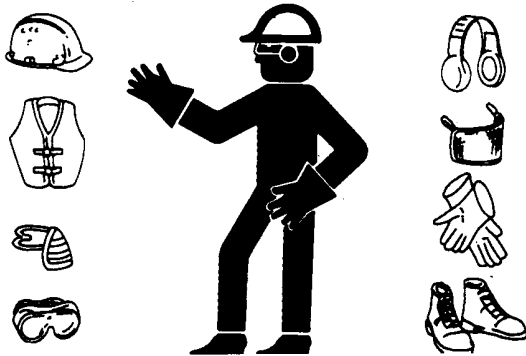
RowSense is a trademark of Deere & Company

AutoTrac is a trademark of Deere & Company
iGuide is a trademark of Deere & Company
iTEC is a trademark of Deere & Company

year. Look for signs of loose hardware or belt damage, such as cuts, fraying, extreme or unusual wear, discoloration, or abrasion. Replace only with replacement parts approved for your machine. See your John Deere dealer.

DX,ROPS1-19-22AUG13

Wear Protective Clothing



TS206—UN—15APR13

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.

DX,WEAR-19-10SEP90

Operate Safely



N39547—UN—06OCT88

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.

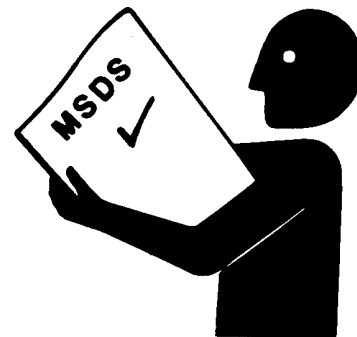
Operate machine from tractor seat only.

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

Tow machine behind a properly equipped tractor only.

JS56696,000065B-19-29MAR23

Read and Understand MSDS



TS1132—UN—15APR13

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.

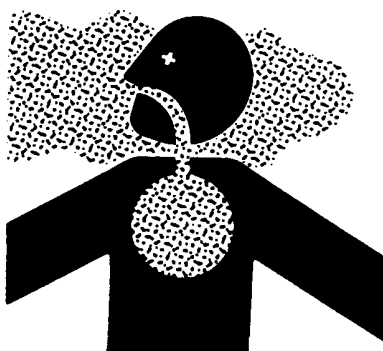
A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

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.)

JS56696,0000661-19-28JUL09

Handle Agricultural Chemicals Safely



TS220—UN—15APR13



A34471

A34471—UN—11OCT88

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.
- 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.

DX,WW,CHEM01-19-24AUG10

Working With Anhydrous Ammonia

Any person required to handle, transfer, transport or otherwise work with ammonia shall be trained to understand the properties of ammonia, to become competent in safe operating practices and to take appropriate action in events of a leak or emergency. These notes are a supplement to a thorough understanding of the Material Safety Data Sheets (MSDS), state and local regulations, and safety training from your local anhydrous ammonia supplier. They are not intended to replace other sources of safety information. Read safety instructions from anhydrous ammonia supplier and equipment supplier.

1. Anhydrous ammonia poses three distinct hazards to humans.
 - a. It is desiccant and will aggressively attract water from whatever it comes in contact with. Eyes are particularly vulnerable to damage. Any exposed skin surface can also be damaged.
 - b. Anhydrous ammonia is typically stored under pressure. When exposed to atmospheric pressure, it boils at -33°C (-28°F). The vaporization will freeze whatever the liquid anhydrous ammonia comes in contact with. Each 0.5 kg (1 lb.) of Anhydrous Ammonia that vaporizes is capable of freezing about 1.8 kg (4 lb.) of water.
 - c. Danger to the respiratory system may occur if high concentrations of anhydrous ammonia is inhaled.
2. Reduce risk to exposure and injury.
 - a. Wear PPE (Personal Protective Equipment).
 - ALWAYS WEAR REQUIRED and APPROVED PPE when working with anhydrous ammonia and anhydrous ammonia equipment.
 - PPE includes but is not limited to

CHEMICALLY-PROTECTIVE, SPLASH-PROOF GOGGLES and RUBBER GLOVES. An approved full face shield may be worn to protect the face but only as secondary eye protection.

b. Take Precautionary Measures.

- Plan your work with safety in mind. Plan escape routes from any working position and know the location of emergency water sources if they are needed.
- Always have a container with no less than 19 L (5 gal) of readily available clean water for emergency usage. Carry a squeeze bottle of water at all times.
- Never fill tank past 85% capacity.
- Before activating the application system, know the location of bystanders and/or coworkers.
- If modifying anhydrous ammonia system using a section control system to allow control of flow to individual sections of machine, additional safety measures **MUST** be taken. These measures include placement of bleed valve(s) at distribution lines between the main control valve and the section control valves. In addition, all anhydrous ammonia hoses **NOT OPEN** to atmosphere **MUST** be high pressure rated to ensure safety.

c. Transport and Store Safely.

- Do not park applicator and/or nurse tank in an enclosed area as toxic or flammable conditions can result.
- Verify anhydrous ammonia wagons and/or applicators are safe for road travel and securely attached to vehicles drawing them.
- **NEVER** tow anhydrous equipment into public places without authorization.
- When transporting anhydrous ammonia, verify discharge hoses are securely fastened to both ends. Some states require supply hoses to be secured to nurse tank before transporting. Check state and local laws.
- Turn off all hose end and tank valves prior to transporting, servicing, and storing.
- Properly bleed system to remove pressure and liquid anhydrous ammonia before servicing and storing. Verify all shut-off ball valves are operating and have released all trapped anhydrous ammonia inside ball. Follow all original equipment manufacturer's instructions.

d. Service Equipment Safely.

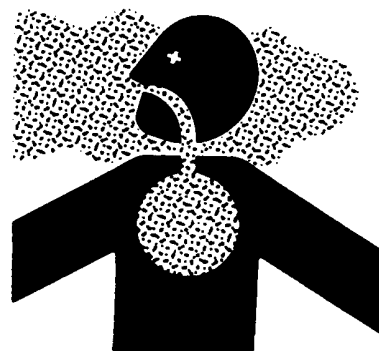
- Turn off all hose end and tank valves prior to transporting, servicing, and storing.
- Properly bleed system to remove pressure and liquid anhydrous ammonia before servicing and storing. Verify all shut-off ball valves are operating and have released all trapped anhydrous ammonia inside ball. Follow all original equipment manufacturer's instructions.
- **NEVER** attempt to connect or disconnect coupling until all flow from open bleed valves is stopped and all lines are completely bled.
- Disconnected hoses may still have liquid anhydrous in them.
- Never look directly into hoses, quick couplers, meters, and shut-off valves.
- Stay upwind of the fitting you are working on.
- Never attempt to clear blockage from any hose until pressure has been bled from the system. Plugged fertilizer tubes may have pressurized ammonia behind the plug.

3. If you come in contact with anhydrous ammonia:

- a. Get away from the exposure.
- b. **IRRIGATE THE AFFECTED AREA WITH WATER IMMEDIATELY AND CONSTANTLY.** Eyes receive first attention with eyelids held open for flushing.
- c. Seek medical assistance.

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Emergency Procedure For Anhydrous Ammonia



TS220—UN—15APR13



TS272—UN—23AUG88

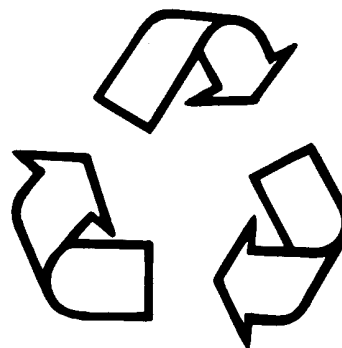
CAUTION: Only personnel trained for and designated to handle emergencies should attempt to stop a leak.

In the event of an anhydrous ammonia leak, it is vital the following steps are taken to insure the safety of you and others.

1. Position machine heading into the wind and lower shanks into ground.
2. **IMMEDIATELY** go to a safe distance upwind from vapor cloud and warn others in proximity to machine.
3. Determine possibility of safely closing shut-off valve (A) by pulling emergency rope (B) at front of machine or closing tank withdrawal valve (C). **DO NOT** attempt to close by other means. **DO NOT** reenter anhydrous ammonia vapor cloud.
4. Contact authorities as necessary and report released ammonia to environmental protection or other authorities as required by law.
5. Retrieve equipment **ONLY AFTER** all traces of anhydrous ammonia are gone.
6. Close all tank valves and open bleed valves.
7. Determine cause of leak and take following actions:
 - If leak is tank related, return to supplier.
 - If leak is from knife supply line, replace (refer to implement manual).
 - If leak is from any other part of machine, see John Deere dealer.

JS56696,0000660-19-28JUL09

Decommissioning — Proper Recycling and Disposal of Fluids and Components



TS1133—UN—15APR13

Safety and environmental stewardship measures must be taken into account when decommissioning a machine and/or component. These measures include the following:

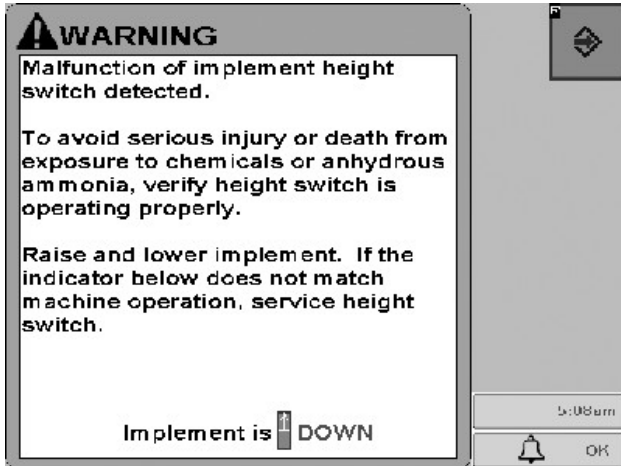
- Use appropriate tools and personal protective equipment such as clothing, gloves, face shields or glasses, during the removal or handling of objects and materials.
- Follow instructions for specialized components.
- Release stored energy by lowering suspended machine elements, relaxing springs, disconnecting the battery or other electrical power, and releasing pressure in hydraulic components, accumulators, and other similar systems.
- Minimize exposure to components which may have residue from agricultural chemicals, such as fertilizers and pesticides. Handle and dispose of these components appropriately.
- Carefully drain engines, fuel tanks, radiators, hydraulic cylinders, reservoirs, and lines before recycling components. Use leak-proof containers when draining fluids. Do not use food or beverage containers.
- Do not pour waste fluids onto the ground, down a drain, or into any water source.
- Observe all national, state, and local laws, regulations, or ordinances governing the handling or disposal of waste fluids (example: oil, fuel, coolant, brake fluid); filters; batteries; and, other substances or parts. Burning of flammable fluids or components in other than specially designed incinerators may be prohibited by law and could result in exposure to harmful fumes or ashes.
- Service and dispose of air conditioning systems appropriately. Government regulations may require a certified service center to recover and recycle air conditioning refrigerants which could damage the atmosphere if allowed to escape.
- Evaluate recycling options for tires, metal, plastic, glass, rubber, and electronic components which may be recyclable, in part or completely.

- Contact your local environmental or recycling center, or your John Deere dealer for information on the proper way to recycle or dispose of waste.

DX,DRAIN-19-01JUN15

Safety Signs

Malfunction of Implement Height Switch Detected

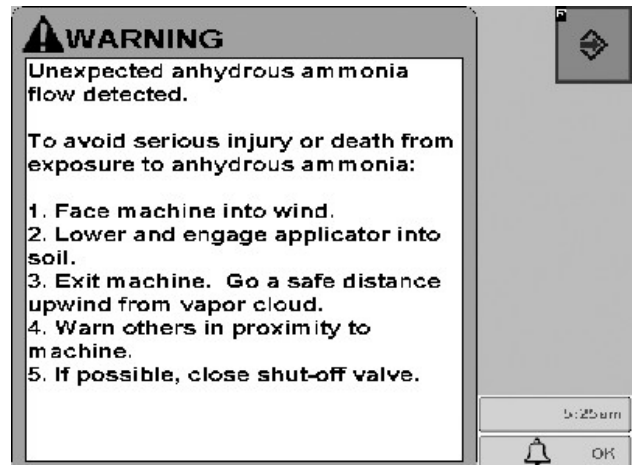


PC13147—19—17FEB11

This message will be displayed on a NH3 system when the system detects the implement is down for an extensive period of time, which can indicate a failure in the height switch. Product application will stop. To verify correct operation, follow the instructions. If the height switch indicator does not match machine operation, service height switch.

HC94949,00004EA-19-18OCT16

Unexpected NH3 Flow Detected

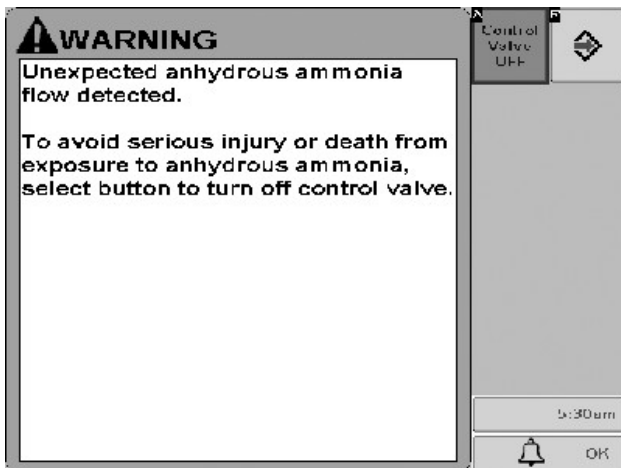


PC13148—19—17FEB11

This message will be displayed if the GreenStar Rate Controller has attempted to close all valves but still detects flow. To reduce risk of injury, follow the instructions on the screen.

HC94949,00004EC-19-01MAY14

Unexpected NH3 Flow Detected



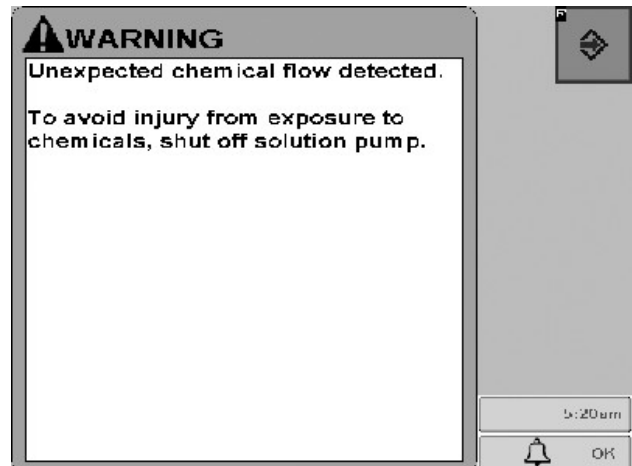
PC13152—19—17FEB11

This message will be displayed if the GreenStar Rate Controller has attempted to close the On/Off valve but still detects flow. If the Control Valve OFF button is selected, the system will also attempt to shut off the control valve.

NOTE: This message will only be displayed when using a dual valve system (i.e the control valve type is Standard or Fast).

HC94949,00004EB-19-01MAY14

Unexpected Chemical Flow Detected

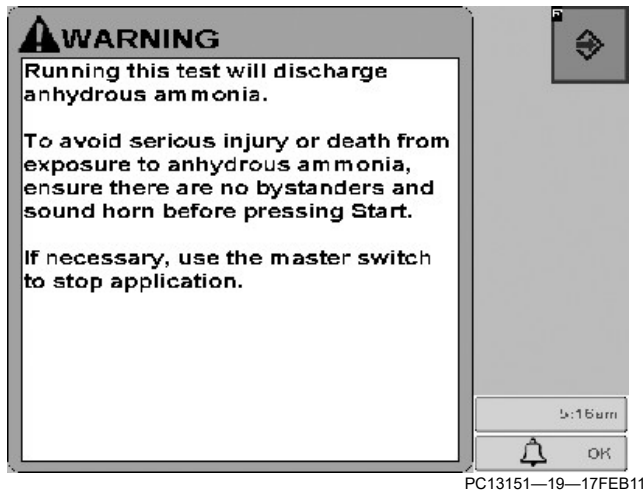


PC13158—19—17FEB11

This message will be displayed if the GreenStar Rate Controller has attempted to close the section valves but still detects flow on a sprayer or liquid fertilizer system.

HC94949,00004ED-19-01MAY14

NH3 Diagnostic Tests

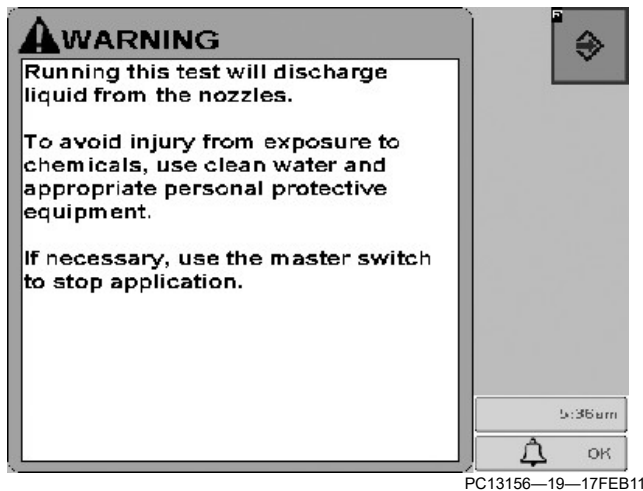


PC13151—19—17FEB11

This message will be displayed when any diagnostic test is selected on NH3 systems that discharges anhydrous ammonia.

HC94949,00004EE-19-01MAY14

Diagnostic Tests



PC13156—19—17FEB11

This message will be displayed when any diagnostic test is selected on sprayer or liquid fertilizer applications that will discharge liquid.

HC94949,00004EF-19-01MAY14

Safety Features

Safety Features

GreenStar™ Rate Controller: In addition to the safety features shown here, other components, systems, safety signs on the unit, safety messages and instructions in the operator's manual contribute to the safe operation of this product when combined with the care and concern of a capable operator.

Read and follow the instructions in all related manuals for implements and application equipment.

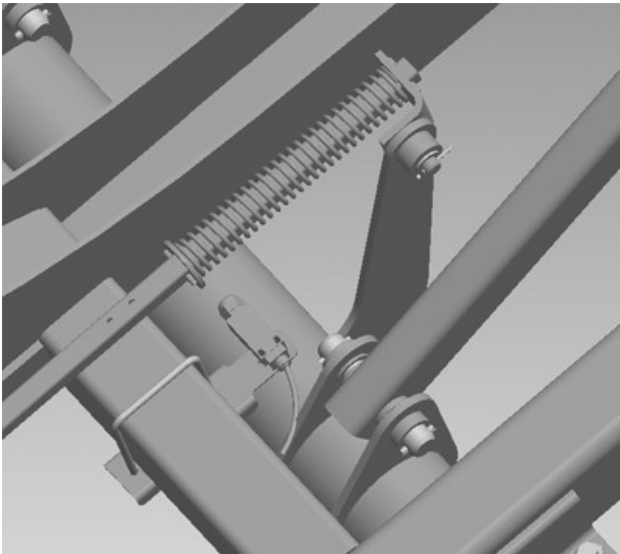
JS56696,00006F3-19-05APR10

The use of a height switch with Liquid Fertilizer applications is optional.

If using GreenStar™ Rate Controllers in a Multi-Product configuration, a single height switch can be shared among multiple GreenStar™ Rate Controllers. The height switch must be connected to one GreenStar™ Rate Controller and that GreenStar™ Rate Controller must be configured to "Send" the height switch status to the other GreenStar™ Rate Controllers. Each additional GreenStar™ Rate Controller must be configured to "Receive" the height switch status. There is an additional option of "Do Not Share" that can be used if multiple height switches are desired in the application.

CZ76372,00001D4-19-06OCT10

Implement Height Switch



PC10226—UN—15JUN07

Height Switch

The implement height switch is **REQUIRED** for NH3 and planter applications. These applications will not operate without an implement height switch correctly installed. This height switch prevents the GreenStar™ Rate Controller from discharging product unless the implement is lowered into the ground.

To verify the height switch operates correctly, raise and lower the implement while observing the height switch indicator (see MAIN SCREEN INDICATIONS in the OPERATION sections).

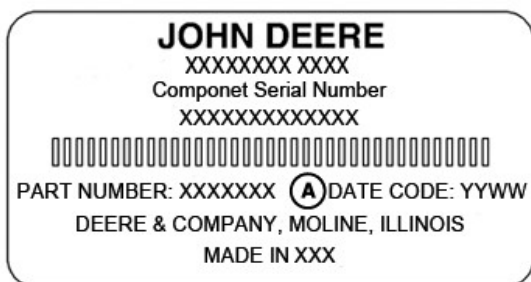
When operating NH3, an alert will appear if the system detects the implement has been down for an extensive period of time (see MALFUNCTION OF IMPLEMENT HEIGHT SWITCH DETECTED in "Safety Signs" section).

Planter applications use the implement height switch for documentation purposes only. Planters will not map correctly without the height switch properly installed.

Sprayer applications do **NOT** require or allow an implement height switch.

Regulatory and Compliance Information

Identify Date Code



PC17678—UN—18SEP13

Product Label Example

DATE CODE **YY** **WW**

(B) (C)

PC17574—UN—16AUG13

Date Code Example

- A—Date Code (Date of Manufacture)
- B—Last Two Numbers of Year of Manufacture
- C—Week Number of Calendar Year of Manufacture

Use the date code (A) on the product label to identify the date of manufacture. “YY” (B) identifies the last two numbers of the year of manufacture; “WW” (C) identifies the week number of calendar year of manufacture.

NOTE: The week number of manufacture ranges between 01-53.

Date Code		
YY	Last Two Numbers of Year of Manufacture	Example: 11 = 2011 12 = 2012 13 = 2013
WW	Week Number of Calendar Year of Manufacture	Example: 01, 02, 03...53

BA31779,00006DD-19-18SEP13

Customs Union—EAC (English and Russian)

Customs Unions—EAC

Information for products that bear conformity mark of the Customs Union member states

Manufacturer: Deere & Company
Moline, Illinois U.S.A.

Model: GreenStar™ Rate Controller
GreenStar™ Rate Controller Dry
Made in USA

Name and address of the authorized representative in the Customs Union of Russia, Belarus, and Kazakhstan:
Limited Liability Company “John Deere Rus”

Address: 142050, Russia, Moscow region, Domodedovo district, Domodedovo, Beliy Stolbi micro district, vladeny “Warehouse 104,” Building 2.

For technical support, please contact your dealer.

EAC

PC20729—UN—28JAN15

Таможенный союз—EAC

Информация об изделиях, которые имеют знак соответствия требованиям технических регламентов Таможенного союза

Производитель: Компания Deere & Company
г. Молин, Штат Иллинойс, США

модель:

Контроллер нормы внесения жидких удобрений GreenStar™

Контроллер нормы внесения сухих удобрений GreenStar™

Сделано в США.

Наименование и адрес уполномоченного представителя на территории Таможенного союза России, Белоруссии и Казахстана: Общество с ограниченной ответственностью "Джон Дир Русь"

Адрес: 142050, Россия, Московская область, Домодедовский район, г. Домодедово, микрорайон "Белые столбы", владение "Склады 104," стр. 2.

Для получения технической поддержки обращайтесь к дилеру, обслуживающему вашу организацию.



PC20730—UN—28JAN15
HC94949.0000730-19-29JAN15

EU Declaration of Conformity

Deere & Company
Moline, Illinois, U.S.A.

The undersigned hereby declares that:

Product: GreenStar Rate Controller

fulfill(s) all relevant provisions and essential requirements of the following directives:

DIRECTIVE	NUMBER	CERTIFICATION METHOD
Electromagnetic Compatibility Directive	2014/30/EU	Annex II of the Directive

The product is in conformity with the following standards and/or other normative documents:

ISO 14982: 1998

EN 55022: 2010

EN 55024: 2010

Name and address of the person in the European Community authorized to compile the technical construction file:

Brigitte Birk
John Deere GmbH & Co. KG
Mannheim Regional Center
John Deere Strasse 70
D-68163 Mannheim, Germany

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Place of Declaration: Urbandale, Iowa, U.S.A.

Date of Declaration: 26 April 2016

Manufacturing Unit: John Deere Intelligent Group

Name: Aaron Senneff

Title: Software Development

RW00482,0000233-19-21FEB18



DXCE01—UN—28APR09

Thailand—Declaration of Conformity

เครื่องโทรคมนาคมและอุปกรณ์นี้ มีความสอดคล้องตามข้อกำหนดของ กทช./กสทช.

PC22534—UN—20APR16
AE77568,00001CC-19-11APR17

UK Declaration of Conformity

Deere & Company
Moline, Illinois, U.S.A.

The undersigned hereby declares that:

Product Name(s): GreenStar Rate Controller

fulfill(s) all relevant provisions and essential requirements of the following UK Regulations:

REGULATION	NUMBER	CERTIFICATION METHOD
The Electromagnetic Compatibility Regulations	S.I. 2016 / 1091	Schedule 2, Module A

The product is in conformity with the following standards and/or other normative documents:

EN ISO 14982:2009

EN 55024: 2010

Name and address of the person authorized to compile the technical construction file:

John Deere Ltd.
Harby Road
Langar
Nottinghamshire
NG13 9HT
United Kingdom
EUConformity@JohnDeere.com

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Place of Declaration: Urbandale, IA, USA

Date of Declaration: 29 April 2021

Name: Scott Torgerson

Manufacturing Unit: Deere & Company, Moline, IL 61265

Title: Delivery Manager Electronic Hardware

Ag & Turf Products Importer: John Deere Ltd., Harby Road, Langar, Nottinghamshire, NG13 9HT, United Kingdom

Forestry Products Importer: John Deere Forestry Ltd- Carlisle Airport Industrial Estate, Carlisle, Cumbria, CA6 4NW, United Kingdom

Construction Importer: Wirtgen Limited, Wirtgen Group House, Overfield Park, Godfrey Drive, Newark, Notts. NG24 2UA, United Kingdom



RXA0179545—UN—16APR21
d6vudh3,1667277010742-19-01NOV22

System Overview

Theory of Operation

GreenStar™ Rate Controller is a flow-based system that controls product application on pull-behind sprayers, self-propelled sprayers, liquid fertilizer tools, NH3 tools, and planters. The application target rate is operator defined and stored in the GreenStar™ Rate Controller.

The controller utilizes flow meter feedback and ground speed using global positioning system (GPS), Radar, or wheel speed in calculating the application rate. The controller uses this calculation to make system adjustments to achieve target rate. The controller signals the valve to open or close and integrates with the existing product delivery system pump to increase or decrease product amount applied. An optional pressure sensor can be installed to monitor system pressure on the GS3 2630 Display. Rate controller cannot use the pressure sensor to adjust application rates.

The rate controller is designed to turn implement on and off using coverage, boundary, and GPS information to work with John Deere Section Control.

(Reference GS3 2630 Display Operator's Manual for details on Section Control.)

The controller does rate smoothing. Rate smoothing removes small fluctuations in application rate values shown on display. If actual value is within a user-defined percentage of target value, target value is displayed. Percentage range is 3–15% and system defaults to 3%.

Planters Only:

GreenStar™ Rate Controller can communicate with SeedStar™ controllers to control engagement of hydraulic variable rate motors on select planter configurations. GreenStar™ Rate Controller can also control electronic row clutches.

RW00482,0000445-19-07JAN15

Profile Types

GreenStar™ Rate Controller supports the following profile types:

NOTE: Specialty sprayer profiles are only available on Generation 4 Displays.

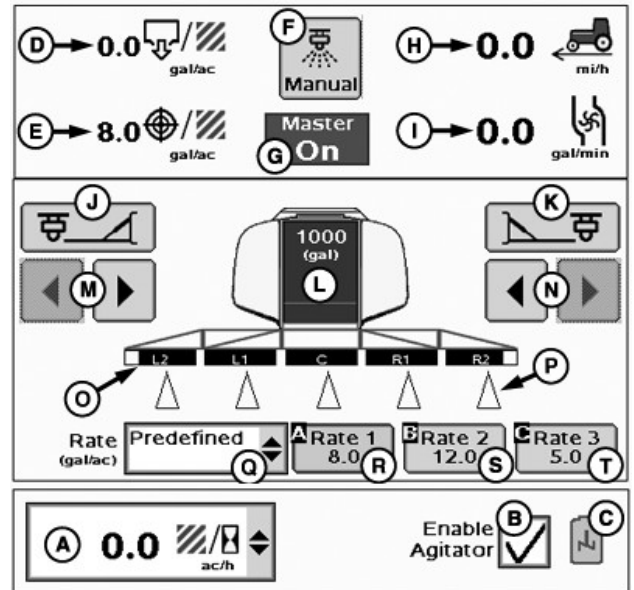
- Pull-Behind Sprayer
- Self-Propelled Sprayer
- Pull-Behind Specialty Sprayer
- Self-Propelled Specialty Sprayer
- Liquid Fertilizer Tool
- NH3 Tool
- Planter

GreenStar is a trademark of Deere & Company
SeedStar is a trademark of Deere & Company

- Manure Constituent Sensing (MCS) Applicator

RW00482,0000948-19-20NOV19

Run Page—Sprayer



PC20780—UN—03FEB15

GreenStar™ Rate Controller Main Page

- A—Information Drop-Down Menu
- B—Enable Agitator Checkbox
- C—Agitator Icon
- D—Actual Rate
- E—Target Rate
- F—Manual Spray Button
- G—Master Switch Indicator/Implement Height Switch Indicator
- H—Travel Speed
- I—Flow (Volume per Time)
- J—Left Fence Row Nozzle On/Off Button
- K—Right Fence Row Nozzle On/Off Button
- L—Tank Level Indicator Button
- M—Left Side Section On/Off Buttons
- N—Right Side Section On/Off Buttons
- O—Implement Sections
- P—Section Status Indicators
- Q—Rate Selection Drop-Down Menu
- R—Predefined Rate 1
- S—Predefined Rate 2
- T—Predefined Rate 3

Information drop-down (A) includes:

- Productivity (area per hour)
- Estimated time remaining on current tank level
- Estimated are remaining on current tank level
- Flow per minute
- Area covered
- Total product applied
- Average application rate
- Speed
- Pressure sensor 2

Estimated time and area values are an instantaneous calculation based on current tank level. Estimated time and area values can be expected to fluctuate due to changes to flow rate, working width, or speed while operating.

To activate agitator, select Enable Agitator checkbox (B).

Agitator icon (C) changes from gray to white when active.



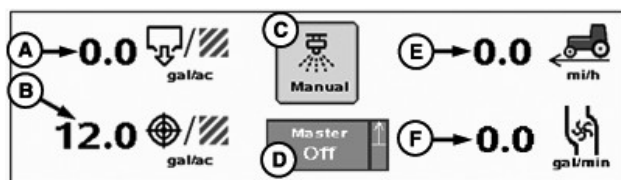
PC20781—UN—03FEB15

A—Enable Pump Checkbox

Enable Flow Return in System Setup to display Enable Pump checkbox (A).

HC94949,000073F-19-03FEB15

Manual Spray Operation



PC12332—UN—14OCT09

Main Screen Indications

- A—Actual Rate
- B—Target Rate
- C—Manual Spray Button
- D—Master Switch Indicator/Implement Height Switch Indicator
- E—Travel Speed
- F—Flow (Volume per Time)

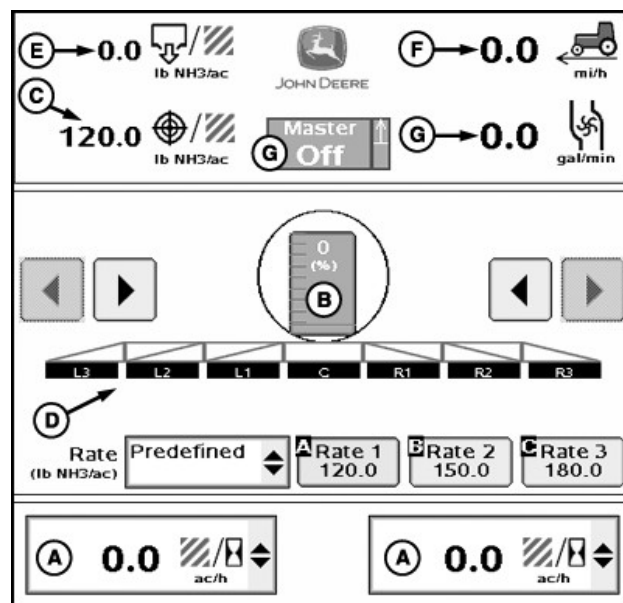
Manual Spray button (C) forces controller to apply product at the present application rate or minimum flow rate (whichever is greater). It overrides John Deere Section Control and machine speed threshold for a duration of 5 sec. when pressed. A countdown indicator appears when this function is enabled. It may be pressed any time during countdown period to reset the counter back to 5 seconds. Minimum flow rate is controlled until speed and target rate warrant a higher flow rate. Manual Spray button is disabled if minimum flow rate is zero.

NOTE: To verify height switch operates correctly, raise and lower implement while observing height switch indicator.

Height switch indicator displays whether the implement is in up or down position.

HC94949,0000737-19-03FEB15

Run Page—NH3



PC20751—UN—29JAN15

Main Page—NH3

- A—Information Drop-Down Menu
- B—Flow (Volume Per Time)
- C—Tank Levels Button
- D—Target Rate
- E—Section Indicators
- F—Actual Rate
- G—Master Switch Indicator/Implement Height Switch Indicator

The Information drop-down includes:

- Productivity (area per hour)
- Estimated time remaining on current tank level
- Estimated area remaining on current tank level
- Flow per minute
- Area covered
- Total product applied
- Average application rate
- Speed
- Pressure sensor 2

The estimated time and area values are an instantaneous calculation based on current tank level. Estimated time and area values can be expected to fluctuate due to changes in flow rate, working width, or speed while operating.

NOTE: Flow per minute is only an option when pressure sensor is installed.

Area covered, total product applied, and average application rate can be zeroed by selecting Reports and Totals softkey > Current tab.

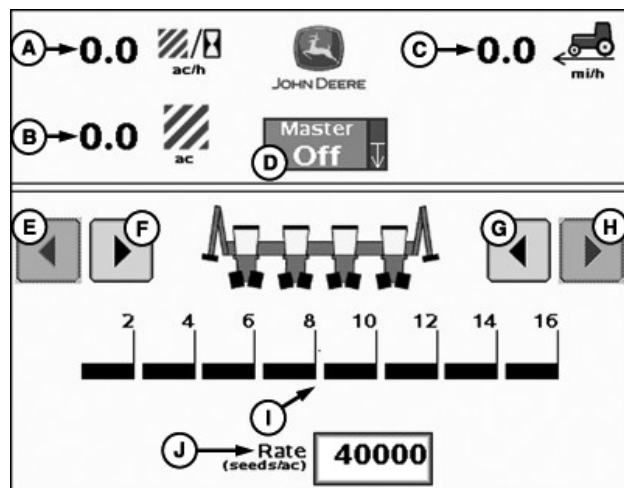
Pressure sensor 2 is only an option when two pressure sensors have been configured.

To verify the height switch operates correctly, raise and lower the implement while observing the height switch indicator.

Height switch indicator displays whether implement is in up or down position.

HC94949,0000732-19-04FEB15

Run Page—Planter



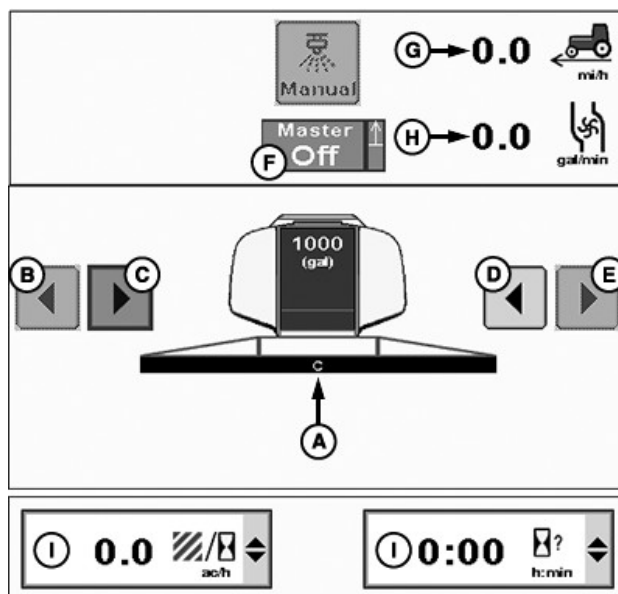
Planter Run Page

PC12320—UN—06OCT09

- A—Area Per Hour
- B—Total Area
- C—Travel Speed
- D—Master Switch Indicator/Implement Height Switch Indicator
- E—Left Sections Off Button
- F—Left Sections On Button
- G—Right Sections On Button
- H—Right Sections Off Button
- I—Section Indicator
- J—Seed Rate Input Box

HC94949,0000733-19-02FEB15

Run Page—MCS Applicator



PC27695—UN—31OCT19

- A—Implement Sections
- B—Left Sections Off Button
- C—Left Sections On Button
- D—Right Sections On Button
- E—Right Sections Off Button
- F—Master Switch Indicator/Implement Height Switch Indicator
- G—Travel Speed
- H—Flow (volume per time)
- I—Information Drop-Down Menu

RW00482,0000949-19-31OCT19

Rate Controller Requirements

IMPORTANT: When setting up a GreenStar™ Rate Controller in a system containing multiple GreenStar™ Rate Controllers, ensure that setup is applied to the intended control unit. Verify that the control unit serial number matches the serial number selected on the display.

NOTE: Turning the master switch ON or OFF affects all GreenStar™ Rate Controllers in the system.

Hardware:

- Foot switch
- GreenStar™ Rate Controller harnesses
- GreenStar™ harness
- FlexBox™ control unit
- Switch box control unit (optional)
- Height switch
- StarFire™ Receiver (optional)

GreenStar is a trademark of Deere & Company
FlexBox is a trademark of Deere & Company
StarFire is a trademark of Deere & Company

- GreenStar™ 2 Display, GreenStar™ 3 Display, 4600 CommandCenter™, or 4640 Universal Display

(Reference the GreenStar™ 2 1800 Display Operator's Manual for compatibility information for that display.)

Conditions:

- Implement and system setup must be completed.
- Turn ON the master switch.
- If switch box is present, assign switch to a section and turn ON switch.
- If applicable, use Section Control to turn ON section.

NOTE: Section Control works with pull-behind sprayers, self-propelled sprayers, liquid fertilizer tools, NH3 tools, and planters.

- Machine speed must be greater than 0.5 km/h (0.3 mph).

RW00482,000094A-19-31OCT22

Component Overview and Compatibility

IMPORTANT: Valve power and valve ground pins are not reverse-voltage protected. Take precautions so that pins are not connected backwards to prevent damage to the control unit.

The following component configurations are compatible with the GreenStar™ Rate Controller.

(Reference Main Harness [37-Pin Connector] Table in Supplemental Information section for more information.)

Section Valves

- Section valves with 3-wire single-pole single-throw (SPST)

A 3-wire valve is considered a valve with a solenoid-like operation. There is one signal wire controlling operation of the valve. When signal wire is high (12 V), valve is opened. When signal wire is low (0 V), valve closes. This can sometimes be referred to as an SPST valve. There may be configurations where a valve with this operation only has two wires, a signal wire and a ground wire.

- Use valve power and valve ground for all section valves. If valve power and valve ground are not connected, section valves will not open or close.
- Split section valves evenly among available valve power and valve ground pins to disperse electrical load evenly through those terminals.

- Section valves with 2-wire double-pole double-throw (DPDT). Not compatible on NH3 systems.

A 2-wire valve is considered a valve with reversing capabilities. This valve needs two outputs to control its operation. When (+) signal wire is high (12 V) and (-) signal wire is low (0 V), valve opens. Likewise, when (-) signal wire is high (12 V) and (+) signal wire is low (0 V), valve closes. When both signal wires are low (0 V), the valve does not move. This type of valve can sometimes be referred to as a DPDT valve.

- Section valves require less than 2.5 A.
- Hagie section valve communicate over the CAN bus.

Raven Sidekick™ Pro Direct Injection Pump Compatibility

IMPORTANT: If multiple control units are being used, only one control unit should be configured to communicate with all direct injection pumps on the system.

GreenStar™ Rate Controller is compatible with the Raven Sidekick™ Pro direct injection pump for applying product using the following implements:

- Sprayers
- Liquid fertilizer tools
- NH3 applicators

Raven Sidekick™ Pro injects varying amounts of product into the main solution line of the implement. This eliminates the need to mix chemicals in the main tank. GreenStar™ Rate Controller can be configured with up to three Raven Sidekick™ Pro direct injection pumps.

RW00482,000022D-19-16FEB18

Sections

- Sprayers and Liquid Fertilizer

The number of implement sections the GreenStar™ Rate Controller can control depends on:

- Section valve type
- Agitator valve
- Fence row nozzles (optional for pull-behind sprayer and self-propelled sprayer ONLY)

- NH3 (Anhydrous Ammonia)

- 1—12 sections available for NH₃ applications.

Maximum Number of Sections by Configuration

NOTE: Agitator valve and flow return valve presence do not affect the section availability for 3-wire section valves.

Valve Type: 3-Wire (Such as Raven, TEEJET®, KZCO™, and BANJO®)				
Fence Row Valve	Dual Boom	Agitator Valve	Flow Return Valve	Maximum Number of Sections Available
No	No	No	No	14
No	Yes	No	No	13
No	No	No	Yes	11
No	No	Yes	No	10
Yes	No	No	No	8

TEEJET is a trademark of Spraying System Co.

KZCO is a trademark of KZCO, Inc.

BANJO is a trademark of Alasco Industrial Products, Inc.

Valve Type: 2-Wire (Such as HARDI®)			
Fence Row Valve	Agitator Valve	Flow Return Valve	Maximum Number of Sections Available
No	No	No	7
No	No	Yes	6
Left Only	No	Does not affect	5
Right Only	No	Does not affect	5
Both Left & Right	No	Does not affect	5
Does not affect	Yes	Does not affect	4

HARDI is a trademark of HARDI International A/S

RW00482.000022E-19-16FEB18

Flow Control Valves

	NH ₃	Liquid Fertilizer	Sprayers
Standard	X	X	X
Fast	X	X	X
Fast Close	X	X	X
PWM		X	X
PWM Close		X	X

- Flow Control Valve types: Standard, Fast, Fast Close, PWM, and PWM Close.
- Flow Control Valves that require 12V power to open.
- Flow Control Valves that require less than 2.5 amp of current.

Flow Control Valve Types

IMPORTANT: For PWM and PWM Close Control Valve systems, it is recommended that an external solution pump on/off switch is wired into the cab, if not already present, allowing the operator to shut off the solution pump. Solution pump damage could occur if it is run without solution in it.

PWM Control Valve System: When the master switch is shut off on a PWM Control Valve System, it will close the section on/off valve(s) stopping product flow. The PWM Valve will remain at its current position allowing hydraulic flow to continue to the solution pump which will allow the solution pump to continue running. An external solution pump on/off switch will allow the operator to shut off the solution pump.

PWM Close Control Valve System: When the master switch is shut off on a PWM Close Control Valve System, it will shut off the solution pump. An external solution pump on/off switch can be more user-friendly and familiar for a sprayer operator to shut off the solution pump if the solution tank runs empty.

Refer to the solution pump manufacturer's Operators Manual for more information.

• Standard Control Valves

Standard control valves are used in dual-valve systems and are used in conjunction with an on/off valve. The on/off valve closes in order to stop product flow and the standard control valve remains in its current position. Upon the re-opening of the on/off valve, the standard control valve should need little to no adjustment, assuming the target flow rate has not changed dramatically.

• Fast Close Control Valves

Fast Close control valves are used in single-valve systems. Due to its quick response time, a fast close valve eliminates the need for an additional on/off valve. The fast close valve serves as the rate control valve and will also completely close 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.

• Fast Control Valves

Fast control valves are used in dual-valve systems and are used in conjunction with an on/off valve. The on/off valve closes in order to stop product flow and the fast control valve remains in its current position. Upon re-opening the on/off valve, the fast control valve should need little to no adjustment, assuming the target flow rate has not changed dramatically.

- **PWM Control Valves**

PWM Control Valves are used in dual-valve systems and are used in conjunction with an on/off valve. The on/off valve closes to stop flow and the PWM Valve remains in its current position. Upon reopening the on/off valve, the PWM Valve should need little to no adjustment, assuming the target flow has not changed dramatically.

- **PWM Close Control Valves**

PWM Close Control Valves are used in single-valve systems. Due to its quick response time the PWM Close Valve eliminates the need for an additional on/off valve. The PWM valve serves as the rate control valve and will also completely close when it is necessary to completely stop flow. To start product flow once again, the PWM close valve opens and quickly ramps flow back up to achieve the target application rate.

NOTE: Fast and Fast Close or PWM and PWM Close Valves are physically the same with the only difference being how the GreenStar Rate Controller controls them.

Flowmeters

- Flowmeters requiring 5V or 12V power supply.
- Flowmeters with square wave signal type.

Flowmeter Supplemental Information

- For a Flowmeter requiring a 5V power supply, use power provided through the pin labeled Flowmeter #1 5vdc.
- For a Flowmeter requiring a 12V power supply, use power provided through the pin labeled ECU Power.

Pressure Sensors

- Pressure sensors requiring 5V or 12V power supply
- Pressure sensors that are voltage based with an output voltage range of 0V to 5V

Planter Compatibility

The GreenStar Rate Controller can communicate with SeedStar controllers to control engagement of hydraulic variable rate motors on the following John Deere planter configurations:

- John Deere planters with Hydraulic Variable Rate Motors will have 2 to 4 sections available.
- John Deere planters with Non-CAN based frame control.

The GreenStar Rate Controller can control engagement of electric clutches or solenoids on the following ground drive configurations:

- Planters with individual row clutches (Tru Count) will have 1 to 16 sections available.
- Planters with Non-CAN based frame control.
- Planters with existing 1/2, 1/3, or 1/4 electric disconnect clutches will have 2 to 4 sections available dependent on the disconnect sections.

Implement Height Switch

- An implement height switch is REQUIRED for NH3 and planter applications.
- An implement height switch is OPTIONAL for liquid fertilizer applications.

CZ76372,00001E9-19-27OCT10

Component Overview

StarFire™ Receiver

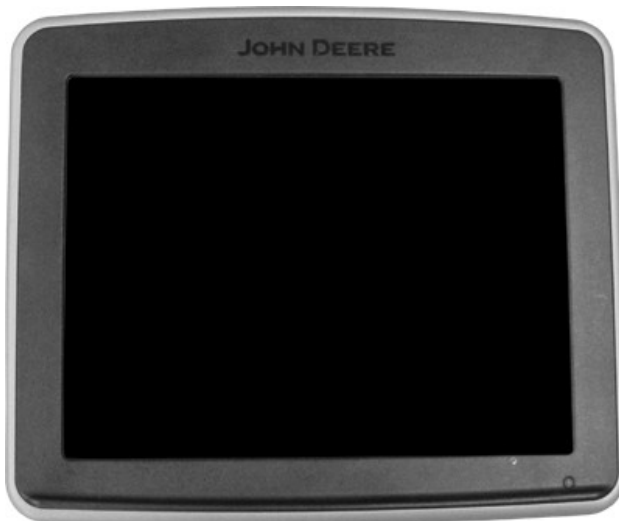


PC20203—UN—06NOV14

Receiver uses navigation satellites with StarFire™ correction satellites to determine machine location and direction of travel. An integrated terrain compensation module (TCM) adjusts machine position to compensate for uneven terrain. A StarFire™ signal activation is required to operate AutoTrac™.

HC94949,0000651-19-11NOV14

Display



PC13407—UN—20APR11

GreenStar™ 3 2630 Display



PC24742—UN—28SEP17

John Deere 4640 Universal Display

The display is the user interface used by the operator to:

- Configure and calibrate system components.
- Monitor system performance.
- Make system adjustments.
- Program software.
- View diagnostic tests.

GreenStar™ Rate Controller is compatible with GreenStar™ 2 1800, GreenStar™ 2 2600, GreenStar™ 3 2630, 4100 CommandCenter™, 4200 CommandCenter™, 4240 Universal, 4600 CommandCenter™, and 4640 Universal Displays.

AL70325,0000546-19-15MAY19

Foot Switch



PC20244—UN—13NOV14

Foot Switch

Foot switch activates and deactivates master switch if switchbox option is not utilized.

HC94949,000070F-19-26JAN15

StarFire is a trademark of Deere & Company
AutoTrac is a trademark of Deere & Company

GreenStar is a trademark of Deere & Company
CommandCenter is a trademark of Deere & Company

Switch Box



PC25178—UN—09JAN18

Switch Box Controller (Optional)

GreenStar Rate Controller 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 based speed sensor.

Use wire 211 (brown wire) in the 2-pin connector (A) to interface to the radar sensor.

JS56696,0000752-19-05APR10

The purpose of the optional switch box controller (SBC) is to allow the operator to enable or disable individual control valves manually rather than rely on the display for these settings.

The master switch permits the operator to shut OFF 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.

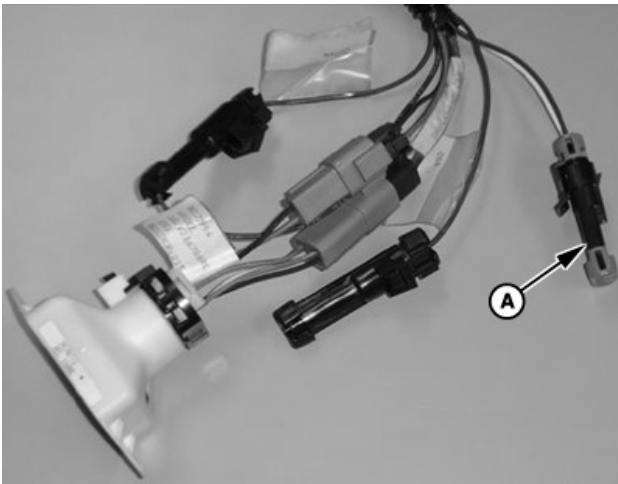
Each switch controls control valves assigned to it during system setup procedure. Even if the master switch and individual switches are on, control valves must still be enabled on the display in order for it to activate.

(For more information, see System Setup in the Configuring Sprayers and Liquid Fertilizer Tool, Configuring NH3 Tool, or Configuring Planter section.)

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

HC94949,0000653-19-21FEB18

System Speed Signal



PC9827—UN—20NOV06

GreenStar Harness

A—2-Pin Connector

The GreenStar Rate Controller System requires an approved speed signal.

If the vehicle has no John Deere GPS receiver, the

Configuring Sprayers, Liquid Fertilizer Tools, and Specialty Sprayers

Configuring Sprayers, Liquid Fertilizer Tools, and Specialty Sprayers

1. Access GreenStar™ Rate Controller
2. Offsets
3. Implement Setup
4. Rate Control
5. Refilling Tank
6. Setup Implement Sections
7. Dual Boom (If Equipped)
8. Setup Height Switch CAN Message
9. System Setup
10. Alarm Setup
11. Rate Setup
12. Raven Direct Inject Pump Setup (If Equipped)

AL70325,0000544-19-14MAY19

Access GreenStar™ Rate Controller

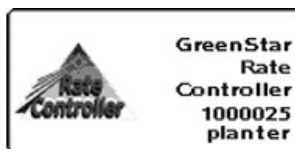
To access the GreenStar™ Rate Controller main page:



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



GreenStar™ Rate Controller button

PC12969—UN—25MAY12

2. Select the GreenStar™ Rate Controller button.

Each GreenStar™ Rate Controller is identified by the control unit serial number and implement name once the setup procedure has been completed.

NOTE: GreenStar™ Rate Controller button appears upon power-up after harness is installed and GreenStar™ Rate Controller is connected.

RW00482,00001F4-19-09JAN18

Offsets

It is necessary to set up machine and implement offsets

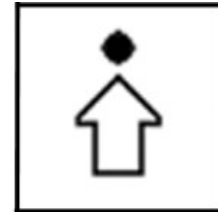
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and John Deere Section Control parameters to optimize GreenStar™ Rate Controller performance.

(Refer to GreenStar™ Display Operator's Manual.)

HC94949,0000724-19-28JAN15

Implement Setup

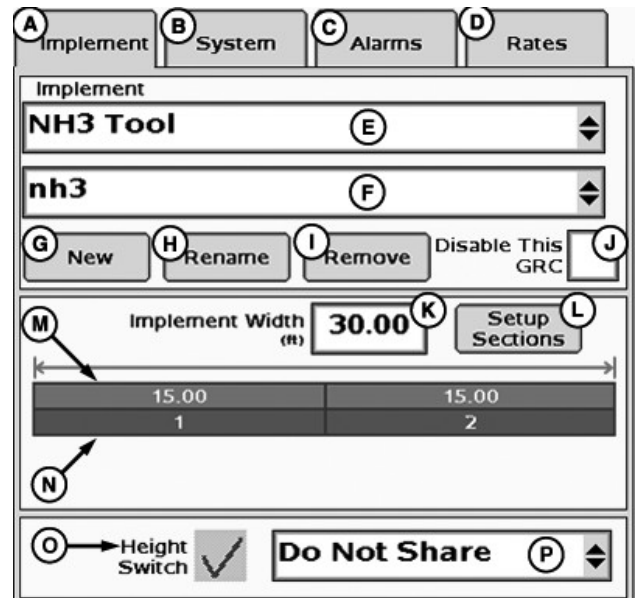


Setup Softkey

PC9419—UN—12SEP06

1. Select Setup.

NOTE: Turn off Master Switch to change most settings or values.



PC12981—UN—28OCT10

- A—Implement Tab
- B—Systems Tab
- C—Alarms Tab
- D—Rates Tab
- E—Implement Type Drop-Down Menu
- F—Implement Name Drop-Down Menu
- G—New Button
- H—Rename Button
- I—Remove Button
- J—Disable Rate Controller Checkbox
- K—Implement Width Input Box
- L—Setup Sections Button
- M—Implement Section Widths
- N—Associated Switchbox Switch Numbers
- O—Height Switch Checkbox
- P—Height Switch Message Drop-Down Menu

2. Select Implement tab (A).

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

HC94949,000067B-19-08DEC14

Implement Selection

Implement
Pull-behind Sprayer
Redball
New Rename Remove Disable This GRC

PC25179—UN—09JAN18

- A—Disable This GRC Checkbox
B—Implement Type Drop-Down Menu
C—Implement Name Drop-Down Menu
D—New Button

NOTE: If GreenStar™ Rate Controller will not be used but remains connected, select the Disable This GRC checkbox (A) to eliminate connection to display for documentation, Section Control, and controller warnings.

Implement name must be defined before the System, Alarms, and Rates tabs are enabled.

1. Select desired Implement type from the drop-down menu (B).
2. Select implement name from the drop-down menu (C) or select the New button (D), and enter the implement name.

630.13
GreenStar Rate Controller
redball
Configure System
Prior to applying, the implement and system setup must be completed.
Go to Setup

PC25180—UN—09JAN18

- A—Accept Button

3. For new setup, select the Accept button (A).

RW00482,00001F5-19-20FEB18

Set Up Implement Sections — Sprayers and Liquid Fertilizer Tools

Implement Width (m) 90.00
18.00 18.00 18.00 18.00 18.00
1 2 3 4 5
Setup Sections

PC20372—UN—04DEC14

Setup Sections

- A—Implement Width Input Box
B—Implement Section Widths
C—Associated Switchbox Switch Numbers
D—Setup Sections Button

Initial implement width may be entered into the Implement Width input box (A). The width entered is evenly distributed among sections (B).

If implement sections are of different widths or associated switches (C) are different, select the Setup Sections button (D) and follow the on-screen instructions. Fence row nozzles are also included in section setup.

Setup Sections
Enter number of sections then continue to the next page.
5
18.00 18.00 18.00 18.00 18.00
1 2 3 4 5
Left Fence Row Nozzle Right Fence Row Nozzle
Select the switchbox switch associated with the fence row nozzle
Left Nozzle Switch 9 Right Nozzle Switch 10
Next Button

PC20342—UN—25NOV14

- A—Number of Sections Input Box
B—Left Fence Row Nozzle Checkbox
C—Right Fence Row Nozzle Checkbox
D—Left Nozzle Switch Drop-Down Menu
E—Right Nozzle Switch Drop-Down Menu
F—Next Button

1. Enter the number of sections (A).

NOTE: Switchbox information is hidden when switchbox is not connected.

2. If equipped, select the fence row nozzle checkboxes (B and C).

- If equipped, indicate the switch number (D and E) associated with each fence row nozzle.
- Select the Next button (F) to edit the individual sections.

PC20343—UN—25NOV14

- F—Next Button
G—Width of Section Button
H—Switch Drop-Down Menu

- Enter each individual section width (G) and associated switchbox number (H).

AL70325.0000548-19-23MAY19

Set Up Implement Sections — Specialty Sprayer

PC27167—UN—16MAY19

- A—Implement Width Input Box
B—Implement Sections
C—Setup Sections Button

Enter the implement width in the Implement Width input box (A). The width entered is evenly distributed among the sections (B).

If implement sections have different widths or number of rows, select the Setup Sections button (C) and follow the on-screen instructions.

PC27134—UN—13MAY19

- A—Number of Sections Input Box
B—Row Spacing Input Box
C—Next Button

- Enter the number of sections in the Number of Sections input box (A).
- Enter the row spacing in the Row Spacing input box (B).
- Select the Next button (C) to enter information for each individual section.

PC27176—UN—17MAY19

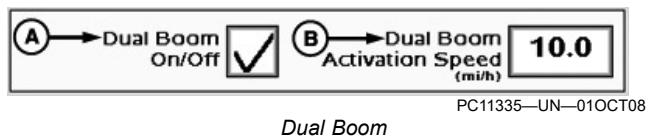
- D—Number of Full Rows Input Box
E—Check for Additional Half Row Checkbox

- Enter the number of full rows in the individual section in the Number of Full Rows input box (D).

- Select checkbox (E) to add an additional half row to the section.

AL70325,0000541-19-29MAY19

Set Up Dual Boom (If Equipped)



A—Dual Boom On/Off Checkbox
B—Dual Boom Activation Input Box

Dual boom allows for a second rank of nozzles to activate when high speeds and/or application rates are required. This allows for pressure and nozzle pattern to remain consistent.

If current speed is above threshold indicated, dual boom activates. When speed drops 10% below value, dual boom deactivates.

To set up dual boom:

- Select dual boom On/Off checkbox (A) to enable dual boom.
- Enter speed value in Dual Boom Activation input box (B). When speed value is reached, dual boom becomes active.

NOTE: Dual boom is only available for sprayers with 3-wire section valve type.

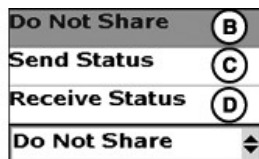
HC94949,0000739-19-02FEB15

Set Up Height Switch CAN Message



A—Height Switch Check Box

If using GreenStar™ Rate Controllers in a multi-product configuration, one rate control unit can share height switch (A) status among multiple control units.



Height Switch Message Drop-Down Menu

B—Do Not Share

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C—Send Status
D—Receive Status

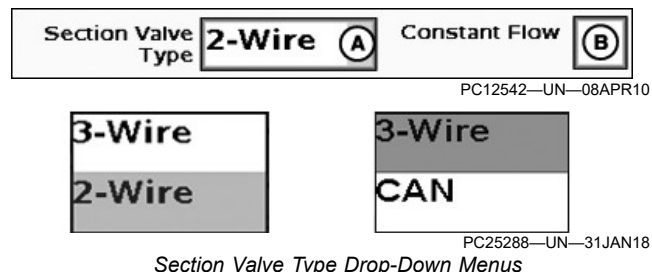
NOTE: Do Not Share (B) can be used if multiple height switches are desired in the application or operating with a single control unit.

- Connect height switch to one control unit.
- Configure that control unit to Send Status (C).
- Configure each additional control unit to Receive Status (D).

RW00482,00001F7-19-09JAN18

System Setup

- Select the System tab.



A—Section Valve Type Drop-Down Menu
B—Constant Flow Checkbox

- Select Section Valve Type from the drop-down menu (A).

NOTE: If a 2-wire valve is required and not shown in the drop-down menu, the number of implement sections must be adjusted in the implement setup.

NOTE: CAN is designated for Hagie functionality. If CAN is not shown in the drop-down menu, self-propelled sprayer must be selected and number of implement sections must be adjusted to ten.

(Reference Component Overview and Compatibility for more information.)

- Select the Constant Flow checkbox (B) to configure the control unit to operate a section valve with a continuous bypass that returns flow to the tank when sections are off.

(Reference Sprayers and Liquid Fertilizer Tool Diagnostics for calibrating the section bypass valves.)

CAUTION: Selecting the wrong valve type can result in valves opening unexpectedly. To avoid injury from exposure to chemicals, verify that the correct valve is selected. Review control valve type before transferring GreenStar™ Rate Controller between implements.

A—Control Valve Type Drop-Down Menu

4. Select the Control Valve Type from the drop-down menu (A).

Select None for systems that do not have a control valve. Dragline manure applications that do not have a control valve are an example.

**A—Tank Capacity Input Box
B—Control Valve Calibration Input Box
C—PWM Setup Button**

5. Enter maximum volume in the Tank Capacity input box (A). Tank capacity range is 0–17,000, and it defaults to 3785 L (1000 gal).
6. For Standard, Fast, and Fast Close control valves:
 - a. Enter the Valve Calibration Number (B).
 - b. Continue to step 7.

For PWM and PWM Close control valves:

- a. Select the PWM Setup button (C).

**A—Control Valve Calibration Input Box
B—Coil Frequency Input Box
C—High Limit Input Box
D—Low Limit Input Box
E—Calibrate PWM Limits Button
F—Pump Standby Duty Cycle Checkbox**

**G—Duty Cycle Input Box
H—Pump Enable Checkbox
I—Enable Pump Checkbox
J—Accept Button**

- b. Enter Valve Calibration Number (A).

NOTE: Table shows recommended values. Fine-tune control valve calibration valve for optimal performance.

(Reference fine-tuning procedure in Troubleshooting for more information.)

Standard Valve Type	Valve Calibration Number (XYZ)
Raven 165	2513
Raven 894	2513
Raven 125	2513
TeeJet®	1003
HARDI®	7051

*TeeJet is a trademark of Spraying Systems Company
HARDI is a trademark of HARDI Midwest Incorporated*

Fast-Close Valve Type	Valve Calibration Number (XYZ)
Raven 177	0753
HINIKER™ Servo Valve (8160 Monitor Compatible)	0433
KZCO® Servo Valve (John Deere 2510 Liquid Fertilizer system)	1031

*HINIKER is a trademark of Hiniker Company
KZCO is a trademark of KZCO Incorporated*

PWM-Close Valve Type	Valve Calibration Number (XYZ)
Sauer-Danfoss™ Hagie MFG T540	1533
Command Controls Corporation FV1501	1411

Sauer-Danfoss is a trademark of Sauer-Danfoss Incorporated

- c. Enter the Coil Frequency (B) for PWM and PWM Close valve. Coil Frequency default value is 122.

(Refer to control valve manufacturer Operator's Manual for proper coil frequency value.)
- d. Define PWM Limits to control minimum and maximum desired flow, or control pressure. This is to prevent machine damage and ensure quick system response.

Define limits manually by entering high and low limits into input boxes (C and D). High and low limit ranges are 0–255.

Otherwise, select Calibrate PWM Limits button (E), and follow on-screen steps to perform

calibration procedure. Once calibration is completed, select the Setup softkey to return to System Setup.

(Refer to Calibrate PWM Limits in Sprayers and Liquid Fertilizer Tool and Diagnostics section for details on how to perform test.)

- e. Select Pump Standby Duty Cycle checkbox (F) and enter the Duty Cycle (G) for the system to maintain when all sections are closed. This value is tied to the PWM high and low limits and the acceptable range is dictated by the values entered into the high and low limits.

NOTE: If there is no hardwired pump ON/OFF switch installed, select Pump Enable (H).

- f. Select Pump Enable if there is no hardwired pump ON/OFF switch installed. Enable Pump (I) overrides PWM signal to shut off pump when not selected.
- g. Select the Accept button (J).

The image shows a screen titled "Flowmeter Calibration". It has four main components: a text input field labeled "Flowmeter Calibration" with the value "743" and a circled 'A' next to it; a dropdown menu labeled "Flowmeter Units" with "10 gal" selected and a circled 'B' next to it; a large button labeled "Calibrate Flowmeter" with a circled 'C' next to it; and a checkbox labeled "Flow Return" which is checked, with a circled 'D' next to it.

Flowmeter Calibration

- A—Flowmeter Calibration Input Box
 B—Flowmeter Units Drop-Down Menu
 C—Calibrate Flowmeter Button
 D—Flow Return Checkbox

7. Enter Flowmeter Calibration number (A) that is stamped on the valve.

NOTE: Most flowmeters have an attached tag indicating recommended calibration number. Enter number as initial Flowmeter Calibration value.

8. Choose unit of measurement from the Flowmeter Units drop-down menu (B).
9. Select the Calibrate Flowmeter button (C) and follow on-screen instructions. (See Sprayers and Liquid Fertilizer Tool Diagnostics section.)

Flow Return checkbox (D) is available for liquid systems equipped with a fixed displacement pump

to allow product to return to tank when all sections are closed.

Once calibration is completed, select the Setup softkey to return to System Setup.

The image shows a screen with two main sections. The top section is for "Pressure Sensor" configuration, with checkboxes for "Pressure 1" (checked, labeled 'A') and "Pressure 2" (unchecked, labeled 'B'), and a button labeled "Calibrate Pressure Sensor" (labeled 'C'). The bottom section is for "Agitator Valve" configuration, with a checked checkbox labeled 'D' and a drop-down menu labeled "Agitator Duty Cycle (%)" with the value "20" selected (labeled 'E').

PC20609—UN—17DEC14

- A—Pressure Sensor 1 Checkbox
 B—Pressure Sensor 2 Checkbox
 C—Calibrate Pressure Sensor Button
 D—Agitator Valve Checkbox
 E—Agitator Duty Cycle Drop-Down Menu

10. Select Pressure Sensor 1 checkbox (A) if the sensor is installed. If using more than one pressure sensor, select Pressure Sensor 2 checkbox (B). If a pressure sensor is selected, pressure indicator displays on Menu instead of flow rate.
11. Select the Calibrate Pressure Sensor button (C) and follow the on-screen instructions.

Once calibration is completed, select the Setup softkey to return to System Setup.

(Refer to Sprayers and Liquid Fertilizer Tool Diagnostics section.)

12. To enable the agitator, select Agitator Valve checkbox (D).

NOTE: Agitator valve selection affects number of sections available for 2-wire valves.

13. Select agitator duty cycle percent from the drop-down menu (E). Agitation rate is based on 10 min intervals. For example, at 20% the agitator runs for 2 min, and is off for 8 min.

If tank volume is at or below 20% of the total volume of the tank, agitation reduces to half the set run time. For example, at 20% setting from the previous example, the agitation runs for 1 min, and is off for 9 min.

RW00482,00001F8-19-22FEB18

Alarms Setup (Optional)

The screenshot shows the 'Alarms' tab with the following settings:

- Low Tank Level (gal):** 200 (B) with alarm checkbox (I) checked.
- High Alarm (% above target rate):** 20 (C) with alarm checkbox (J) checked.
- Low Alarm (% below target rate):** 20 (D) with alarm checkbox (K) checked.
- Pressure Sensor 1:**
 - Minimum (psi): 12 (E) with alarm checkbox (L) unchecked.
 - Maximum (psi): 250 (F) with alarm checkbox (M) checked.
- Pressure Sensor 2:**
 - Minimum (psi): 12 (G) with alarm checkbox (N) unchecked.
 - Maximum (psi): 250 (H) with alarm checkbox (O) checked.

PC20619—UN—18DEC14

- A—Alarms Tab
- B—Low Tank Level Input Box
- C—High Alarm Input Box
- D—Low Alarm Input Box
- E—Pressure Sensor 1 Minimum Pressure Input Box
- F—Pressure Sensor 1 Maximum Pressure Input Box
- G—Pressure Sensor 2 Minimum Pressure Input Box
- H—Pressure Sensor 2 Maximum Pressure Input Box
- I—Low Tank Level Checkbox
- J—High Alarm Checkbox
- K—Low Alarm Checkbox
- L—Pressure Sensor 1 Minimum Pressure Checkbox
- M—Pressure Sensor 1 Maximum Pressure Checkbox
- N—Pressure Sensor 2 Minimum Pressure Checkbox
- O—Pressure Sensor 2 Maximum Pressure Checkbox

Alarms allow the operator to predefine alerts for application rate and low tank level. Alarms are percentage-based, and alert the operator when the value goes outside of range. For example, if the application rate is set to 100 and the high and low alarm is set at 20, the alert triggers when the application rate is below 80 or above 120.

1. Select Alarms tab (A).
2. Enter Low Tank Level volume (B).
3. Enter High Alarm (C) and Low Alarm (D) percent rates .
4. Enter Minimum (E) and Maximum (F) pressure for Pressure Sensor 1, if equipped.
5. Enter Minimum (G) and Maximum (H) pressure for Pressure Sensor 2, if equipped.
6. Enable desired alarm checkboxes (I–O).

HC94949,00006BF-19-06JAN15

Rates Setup

The screenshot shows the 'Rates' tab with the following settings:

- Rate 1 (gal/ac):** 0.0 (E)
- Rate 2 (gal/ac):** 0.0 (F)
- Rate 3 (gal/ac):** 0.0 (G)
- Minimum Flow Rate (gal/min):** 0.0 (H). A note indicates: 'Enter minimum flow rate required to maintain spray pattern. This is also the flowrate used when manual button is pressed.' with an arrow pointing to (I).
- Rate Smoothing:** Checked (J) with input box (K) set to 3%.

PC12548—UN—08APR10

- A—Implement Tab
- B—System Tab
- C—Alarms Tab
- D—Rates Tab
- E—User Rate 1 Input Box
- F—User Rate 2 Input Box
- G—User Rate 3 Input Box
- H—Minimum Flow Rate Input Box
- I—Enter minimum flow rate required to maintain spray pattern. This is also the flow rate used when manual button is pressed.
- J—Rate Smoothing Enable/Disable Box
- K—Rate Smoothing Input Box

1. Select Rates tab.
2. Input Target Rates (E–G).

NOTE: Values entered on this page are available on the home page.

3. Input Minimum Flow Rate (H), if desired. Default value is 0.0.

NOTE: Minimum Flow Rate is useful for maintaining constant pressure when making headland turns where speed is lower than normal. This changes drastically over a short period of time. Minimum Flow Rate applies to entire boom width. If one or more boom sections are turned off, the actual minimum flow rate will be adjusted to account for reduced working width.

4. Enable Rate Smoothing (J–K), and enter user-defined Rate Smoothing percent.

NOTE: Rate Smoothing percentage range is 3–15% and system defaults to 3%.

HC94949,0000708-19-23JAN15

Raven Direct Injection Pump Setup (If Equipped)



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



Raven Pump Buttons

PC25314—UN—09FEB18

2. Select the Raven Pump button. If multiple pumps are used, set up each pump individually.

(Reference Raven Sidekick™ Pro Operator's Manual for the pump setup.)

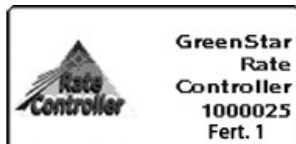
NOTE: If more than one pump is being used, ensure that the pumps do not have the same pump number.



Menu Button

PC8663—UN—29APR15

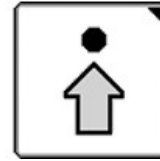
3. Select the Menu button.



GreenStar™ Rate Controller Button

PC15160—UN—25MAY12

4. Select the GreenStar™ Rate Controller button.

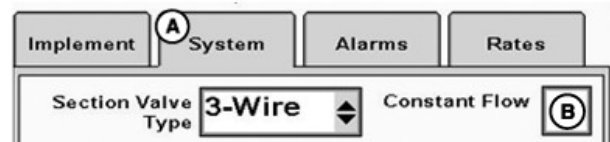


Setup Softkey

PC21157—UN—11MAY15

5. Select the Setup softkey to enter the control unit setup.

NOTE: Turn OFF master switch to change most settings or values.



System Tab

PC20508—UN—09DEC14

A—System Tab

B—Constant Flow Checkbox

6. Select the System tab (A).
7. If Raven Sidekick™ Pro is being used on a sprayer or liquid fertilizer tool, uncheck the Constant Flow checkbox (B).



Direct Injection Pump Softkey

PC14938—UN—03MAY12

8. Select the Direct Injection Pump softkey.

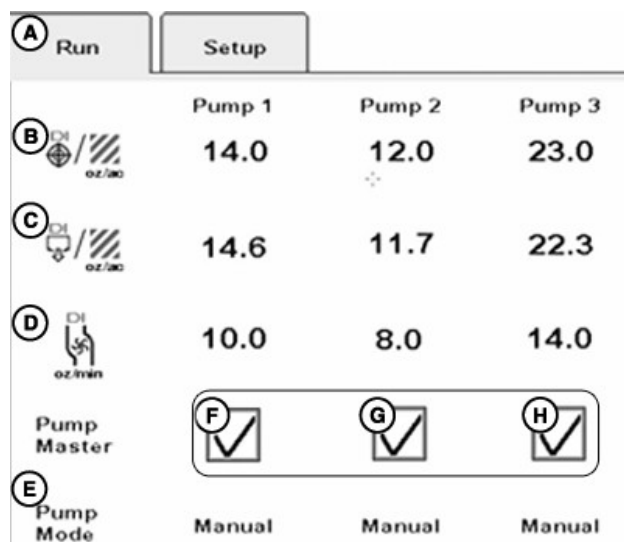


A—Setup Tab

B—Enable Direct Injection Communication Checkbox

PC20374—UN—04DEC14

9. On Setup tab (A), select the Enable Direct Injection Communication checkbox (B).



PC20618—UN—18DEC14

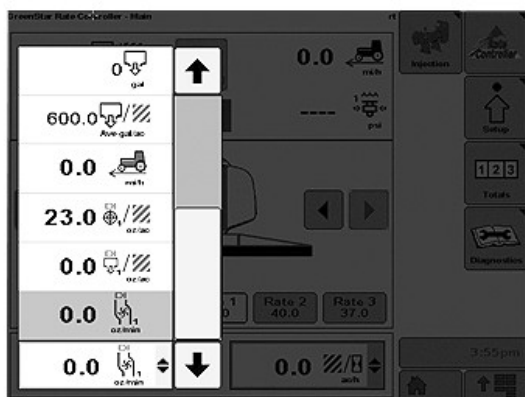
- A—Run Tab
 B—Target Rate
 C—Applied Rate
 D—Flow Rate
 E—Pump Mode
 F—H—Pump Master Checkboxes

10. Run tab (A) displays values based on the initial Raven setup screens:

- Target rate (B)
- Applied rate (C)
- Flow rate (D)
- Pump mode (E)

NOTE: Select the Raven Pump softkey to adjust values.

11. Enable pumps by selecting the checkboxes (F–H).



PC14941—UN—02MAY12

GreenStar™ Rate Controller Main Run Page

NOTE: Rates can be viewed on GreenStar™ Rate Controller main run page by selecting the desired rate from the information drop-down menus.

RW00482,00001F9-19-21FEB18

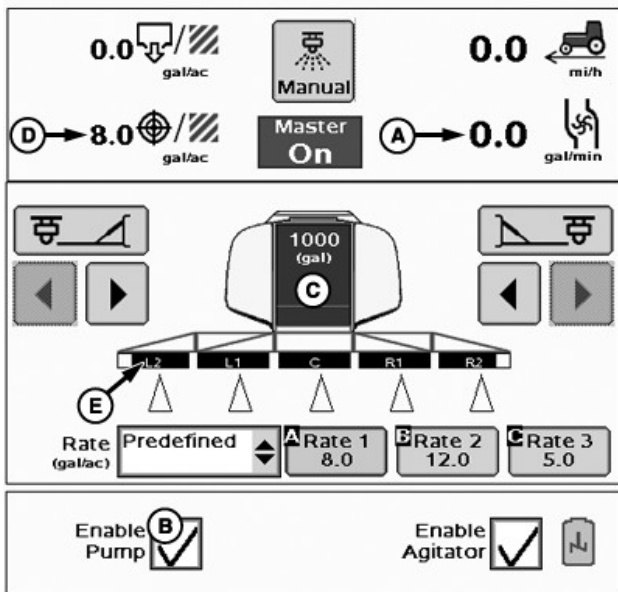
Operating Sprayers, Liquid Fertilizer Tools, and Specialty Sprayers

GreenStar™ Rate Controller Operation – Sprayers, Liquid Fertilizer Tools, and Specialty Sprayers

1. Verify User-Defined Values
2. Rate Control
3. Implement Section States
4. Refilling Tank
5. Activate and Deactivate System
6. Monitor System Performance
7. Rinse Cycle (see Sprayers and Liquid Fertilizer Tool Diagnostics section)

AL70325,0000545-19-14MAY19

Verify User-Defined Values



PC20745—UN—28JAN15

GreenStarGreenStar

- A—Travel Speed
B—Enable Pump Checkbox
C—Tank Level Indicator Button
D—Target Rate
E—Implement Sections

NOTE: Pressure (A): Pressure from pressure sensor 1 will be displayed instead of flow if system is configured for a pressure sensor.

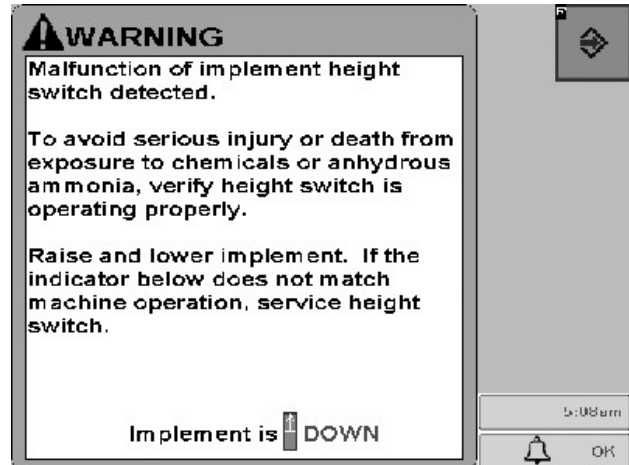
Enable Pump (B): Information drop-down menu will be displayed if Pump Enable was not selected in PWM Settings.

1. Verify tank level for accuracy (C).
2. Verify target rates (D).

3. Verify section indicators for accuracy (E).

HC94949,000072A-19-29JAN15

Malfunction of Implement Height Switch Detected



PC13147—19—17FEB11

This message will be displayed on a NH3 system when the system detects the implement is down for an extensive period of time, which can indicate a failure in the height switch. To verify correct operation, follow the instructions. If the height switch indicator does not match machine operation, service height switch.

HC94949,00004F0-19-01MAY14

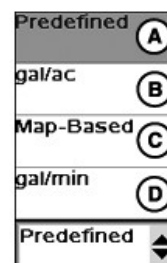
Rate Control

Implement Section and Rate Control



PC25205—UN—11JAN18

Rate Drop-Down Menu



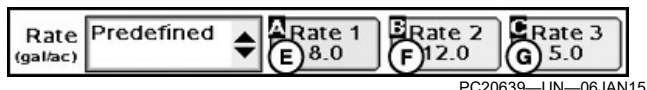
PC12550—UN—09APR10

- A—Predefined
B—gal/ac (US Units)
C—Map-Based
D—gal/min (US Units)

1. Select an available rate type (A–D) from the Rate drop-down menu.

Predefined Rates

Predefined rates are limited to a maximum of three. These rates can be set up on the Rates tab.



Predefined Rates

E—Predefined Rate 1 Button

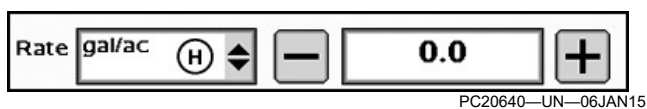
F—Predefined Rate 2 Button

G—Predefined Rate 3 Button

The letters on the top left corner of each predefined rate button (E–G) represent the shortcut buttons that are available when using a display control.

(For more information on a display control, reference the GreenStar™ 3 2630 Display Operator's Manual.)

Rate Based on Volume per Unit of Area



Rates Based on Volume Per Unit of Area

H—Rate Selection Drop-Down Menu

A rate based on volume per unit of area can be set by choosing one of the items from the Rate Selection drop-down menu (H). This rate mode ensures a consistent application rate over an area as working width and machine speed are adjusted.

- gal/ac (US Units)
- L/ha (Metric Units)
- l Gal/ac (Imperial Units)
- gal/100 y (US Units)
- L/100 m (Metric Units)

Map-Based Rates

To run map-based rates, select the prescription in GreenStar™ documentation. Map-based only appears in the drop-down menu if a prescription is selected.

Rates Based on Flow



Rates Based on Flow

A—Rate Selection Drop-Down Menu

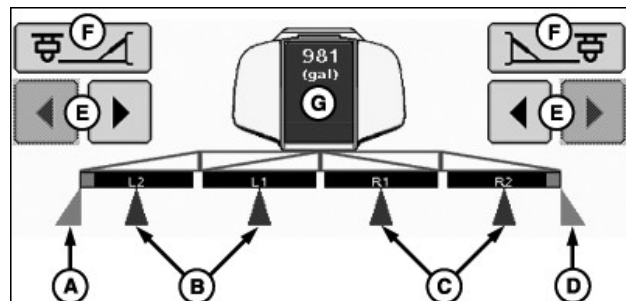
A rate based on flow can be set by choosing one of the items from the Rate Selection drop-down menu (A). This rate mode ensures a constant flow rate, regardless of changes in machine speed. A decrease in rate may be visible when sections are disabled.

GreenStar is a trademark of Deere & Company

- gal/min (US Units)
- L/min (Metric Units)
- l gal/min (Imperial Units)

AL70325,0000543-19-16MAY19

Implement Section States



Implement Sections Spraying

A—Left Fence Row Nozzle Active

B—Left Sections Active

C—Right Sections Active

D—Right Fence Row Nozzle Active

E—Section ON/OFF Buttons

F—Fence Row Nozzles ON/OFF Buttons

G—Tank Level/Tank Refill

Implement sections can be in one of three states:

- Disabled—Section is disabled.
- Enabled—Section is enabled.
- Active—Section is spraying.

Section ON/OFF buttons (E) enable or disable one section at a time from left to right or right to left.

The fence row nozzle buttons (F) enable or disable fence row nozzles.

NOTE: Operator can enable and disable fence row nozzles with switch box in cab.

	Section (B and C)	Fence Row (A and D)
Disable	Clear Square	No Square
Enable	Black Square	Purple Square
Active	Blue Square	Purple Triangle and Square
Not Active	Clear Square	Clear Square

Dual Boom



Implement Section States

PC11273—UN—17SEP08

Open triangles indicate dual boom is configured, but not spraying. Light blue triangles indicate dual boom is spraying.

NOTE: When active, second tier clear triangle appears. Dual boom appears as clear triangle when machine is slower than dual boom activation speed setting. After achieving speed, triangle turns turquoise.

RW00482,00001FB-19-22FEB18

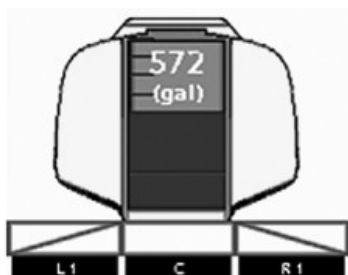
- Switchbox: Press switch.

NOTE: System only operates when machine ground speed is greater than 0.5 km/h (0.3 mph).

Master switch indicator on run page displays an on/off state.

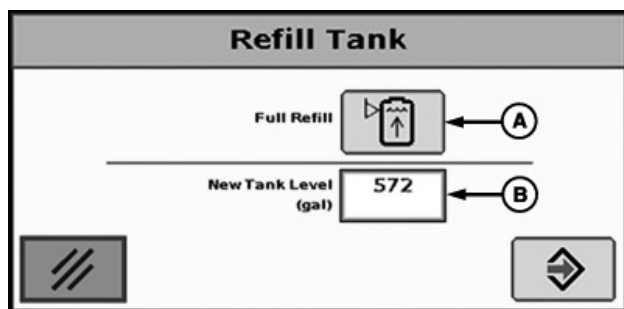
HC94949,000070E-19-03FEB15

Refilling Tank



PC11381—UN—08OCT08

Estimated Volume Remaining



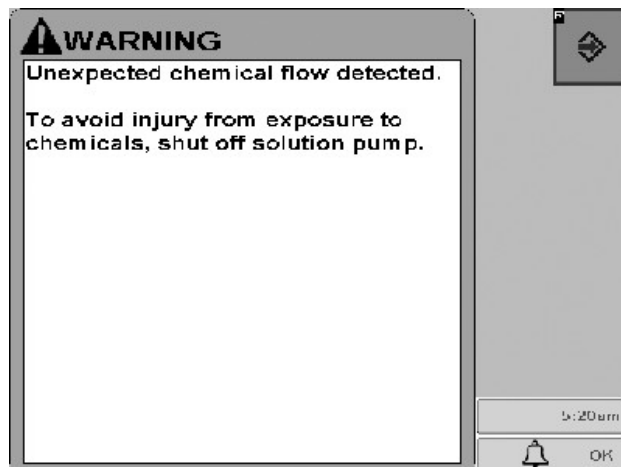
PC11382—UN—08OCT08

A—Full Refill Button
B—New Tank Level Input Box

1. Reset estimated tank level after refilling.
2. Select estimated volume remaining/refill button.
3. If volume after refilling is full, select Full Refill (A). This sets tank level to defined tank capacity.
4. When partially filling tank, enter new level by pressing new tank level button and input estimated value (B).

HC94949,000070D-19-03FEB15

Unexpected Chemical Flow Detected



PC13158—19—17FEB11

This message will be displayed if the GreenStar Rate Controller has attempted to close the section valves but still detects flow on a sprayer or liquid fertilizer system.

HC94949,00004F1-19-01MAY14

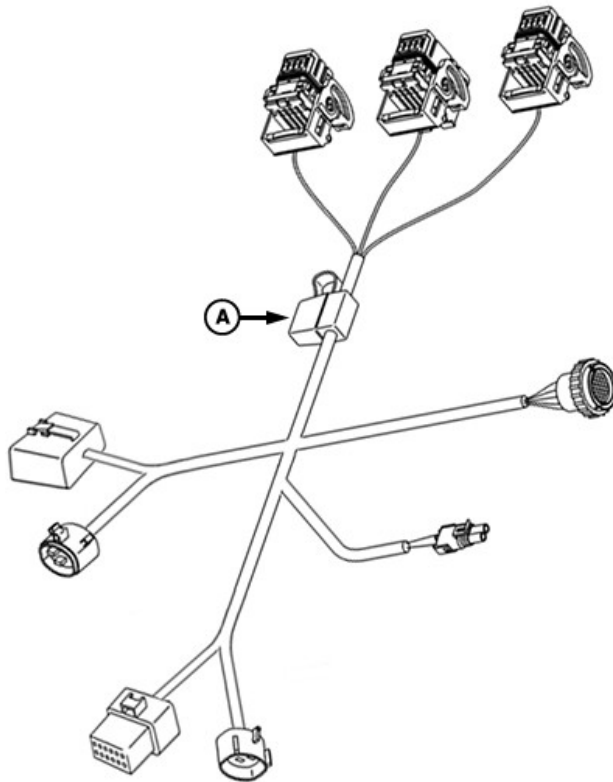
Activate and Deactivate System

1. To activate system:
 - Foot switch: Turn master switch to On position.
 - Switchbox: Press switch.
2. To deactivate system:
 - Foot switch: Turn master switch to Off position.

Limp Home Mode

NOTE: Limp home mode does not function when NH3 tool or planter is the selected implement type.

RW00482,00001FC-19-20FEB18



PC25183—UN—10JAN18

Limp Home 10 A Fuse

A—Limp Home 10 A Fuse

If communication between display and GreenStar™ Rate Controller fails for any reason, operator can decide to operate system in a limited functionality mode to finish a field.

By removing the in-line fuse (A) located in the main harness, control unit enters limp home mode. While in limp home mode, the system:

- Enables all implement sections.
- Disables fence row nozzles.
- Calculates flow rate based on standard limp home speed of 8 km/h (5 mph), predefined Rate 1, and full implement width.

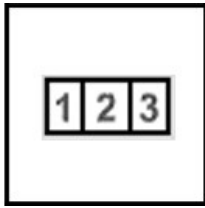
Limp home mode assumes that all CAN bus communication has been lost and defaults to Rate 1, the original operating width, and a fixed speed of 8 km/h (5 mph).

NOTE: It is the operator's responsibility to keep the tractor at 8 km/h (5 mph) to ensure proper rate is being dispensed.

If operator is using switch box controls, only the master switch on the switch box works.

If the limp home fuse is lost or destroyed, it can be replaced by a common automotive 10 A fuse.

Reports and Totals

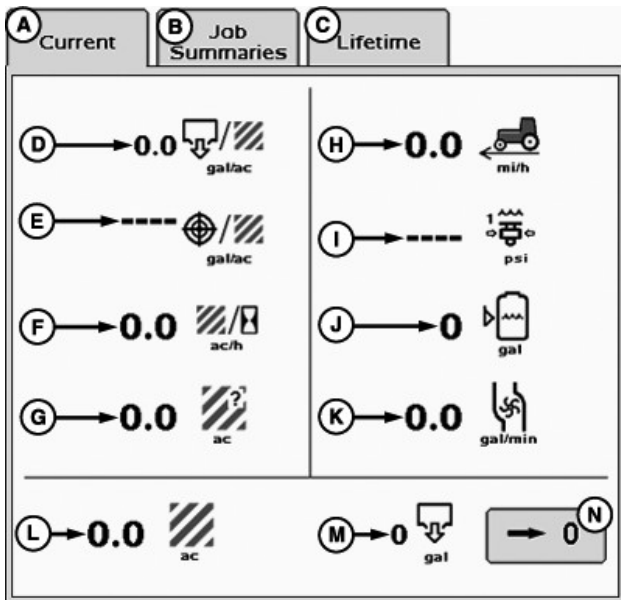


Reports and Totals Softkey

PC9669—UN—26OCT06

Select the Reports and Totals softkey.

Current



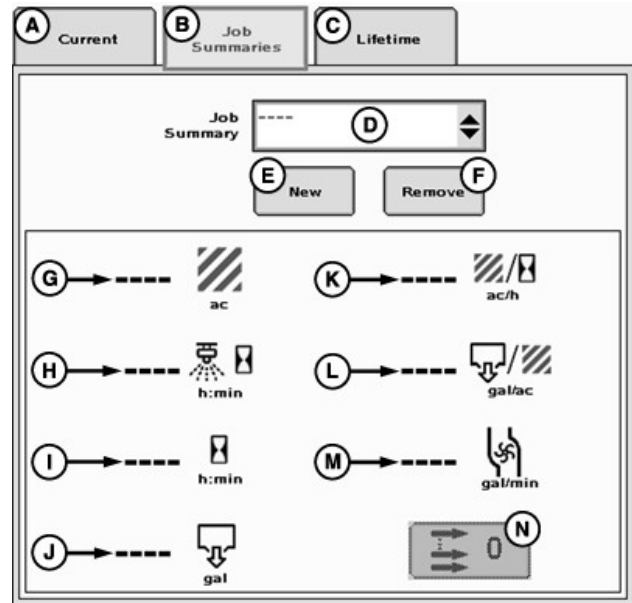
Current Tab

PC12977—UN—27OCT10

- A—Current Tab
- B—Job Summaries Tab
- C—Lifetime Tab
- D—Actual Rate Per Area
- E—Target Rate Per Area
- F—Area Per Hour
- G—Area Remaining on Current Tank Level
- H—Travel Speed
- I—Pressure Sensor 1
- J—Volume Remaining
- K—Volume Per Time (Flow rate)
- L—Area
- M—Volume Applied
- N—Reset Counter Button

The current page displays instant values.

Job Summaries



Job Summaries Tab

PC12247—UN—10SEP09

- A—Current Tab
- B—Job Summaries Tab
- C—Lifetime Tab
- D—Job Summary Drop-Down Menu
- E—New Button
- F—Remove Button
- G—Area
- H—Time Spent Applying
- I—Total Hours Spent on Job
- J—Volume
- K—Average Area Per Hour
- L—Average Volume Per Area
- M—Volume Per Time (Flow rate)
- N—Zero Button

The job summaries page tracks totals listed on the job page. Only values for the currently selected job summary are incremented.

Job summaries are stored on the control unit. The control unit can store up to six different jobs for each configuration.

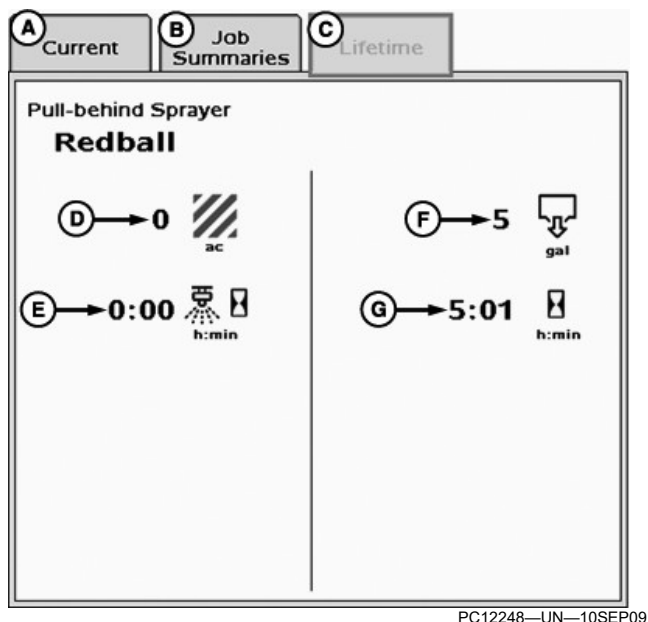
To create a new job:

1. Select the New button (E).
2. Enter a name for the current job.

Jobs that are no longer needed may be deleted by selecting the job and pressing the Remove button (F).

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

Lifetime



Lifetime Tab

- A—Current Tab
- B—Job Summaries Tab
- C—Lifetime Tab
- D—Total Area
- E—Time Spent Applying
- F—Total Volume
- G—Total Hours

The lifetime page tracks all totals for the lifetime of the implement selected.

RW00482.0000204-19-20FEB18

Sprayer, Liquid Fertilizer Tool, and Specialty Sprayer Diagnostics

Diagnostic Page



Diagnostics Softkey

PC9431—UN—14SEP06

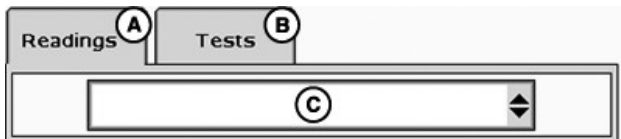
Select the Diagnostics button on the right-hand side to enter the diagnostics page.

JS56696,000070A-19-05APR10

E—Software Version Number

JS56696,000070C-19-05APR10

Readings



Readings Tab

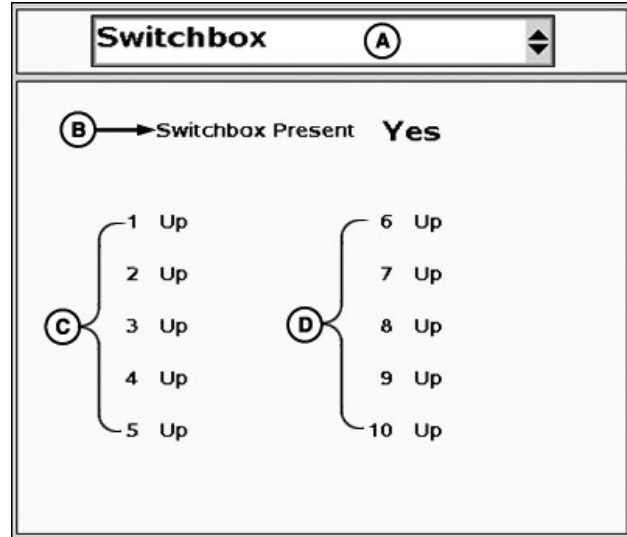
PC12249—UN—14SEP09

- A—Readings Tab
- B—Tests Tab
- C—Reading Type Drop-Down Menu

Select the Readings tab to display GreenStar Rate Controller readings.

JS56696,000070B-19-05APR10

Switchbox Readings

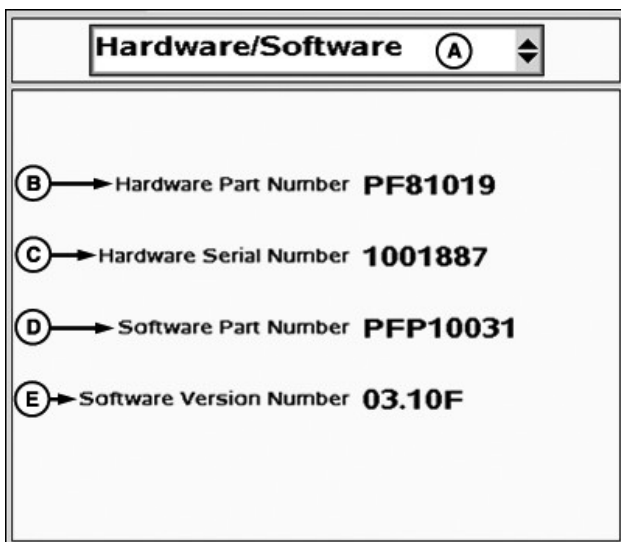


PC12251—UN—06OCT09

- 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

JS56696,000070D-19-05APR10

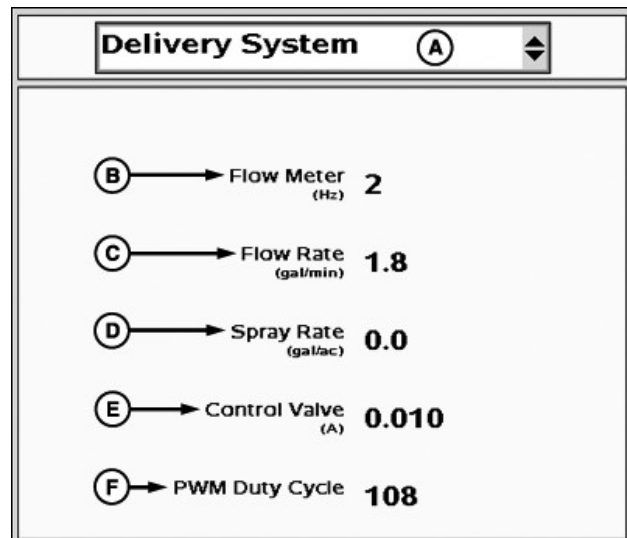
Hardware/Software Readings



PC12606—UN—12MAY10

- A—Readings Selection Drop-Down Menu
- B—Hardware Part Number
- C—Hardware Serial Number
- D—Software Part Number

Delivery System Readings



PC12257—UN—07OCT09

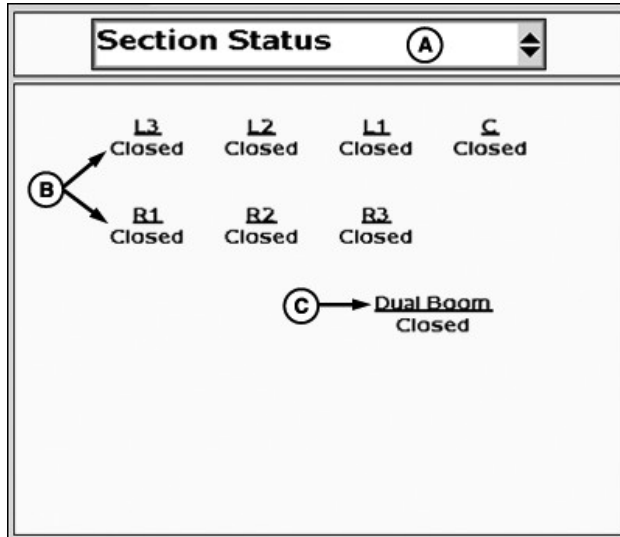
- A—Readings Selection Drop-Down Menu
- B—Flow Meter Frequency
- C—Flow Rate
- D—Spray Rate
- E—Control Valve Current
- F—PWM Duty Cycle

PWM Duty Cycle—This number represents the current position of the PWM / PWM Close Control Valve. The

number will be between the current High and Low Limit settings previously defined by the operator.

JS56696,000070E-19-05APR10

Section Status Readings



PC12258—UN—14SEP09

- A—Readings Selection Drop-Down Menu
B—Section Status
C—Dual Boom Status

NOTE: Section valve current will be displayed for 2-wire section valve.

JS56696,000070F-19-05APR10

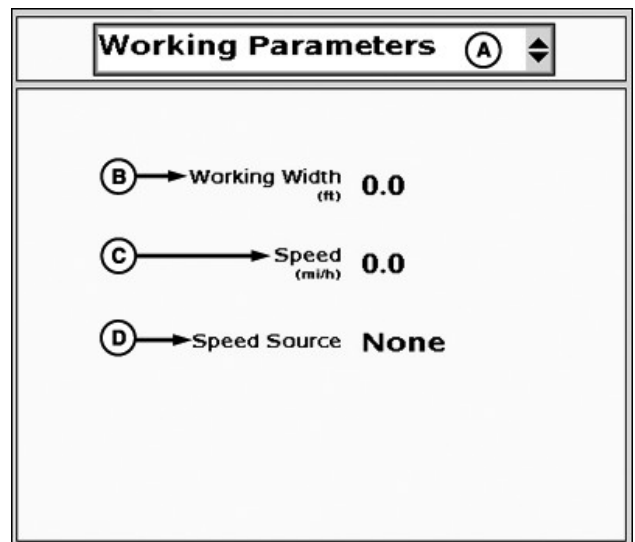
- E—Sensor 3 Power
F—Sensor 4 Power
G—Valve Power
H—Valve 1 Power
I—Valve 2 Power
J—Valve 3 Power
K—Valve 4 Power

NOTE: Sensor Power 4 is not currently used, expected value is 0.

NOTE: Valve Power will be "None" if Valve Power is not connected.

JS56696,0000710-19-05APR10

Working Parameters Readings

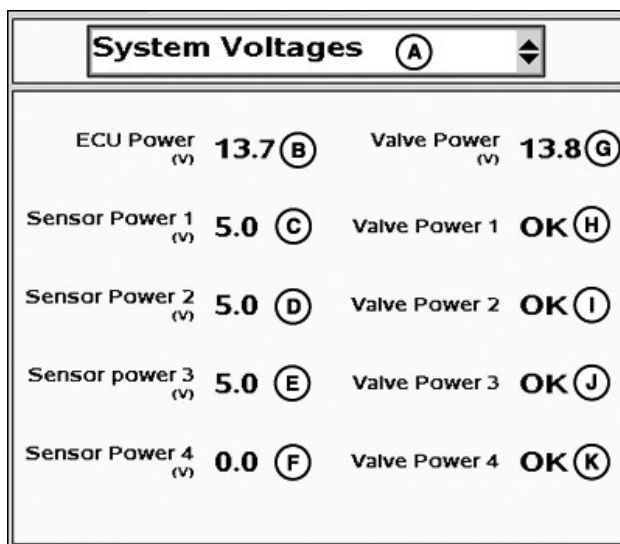


PC12256—UN—06OCT09

- A—Readings Selection Drop-Down Menu
B—Working Width
C—Speed
D—Speed Source

JS56696,0000711-19-05APR10

System Voltages Readings



PC12255—UN—06OCT09

- A—Readings Selection Drop-Down Menu
B—ECU Power
C—Sensor 1 Power
D—Sensor 2 Power

Switches/Status Readings

PC12259—UN—06OCT09

- A—Readings Selection Drop-Down Menu
- B—Master Switch Status
- C—Height Switch Status
- D—Height Switch Voltage

NOTE: Height switch is only available on liquid fertilizer tools.

JS56696,0000712-19-05APR10

NOTE: This option will only be available if a pressure sensor has been configured.

CZ76372,00001F5-19-27OCT10

Tests

PC12607—UN—12MAY10

- A—Readings Tab
- B—Tests Tab
- C—Test Type Drop-Down Menu

JS56696,0000714-19-14OCT09

Calibrate Flowmeter - Catch

PC13156—19—17FEB11

This message will be displayed when any diagnostics test is selected on sprayer or liquid fertilizer applications that will discharge liquid.

HC94949,00004F2-19-01MAY14

Sensors/Status Readings

PC12978—UN—27OCT10

- A—Readings Selection Drop-Down Menu
- B—Pressure Sensor Voltage
- C—Calibration Points
- D—Pressure
- E—Slope

Calibrate Flowmeter - Catch

Calibration Test

- A—Tests Drop-Down Menu
- B—Catch Test Description
- C—Enabled Sections
- D—Left Sections Off
- E—Left Sections ON
- F—Left Fence Row Nozzles
- G—Right Fence Row Nozzles
- H—Right Sections ON
- I—Right Sections OFF
- J—Calibrate Flowmeter

The Calibrate Flowmeter - Catch test allows the operator to catch product and enter the exact amount caught to calibrate the flowmeter.

Catch Test Description (B) - Adjusts the calibration valve by dispensing product into a container without moving the machine and entering amount collected.

Place containers (such as calibration container) under up to 7 nozzles to capture volumes sprayed during the test. Only 7 samples may be entered into the sample volumes popup screen. Calibrating Flowmeter may be repeated as many times as needed if all nozzles are to be tested. By measuring these samples and entering the values into the system, an accurate flowmeter calibration value can be attained. Follow the on-screen instructions as described.

1. Configure the control valve and flowmeter in Setup (Softkey G).
2. Select Calibrate Flowmeter - Catch from the Tests drop-down menu.
3. **Be sure the flowmeter is clean.**

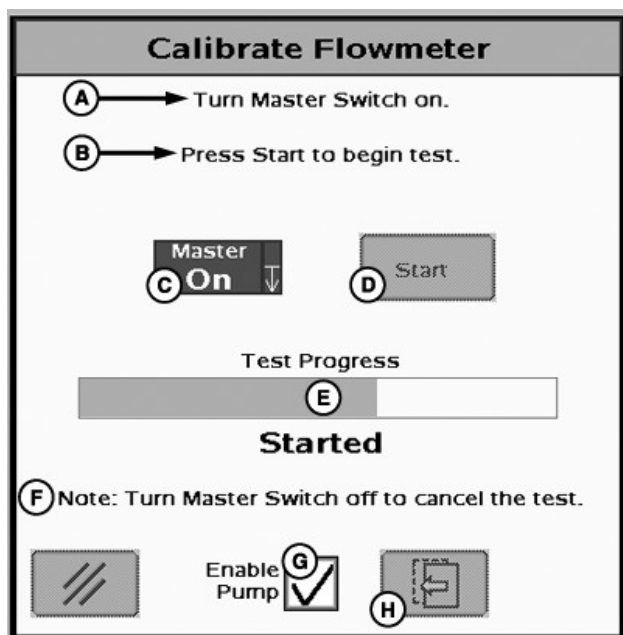
- A—Enter the values below. Test time must be between 10 seconds and 10 minutes.
- B—Number of nozzles that will spray
- C—Test Speed
- D—Rate
- E—Volume to dispense per nozzle
- F—Estimated test time
- G—Next Page

4. Enable the sections to spray and select the Calibrate Flowmeter button.

IMPORTANT: Always fill the solution tank with clean water to do a proper calibration test.

5. Enter calibration test parameters.

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



PC14153—UN—01NOV11

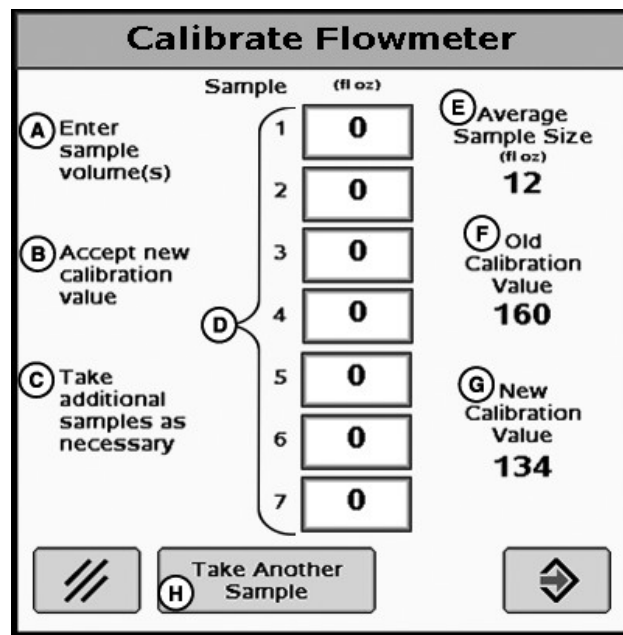
Calibration Test

- A—Turn Master Switch ON.
 B—Select Start to begin test.
 C—Master Switch Indicator
 D—Start Button
 E—Test Progress
 F—Note: Turn Master Switch OFF to cancel the test.
 G—Enable Pump Checkbox
 H—Previous Page

6. Turn Master Switch on, Enable Pump (G), start test, and collect samples.

NOTE: Enable Pump checkbox (G) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

- Ensure sample containers are properly positioned.
- Turn the Master Switch on.
- Check Enable Pump checkbox (G) if it is displayed.
- Select the "Start" button (D) on the screen.



PC12325—UN—07OCT09

- A—Enter Sample Values
 B—Accept New Calibration Value
 C—Take additional Samples As Necessary
 D—Sample Amounts
 E—Average Sample Size
 F—Old Calibration Value
 G—New Calibration Value
 H—Take Another Sample

7. Enter the collected sample volumes on the popup screen.
- Enter the measured amounts collected from each container.
 - If fewer than 7 samples were collected, leave remaining values set to 0.
 - Select "Take Another Sample" if additional samples are desired.
8. Repeat steps 4—7 as necessary.
- If it is desired to collect samples from other sprayer sections and/or nozzles in order to further confirm test results, select the cancel button and repeat steps 4—7.
9. Accept new calibration value.
- Select the accept button to accept the New Calibration Value.
10. Turn Master Switch OFF at any time to cancel test.

BA31779,00002B0-19-10NOV11

Calibrate Flowmeter - Applied

The Calibrate Flowmeter - Applied test allows the operator to apply an amount of product and enter that known amount to calibrate the flowmeter.

Applied Product Test Description: Adjusts the calibration

value by comparing the rate controller's amount applied to the actual amount applied.

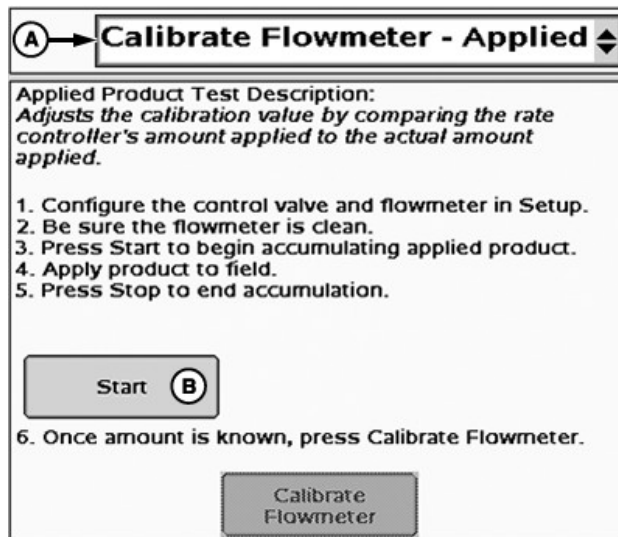


Setup Softkey

PC21157—UN—11MAY15

1. Select the Setup softkey and configure the control valve and flowmeter.

NOTE: Master switch must be OFF to enter data.



PC25193—UN—11JAN18

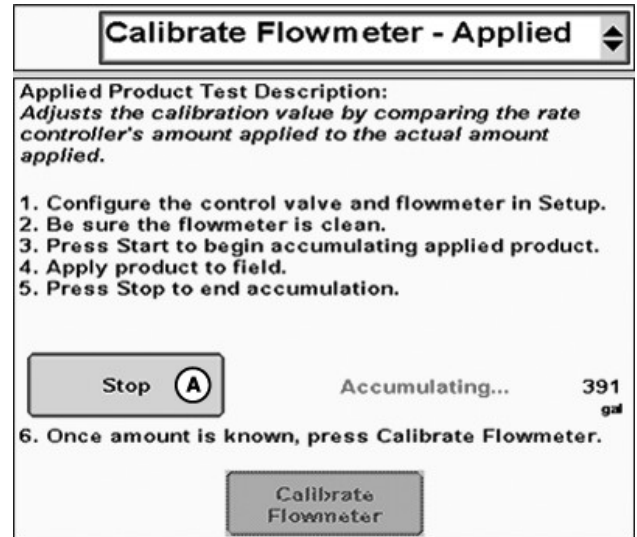
Calibrate Flowmeter - Applied

- A—Tests Drop-Down Menu**
B—Start Button

2. Select Calibrate Flowmeter - Applied from the Tests drop-down menu (A).
3. Ensure that the flowmeter is clean.
4. Select the Start button (B) to begin accumulating applied product.

NOTE: While product is being applied, the operator can navigate away from this page and return once enough product has been applied to complete the calibration.

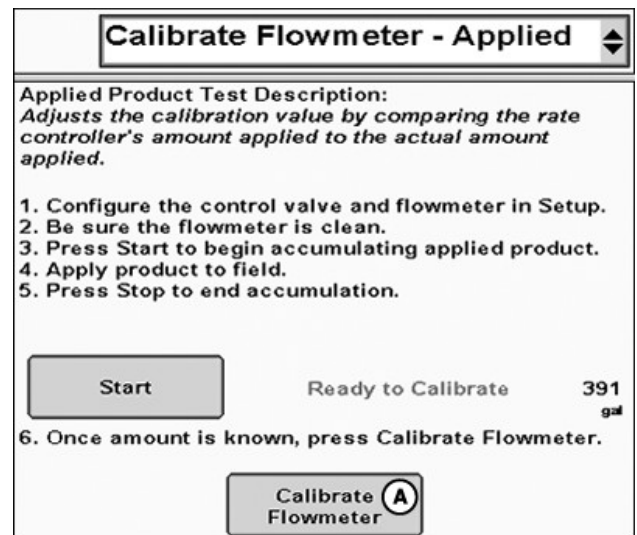
5. Apply product to field.



PC25194—UN—11JAN18

A—Stop Button

6. Select the Stop button (A) to end accumulation.



PC25196—UN—11JAN18

A—Calibrate Flowmeter Button

7. Once amount is known, select the Calibrate Flowmeter button (A).

Calibration Test

Enter amount of product applied and accept new calibration value.

Amount Accumulated by Rate Controller 391 gal

Actual Amount Applied gal (A)

Old Calibration Value 745 New Calibration Value 766

(B)

PC25197—UN—11JAN18

A—Actual Amount Applied Input Box
B—Accept Button

8. Enter the Actual Amount Applied (A).
9. To save the new calibration value, select the Accept button (B).

RW00482.0000205-19-22FEB18

Configuration Test

WARNING

Running this test will discharge liquid from the nozzles.

To avoid injury from exposure to chemicals, use clean water and appropriate personal protective equipment.

If necessary, use the master switch to stop application.

5:36 PM

OK

PC13156—19—17FEB11

This message will be displayed when any diagnostic test is selected on sprayer or liquid fertilizer applications that will discharge liquid.

Configuration Test (A)

1. Turn Master Switch ON
2. Press Start
Note: Turn Master Switch OFF at any time to cancel test

Master (B) On

Start (C) Enable Pump (D) ☒

	Flow (gal/min)	Variance (%)
(E) 1. Test Started	0.0	0
(F) 2. Agitator Test	0.0	0
(G) 3. Section Valve Test	0.0	0
(H) 4. Flow Control Test	0.0	0
(I) 5. Test Complete	0.0	0

PC14154—UN—01NOV11

Configuration Test

A—Tests Drop-Down Menu
B—Master Switch Indicator
C—Start Configuration Test Button
D—Enable Pump Checkbox
E—Test Started
F—Agitator Test
G—Section Valve Test
H—Flow Control Test
I—Test Complete

The operator can run a configuration test to ensure that the system is functioning properly.

IMPORTANT: Always fill the solution tank with clean water to do a proper configuration test.

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

To begin configuration test:

1. Select Configuration test from the tests drop-down menu (A).
2. Turn the Master Switch ON.
3. Enable Pump checkbox (D) if it is displayed.

NOTE: Enable Pump Checkbox (D) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

4. Select Start button (C) on the screen.

When the test is started, the following procedures are automatically performed in sequence:

1. The agitator valve (if equipped) is opened for 15 seconds.
2. Each boom section valve is individually cycled on/off for approximately 6 seconds, starting with the left-

most boom, and moving from left to right then back from right to left. All boom section valves are then turned on for approximately 10 seconds.

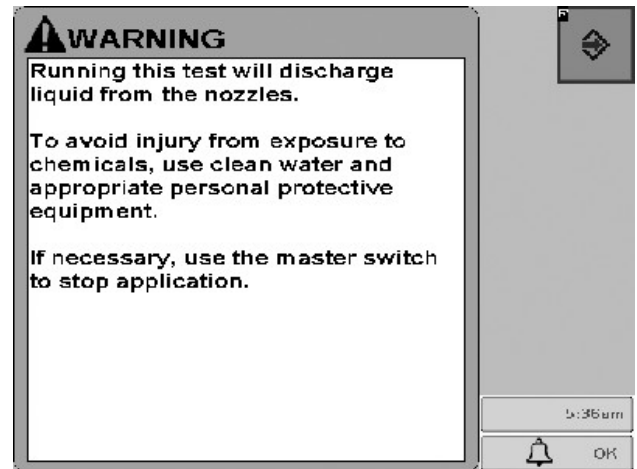
3. The flow control valve is tested across the entire range of flow. The results are displayed on in the Flow / Variance table on the screen. A low Variance % indicates a properly functioning flow control valve.

If the system does not control rate accurately, there are a few things to look for and adjust. (A high variance number in the desired flow 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 specific to your system.
- The lower the Variance (%), the better the GreenStar Rate Controller is able to control at a desired flow rate. There are a few issues that might cause the variance on the configuration test to be inconsistent:
 - Low pump speed (low flow through SCV).
 - The amount of liquid in the sprayer tank. For example, if the liquid in the sprayer tank is low and the back of the sprayer is on a down hill slope, it may not be able to draw in enough liquid to achieve the higher flow rates.
- System operating parameters (example: tractor speed, pump speed, etc.) may need to be adjusted to increase performance at certain levels.

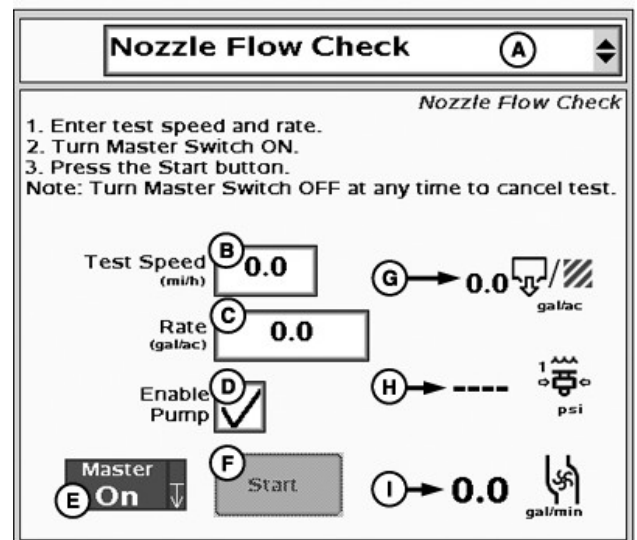
HC94949,00004F3-19-01MAY14

Nozzle Flow Check Test



PC13156—19—17FEB11

This message will be displayed when any diagnostic test is selected on sprayer or liquid fertilizer applications that will discharge liquid.



PC14155—UN—02NOV11

Nozzle Flow Check

- A—Tests Drop-Down Menu
- B—Test Speed Input Box
- C—Rate Input Box
- D—Enable Pump Checkbox
- E—Master Switch Indicator
- F—Start Nozzle Flow Check Button
- G—Rate
- H—Pressure
- I—Flow

Nozzle Flow Check is a procedure to check your application rate at a desired speed while the machine is not moving. The following items can be determined:

- If the actual application rate can meet the target application rate at a given speed.
- The actual flow rate in lpm (gpm) out of the implement section.

- Whether the nozzles are worn.
- The pressure at the spray control valves given a desired speed and application rate.

IMPORTANT: Always fill the solution tank with clean water to do a proper nozzle flow check.

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

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

1. Select Nozzle Flow Check from the tests drop-down menu.
2. Enter a Test Speed such as 10 km/h (6.2 mph).
3. Enter a desired spray "Rate" such a 94 l/hect (10 gal/ac).
4. Set pump to normal operating speed.
5. Turn the Master Switch ON.
6. Check Enable Pump checkbox (D) if it is displayed.

NOTE: Enable Pump Checkbox (D) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

7. Select the Start button on the screen.

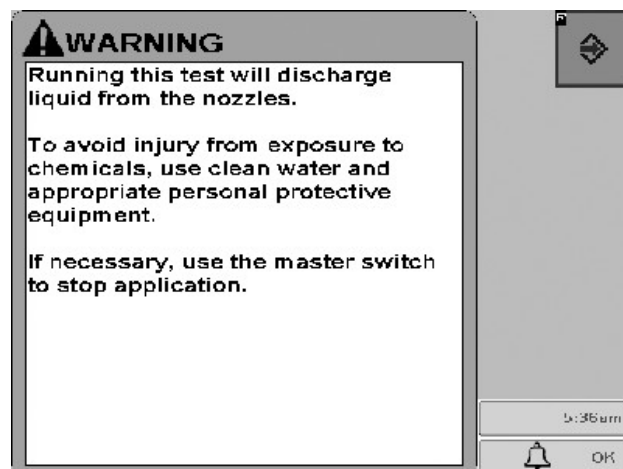
NOTE: Speed and rate can be changed while test is running.

8. If the volume is higher than expected and pressure is lower than expected, nozzle tips could be worn.

If the pressure is higher than expected for the given output, nozzle tips could be partially plugged. Also, a pressure drop could be occurring from the section shut-off valves to nozzle tips (normally only associated with high flow rates.)

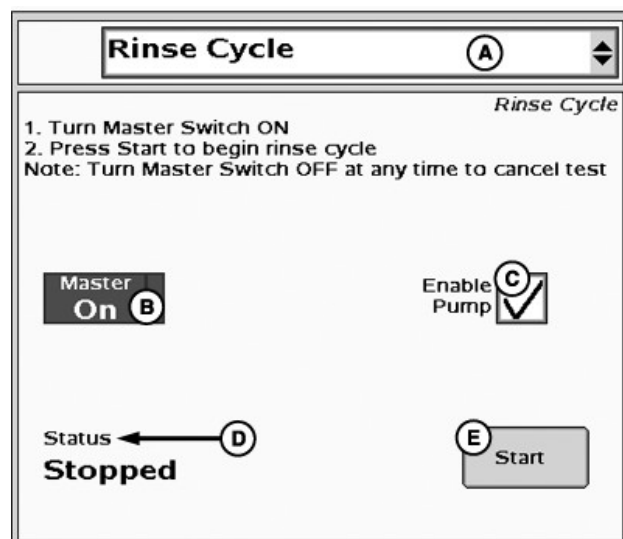
HC94949,00004F4-19-01MAY14

Rinse Cycle



PC13156—19—17FEB11

This message will be displayed when any diagnostic test is selected on sprayer or liquid fertilizer applications that will discharge liquid.



PC14156—UN—02NOV11

Rinse Cycle

- A—Tests Drop-Down Menu
- B—Master Switch Indicator
- C—Enable Pump Checkbox
- D—Rinse Cycle Status
- E—Start Rinse Cycle Button

The operator can select a Rinse Cycle test, which will open all of the section and fence row valves and the flow control valve fully. After pressing the Start button, the system will run until the flow meter detects reduced flow.

IMPORTANT: Always fill the solution tank with clean water to do a proper rinse cycle.

To begin Rinse Cycle:

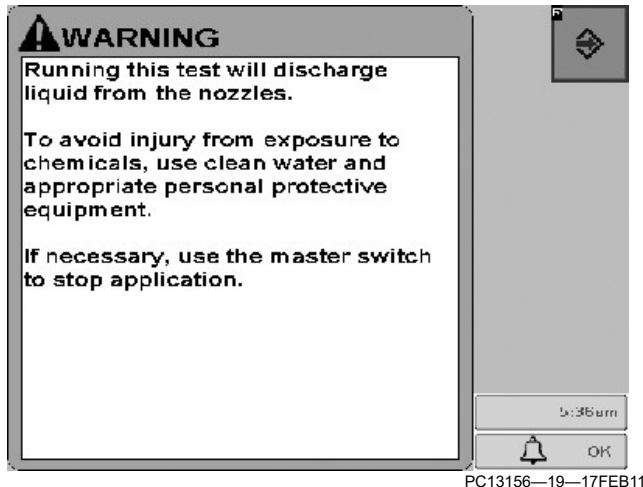
1. Select Rinse Cycle from the tests drop-down menu.
2. Turn the Master Switch ON
3. Check Enable Pump checkbox (C) if it is displayed.

NOTE: Enable Pump checkbox (C) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

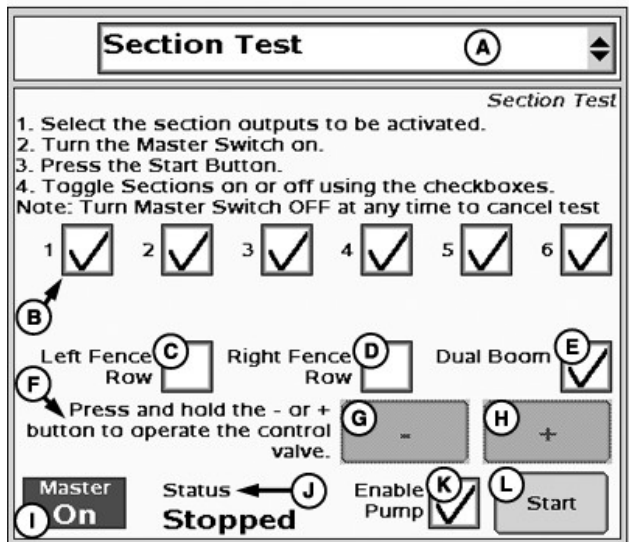
4. Select Start to begin rinse cycle.

HC94949,00004F5-19-01MAY14

Section Test



This message will be displayed when any diagnostic test is selected on sprayer or liquid fertilizer applications that will discharge liquid.



PC14157-UN-02NOV11

Section Test

- A—Test Type Drop-Down Menu
- B—Section Checkboxes
- C—Left Fence Row Check Box
- D—Right Fence Row Check Box
- E—Dual Boom Check Box
- F—Press and hold the - or + button to operate the control valve.
- G— - Button
- H—+ Button
- I—Master Switch Indicator
- J—Test Status
- K—Enable Pump Checkbox

L—Start Section Test Button

To begin Section test:

1. Select Section Test from the tests drop-down menu.
2. Select the section/fence row nozzle outputs to be activated.
3. Turn the Master Switch ON.
4. Check Enable Pump checkbox (K) if it is displayed.

NOTE: Enable Pump checkbox (K) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

5. Select Start button on the screen.
6. Toggle sections/fence row nozzles on or off using the checkboxes.

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

HARDI Section Bypass (Constant Flow) Valves

To set up HARDI Section Bypass (Constant Flow) Valves, follow these instructions:

1. Ensure all sections are turned on and fence row nozzles are turned off
2. Set a normal operating flow rate/pressure using the + and - buttons.
3. Note the pressure on the HARDI pressure gauge located near the section bypass (Constant Flow) valves.
4. Switch off the 1st section (left-most section).
5. Adjust the flow bypass on the first (left-most) valve to restore the gauge pressure to the pressure noted in Step 3.
6. Repeat the process by switching off the next section and restoring the pressure.

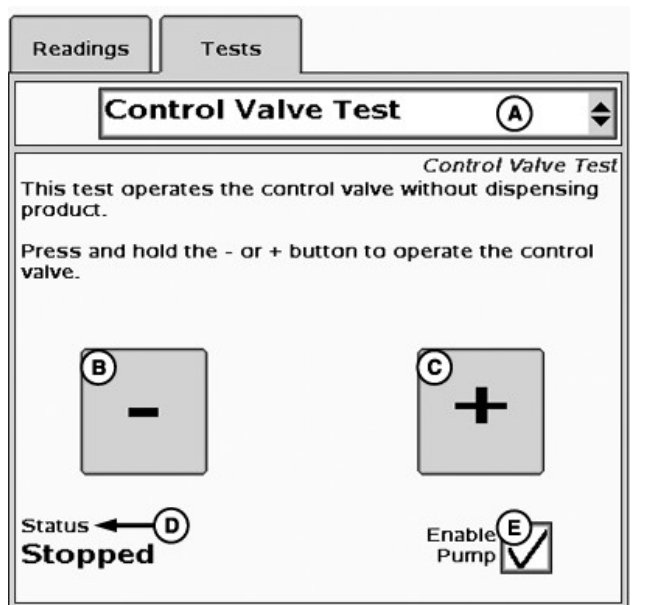
NOTE: Sections that are selected will open while the test is in progress. Non-selected sections will remain closed.

NOTE: Dual boom box will be hidden if dual boom is not configured.

NOTE: Fence row nozzle boxes will be hidden if not configured.

HC94949,00004F6-19-01MAY14

Control Valve Test



PC14160—UN—10NOV11

Control Valve Test

- A—Tests Drop-Down Menu
- B— Button
- C—+ Button
- D—Control Valve Test Status
- E—Enable Pump Check Box
- F—

This test operates the control valve without dispensing product.

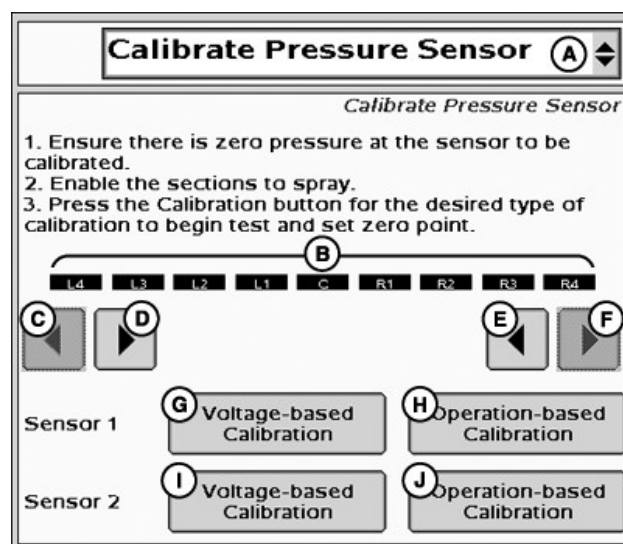
NOTE: This test is not available with Fast Close and PWM Close control valves.

Enable Pump Checkbox (E) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

Press and hold the - or + button to operate the valve.

BA31779,00002CC-19-10NOV11

Calibrate Pressure Sensor



PC13002—UN—04NOV10

Calibrate Pressure Sensor

- A—Tests Drop-Down Menu
- B—Enabled Sections
- C—Left Sections Off
- D—Left Sections ON
- E—Right Sections ON
- F—Right Sections OFF
- G—Sensor 1 Voltage-based Calibration
- H—Sensor 1 Operation-based Calibration
- I—Sensor 2 Voltage-based Calibration
- J—Sensor 2 Operation-based Calibration

The Calibrate Pressure Sensor option is only available in the Tests drop-down menu when at least one Pressure Sensor Enable/Disable box is checked on the Setup >> Systems Tab.

There are two options for calibrating a pressure sensor. The Operation Based Calibration requires that two calibration points be entered and is used when the slope of the pressure sensor is not known. The Voltage Based Calibration can be used when the slope of the pressure sensor is known and only requires a zero point.

- 1.Ensure there is zero pressure at the sensor to be calibrated.
- 2.Enable the sections to spray.
- 3.Press the Calibration button for the desired type of calibration to begin test and set zero point.

Calibrate Pressure Sensor

**Voltage-based
Pressure Sensor 1**

1. Ensure the sensor has 12V power supply.
2. Enter the slope as reported by the implement pressure gauge manufacturer in the box below
3. Select Accept

0.0 ^A mV/psi

PC12999—UN—04NOV10

A—Sensor Slope Input Box

Voltage-based Calibration

1. Ensure the sensor has 12V power supply.

NOTE: Check with sensor manufacturer to ensure that sensor can accept 12V power.

2. Enter the slope as reported by the implement pressure gauge manufacturer in the box below.

3. Select Accept.

NOTE: Sensor power can be connected to the ECU Power pin (pin 26 of 37-pin connector) to provide 12V.

NOTE: For Raven pressure sensors with a 12V power supply the slope will be 16 mV/psi.

Calibrate Pressure Sensor

Operation-based 1 2
Pressure Sensor 1

1. Set the pump to the normal operating speed.
2. Turn master switch on.
3. Proceed to the next step. This will commence product application.

Master Off ^A

Enable Pump ^B ☒

PC14158—UN—02NOV11

Calibrate Pressure Sensor

A—Master Switch Indicator

B—Enable Pump Checkbox

Operation-based Calibration

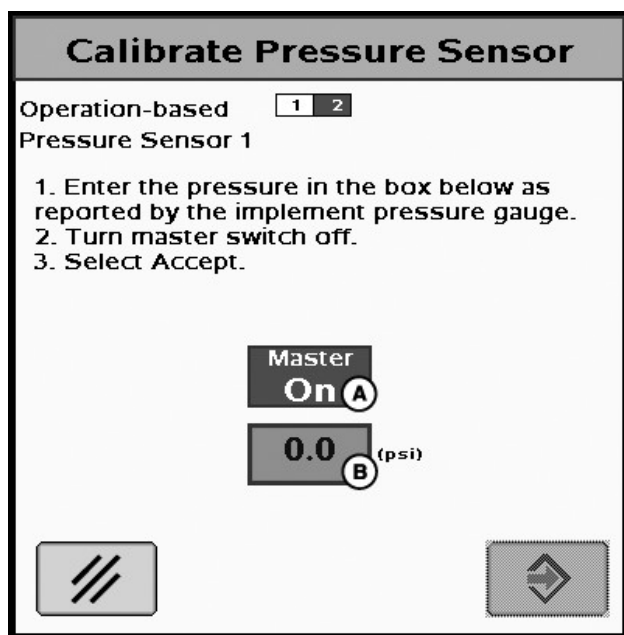
1. Set the pump to the normal operating speed.

2. Turn master switch on.

3. Check Enable Pump checkbox (B) if it is displayed.

NOTE: Enable Pump checkbox (B) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

4. Proceed to the next step. This will commence product application.



PC13001—UN—04NOV10

Calibrate Pressure Sensor

A—Master Switch Indicator

B—Pressure Input Box

1. Enter the pressure in the box below as reported by the implement pressure gauge.

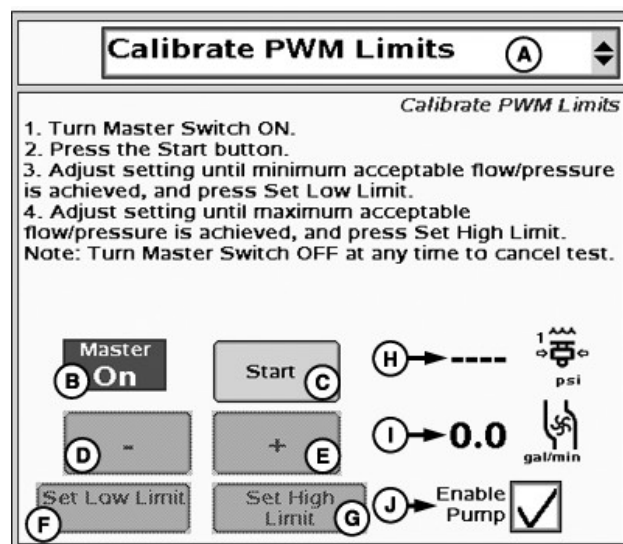
2. Turn master switch off.

3. Select Accept.

NOTE: The system will spray for 30 seconds maximum. Once the system has stabilized the value from the gauge, it must be entered during this period of time.

BA31779,00002B8-19-10NOV11

Calibrate PWM Limits



PC14159—UN—03NOV11

Calibrate PWM Limits

A—Tests Drop-Down Menu

B—Master Switch Indicator

C—Start Button

D—Decrease Button

E—Increase Button

F—Set Low Limit Button

G—Set High Limit Button

H—Pressure

I—Flow

J—Enable Pump

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

1. Turn Master Switch On.

2. Check Enable Pump (J) if it is displayed.

NOTE: Enable Pump (J) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

3. Press the Start Button.

4. Adjust setting until minimum acceptable flow/pressure is achieved, press Set Low Limit.

5. Adjust setting until maximum acceptable flow/pressure is achieved, and press Set High Limit.

BA31779,00002B9-19-03NOV11

Configuring NH3 Tool

Configure NH3 Tool

1. Access GreenStar™ Rate Controller
2. Offsets
3. Implement Setup
4. Implement Selection
5. Set Up Implement Sections
6. Set Up Height Switch CAN Message
7. System Setup
8. Alarm Setup (Optional)
9. Rates Setup
10. Raven Direct Injection Pump Setup (If Equipped)

HC94949,00006B5-19-02FEB15

Access GreenStar™ Rate Controller

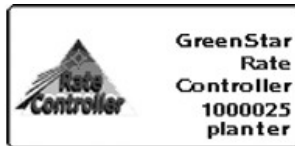
To access the GreenStar™ Rate Controller main page:



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



GreenStar™ Rate Controller button

PC12969—UN—25MAY12

2. Select the GreenStar™ Rate Controller button.

Each GreenStar™ Rate Controller is identified by the control unit serial number and implement name once the setup procedure has been completed.

NOTE: GreenStar™ Rate Controller button appears upon power-up after harness is installed and GreenStar™ Rate Controller is connected.

RW00482,00001F4-19-09JAN18

Offsets

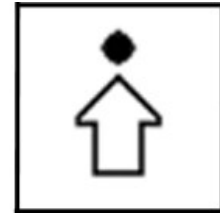
It is necessary to set up machine and implement offsets and John Deere Section Control parameters to optimize GreenStar™ Rate Controller performance.

(Refer to GreenStar™ Display Operator's Manual.)

HC94949,0000726-19-28JAN15

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Implement Setup

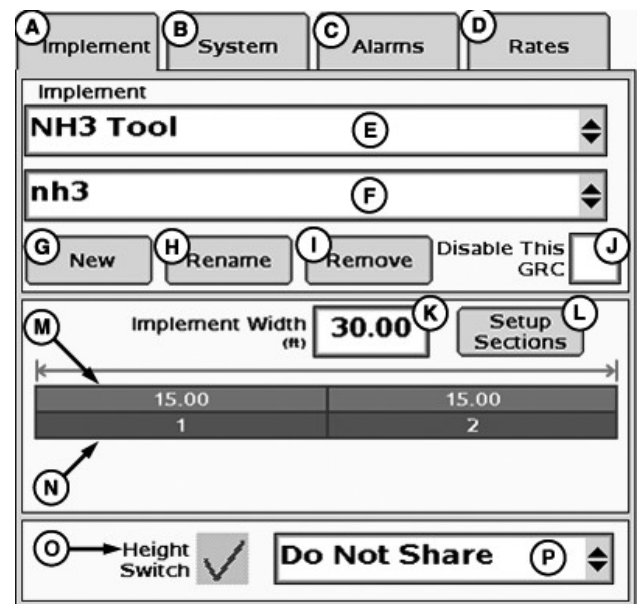


Setup Softkey

PC9419—UN—12SEP06

1. Select Setup.

NOTE: Turn off Master Switch to change most settings or values.



PC12981—UN—28OCT10

- A—Implement Tab
- B—Systems Tab
- C—Alarms Tab
- D—Rates Tab
- E—Implement Type Drop-Down Menu
- F—Implement Name Drop-Down Menu
- G—New Button
- H—Rename Button
- I—Remove Button
- J—Disable Rate Controller Checkbox
- K—Implement Width Input Box
- L—Setup Sections Button
- M—Implement Section Widths
- N—Associated Switchbox Switch Numbers
- O—Height Switch Checkbox
- P—Height Switch Message Drop-Down Menu

2. Select Implement tab (A).

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

HC94949,000067B-19-08DEC14

Implement Selection

Implement
NH3 Tool (B) [dropdown arrow]
nh3 (C) [dropdown arrow]
New (D) Rename Remove Disable This GRC (A)

PC25201—UN—11JAN18

- A—Disable This GRC Checkbox
B—Implement Type Drop-Down Menu
C—Implement Name Drop-Down Menu
D—New Button

NOTE: If GreenStar™ Rate Controller will not be used but remains connected, select the Disable This GRC checkbox (A) to eliminate connection to display for documentation, Section Control, and controller warnings.

Implement name must be defined before the System, Alarms, and Rates tabs are enabled.

1. Select desired Implement type from the drop-down menu (B).
2. Select implement name from the drop-down menu (C) or select the New button (D), and enter the implement name.

630.13
GreenStar Rate Controller
redball
Configure System
Prior to applying, the implement and system setup must be completed.
Go to Setup (A)

PC25180—UN—09JAN18

- A—Accept Button

3. For new setup, select the Accept button (A).

RW00482,0000206-19-22FEB18

Set Up Implement Sections

Implement Width (ft) 30.00 (B) Setup Sections (D)
15.00 15.00
1 2
(C)

PC20504—UN—08DEC14

Setup Sections

- A—Implement Section Widths
B—Implement Width Input Box
C—Associated Switchbox Switch Numbers
D—Setup Sections Button

Initial implement width (A) may be entered into the Implement Width input box (B). The width entered is evenly distributed among sections.

If implement sections are different widths or associated switches (C) are different, select Setup Sections button (D) and follow onscreen instructions. Fence row nozzles are also included under setup sections.

Setup Sections
Enter number of sections then continue to the next page.
5 (A)
18.00 18.00 18.00 18.00 18.00
1 2 3 4 5
(B)

PC20611—UN—17DEC14

PC20612—UN—17DEC14

- A—Number of Sections Input Box
B—Next Button
C—Section Width Input Box
D—Switch Box Input Box

1. Enter number of sections (A).

NOTE: Switchbox information is hidden when no switchbox is connected.

2. Select Next (B) to enter individual section width (C) and associated switch box number (D).

HC94949,00006B3-19-17DEC14

Set Up Height Switch CAN Message

PC20783—UN—03FEB15

Height Switch

A—Height Switch Check Box

If using GreenStar™ Rate Controllers in a multi-product configuration, one rate control unit can share height switch (A) status among multiple control units.

PC20784—UN—03FEB15

Height Switch Message Drop-Down Menu

- B—Do Not Share
C—Send Status
D—Receive Status

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NOTE: Do Not Share (B) can be used if multiple height switches are desired in the application or operating with a single control unit.

1. Connect height switch to one control unit.
2. Configure that control unit to Send Status (C).
3. Configure each additional control unit to Receive Status (D).

RW00482,00001F7-19-09JAN18

System Setup

CAUTION: Selecting the wrong valve type may result in valves opening unexpectedly. To avoid injury from exposure to chemicals, verify the correct valve is selected. Review control valve type before moving GreenStar™ Rate Controller between implements.

1. Select System tab.

PC12277—UN—16SEP09

Control Valve Type



PC10645—UN—11OCT07

Dual Valve System

A—Control Valve Type Drop-Down Menu

2. Select Control Valve Type from drop-down (A).

NOTE: If 2-wire valve is required and not shown in the drop-down, adjust number of implement sections in earlier Implement Setup (see component compatibility section).

PC12985—UN—28OCT10

Control Valve Calibration

- A—Control Valve Calibration
B—Tank Capacity
C—Tank Capacity Displayed
D—Tank Capacity Units

3. Select and enter Control Valve Calibration number (A).

NOTE: Table shows recommended values. Fine-tune control valve calibration valve for optimal performance (see fine-tuning procedure in Troubleshooting section).

4. Select and enter maximum Tank Capacity (B).
5. Select Tank Capacity Displayed from drop-down (C).
6. Select Tank Capacity Units from drop-down (D).

Standard Valve Type	Valve Calibration Number (XYZ)
Raven™ 165	2513
Raven™ 894	2513
Raven™ 125	2513
TeeJet®	1003
HARDI®	7051

Raven is a trademark of Raven Industries Incorporated
TeeJet is a trademark of Spraying Systems Company
HARDI is a trademark of HARDI Midwest Incorporated

Fast-Close Valve Type	Valve Calibration Number (XYZ)
Raven™ 177	0753
HINIKER™ Servo Valve (8160 Monitor Compatible)	0433

HINIKER is a trademark of Hiniker Company

Fast-Close Valve Type	Valve Calibration Number (XYZ)
Raven™ 177	0753
HINIKER™ Servo Valve (8160 Monitor Compatible)	0433

NOTE: These are recommended values. It is recommended to fine tune control valve calibration number for optimal performance (see fine tuning procedure in Troubleshooting section).

PC20626—UN—18DEC14

- A—Flowmeter Calibration Input Box
- B—Flowmeter Units Drop-down Menu
- C—Pressure Sensor 1 Checkbox
- D—Pressure Sensor 2 Checkbox
- E—Calibrate Pressure Sensor Button

7. Select and enter Flowmeter Calibration (A) as stamped on valve.

NOTE: Most flowmeters have an attached tag indicating the recommended calibration number. Enter this number as the initial flowmeter calibration value. It is not necessary to enter an additional product mass conversion value as the controller does it automatically.

8. Select Flowmeter Units from drop-down (B).
9. Select Pressure Sensor 1 (C) if sensor is installed. If using more than one pressure sensor, select Pressure Sensor 2 (D). If a pressure sensor is selected, pressure indicator displays on Menu instead of flow rate.
10. Select Calibrate Pressure Sensor button (E) and follow the onscreen instructions. Once calibration is completed, select Setup softkey to return to System Setup.

(Refer to Sprayers and Liquid Fertilizer Tool Diagnostics.)

HC94949,0000711-19-29JAN15

Alarms Setup (Optional)

PC20610—UN—17DEC14

Alarm Setup

- A—Alarms Tab
- B—Low Tank Level Input Box
- C—High Alarm Input Box
- D—Low Alarm Input Box
- E—Minimum Pressure Input Box
- F—Maximum Pressure Input Box
- G—Minimum Pressure Input Box
- H—Maximum Pressure Input Box
- I—Alarm Checkbox

Alarms allow the operator to predefine alerts for application rate and low tank level. Alarms are percentage based, and alert the operator when the value goes outside of range. For example, if the application rate is set to 100 and the alarm is set at 20, the alert triggers when the application rate is below 80 or above 120.

1. Select Alarms tab (A).
2. Enter Low Tank Level volume (B).
3. Enter High Alarm (C) and Low Alarm (D) percent rates.
4. Enter Minimum pressure (E) and Maximum pressure (F) for Pressure Sensor 1, if equipped.
5. Enter Minimum pressure (G) and Maximum pressure (H) for Pressure Sensor 2, if equipped.
6. Enable desired alarm checkboxes (I).

HC94949,00006B1-19-17DEC14

NOTE: When Actual Nitrogen is enabled, Percent Nitrogen input box appears. Entering a Percent Nitrogen value converts application rates to mass of Nitrogen rather than mass of total product applied.

4. Enable Rate Smoothing (G), and enter user-defined Rate Smoothing percent (H).

NOTE: Rate Smoothing percentage range is 3-15% and system defaults to 3%.

HC94949,00006B0-19-07JAN15

Raven Direct Injection Pump Setup (If Equipped)



Menu Button

PC8663—UN—29APR15

Rates Setup

Implement	System	Alarms	A Rates
Rate 1 B 0.0 Rate 2 C 0.0 Rate 3 D 0.0			
Rate Smoothing G ☒ H 3 % Actual Nitrogen E ☒ Percent Nitrogen F 82			

PC20608—UN—17DEC14

- A**—Rates Tab
B–D—Target Rate Input Boxes
E—Actual Nitrogen Checkbox
F—Percent Nitrogen Input Box
G—Rate Smoothing Checkbox
H—Rate Smoothing Percentage Input Box

1. Select Rates tab (A).
2. Input Target Rates (B–D).

NOTE: Values entered on this page are available on the home page.

3. Enable Actual Nitrogen (E) and input Percent Nitrogen (F), if needed.

1. Select the Menu button.



Raven Pump Buttons

PC25314—UN—09FEB18

2. Select the Raven Pump button. If multiple pumps are used, set up each pump individually.

(Reference Raven Sidekick™ Pro Operator's Manual for the pump setup.)

NOTE: If more than one pump is being used, ensure that the pumps do not have the same pump number.

Raven Sidekick is a trademark of Deere & Company



Menu Button

PC8663—UN—29APR15

3. Select the Menu button.



GreenStar™ Rate Controller Button

PC15160—UN—25MAY12

4. Select the GreenStar™ Rate Controller button.

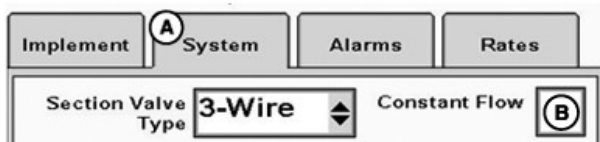


Setup Softkey

PC21157—UN—11MAY15

5. Select the Setup softkey to enter the control unit setup.

NOTE: Turn OFF master switch to change most settings or values.



System Tab

PC20508—UN—09DEC14

- A—System Tab**
B—Constant Flow Checkbox

6. Select the System tab (A).
7. If Raven Sidekick™ Pro is being used on a sprayer or liquid fertilizer tool, uncheck the Constant Flow checkbox (B).



Direct Injection Pump Softkey

PC14938—UN—03MAY12

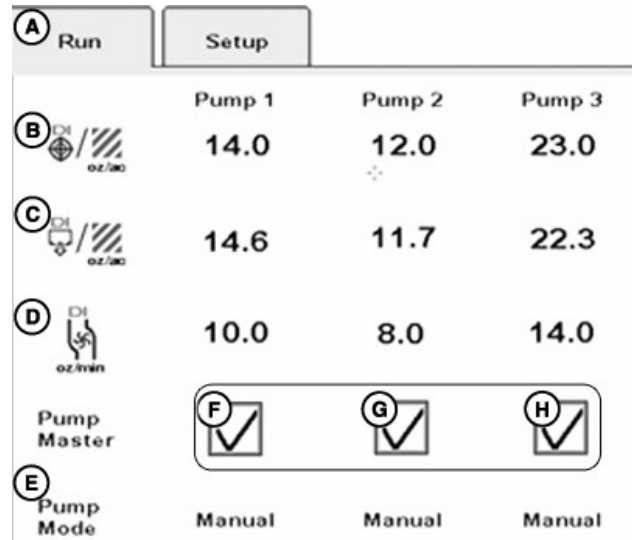
8. Select the Direct Injection Pump softkey.



PC20374—UN—04DEC14

- A—Setup Tab**
B—Enable Direct Injection Communication Checkbox

9. On Setup tab (A), select the Enable Direct Injection Communication checkbox (B).



PC20618—UN—18DEC14

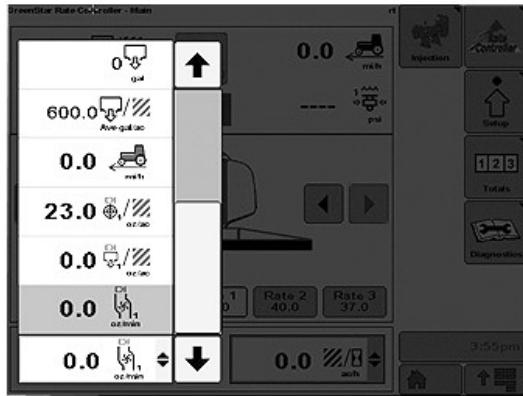
- A—Run Tab**
B—Target Rate
C—Applied Rate
D—Flow Rate
E—Pump Mode
F—H—Pump Master Checkboxes

10. Run tab (A) displays values based on the initial Raven setup screens:

- Target rate (B)
- Applied rate (C)
- Flow rate (D)
- Pump mode (E)

NOTE: Select the Raven Pump softkey to adjust values.

11. Enable pumps by selecting the checkboxes (F–H).



PC14941—UN—02MAY12

GreenStar™ Rate Controller Main Run Page

NOTE: Rates can be viewed on GreenStar™ Rate Controller main run page by selecting the desired rate from the information drop-down menus.

RW00482.00001F9-19-21FEB18

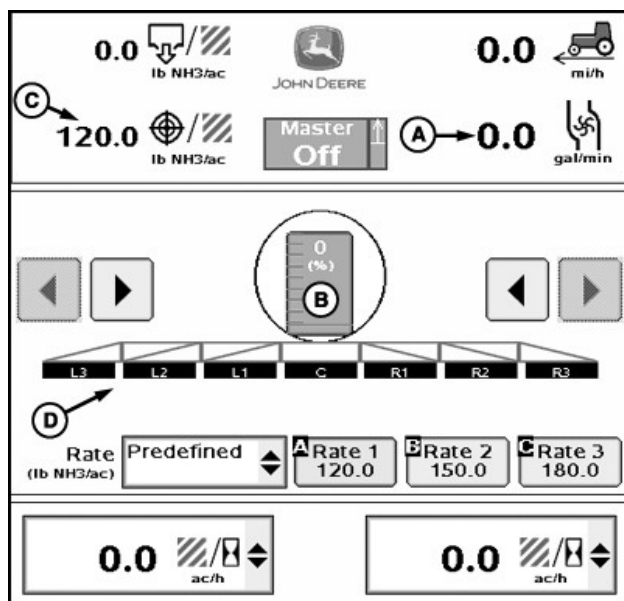
Operating NH3 Tool

GreenStar™ Rate Control NH3 Tool – Sprayer and Liquid Fertilizer

1. Verify User-Defined Values
2. Rate Control
3. Implement Section States
4. Refilling Tank
5. Activate and Deactivate System
6. Monitor System Performance
7. Rinse Cycle (see NH3 Tool Diagnostics section)

HC94949,00006AE-19-26JAN15

Verify User-Defined Values



PC20752—UN—29JAN15

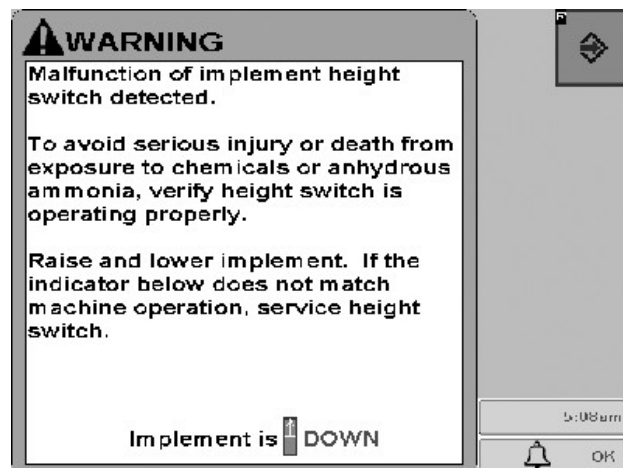
- A—Flow (Volume Per Time)
B—Tank Levels Button
C—Target Rate
D—Section Indicators

NOTE: Pressure (A): Pressure from pressure sensor 1 is displayed instead of flow if system is configured for a pressure sensor.

1. Verify tank levels (B) for accuracy.
2. Verify target rate (C).
3. Verify section indicators (D) for accuracy.

HC94949,00006AC-19-29JAN15

Malfunction of Implement Height Switch Detected

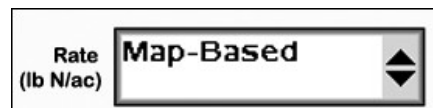


PC13147—19—17FEB11

This message will be displayed on a NH3 system when the system detects the implement is down for an extensive period of time, which can indicate a failure in the height switch. To verify correct operation, follow the instructions. If the height switch indicator does not match machine operation, service height switch.

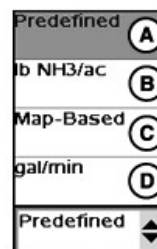
HC94949,00004F7-19-01MAY14

Rate Control



PC20624—UN—05JAN15

Rate Drop-Down Menu



PC20621—UN—05JAN15

- A—Predefined
B—lb NH3/ac
C—Map-Based
D—gal/min

Implement Section and Rate Control

Select an available rate type (A–D) from the Rate drop-down menu.

Predefined Rates



PC20622—UN—05JAN15

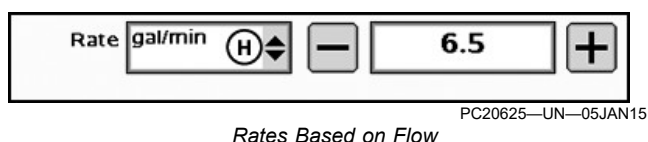
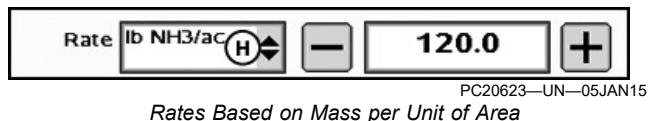
Predefined Rates

E—Predefined Rate 1 Button
F—Predefined Rate 2 Button
G—Predefined Rate 3 Button

Predefined rates are limited to a maximum of three. These rates can be set up on the Rates tab.

The letters on the top left corner of each rate button (E–G) represent the shortcut softkeys that are available when using a display control. (For more information, see GreenStar™ 3 2630 Display Operator's Manual.)

Rates Based on Mass Per Unit of Area



H—Predefined Rate Selection Drop-Down Menu

A rate based on mass per unit of area can be set by choosing one of the items from the Rate Selection drop-down menu (H). This rate mode ensures a consistent application rate over an area, as working width and machine speed are adjusted.

- lb N/ac or lb NH3/ac (US units)
- kg N/ha or kg NH3/ha (Metric units)
- lb N/ac or lb NH3/ac (Imperial units)

For lb. N/ac or kg N/ha, ensure Actual Nitrogen box is checked on the Rates tab.

Map-Based Rates

To run map-based rates, select a prescription in GreenStar™ documentation. Map-based only appears in the drop-down menu if a prescription is selected.

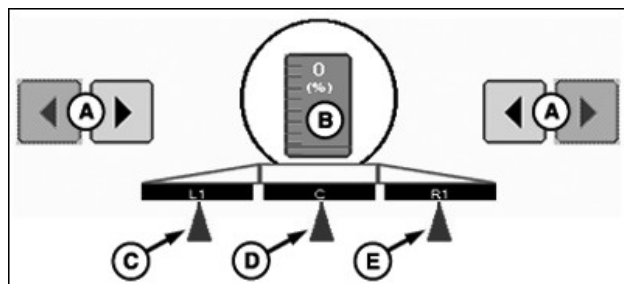
Rates Based on Flow

A rate based on flow can be set by choosing one of the items from the Rate Selection drop-down menu. This rate mode ensures a constant flow rate, regardless of changes in machine speed. A decrease in rate may be visible when sections are disabled.

- gal/min (US units)
- L/min (Metric units)
- l Gal/min (Imperial units)

RW00482,0000207-19-20FEB18

Implement Section States



PC12282—UN—16SEP09

Implement Sections Spraying

A—Section ON/OFF Buttons
B—Tank Level/Tank Refill
C—Left Section Active
D—Center Section Active
E—Right Section Active

Implement sections can be in one of three states:

- Disabled—Section is disabled.
- Enabled—Section is enabled.
- Active—Section is applying.

Section on/off buttons (A) enable or disable one section at a time from left to right or right to left. The operator can also enable/disable sections with the switch box in the cab.

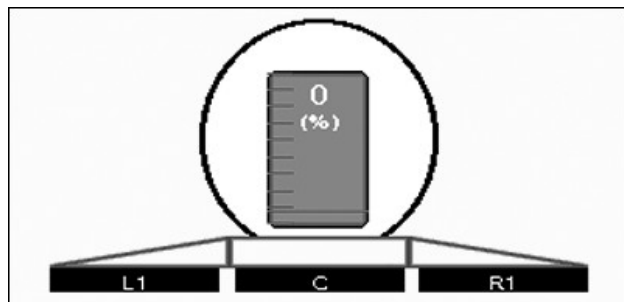
Section nozzles have colored triangle indications under implement sections to show active status.

Enabled sections have black fill color indication. Sections that are in the off state have white fill color indication.

Active sections have blue fill color triangle indication under the section.

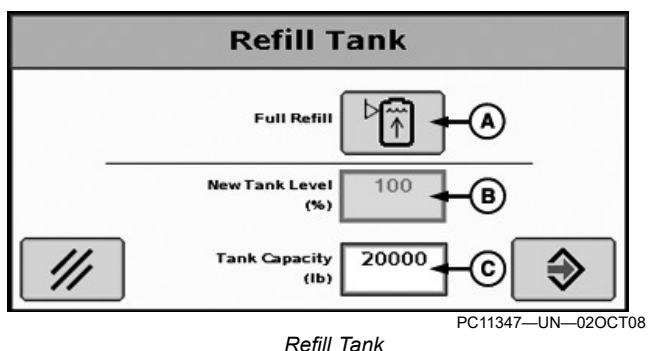
HC94949,00006AA-19-17DEC14

Refilling Tank



PC12283—UN—16SEP09

Volume Remaining/Refill Button



- A—Full Refill Button
B—New Tank Level Input Box
C—Tank Capacity Input Box

1. Reset estimated tank level after refilling.
2. Select estimated volume remaining/refill button.
3. If volume after refilling is full, select Full Refill (B). This sets tank level to defined tank capacity.
4. If only partially filling tank, enter new tank level by pressing new tank level button and input estimated value. If tank size has changed, enter new tank capacity.

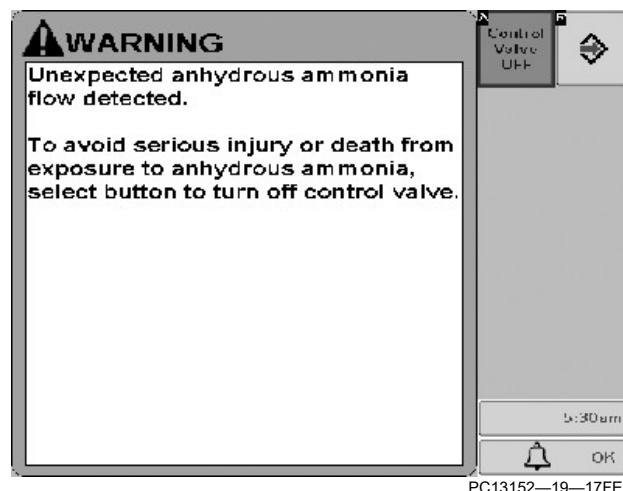
HC94949,0000712-19-03FEB15

Activate and Deactivate System

1. To activate system:
 - Switchbox: Turn master switch to On position.
 - Foot switch: Press switch.
2. To deactivate system:
 - Switchbox: Turn master switch to Off position.
 - Foot switch: Press switch.

HC94949,0000713-19-28JAN15

Unexpected NH3 Flow Detected

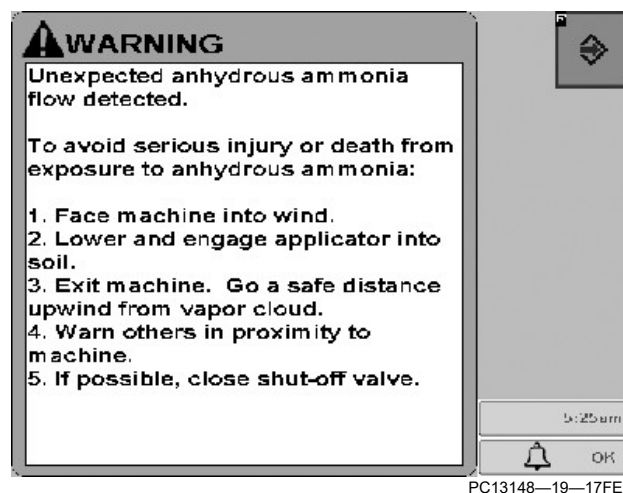


This message will be displayed if the GreenStar Rate Controller has attempted to close the On/Off valve but still detects flow. If the Control Valve OFF button is selected, the system will also attempt to shut off the control valve.

NOTE: This message will only be displayed when using a dual valve system (i.e the control valve type is Standard or Fast).

HC94949,00004F8-19-01MAY14

Unexpected NH3 Flow Detected

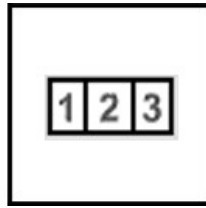


This message will be displayed if the GreenStar Rate Controller has attempted to close all valves but still detects flow. To reduce risk of injury, follow the instructions on the screen.

HC94949,00004F9-19-01MAY14

Viewing NH3 Tool Reports and Totals

Reports and Totals

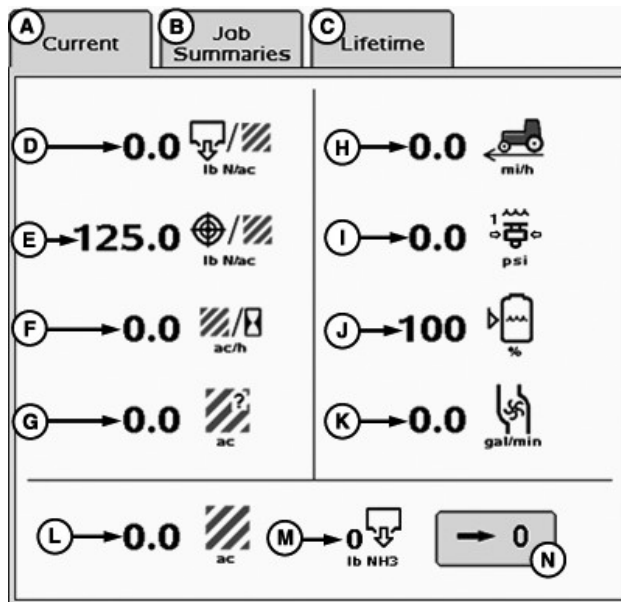


Reports and Totals Softkey

PC9669—UN—26OCT06

Select the Reports and Totals softkey.

Current



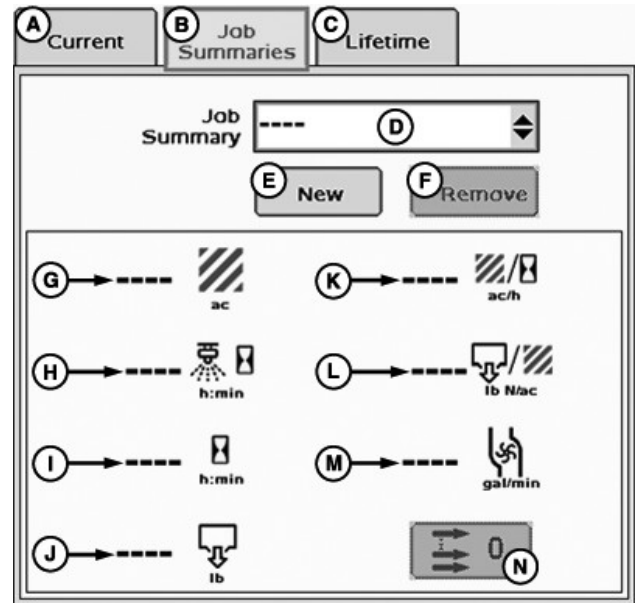
Current Tab

PC12988—UN—28OCT10

- A—Current Tab
- B—Job Summaries Tab
- C—Lifetime Tab
- D—Actual Rate Per Area
- E—Target Rate Per Area
- F—Area Per Hour
- G—Area Remaining on Current Tank Level
- H—Travel Speed
- I—Pressure Sensor 1
- J—Volume Remaining
- K—Flow Per Minute
- L—Area
- M—Amount of Product Applied
- N—Reset Counter Button

The current page displays instant values.

Job Summaries



Job Summaries Tab

PC12341—UN—14OCT09

- A—Current Tab
- B—Job Summaries Tab
- C—Lifetime Tab
- D—Job Summary Drop-Down Menu
- E—New Button
- F—Remove Button
- G—Area
- H—Time Spent Applying
- I—Total Hours Spent on Job
- J—Volume
- K—Average Area Per Hour
- L—Average Volume Per Area
- M—Average Flow Per Minute (Flow rate)
- N—Zero Button

The job summaries page tracks totals listed on the job page. Only values for the currently selected job summary are incremented.

Job summaries are stored on the control unit. The control unit can store up to six different jobs for each configuration.

To create a new job:

1. Select the New button (E).
2. Enter a name for the current job.

Jobs that are no longer needed may be deleted by selecting the job and pressing the Remove button (F).

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

Lifetime

A Current

B Job Summaries

C Lifetime

NH3 Tool

1Single Sec NH3

D → 63 ac E → 1:37 h:min	F → 7405 lb G → 150:35 h:min
---	---

PC12342—UN—14OCT09

Lifetime Tab

- A—Current Tab
- B—Job Summaries Tab
- C—Lifetime Tab
- D—Total Area
- E—Time Spent Applying
- F—Total Volume
- G—Total Hours

The lifetime page tracks all totals for the lifetime of the implement selected.

RW00482,0000229-19-22FEB18

NH3 Tool Diagnostics

Diagnostic Page



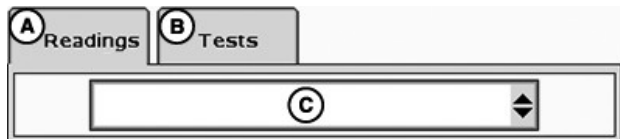
Diagnostics Softkey

PC9431—UN—14SEP06

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

JS56696,000072E-19-05APR10

Readings



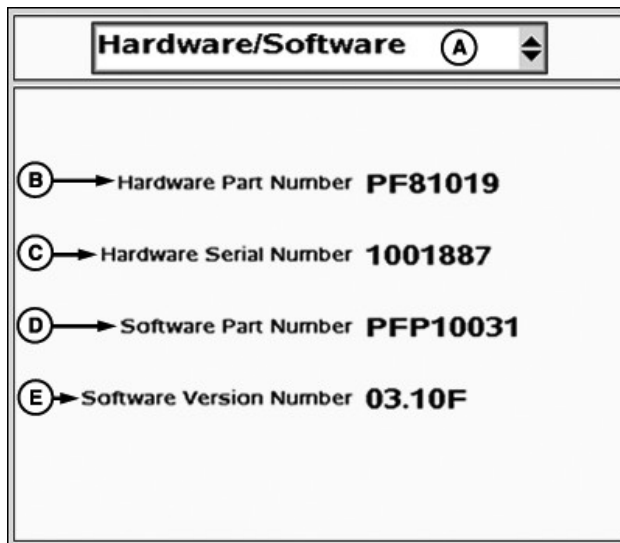
PC12286—UN—16SEP09

- A—Readings Tab
- B—Tests Tab
- C—Reading Type Drop-Down Menu

Select Readings tab to display GreenStar Rate Controller readings.

JS56696,000072F-19-05APR10

Hardware/Software Readings

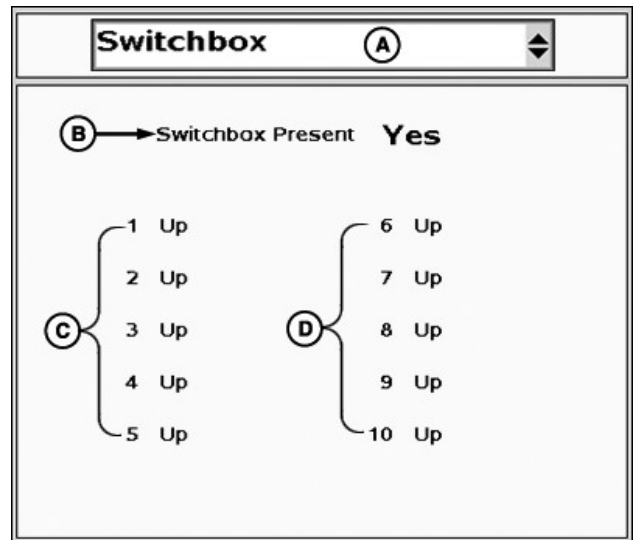


PC12616—UN—13MAY10

- A—Readings Selection Drop-Down Menu
- B—Hardware Part Number
- C—Hardware Serial Number
- D—Software Part Number
- E—Software Version Number

JS56696,0000730-19-14OCT09

Switchbox Readings



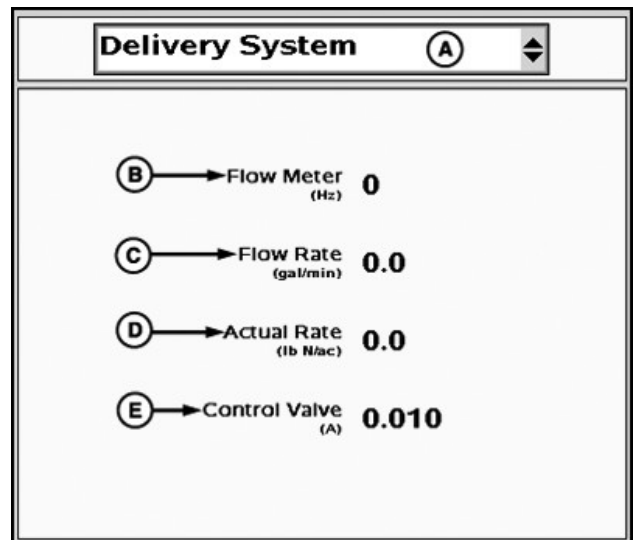
PC12251—UN—06OCT09

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

JS56696,0000731-19-05APR10

Delivery System Readings



PC12289—UN—06OCT09

Delivery System Readings

- A—Readings Selection Drop-Down Menu
- B—Flow Meter Frequency
- C—Flow Rate
- D—Spray Rate
- E—Control Valve Current

Actual Rate - The Actual Nitrogen Check Box on the Rates Tab will determine the units that are referenced

for the Actual Rate. Check this box for lb N/ac. Uncheck this box for lb NH3/ac.

JS56696,0000732-19-13MAY10

Section Status Readings

PC12565—UN—13MAY10

Section Status Readings

A—Readings Selection Drop-Down Menu
B—Section Status

JS56696,0000733-19-13MAY10

System Voltages Readings

PC12291—UN—06OCT09

System Voltages Readings

A—Readings Selection Drop-Down Menu
B—ECU Power
C—Sensor 1 Power
D—Sensor 2 Power
E—Sensor 3 Power
F—Sensor 4 Power

G—Valve Power
H—Valve 1 Power
I—Valve 2 Power
J—Valve 3 Power
K—Valve 4 Power

NOTE: Sensor Power 4 is not currently used, expected value is 0.

NOTE: Valve Power will be "None" if Valve Power is not connected.

JS56696,0000734-19-05APR10

Working Parameters Readings

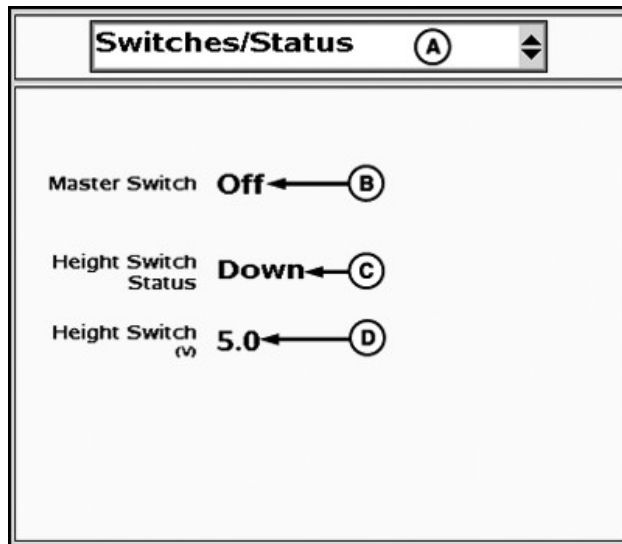
PC12292—UN—06OCT09

Working Parameters Readings

A—Readings Selection Drop-Down Menu
B—Working Width
C—Speed
D—Speed Source

JS56696,0000735-19-05APR10

Switches/Status Readings

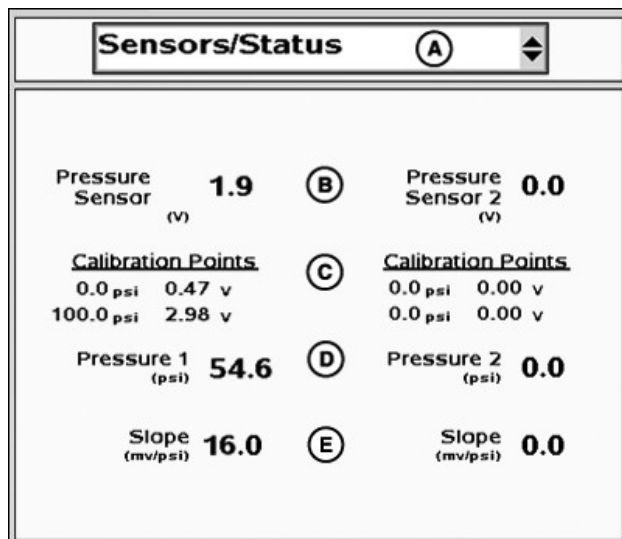


- A—Readings Selection Drop-Down Menu
 B—Master Switch Status
 C—Height Switch Status
 D—Height Switch Voltage

PC12293—UN—06OCT09

JS56696,0000736-19-05APR10

Sensors/Status Readings



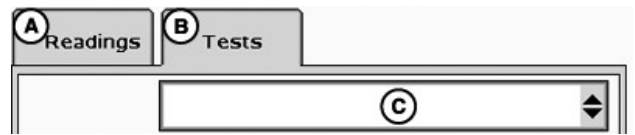
- A—Readings Selection Drop-Down Menu
 B—Pressure Sensor Voltage
 C—Calibration Points
 D—Pressure
 E—Slope

PC12978—UN—27OCT10

NOTE: This option will only be available if a pressure sensor has been configured.

CZ76372,0000204-19-28OCT10

Tests



PC12295—UN—13MAY10

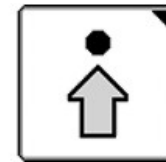
- A—Readings Tab
 B—Tests Tab
 C—Test Type Drop-Down Menu

JS56696,0000738-19-13MAY10

Calibrate Flowmeter - Applied

The Calibrate Flowmeter - Applied test allows the operator to apply an amount of product and enter that known amount to calibrate the flowmeter.

Applied Product Test Description: Adjusts the calibration value by comparing the rate controller's amount applied to the actual amount applied.

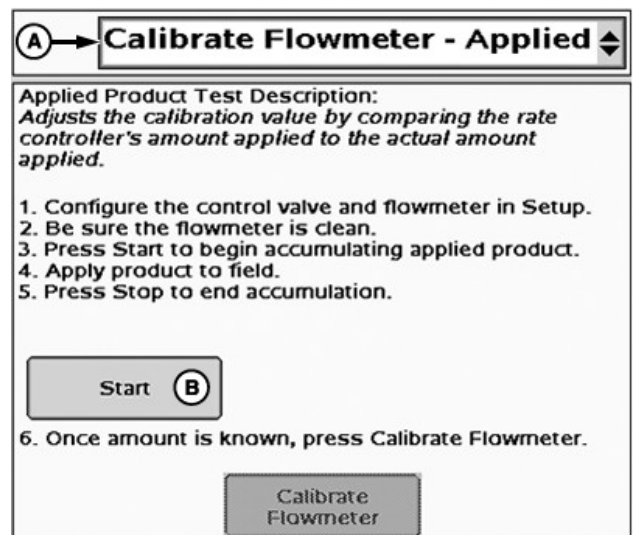


Setup Softkey

PC21157—UN—11MAY15

1. Select the Setup softkey and configure the control valve and flowmeter.

NOTE: Master switch must be OFF to enter data.



PC25193—UN—11JAN18

Calibrate Flowmeter - Applied

- A—Tests Drop-Down Menu
 B—Start Button

2. Select Calibrate Flowmeter - Applied from the Tests drop-down menu (A).

3. Ensure that the flowmeter is clean.
4. Select the Start button (B) to begin accumulating applied product.

NOTE: While product is being applied, the operator can navigate away from this page and return once enough product has been applied to complete the calibration.

5. Apply product to field.

PC25211—UN—12JAN18

A—Stop Button

6. Select the Stop button (A) to end accumulation.

PC25212—UN—12JAN18

A—Calibrate Flowmeter Button

7. Once amount is known, select the Calibrate Flowmeter button (A).

PC25213—UN—12JAN18

A—Actual Amount Applied Input Box

B—Accept Button

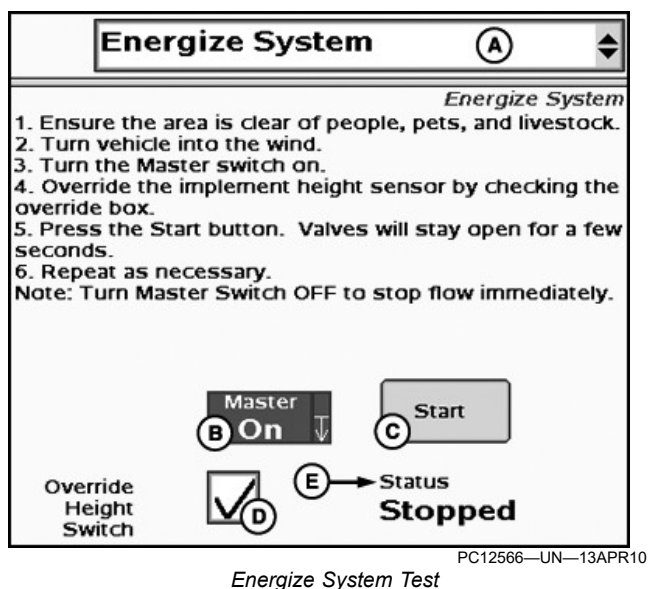
8. Enter the Actual Amount Applied (A).
9. To save the new calibration value, select the Accept button (B).

RW00482.0000209-19-22FEB18

Energize System

PC13151—19—17FEB11

This message will be displayed when the Energize System test is selected on NH3 systems.



Energize System Test

- A—Tests Drop-Down Menu
 B—Master Switch Indicator/Implement Height Switch Indicator
 C—Start Energize System Test Button
 D—Override Height Switch Enable/Disable
 E—Energize System Status

The Energize System procedure is used to test for flow at the openers, purge air and vapor from the NH3 delivery system and fill the cooler and hoses with liquid anhydrous. Upon pressing the start button, the control valve and section valve(s) will be fully opened for a few seconds, after which time they will automatically close. The Master Switch can be turned off at any time to immediately force the valves to return to the closed position.

NOTE: Turn Master Switch OFF to stop flow immediately.

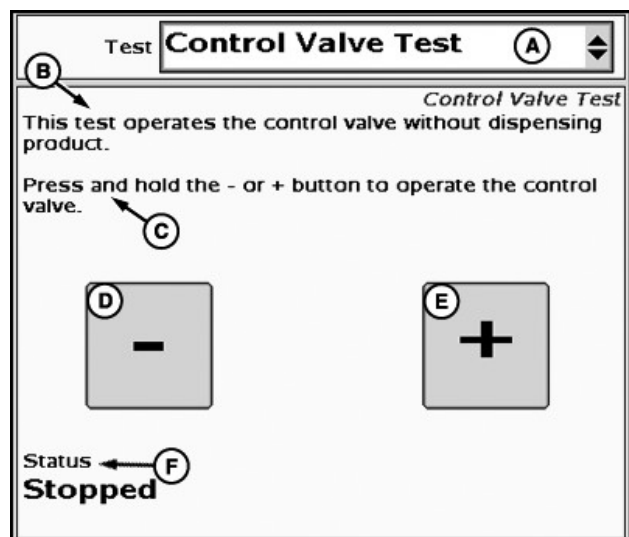
To begin Energize System test:

1. Select Energize System from the tests drop-down menu.
2. Ensure the area is clear of people, pets, and livestock.
3. Turn vehicle into the wind.
4. Turn the Master Switch ON
5. Override the implement height switch sensor by checking the override box.
6. Select the Start button. Valves will stay open for a few seconds.
7. Repeat as necessary.
8. Turn Master Switch OFF to stop flow immediately.

NOTE: The override height switch box must be checked each time the test is run.

HC94949,00004FA-19-01MAY14

Control Valve Test



Control Valve Test

- A—Tests Drop-Down Menu
 B— Button
 C—+ Button
 D—Control Valve Test Status

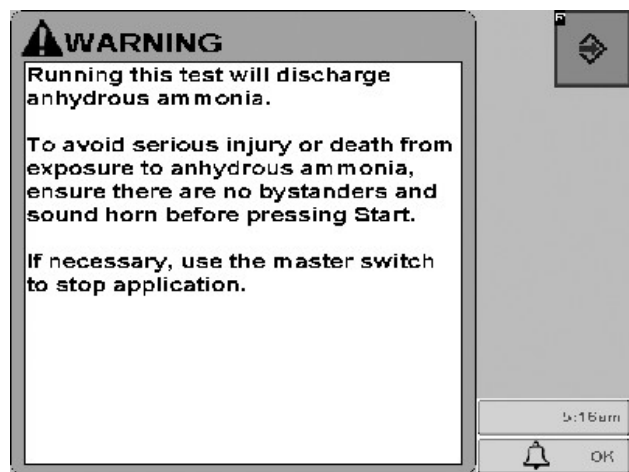
This test operates the control valve without dispensing product.

Press and hold the - or + button to operate the valve.

NOTE: Not available for Fast Close control valve type.

JS56696,000073A-19-05APR10

Bleed Section Test



PC13151—19—17FEB11

This message will be displayed when the Energize System test is selected on NH3 systems.

Bleed Section Test

1. Ensure the area is clear of people, pets, and livestock.
 2. Turn vehicle into the wind.
 3. Select the section outputs to be activated.
 4. Turn the Master switch on.
 5. Override the implement height sensor by checking the override box.
 6. Press the Start button.
 7. Toggle sections on or off using checkboxes.
 Note: Turn Master Switch OFF to stop flow immediately.

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐
 7 ☐ 8 ☐ 9 ☐ 10 ☐ Master Section On/Off ☐

Master Off ☐ Override Height Switch ☐ Start Status **Stopped**

PC12299—UN—22SEP09

Bleed Section Test

- A—Tests Drop-Down Menu
 B—Section output Checkboxes
 C—Master Section ON/OFF Checkbox
 D—Master Switch Indicator
 E—Override Height Switch Checkbox
 F—Start Bleed Section Test
 G—Bleed Section Test Status

The Bleed Section Test allows the operator to bleed trapped anhydrous ammonia from high pressure lines between section valves and the control valve while remaining seated in the cab.

NOTE: Turn Master Switch OFF to stop flow immediately.

1. Select Bleed Section Test from the tests drop-down menu.
2. Ensure the area is clear of people, pets, and livestock.
3. Turn vehicle into the wind.
4. Select the section outputs to be activated.
5. Turn the Master Switch on.
6. Override the implement height sensor by checking the override box.
7. Press the Start button.
8. Toggle sections on or off using the checkboxes.

Master Section On/Off Check Box - This check box is displayed when the control valve type is Standard or Fast. The operator can check this box if a Master Section Valve is present and it needs to be activated for the test.

HC94949,00004FB-19-01MAY14

Calibrate Pressure Sensor

Calibrate Pressure Sensor

1. Ensure the NH3 tank is disconnected from the control valves and the pressure sensor is at atmospheric pressure.
 2. Press the Calibration button for the desired type of calibration to begin test and set zero point.

Sensor 1 Voltage-based Calibration Operation-based Calibration
 Sensor 2 Voltage-based Calibration Operation-based Calibration

PC13003—UN—04NOV10

Calibrate Pressure Sensor

- A—Tests Drop-Down Menu
 B—Sensor 1 Voltage-based Calibration
 C—Sensor 1 Operation-based Calibration
 D—Sensor 2 Voltage-based Calibration
 E—Sensor 2 Operation-based Calibration

The Calibrate Pressure Sensor option is only available in the Tests drop-down menu when at least one Pressure Sensor Enable/Disable box is checked on the Setup >> Systems Tab.

There are two options for calibrating a pressure sensor. The Operation Based Calibration requires that two calibration points be entered and is used when the slope of the pressure sensor is not known. The Voltage Based Calibration can be used when the slope of the pressure sensor is known and only requires a zero point.

1. Ensure the NH3 tank is disconnected from the control valves and the pressure sensor is at atmospheric pressure.
2. Press the Calibration button for the desired type of calibration to begin test and set zero point.

Calibrate Pressure Sensor

Voltage-based
Pressure Sensor 1

1. Ensure the sensor has 12V power supply.
2. Enter the slope as reported by the implement pressure gauge manufacturer in the box below
3. Select Accept

0.0 ^A mV/psi




PC12999—UN—04NOV10

Calibrate Pressure Sensor

Calibrate Pressure Sensor

Operation-based 1 2
Pressure Sensor 1

1. Connect the NH3 tank to the control valves.
2. Energize the system.
3. Permit the sensor to come to tank pressure.

0.0 ^A (psi)




PC13004—UN—04NOV10

Calibrate Pressure Sensor

A—Sensor Slope Input Box**Voltage-based Calibration**

1. Ensure the sensor has 12V power supply.

NOTE: Check with sensor manufacturer to ensure that sensor can accept 12V power.

2. Enter the slope as reported by the implement pressure gauge manufacturer in the box below.

3. Select Accept.

NOTE: Sensor power can be connected to the ECU Power pin (pin 26 of 37-pin connector) to provide 12V.

NOTE: For Raven pressure sensors with a 12V power supply the slope will be 16 mV/psi.

Operation-based Calibration

1. Connect the NH3 tank to the control valves.

2. Energize the system.

3. Permit the sensor to come to tank pressure.

Calibrate Pressure Sensor

Operation-based 1 2
Pressure Sensor 1

1. Enter the pressure in the box below as reported by the implement pressure gauge.
2. Select Accept.

0.0 ^A (psi)




PC13005—UN—04NOV10

Calibrate Pressure Sensor

A—Pressure Input Box

1. Enter the pressure in the box below as reported by the implement pressure gauge.

2. Select Accept.

CZ76372,0000212-19-09NOV10

Configuring Planter

Configure Planter

1. Access GreenStar™ Rate Controller
2. Offsets
3. Implement Setup
4. Implement Selection
5. Set Up Planter Sections
6. Set Up Height Switch CAN Message
7. Set Up SeedStar™ Generation 2 Planters

HC94949,0000660-19-02FEB15

Access GreenStar™ Rate Controller

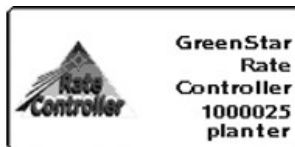
To access the GreenStar™ Rate Controller main page:



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



GreenStar™ Rate Controller button

PC12969—UN—25MAY12

2. Select the GreenStar™ Rate Controller button.

Each GreenStar™ Rate Controller is identified by the control unit serial number and implement name once the setup procedure has been completed.

NOTE: GreenStar™ Rate Controller button appears upon power-up after harness is installed and GreenStar™ Rate Controller is connected.

RW00482,00001F4-19-09JAN18

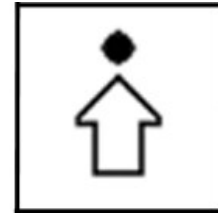
Offsets

It is necessary to set up machine and implement offsets and John Deere Section Control parameters to optimize GreenStar™ Rate Controller performance.

(Refer to GreenStar™ Display Operator's Manual.)

HC94949,0000728-19-28JAN15

Implement Setup



Setup Softkey

PC9419—UN—12SEP06

1. Select Setup.

NOTE: Turn off Master Switch to change most settings or values.

PC12989—UN—28OCT10

- A—Implement Tab
- B—System Tab
- C—Alarms Tab
- D—Rates Tab
- E—Implement Type Drop-Down Menu
- F—Implement Name Drop-Down Menu
- G—New Implement Button
- H—Rename Implement Button
- I—Remove Implement Button
- J—Disable Rate Controller Checkbox
- K—Implement Width Input Box
- L—Setup Sections Button
- M—Implement Sections
- N—Associated Switch Box Switch Numbers
- O—Height Switch Checkbox
- P—Height Switch Message Drop-Down Menu

2. Select Implement tab (A).

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

HC94949,0000685-19-08DEC14

Implement Selection

Implement
Planter (B) [v]
1770NT (C) [v]
New (D) Rename Remove Disable This GRC (A) [x]

PC25315—UN—07FEB18

- A—Disable This GRC Checkbox
B—Implement Type Drop-Down Menu
C—Implement Name Drop-Down Menu
D—New Button

NOTE: If GreenStar™ Rate Controller will not be used but remains connected, select the Disable This GRC checkbox (A) to eliminate connection to display for documentation, Section Control, and controller warnings.

Implement name must be defined before the System, Alarms, and Rates tabs are enabled.

1. Select desired Implement type from the drop-down menu (B).
2. Select implement name from the drop-down menu (C) or select the New button (D), and enter the implement name.

630.13
GreenStar Rate Controller
redball
Configure System
Prior to applying, the implement and system setup must be completed.
Go to Setup (A) [v]

PC25180—UN—09JAN18

- A—Accept Button

3. For new setup, select the Accept button (A).

RW00482,000020A-19-22FEB18

Set Up Planter Sections

Implement Width (ft) 60.00 (A) Setup Sections (D) [v]
(B) [v]
(C) [v]
1-2 3-4 5-6 7-8 9-10 11-12 13-14 15-16 17-18 19-20 21-22 23-24
1 2 3 4 5 5 5 6 7 8 9 10

PC20775—UN—03FEB15

Setup Sections

- A—Implement Width Input Box
B—Implement Section Widths
C—Associated Switchbox Switch Numbers
D—Setup Sections Button

Initial implement width (A) may be entered into the implement width input box. Width entered is evenly distributed among sections.

If implement sections (B) are different widths or associated switches (C) are different, select Setup Sections (D) and follow on screen instructions.

Setup Sections
Enter number of sections and row spacing then continue to the next page.
Number of Sections 12 (A) [v]
Row Spacing (in) 30.0 (B) [v]
1-2 3-4 5-6 7-8 9-10 11-12 13-14 15-16 17-18 19-20 21-22 23-24
1 2 3 4 5 5 5 6 7 8 9 10
(C) [v]

PC20602—UN—17DEC14

PC20603—UN—17DEC14

- A—Number of Sections Input Box
B—Row Spacing Input Box
C—Next Button
D—To Row Input Box
E—Switchbox Switch Association Drop-Down Menu

1. Enter number of sections (A).
2. Enter row spacing distance (B).
3. Select Next (C).
4. Enter rows associated with each section by inputting a row number into input box (D). For example, entering a value of 2 designates rows 1 and 2 as first planter section.
5. Select associated switchbox switch number from drop-down (E).
6. Define remaining sections by pressing Next and entering row numbers into input box.

HC94949,000068B-19-03FEB15

Set Up Height Switch CAN Message

PC20783—UN—03FEB15

Height Switch

A—Height Switch Check Box

If using GreenStar™ Rate Controllers in a multi-product configuration, one rate control unit can share height switch (A) status among multiple control units.

PC20784—UN—03FEB15

Height Switch Message Drop-Down Menu

- B—Do Not Share
C—Send Status
D—Receive Status

NOTE: Do Not Share (B) can be used if multiple height switches are desired in the application or operating with a single control unit.

1. Connect height switch to one control unit.
2. Configure that control unit to Send Status (C).
3. Configure each additional control unit to Receive Status (D).

RW00482,00001F7-19-09JAN18

Set Up SeedStar™ Generation 2 Planters

Some planters may be equipped with SeedStar™ Generation 2. The GreenStar™ Rate Controller automatically recognizes SeedStar™ Gen 2 is present.

PC12992—UN—28OCT10

Default SeedStar Configuration

- A—Implement Tab
B—System Tab
C—Alarms Tab
D—Rates Tab
E—Implement Type Drop-Down Menu
F—Implement Name Drop-Down Menu
G—New Implement Button
H—Rename Implement Button

- I—Remove Implement Button
- J—Disable Rate Controller Checkbox
- K—Implement Width Input Box
- L—Setup Sections Button
- M—Implement Sections
- N—SeedStar ON/Off Checkbox
- O—Height Switch Checkbox
- P—Height Switch Message Drop-Down Menu

The Implement Setup page for SeedStar™ Gen 2 planters includes an extra check box on the bottom of the page labeled “USE SEEDSTAR” The box has a check in it by default. With this box checked, the controller uses setup information from SeedStar™ Gen 2 Controller.

NOTE: In order for the controller to recognize SeedStar™ Gen 2 and use its configuration information, it must be connected to CAN Bus and running when the GreenStar™ Rate Controller planter configuration is created.

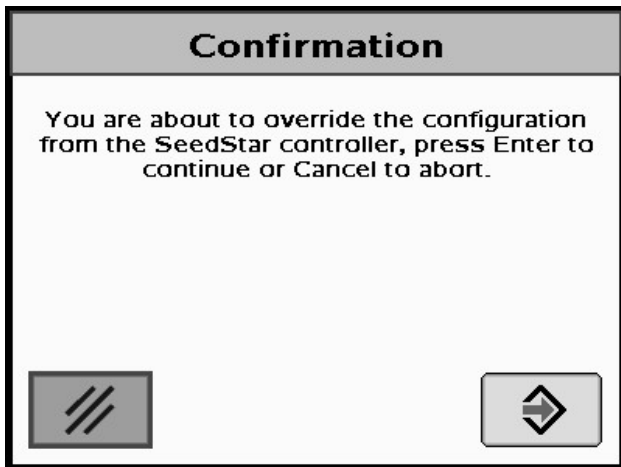


PC10537—UN—13SEP07

Custom SeedStar Configuration

A—Use SeedStar™ Check Box

To customize the SeedStar™ 1 configuration, remove the check from the box and setup the sections manually.



PC10534—UN—13SEP07

SeedStar™ Confirmation

When disabling SeedStar™, a confirmation screen appears.

SeedStar™ Confirmation— You are about to override the configuration from the SeedStar™ controller, select Enter to continue or Cancel to abort.

Select enter to continue.

Refer to SETUP PLANTER SECTIONS.

HC94949,00006A8-19-17DEC14

SEEDSTAR 2 PLANTERS

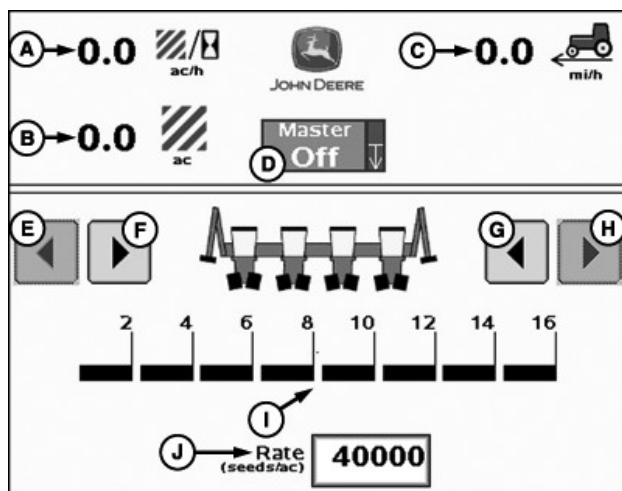
Some planters may be equipped with SeedStar 2. The GreenStar Rate Controller will not recognize that SeedStar 2 is present. The operator must configure the GreenStar Rate Controller sections to match the setup information in the SeedStar 2 controller.

NOTE: If the GreenStar Rate Controller was previously installed on a SeedStar 1 planter, a NEW planter configuration / name will need to be created for a SeedStar 2 planter. Do not modify the SeedStar 1 configuration.

JS56696,0000742-19-05APR10

Operating Planter

Planter Home Page



PC12320—UN—06OCT09

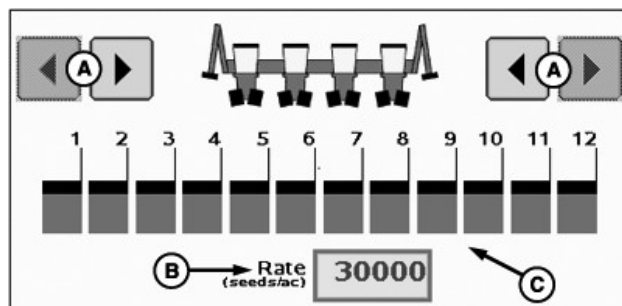
Main Planter Screen

- A—Area Per Hour
- B—Total Area
- C—Travel Speed
- D—Master Switch Indicator/Implement Height Switch Indicator
- E—Left Sections OFF Button
- F—Left Sections ON Button
- G—Right Sections ON Button
- H—Right Sections Off Button
- I—Section Indicator
- J—Seed Rate Input Box

NOTE: The seed rate input box is for documentation purposes. This box will not be documented if connected to a SeedStar controller.

JS56696,0000743-19-14OCT09

Implement Section States



PC11358—UN—02OCT08

- A—Section ON/OFF Buttons
- B—Seed Rate Input Box
- C—Section Indicator

Implement sections can be in one of three states:

- Disabled—Section is disabled.
- Enabled—Section is enabled.
- Active—Section is planting.

Section on/off buttons (A) arm or disarm one section at a

time from left to right or right to left. The operator can also enable/disable sections with the switch box in the cab.

Sections that are in the enabled state have black fill color indication.

Active sections have a green rectangle indication under the section.

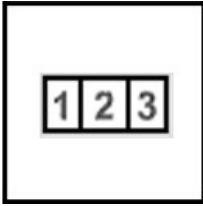
Sections that are in the off state are transparent.

HC94949,00006A7-19-17DEC14

Viewing Planter Reports and Totals

Reports and Totals

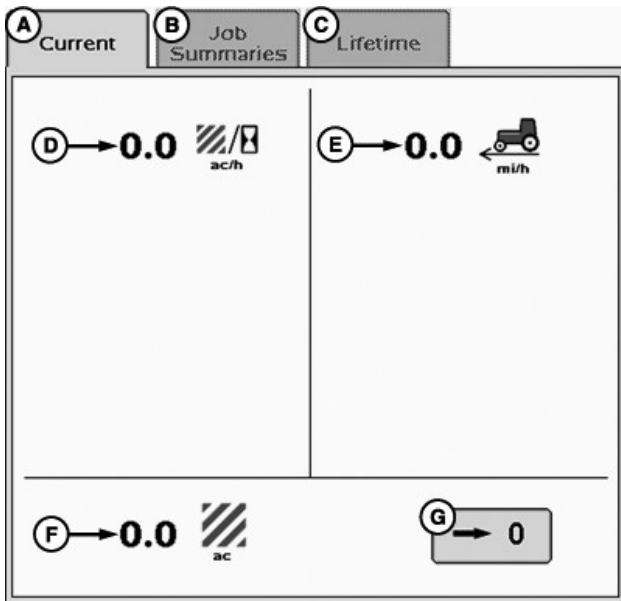
Select the Reports and Totals button to show the following page.



PC9669—UN—26OCT06

Reports and Totals Softkey

The current page will display instant values.



PC12318—UN—06OCT09

Current Tab

- A—Current Tab
- B—Job Summaries Tab
- C—Lifetime Tab
- D—Area Per Hour
- E—Traveling Speed
- F—Area
- G—Area/Reset Button

JS56696,0000746-19-14OCT09

Planter Diagnostics

Diagnostic Page



Diagnostics Softkey

PC9431—UN—14SEP06

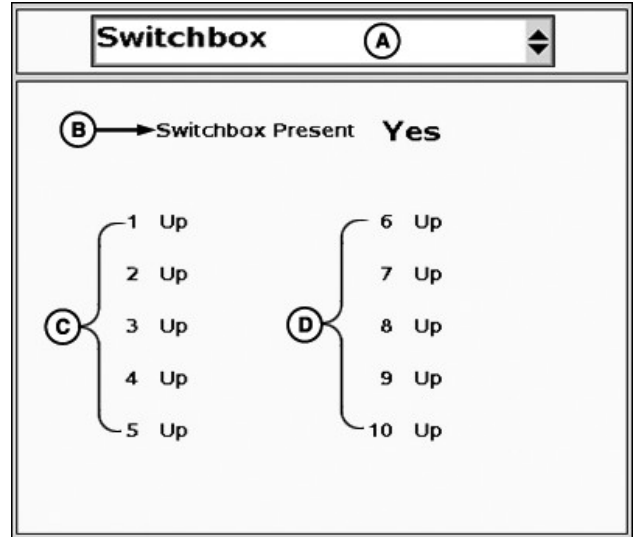
Select the Diagnostics button on the right-hand side to enter the diagnostics page.

JS56696,0000747-19-05APR10

E—Software Version Number

JS56696,0000749-19-05APR10

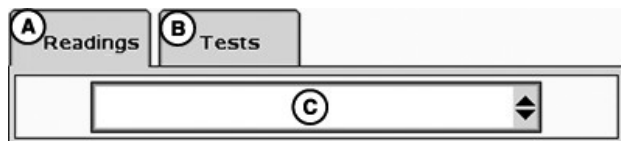
Switchbox Readings



Switchbox

PC12251—UN—06OCT09

Readings



Readings Tab

PC12300—UN—22SEP09

A—Readings Tab

B—Tests Tab

C—Reading Type Drop-Down Menu

Select the Readings tab to display planter readings.

JS56696,0000748-19-05APR10

A—Reading Type Drop-Down Menu

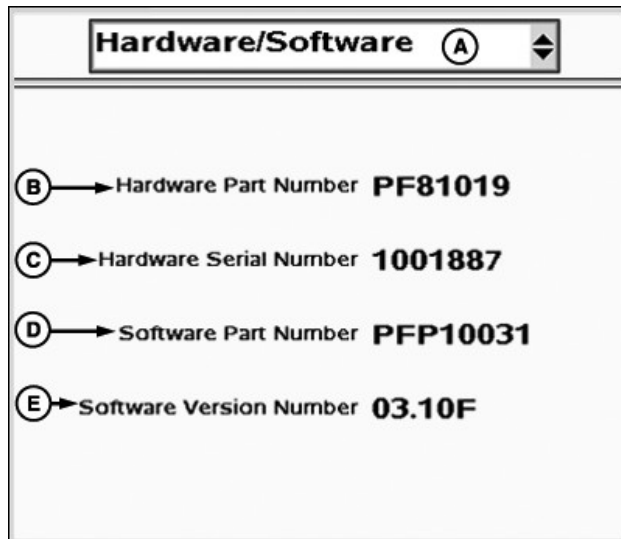
B—Switchbox Present Status

C—Switches 1 Through 5 Status on Switchbox

D—Switches 6 Through 10 Status on Switchbox

JS56696,000074A-19-05APR10

Hardware/Software Readings



Hardware/Software

PC12619—UN—17MAY10

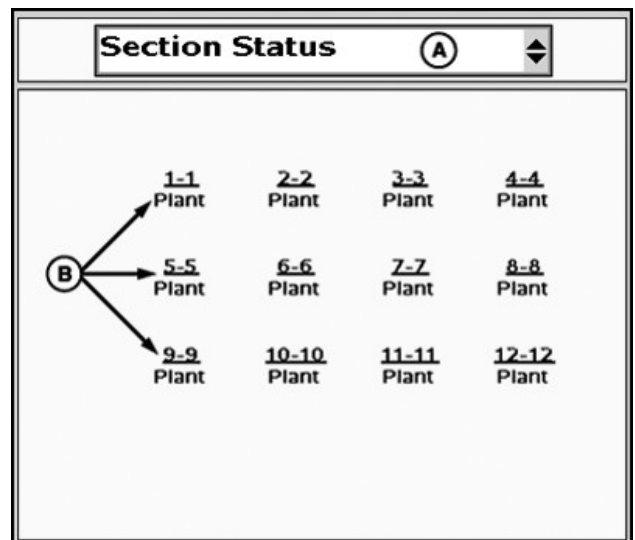
A—Reading Type Drop-Down Menu

B—Hardware Part Number

C—Hardware Serial Number

D—Software Part Number

Section Status Readings



Section Status

PC12303—UN—06OCT09

A—Reading Type Drop-Down Menu

B—Section Status

JS56696,000074B-19-05APR10

System Voltages Readings

Reading	Value
B ECU Power (v)	13.7
C Sensor Power 1 (v)	5.0
D Sensor Power 2 (v)	5.0
E Sensor Power 3 (v)	5.0
F Sensor Power 4 (v)	0.0
G Valve Power (v)	13.7
H Valve Power 1	OK
I Valve Power 2	OK
J Valve Power 3	OK
K Valve Power 4	OK

PC12304—UN—06OCT09

System Voltages

Working Parameters Readings

Reading	Value
B Working Width (ft)	0.0
C Speed (mi/h)	0.0
D Speed Source	None

PC12256—UN—06OCT09

Working Parameters

A—Reading Type Drop-Down Menu

B—ECU Power

C—Sensor Power 1

D—Sensor Power 2

E—Sensor Power 3

F—Sensor Power 4

G—Valve Power

H—Valve Power 1

I—Valve Power 2

J—Valve Power 3

K—Valve Power 4

NOTE: Sensor Power 4 is not currently used, expected value is 0.

NOTE: Valve Power will be "None" if Valve Power is not connected.

JS56696,000074C-19-05APR10

A—Reading Type Drop-Down Menu

B—Working Width

C—Speed

D—Speed Source

JS56696,000074D-19-05APR10

Switches/Status Readings

Reading	Value
B Master Switch	Off
C Height Switch Status	Up
D Height Switch (v)	None
E Planter Feedback 1	Plant
F Planter Feedback 2	Plant
G Planter Feedback 3	Plant
H Planter Feedback 4	Plant

PC12306—UN—06OCT09

Switches Status

A—Reading Type Drop-Down Menu

B—Master Switch Status

C—Height Switch Status

D—Height Switch Voltage

E—Planter Feedback 1

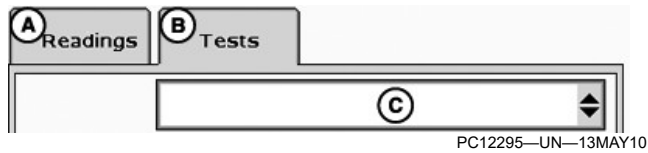
F—Planter Feedback 2

G—Planter Feedback 3

H—Planter Feedback 4

JS56696,000074E-19-05APR10

Tests



A—Readings Tab

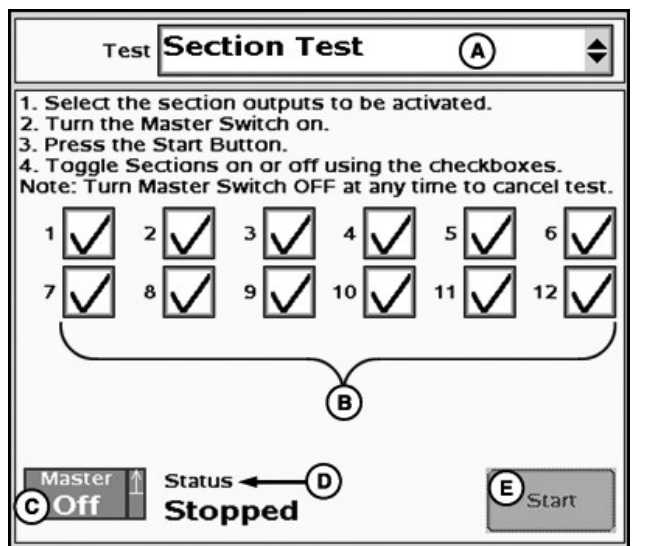
B—Tests Tab

C—Test Type Drop-Down Menu

Select Tests tab to display planter tests.

JS56696,000074F-19-14OCT09

Section Test



Section Test

A—Tests Drop-Down Menu

B—Section 1 through 12 ON/OFF Checkboxes

C—Master Switch Indicator/Implement Height Switch Indicator

D—Test Status

E—Start Section Test Button

To begin Section test:

1. Select Section test from the tests drop-down menu.
2. Select the section outputs to be activated.
3. Turn the Master Switch ON.
4. Select Start button on the screen.
5. Toggle sections on or off using the checkboxes.
6. Turn Master switch off any time to cancel test.

NOTE: Sections that are selected will not plant. Non-selected sections will plant while the test is in progress.

JS56696,0000750-19-14OCT09

Configuring MCS Applicator

Configuring MCS Applicator

1. Access GreenStar™ Rate Controller
2. Offsets
3. Implement Setup
4. Set Up Implement Sections
5. Set Up Height Switch CAN Message
6. System Setup
7. Alarm Setup
8. Rate Setup
9. Raven Direct Inject Pump Setup (If Equipped)

RW00482,000094B-19-20NOV19

Access GreenStar™ Rate Controller

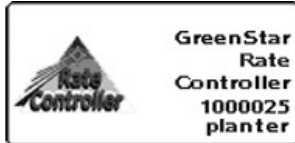
To access the GreenStar™ Rate Controller main page:



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



GreenStar™ Rate Controller button

PC12969—UN—25MAY12

2. Select the GreenStar™ Rate Controller button.

Each GreenStar™ Rate Controller is identified by the control unit serial number and implement name once the setup procedure has been completed.

NOTE: GreenStar™ Rate Controller button appears upon power-up after harness is installed and GreenStar™ Rate Controller is connected.

RW00482,00001F4-19-09JAN18

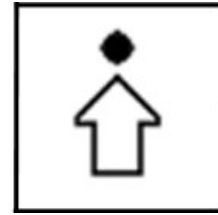
Offsets

It is necessary to set up machine and implement offsets and John Deere Section Control parameters to optimize GreenStar™ Rate Controller performance.

(Refer to GreenStar™ Display Operator's Manual.)

HC94949,0000724-19-28JAN15

Implement Setup



Setup Softkey

PC9419—UN—12SEP06

1. Select the Setup softkey.

NOTE: To change most of the settings or values, the master switch must be turned off.



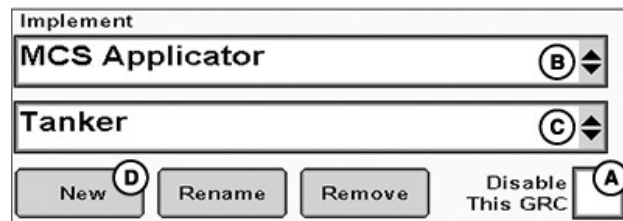
PC27702—UN—31OCT19

A—Implement Tab

2. Select the Implement tab (A).

RW00482,0000955-19-18NOV19

Implement Selection



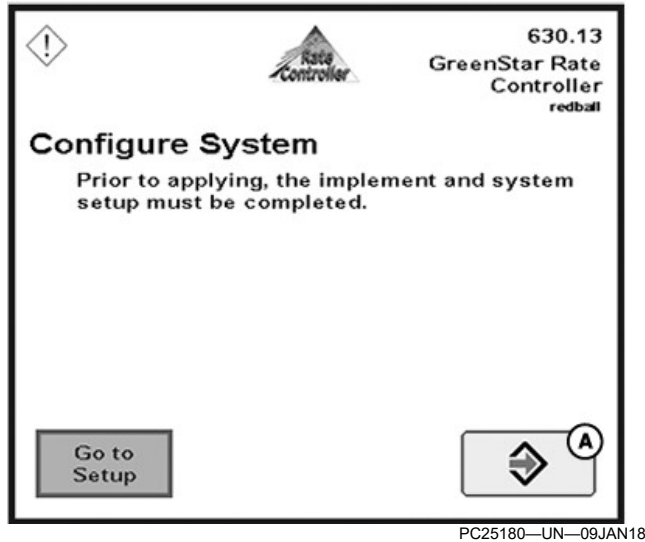
PC27701—UN—31OCT19

A—Disable This GRC Checkbox
B—Implement Type Drop-Down Menu
C—Implement Name Drop-Down Menu
D—New Button

NOTE: If the GreenStar™ Rate Controller will not be used but remains connected, select the Disable This GRC checkbox (A) to eliminate the connection to the display for documentation, Section Control, and control unit warnings.

The implement name must be defined before the System and Alarms tabs are enabled.

1. Select the desired implement type from the drop-down menu (B).
2. Select the implement name from the drop-down menu (C), or select the New button (D) to enter the implement name.

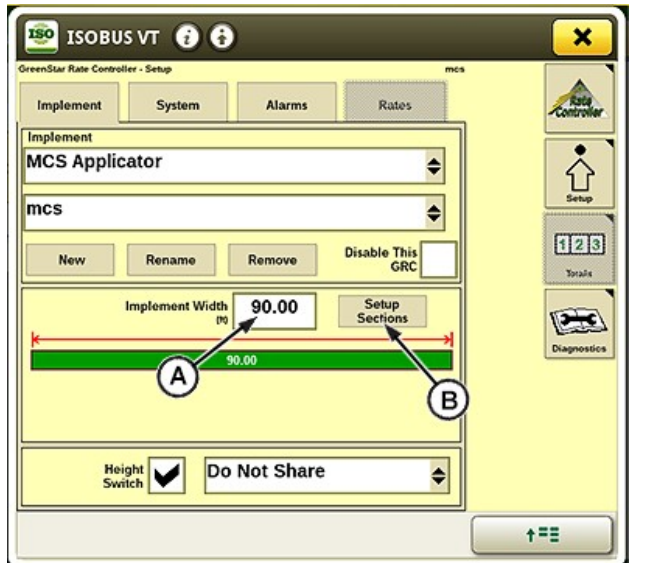


A—Accept Button

- For a new setup, select the Accept button (A).

RW00482,000094D-19-19NOV19

Set Up Implement Sections — MCS Applicator

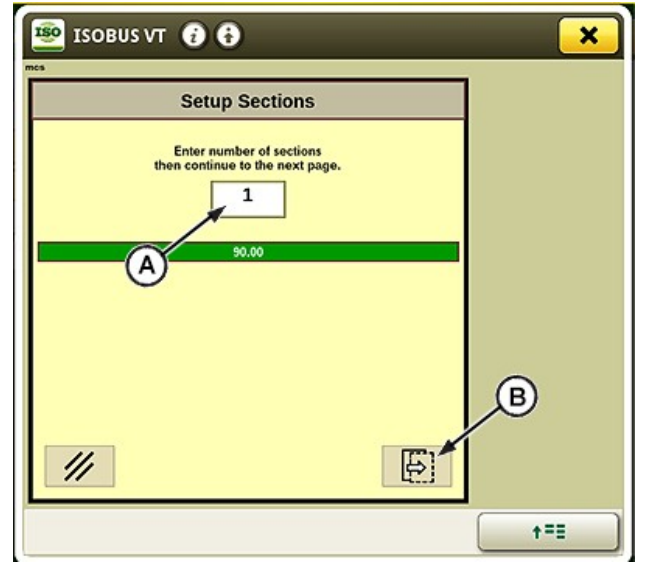


Setup Sections

- A—Implement Width Input Box
B—Setup Sections Button

Initial implement width may be entered into the Implement Width input box (A).

Select the Setup Sections button (B) to enter the implement section numbers and follow on-screen instructions.

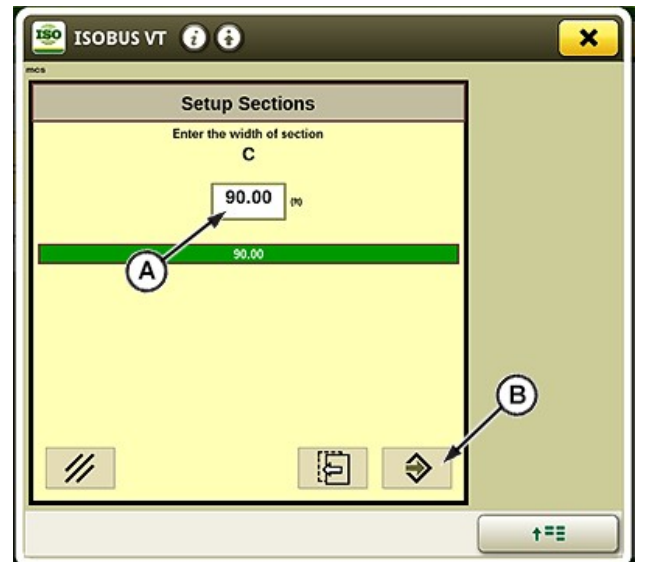


- A—Number of Section
B—Next Button

- Enter the number of section (A) as 1.

NOTE: Switch box information is hidden when the switch box is not connected.

- Select the Next button (B) to enter the width of section.



- A—Width of Section Input Box
B—Next Button

- Enter width of section (A).
- Select the Accept button (B).

RW00482,0000956-19-02NOV22

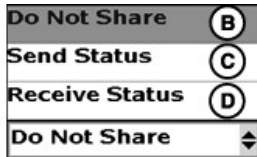
Set Up Height Switch CAN Message



Height Switch

A—Height Switch Check Box

If using GreenStar™ Rate Controllers in a multi-product configuration, one rate control unit can share height switch (A) status among multiple control units.



Height Switch Message Drop-Down Menu

- B—Do Not Share
C—Send Status
D—Receive Status

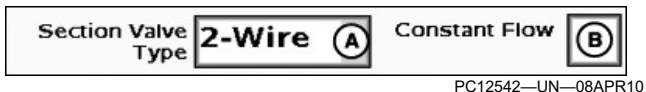
NOTE: Do Not Share (B) can be used if multiple height switches are desired in the application or operating with a single control unit.

1. Connect height switch to one control unit.
2. Configure that control unit to Send Status (C).
3. Configure each additional control unit to Receive Status (D).

RW00482,00001F7-19-09JAN18

System Setup

1. Select the System tab.



Section Valve Type Drop-Down Menus

- A—Section Valve Type Drop-Down Menu
B—Constant Flow Checkbox

2. Select Section Valve Type from the drop-down menu (A).

NOTE: If a 2-wire valve is required and not shown in the drop-down menu, the number of implement sections must be adjusted in the implement setup.

NOTE: CAN is designated for Hagie functionality. If CAN is not shown in the drop-down menu, self-propelled sprayer must be selected and number of implement sections must be adjusted to ten.

(Reference Component Overview and Compatibility for more information.)

3. Select the Constant Flow checkbox (B) to configure the control unit to operate a section valve with a continuous bypass that returns flow to the tank when sections are off.

(Reference Sprayers and Liquid Fertilizer Tool Diagnostics for calibrating the section bypass valves.)

CAUTION: Selecting the wrong valve type can result in valves opening unexpectedly. To avoid injury from exposure to chemicals, verify that the correct valve is selected. Review control valve type before transferring GreenStar™ Rate Controller between implements.

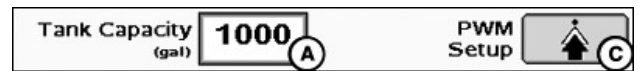
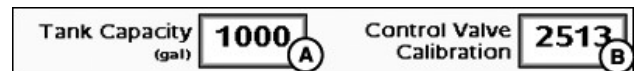


Control Valve Type

A—Control Valve Type Drop-Down Menu

4. Select the Control Valve Type from the drop-down menu (A).

Select None for systems that do not have a control valve. Dragline manure applications that do not have a control valve are an example.



- A—Tank Capacity Input Box
B—Control Valve Calibration Input Box
C—PWM Setup Button

5. Enter maximum volume in the Tank Capacity input box (A). Tank capacity range is 0–17,000, and it defaults to 3785 L (1000 gal).
 6. For Standard, Fast, and Fast Close control valves:
 - a. Enter the Valve Calibration Number (B).
 - b. Continue to step 7.
- For PWM and PWM Close control valves:
- a. Select the PWM Setup button (C).

PC25297—UN—01FEB18

- A—Control Valve Calibration Input Box
 B—Coil Frequency Input Box
 C—High Limit Input Box
 D—Low Limit Input Box
 E—Calibrate PWM Limits Button
 F—Pump Standby Duty Cycle Checkbox
 G—Duty Cycle Input Box
 H—Pump Enable Checkbox
 I—Enable Pump Checkbox
 J—Accept Button

- b. Enter Valve Calibration Number (A).

NOTE: Table shows recommended values. Fine-tune control valve calibration valve for optimal performance.

(Reference fine-tuning procedure in Troubleshooting for more information.)

Standard Valve Type	Valve Calibration Number (XYZ)
Raven 165	2513
Raven 894	2513
Raven 125	2513
TeeJet®	1003
HARDI®	7051

*TeeJet is a trademark of Spraying Systems Company
 HARDI is a trademark of HARDI Midwest Incorporated*

Fast-Close Valve Type	Valve Calibration Number (XYZ)
Raven 177	0753
HINIKER™ Servo Valve (8160 Monitor Compatible)	0433

Fast-Close Valve Type	Valve Calibration Number (XYZ)
KZCO® Servo Valve (John Deere 2510 Liquid Fertilizer system)	1031

*HINIKER is a trademark of Hiniker Company
 KZCO is a trademark of KZCO Incorporated*

PWM-Close Valve Type	Valve Calibration Number (XYZ)
Sauer-Danfoss™ Hagie MFG T540	1533
Command Controls Corporation FV1501	1411

Sauer-Danfoss is a trademark of Sauer-Danfoss Incorporated

- c. Enter the Coil Frequency (B) for PWM and PWM Close valve. Coil Frequency default value is 122.

(Refer to control valve manufacturer Operator's Manual for proper coil frequency value.)

- d. Define PWM Limits to control minimum and maximum desired flow, or control pressure. This is to prevent machine damage and ensure quick system response.

Define limits manually by entering high and low limits into input boxes (C and D). High and low limit ranges are 0–255.

Otherwise, select Calibrate PWM Limits button (E), and follow on-screen steps to perform calibration procedure. Once calibration is completed, select the Setup softkey to return to System Setup.

(Refer to Calibrate PWM Limits in Sprayers and Liquid Fertilizer Tool and Diagnostics section for details on how to perform test.)

- e. Select Pump Standby Duty Cycle checkbox (F) and enter the Duty Cycle (G) for the system to maintain when all sections are closed. This value is tied to the PWM high and low limits and the acceptable range is dictated by the values entered into the high and low limits.

NOTE: If there is no hardwired pump ON/OFF switch installed, select Pump Enable (H).

- f. Select Pump Enable if there is no hardwired pump ON/OFF switched installed. Enable Pump (I) overrides PWM signal to shut off pump when not selected.

- g. Select the Accept button (J).

Flowmeter Calibration **743** (A)

Flowmeter Units **10 gal** (B)

Calibrate Flowmeter (C)

Flow Return ☒ (D)

PC12545—UN—08APR10

Flowmeter Calibration

- A—Flowmeter Calibration Input Box
 B—Flowmeter Units Drop-Down Menu
 C—Calibrate Flowmeter Button
 D—Flow Return Checkbox

- Enter Flowmeter Calibration number (A) that is stamped on the valve.

NOTE: Most flowmeters have an attached tag indicating recommended calibration number. Enter number as initial Flowmeter Calibration value.

- Choose unit of measurement from the Flowmeter Units drop-down menu (B).
- Select the Calibrate Flowmeter button (C) and follow on-screen instructions. (See Sprayers and Liquid Fertilizer Tool Diagnostics section.)

Flow Return checkbox (D) is available for liquid systems equipped with a fixed displacement pump to allow product to return to tank when all sections are closed.

Once calibration is completed, select the Setup softkey to return to System Setup.

Pressure 1 Sensor ☒ (A) 2 ☐ (B)

Calibrate Pressure Sensor (C)

Agitator Valve ☒ (D)

Agitator Duty Cycle **20** (%) (E)

PC20609—UN—17DEC14

- A—Pressure Sensor 1 Checkbox
 B—Pressure Sensor 2 Checkbox
 C—Calibrate Pressure Sensor Button
 D—Agitator Valve Checkbox
 E—Agitator Duty Cycle Drop-Down Menu

- Select Pressure Sensor 1 checkbox (A) if the sensor is installed. If using more than one pressure sensor, select Pressure Sensor 2 checkbox (B). If a pressure sensor is selected, pressure indicator displays on Menu instead of flow rate.
- Select the Calibrate Pressure Sensor button (C) and follow the on-screen instructions.
 Once calibration is completed, select the Setup softkey to return to System Setup.
 (Refer to Sprayers and Liquid Fertilizer Tool Diagnostics section.)
- To enable the agitator, select Agitator Valve checkbox (D).

NOTE: Agitator valve selection affects number of sections available for 2-wire valves.

- Select agitator duty cycle percent from the drop-down menu (E). Agitation rate is based on 10 min intervals. For example, at 20% the agitator runs for 2 min, and is off for 8 min.

If tank volume is at or below 20% of the total volume of the tank, agitation reduces to half the set run time. For example, at 20% setting from the previous example, the agitation runs for 1 min, and is off for 9 min.

RW00482,0000957-19-31OCT19

Alarms Setup (Optional)

Implement System **Alarms** (A) Rates

Low Tank Level (gal) **200** (B) ☒ (I)

High Alarm (% above target rate) **20** (C) ☒ (J)

Low Alarm (% below target rate) **20** (D) ☒ (K)

Pressure Sensor 1		Pressure Sensor 2	
Alarm?		Alarm?	
Minimum (psi)	12 (E) ☒ (L)	12 (G) ☒ (N)	
Maximum (psi)	250 (F) ☒ (M)	250 (H) ☒ (O)	

PC20619—UN—18DEC14

- A—Alarms Tab
 B—Low Tank Level Input Box
 C—High Alarm Input Box
 D—Low Alarm Input Box
 E—Pressure Sensor 1 Minimum Pressure Input Box
 F—Pressure Sensor 1 Maximum Pressure Input Box
 G—Pressure Sensor 2 Minimum Pressure Input Box

H—Pressure Sensor 2 Maximum Pressure Input Box
 I—Low Tank Level Checkbox
 J—High Alarm Checkbox
 K—Low Alarm Checkbox
 L—Pressure Sensor 1 Minimum Pressure Checkbox
 M—Pressure Sensor 1 Maximum Pressure Checkbox
 N—Pressure Sensor 2 Minimum Pressure Checkbox
 O—Pressure Sensor 2 Maximum Pressure Checkbox

Alarms allow the operator to predefine alerts for application rate and low tank level. Alarms are percentage-based, and alert the operator when the value goes outside of range. For example, if the application rate is set to 100 and the high and low alarm is set at 20, the alert triggers when the application rate is below 80 or above 120.

1. Select Alarms tab (A).
2. Enter Low Tank Level volume (B).
3. Enter High Alarm (C) and Low Alarm (D) percent rates .
4. Enter Minimum (E) and Maximum (F) pressure for Pressure Sensor 1, if equipped.
5. Enter Minimum (G) and Maximum (H) pressure for Pressure Sensor 2, if equipped.
6. Enable desired alarm checkboxes (I–O).

HC94949,00006BF-19-06JAN15

Rates



PC27707—UN—31OCT19

A—Rates Tab

The Rates tab (A) is not available for manure constituent sensing (MCS) applicator profiles. Rate is controlled by the MCS control unit.

(For more information, reference the MCS Operator's Manual.)

RW00482,000094F-19-19NOV19

Raven Direct Injection Pump Setup (If Equipped)



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



PC25314—UN—09FEB18

Raven Pump Buttons

2. Select the Raven Pump button. If multiple pumps are used, set up each pump individually.

(Reference Raven Sidekick™ Pro Operator's Manual for the pump setup.)

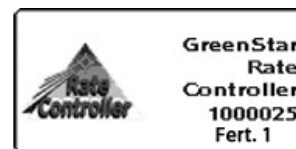
NOTE: If more than one pump is being used, ensure that the pumps do not have the same pump number.



Menu Button

PC8663—UN—29APR15

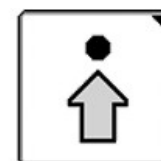
3. Select the Menu button.



PC15160—UN—25MAY12

GreenStar™ Rate Controller Button

4. Select the GreenStar™ Rate Controller button.



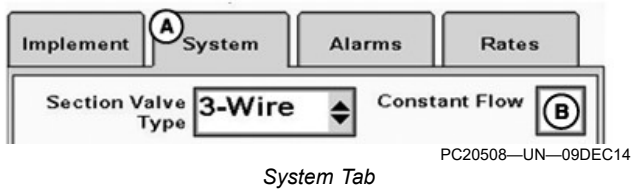
Setup Softkey

PC21157—UN—11MAY15

5. Select the Setup softkey to enter the control unit setup.

Raven Sidekick is a trademark of Deere & Company
 GreenStar is a trademark of Deere & Company

NOTE: Turn OFF master switch to change most settings or values.



- A—System Tab
B—Constant Flow Checkbox

6. Select the System tab (A).
7. If Raven Sidekick™ Pro is being used on a sprayer or liquid fertilizer tool, uncheck the Constant Flow checkbox (B).



PC14938—UN—03MAY12

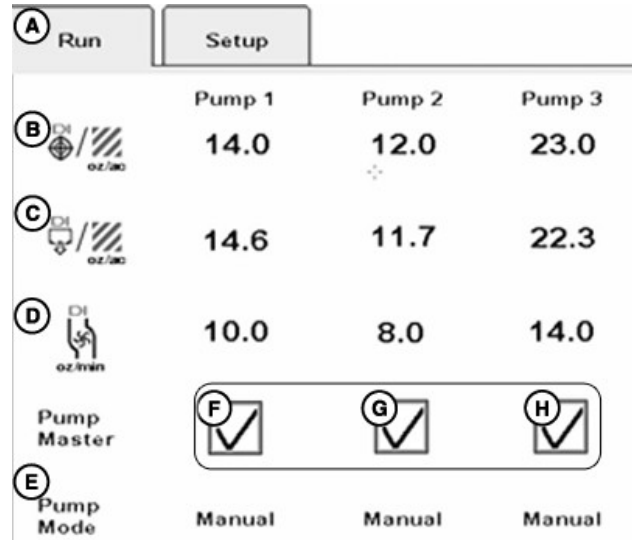
Direct Injection Pump Softkey

8. Select the Direct Injection Pump softkey.



- A—Setup Tab
B—Enable Direct Injection Communication Checkbox

9. On Setup tab (A), select the Enable Direct Injection Communication checkbox (B).



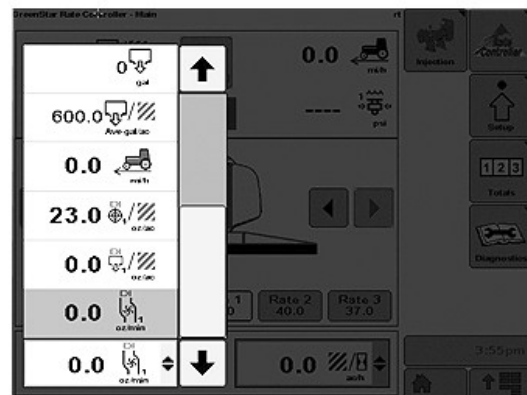
- A—Run Tab
B—Target Rate
C—Applied Rate
D—Flow Rate
E—Pump Mode
F—H—Pump Master Checkboxes

10. Run tab (A) displays values based on the initial Raven setup screens:

- Target rate (B)
- Applied rate (C)
- Flow rate (D)
- Pump mode (E)

NOTE: Select the Raven Pump softkey to adjust values.

11. Enable pumps by selecting the checkboxes (F–H).



PC14941—UN—02MAY12

GreenStar™ Rate Controller Main Run Page

NOTE: Rates can be viewed on GreenStar™ Rate Controller main run page by selecting the desired rate from the information drop-down menus.

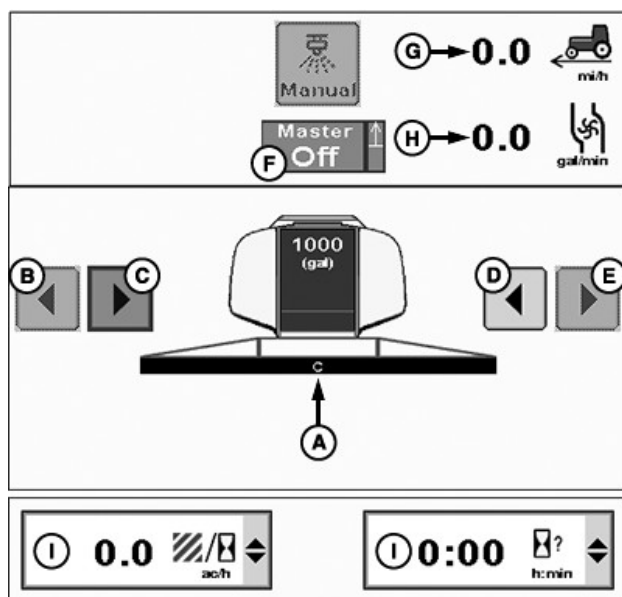
Operating MCS Applicator

GreenStar™ Rate Controller Operation–MCS Applicator

1. Run Page–MCS Applicator
2. Implement Section States
3. Refilling Tank
4. Activate and Deactivate System
5. Monitor System Performance
6. Rinse Cycle (see Sprayers and Liquid Fertilizer Tool Diagnostics section)

RW00482,0000951-19-15NOV19

Run Page–MCS Applicator

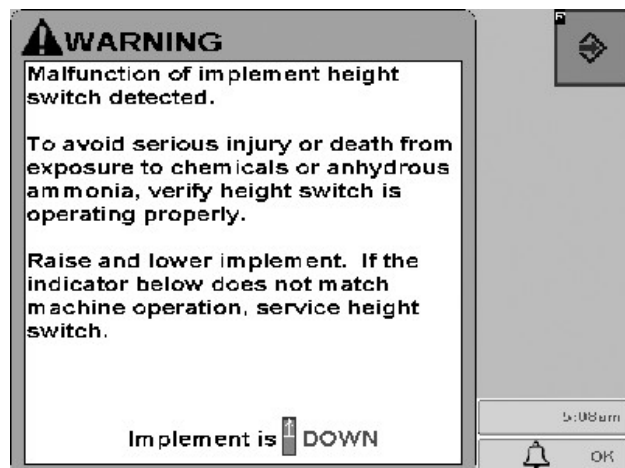


PC27695—UN—31OCT19

- A—Implement Sections
- B—Left Sections Off Button
- C—Left Sections On Button
- D—Right Sections On Button
- E—Right Sections Off Button
- F—Master Switch Indicator/Implement Height Switch Indicator
- G—Travel Speed
- H—Flow (volume per time)
- I—Information Drop-Down Menu

RW00482,0000949-19-31OCT19

Malfunction of Implement Height Switch Detected



PC13147—19—17FEB11

This message will be displayed on a NH3 system when the system detects the implement is down for an extensive period of time, which can indicate a failure in the height switch. To verify correct operation, follow the instructions. If the height switch indicator does not match machine operation, service height switch.

HC94949,00004F0-19-01MAY14

Rates



PC27707—UN—31OCT19

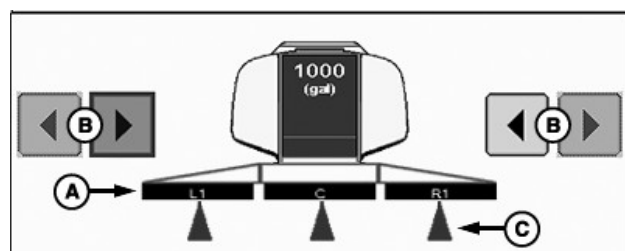
A—Rates Tab

The Rates tab (A) is not available for manure constituent sensing (MCS) applicator profiles. Rate is controlled by the MCS control unit.

(For more information, reference the MCS Operator's Manual.)

RW00482,000094F-19-19NOV19

Implement Section States



PC27752—UN—22NOV19

- A—Implement Sections
- B—Section ON/OFF Buttons
- C—Colored Triangle Indicators

Implement sections (A) can be in one of three states:

- Disabled—Section is disabled.
- Enabled—Section is enabled.
- Active—Section is applying.

Section ON/OFF buttons (A) enable or disable one section at a time from left to right or right to left. The operator can also enable or disable sections with the switch box in the cab.

Enabled implement sections are filled black and disabled are filled white.

Section nozzles have colored triangle indicators (C) under the implement sections to show the status. Active sections display a blue colored triangle indicator under the section.

RW00482,000095C-19-22NOV19

Activate and Deactivate System

1. To activate system:

- Foot switch: Turn master switch to On position.
- Switchbox: Press switch.

2. To deactivate system:

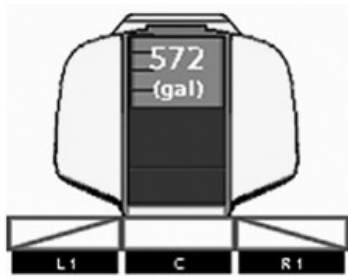
- Foot switch: Turn master switch to Off position.
- Switchbox: Press switch.

NOTE: System only operates when machine ground speed is greater than 0.5 km/h (0.3 mph).

Master switch indicator on run page displays an on/off state.

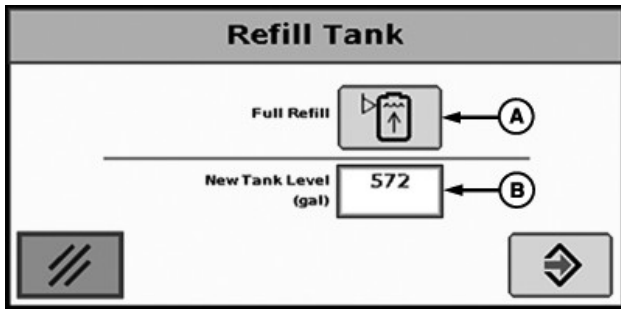
HC94949,000070E-19-03FEB15

Refilling Tank



PC11381—UN—08OCT08

Estimated Volume Remaining



PC11382—UN—08OCT08

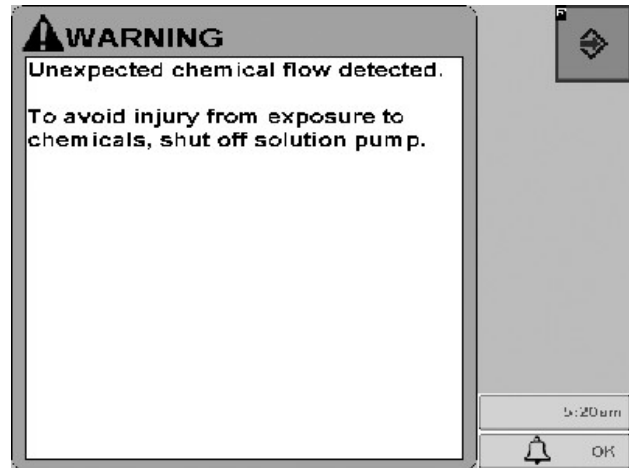
A—Full Refill Button

B—New Tank Level Input Box

1. Reset estimated tank level after refilling.
2. Select estimated volume remaining/refill button.
3. If volume after refilling is full, select Full Refill (A). This sets tank level to defined tank capacity.
4. When partially filling tank, enter new level by pressing new tank level button and input estimated value (B).

HC94949,000070D-19-03FEB15

Unexpected Chemical Flow Detected



PC13158—19—17FEB11

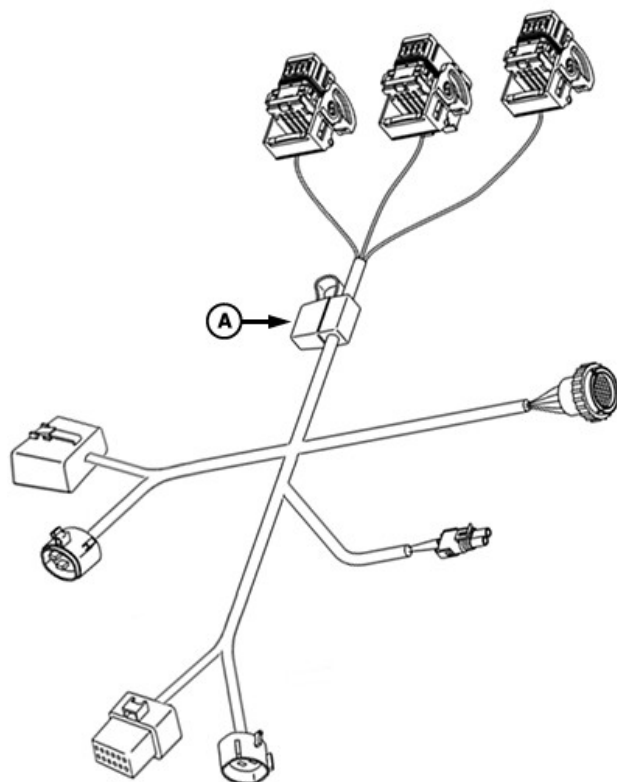
This message will be displayed if the GreenStar Rate Controller has attempted to close the section valves but still detects flow on a sprayer or liquid fertilizer system.

HC94949,00004F1-19-01MAY14

Limp Home Mode

NOTE: Limp home mode does not function when NH3 tool or planter is the selected implement type.

RW00482,00001FC-19-20FEB18



PC25183—UN—10JAN18

Limp Home 10 A Fuse

A—Limp Home 10 A Fuse

If communication between display and GreenStar™ Rate Controller fails for any reason, operator can decide to operate system in a limited functionality mode to finish a field.

By removing the in-line fuse (A) located in the main harness, control unit enters limp home mode. While in limp home mode, the system:

- Enables all implement sections.
- Disables fence row nozzles.
- Calculates flow rate based on standard limp home speed of 8 km/h (5 mph), predefined Rate 1, and full implement width.

Limp home mode assumes that all CAN bus communication has been lost and defaults to Rate 1, the original operating width, and a fixed speed of 8 km/h (5 mph).

NOTE: It is the operator's responsibility to keep the tractor at 8 km/h (5 mph) to ensure proper rate is being dispensed.

If operator is using switch box controls, only the master switch on the switch box works.

If the limp home fuse is lost or destroyed, it can be replaced by a common automotive 10 A fuse.

Viewing MCS Applicator Reports and Totals

Reports and Totals



PC27737—UN—18NOV19

Reports and Totals Softkey

The Reports and Totals softkey is not available for manure constituent sensing (MCS) applicator profiles. Reports and totals is tracked by the MCS control unit.

(For more information, reference the MCS Operator's Manual.)

RW00482,0000959-19-20NOV19

MCS Applicator Diagnostics

Diagnostic Page



Diagnostics Softkey

PC9431—UN—14SEP06

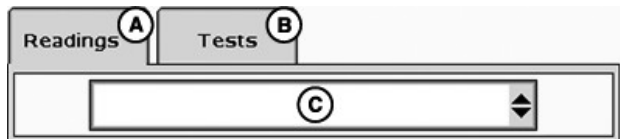
Select the Diagnostics button on the right-hand side to enter the diagnostics page.

JS56696,000070A-19-05APR10

E—Software Version Number

JS56696,000070C-19-05APR10

Readings



Readings Tab

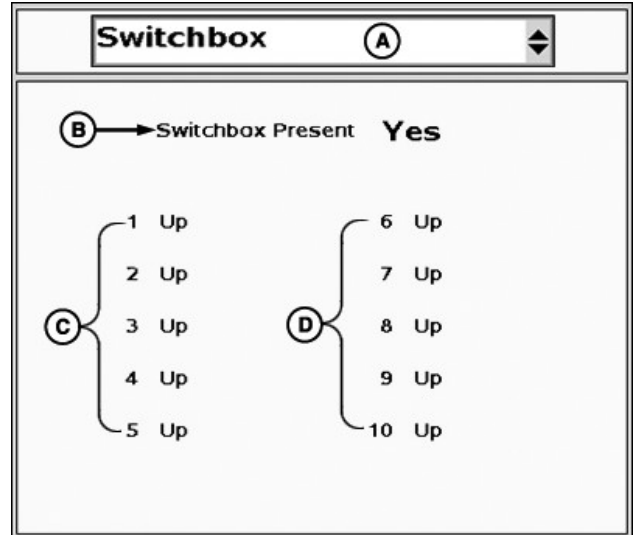
PC12249—UN—14SEP09

- A—Readings Tab
- B—Tests Tab
- C—Reading Type Drop-Down Menu

Select the Readings tab to display GreenStar Rate Controller readings.

JS56696,000070B-19-05APR10

Switchbox Readings

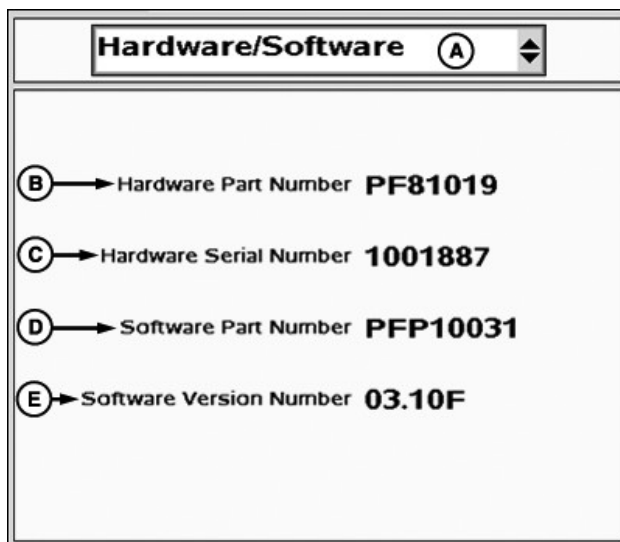


PC12251—UN—06OCT09

- 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

JS56696,000070D-19-05APR10

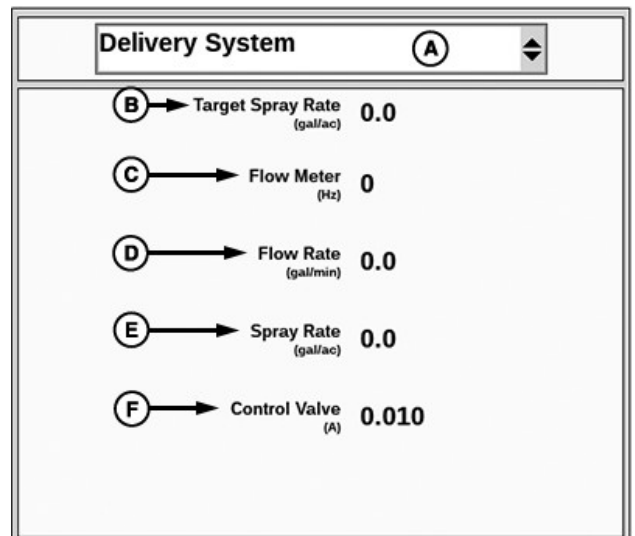
Hardware/Software Readings



PC12606—UN—12MAY10

- A—Readings Selection Drop-Down Menu
- B—Hardware Part Number
- C—Hardware Serial Number
- D—Software Part Number

Delivery System Readings

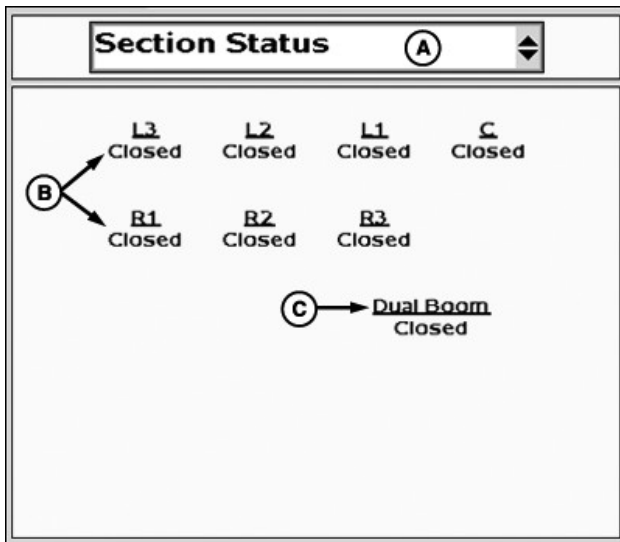


PC27734—UN—15NOV19

- A—Readings Selection Drop-Down Menu
- B—Target Spray Rate
- C—Flow Meter (frequency)
- D—Flow Rate
- E—Spray Rate
- F—Control Valve (current)

RW00482,0000950-19-15NOV19

Section Status Readings



PC12258—UN—14SEP09

- A—Readings Selection Drop-Down Menu
 B—Section Status
 C—Dual Boom Status

NOTE: Section valve current will be displayed for 2-wire section valve.

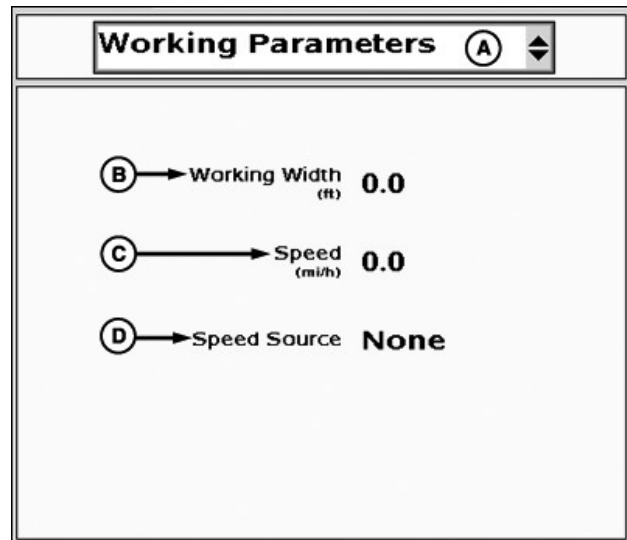
JS56696,000070F-19-05APR10

NOTE: Sensor Power 4 is not currently used, expected value is 0.

NOTE: Valve Power will be "None" if Valve Power is not connected.

JS56696,0000710-19-05APR10

Working Parameters Readings

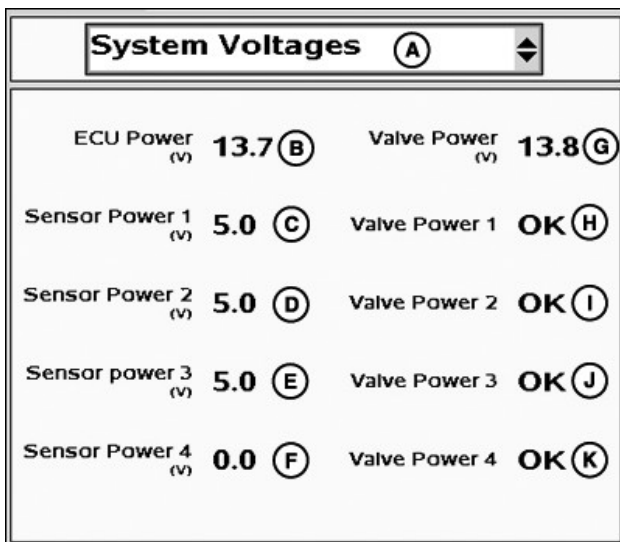


PC12256—UN—06OCT09

- A—Readings Selection Drop-Down Menu
 B—Working Width
 C—Speed
 D—Speed Source

JS56696,0000711-19-05APR10

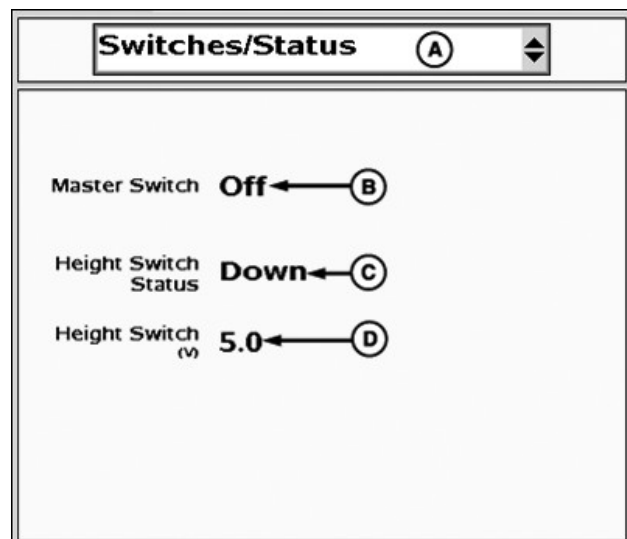
System Voltages Readings



PC12255—UN—06OCT09

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

Switches/Status Readings



PC12259—UN—06OCT09

- A—Readings Selection Drop-Down Menu
 B—Master Switch Status
 C—Height Switch Status
 D—Height Switch Voltage

NOTE: Height switch is only available on liquid fertilizer tools.

JS56696,0000712-19-05APR10

Sensors/Status Readings

PC12978—UN—27OCT10

- A—Readings Selection Drop-Down Menu
 B—Pressure Sensor Voltage
 C—Calibration Points
 D—Pressure
 E—Slope

NOTE: This option will only be available if a pressure sensor has been configured.

CZ76372,00001F5-19-27OCT10

Tests

PC12607—UN—12MAY10

- A—Readings Tab
 B—Tests Tab
 C—Test Type Drop-Down Menu

JS56696,0000714-19-14OCT09

Calibrate Flowmeter - Catch

PC13156—19—17FEB11

This message will be displayed when any diagnostics test is selected on sprayer or liquid fertilizer applications that will discharge liquid.

HC94949,00004F2-19-01MAY14

Calibrate Flowmeter - Catch

PC12608—UN—12MAY10

Calibration Test

- A—Tests Drop-Down Menu
 B—Catch Test Description
 C—Enabled Sections
 D—Left Sections Off
 E—Left Sections ON
 F—Left Fence Row Nozzles
 G—Right Fence Row Nozzles
 H—Right Sections ON
 I—Right Sections OFF
 J—Calibrate Flowmeter

The Calibrate Flowmeter - Catch test allows the operator to catch product and enter the exact amount caught to calibrate the flowmeter.

Catch Test Description (B) - Adjusts the calibration valve

by dispensing product into a container without moving the machine and entering amount collected.

Place containers (such as calibration container) under up to 7 nozzles to capture volumes sprayed during the test. Only 7 samples may be entered into the sample volumes popup screen. Calibrating Flowmeter may be repeated as many times as needed if all nozzles are to be tested. By measuring these samples and entering the values into the system, an accurate flowmeter calibration value can be attained. Follow the on-screen instructions as described.

1. Configure the control valve and flowmeter in Setup (Softkey G).
2. Select Calibrate Flowmeter - Catch from the Tests drop-down menu.
3. **Be sure the flowmeter is clean.**

Calibrate Flowmeter

Enter the values below.
Test time must be between 10 seconds and 10 minutes.

(A) Number of Nozzles that will Spray (B) 0

Test Speed (mi/h) (C) 0.0

Rate (gal/ac) (D) 0.0

Volume to Dispense per Nozzle (fl oz) (E) 0

Estimated Test Time (mm:ss) 0:00 (F)

(G) [Next Page Button]

PC12264—UN—15SEP09

A—Enter the values below. Test time must be between 10 seconds and 10 minutes.

B—Number of nozzles that will spray

C—Test Speed

D—Rate

E—Volume to dispense per nozzle

F—Estimated test time

G—Next Page

4. Enable the sections to spray and select the Calibrate Flowmeter button.

IMPORTANT: Always fill the solution tank with clean water to do a proper calibration test.

5. Enter calibration test parameters.

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

Calibrate Flowmeter

(A) → Turn Master Switch on.

(B) → Press Start to begin test.

(C) Master On (D) Start

Test Progress (E)

Started

(F) Note: Turn Master Switch off to cancel the test.

(G) Enable Pump (H) [Back Button]

PC14153—UN—01NOV11

Calibration Test

A—Turn Master Switch ON.

B—Select Start to begin test.

C—Master Switch Indicator

D—Start Button

E—Test Progress

F—Note: Turn Master Switch OFF to cancel the test.

G—Enable Pump Checkbox

H—Previous Page

6. Turn Master Switch on, Enable Pump (G), start test, and collect samples.

NOTE: Enable Pump checkbox (G) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

- Ensure sample containers are properly positioned.
- Turn the Master Switch on.
- Check Enable Pump checkbox (G) if it is displayed.
- Select the "Start" button (D) on the screen.

Calibrate Flowmeter

A Enter sample volume(s)

B Accept new calibration value

C Take additional samples as necessary

D Sample Amounts

E Average Sample Size (fl oz) **12**

F Old Calibration Value **160**

G New Calibration Value **134**

H Take Another Sample

Sample (fl oz)

1	0
2	0
3	0
4	0
5	0
6	0
7	0

PC12325—UN—07OCT09

- A—Enter Sample Values
 B—Accept New Calibration Value
 C—Take additional Samples As Necessary
 D—Sample Amounts
 E—Average Sample Size
 F—Old Calibration Value
 G—New Calibration Value
 H—Take Another Sample

- Enter the collected sample volumes on the popup screen.
 - Enter the measured amounts collected from each container.
 - If fewer than 7 samples were collected, leave remaining values set to 0.
 - Select "Take Another Sample" if additional samples are desired.
- Repeat steps 4—7 as necessary.
 - If it is desired to collect samples from other sprayer sections and/or nozzles in order to further confirm test results, select the cancel button and repeat steps 4—7.
- Accept new calibration value.
 - Select the accept button to accept the New Calibration Value.
- Turn Master Switch OFF at any time to cancel test.

BA31779,00002B0-19-10NOV11

Calibrate Flowmeter - Applied

The Calibrate Flowmeter - Applied test allows the operator to apply an amount of product and enter that known amount to calibrate the flowmeter.

Applied Product Test Description: Adjusts the calibration

value by comparing the rate controller's amount applied to the actual amount applied.



Setup Softkey

PC21157—UN—11MAY15

- Select the Setup softkey and configure the control valve and flowmeter.

NOTE: Master switch must be OFF to enter data.

A → **Calibrate Flowmeter - Applied**

Applied Product Test Description:
Adjusts the calibration value by comparing the rate controller's amount applied to the actual amount applied.

- Configure the control valve and flowmeter in Setup.
- Be sure the flowmeter is clean.
- Press Start to begin accumulating applied product.
- Apply product to field.
- Press Stop to end accumulation.

Start **B**

6. Once amount is known, press Calibrate Flowmeter.

Calibrate Flowmeter

PC25193—UN—11JAN18

Calibrate Flowmeter - Applied

- A—Tests Drop-Down Menu
 B—Start Button

- Select Calibrate Flowmeter - Applied from the Tests drop-down menu (A).
- Ensure that the flowmeter is clean.
- Select the Start button (B) to begin accumulating applied product.

NOTE: While product is being applied, the operator can navigate away from this page and return once enough product has been applied to complete the calibration.

- Apply product to field.

Calibrate Flowmeter - Applied

Applied Product Test Description:
Adjusts the calibration value by comparing the rate controller's amount applied to the actual amount applied.

1. Configure the control valve and flowmeter in Setup.
2. Be sure the flowmeter is clean.
3. Press Start to begin accumulating applied product.
4. Apply product to field.
5. Press Stop to end accumulation.

Stop **A** Accumulating... 391 gal

6. Once amount is known, press Calibrate Flowmeter.

Calibrate Flowmeter

PC25194—UN—11JAN18

A—Stop Button

6. Select the Stop button (A) to end accumulation.

Calibrate Flowmeter - Applied

Applied Product Test Description:
Adjusts the calibration value by comparing the rate controller's amount applied to the actual amount applied.

1. Configure the control valve and flowmeter in Setup.
2. Be sure the flowmeter is clean.
3. Press Start to begin accumulating applied product.
4. Apply product to field.
5. Press Stop to end accumulation.

Start Ready to Calibrate 391 gal

6. Once amount is known, press Calibrate Flowmeter.

Calibrate Flowmeter **A**

PC25196—UN—11JAN18

A—Calibrate Flowmeter Button

7. Once amount is known, select the Calibrate Flowmeter button (A).

Calibration Test

Enter amount of product applied and accept new calibration value.

Amount Accumulated by Rate Controller 391 gal

Actual Amount Applied 380 **A** gal

Old Calibration Value New Calibration Value

745 766

B

PC25197—UN—11JAN18

A—Actual Amount Applied Input Box

B—Accept Button

8. Enter the Actual Amount Applied (A).

9. To save the new calibration value, select the Accept button (B).

RW00482.0000205-19-22FEB18

Configuration Test

WARNING

Running this test will discharge liquid from the nozzles.

To avoid injury from exposure to chemicals, use clean water and appropriate personal protective equipment.

If necessary, use the master switch to stop application.

5:36:00 OK

PC13156—19—17FEB11

This message will be displayed when any diagnostic test is selected on sprayer or liquid fertilizer applications that will discharge liquid.

	Flow (gal/min)	Variance (%)
1. Test Started	0.0	0
2. Agitator Test	0.0	0
3. Section Valve Test	0.0	0
4. Flow Control Test	0.0	0
5. Test Complete	0.0	0

PC14154—UN—01NOV11

Configuration Test

- A—Tests Drop-Down Menu
 B—Master Switch Indicator
 C—Start Configuration Test Button
 D—Enable Pump Checkbox
 E—Test Started
 F—Agitator Test
 G—Section Valve Test
 H—Flow Control Test
 I—Test Complete

The operator can run a configuration test to ensure that the system is functioning properly.

IMPORTANT: Always fill the solution tank with clean water to do a proper configuration test.

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

To begin configuration test:

1. Select Configuration test from the tests drop-down menu (A).
2. Turn the Master Switch ON.
3. Enable Pump checkbox (D) if it is displayed.

NOTE: Enable Pump Checkbox (D) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

4. Select Start button (C) on the screen.

When the test is started, the following procedures are automatically performed in sequence:

1. The agitator valve (if equipped) is opened for 15 seconds.
2. Each boom section valve is individually cycled on/off for approximately 6 seconds, starting with the left-

most boom, and moving from left to right then back from right to left. All boom section valves are then turned on for approximately 10 seconds.

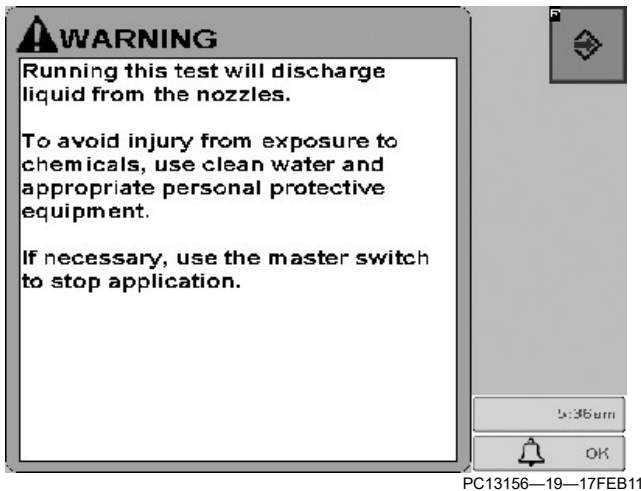
3. The flow control valve is tested across the entire range of flow. The results are displayed on in the Flow / Variance table on the screen. A low Variance % indicates a properly functioning flow control valve.

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

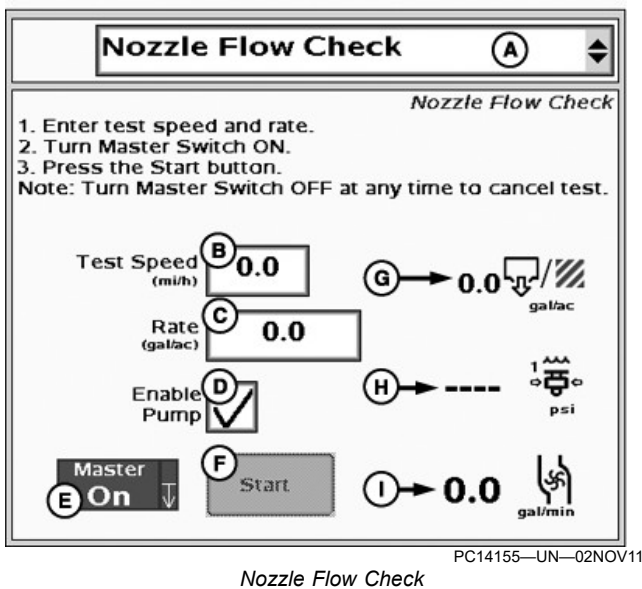
- Ensure to enter the correct calibration value for the control valve type (or a similar valve type) that is being used. This value is a starting point and can be tuned specific to your system.
- The lower the Variance (%), the better the GreenStar Rate Controller is able to control at a desired flow rate. There are a few issues that might cause the variance on the configuration test to be inconsistent:
 - Low pump speed (low flow through SCV).
 - The amount of liquid in the sprayer tank. For example, if the liquid in the sprayer tank is low and the back of the sprayer is on a down hill slope, it may not be able to draw in enough liquid to achieve the higher flow rates.
- System operating parameters (example: tractor speed, pump speed, etc.) may need to be adjusted to increase performance at certain levels.

HC94949,00004F3-19-01MAY14

Nozzle Flow Check Test



This message will be displayed when any diagnostic test is selected on sprayer or liquid fertilizer applications that will discharge liquid.



- A—Tests Drop-Down Menu
- B—Test Speed Input Box
- C—Rate Input Box
- D—Enable Pump Checkbox
- E—Master Switch Indicator
- F—Start Nozzle Flow Check Button
- G—Rate
- H—Pressure
- I—Flow

Nozzle Flow Check is a procedure to check your application rate at a desired speed while the machine is not moving. The following items can be determined:

- If the actual application rate can meet the target application rate at a given speed.
- The actual flow rate in lpm (gpm) out of the implement section.

- Whether the nozzles are worn.
- The pressure at the spray control valves given a desired speed and application rate.

IMPORTANT: Always fill the solution tank with clean water to do a proper nozzle flow check.

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

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

1. Select Nozzle Flow Check from the tests drop-down menu.
2. Enter a Test Speed such as 10 km/h (6.2 mph).
3. Enter a desired spray "Rate" such a 94 l/hect (10 gal/ac).
4. Set pump to normal operating speed.
5. Turn the Master Switch ON.
6. Check Enable Pump checkbox (D) if it is displayed.

NOTE: Enable Pump Checkbox (D) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

7. Select the Start button on the screen.

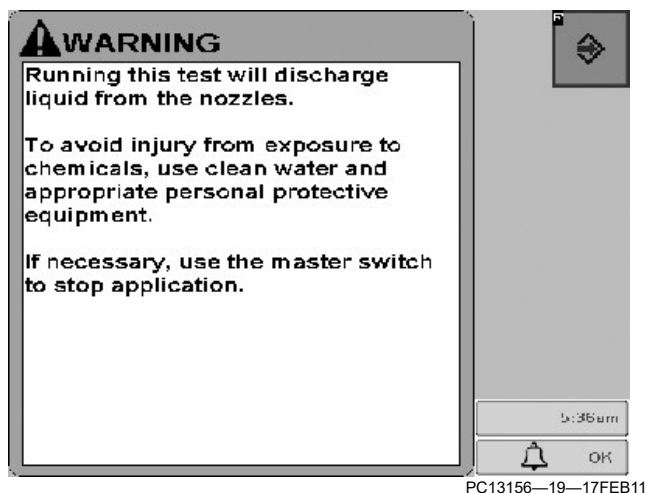
NOTE: Speed and rate can be changed while test is running.

8. If the volume is higher than expected and pressure is lower than expected, nozzle tips could be worn.

If the pressure is higher than expected for the given output, nozzle tips could be partially plugged. Also, a pressure drop could be occurring from the section shut-off valves to nozzle tips (normally only associated with high flow rates.)

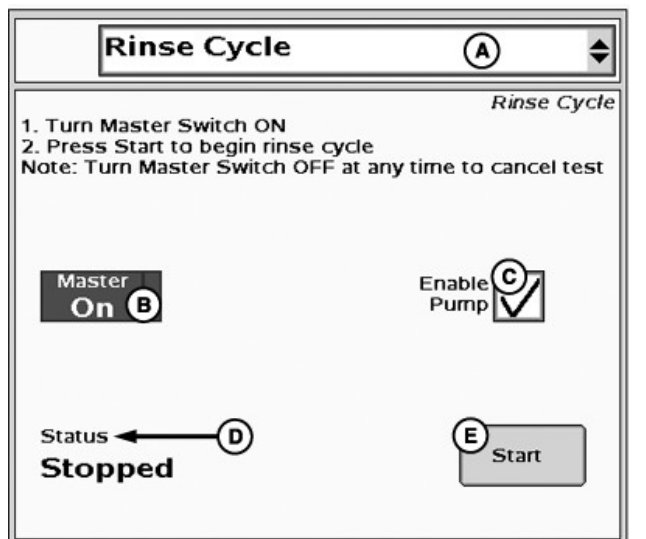
HC94949,00004F4-19-01MAY14

Rinse Cycle



PC13156—19—17FEB11

This message will be displayed when any diagnostic test is selected on sprayer or liquid fertilizer applications that will discharge liquid.



PC14156—UN—02NOV11

Rinse Cycle

- A—Tests Drop-Down Menu
- B—Master Switch Indicator
- C—Enable Pump Checkbox
- D—Rinse Cycle Status
- E—Start Rinse Cycle Button

The operator can select a Rinse Cycle test, which will open all of the section and fence row valves and the flow control valve fully. After pressing the Start button, the system will run until the flow meter detects reduced flow.

IMPORTANT: Always fill the solution tank with clean water to do a proper rinse cycle.

To begin Rinse Cycle:

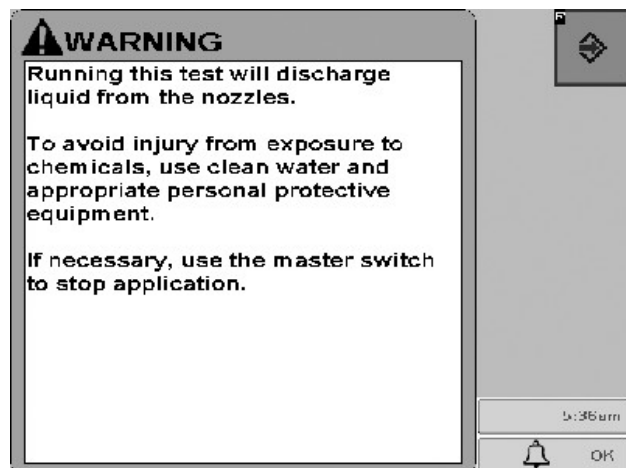
1. Select Rinse Cycle from the tests drop-down menu.
2. Turn the Master Switch ON
3. Check Enable Pump checkbox (C) if it is displayed.

NOTE: Enable Pump checkbox (C) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

4. Select Start to begin rinse cycle.

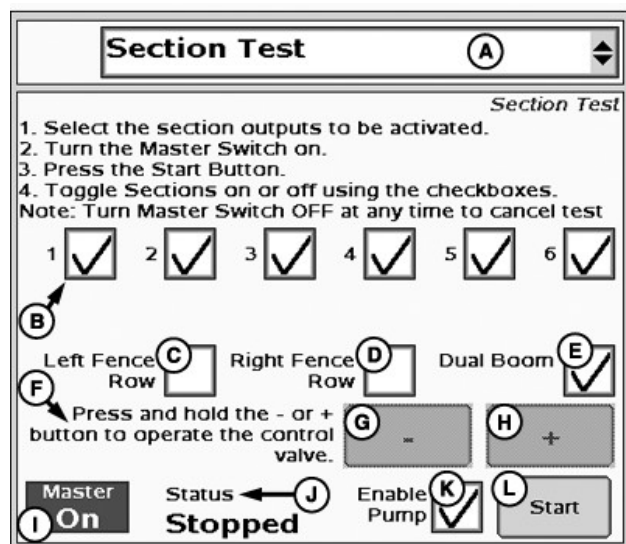
HC94949,00004F5-19-01MAY14

Section Test



PC13156—19—17FEB11

This message will be displayed when any diagnostic test is selected on sprayer or liquid fertilizer applications that will discharge liquid.



PC14157—UN—02NOV11

Section Test

- A—Test Type Drop-Down Menu
- B—Section Checkboxes
- C—Left Fence Row Check Box
- D—Right Fence Row Check Box
- E—Dual Boom Check Box
- F—Press and hold the - or + button to operate the control valve.
- G— - Button
- H—+ Button
- I—Master Switch Indicator
- J—Test Status
- K—Enable Pump Checkbox

L—Start Section Test Button

To begin Section test:

1. Select Section Test from the tests drop-down menu.
2. Select the section/fence row nozzle outputs to be activated.
3. Turn the Master Switch ON.
4. Check Enable Pump checkbox (K) if it is displayed.

NOTE: Enable Pump checkbox (K) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

5. Select Start button on the screen.
6. Toggle sections/fence row nozzles on or off using the checkboxes.

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

HARDI Section Bypass (Constant Flow) Valves

To set up HARDI Section Bypass (Constant Flow) Valves, follow these instructions:

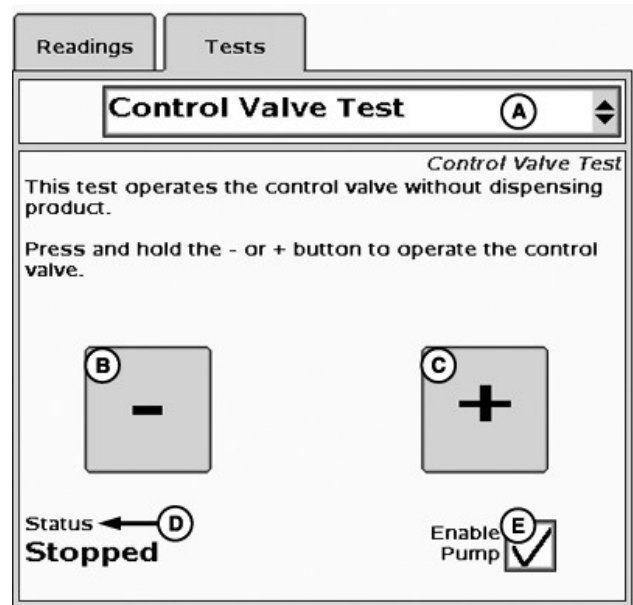
1. Ensure all sections are turned on and fence row nozzles are turned off
2. Set a normal operating flow rate/pressure using the + and – buttons.
3. Note the pressure on the HARDI pressure gauge located near the section bypass (Constant Flow) valves.
4. Switch off the 1st section (left-most section).
5. Adjust the flow bypass on the first (left-most) valve to restore the gauge pressure to the pressure noted in Step 3.
6. Repeat the process by switching off the next section and restoring the pressure.

NOTE: Sections that are selected will open while the test is in progress. Non-selected sections will remain closed.

NOTE: Dual boom box will be hidden if dual boom is not configured.

NOTE: Fence row nozzle boxes will be hidden if not configured.

HC94949,00004F6-19-01MAY14

Control Valve Test

PC14160—UN—10NOV11

Control Valve Test

- A—Tests Drop-Down Menu**
B— Button
C—+ Button
D—Control Valve Test Status
E—Enable Pump Check Box
F—

This test operates the control valve without dispensing product.

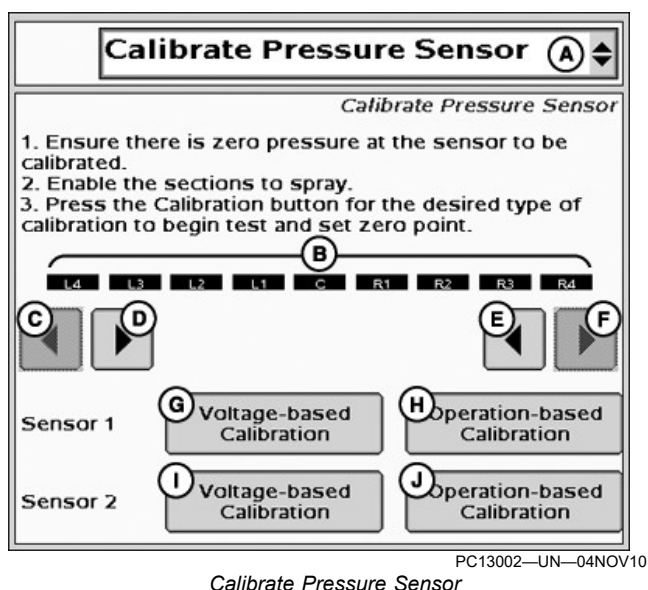
NOTE: This test is not available with Fast Close and PWM Close control valves.

Enable Pump Checkbox (E) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

Press and hold the - or + button to operate the valve.

BA31779,00002CC-19-10NOV11

Calibrate Pressure Sensor



A—Tests Drop-Down Menu

B—Enabled Sections

C—Left Sections Off

D—Left Sections ON

E—Right Sections OFF

F—Right Sections ON

G—Sensor 1 Voltage-based Calibration

H—Sensor 1 Operation-based Calibration

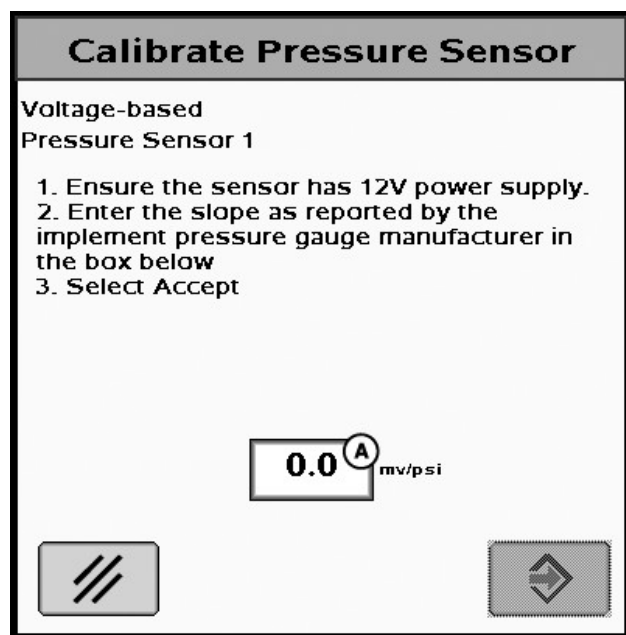
I—Sensor 2 Voltage-based Calibration

J—Sensor 2 Operation-based Calibration

The Calibrate Pressure Sensor option is only available in the Tests drop-down menu when at least one Pressure Sensor Enable/Disable box is checked on the Setup >> Systems Tab.

There are two options for calibrating a pressure sensor. The Operation Based Calibration requires that two calibration points be entered and is used when the slope of the pressure sensor is not known. The Voltage Based Calibration can be used when the slope of the pressure sensor is known and only requires a zero point.

1. Ensure there is zero pressure at the sensor to be calibrated.
2. Enable the sections to spray.
3. Press the Calibration button for the desired type of calibration to begin test and set zero point.



A—Sensor Slope Input Box

Voltage-based Calibration

1. Ensure the sensor has 12V power supply.

NOTE: Check with sensor manufacturer to ensure that sensor can accept 12V power.

2. Enter the slope as reported by the implement pressure gauge manufacturer in the box below.

3. Select Accept.

NOTE: Sensor power can be connected to the ECU Power pin (pin 26 of 37-pin connector) to provide 12V.

NOTE: For Raven pressure sensors with a 12V power supply the slope will be 16 mV/psi.

Calibrate Pressure Sensor

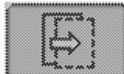
Operation-based 1 2

Pressure Sensor 1

1. Set the pump to the normal operating speed.
2. Turn master switch on.
3. Proceed to the next step. This will commence product application.





PC14158—UN—02NOV11

Calibrate Pressure Sensor

Calibrate Pressure Sensor

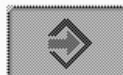
Operation-based 1 2

Pressure Sensor 1

1. Enter the pressure in the box below as reported by the implement pressure gauge.
2. Turn master switch off.
3. Select Accept.





PC13001—UN—04NOV10

Calibrate Pressure Sensor

A—Master Switch Indicator
 B—Enable Pump Checkbox

Operation-based Calibration

1. Set the pump to the normal operating speed.
2. Turn master switch on.
3. Check Enable Pump checkbox (B) if it is displayed.

NOTE: Enable Pump checkbox (B) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

4. Proceed to the next step. This will commence product application.

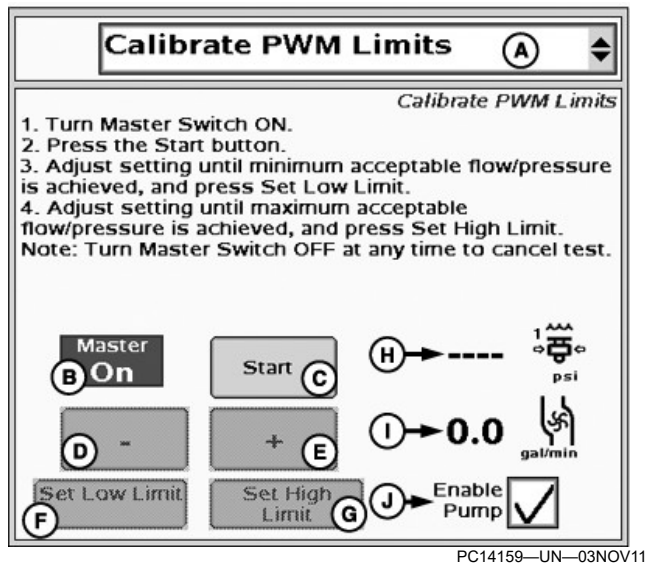
A—Master Switch Indicator
 B—Pressure Input Box

1. Enter the pressure in the box below as reported by the implement pressure gauge.
2. Turn master switch off.
3. Select Accept.

NOTE: The system will spray for 30 seconds maximum. Once the system has stabilized the value from the gauge, it must be entered during this period of time.

BA31779,00002B8-19-10NOV11

Calibrate PWM Limits



Calibrate PWM Limits

- A—Tests Drop-Down Menu
- B—Master Switch Indicator
- C—Start Button
- D—Decrease Button
- E—Increase Button
- F—Set Low Limit Button
- G—Set High Limit Button
- H—Pressure
- I—Flow
- J—Enable Pump

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

1. Turn Master Switch On.
2. Check Enable Pump (J) if it is displayed.

NOTE: Enable Pump (J) will only be displayed if control valve type is PWM and Pump Enable checkbox was selected in PWM settings.

3. Press the Start Button.
4. Adjust setting until minimum acceptable flow/pressure is achieved, press Set Low Limit.
5. Adjust setting until maximum acceptable flow/pressure is achieved, and press Set High Limit.

BA31779,00002B9-19-03NOV11

Troubleshooting

GreenStar Rate Controller Trouble Codes

Fault Code Number	Description	Recommended Initial Action
GRC 158.03	Switched Supply Voltage High	Contact dealer.
GRC 158.04	Switched Supply Voltage Low	Contact dealer.
GRC 628.12	Control Unit Programming	Contact dealer.
GRC 629.12	Control Unit Fault	Contact dealer.
GRC 630.13	Configure System	See owners manual and calibrate system.
GRC 630.14	SeedStar Configuration Conflict	Verify SeedStar and GreenStar Rate Controller settings match.
GRC 639.14	CAN Communications Error	Contact dealer.
GRC 1871.02	No Height Switch data	Check settings on Implement tab.
GRC 1871.14	Multiple Height Switches	Check settings on Implement tab.
GRC 3130.17	Low Tank Volume	Check tank level shown on display. Adjust if necessary.
GRC 3132.03	Pressure Above Maximum Level - Sensor 1	Check settings on the Alarms tab. Adjust if necessary.
GRC 3132.04	Pressure Below Minimum Level - Sensor 1	Check settings on the Alarms tab. Adjust if necessary.
GRC 3133.01	Solution Pump Dry	Check actual tank level and flow meter.
GRC 3133.31	Solution Pump Not On	Check Enable Pump checkbox to turn on pump.
GRC 3509.03	Sensor Supply Voltage for Pressure Sensor High	Contact dealer.
GRC 3509.04	Sensor Supply Voltage for Pressure Sensor Low	Contact dealer.
GRC 3510.03	Sensor Supply Voltage for Flow Meter High	Contact dealer.
GRC 3510.04	Sensor Supply Voltage for Flow Meter Low	Contact dealer.
GRC 521529.03	Pressure Above Maximum Level - Sensor 2	Check settings on the Alarms tab. Adjust if necessary.
GRC 521529.04	Pressure Below Minimum Level - Sensor 2	Check settings on the Alarms tab. Adjust if necessary.
GRC 523350.30	Implement Height Switch Malfunction	Verify implement height switch is installed.
GRC 523394.00	Unexpected Product Flow Detected	Contact dealer.
GRC 523394.01	No Flow Detected	Check actual tank level and flow meter.
GRC 523394.16	Application Rate Above Maximum Level	Check settings on the Alarms tab. Adjust if necessary.
GRC 523394.18	Application Rate Below Minimum Level	Check settings on the Alarms tab. Adjust if necessary.
GRC 523823.00	Application Speed Exceeded	Operate at lower vehicle speed.
GRC 523935.06	Driver Over-Current	Contact dealer.
GRC 523966.31	GreenStar Rate Controller Limp Home Mode Enabled	Check limp home fuse in GreenStar Rate Controller harness.
GRC 524158.02	Planter Adapter Harness Fault	Contact dealer.

BA31779,00002AD-19-10NOV11

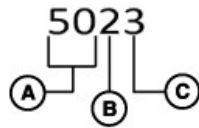
GreenStar Rate Controller Switch Box Trouble Codes

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	Contract dealer.
SBC 000639.14	CAN Communication Error	CAN Bus problem or GreenStar Rate Controller Switch Box has a CAN Bus error. Contract dealer.
SBC 523910.02	Controller Memory Corrupted	Contract dealer.
SBC 524058.02	Master Switch Conflict	Master switch digital inputs are not in a valid state. Contract dealer.

JS56696,00007AD-19-17MAY10

Control Valve Calibration Number Tuning



PC14715—UN—10FEB12

A—XX: Valve Speed
B—Y: Overshoot Reduction
C—Z: % Error Allowed

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 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.

HC94949,0000683-19-05DEC14

Observable Symptoms

Symptom	Problem	Solution
Unexpected application rate.	Incorrect rate type selected (gal./min. or gal./acre).	Select correct rate type.
Product does not shut off.	Valve does not respond to commands.	Select correct valve type.
2-Wire valve selection is not available.	Dual boom is selected.	Disable dual boom.
	More than seven sections are selected.	Assign less than eight sections.
Erratic implement section is not turning on or off.	Incorrect section valve type selected.	Select correct section valve type.
Application is erratic.	Calibration number is not set correctly.	Enter correct calibration number.
Trouble code is displayed for high pressure.	System pressure is high.	Select flow return in system setup.

Troubleshooting

Symptom	Problem	Solution
Trouble code is displayed for unexpected flow.	Constant flow is disabled when using a constant flow system with boom valve closed.	Select constant flow in system setup.
Flow is not applying at desired rate.	Incorrect application rate.	Ensure 10 gal./10 L unit is used.
	Minimum Flow rate feature causes over-application in areas where machine speed is low enough to activate Minimum Flow Rate.	Set minimum flow rate to 0 to disable feature.
	Flow per minute is not an option.	Ensure pressure sensor is installed.
Raven calibration number of 0043 is not optimal for controller.	PWM or PWM Close control valve is not referenced in chart.	Fine-tune calibration value for optimal performance.
System detects implement is down for an extensive period of time.	Height switch is disabled.	If height switch indicator does not match machine operation, service height switch.
Unexpected chemical flow detected.	Controller attempts to close section valves, but detects flow on a sprayer or liquid fertilizer system.	Shut off solution pump.
Unable to set up minimum and maximum alarms.	Minimum and maximum alarms are disabled.	Ensure pressure sensor is installed and configured.
Unable to set values.	System not allowing changes to values or settings.	Ensure Master Switch is off.
Unexpected anhydrous ammonia flow detected.	Controller attempts to close On/Off valve, but still detects flow.	Select button to turn off control valve.
	Controller attempts to close all valves, but still detects flow.	Follow instructions on Warning page on display.
Pressure sensors are not configured.	Pressure sensor 2 is not an option.	Ensure both sensors are configured.
Pump information drop-down does not appear.	Pump Enable checkbox is selected.	Ensure Enable Pump checkbox is not selected.
Unwanted minimum flow rate activation.	Over application in low speed areas.	Set minimum flow rate to 0 to disable function.

HC94949,0000624-19-16NOV23

Specifications

Main Harness (37-Pin Connector) Table

Pin	Function
1	Valve Ground
2	Valve Ground
3	Valve Power
4	Driver 1
5	Driver 2
6	Driver 3
7	Driver 4
8	Driver 5
9	Driver 6
10	Driver 7
11	Driver 8
12	Driver 9
13	Driver 10
14	Disconnect Switch 4 (for use in planter applications only)
15	Driver 16
16	Driver 15
17	Driver 14 (dual boom output)
18	Driver 13
19	Driver 12
20	Driver 11
21	Flowmeter Shield
22	Future Use
23	Future Use
24	Disconnect Switch 3 (for use in planter applications only)
25	Flowmeter #1 5 V DC
26	ECU Power (only use for a flowmeter sensor or pressure sensor requiring a 12 V power supply)
27	ECU Ground
28	Flowmeter #1 Signal
29	Pressure Sensor Ground
30	Pressure Sensor #1 5 V DC
31	Pressure Sensor #1 Signal
32	Disconnect Switch 1 (for use in planter applications only)
33	Disconnect Switch 2 (for use in planter applications only)
34	Pressure Sensor #2 5 V DC
35	Pressure Sensor #2 Signal
36	Valve Power
37	Valve Power

HC94949,0000625-19-22NOV19

Connector Information for Adapter Harness

Description	John Deere Part Number
37-Pin Connector Body (receptacle side)	57M9834
Cable Clamp for 37-Pin Connector Body	57M9870
Terminal Pin (14-18 gauge / 0.8 – 2.0 mm ²)	57M9439

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

RW00482,000095B-19-22NOV19

Recommended Wire Sizes

Minimum Recommended Wire Size—Metric (mm ²)					
Length (mm)	Current (A)				
	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 (A)				
	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

JS56696,0000762-19-13DEC17

Driver Output Table

Driver Number	Standard Sprayer (3-wire)	Hardi Sprayer (2-wire)	NH3 Tool	Planters
Driver 1	Section 1	Section 1 (+)	Section 1	Clutch 1
Driver 2	Section 2	Section 1 (-)	Section 2	Clutch 2
Driver 3	Section 3	Section 2 (+)	Section 3	Clutch 3

Specifications

Driver 4	Section 4	Section 2 (-)	Section 4	Clutch 4
Driver 5	Section 5	Section 3 (+)	Section 5	Clutch 5
Driver 6	Section 6	Section 3 (-)	Section 6	Clutch 6
Driver 7	Section 7	Section 4 (+)	Section 7	Clutch 7
Driver 8	Section 8	Section 4 (-)	Section 8	Clutch 8
Driver 9	Section 9 or Left Fence Row	Section 5 (+) or Agitator (+)	Section 9	Clutch 9
Driver 10	Section 10 or Right Fence Row	Section 5 (-) or Agitator (-)	Section 10	Clutch 10
Driver 11	Agitator Valve or Section 11	Section 6 (+) or Left Fence Row		Clutch 11
Driver 12	Return Valve or Section 12	Section 6 (-) or Right Fence Row		Clutch 12
Driver 13	Section 13	Section 7 (+) or Return (-)	Master On/Off Valve	Clutch 13
Driver 14	Dual Boom or Section 14	Section 7 (-) or Return (+)		Clutch 14
Driver 15	Control (+)	Control (+)	Control (+)	Clutch 15
Driver 16	Control (-)	Control (-)	Control (-)	Clutch 16

NOTE: Enabling optional features, such as fence row nozzles and agitators, reduces the number of section controls. For example, configuring a Hardi sprayer to use an agitator valve limits the number of boom section controls to four. Refer to table in the System Overview section.

RW00482,0000230-19-20FEB18

Maintenance

Preseason Checklist

In addition to performing checklist before season begins, utilize preseason checklist if any of the following occur:

- A different tractor or implement is introduced to system.
 - A hydraulic system component is repaired, replaced, or adjusted.
 - An Ag Management Systems (AMS) component is replaced.
- ☐ Refer to electronic Operator's Manual from Manuals. Deere.com or contact your John Deere dealer for latest version.
 - ☐ Update software. Refer to StellarSupport.com for latest software.
 - ☐ Display
 - ☐ Controller
 - ☐ Load and activate applications on display.
 - ☐ Inspect wiring harness for wear and damage around pinch points, corners, edges, and harness support locations. Repair as necessary.
 - ☐ Inspect connector seals and latching mechanisms. Repair as necessary.
 - ☐ Inspect connector pins for wear, debris, and corrosion. Clean and (or) repair as necessary.
 - ☐ ISO connector
 - ☐ Controller connectors
 - ☐ Display
 - ☐ Inspect mounting hardware. Retorque as necessary.
 - ☐ Display
 - ☐ Controller mount
 - ☐ Calibrate sensors and control values.
 - ☐ Verify switch functionality if switchbox is present.
 - ☐ Perform system voltage test.
 - ☐ Perform flow control test.

(Reference implement Operator's Manual for detailed checklists.)

NOTE: Some tests are not available depending on application.

HC94949,00005E4-19-03FEB15

Daily Checklist

- ☐ Inspect wiring harness for wear and damage around pinch points, corners, edges, and harness support locations. Repair as necessary.
- ☐ Inspect wiring harness at connectors for wear on exposed wires. Repair as necessary.
- ☐ Inspect mounting hardware. Retorque as necessary.

- ☐ Display
- ☐ Controller mount
- ☐ Run control unit diagnostic tests.
- ☐ Perform Control Valve test.
- ☐ Verify section status readings.
- ☐ Verify system voltage readings.
- ☐ Verify switches and status readings.
- ☐ Verify sensor and status readings.

(Reference implement Operator's Manual for detailed checklists.)

NOTE: When changing product, empty bin or tank, perform rinse cycle, and perform new product setup and calibration.

Some tests are not available depending on application.

HC94949,00005E5-19-13DEC17

Postseason Checklist

- ☐ Inspect wiring harness for wear and damage around pinch points, corners, edges, and harness support locations. Repair as necessary.
- ☐ Inspect wiring harness at connectors for wear on exposed wires. Repair as necessary.
- ☐ Inspect connector seals and latching mechanisms. Repair as necessary.
- ☐ Inspect connector pins for wear, debris, and corrosion. Clean and (or) repair as necessary.
 - ☐ ISO connector
 - ☐ Control unit connectors
 - ☐ Display
- ☐ Inspect mounting hardware. Retorque as necessary.
 - ☐ Display
 - ☐ Control unit mount
- ☐ Perform rinse cycle.

(Reference implement Operator's Manual for detailed checklists.)

NOTE: Some tests are not available depending on application.

HC94949,00005E6-19-13DEC17

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John Deere Service Literature Available

Technical Information

Technical information can be purchased from John Deere. Publications are available in print or CD-ROM format.

Orders can be made using one of the following:

- John Deere Technical Information Store: **www.JohnDeere.com/TechInfoStore**
- Call 1-800-522-7448
- Contact your John Deere dealer

Available information includes:



TS189—UN—17JAN89

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.



TS191—UN—02DEC88

OPERATOR'S MANUALS providing safety, operating, maintenance, and service information.



TS224—UN—17JAN89

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 a separate component technical manual.



TS1663—UN—10OCT97

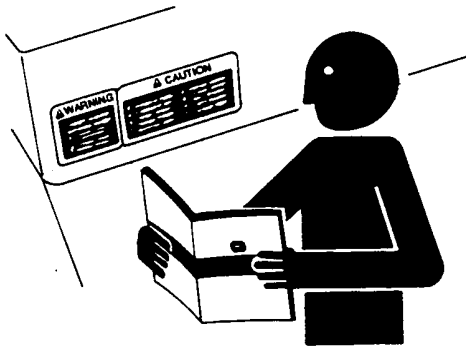
EDUCATIONAL CURRICULUM including five comprehensive series of books detailing basic information regardless of manufacturer:

- Agricultural Primer series covers technology in farming and ranching.
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- Fundamentals of Compact Equipment manuals provide instruction in servicing and maintaining equipment up to 40 PTO horsepower.

DX,SERV LIT-19-07DEC16

John Deere Service Keeps You on The Job

John Deere Is At Your Service



TS201—UN—15APR13

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.

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

