



# iGrade™ (S.N. PCXL01A or B)



JOHN DEERE



## OPERATOR'S MANUAL

iGrade™

OMPFP19003 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

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## 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](http://techpubs.deere.com).

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CZ76372,000071F-19-08OCT19

Serial Number: \_\_\_\_\_

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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

## 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

## 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

## 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.

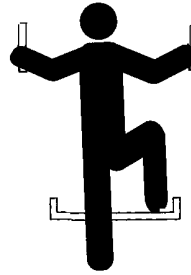
On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

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 can 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 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.

RR94114,0001FFA-19-18DEC14

### 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 is a trademark of Deere & Company  
iGuide is a trademark of Deere & Company  
iTEC is a trademark of Deere & Company*

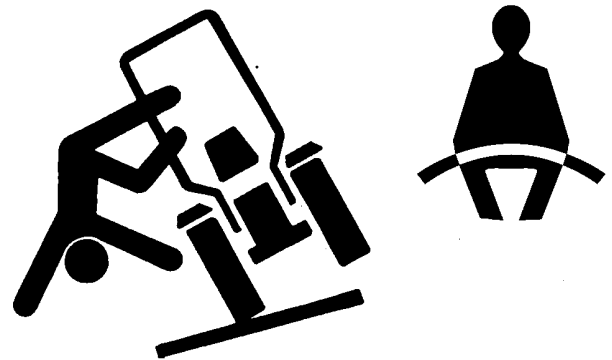
AutoTrac™ Turn Automation, AutoTrac™ Universal (ATU), RowSense™, and Machine Sync.

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*

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

## Operate Implement Automation Systems Safely



PC13793—UN—25MAY11

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

Implement automation systems are intended to aid the operator in performing field operations more efficiently. The operator is always responsible for the machine path.

Implement automation systems include any application that automates implement movement. This includes, but may not be limited to, iGrade™ and Active Implement Guidance.

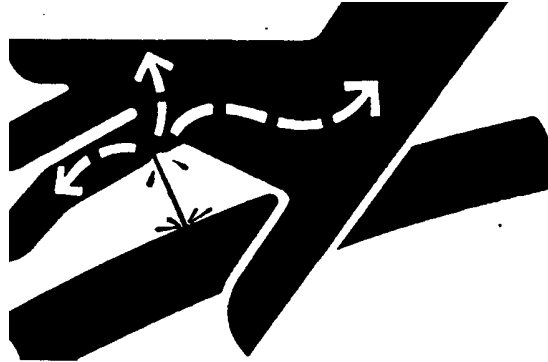
To prevent injury to the operator and bystanders:

- Verify the machine, implement, and automation systems are set up correctly.
- Remain alert and pay attention to the surrounding environment.
- Take control of the machine, 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.

CF86321.0000366-19-19DEC13

## Avoid High-Pressure Fluids



X9811—UN—23AUG88

Inspect hydraulic hoses periodically – at least once per year – for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braid or any other signs of wear or damage.

Replace worn or damaged hose assemblies immediately with John Deere approved replacement parts.

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available in English from Deere & Company Medical Department in Moline, Illinois, U.S.A., by calling 1-800-822-8262 or +1 309-748-5636.

DX,FLUID-19-12OCT11

# Regulatory and Compliance Information

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## EU Declaration of Conformity

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

The undersigned hereby declares that:

Product: Application Controller  
Models: XL01, XL02

fulfills all relevant provisions and essential requirements of the following directive:

| 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 normative documents:

ISO 14982: 1998

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 (Zentralfunktionen)  
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Mannheim, Germany D-68163

Place of declaration: Urbandale, Iowa, U.S.A  
Date of declaration: 27 April 2016

Name: Aaron Senneff  
Title: Manager - Software Development



DXCE01—UN—28APR09  
AE77568,00001D9-19-28APR16

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# Introduction

## Theory of Operation

iGrade™ is an active elevation control system which uses selective control valves (SCVs) to control implement height based off global positioning system (GPS) elevation data.

iGrade™ has four control types:

- **Grade Control** creates a desired slope by actual distance traveled, not linear distance. Grade control is not direction-dependent.
- **Plane Control** creates either a single slope or dual slope plane.
- **Distance Trip** triggers machine hydraulics based on distance traveled, or a low side driver to complete the circuit for an electronic device. For example, use distance trip to create irrigation bays for bedded crop irrigation or release seed while planting a test plot.
- **Remote Control** receives elevation data commands from another source for a desired plane or ditch design.

(Reference specific control type section for more information.)

iGrade™ utilizes latitude and longitude position from StarFire™ Receivers to obtain a plane or elevation point. To function properly, setup is crucial to performance.

RW00482,0000417-19-22JUN15

## iGrade™ Requirements

### Hardware:

- Application Controller 1100
- Various harnesses associated with power supply, controller integration, sensor communication, and steering control.

**NOTE:** iGrade™ does not use an implement feedback sensor.

### Display:

- GreenStar™ 3 2630 Display (recommended)
- GreenStar™ 2 2600 Display
- GreenStar™ 2 2100 Display
- GreenStar™ 3 CommandCenter™
- Generation 4 Display

**NOTE:** Generation 4 Displays do not support dual implement receivers.

### Receiver:

**NOTE:** It is crucial to system performance to use lowest serial numbered receiver on the front scraper and highest serial numbered receiver on rear scraper.

- StarFire™ 3000 or 6000 Receiver installed on machine.
- StarFire™ 3000 or 6000 Receiver installed on implement.
  - StarFire™ global navigation satellite system (GNSS) antenna is recommended.
- StarFire™ 3000 or 6000 Receiver installed on base station.

**NOTE:** StarFire™ 6000 Receiver is not compatible with external antennas.

- StarFire™ GNSS antenna is recommended.
- Choke ring antenna is optional.

### Software:

- Real time kinematic (RTK) activation on implement and base station receivers. Max Cut and Distance Trip require RTK activation on both the machine and implement receivers.
- AutoTrac™ activation on display (not required to steer system manually).
- iGrade™ activation on Application Controller 1100.
- Display software updated to latest version.

RW00482,000069A-19-15JUN18

## Navigate to Application Controller Using Generation 4 Display

**NOTE:** Turn key OFF and allow the display to completely power down before connecting or disconnecting ISOBUS implements.

This Operator's Manual provides instructions for using a GreenStar™ 3 2630 Display. If using a Generation 4 Display, these instructions are the same after navigating to the Application Controller 1100.



Menu Button

PC17269—UN—15JUL13

1. Select the Menu button.

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

AutoTrac is a trademark of Deere & Company



Applications Tab

PC21496—UN—05OCT15

2. Select the Applications tab.



ISOBUS VT Application

PC16682—UN—18MAR13

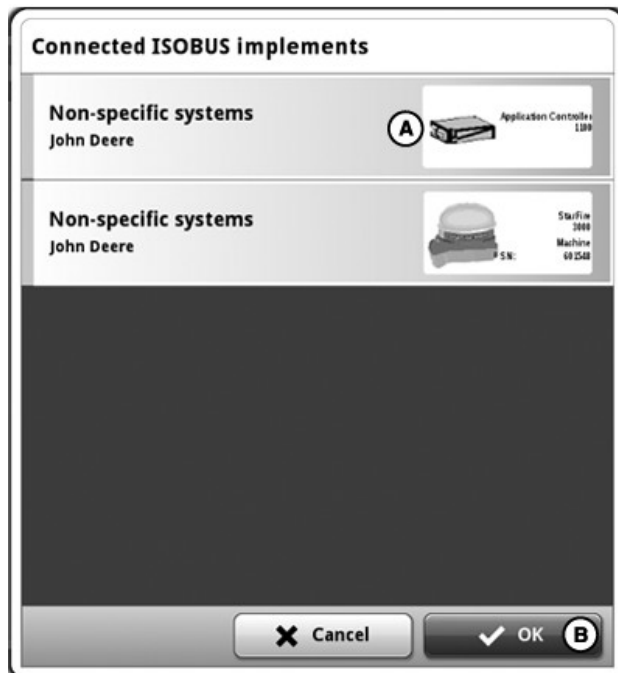
3. Select the ISOBUS VT application.



ISOBUS VT Menu Button

PC15293—UN—18MAR13

4. Select the ISOBUS VT Menu button.



Connected ISOBUS Implements

PC22167—UN—23FEB16

A—Application Controller 1100 Button  
B—OK Button

5. Select the Application Controller 1100 button (A).
6. Select the OK button (B).

RW00482,00005AD-19-22MAR18

## Activate iGrade™

To operate iGrade™, a 26-digit activation code is required for Application Controller 1100. Contact your John Deere dealer and provide the application controller serial number found on controller.



Menu Button

PC8663—UN—29APR15

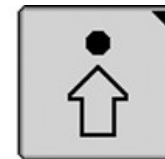
1. Select the Menu button.



Application Controller 1100 Button

PC14926—UN—27APR12

2. Select the Application Controller button.



Setup Softkey

PC12961—UN—13APR15

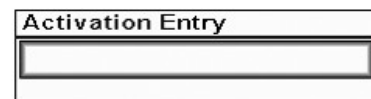
3. Select the Setup softkey.



Activation Entry Button

PC17966—UN—07NOV13

4. Select the Activation Entry button.



Activation Entry Box

PC17967—UN—07NOV13

5. Select the Activation Entry box and enter the activation code.



Accept Button

PC22267—UN—14MAR16

6. Select the Accept button.

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7. Shut off machine, wait for display to power down, then restart machine.

RW00482,000069B-19-05JUN18

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### **Replace Erasable Programmable Read-Only Memory (EPROM)**

EPROM is contained in tractor hydraulic controller. On some early models of 8000 and 9000 series tractors, it is necessary to replace EPROM. This may require replacing only the EPROM or the whole tractor hydraulic controller.

For more information on EPROM requirements and compatibility, contact your John Deere dealer.

RW00482,000048A-19-15APR15

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### **Machine Compatibility**

John Deere external valve kit adds hydraulic control to machines that do not come with factory installed hydraulic controls.

(Reference External Valve in Components section for more information.)

RW00482,00004EF-19-07MAY15

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# Softkey Legend

## Application Controller 1100—Setup Softkey



Setup Softkey

PC21157—UN—11MAY15

- Control Selection—Select control type for selective control valve (SCV) 1 or SCV 3.
- SCV Threshold Setup—Enter extend and retract threshold and valve test on or off.
- Serial Port Setup—Set up serial port communications.
- I/O Voltages—View Input / Output (I/O) voltage readings.
- Activation Entry—Enter Application Controller 1100 specific activations.

RW00482,00004F0-19-29JUL15

## Application Controller 1100—Main Softkey



Main Softkey

PC21156—UN—11MAY15

- Control Main—View information and select operational functions for selected control type (SCV 1 or SCV 3).
- Control Setup—Set up and enter required inputs for selected control type (SCV 1 or SCV 3)
- Version Information—View application controller specific information, reset factory defaults, or turn CAN bus diagnostics on or off.

RW00482,00004F3-19-29JUL15

## GreenStar™—Mapping Softkey



Mapping Softkey

PC21152—UN—11MAY15

- Maps Tab—Change map settings, and view or record maps.

- Boundaries Tab—Set up client, farm, field, and boundaries.
- Flags Tab—Set up and flag point of interest.
- Multi-Machine Tab—Set up Machine Sync shared data and automation.

RW00482,00004F1-19-29JUL15

## GreenStar™—Guidance Softkey



Guidance Softkey

PC21148—UN—11MAY15

- View Tab—View map, select track name, change steering sensitivity, view AutoTrac™ pie chart, or turn AutoTrac™ steering on or off.
- Guidance Settings Tab—Set up tracking mode, general guidance settings, track settings, AutoTrac™ advanced settings, and lightbar settings.
- Shift Track Settings Tab—Set up shift track settings and turn shifts on or off.

RW00482,00004F4-19-29JUL15

## StarFire™ Receiver—StarFire™ Softkey



StarFire™ Softkey

PC21154—UN—11MAY15

- Info Tab—View general StarFire™ and global positioning system (GPS) information.
- Setup Tab—Set up StarFire™ mount direction, fore/aft, height, optimize shading, hours on after shutdown, and calibrate terrain compensation module (TCM).
- Activations Tab—Enter StarFire™ Receiver activations codes.
- Serial Port Tab—Set up or change serial port settings.

CZ76372,0000781-19-01DEC16

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

## StarFire™ Receiver—RTK Softkey



*RTK Softkey*

PC21155—UN—11MAY15

Select RTK softkey to set up real time kinematics (RTK) radios.

RW00482,00004F9-19-04MAY16

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## StarFire™ Receiver—Satellite Softkey



*Satellite Information Softkey*

PC21153—UN—11MAY15

- Sky Plot Tab—View sky plot and satellite tracking information.
- Graph Tab—View satellite tracking information in a graph.

RW00482,00004F6-19-04MAY16

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## StarFire™ Receiver—Diagnostics Softkey



*Diagnostics Softkey*

PC21158—UN—11MAY15

- Readings Tab—View StarFire™ and real time kinematics (RTK) information.
- Data Logs Tab—View StarFire™, differential mode, and satellite information.
- Over the Air Tab—View over the air messages.

RW00482,00004F7-19-04MAY16

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# System Components

## StarFire™ Receiver



PC23442—UN—02DEC16  
*StarFire™ 6000 Receiver*

The receiver uses navigation satellites along with the StarFire™ satellite and real time kinematic (RTK) corrections to determine machine and implement location, direction of travel, and elevation. An integrated terrain compensation module (TCM) adjusts machine position to compensate for uneven terrain.

Install the implement receiver less than 4.0 m (13.1 ft) above the ground level.

RW00482,00004AC-19-24JUN19

satellites are low on horizon or when signals reflect off a surface.

RW00482,00004AA-19-07AUG15

## Choke Ring Antenna (Optional)



PC20986—UN—17MAR15  
*Choke Ring Antenna*

A choke ring antenna is designed to be used on base stations with multipath issues to help reduce signal interference. A coaxial cable is required.

RW00482,00004AB-19-07AUG15

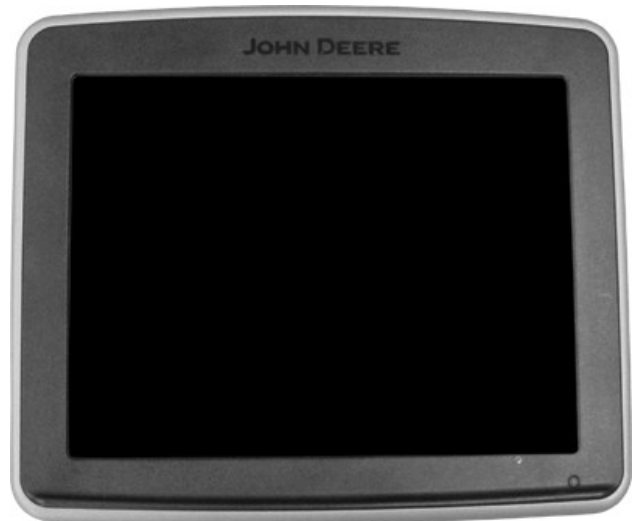
## StarFire™ Global Navigation Satellite System (GNSS) Antenna (Recommended)



PC20975—UN—16MAR15  
*GNSS Antenna*

Implement receivers may require a StarFire™ GNSS antenna if operating iGrade™ in high multipath conditions. High multipath conditions can occur when

## 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.

RW00482,000022F-19-07FEB18

## UCC2 Application Controller



PC20218—UN—07NOV14

UCC2 Application Controller with Harness

UCC2 Application Controller sends commands to machine hydraulic controller to operate implement hydraulic mechanism to cut or fill to desired elevation.

RW00482,000041A-19-07AUG15

## Counterbalance Valve



PC20217—UN—07NOV14

Counterbalance Valve

Counterbalance valve returns hydraulic fluid once pressure is present on supply side of valve. Counterbalance valve works in conjunction with hydraulic flow setting. When hydraulic flow is changed, counterbalance valve requires adjustment.

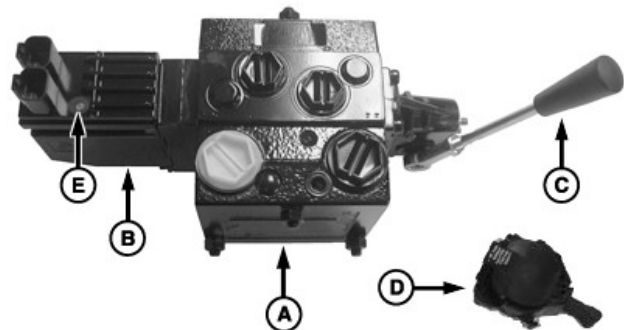
A counterbalance valve is required when machine hydraulic system does not regulate return flow. For optimal and consistent performance, install and properly adjust counterbalance valve.

The following machine models utilize CAN-based selective control valves (SCVs) requiring a counterbalance valve.

- 8030 series wheel tractors (S.N. 40001–)
- 8030 series track tractors (S.N. 905001–)
- 9030 series wheel tractors (S.N. 013000–)
- 9030 series track tractors (S.N. 911000–)
- All 7R, 8R, 8RT, 9R, and 9RT series tractors

RW00482,000041B-19-07AUG15

## External Valve



PC19688—UN—11JUN14

- A—Hydraulic Control Block
- B—Electronic Valve Body
- C—External Valve Control Lever
- D—Remotely Mounted Electronic SCV Control Lever

#### **E—LED Indicator**

External valve gives the UCC2 Application Controller the ability to control machine hydraulics. John Deere external valve design and functionality vary for open-center and closed-center hydraulic systems. Use external valve:

- If the UCC2 Application Controller does not have the ability to control machine hydraulics. Typically, this condition occurs in older machine models or machines that are not made by John Deere but are equipped with a John Deere guidance system and an ISO connector.
- To conserve machine selective control valve (SCV) connections. External valve can connect to an open SCV on machine or can use power beyond as a hydraulic power source from machine.

#### **John Deere External Valve Components**

Hydraulic control block (A) directs hydraulic flow to the hydraulic cylinders for implement position.

Electronic valve body (B) receives commands from the Application Controller and communicates them to the hydraulic control block.



**CAUTION: To avoid serious injury, keep area around equipment clear.**

**Moving external valve control lever (C) may cause implement to move.**

External valve control lever manually controls the hydraulic control block.

Remotely mounted electronic SCV control lever (D) manually controls the hydraulic control block from the operator's station.

LED indicator (E) provides system status of the electric valve body.

- Green—Valve is receiving commands from the control unit.
- Orange—Valve is powered up. No commands are being received from the control unit.
- Red—Indicates a problem.

(Reference Troubleshooting section.)

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RW00482,0000339-19-11JUN19

# System Setup

## Machine and Implement Setup

1. Connect implement.
2. Verify hydraulic hose routing.
3. Adjust selective control valves (SCVs).
4. Set up hydraulic control—selective control valve (SCV) thresholds.
5. Adjust counterbalance valve (if applicable).
6. Adjust scraper offsets.
7. Set up terrain compensation module (TCM) for machine (if equipped) and implement receiver.
8. Configure control type.

(Reference specific control type section for more information.)

- Grade Control
- Plane Control
- Distance Trip
- Topography Maps
- Remote Control—Serial Port

2. Connect implement receiver harness to ISO 9-pin connector (A).
3. Connect implement constant power harness to machine constant power connector.
4. If implement is configured with road lights, connect lighting harness to lighting connector (B).
5. Connect all other implement connections related to attaching equipment to tractor.

**NOTE:** Hydraulic hose routing is essential for proper operation. External valve has a *P* stamped for pressure hose connection, *T* for return or tank hose connection, and *LS* for load sense hose connection.

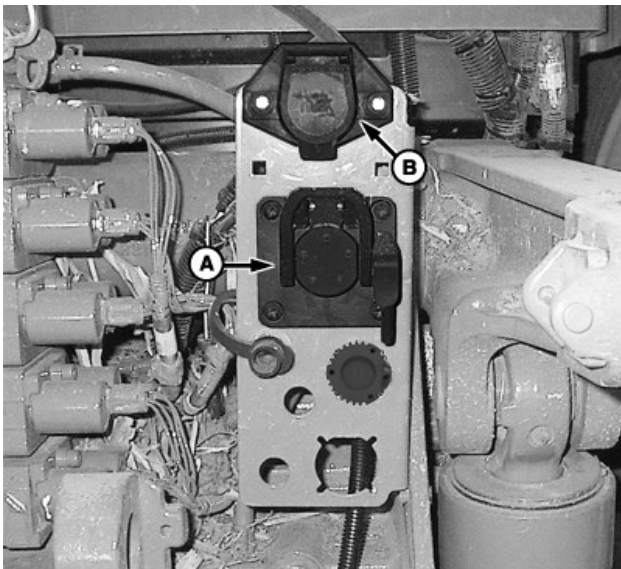
6. If external valve is used, connect pressure hose and return or tank hose from external valve to machine. If using power beyond to supply external valve, connect load sense hose.

(Reference machine Operator's Manual for additional information on attaching implement and implement hydraulics to machine.)

RW00482,00004A7-19-10AUG15

RW00482,000059A-19-05FEB16

## Connect Implement



PC21197—UN—27MAY15

Rear of Tractor Shown

A—ISO 9-pin Connector  
B—Lighting Connector

1. Shut off machine, set parking brake, and remove key.

**NOTE:** Do not connect implement when machine is on. Connecting while powered generates faults causing iGrade™ not to operate.

iGrade is a trademark of Deere & Company

## Verify Hydraulic Hose Routing

Hydraulic hose routing is essential for proper operation.

| Selective Control Valve (SCV) Position | Scraper Elevation Movement |
|----------------------------------------|----------------------------|
| Extend                                 | Raise                      |
| Retract                                | Lower                      |

If selective control valve (SCV) position does not match scraper movement, reverse hydraulic hose position in the SCV.

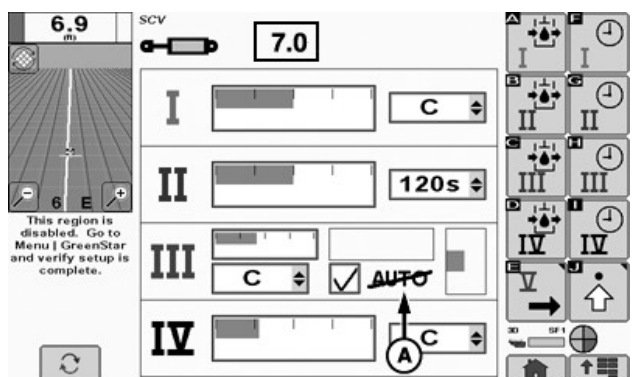
(Reference Cross Slope Control section for more information on cross slope scraper movement.)

RW00482,000052B-19-10AUG15

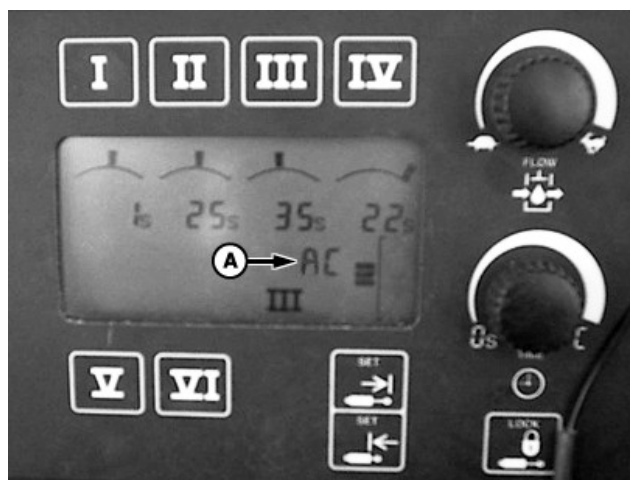
## Adjust Selective Control Valve (SCV)



Generation 4 CommandCenter™



GreenStar™ 3 CommandCenter™



TouchSet™

A—Auto Mode Indicator

**CAUTION:** Excessive SCV flow rate settings can cause sudden machine movement when the cylinder is operated. Verify that bystanders are clear of the machine to avoid injury before engaging SCV button to check current flow rate. Full extension or retraction of cylinder should take approximately 2 seconds.

To display auto mode indicator (A), automatic SCV control requires:

- Application controller installed.
- Control type selected for SCV 1 or 3.

(Reference Configure Control Type to select a control type.)

Automatic SCV control activates when SCV is placed in forward detent position.

- CommandCenter™—AUTO with a strike through it indicates that auto mode is not active. !AUTO! indicates a fault and that auto mode is inoperable. AUTO indicates normal auto mode operation.
- TouchSet™—EC indicates that auto mode is not active. AC indicates normal auto mode operation.

An SCV's detent flow setting applies to both extend and retract. The application controller automatically controls detent time when a control type is selected and auto mode is engaged.

Adjust detent flow for each operation.

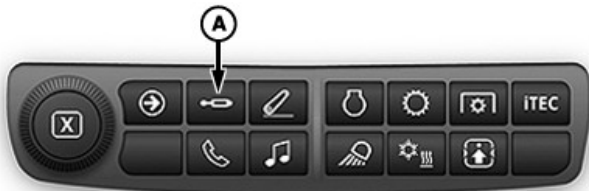
(Refer to machine Operator's Manual for more information on SCV controls.)

SCV can be operated to observe flow rate while in adjustment mode.

| SCV Flow Output (Approximate) |       |         |
|-------------------------------|-------|---------|
| SCV Flow Settings             | Flow  |         |
|                               | L/min | gal/min |
| 0.1 <sup>a</sup>              | —     | —       |
| 1.0                           | 3.6   | 1.0     |
| 2.0                           | 7.2   | 1.9     |
| 3.0                           | 10.2  | 2.7     |
| 4.0                           | 14.4  | 3.8     |
| 5.0                           | 19.2  | 5.0     |
| 6.0                           | 24.0  | 6.4     |
| 7.0                           | 31.2  | 8.2     |
| 8.0                           | 39.6  | 10.5    |
| 9.0                           | 65.4  | 17.2    |
| 10.0                          | 114   | 30.0    |

<sup>a</sup> 0.1 = Minimum Flow Setting

## Generation 4 CommandCenter™

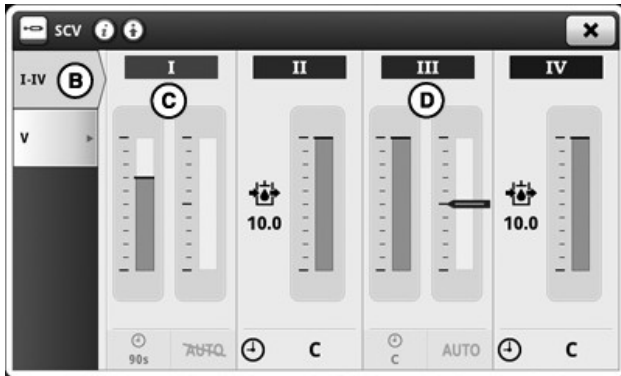


PC25700—UN—21MAY18

Navigation Bar

### A—SCV Shortcut

1. Select the SCV shortcut (A).

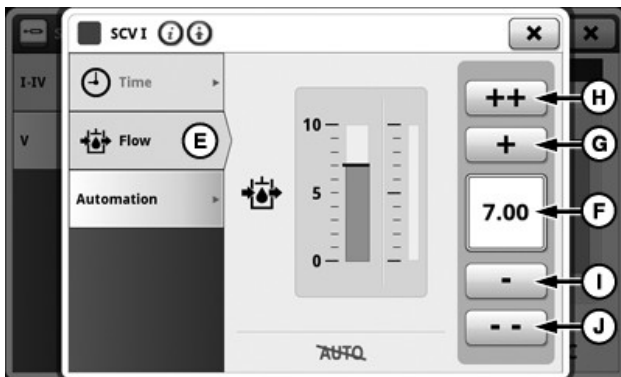


PC22198—UN—24FEB16

SCV Main Page

- B—SCV I-IV Tab
- C—SCV I
- D—SCV III

2. Select an SCV I-IV tab (B).
3. Select the SCV (C or D) being used.



PC22199—UN—24FEB16

SCV Detent Flow

- E—Flow Tab
- F—Detent Flow
- G—Small Increase (+)
- H—Large Increase (+ +)
- I—Small Decrease (-)
- J—Large Decrease (- -)

4. Select the Flow tab (E).

**NOTE:** Detent flow (F) is displayed in increments of 0.04 beginning at 0.04 through 10. Selecting small increase (+) (G) increases flow by 0.04, selecting large increase (+ +) (H) increases flow by 1.00, and selecting small decrease (-) (I) and large decrease (- -) (J) decreases flow setting by the same increments.



PC25701—UN—21MAY18

Navigation Bar

### K—Encoder Wheel

5. To increase flow, select small increase (+) or large increase (+ +). To decrease flow, select small decrease (-) or large decrease (- -). Turning the encoder wheel (K) also increases or decreases flow settings.

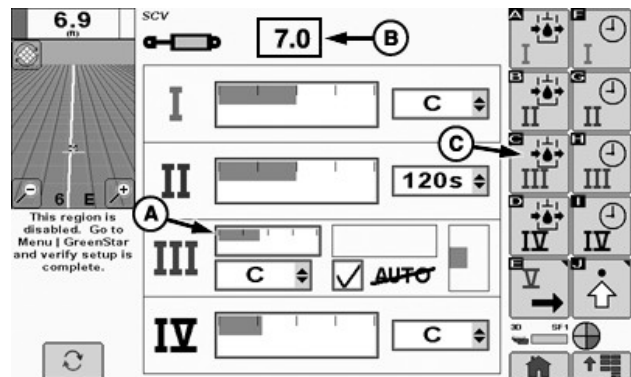
## GreenStar™ 3 CommandCenter™



RXA0117610—UN—10JUN11

CommandARM™ Menu Button > SCV Button > Advanced Settings Softkey

1. Select the Menu button.
2. Select the SCV button.
3. Select the Advanced Settings softkey.



PC22226—UN—10MAR16

SCV Home Page

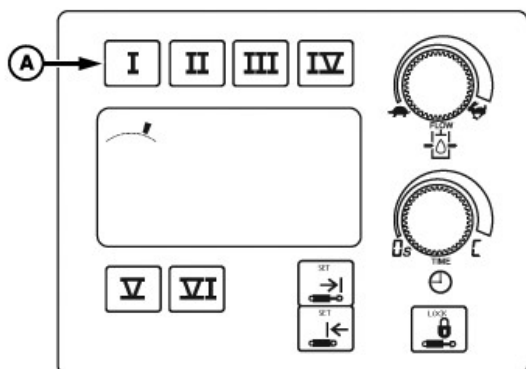
### A—Detent Flow Bar Graph

B—Detent Flow Value Box  
C—Extend Set Softkey

**NOTE:** Bar graph (A) depicts detent flow (B).

4. Select the Extend Set softkey (C) for SCV being used to navigate to detent flow bar graph. Select the Confirm button to highlight. Rotate the thumb wheel to adjust flow, then select the Confirm button.

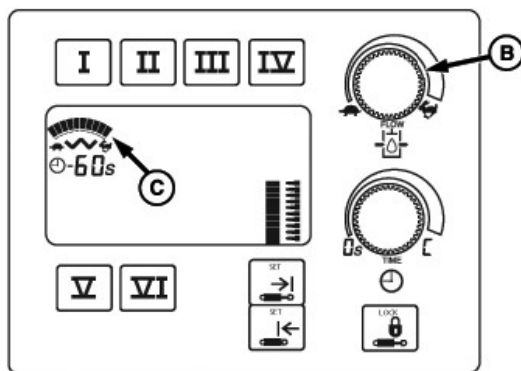
### TouchSet™ Display



PC17987—UN—07NOV13

#### A—SCV Selection Buttons

1. Select the button (A) for SCV being used. The screen under the SCV selection buttons displays previous flow rate.



PC17988—UN—07NOV13

B—Flow Adjustment Dial  
C—Bar Graph

**NOTE:** As operator turns the flow adjustment dial (B), the number of line segments increases or decreases as flow changes.

2. Turn the flow adjustment dial clockwise to increase flow or counterclockwise to decrease flow. Flow setting is displayed on the bar graph (C) when adjustments are made.

RW00482,000069C-19-05JUN18

## Set Up Hydraulic Control—Selective Control Valve (SCV) Threshold

**CAUTION:** To avoid serious injury, keep area around equipment clear. This procedure requires machine to move forward.

**Implement moves during calibration.**

**NOTE:** If using an external valve, set up external valve hydraulic control and do not set up SCV threshold.

(For more information, reference Set Up Hydraulic Control — External Valve.)

**NOTE:** Threshold values are unique for every SCV due to the normal manufacturing tolerances. To achieve optimal performance, fine-tune threshold value to lowest value that generates movement in the scraper.

SCV threshold setup is used to calibrate Application Controller 1100 to determine minimum amount of signal from the hydraulic control unit required before scraper moves. Without SCV threshold calibration, scraper may move significantly faster in one direction, undercompensate, overcompensate, or not perform as expected due to hydraulic limitations.

Perform SCV Threshold Setup:

- If values are set at 5 or 250 (factory defaults).
- If values are identical for the extend and retract settings.
- If values are copied from another machine.
- If hydraulic hose routing changes between SCV 1 and SCV 3.
- If a hydraulic component on machine is repaired.
- If counterbalance valve is adjusted.
- If hydraulic flow rate is adjusted.

### Set Up SCV Threshold:

If using dual scrapers or cross slope control, set up SCV thresholds for both SCV 1 and SCV 3.



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



PC14926—UN—27APR12  
Application Controller 1100 Button

2. Select the Application Controller 1100 button.



Setup Softkey

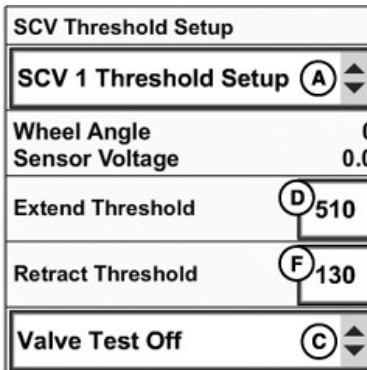
PC12961—UN—13APR15

3. Select the Setup softkey.

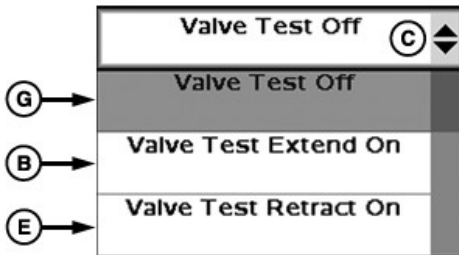


PC18039—UN—11NOV13  
SCV Threshold Setup Button

4. Select the SCV Threshold Setup button.



PC22106—UN—29JAN16



PC22105—UN—29JAN16



PC21160—UN—12MAY15  
Increase (+) SCV Threshold Button



PC21161—UN—12MAY15  
Decrease (-) SCV Threshold Button

A—SCV Threshold Setup Drop-Down Menu  
B—Valve Test Extend On

C—Valve Test Drop-Down Menu  
D—Extend Threshold  
E—Valve Test Retract On  
F—Retract Threshold  
G—Valve Test Off

5. Select the SCV being used from the drop-down menu (A).

**NOTE:** To calibrate the SCV threshold, machine must slowly move forward, faster than 0.72 km/h (0.45 mph), with selected SCV (1 or 3) detented to AC or AUTO. Implement does not need to be in lowered (working) position for calibration.

If machine is not moving faster than 0.72 km/h (0.45 mph), SCV control does not produce hydraulic flow.

(Refer to machine Operator's Manual for more information on SCV speed requirements.)

6. Drive machine forward, faster than 0.72 km/h (0.45 mph). Do not engage AutoTrac™.
7. Place the SCV in extend detent position, not float.
8. Select Valve Test Extend On (B) from the drop-down menu (C).
9. Adjust the Extend Threshold value (D). Select the decrease (-) SCV Threshold button until scraper does not move. Select the increase (+) SCV Threshold button until scraper moves at the slowest possible speed but still continuously moves.

**NOTE:** If the implement cylinder reaches maximum or minimum stroke during test, select the Valve Test Retract On (E) to reposition the cylinder.

- If the scraper height does not change, increase the Extend Threshold value until minimal movement is achieved.
- If the scraper moves quickly or erratically, decrease the Extend Threshold value.
- Repeat the procedure as required to obtain a slow, smooth, and constant change in scraper height.
- The Extend and Retract Threshold values may be different.

10. Select Valve Test Retract On from the drop-down menu.
11. Adjust the Retract Threshold value (F). Select the decrease (-) SCV Threshold button until scraper does not move. Select the increase (+) SCV Threshold button until scraper moves at the slowest possible speed but still continuously moves.

**NOTE:** If the implement cylinder reaches maximum or minimum stroke during test, select Valve Test Extend On to reposition the cylinder.

12. Turn Valve Test Off (G) when calibration is complete.

If the SCV flow rate is too high, scraper could be overly sensitive and cause washboard effect.

If the SCV flow rate is too low, control and load limit functionality could be impaired or limited.

RW00482,000069D-19-05JUN18

4. Adjust SCV 1 Max Flow (%) (A) to desired value.

Max Flow can be adjusted from 10% to 100%. Size of cylinder determines best flow rate.

SCV Max Flow (%) value is defaulted to 100. Set value to 30 when getting started. Adjust the value up or down depending on implement performance during operation.

**NOTE:** When using power beyond, hydraulic flow rate to implement is adjusted on External Valve Setup page.

RW00482,0000393-19-08MAR18

## Set Up Hydraulic Control—External Valve

To adjust hydraulic flow:



PC14926—UN—27APR12

Application Controller 1100 Button

1. Select the Application Controller 1100 button.



PC12961—UN—13APR15

Setup Softkey

2. Select the Setup softkey.

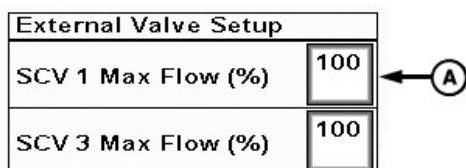


PC17999—UN—07NOV13

External Valve Setup Button

3. Select the External Valve Setup button.

(Reference the Troubleshooting section if the External Valve Setup button is not displayed.)



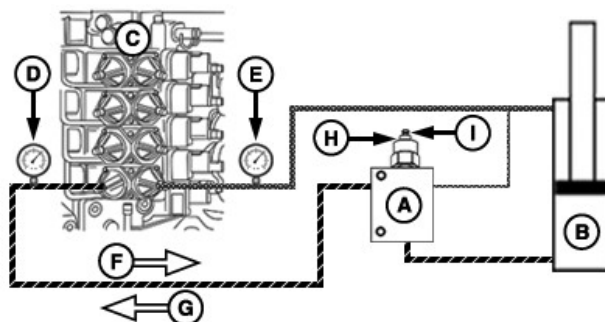
PC18000—UN—07NOV13

External Valve Setup

**A—SCV 1 Max Flow (%)**

**NOTE:** Only selective control valve (SCV) 1 can be used with an external valve.

## Adjust Counterbalance Valve



PC23339—UN—16NOV16



PC23340—UN—10NOV16

Pressure Gauge Tool

- A—Counterbalance Valve**
- B—Implement Hydraulic Cylinder**
- C—Machine**
- D—Pressure Gauge**
- E—Pressure Gauge**
- F—Extend Hydraulic Flow**
- G—Retract Hydraulic Flow**
- H—Lock Nut**
- I—Valve Cartridge**

**NOTE:** Flow rates between 11—30 L/min (3—8 gal/min) are recommended.

If hydraulic flow rate is adjusted, complete selective control valve (SCV) threshold calibration test.

Counterbalance valve (A) regulates the return flow from implement hydraulic cylinder (B) back to the machine (C). Regulating return flow allows a smooth transition of implement movement when the cylinder is retracting. Counterbalance valve settings depend on the weight of the implement. If using a scraper capable of transporting

material, fill scraper half-full when setting counterbalance valve.

**NOTE:** Make pressure gauge tools using quick couplers, T-fittings, and pressure gauges. Required range for pressure gauges is 0—20 684 kPa (206.8 bar) (3000 psi).

1. Install pressure gauges (D and E) close to selective control valves (SCVs) at rear of machine.
2. Select SCV control lever to extend hydraulic flow (F) and record load pressure on gauge (D) while raising implement.

3. Determine counterbalance valve set point pressure value.

Load pressure x 1.3 = set point pressure

Example: 14 650 kPa x 1.3 = 19 045 kPa

146.5 bar x 1.3 = 190.5 bar

2125 psi x 1.3 = 2763 psi

4. Select SCV control lever to retract hydraulic flow (G) and adjust counterbalance valve to set point pressure while lowering implement. Setting counterbalance valve may require raising and lowering the implement several times.

- a. Loosen lock nut (H).
  - b. Turn valve cartridge (I) until pressure gauge (E) reading is equal to set point pressure while implement is lowering.
- Turn clockwise to increase pressure.
  - Turn counterclockwise to decrease pressure.

5. Tighten lock nut on the valve cartridge.

#### Specification

Lock Nut—Torque. . . . . 20—25 N·m  
(15—18 lb·ft)

| Valve Cartridge Adjustment | kPa  | bar  | psi  |
|----------------------------|------|------|------|
| 1 full turn                | 8790 | 87.9 | 1275 |
| 1/2 turn                   | 4395 | 44.0 | 638  |
| 1/3 turn                   | 2930 | 29.3 | 425  |
| 1/4 turn                   | 2200 | 22.0 | 319  |



PC23341—UN—10NOV16

**A—Washboarding Peaks and Valleys Close Together**  
**B—Washboarding Peaks and Valleys Far Apart**

6. Operate system and monitor ground condition. If washboarding peaks and valleys occur, adjust counterbalance valve pressure.

- If washboarding peaks and valleys are close together (A), pressure is too low. Turn the valve cartridge clockwise to increase pressure.
- If washboarding peaks and valleys are far apart (B), pressure is too high. Turn the valve cartridge counterclockwise to decrease pressure.

RW00482,000069E-19-05JUN18

## Adjust Offsets

iGrade™ allows operator to preset plane offset step size. This enables operator to incrementally adjust elevation of the plane up or down during operation. As elevation of the plane is shifted, scraper cutting edge is adjusted each time offset button is selected. For dual scraper applications, the same offset step value is applied to both selective control valve (SCV) 1 and SCV 3.



Menu Button

PC8663—UN—29APR15

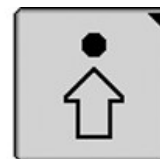
1. Select the Menu button.



Application Controller 1100 Button

PC14926—UN—27APR12

2. Select the Application Controller 1100 button.



Setup Softkey

PC12961—UN—13APR15

3. Select the Setup softkey.

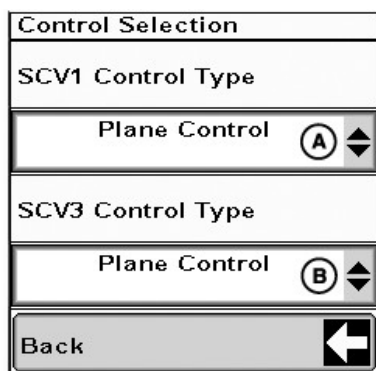


Control Selection Button

PC17972—UN—07NOV13

4. Select the Control Selection button.

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PC21005—UN—20MAR15

Control Selection

- A—SCV1 Control Type Drop-Down Menu  
B—SCV3 Control Type Drop-Down Menu

5. Select Plane Control, Remote Control, or Grade Control from the SCV1 Control Type drop-down menu (A).
6. If using dual scrapers, select SCV3 Control Type from the drop-down (B).



PC13072—UN—16NOV10

Main Softkey

7. Select the Main softkey.



PC18047—UN—12NOV13

Plane Control Setup Button



PC18471—UN—10FEB14

Remote Control Setup Button



PC18076—UN—13NOV13

Grade Control Setup Button

8. Select the Plane Control Setup, Remote Control Setup, or Grade Control Setup button for SCV 1. If using dual scrapers, selecting SCV 1 or SCV 3 sets the same step size for both SCVs.



PC18474—UN—10FEB14

Parameter Setup Button

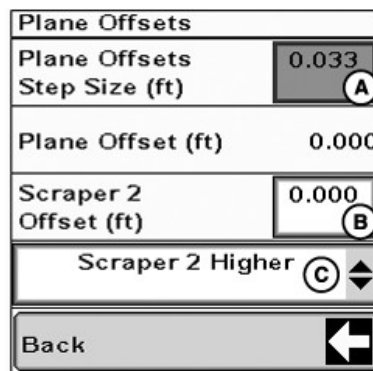
9. Select the Parameter Setup button.



PC18473—UN—10FEB14

Offsets Setup Button

10. Select the Offsets Setup button.



PC21163—UN—12MAY15

- A—Offsets Step Size  
B—Scraper 2 Offset  
C—Scraper 2 Drop-Down Menu

11. Enter the Offsets Step Size (A).
12. For dual scrapers, scraper 2 offset can be set higher or lower than scraper 1.

**NOTE:** Enter a value of 0 if scraper 1 and scraper 2 are on the same plane. Depending on units selected for the display, scraper 2 maximum offset is 3 m or 3 ft.

- a. Enter Scraper 2 Offset (B).
- b. Select Scraper 2 Higher or Scraper 2 Lower from the drop-down menu (C).

RW00482,000069F-19-05JUN18

## Set Up Global Position System (GPS) Receiver

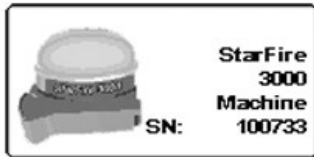
Mount implement receiver directly over the cutting edge of implement or a position that copies vertical movement of the cutting edge. The preferred mount direction for the implement receiver is forward.



PC8663—UN—29APR15

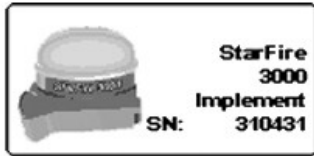
Menu Button

1. Select the Menu button.



PC13006—UN—05NOV14

StarFire™ Machine Button

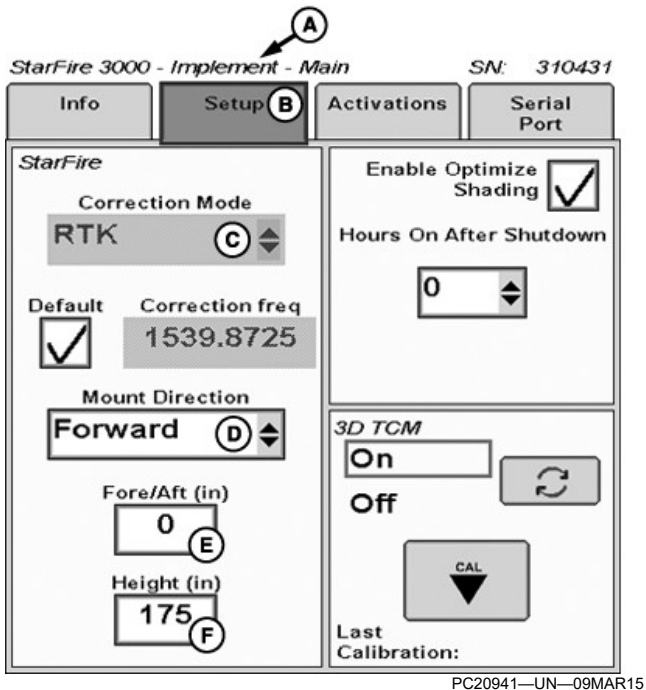


PC20634—UN—19DEC14

StarFire™ Implement Button

2. Select a StarFire™ button.

- StarFire™ Machine button.
- StarFire™ Implement button.



PC20941—UN—09MAR15

- A—Implement  
B—Setup Tab  
C—Correction Mode  
D—Mount Direction  
E—Fore/Aft  
F—Height

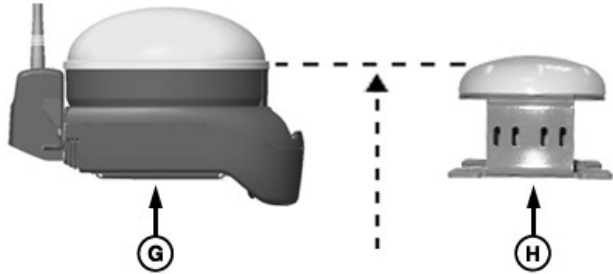
Implement (A) displays at top of page if the StarFire™ Implement button is selected.

3. Select the Setup tab (B).
4. Select Correction Mode (C) if using StarFire™ signal. To turn real time kinematic (RTK) ON or OFF, configure RTK.

(Reference StarFire™ Receiver or RTK Operator's Manual.)

*NOTE: If the machine or implement is automatically detected, Mount Direction (D), Fore/Aft (E), and (or) Height (F) may be grayed out and cannot be changed.*

5. If it is not grayed out, select the Mount Direction.



PC23079—UN—20SEP16

- G—Receiver  
H—External Antenna

6. If they are not grayed out, enter a value for Fore/Aft and (or) Height. Height is measured from ground to middle of receiver (G), or to the top of external antenna (H) (if equipped).

(Reference StarFire™ Receiver Operator's Manual for more information.)

RW00482,00006A0-19-05JUN18

## Calibrate Terrain Compensation Module (TCM)



Menu Button

PC20197—UN—05NOV14

1. Select the Menu button.



PC20634—UN—19DEC14

StarFire™ Button

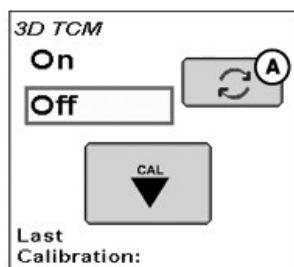
2. Select the StarFire™ button.



Setup Tab

PC20199—UN—05NOV14

3. Select the Setup tab.



PC19992—UN—04SEP14

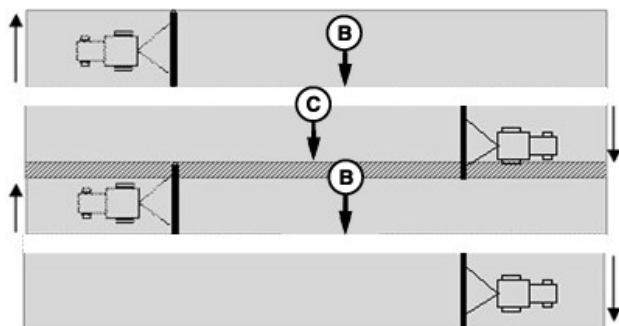
#### A—TCM Toggle Button

Select the TCM toggle button (A) to turn the TCM ON and OFF. When the TCM is turned OFF, StarFire™ global positioning system (GPS) message is not corrected for machine dynamics or side slopes. TCM defaults to ON after cycling power.

**NOTE:** TCM must be turned ON for AutoTrac™ to activate.

Calibrate the TCM so the receiver can determine zero degree roll angle and pitch angle.

Before calibrating, ensure that machine and implement are in proper working condition and ready for field work. Machine must be ballasted and tires properly inflated. Lower implement as close as possible to the working position when calibrating.



PC19993—UN—03SEP14

**B—Skip**  
**C—Overlap**

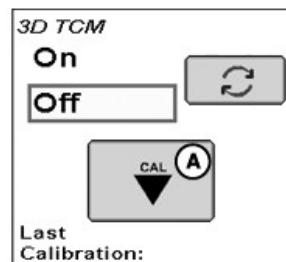
Calibrate the TCM every time the receiver is removed from the machine and reattached or if the TCM angle in relation to the machine has changed. Changes in the TCM angle in relation to machine can create an offset and look like a consistent skip (B) or overlap (C) in pass-to-pass operation. Possible causes of this offset could be the StarFire™ mounting bracket is slightly offset, the machine cab is slightly offset, or uneven tire pressures from one side to other.

To eliminate offset, position the machine and calibrate the TCM, drive down a pass, turn around, and drive down same pass in opposite direction. If the machine does not follow same pass, measure the offset distance and enter in implement offset.

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

### Position Machine and Calibrate Terrain Compensation Module (TCM)

1. Park the machine on a hard, level surface and come to a complete stop (cab is not rocking).
2. Mark the location of tires or tracks on ground to note the location of axle.



PC19994—UN—04SEP14

#### A—Calibration Button

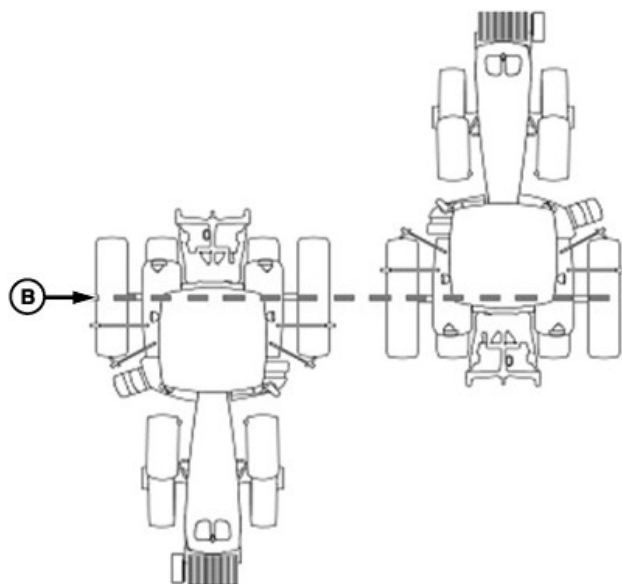
3. Select the Calibration button (A).



Accept Button

PC22267—UN—14MAR16

4. Select the Accept button. Calibrating status bar appears, then disappears when finished.
5. Turn the machine 180 degrees to face the opposite direction. Ensure that tires are in proper location for fixed or floating front axle and machine has come to a complete stop (cab is not rocking).



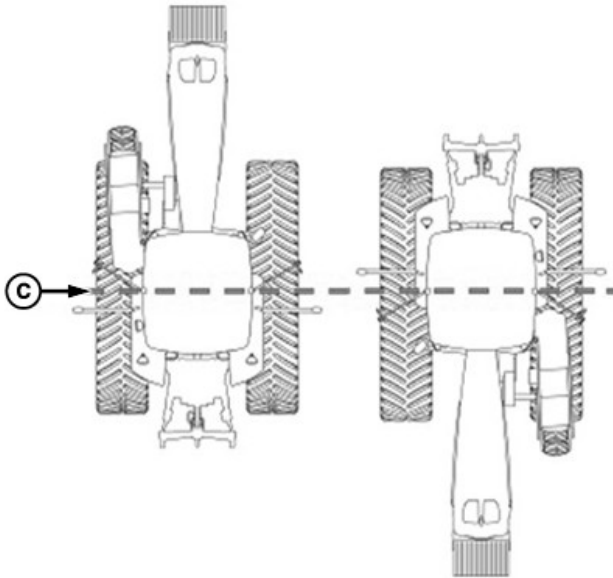
PC19995—UN—03SEP14

Floating Front Axle Machines

#### B—Rear Axle

- For floating front axle machines (mechanical front wheel drive [MFWD], Independent Link

Suspension [ILS™], or Triple-Link Suspension [TLS™]), place wheels so rear axle (B) is in same location when performing 2-point calibration.



PC19996—UN—03SEP14

*Fixed Axle Wheels Or Tracks Machines*

#### **C—Machine Pivot Point**

- For fixed-axle wheels or tracks machines (track tractors, 47X0 and 49X0 series sprayers, or 9000 and 9020 series wheel tractors), place wheels or tracks so machine pivot point (C) is in same location when facing either direction.
6. Select the Accept button. Calibrating status bar appears, then disappears when finished.
  7. Select the Accept button to return to Setup tab. If calibration was unsuccessful, recalibrate the TCM.

DK01672,000019E-19-22MAR18

## **Configure Control Type**

Select and set up control type.

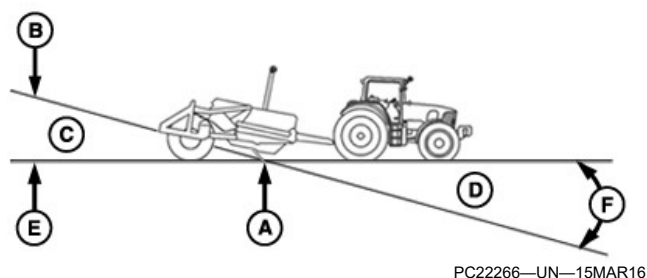
(Reference specific control type section for more information.)

- Grade Control
- Plane Control
- Cross Slope
- Distance Trip
- Remote Control—Serial Port

RW00482,00005B4-19-29FEB16

# Grade Control

## Theory of Operation



- A—Control Point
- B—Desired Plane or Grade
- C—Area Filled (Dirt Added)
- D—Area Cut (Dirt Removed)
- E—Starting Plane or Grade
- F—Slope %

Grade control is commonly used to create field roads or simple ditches. Grade Control automatically controls scraper to a defined slope over a global positioning system (GPS) distance. Grade may be defined by the Grade Calculator or by the operator entering slope, direction, and control point (A).

Control point is a location on the ground that is at the absolute elevation for the desired plane or grade (B). The control point is a reference location that is used to compare absolute elevation versus elevation calculated by iGrade™.

System automatically fills (C) or cuts (D) during uphill or downhill operation based on distance traveled.

RW00482,00005D5-19-15MAR16

## Input Grade Value



Menu Button

PC8663—UN—29APR15

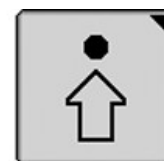
1. Select the Menu button.



Application Controller 1100 Button

PC14926—UN—27APR12

2. Select the Application Controller 1100 button.



Setup Softkey

PC12961—UN—13APR15

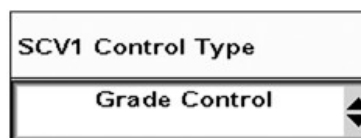
3. Select the Setup softkey.



Control Selection Button

PC17972—UN—07NOV13

4. Select the Control Selection button.



SCV Control Type Drop-Down Menu

PC18075—UN—13NOV13

5. Select Grade Control from the SCV1 Control Type drop-down menu.

**NOTE:** Selecting same control type for selective control valve (SCV) 1 and SCV 3 allows dual scrapers to control the same plane or grade.

6. If using dual scrapers, select Grade Control from the SCV3 Control Type drop-down menu.
7. If using cross slope, select Cross Slope Control from the SCV3 Control Type drop-down menu.

**NOTE:** Application controller must be restarted to operate with new control function.

8. Shut off the machine, wait for the display to power down, then restart the machine.



Menu Button

PC8663—UN—29APR15

9. Select the Menu button.



Application Controller 1100 Button

PC14926—UN—27APR12

10. Select the Application Controller 1100 button.



Main Softkey

PC13072—UN—16NOV10

11. Select the Main softkey.



Grade Control Setup Button

PC18076—UN—13NOV13

12. Select the Grade Control Setup button.

**NOTE:** Slope percent does not equal angle of slope in degrees.

| Slope   |         |
|---------|---------|
| Percent | Degrees |
| 1       | 0.57    |
| 8.75    | 5       |
| 17.6    | 10      |

13. Input slope using one of the following methods:

**Grade Control Setup**

Grade Control SCV 1  
Status Cycle Power

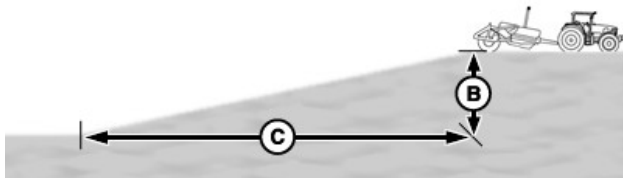
Grade Length (ft) 0  
GPS Altitude (ft) 0.00

Slope (%) **A** 0.0000

**D** → Grade Calculator →

Parameter Setup →

PC22109—UN—01FEB16



PC22090—UN—26JAN16

A—Slope (%)  
B—Vertical Distance  
C—Horizontal Distance  
D—Grade Calculator

- Enter Slope (%) (A) manually.

$$\text{Slope (\%)} = \frac{\text{Vertical Distance (B)}}{\text{Horizontal Distance (C)}} \times 100$$

(Reference Determining Slope Values for Drainage and Irrigation for more information.)

- Select Grade Calculator (D) to record a series of points and calculate slope along recorded path.

(Reference Plane Calculator Theory of Operation for more information.)

**NOTE:** Do not adjust scraper height during this procedure.

Use front scraper as SCV 1 to define grade when utilizing dual scrapers.

**Grade Calculator**

**E** → Start/Stop Grade Calculator

**F** → Set as Grade Control Slope

Downhill Grade % 0.0000  
Grade Length (ft) 0

**G** → Max Cut (ft) 0.00  
**H** → Max Fill (ft) 0.00

Back ←

PC22447—UN—06APR16



PC22448—UN—06APR16

E—Start/Stop Grade Calculator  
F—Set as Grade Control Slope  
G—Max Cut  
H—Max Fill

- Select Start Grade Calculator (E) to reset Grade Calculator, clear any previous data, and set start position.
- Drive to end position and select Stop Grade Calculator (E).
- Review grade values displayed. If data appears correct, select Set as Grade Control Slope (F).

Grade Calculator relies solely on elevation change versus distance traveled. Vertical distance is based on elevation at start and end points. Horizontal Distance is the total length of the path traveled. During operation, it is essential to travel the same path recorded by the Grade Calculator to ensure that distance is the same. If distance varies, desired elevation will not be achieved.

Grade Calculator determines Max Cut (G) and Max Fill

(H) values from recorded path. Max Cut is the difference between planned grade and highest point above planned grade. Max Fill is the difference between planned grade and lowest point below planned grade.

(Reference Optimize iGrade™ section for more information.)

RW00482,00006A1-19-05JUN18

## Operate Grade Control

1. Drive machine to the desired grade control point.



Main Softkey

PC13072—UN—16NOV10

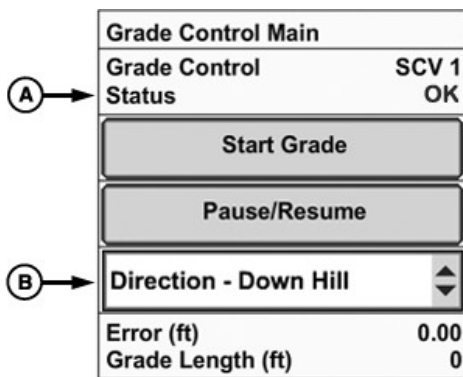
2. Select the Main softkey.



Grade Control Main Button

PC18409—UN—24JAN14

3. Select the Grade Control Main button.



PC22049—UN—05FEB16

A—Status

B—Grade Direction Drop-Down Menu

4. Verify that Status (A) is OK.  
(Reference Troubleshooting if status is not OK.)
5. Select the Grade Direction (B) that machine will travel (uphill or downhill).

**NOTE:** Uphill is a positive slope and downhill is a negative slope. If travel direction is changed while grading, ensure the correct direction (uphill or downhill) is selected.

6. Lower the implement to the desired depth.



PC18249—UN—19DEC13

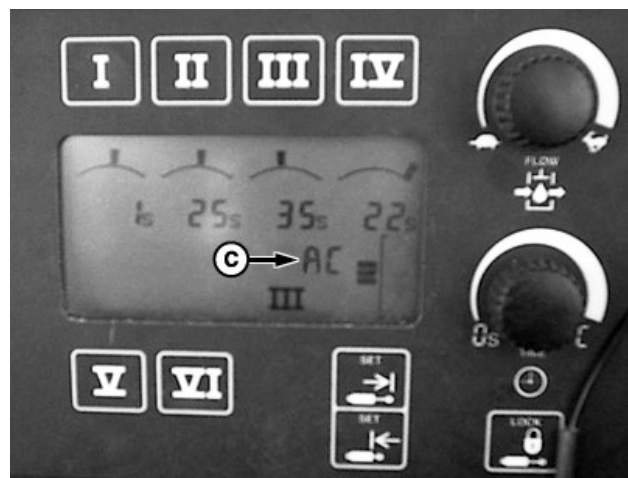
A—SCV 1 Control Lever

B—SCV 3 Control Lever

**NOTE:** Machine must be moving faster than 0.72 km/h (0.45 mph) for the selective control valve (SCV) to engage.

(Reference machine Operator's Manual for more information on SCV speed requirements.)

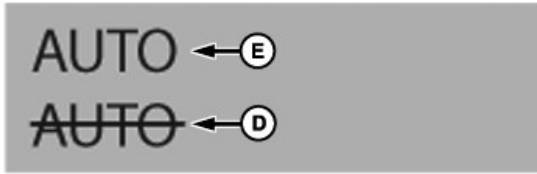
7. To engage auto mode, place SCV control lever (A or B) in forward detent position. Use front bucket first if using dual scrapers.



PC18250—UN—20DEC13

C—AC Mode

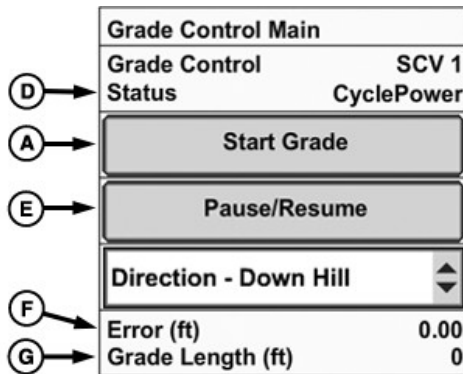
- If operating a machine with a TouchSet™ Display, verify that EC changes to AC (C).



D—AUTO Mode Indicator (Turned Off)  
E—AUTO Mode Indicator (Turned On)

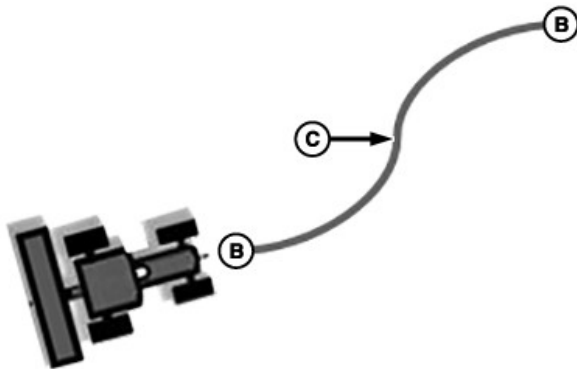
PC18251—UN—20DEC13

- If operating a machine with a CommandCenter™, verify that AUTO off (D) changes to AUTO on (E).



PC22423—UN—13APR16

Grade Control Main



PC22422—UN—05APR16

A—Start Grade Button  
B—Start Point  
C—Grade Path  
D—Grade Control Status  
E—Pause/Resume Button  
F—Offset Error  
G—Grade Length

- Select the Start Grade button (A) when machine is at one of the start points (B) of the grade path (C). Status (D) changes from OK to Running while using Grade Control.

**NOTE:** Only select the Start Grade button at the beginning of a new grade path or after changing uphill or downhill direction.

- If using dual scrapers, raise the front pan when full, then engage SCV 3 to place rear pan into auto mode.
- Select the Pause/Resume button (E) to stop grade when the scrapers are full. Status changes from Running to Paused.
- After emptying scrapers, return the front scraper cutting edge to the same grade, location, and direction as when pause was selected. Engage appropriate SCV to place in auto mode.
- Select the Pause/Resume button and continue grading.
- Error (F) displays distance that scraper is above or below planned grade. Zero represents scraper being on grade.

Verify control point a minimum of once an operating hour. Lower scraper cutting edge to control point and monitor offset Error value. Absolute elevation and iGrade™ calculated elevation are equal when offset value equals zero. If offset value is greater than 0.03 +/- 0.015 m (0.1 +/- 0.05 ft), it is recommended to recalculate grade slope.

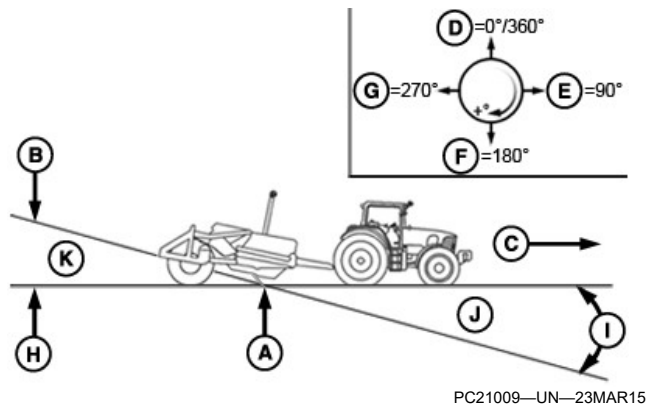
(Reference Control Point, Load Limiting, and Max Cut for more information.)

- Monitor Grade Length (G). Grade Length resets to zero each time Start Grade button is selected. Each pass on the grade path should have same grade length. Variation in grade length affects quality of grade being created.

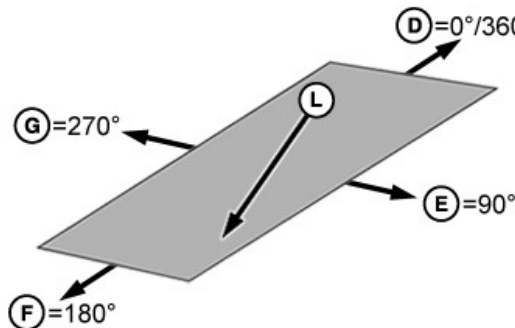
RW00482,00006A2-19-14JUN18

# Plane Control

## Theory of Operation

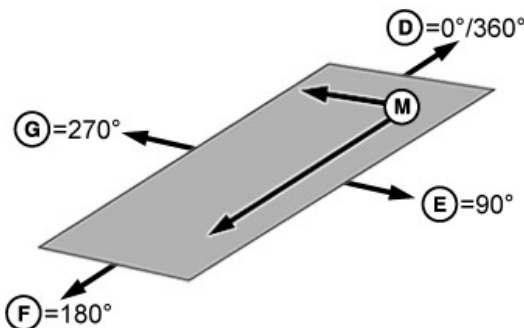


PC21009—UN—23MAR15



PC21010—UN—23MAR15

Single Slope



PC21011—UN—27MAR15

Dual Slope

- A—Control Point
- B—Desired Plane or Grade
- C—Slope Direction
- D—North = 0°/360°
- E—East = 90°
- F—South = 180°
- G—West = 270°
- H—Starting Plane or Grade
- I—Slope %
- J—Area Cut (Dirt Removed)
- K—Area Filled (Dirt Added)
- L—Control Point with Single Slope (Down Slope Direction 160°)
- M—Control Point with Dual Slope (Down Slope Direction1 270° and Down Slope Direction2 180°)

Plane Control automatically controls scraper to cut to defined plane. Defined planes can be a single sloped plane or a dual sloped plane. Planes may be defined by the Plane Calculator or by the operator entering slope, direction, and control point (A).

Control point is a location on the ground that is at the absolute elevation for the desired plane or grade (B). The control point is a reference location that is used to compare absolute elevation versus elevation calculated by iGrade™.

(For more information on control point, reference control point in Optimization iGrade™ section.)

Slope direction (C) is calculated based on global positioning system (GPS) heading in relation to true North (D) and in the down slope direction. North corresponds to a heading of 0° and 360°. iGrade™ has the option of setting two independent planes that are selectable during operation. A common field operation that requires multiple planes is when material is being removed to create a plane profile and transferred to fill another plane profile.

The Plane Calculator can create a best fit plane based on recorded elevation data. Once all data has been collected, a best fit plane is created.

RW00482,00004B6-19-16JUN15

## Slope Direction

Slope direction is required for manually entering slope plane. Determine slope direction by positioning machine at the control point in the direction of desired slope.



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.

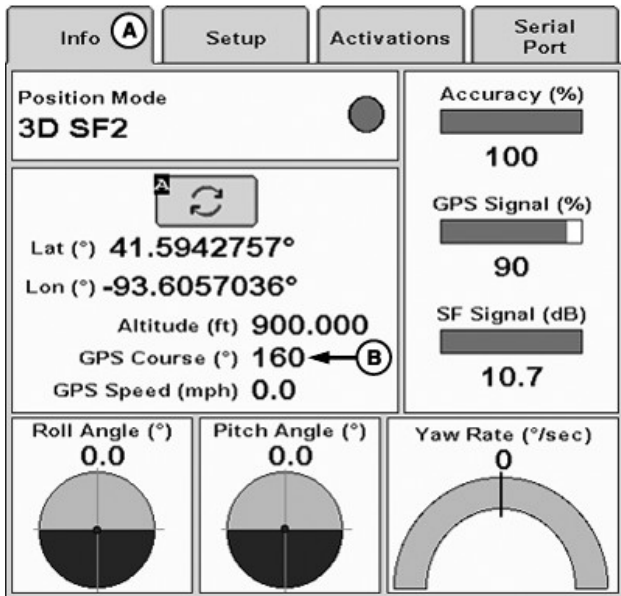


StarFire™ Button

PC20634—UN—19DEC14

2. Select the StarFire™ button.

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StarFire is a trademark of Deere & Company



A—Info Tab  
B—GPS Course

3. Select the Info tab (A).
4. View the GPS Course (B).

RW00482,00006A3-19-05JUN18

## Control Selection



Menu Button

PC20197—UN—05NOV14

1. Select the Menu button.



Application Controller 1100 Button

PC14926—UN—27APR12

2. Select the Application Controller 1100 button.



Setup Softkey

PC12961—UN—13APR15

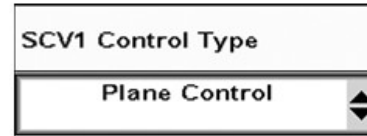
3. Select the Setup softkey.



Control Selection Button

PC17972—UN—07NOV13

4. Select the Control Selection button.



SCV Control Type Drop-Down Menu

PC18413—UN—13APR15

5. Select Plane Control from the SCV1 Control Type drop-down menu.

**NOTE:** For ease of instruction, this manual uses selective control valve (SCV) 1 for the iGrade™ system. Turn other SCV controls off unless using dual scrapers.

Selecting same control type for SCV 1 and SCV 3 allows dual scrapers to control same plane or grade.

6. If using dual scrapers, select Plane Control from the SCV3 Control Type drop-down menu.

7. If using cross slope, select Cross Slope Control from the SCV3 Control Type drop-down menu.

**NOTE:** Application controller must be restarted to operate with new control function.

8. Shut off the machine, wait for the display to power down, then restart the machine.

RW00482,00006A4-19-05JUN18

## Select Active Plane

iGrade™ has the option of creating two separate planes for a given field.



Menu Button

PC20197—UN—05NOV14

1. Select the Menu button.



Application Controller 1100 Button

PC14926—UN—27APR12

iGrade is a trademark of Deere & Company

2. Select the Application Controller 1100 button.



Main Softkey

PC13072—UN—16NOV10

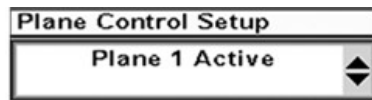
3. Select the Main softkey.



Plane Control Setup Button

PC18047—UN—12NOV13

4. Select the Plane Control Setup button.



Plane Control Setup Drop-Down Menu

PC18414—UN—27JAN14

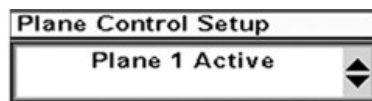
**NOTE:** The system allows operator to set up two independent planes that can be used as a cut and a fill plane. Planes are labeled Plane 1 and Plane 2 in drop-down menu.

In a dual scraper application, the last active plane for selective control valve (SCV) 1 or SCV 3 applies to both scrapers.

5. Select active plane from the Plane Control Setup drop-down menu.

RW00482.00006A5-19-05JUN18

## Define Single Slope Plane



Plane Control Setup Drop-Down Menu

PC18414—UN—27JAN14

1. Select plane from the Plane Control Setup drop-down menu.



Single Slope Entry Button

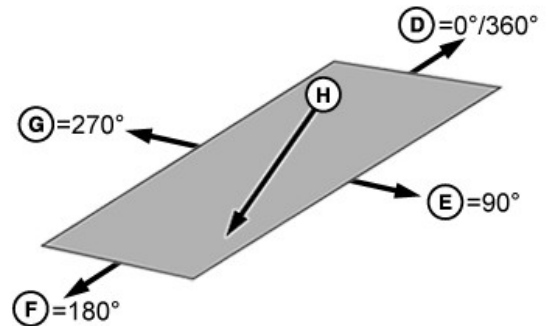
PC18415—UN—27JAN14

2. Select the Single Slope Entry button.

| Single Slope Entry             |        |
|--------------------------------|--------|
| A → Slope (%)                  | 0.1200 |
| B → Down Slope Direction (deg) | 160.00 |
| C → Set Plane Origin           |        |

Single Slope Entry

PC18416—UN—28JAN14



Single Slope

PC18423—UN—28JAN14

- A—Slope (%)
- B—Down Slope Direction (degrees)
- C—Set Plane Origin Button
- D—North = 0°/360°
- E—East = 90°
- F—South = 180°
- G—West = 270°
- H—Control Point with Single Slope (Down Slope Direction 160°)

3. If known, enter Slope (%) (A) and Down Slope Direction (B). If unknown, use Plane Calculator to determine values.

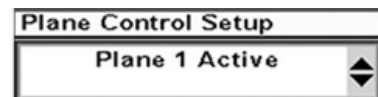
(Reference Plane Calculator and Determining Slope Values for Drainage and Irrigation for more information.)

4. Lower scraper on the control point and select the Set Plane Origin button (C).

**NOTE:** If running dual scrapers, use front scraper to set plane origin.

RW00482.00006A6-19-05JUN18

## Define Dual Slope Plane



Plane Control Setup Drop-Down Menu

PC18414—UN—27JAN14

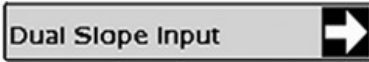
1. Select plane from the Plane Control Setup drop-down menu.



Dual Slop Entry Button

PC18417—UN—27JAN14

2. Select the Dual Slope Entry button.



Dual Slope Input Button

PC18419—UN—27JAN14

3. Select the Dual Slope Input button.

| Dual Slope Input                  |        |
|-----------------------------------|--------|
| (A) → Slope1 (%)                  | 0.1200 |
| (B) → Down Slope Direction1 (deg) | 270.00 |
| (C) → Slope2 (%)                  | 0.1400 |
| (D) → Down Slope Direction2 (deg) | 180.00 |
| (E) → Back                        |        |

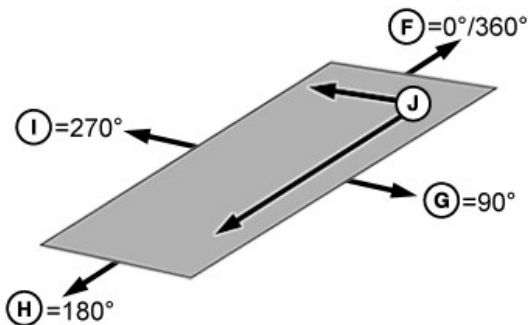
Dual Slope Input

PC18418—UN—04FEB14



Set Plane Origin Button

PC20254—UN—13NOV14



Dual Slope

PC21021—UN—27MAR15

- A—Slope1 (%)
- B—Down Slope Direction1 (degrees)
- C—Slope2 (%)
- D—Down Slope Direction2 (degrees)
- E—Back Button
- F—North = 0°/360°
- G—East = 90°
- H—South = 180°
- I—West = 270°
- J—Control point with Dual Slope (Down Slope Direction1 270° and Down Slope Direction2 180°)

4. If known, enter Slope1 (%) (A), Down Slope Direction1 (B), Slope2 (%) (C), and Down Slope Direction2 (D). If unknown, use Plane Calculator to determine values.

(Reference Plane Calculator and Determining Slope Values for Drainage and Irrigation for more information.)

*NOTE: Two slope directions allow operator to define slopes in relation to each other. Slope directions can be at any angle to one another.*

5. Select the Back button (E) to return to Dual Slope Entry page to set plane origin.



Set Plane Origin Button

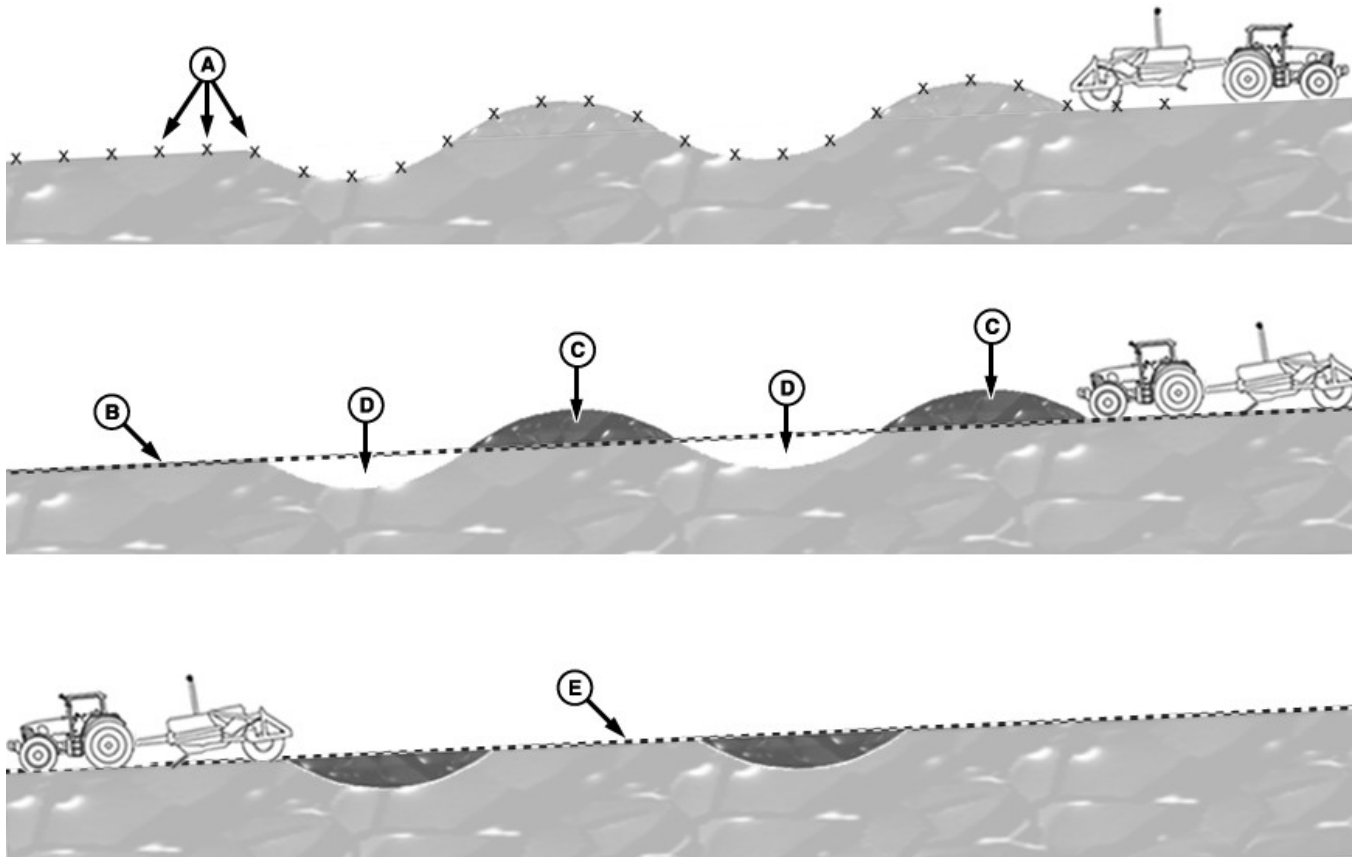
PC20254—UN—13NOV14

6. Lower scraper to control point and select the Set Plane Origin button.

*NOTE: If running dual scrapers, use front scraper to set plane origin.*

RW00482.00006A7-19-05JUN18

## Plane Calculator Theory of Operation



PC22012—UN—13JAN16

A—Elevation Points  
B—Best-fit Plane  
C—Cut Area

D—Fill Area  
E—Final Plane

Plane calculator records a series of elevation points (A) (approximately every 1.5 m [5 ft]) to generate a best-fit plane (B) and calculates values for slope and direction. Plane calculator uses a theoretical one for one cut and fill ratio resulting in no shortage or overage in material. Cut and fill ratio varies on soil types and the amount of

dirt being moved. An area that requires large quantities of dirt to be moved to create a plane requires moving up the plane offset to minimize an overage of dirt. The plane created is displayed in both single and dual sloped entry pages. For dual scrapers, use front scraper for plane calculator or to set plane origin.

RW00482,000058C-19-07MAR16

## Plane Calculator

*NOTE: Plane calculator can be used without an implement.*

*(Reference Install Jumper Wire in Troubleshooting section to operate without an implement receiver.)*



PC18084—UN—13NOV13

Plane Calculator Button

1. Select the Plane Calculator button.

| Plane Calculator          |        |
|---------------------------|--------|
| Slope (%)                 | 0.0000 |
| Direction (deg)           | 0.00   |
| Clear Plane Data (A)      |        |
| Start Data Collection (B) |        |
| Save to Active Plane (E)  |        |
| Back                      |        |

PC21018—UN—01APR15

A—Clear Plane Data Button  
B—Start (Stop) Data Collection Button

C—Slope (%)  
D—Direction (degrees)  
E—Save to Active Plane Button

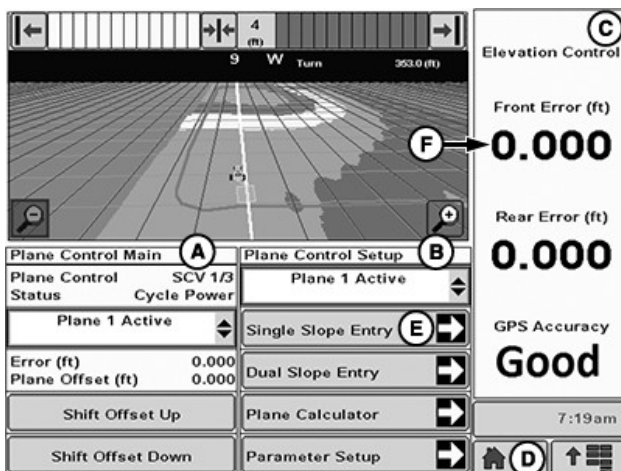
**NOTE:** Any stored data is applied to the plane being calculated if data is not cleared.

2. Select the Clear Plane Data button (A).
3. Set scraper to position that can remain unchanged (for example, in up position) during data collection.
4. Select the Start Data Collection button (B) to record data.
5. Drive through field collecting data for plane calculation. More data points collected results in higher plane calculation accuracy.  
(Reference Data Collection Drive Patterns in Optimize iGrade™ section for recommendations.)
6. Select the Stop Data Collection button once area is covered and review the calculated Slope (%) (C) and Direction (D).
7. Select the Save to Active Plane button (E) to accept and populate slope information for active plane.

**NOTE:** Slope % and Direction (deg) are displayed in both Single Slope Entry and Dual Slope Entry pages. Dual Slope Input displays Slope2 (%) = 0 and Direction2 (deg) = 90.

RW00482,00006A8-19-05JUN18

## Locate Calculated Control Point on Plane



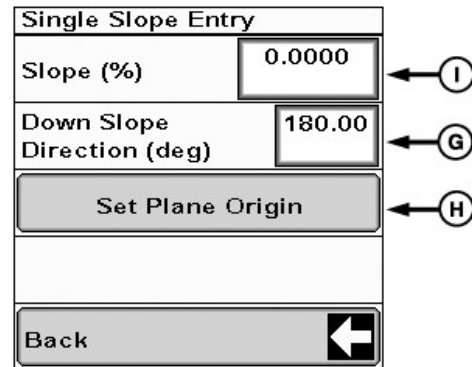
PC25717—UN—21MAY18

A—Plane Control Main  
B—Plane Control Setup  
C—Elevation Control  
D—Home Button  
E—Single Slope Entry Button  
F—Front Control Error

**NOTE:** It is recommended to set up a home page with Plane Control Main (A), Plane Control Setup (B), and Elevation Control (C).

(Reference Layout Manager for more information.)

1. Select the Home button (D).
2. Select the Single Slope Entry button (E).
3. Drive machine through field until Front Control Error (F) displays 0.000.



PC22048—UN—20JAN16

G—Down Slope Direction  
H—Set Plane Origin Button  
I—Slope (%)

- Follow natural grade along Down Slope Direction (G) or 180 degrees off Down Slope Direction.
- For irrigation applications, drive from the head ditch to the tail ditch until Front Control Error displays 0.000.

4. When Control Error displays 0.000, stop machine and lower scraper blade to ground.
5. Select the Set Plane Origin button (H).
6. Due to satellite drift, mark scraper position or set flags so that scraper can return to the same location to verify control point.  
**NOTE:** Front Control Error should be as close as possible to 0.00 during control point verifications.
7. Prior to moving material, adjust Slope (%) (I) to preferred value.

RW00482,00006A9-19-05JUN18

## Plane Calculator with Topography Maps

Running plane calculator and survey mode simultaneously allows operator to generate:

- Plane calculations for single or dual slope input values.
- Topography maps used as a visual for determining high and low elevation areas of the field.

## Record Boundaries

**NOTE:** Client, Farm, and Field are required before recording boundaries.

1. Drive machine to boundary of field.



Menu Button

PC8663—UN—29APR15

2. Select the Menu button.



GreenStar™ Button

PC12685—UN—29APR15

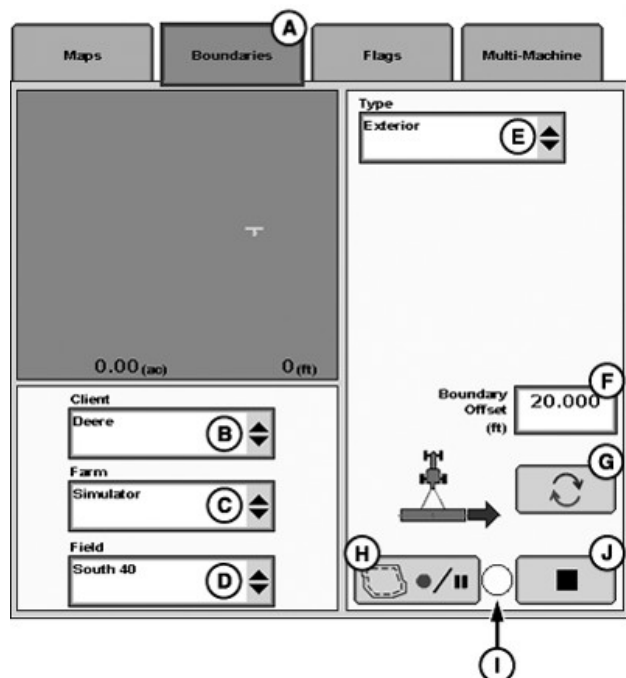
3. Select the GreenStar™ button.



Mapping Softkey

PC21035—UN—31MAR15

4. Select the Mapping softkey.



PC21033—UN—01APR15

- A—Boundaries Tab
- B—Client Drop-Down Menu
- C—Farm Drop-Down Menu
- D—Field Drop-Down Menu
- E—Boundary Type Drop-Down Menu
- F—Boundary Offset Entry Box
- G—Offset Toggle Button
- H—Record and Pause Button
- I—Recording Indicator Light
- J—Stop Recording Button

5. Select the Boundaries tab (A).
6. Select Client (B), Farm (C), and Field (D) from the drop-down menus.
7. Select Exterior from the Boundary Type drop-down menu (E).
8. Select Boundary Offset (F) and enter the distance from the global positioning system (GPS) receiver to the edge of the field. Enter 0 if the offset is not used.
9. Select the Offset Toggle button (G) to select left or right of the machine or implement.
10. Select the Record button (H). Recording Indicator Light (I) blinks when recording and stays solid when paused.

**NOTE:** A boundary cannot intersect itself. Select the Pause Recording button (H) before stopping. Always start moving forward before recording again.

11. When recording is completed, select the Stop Recording button (J).

## Set Up Survey Mode

1. If using AutoTrac™, set up guidance lines.

(Reference Guidance Lines in the Optimize iGrade™ section for more information.)



Menu Button

PC8663—UN—29APR15

2. Select the Menu button.



GreenStar™ Button

PC12685—UN—29APR15

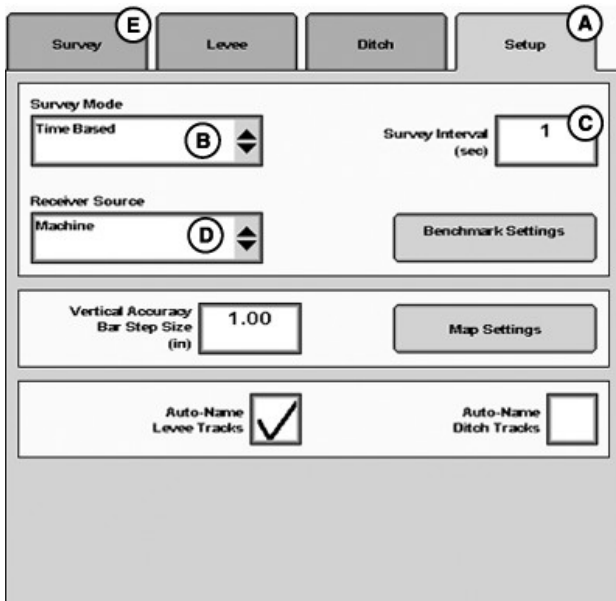
3. Select the GreenStar™ button.



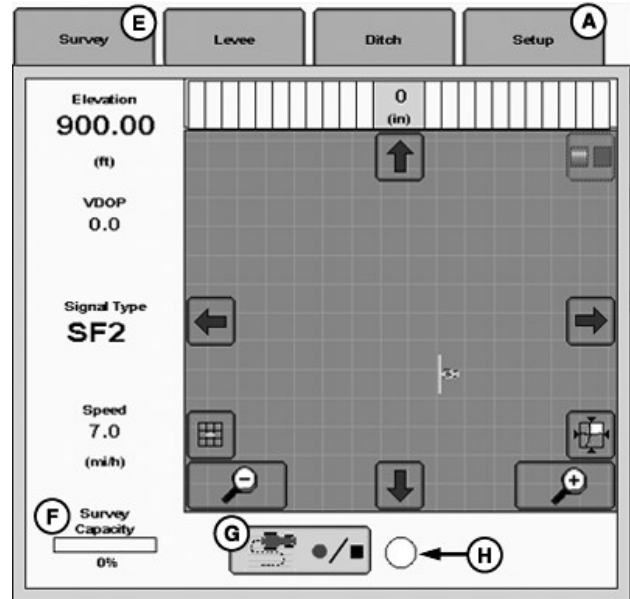
Water Management Softkey

PC21034—UN—31MAR15

4. Select the Water Management softkey.



PC21036—UN—14APR15



PC21037—UN—21MAY15

- A—Setup Tab
- B—Survey Mode Drop-Down Menu
- C—Survey Interval Entry Box
- D—Receiver Source Drop-Down Menu
- E—Survey Tab
- F—Survey Capacity
- G—Recording Button
- H—Recording Indicator Light

5. Select the Setup tab (A).
6. Select survey mode from the drop-down menu (B).
  - Distance—Is suited for lower speed surveys. Survey points are consistently spaced at a user-defined distance.
  - Time—Is suited for higher speed surveys. Distance between survey points varies based on speed and interval.
7. Enter the Survey Interval (C).

*NOTE: Plane calculator can be used without an implement. (Reference Install Jumper Wire in Troubleshooting section to operate without an implement receiver.)*

*If a jumper wire is installed, select the implement as receiver source.*

8. Select a receiver source from the drop-down menu (D).
9. Select the Survey tab (E) and verify that display has enough Survey Capacity (F) to store additional information.

(Reference Data Management in GreenStar™ 3 2630 Display Operator's Manual for more information.)

10. Select the Record button (G). Recording Indicator Light (H) blinks when recording.



16. Select the Clear Plane Data button (A).
  17. Set scraper to a position that can remain unchanged (for example, in up position) during data collection.
  18. Select the Start Data Collection button (B) to record data.
  19. Drive through the field collecting data for plane calculation. More data points collected results in higher accuracy of plane calculation.
- (Reference Data Collection Drive Patterns for recommendations.)



- PC21043—UN—01APR15



- Stop Data Collection Button*



- PC21065—LIN—06APR15

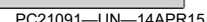


- ### Save to Active Plane Button



21. Select the **Save to Active Plane** button to accept and populate slope information for the active plane.

**NOTE:** If desired, slope input values can be modified on Single or Dual Slope entry pages after selecting the Save to Active Plane button.



22. Select the Record button (A) to stop recording.

RW00482.00006AA-19-05JUN18

## Retrieve Elevation Maps

If elevation maps have previously been saved, they can be retrieved.



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



GreenStar™ Button

PC12685—UN—29APR15

2. Select the GreenStar™ button.



Resources Softkey

PC21150—UN—11MAY15

3. Select the Resources softkey.

PC21283—UN—17JUN15

A—Resources Tab  
B—Client Drop-Down Menu  
C—Farm Drop-Down Menu  
D—Field Drop-Down Menu

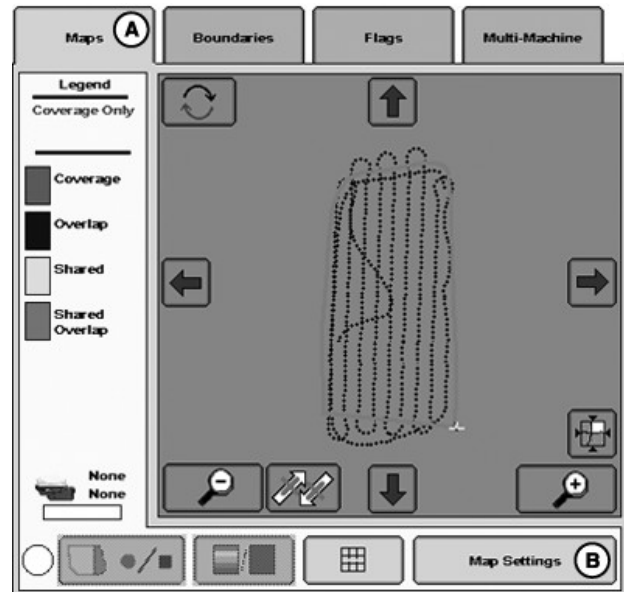
4. Select the Resources tab (A).
5. Select Client (B), Farm (C), and Field (D) from the drop-down menus.



Mapping Softkey

PC21152—UN—11MAY15

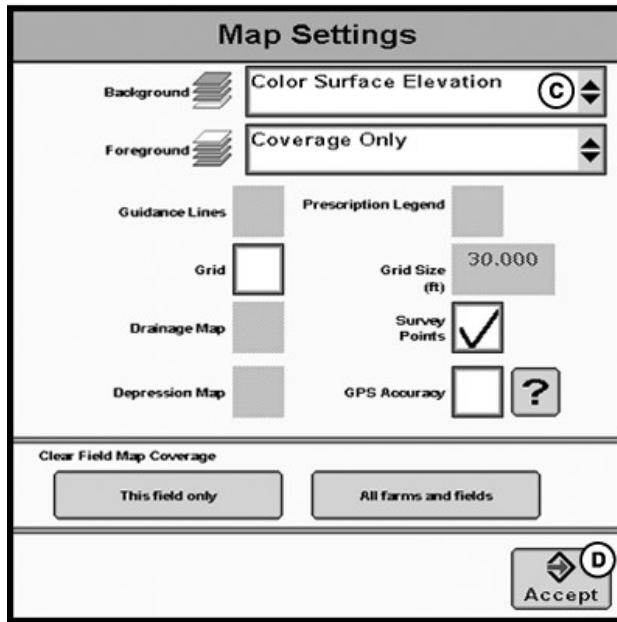
6. Select the Mapping softkey.



PC21281—UN—17JUN15

A—Maps Tab  
B—Map Settings Button

7. Select the Maps tab (A).
8. Select the Map Settings button (B).



PC21282—UN—17JUN15

C—Background Drop-Down Menu  
D—Accept Button

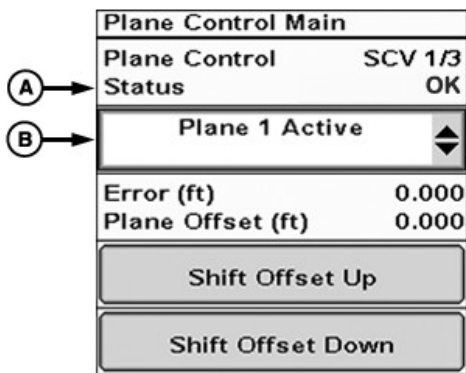
9. Select Color Surface Elevation from the Background drop-down menu (C).
10. Select the Accept button (D).

RW00482,00006AB-19-05JUN18

## Operate Plane Control

In a dual scraper operation, the operator can choose to fill one scraper at a time or both scrapers simultaneously.

### Fill Scrapers One at a Time:



PC22050—UN—05FEB16

A—Status  
B—Active Plane Drop-Down Menu

1. Verify that Status (A) is OK.  
(Reference Troubleshooting if status is not OK.)
2. With scrapers empty, drive to area to remove material.

3. Select appropriate plane from the drop-down menu (B).

The last active plane for the selective control valve (SCV) 1 or SCV 3 applies to both scrapers.



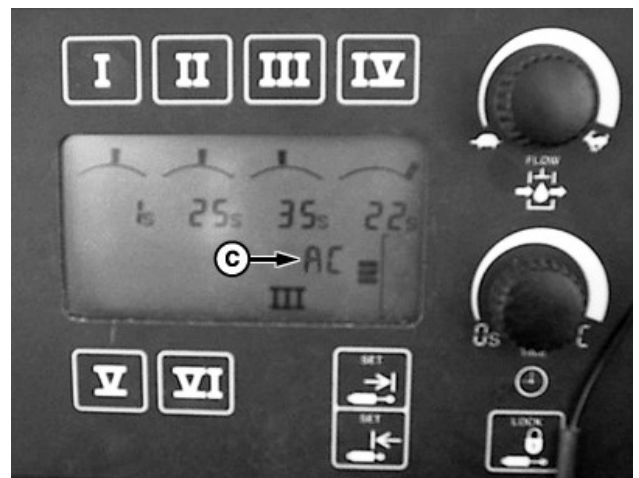
PC21027—UN—30MAR15

A—SCV 1 Control Lever  
B—SCV 3 Control Lever

**NOTE:** Machine must be moving faster than 0.72 km/h (0.45 mph) for SCV to engage.

(Reference machine Operator's Manual for more information on SCV speed requirements.)

4. To engage auto mode, place SCV control lever (A or B) in forward detent position. Use front bucket first if using dual scrapers.

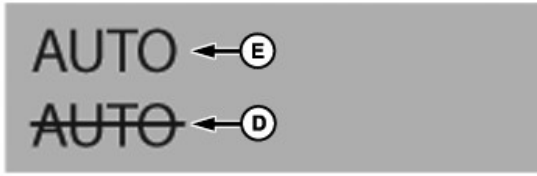


PC18250—UN—20DEC13

TouchSet™ Display

C—AC Mode

- If operating a machine with a TouchSet™ Display, verify that EC changes to AC (C).

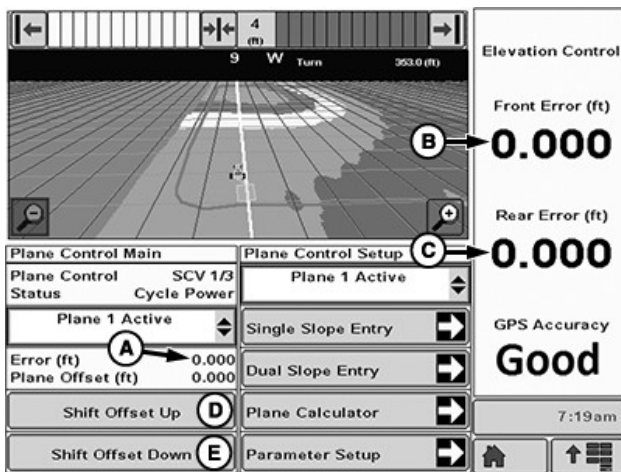


D—AUTO Mode Indicator (Turned Off)  
E—AUTO Mode Indicator (Turned On)

PC18251—UN—20DEC13

- If operating a machine with a CommandCenter™, verify that AUTO off (D) changes to AUTO on (E).

5. Allow the scraper to fill.



PC25718—UN—21MAY18

A—Error Value  
B—Front Error Value  
C—Rear Error Value  
D—Shift Offset Up Button  
E—Shift Offset Down Button

6. Monitor offset error values (A–C).

**NOTE:** For ease of operation, use the Layout Manager to configure display home page for specific operations.

(Reference Layout Manager for more information.)

- Select the Shift Offset Up button (D) to raise the bucket to remove less material.
- Select the Shift Offset Down button (E) to lower the bucket to remove more material.

**NOTE:** If max cut or load limiting are set, scraper height automatically adjusts.

(Reference Optimization section for more information.)

7. Monitor the material in bucket.

- When the bucket is full, disengage SCV 1 control lever and raise scraper.
- If using dual scrapers, place SCV 3 control lever in forward detent position.
- Allow the second scraper to fill.
- Monitor the offset error values.

- Select the Shift Offset Up button to raise the bucket to remove less material.
- Select the Shift Offset Down button to lower the bucket to remove more material.

**NOTE:** If max cut or load limiting are set, scraper height automatically adjusts.

(Reference Optimization section for more information.)

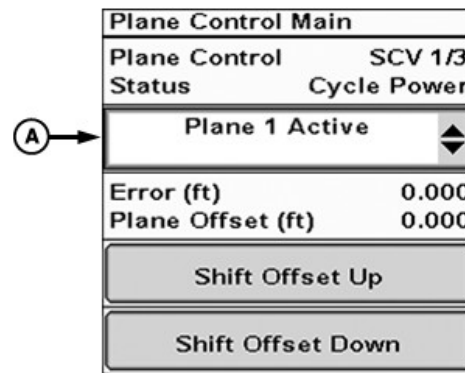
- When the bucket is full, disengage SCV 3 control lever and raise scraper.

- Unload buckets in appropriate area.

(Reference scraper Operator's Manual for unloading operations.)

#### Fill Dual Scrapers at the Same Time:

- With scrapers empty, drive to area to remove material.



PC21024—UN—30MAR15

A—Active Plane Drop-Down Menu

- Select appropriate plane from the drop-down menu (A). The last active plane for SCV 1 or SCV 3 applies to both scrapers.



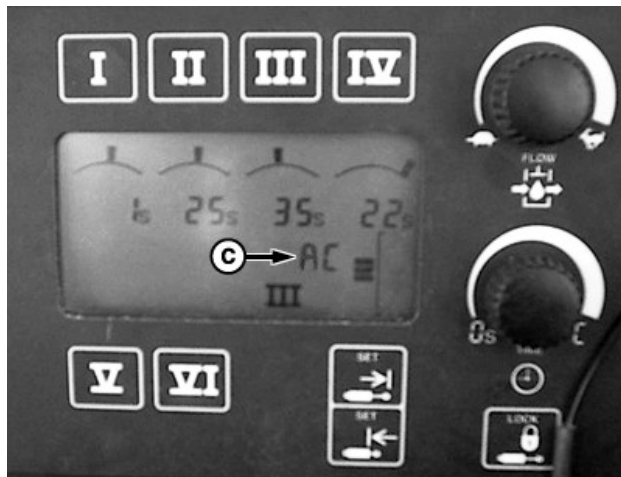
PC21027—UN—30MAR15

A—SCV 1 Control Lever  
B—SCV 3 Control Lever

**NOTE:** Machine must be moving faster than 0.72 km/h (0.45 mph) for SCV to engage.

(Reference machine Operator's Manual for more information on SCV speed requirements.)

- To engage auto mode, place SCV 1 and 3 control levers (A and B) in forward detent position.

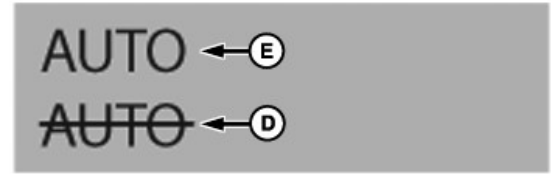


PC18250—UN—20DEC13

TouchSet™ Display

C—AC Mode

- If operating a machine with a TouchSet™ Display, verify that EC changes to AC (C).

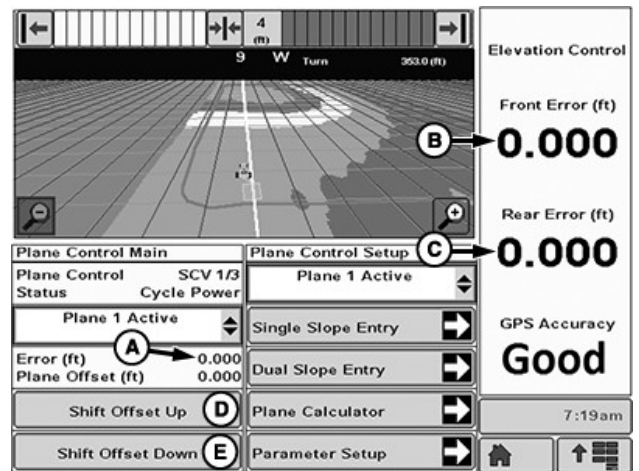


PC18251—UN—20DEC13

D—AUTO Mode Indicator (Turned Off)  
E—AUTO Mode Indicator (Turned On)

- If operating a machine with a CommandCenter™, verify that AUTO off (D) changes to AUTO on (E).

- Allow the scrapers to fill.



PC25718—UN—21MAY18

A—Error Value  
B—Front Error Value  
C—Rear Error Value  
D—Shift Offset Up Button  
E—Shift Offset Down Button

- Monitor offset error values (A–C).

- Select the Shift Offset Up button (D) to raise the buckets to remove less material.
- Select the Shift Offset Down button (E) to lower the buckets to remove more material.

**NOTE:** If max cut or load limiting are set, scraper height automatically adjusts.

(Reference Optimization section for more information.)

- Monitor material in the buckets.
  - When the buckets are full, disengage SCV 1 and 3 control levers and raise scrapers.
  - Unload the buckets in appropriate area.
- (Reference scraper Operator's Manual for unloading operations.)

**Fill Area:**

|                       |             |
|-----------------------|-------------|
| Plane Control Main    |             |
| Plane Control         | SCV 1/3     |
| Status                | Cycle Power |
| Plane 2 Active (A) ▲▼ |             |
| Error (ft)            | 0.000       |
| Plane Offset (ft)     | 0.000       |
| Shift Offset Up       |             |
| Shift Offset Down     |             |

PC21280—UN—17JUN15

**A—Active Plane Drop-Down Menu**

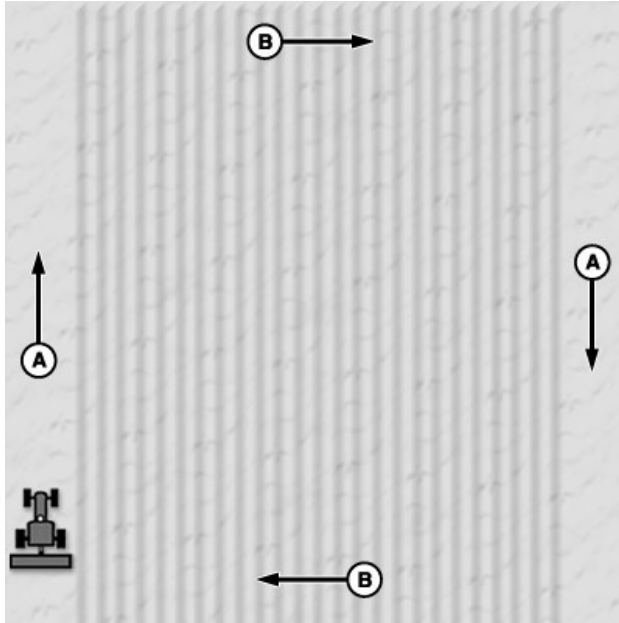
1. If filling an area using plane 2, select Plane 2 Active (A) from the drop-down menu. In a dual scraper application, the last active plane for SCV 1 or SCV 3 applies to both scrapers.
2. Unload the scrapers.
3. Monitor the elevation.

(Reference scraper Operator's Manual for unloading operations.)

RW00482,00006AC-19-14JUN18

# iGrade™ for Non-earth Moving Scrapers and Buckets

## iGrade™ for Non-earth Moving Scrapers and Buckets



A—Record  
B—Pause Recording

Plane control and remote control can be used on a variety of implements other than earth moving scrapers and buckets. For example, plane control can be used on bed forming implements to maintain the gradient of the furrow. This method assists in the furrows ability to drain, while continuing to leave the top soil on the bed intact.

Use iGrade™ for non-earth moving scrapers and buckets only on surfaces leveled to a single plane.

### Implement requirements:

- Single depth-adjusting gauge wheels controlled by selective control valve (SCV).

### Setup:

Option 1: Set plane origin then input same slope and slope direction values used during land leveling operation.

Option 2: Use the Plane Calculator. Since surface should already be leveled to a single plane, minimum data collection points are required.

To record the minimum points for this operation:

1. Position gauge wheels of implement in down position with implement tools not engaging surface. Ensure wheel position does not change while recording data points.
2. Record the length of opposite sides of field in the direction of furrows (A).
3. Pause data collection if crossing end rows or not

traveling on plane when driving to opposite side of field (B).

(Reference Plane Control section for more information.)

Option 3: Use remote control and third-party land leveling software to create surface design. Depending on third-party software, use a previous surface design or resurvey area.

(Reference Remote Control section for more information.)

### Operation:

*NOTE: Depending on manufacturer's recommendations and condition of implement, implement may require regular rephasing of hydraulic cylinders.*

1. Rephase implement gauge wheel cylinders before operating implement.
2. If implement utilizes 3-point hitch, place hydraulics in float position.
3. Adjust implement gauge wheel height as needed:
  - a. Select Plane Control Main.
  - b. Select Shift Offset Up button to raise implement.
  - c. Select Shift Offset Down button to lower implement.

*NOTE: If using active implement guidance, shared signal is disabled and RTK signal level is used.*

RW00482,0000527-19-12AUG15

# Cross Slope Control

## Cross Slope Control

Cross Slope Control allows operator to control the roll angle of a capable scraper. Cross slope is used to control both position and roll angle of the scraper blade. Cross Slope Control is typically necessary when creating ditches, crowned surfaces, or when scraping perpendicular to the direction of fall on a plane.

RW00482,0000522-19-24JUL15

## Select Cross Slope Control

**NOTE:** For ease of instruction, this manual uses selective control valve (SCV) 1 for the iGrade™ system. Turn other SCV controls off unless using dual scrapers or using Cross Slope Control with another control type.



Menu Button

PC20197—UN—05NOV14

1. Select the Menu button.



Application Controller 1100 Button

PC14926—UN—27APR12

2. Select the Application Controller 1100 button.



Setup Softkey

PC12961—UN—13APR15

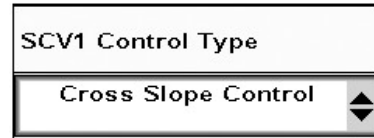
3. Select the Setup softkey.



Control Selection Button

PC17972—UN—07NOV13

4. Select the Control Selection button.



PC21393—UN—24JUL15

SCV Control Type Drop-Down Menu

5. Select Cross Slope Control from the SCV1 Control Type drop-down menu.

**NOTE:** Application controller must be restarted to operate with new control function.

6. Shut off the machine, wait for the display to power down, then restart the machine.

RW00482,00006AD-19-05JUN18

## Cross Slope Setup and Operation

**NOTE:** Terrain compensation module (TCM) determines roll angle and pitch angle of the receiver. TCM calibration is important during cross slope operation so that scraper blade is controlled at the correct slope percent. Calibrate TCM on machine and implement receivers.

(Reference Optimize Terrain Compensation Module [TCM] for more information.)



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



Application Controller 1100 Button

PC14926—UN—27APR12

2. Select the Application Controller 1100 button.



Main Softkey

PC13072—UN—16NOV10

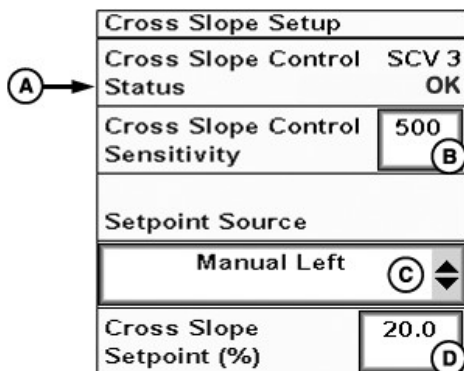
3. Select the Main softkey.



Cross Slope Setup Button

PC21394—UN—27JUL15

4. Select the Cross Slope Setup button.



PC22051—UN—05FEB16

- A—Status  
B—Cross Slope Control Sensitivity  
C—Setpoint Source Drop-Down Menu  
D—Cross Slope Setpoint (%)

5. Verify that Status (A) is OK.  
(Reference Troubleshooting if status is not OK.)
6. Enter Cross Slope Control Sensitivity (B). Cross slope sensitivity controls the speed that scraper blade tilts left or right.
7. Verify cross slope operation.
  - a. Select Manual Right from the Setpoint Source drop-down menu (C).
  - b. Enter 20% for Cross Slope Setpoint (D).
  - c. Raise the scraper to its highest position.
  - d. Drive the machine forward, faster than 0.72 km/h (0.45 mph). Do not engage AutoTrac™.
  - e. Place the selective control valve (SCV) in forward detent position.
  - f. View scraper position. Right side of blade should be lower than left.
  - g. Select Manual Left from the Setpoint Source drop-down menu.
  - h. View scraper position. Left side of blade should be lower than right.
  - i. Enter 0% for Cross Slope Setpoint.
  - j. View scraper position. Blade should be horizontal.
  - k. If scraper position does not respond to Manual Right or Left positions or does not return to a horizontal position, reverse hydraulic hose position in SCV and repeat procedure.

8. Select Setpoint Source from the drop-down menu.

- Plane Control—Automatically determines the cross slope setpoint from the current plane. Other SCV Control Type must be set to Plane Control. Scraper blade is controlled to both the correct elevation and cross slope based on the defined plane.  
(Reference Plane Control section for more information.)

(Reference Plane Control section for more information.)

- Remote Control—Allows a third-party system to control the scraper blade to automatically cut or fill.

(Reference Remote Control and Third-party Installations section for more information.)

- Manual Left or Right—Requires operator to define a right or left cross slope angle of implement. Cross Slope commands scraper blade to maintain the defined angle regardless of terrain slope or direction. This can be used when traveling with a berm or ditch to create a cross slope.

9. If Manual Left or Right is selected, enter Cross Slope Setpoint (%).



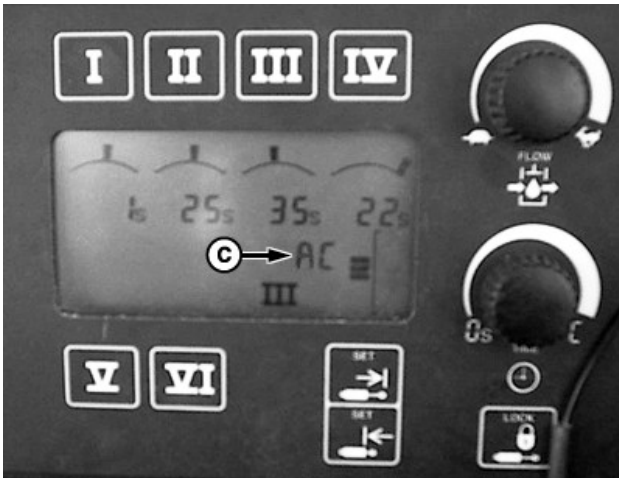
PC21027—UN—30MAR15

- A—SCV 1 Control Lever  
B—SCV 3 Control Lever

**NOTE:** Machine must be moving faster than 0.72 km/h (0.45 mph) for SCV to engage.

(Reference machine Operator's Manual for more information on SCV speed requirements.)

10. To engage auto mode, place SCV control lever (A or B) in forward detent position.

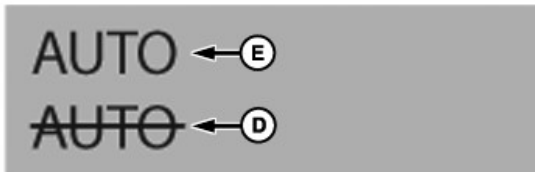


PC18250—UN—20DEC13

TouchSet™ Display

**C—AC Mode**

- If operating a machine with a TouchSet™ Display, verify that EC changes to AC (C).



PC18251—UN—20DEC13

**D—AUTO Mode Indicator (Turned Off)**

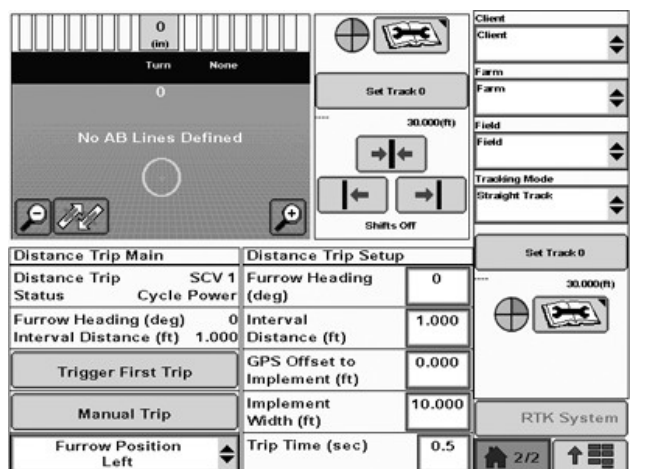
**E—AUTO Mode Indicator (Turned On)**

- If operating a machine with a CommandCenter™, verify that AUTO off (D) changes to AUTO on (E).

RW00482,00006AE-19-14JUN18

# Distance Trip

## Theory of Operation



PC21166—UN—12MAY15

Distance Trip monitors global positioning system (GPS) distance. At a user-defined distance interval, the application controller commands:

- The selective control valve (SCV) controller to cycle machine hydraulics.  
SCV extends and holds for the duration of Trip Time (sec.). Immediately after, SCV retracts and holds for 1.5 times the duration of Trip Time (sec.).
- A low side driver to complete a circuit from a 5 or 12 V power supply to a relay coil.

(Reference Third-Party Installation for more information.)

Distance Trip calculates where a command needs to occur based on furrow heading angle and distance between furrows. Distance Trip operation requires real time kinematics (RTK) enabled machine and implement receivers. Distance Trip uses GPS distance, not elevation.

*NOTE: For ease of operation, use the Layout Manager to configure display homepage for specific operations.*

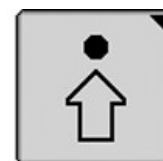
*(Reference the GreenStar™ 3 2630 Display Operator's Manual for more information.)*

RW00482,00006AF-19-05JUN18

## Select Distance Trip

*NOTE: Distance Trip requires SF2 signal or better on the machine to function.*

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Setup Softkey

PC12961—UN—13APR15

1. Select the Setup softkey.



Control Selection Button

PC17972—UN—07NOV13

2. Select the Control Selection button.



Control Selection Drop-Down Menu

PC18093—UN—13NOV13

*NOTE: Distance Trip is only available on selective control valve (SCV) 1.*

3. Select Distance Trip from the Control Selection drop-down menu for SCV 1. Select OFF for SCV 3.

*NOTE: Application controller must be restarted to operate with new control function.*

4. Shut off the machine, wait for the display to power down, then restart the machine.

RW00482,00006B0-19-14JUN18

## Distance Trip Setup

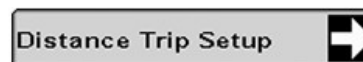
*NOTE: For long trip time applications, reference the Third-Party Installations section.*



Main Softkey

PC13072—UN—16NOV10

1. Select the Main softkey.



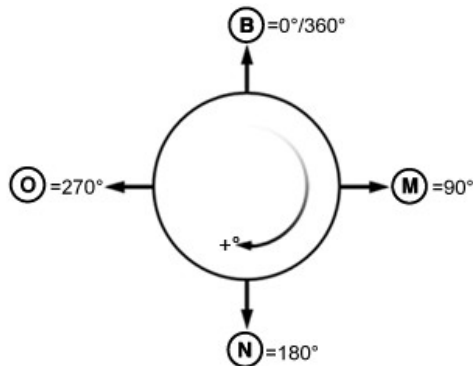
Distance Trip Setup Button

PC18094—UN—13NOV13

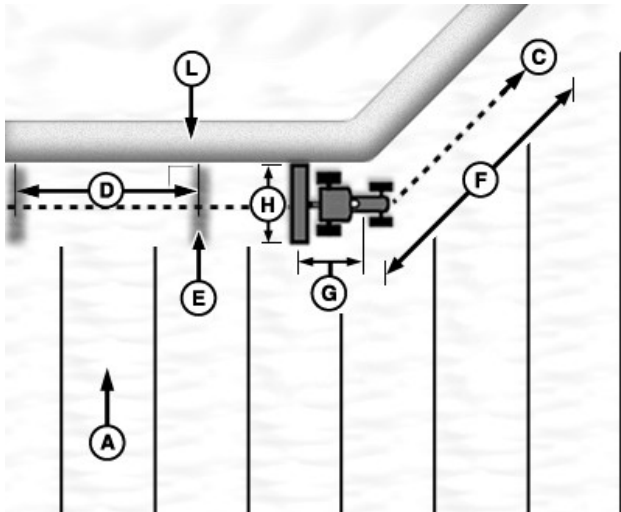
2. Select the Distance Trip Setup button.

| Distance Trip Setup          |           |
|------------------------------|-----------|
| Furrow Heading (deg)         | 0 (A)     |
| Interval Distance (ft)       | 6.561 (D) |
| GPS Offset to Implement (ft) | 0.000 (G) |
| Implement Width (ft)         | 0.000 (H) |
| Trip Time (sec)              | 0.5 (I)   |

PC21174—UN—18MAY15

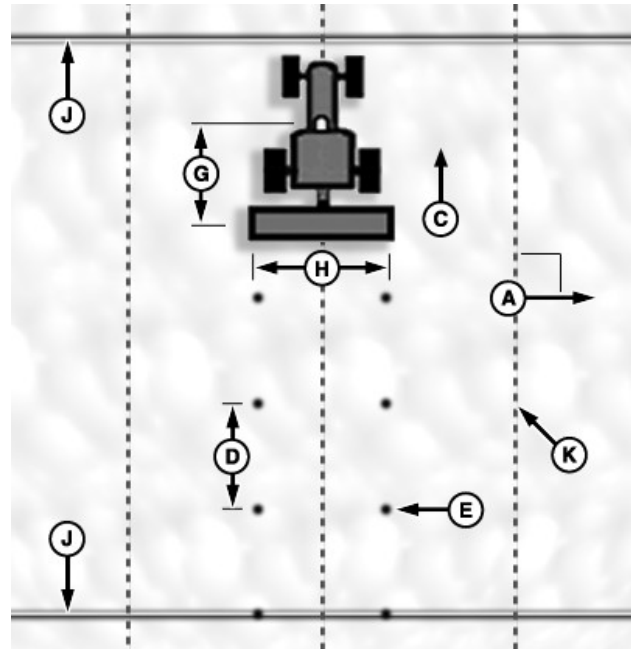


PC21177—UN—18MAY15



Irrigation Furrow Boundary Blockers

PC21172—UN—18MAY15



PC21173—UN—18MAY15

Distance Based Implement Actuation

- A—Furrow Heading
- B—North = 0°/360°
- C—Direction of Travel
- D—Interval Distance
- E—Implement Actuation
- F—Compensates for Extra Distance
- G—GPS Offset to Implement
- H—Implement Width
- I—Trip Time
- J—Reference Lines
- K—Guidance Lines
- L—Irrigation Ditch
- M—East = 90°
- N—South = 180°
- O—West = 270°

3. Enter:

**Furrow Heading (A)**—Global positioning system (GPS) heading of furrow in relation to true North (B).

- For irrigation furrows, center machine over furrow and obtain heading from display.  
(Reference Slope Direction for information.)
- For distance-based implement actuation, input a furrow heading 90 degrees perpendicular to direction of travel (C).

**Interval Distance (D)**—Linear distance between implement actuations (E). Interval Distance must be perpendicular distance to furrow heading. Distance Trip automatically compensates for extra distance (F) when traveling at different angles.

**GPS Offsets to Implement (G)**—Distance from the machine receiver and working point of implement.

**Implement Width (H)**—Distance between furthest working points of implement.

**Trip Time (I)**—Time in seconds that selective control valve (SCV) completes a cycle and affects implement actuation. For example, trip time on a paint marker determines whether dots, dashes, or lines are painted.

(Reference Distance Trip Low Side Driver for more information.)

**Reference Lines (J)**—Marked or flagged reference line to ensure operator triggers distance trip at the same starting and ending locations in both directions of travel.

(Reference Optimize Distance Trip for more information.)

RW00482,00006B1-19-05JUN18

## Initiate Trip Cycle



Main Softkey

PC13072—UN—16NOV10

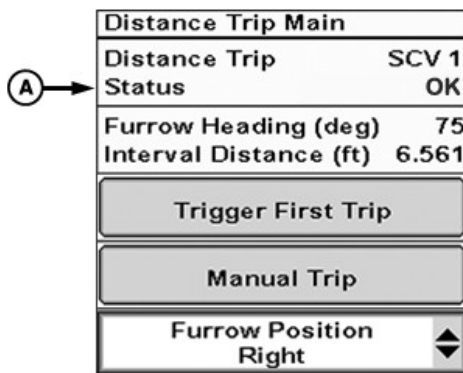
1. Select the Main softkey.



Distance Trip Main Button

PC18425—UN—28JAN14

2. Select the Distance Trip Main button.



Distance Trip Main

PC22227—UN—29FEB16

### A—Status

3. Verify that Status (A) is OK.

(Reference Troubleshooting if status is not OK.)



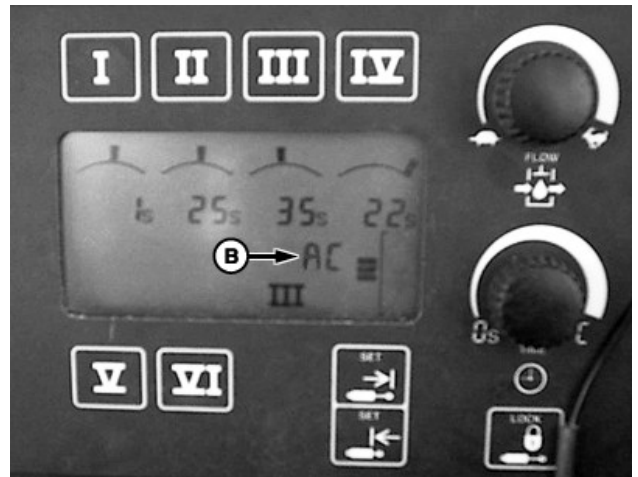
A—SCV 1 Control Lever

PC22229—UN—29FEB16

**NOTE:** Machine must be moving faster than 0.72 km/h (0.45 mph) for the selective control valve (SCV) to engage.

(Reference machine Operator's Manual for more information on SCV speed requirements.)

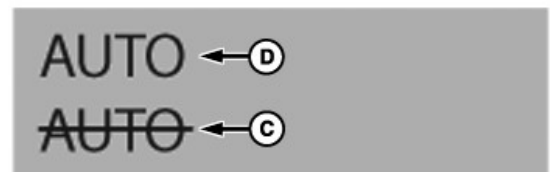
4. To engage auto mode, place the SCV control lever (A) in forward detent position.



B—AC Mode

PC22230—UN—29FEB16

- If operating a machine with a TouchSet™ Display, verify that EC changes to AC (B).



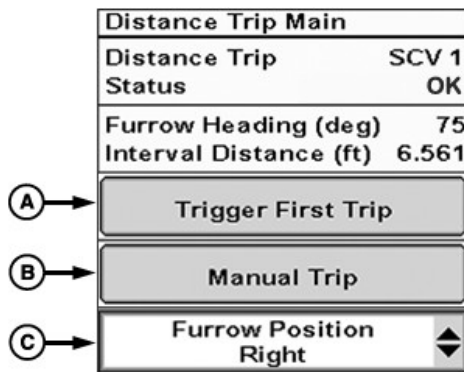
C—AUTO Mode Indicator (Turned Off)

PC22231—UN—29FEB16

TouchSet is a trademark of Deere & Company

**D—AUTO Mode Indicator (Turned On)**

- If operating a machine with a CommandCenter™, verify that AUTO off (C) changes to AUTO on (D).



PC22228—UN—29FEB16

Distance Trip Main

**A—Trigger First Trip****B—Manual Trip****C—Furrow Position**

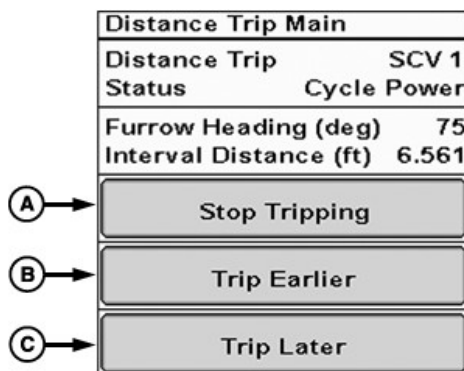
5. Initiate trip cycle.

**Trigger First Trip (A)**—Cycles SCV control unit and sets current location as the origin point to calculate distance.

**Manual Trip (B)**—Cycles SCV without the distance setup or setting current location as the origin point.

**Left or Right Furrow Position (C)**—iGrade™ calculates global positioning system (GPS) distance and trips implement based on which side of the implement furrow is located.

RW00482,00006B2-19-14JUN18

**Adjust Trip Cycle**

PC18427—UN—28JAN14

Distance Trip Main

**A—Stop Tripping****B—Trip Earlier****C—Trip Later**

**Stop Tripping (A)** – Stops measuring distance and tripping selective control valve (SCV).

**Trip Earlier (B)** – Shifts preset trip interval to occur sooner but does not decrease interval distance.

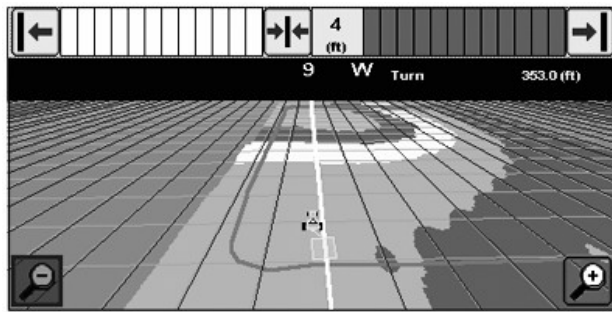
**Trip Later (C)** – Shifts preset trip interval to occur later but does not increase interval distance.

Each press of Trip Earlier or Trip Later buttons changes trip distance by 5 cm (2 in.).

RW00482,0000507-19-22JUN15

# Topography Maps

## Theory of Operation



RW00482,00005CC-19-07MAR16

Topography Maps

*NOTE: For ease of operation, use the Layout Manager to configure display homepage for specific operations.*

*(Reference the GreenStar™ 3 2630 Display Operator's Manual for more information.)*

Surface Water Pro™ Plus (SWP+) is an advanced ditching program that generates a “best fit drain” and provides functionality to create elevation maps. SWP+ calculates the most effective drain in a field while moving the least amount of soil. Information is generated from vertical global positioning system (GPS) signals calculated from the StarFire™ Receiver. SWP+ requires a real time kinematic (RTK) enabled receiver on implement and machine.

*NOTE: Elevation maps utilize a five color map legend. The difference between minimum and maximum elevation is calculated and the elevation bands are spaced out evenly among five colors.*

- *Blue = maximum elevation point*
- *Green*
- *Yellow*
- *Orange*
- *Red = minimum elevation point*

Remote Control feature automatically controls blade height to an elevation calculated from ditches created in Apex™ or by SWP+.

*(Refer to Surface Water Pro™ Operator's Manual for more information.)*

*NOTE: Some displays have a factory demo available with full functionality for SWP+.*

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StarFire is a trademark of Deere & Company  
Apex is a trademark of Deere & Company*

# Remote Control—Serial Port

## Theory of Operation

Third-party software can connect to the application controller using a serial connection and operation-specific message protocols. This functionality may be useful with additional software packages that provide capabilities such as cut and fill mapping. After a serial connection is established, the third-party software can send set point commands to the application controller and automatically control elevation on an implement. The controller is also capable of retransmitting global positioning system (GPS) data to the third-party software using the serial port.

(For more information, contact your John Deere dealer.)

RW00482,00004B2-19-17JUN15

## Serial Port Setup



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



Application Controller 1100 Button

PC14926—UN—27APR12

2. Select the Application Controller 1100 button.



Setup Softkey

PC12961—UN—13APR15

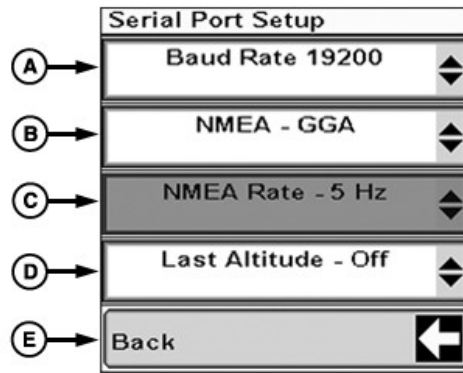
3. Select the Setup softkey.



Serial Port Setup Button

PC18252—UN—17DEC13

4. Select the Serial Port Setup button.



PC18071—UN—13NOV13

Serial Port Setup

- A—Baud Rate Drop-Down Menu
- B—NMEA Message Drop-Down Menu
- C—NMEA Rate Drop-Down Menu
- D—Last Altitude Drop-Down Menu
- E—Back Button

**NOTE:** Baud Rate is the data transfer rate used for commands from third-party software as well as global positioning system (GPS) data going to third-party software, if applicable.

5. Select Baud Rate from the drop-down menu (A).

- 4800
- 9600
- 19200
- 38400

6. If utilizing the application controller to retransmit StarFire™ implement position data through the serial port, select the National Marine Electronics Association (NMEA) messages needed by third-party software from the drop-down menu (B).

**NOTE:** If not using application controller to send StarFire™ implement position data through the serial port, select No NMEA.

- No NMEA
- NMEA – GGA
- NMEA – GGA, GSA
- NMEA – GGA, GSA, RMC
- NMEA – ALL

7. If utilizing application controller to retransmit StarFire™ implement position data through serial port, select the data frequency needed by third-party software from the drop-down menu (C).

- 1 Hz
- 5 Hz

8. If utilizing third-party software to show an as-applied map, Last Altitude allows a third receiver on last

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implement for elevation data. John Deere does not have an approved setup for this application. Customer must determine the best installation setup for this application.

RW00482,00006B3-19-05JUN18

## Control Selection



Setup Softkey

PC12961—UN—13APR15

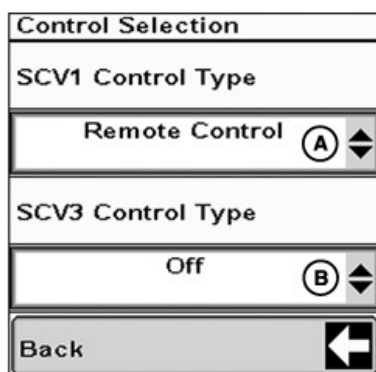
1. Select the Setup softkey.



Control Selection Button

PC17972—UN—07NOV13

2. Select the Control Selection button.



Control Selection

PC21420—UN—30JUL15

A—SCV1 Control Type Drop-Down Menu  
B—SCV3 Control Type Drop-Down Menu

3. Select Remote Control from the SCV1 Control Type drop-down menu (A).

**NOTE:** Remote Control can utilize dual scrapers. Selective control valve (SCV) 1 must be used for the front scraper and SCV 3 for rear scraper. When utilizing dual scraper functionality, change the SCV control type for both SCV 1 and SCV 3 to Remote Control.

4. If using dual scrapers, select Remote Control from the SCV3 Control Type drop-down menu (B).
5. If using cross slope, select Cross Slope Control from the SCV3 Control Type drop-down menu.

RW00482,00006B4-19-05JUN18

## Operate Remote Control



Main Softkey

PC13072—UN—16NOV10

1. Select the Main softkey.



Remote Control Main Button

PC18066—UN—12NOV13

2. Select the Remote Control Main button.



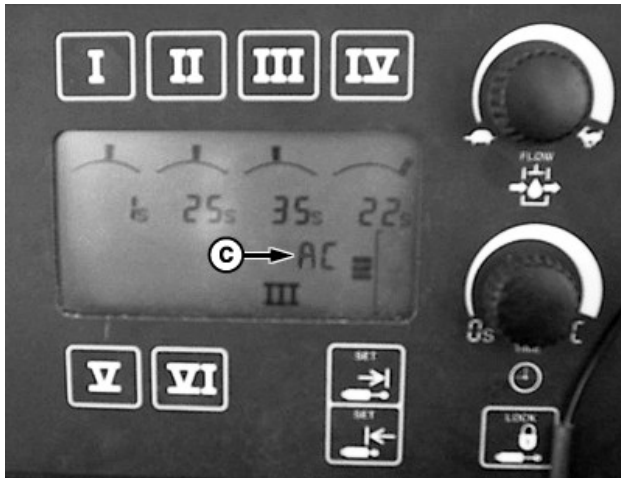
A—SCV 1 Control Lever  
B—SCV 3 Control Lever

PC18249—UN—19DEC13

**NOTE:** Machine must be moving faster than 0.72 km/h (0.45 mph) for the selective control valve (SCV) to engage.

(Reference machine Operator's Manual for more information on SCV speed requirements.)

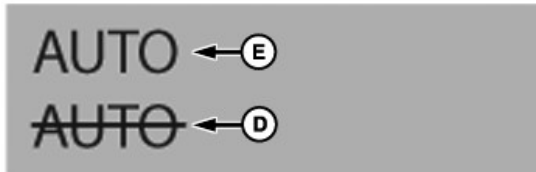
3. To engage auto mode, place the SCV control lever (A or B) in forward detent position. Use the front bucket first if using dual scrapers.



C—AC Mode

PC18250—UN—20DEC13

- If operating a machine with TouchSet™ Display, verify that EC changes to AC (C).



PC18251—UN—20DEC13

D—AUTO Mode Indicator (Turned Off)  
E—AUTO Mode Indicator (Turned On)

- If operating a machine with a CommandCenter™, verify that AUTO off (D) changes to AUTO on (E).

Offsets are based on desired command from third-party software, not ground level (distance off grade, not a maximum cut limit). After selective control valves (SCVs) have been placed in detent and AC enabled, iGrade™ controls blade height to grade.

| Remote Control Main |                         |
|---------------------|-------------------------|
| (B) →               | Status No GPS           |
|                     | Control Error (ft) 0.00 |
| (E) →               | Offset (ft) 0.000       |
|                     | Command (ft) 0.00       |
| (A) →               | Set Offset - Zero Error |
| (C) →               | Shift Offset Up         |
| (D) →               | Shift Offset Down       |

PC23342—UN—10NOV16

A—Set Offset—Zero Error  
B—Control Error  
C—Shift Offset Up  
D—Shift Offset Down

#### E—Offset

- Set Offset—Zero Error (A) takes current error and applies it as an offset to desired command. If third-party software is calibrated to a reference point and Control Error (B) is a non-zero value, select Set Offset—Zero Error to align a common reference point between iGrade™ and third-party software.
- Shift offsets are useful when implement is attempting to control an elevation that machine cannot attain. Select Shift Offset Up (C) for an achievable cut and then select Shift Offset Down (D) over subsequent passes until it is back to 0.

When setting zero point, Offset (E) value represents difference between surveyed receiver elevation and elevation of the front implement receiver when zeroing error.

RW00482,00006B5-19-14JUN18

# Optimize iGrade™

## Optimize iGrade™

(Reference tractor Operator's Manual for optimization of fuel consumption during transport, operator comfort, and ballast.)

If available for machine configuration, it is recommended to optimize the following functions:

- IVT™ (Infinitely Variable Transmission)—electronic communication and interaction between the engine and the transmission allows optimum productivity and efficiency at any engine speed.
- Automatic PowerShift—relieves the operator from shifting during significant load changes in the field and transport.
- PowerShift Efficiency Manager™—manages engine rpm and gear selection for the most efficient level of operation possible.
- iTEC™ (Intelligent Total Equipment Control)—combines transmission shifting, raising, and lowering scrapers, or other functions with the press of one button.
- Foot Decelerator—when depressed, it lowers engine rpm to preset level until released, allowing the operator to achieve slower speeds on turnarounds.
- AutoLoad™—selective control valve (SCV) control unit can only accept one command at a time. Therefore, AutoLoad™ cannot run in conjunction with iGrade™.

iGrade™ includes functionality to automatically adjust scraper cutting depth. This prevents excessive wear and damage, and any downtime that occurs from stalling the machine engine. The functionality monitors engine speed, estimates machine to ground slip, or limits the depth of the cut during a pass.

### Load Limiting

Increase load limiting values when:

- Ground conditions could cause machine or scraper to get stuck.
- Operator has limited experience with iGrade™.

Operator can set thresholds for one or both of the load limiting options. Utilizing Slip % Threshold requires a StarFire™ Receiver on the machine.

- Engine Speed Threshold—monitors engine rpm on the CAN bus. As engine rpm approaches the threshold value, the application controller commands the hydraulics to raise scraper to reduce system load. As engine rpm increases, the application controller commands the hydraulics to lower scraper

to previous elevation. Adjust the Elevation Control Sensitivity value to change the rate that the application controller commands the hydraulics to raise or lower the scraper.

- Slip % Threshold—calculation of Slip % utilizes speed from machine and speed detected from the machine global positioning system (GPS) receiver. As Slip % approaches the threshold value, application controller commands the hydraulics to raise scraper to reduce slip percentage. As Slip % decreases, application controller commands the hydraulics to lower scraper to previous elevation. Adjust the Elevation Control Sensitivity value to change the rate that the application controller commands the hydraulics to raise or lower the scraper.

### Max Cut

Max Cut allows an operator to set the maximum scraper cutting edge depth while cutting to a plane. Max Cut requires StarFire™ Receivers with real time kinematic (RTK) equipped on machine and implement. The application controller monitors elevation of machine and scraper receivers to limit maximum depth of the cutting edge.

RW00482,00006B6-19-14JUN18

### Load Limit



PC14926—UN—27APR12

Application Controller 1100 Button

1. Select the Application Controller 1100 button.



PC13072—UN—16NOV10

Main Softkey

2. Select the Main softkey.



PC18076—UN—13NOV13

Grade Control Setup Button



PC18047—UN—12NOV13

Plane Control Setup Button

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Efficiency Manager is a trademark of Deere & Company  
iTEC is a trademark of Deere & Company  
AutoLoad is a trademark of Deere & Company  
iGrade is a trademark of Deere & Company  
StarFire is a trademark of Deere & Company



Serial Port Setup

PC18252—UN—17DEC13

3. Select the control type being used:

- Grade Control Setup
- Plane Control Setup
- Serial Port Setup (Remote Control)



Parameter Setup Button

PC18474—UN—10FEB14

4. Select the Parameter Setup button.



Elevation Control Sensitivity

PC18050—UN—12NOV13

5. Enter Elevation Control Sensitivity.

**Elevation Control Sensitivity**—Allows operator to adjust the rate scraper moves when Load Limiting is enabled.

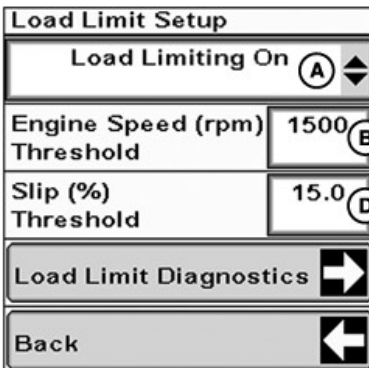
Elevation Control Sensitivity defaults to 2000, and is adjustable between 10—10,001. For slower, less aggressive implement adjustments, decrease value. For faster, more aggressive implement adjustments, increase value.



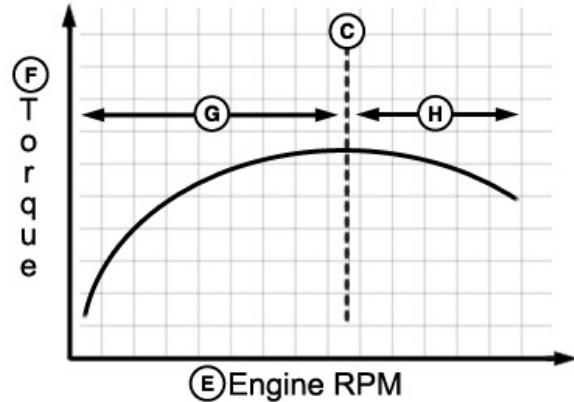
Load Limit Setup Button

PC18059—UN—12NOV13

6. Select the Load Limit Setup button.



PC21030—UN—30MAR15



PC21031—UN—08APR15

- A—Load Limiting Drop-Down Menu  
 B—Engine Speed Threshold  
 C—Peak Torque  
 D—Slip Threshold  
 E—Engine RPM  
 F—Torque  
 G—Engine RPM Below Peak Torque  
 H—Engine RPM Above Peak Torque

7. Enable Load Limiting by selecting Load Limiting On from the drop-down menu (A).

8. Enter Engine Speed Threshold (B). Factory default is 1500 rpm or 1799 rpm.

**NOTE:** Enter an Engine Speed Threshold value greater than the engine's peak torque speed (C) to have power in reserve while the application controller commands the scraper to rise and reduce system load.

(Reference machine manufacturer's specifications for peak torque speed.)

9. Enter the Slip Threshold (D).

**NOTE:** The optimal amount of wheel slip varies by machine model, based on ballast and machine manufacture's guidelines. Slip % default value is 15%.

(Reference machine Operator's Manual for the optimal amount of wheel slip.)

10. To disable Load Limiting, select Load Limiting Off from the drop-down menu (A).

RW00482,00006B7-19-05JUN18

## Max Cut

**NOTE:** Max Cut requires RTK or RTK-X signal on the machine to function.



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



Application Controller 1100 Button

PC14926—UN—27APR12

2. Select the Application Controller 1100 button.



Main Softkey

PC13072—UN—16NOV10

3. Select the Main softkey.



Grade Control Setup Button

PC18076—UN—13NOV13



Plane Control Setup Button

PC18047—UN—12NOV13



Serial Port Setup

PC18252—UN—17DEC13

4. Select the control type being used:
  - Grade Control Setup
  - Plane Control Setup
  - Serial Port Setup (Remote Control)



Parameter Setup Button

PC18474—UN—10FEB14

5. Select the Parameter Setup button.



Elevation Control Sensitivity

PC18061—UN—12NOV13

6. Enter Elevation Control Sensitivity.

**Elevation Control Sensitivity**—Allows operator to adjust the rate scraper moves when Max Cut is enabled.

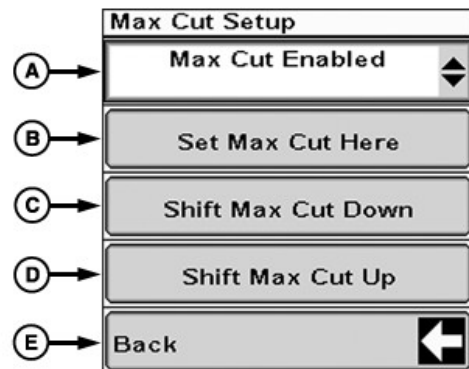
Elevation Control Sensitivity defaults to 2000, and is adjustable between 10—10,001. For slower, less aggressive implement adjustments, decrease value. For faster, more aggressive implement adjustments, increase value.



Max Cut Setup Button

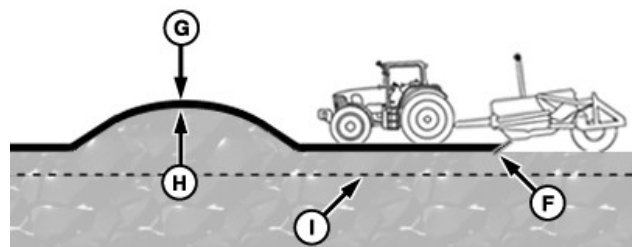
PC18062—UN—12NOV13

7. Select the Max Cut Setup button.



Max Cut Settings

PC18063—UN—12NOV13



PC21067—UN—08APR15

- A—Max Cut Drop-Down Menu
- B—Set Max Cut Here Button
- C—Shift Max Cut Down Button
- D—Shift Max Cut Up Button
- E—Back Button
- F—Implement Cutting Edge
- G—Current Grade
- H—Max Cut (Amount of Material Removed in a Pass)
- I—Desired Plane

8. Enable Max Cut by selecting Max Cut Enabled from the drop-down menu (A).
9. Lower implement(s) cutting edge slightly above the surface of the ground. Select the Set Max Cut Here button (B).
10. While in field moving forward, select the Shift Max Cut Down button (C) to desired cutting depth. Select

the Shift Max Cut Up button (D) to reduce amount of material removed. Each time a shift is selected, the application controller commands the implement to lower or raise 2 cm (0.79 in).

11. To disable Max Cut, select Max Cut Disabled from the drop-down menu (A).

RW00482,00006B8-19-05JUN18

## Optimize SCV Threshold and Elevation Control Sensitivity

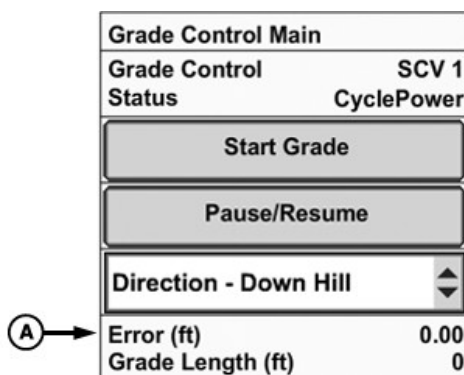
1. Adjust selective control valve (SCV) flow and counterbalance valve (if applicable) to desired performance.
2. Set guidance line.
3. Set up the Grade Control between two marked points. Use Grade Calculator.
4. Raise scraper to avoid ground contact while running Grade Control.
5. Enable AutoTrac™ and Grade Control with the blade in raised position.



Elevation Control Sensitivity

PC18061—UN—12NOV13

6. Adjust the Elevation Control Sensitivity to a value that allows visual scraper movement with Grade Control active.



A—Error Value

PC22477—UN—13APR16

7. Monitor Error (A) on Grade Control main page. Value should remain close to zero during procedure.

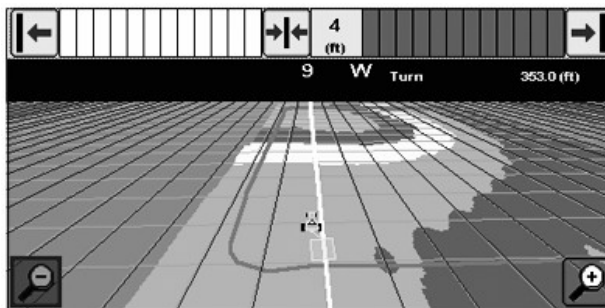
If value continues to stay above or below zero for an extended period of time, adjust SCV Thresholds.

If value is erratic, decrease the Elevation Control Sensitivity and adjust the SCV Threshold value.

**NOTE:** For optimal SCV Threshold calibration values, it is recommended to have a John Deere dealer utilize SCV threshold tool found in Technical Manual.

RW00482,00006B9-19-05JUN18

## Surface Maps



Topography Maps

PC20994—UN—19MAR15

**NOTE:** For ease of operation, use the Layout Manager to configure display homepage for specific operations.

(Reference the GreenStar™ 3 2630 Display Operator's Manual for more information.)

Topography and elevation maps provide a visual of the terrain for a specific area. These maps can be used as a reference for moving material from higher areas to lower areas before forming a plane. Once a boundary is defined and a survey is created, a map can be generated as a paper reference or as a background layer displayed on the GS3 2630 Display.

**NOTE:** Elevation maps utilize a five color map legend. Minimum and maximum elevation points determine the threshold. The difference between minimum and maximum elevation is calculated and elevation bands are spaced out evenly among five colors.

- Blue = maximum elevation point
- Green
- Yellow
- Orange
- Red = minimum elevation point

Available sources to obtain elevation information:

- Surface Water Pro™ Plus survey  
(Reference Topography Maps for more information.)
- Documentation elevation layer  
The GS3 2630 Display captures elevation information when it documents a product application,

planting, harvest, or tillage operation. Apex™ is able to create an elevation map as a background map.

(Reference Apex™ help for more information.)

- GSDNet (Available in the United States only)  
GSDNet requires the boundary and Documentation Elevation Layer of the area to be mapped. GSDNet offers the following maps:
  - Elevation data map
  - Digital elevation map
  - Drainage map
  - Depression map
- Land Surveyor

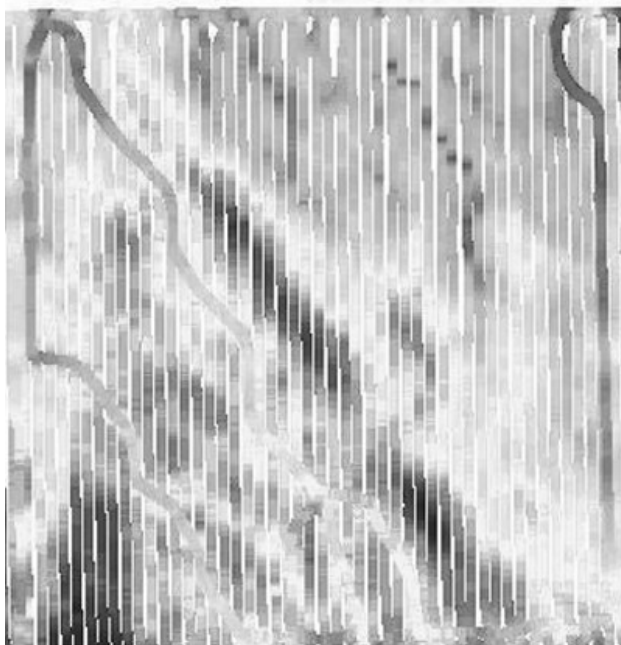
Commercial land surveyors are a source of elevation maps and data. A surveyor may provide the data as shapefiles or CSV files that can be imported into Apex™.

RW00482,00005CD-19-07MAR16

## Utilize GSDNet Maps with iGrade™

GSDNet aerial images provide a visual reference for planning purposes. For best results, perform in-field surveys using real time kinematics (RTK) signal.

### Elevation Data Map



PC22203—UN—25FEB16

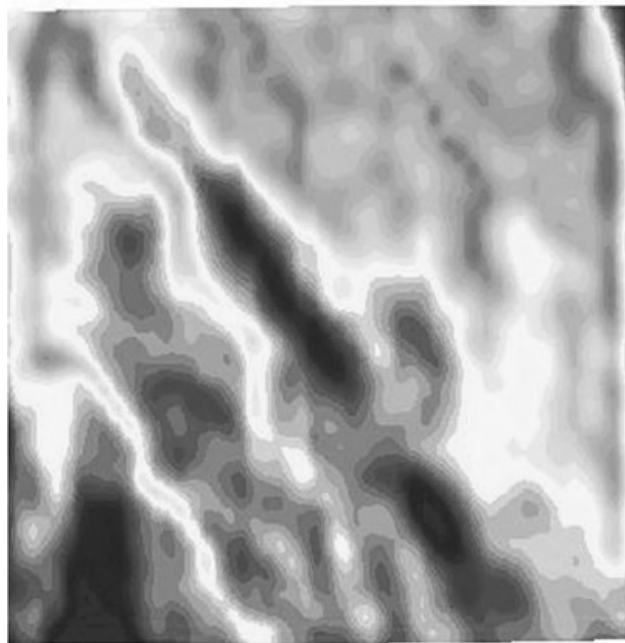
### Elevation Data Map

Remote sensing captures differences in surface elevation and these are displayed in aerial images. Before creating a plane, use elevation maps as a visual

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to move material from high elevation to low elevation to level the area.

### Digital Elevation Map

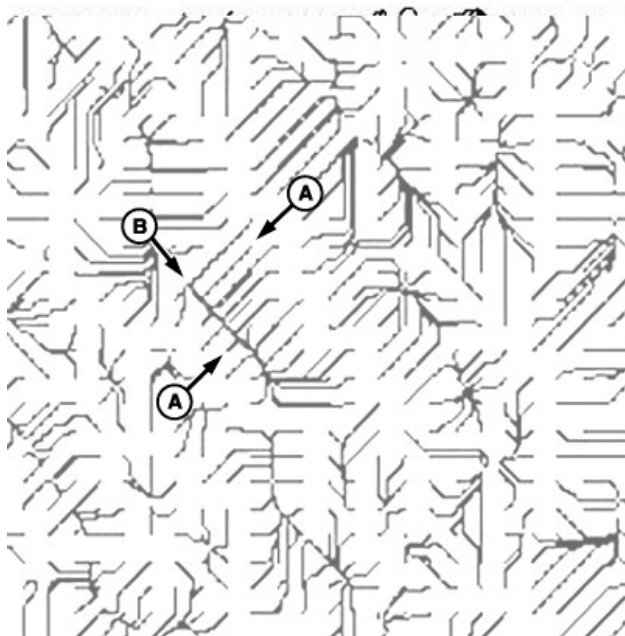


PC22204—UN—25FEB16

### Digital Elevation Map

A rasterized or digitally processed image of the elevation map provides a smoother transition between elevation changes.

### Drainage Map



PC22205—UN—25FEB16

A—Contributory Drain Paths  
B—Main Drain Path

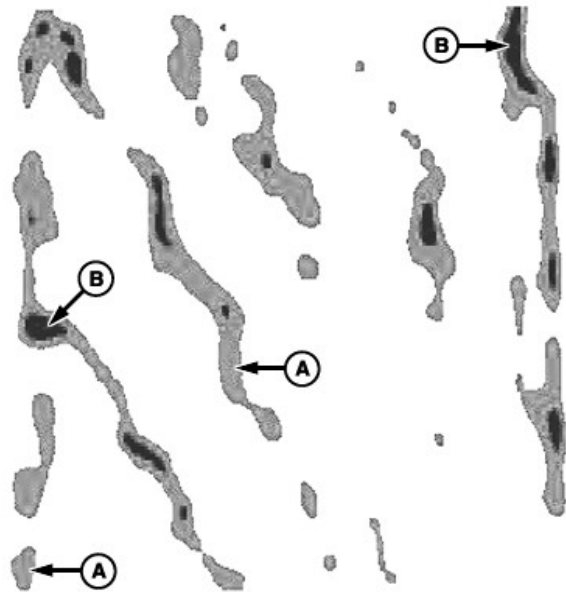
## Drainage Map

Use drainage maps to understand the direction water flows for ditch and waterway design. Guidance lines can be created on the map and exported to the display.

Contributory drain path (A) represents direction water flows to the main drain path.

Main drain path (B) is the accumulation of contributory drain paths and represents the direction of the accumulated water flow.

## Depression Map



A—Low Areas (Green)  
B—Lowest Areas (Red)

PC22206—UN—25FEB16

## Depression Map

Use depression maps as a visual to understand where water is likely to pool. If filling depressions, move material from high elevations to depression areas. If ditches are made between depressions to allow for drainage, guidance lines can be created on the map and exported to the display. Remove material from depression areas to create water retention basins.

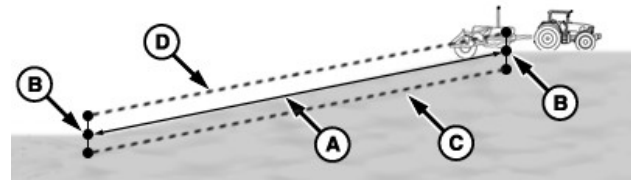
Low areas (A) of the field typically represent a localized watershed that drain into lower areas.

Lowest areas (B) of the field should be considered for drainage.

White areas of the map represent areas of the field that do not collect water.

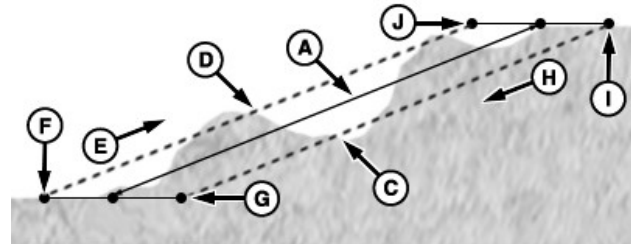
RW00482,00005B3-19-15MAR16

## Optimize Grade Quality



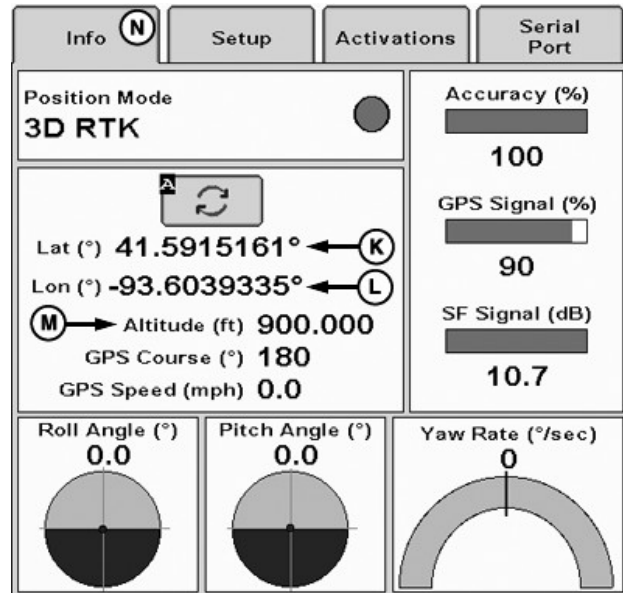
PC23070—UN—16NOV16

Vertical Start/End Points



PC25723—UN—23MAY18

Horizontal Start/End Points



PC23365—UN—14NOV16

A—Desired Grade  
B—Start/End Points  
C—Below Desired Grade  
D—Above Desired Grade  
E—Uphill Direction of Travel  
F—Starting Uphill Too Early (Uphill)  
G—Starting Uphill Too Late (Uphill)  
H—Downhill Direction of Travel  
I—Starting Downhill Too Early  
J—Starting Downhill Too Late  
K—Latitude  
L—Longitude  
M—Altitude  
N—Info Tab

To obtain best grade quality for desired grade (A), implement cutting edge must be at the same position when arriving at the grade start or end points (B).

## Vertical Start/End Points

Setting blade height too low at a starting point results in

final grade being below desired grade (C). Setting blade height too high at a starting point results in final grade being above desired grade (D).

### Horizontal Start/End Points

If starting direction of travel is uphill (E), selecting Start Grade button too early (F) results in grade above desired grade and selecting Start Grade button too late (G) results in grade below desired grade. If starting direction of travel is downhill (H), selecting Start Grade button too early (I) results in grade below desired grade and selecting Start Grade button too late (J) results in grade above desired grade.

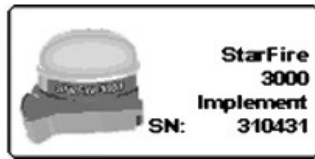
Record the latitude (K), longitude (L), and altitude (M) for both points.



Menu Button

PC8663—UN—29APR15

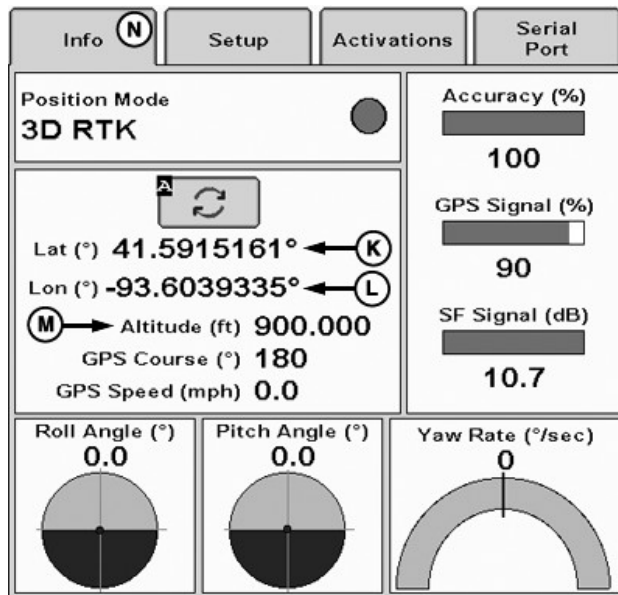
1. Select the Menu button.



StarFire™ Button

PC20634—UN—19DEC14

2. Select the StarFire™ button.



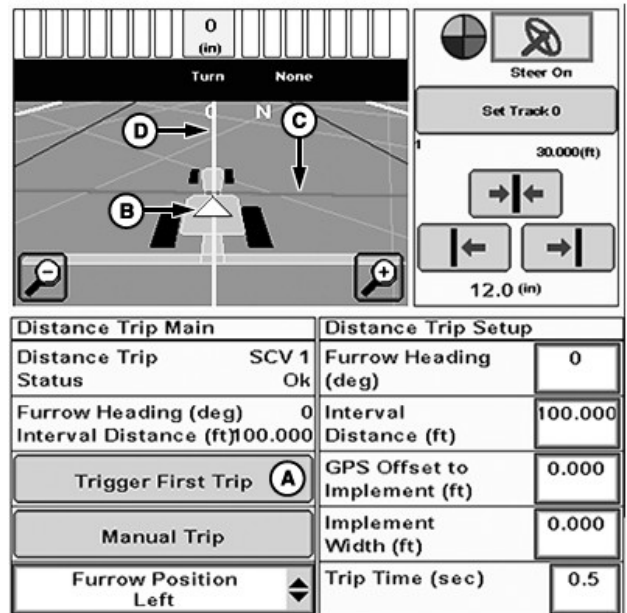
PC23365—UN—14NOV16

K—Latitude  
L—Longitude  
M—Altitude  
N—Info Tab

3. Select the Info tab (N).
4. Position the machine at point A facing point B.
5. Record point A latitude (K), longitude (L), and altitude (M).
6. Position the machine at point B facing point A.
7. Record point B latitude, longitude, and altitude.
8. Before detenting selective control valve (SCV) control lever at the start of each pass, position the implement so the cutting edge is at the recorded altitude.

RW00482,00006BA-19-05JUN18

### Optimize Distance Trip



PC23389—UN—18NOV16

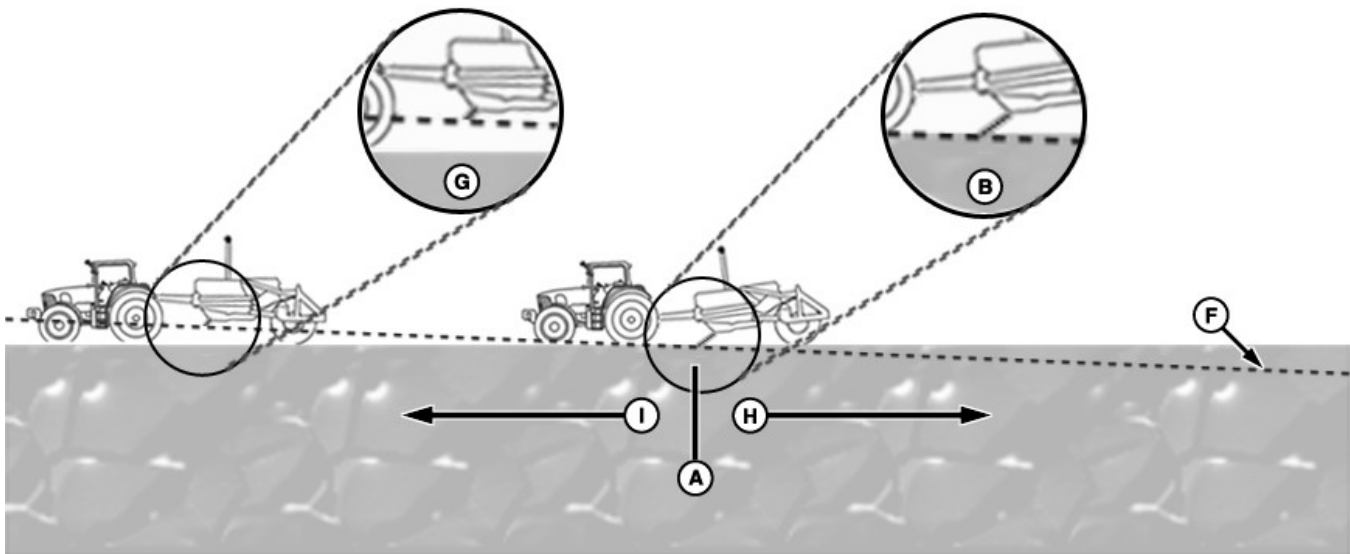
A—Trigger First Trip Button  
B—White Triangle  
C—Boundary Line  
D—Guidance Line

When utilizing distance trip for multiple pass operations, select Trigger First Trip button (A) at start of each pass. Utilize guidance lines and boundaries on display to provide a visual for selecting trigger first trip.

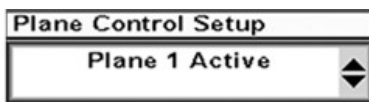
1. Record Boundaries.  
(Refer to Plane Calculator with Topography Maps for more information on recording boundaries.)
2. Setup straight track or AB curve guidance lines.
3. Use boundary lines as markers to trigger first trip.  
Line up the white triangle (B) on the machine with the boundary line (C) and guidance line (D).

RW00482,000002A-19-29NOV16

## Visualizing and Demonstrating Slope Prior to Moving Material



PC22058—UN—22JAN16



PC18414—UN—27JAN14

Plane Control Setup Drop-Down Menu



PC18415—UN—27JAN14

Single Slope Entry Button

| Single Slope Entry         |        |
|----------------------------|--------|
| Slope (%)                  | 0.1200 |
| Down Slope Direction (deg) | 160.00 |
| Set Plane Origin           |        |

PC22059—UN—22JAN16

- A—Midpoint
- B—Scraper Blade slightly Above Ground (Midpoint)
- C—Slope (%)
- D—Down Slope Direction
- E—Set Plane Origin Button
- F—Created Plane
- G—Height of Scraper Blade Above Ground (Up Slope)
- H—Cut Area
- I—Fill Area

1. Drive to midpoint (A) of plane being created.  
(Reference Determining Horizontal Distance for more information.)
2. Lower the scraper blade slightly above ground (B).
3. Select Plane 1 Active from the Plane Control Setup drop-down menu.
4. Select the Single Slope Entry button.

**NOTE:** Down slope direction is 180 degrees from the direction of the machine in graphic.

5. Enter Slope (%) (C) and Down Slope Direction (D).
6. Select the Set Plane Origin button (E).

7. Drive machine in the up slope direction.

**NOTE:** Machine must be moving faster than 0.72 km/h (0.45 mph) for the selective control valve (SCV) to engage.

(Reference machine Operator's Manual for more information on SCV speed requirements.)

8. To engage the scraper, place SCV 1 control lever in forward detent position.
9. Verify that EC on TouchSet™ Display changes to AC.

If operating a machine with CommandCenter™, verify that AUTO off changes to AUTO on.

10. The scraper rises to maintain elevation of the created plane (F).
11. The height of scraper blade above ground (G) represents amount of material from cut area (H) to be placed in fill area (I).

RW00482,00006BB-19-14JUN18

## Determining Slope Values for Drainage and Irrigation

Slope values used for grade and plane creation for drainage and irrigation vary by crop and soil types.

(Reference local regulations, handbooks, and agricultural offices for guidelines and slope value recommendations.)

RW00482,0000595-19-03FEB16

## Determining Vertical Distance



PC22095—UN—27JAN16

A—Vertical Distance  
B—High Point Altitude  
C—Low Point Altitude

Vertical distance (A) is required for calculating the slope between two points of a field.

Vertical distance equals high point altitude (B) minus low point altitude (C).



Menu Button

PC8663—UN—29APR15

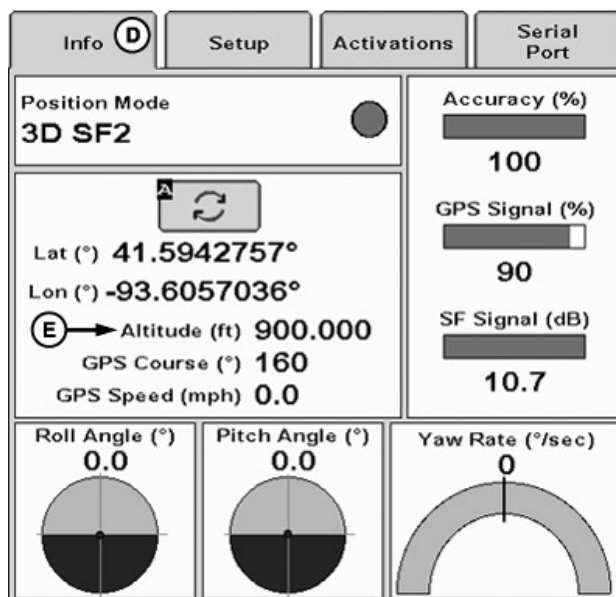
1. Select the Menu button.



StarFire™ Button

PC20634—UN—19DEC14

2. Select the StarFire™ button.



PC22094—UN—27JAN16

D—Info Tab

E—Altitude

3. Select the Info tab (D).
4. View Altitude (E).

RW00482,00006BC-19-05JUN18

## Determining Horizontal Distance

Horizontal distance is required for calculating the slope and determining midpoint.

1. At the start point, position the machine facing the end point.



Menu Button

PC8663—UN—29APR15

2. Select the Menu button.



Performance Monitor Button

PC22080—UN—22JAN16

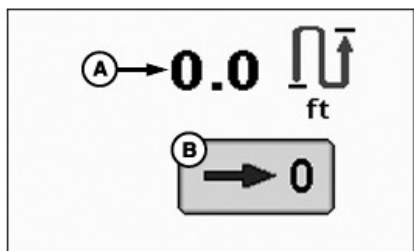
3. Select the Performance Monitor button.



Totals Softkey

PC22096—UN—27JAN16

4. Select the Totals softkey.



A—Distance Counter  
B—Zero Button

PC22097—UN—27JAN16

5. Select the Distance Counter (A) Zero button (B).

**NOTE:** Some machines require holding the Zero button to reset totals.

(Reference GreenStar™ 3 2630 Display Operator's Manual for more information on Distance Counter.)

RW00482,00006BD-19-05JUN18

## Guidance Lines

Use AutoTrac™ with iGrade™ to increase job quality and eliminate excessive overlap and operator fatigue.

Grade Control accuracy depends on traveling same path and linear distance when creating a grade. Using AutoTrac™ allows operator to focus on pausing and resuming grade control while approaching grade endpoints or markers.

Common tracking modes when utilizing AutoTrac™ with iGrade™:

- Straight Track—creates flat planes, straight grades, straight roads, and straight waterways.
- AB Curve—creates planes around contours, curved grades, curved roads, and curved waterways.

RW00482,00004C6-19-27JUL15



C—Accept Button

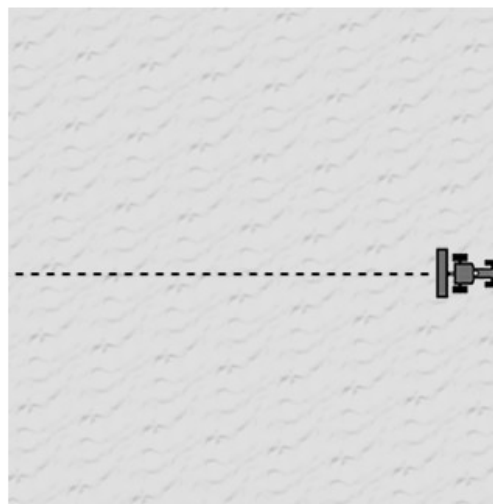
PC22099—UN—27JAN16

6. Select the Accept button (C).
7. Drive to the end point and stop the machine.

**NOTE:** If calculating distance for grade control, it is recommended to engage AutoTrac™ on the guidance line.

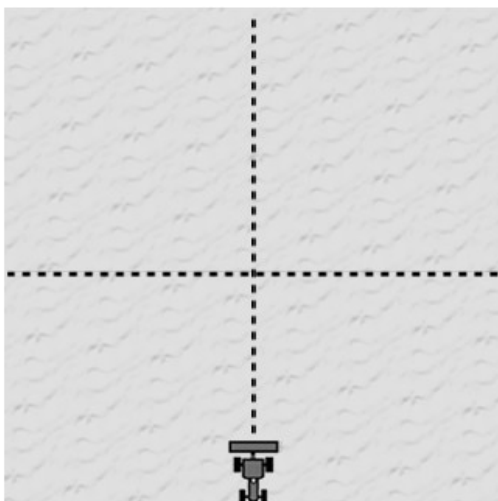
8. View Distance Counter total.

## Data Collection Drive Patterns



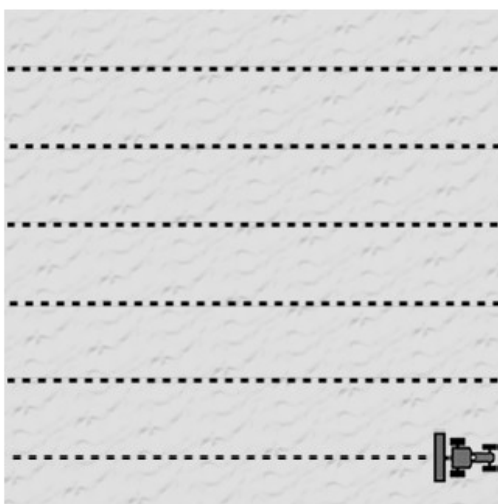
Not Recommended

PC21061—UN—06APR15



Minimum

PC21062—UN—06APR15



Recommended

PC21064—UN—06APR15

The more data points that are collected results in higher accuracy. Conducting a thorough survey can be done by setting up straight track lines through the field. Depending on the field being surveyed, create tracking lines with the following track spacing.

- For fields with significant elevation changes and slopes, track spacing of 7.5—15 m (25—50 ft.) is recommended.
- For flatter fields, track spacing of 15 m (50 ft.) is recommended.
- For flat or precision leveled ground, track spacing of 15—30 m (50—100 ft.) is recommended. Do not exceed 50 m (164 ft.) track spacing for surveying purposes.

RW00482,00004CF-19-29JUL15

## Optimize Terrain Compensation Module (TCM)

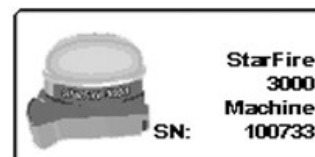
Optimize TCM calibration by allowing the inertial measurement unit (IMU) to measure roll angle and yaw rate before performing the TCM calibration.



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



StarFire™ Button

PC13006—UN—05NOV14

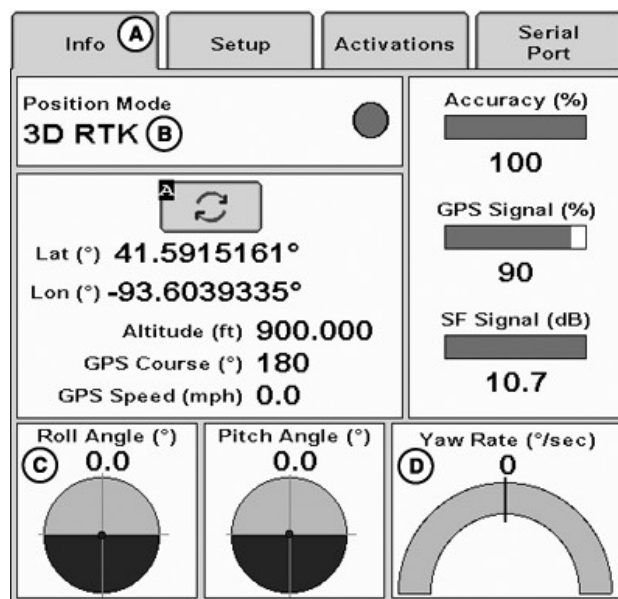
2. Select the StarFire™ button.



StarFire™ Softkey

PC21154—UN—11MAY15

3. Select the StarFire™ softkey.

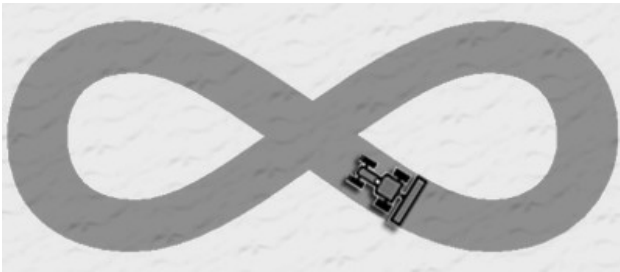


PC24061—UN—06APR17

A—Info Tab  
B—Position Mode  
C—Roll Angle  
D—Yaw Rate

StarFire is a trademark of Deere & Company

4. Select the Info tab (A).
5. Verify 3D Position Mode (B) has established SF1 signal or better.



PC21419—UN—30JUL15  
TCM Optimization Drive Pattern

6. Drive machine in the TCM optimization drive pattern two times to allow the IMU to initialize.
7. Complete the TCM calibration.  
(Reference the Calibrate Terrain Compensation Module [TCM] for more information.)

RW00482,0000525-19-14SEP17

## Base Station



PC21180—UN—15MAY15  
Receiver on Rigid Pole

**⚠ CAUTION:** To prevent serious injury or death, ensure that base station receiver does not move or sway. Any motion of the base station receiver while transmitting directly affects machine position and can cause unexpected machine movement.

A real time kinematic (RTK) enabled StarFire™ Receiver on a machine must have a direct line of sight with the base station to receive the RTK signal. Distance from the base station affects RTK system performance. When operating iGrade™ beyond 1.6 km (1 mi) radius of the base station, vertical accuracy is degraded.

The base station is critical to the RTK system. Shading and multipathing are responsible for most problems with the base station.

**Shading** occurs when objects are more than 5 degrees above the horizon and block the receiver's direct line of sight with a satellite. If an object can cast a natural shadow over the receiver, it can also cause shading.

**Multipathing** occurs when satellite signals reflect off objects, causing indirect signals to arrive at the receiver. Reflected signals take longer to reach base station receiver than direct signals and cause inaccurate satellite range measurements. Reflections can even interfere with the direct signal causing the receiver to temporarily lose the satellite. Metal buildings, chain-link fences, motor vehicles, and bodies of water are all reflectors that can make a base station less reliable.

If a base station experiences either of these problems, it is detrimental to RTK accuracy. Ensure that base station receiver:

- Is mounted to a rigid structure that does not move or sway.
- Has a good view of the sky, more than 5 degrees above the horizon.
- Has few to no reflective objects close to it.

### Configure Base Station

#### Absolute Base

An absolute base station helps minimize global positioning system (GPS) drift while using iGrade™. GPS drift is more noticeable while grading the same plane over multiple days. Absolute Base mode requires 24 hr survey conducted on location before first use. After survey is completed, base station stores location information and starts transmitting corrections. Receiver can be removed after completing a 24 hr survey. Return it to exact same position and it transmits corrections without conducting a new 24 hr survey. For a permanent base location, install a receiver bracket on a post that is buried 0.9—1.2 m (3—4 ft) in the ground.

#### Quick Survey Base

*StarFire is a trademark of Deere & Company  
iGrade is a trademark of Deere & Company*

Quick survey base does not require a 24 hr survey. If using a tripod for temporary operation, a quick survey base may be more practical as long as receiver does not move. Any movement of receiver results in movement of machines using base station. Verify blade height and offsets before operation and reset if needed.

The following example uses a John Deere RTK Radio 900.

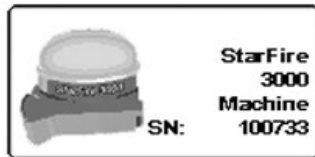
(For more information on base station setup, reference RTK Operator's Manual.)



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



StarFire™ Receiver Button

PC13006—UN—05NOV14

2. Select the StarFire™ Receiver button.



RTK Softkey

PC18498—UN—05NOV14

3. Select the RTK softkey.



Configure Button

PC18499—UN—05NOV14

4. Select the Configure button.

### Configure RTK Network

**Operating Mode**  
Absolute Base A

**Radio Channel (1-14)** 1 B

**Network ID (1 - 4000)** 4001 C

///
➡ D

PC21086—UN—10APR15

- A—Operating Mode Drop-Down Menu  
 B—Radio Channel Entry Box  
 C—Network ID Entry Box  
 D—Accept Button

5. Select Absolute Base or Quick Survey Base from the drop-down menu (A).

6. Enter the Radio Channel (B) and Network ID (C).

*NOTE: Base station and machine must be set up with same Radio Channel and Network ID.*

7. Select Accept button (D).

8. For Absolute Base, conduct a 24 hr survey.

### 24 hr Survey

#### RTK Network Configuration

Configure

**Operating Mode**  
**Absolute Base**

**Radio Channel (1-14)** **1**

**Network ID (1 - 4000)** **4001**

#### Base Station Data

Status  
**No Navigation**

Sat. Corrections **0**

Location Number  
**Absolute 1**

Distance (ft) **0.00**

Direction (°) **0**

Base Battery (V) **13.8**

#### Radio Data

Noise Level **9**

↺

Edit stored RTK Base

Start A

PC21087—UN—10APR15

- A—Edit stored RTK Base Start Button

1. Select the Edit stored RTK Base Start button (A).

B—Survey RTK Base Location Start Button

2. Select the Survey RTK Base Location Start button (B).

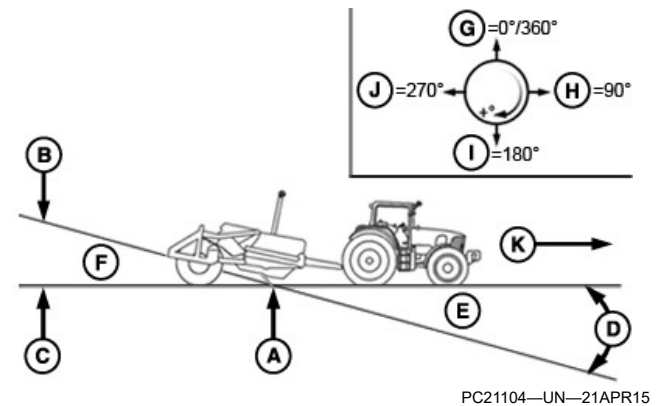
C—Storage Location Drop-Down Menu  
D—Start 24 hr Survey Button

3. Select the storage location (C).
4. Position the StarFire™ Receiver.
5. Press the Start 24 hr survey button (D).
6. Wait 24 hr (display can be disconnected).
7. Base station location automatically saves at end of 24 hr survey.

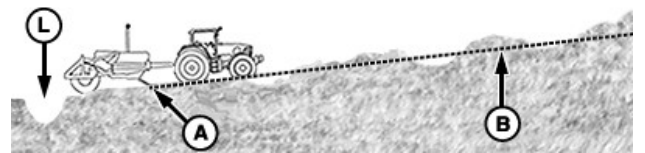
Once survey is started, a 24 hr countdown displays on RTK Configuration page. During the 24 hr countdown, the base station is non-functional and cannot be used. Do not switch power off. Once survey is complete, record and store the base location survey results at a separate location for future reference.

RW00482,00006BE-19-05JUN18

## Control Point



PC21104—UN—21APR15



PC23060—UN—19SEP16

Drain into Existing Ditch



PC23061—UN—19SEP16

Drain Away from Existing Road

A—Control Point  
B—Desired Plane or Grade  
C—Starting Plane or Grade  
D—Slope %  
E—Area Cut (Dirt Removed)  
F—Area Filled (Dirt Added)  
G—North = 0°/360°  
H—East = 90°  
I—South = 180°  
J—West = 270°  
K—Slope Direction (Degrees)  
L—Existing Ditch  
M—Existing Road

A control point (A), also known as a benchmark, is a location in the field at an elevation that does not require the removal or addition of material to be at the desired plane or grade (B). Control points should be identified with flags or markers to allow scrapers to return for system validation and to reset plane or grade origin. System validation and resetting of plane or grade origin is necessary due to normal global positioning system (GPS) drift.

The location of the control point varies by field design. Examples to determine control point:

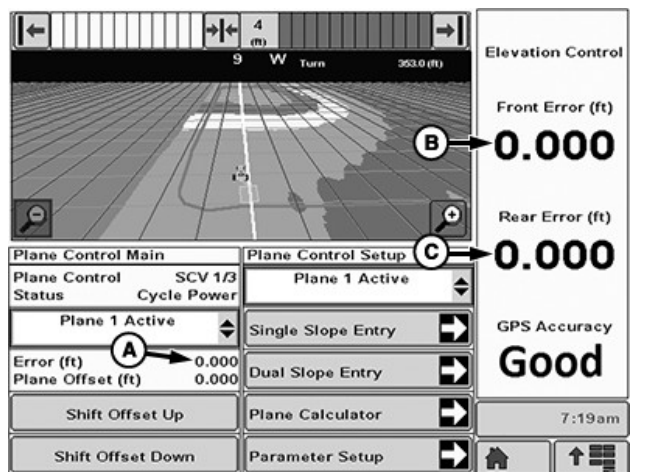
- Use the plane calculator.  
(Reference Locate Calculated Control Point on Plane for more information.)

- Where slope drains into the existing ditch (L).
- Where slope drains away from the existing road (M).

## Validate Plane Origin

**NOTE:** Inconsistent placement of the scraper to the control point results in inconsistent elevation control error values.

1. Drive to control point location and position scraper in the same manner as done during setup.
2. Lower scraper cutting edge to control point surface.



PC25727—UN—24MAY18

A—Error Value  
B—Front Error Value  
C—Rear Error Value

3. Review offset Error values (A—C).
4. If Elevation Control Error exceeds personal preference, reset plane origin.

## Reset Plane Origin



PC14926—UN—27APR12

Application Controller 1100 Button

1. Select the Application Controller 1100 button.



PC13072—UN—16NOV10

Main Softkey

2. Select the Main softkey.



PC18047—UN—12NOV13

Plane Control Setup Button

3. Select the Plane Control Setup button.



PC18415—UN—27JAN14

Single Slope Entry Button



PC18417—UN—27JAN14

Dual Slope Entry Button

4. Select the Single Slope Entry button or Dual Slope Entry button.



PC20254—UN—13NOV14

Set Plane Origin Button

5. Select the Set Plane Origin button.

RW00482,00006BF-19-05JUN18

## Plane Management

During operation, operator may shift plane offset up or down to cut less or more material.

Additional situations that may require shifting offset:

- If the material or soil type will compress and pack over time, shift offsets up. Moving large quantities may increase the potential for compaction.
- If there is a potential of having a shortage of material, shift offsets down.

RW00482,0000598-19-08MAR16

## Layout Manager

Layout Manager provides the ability to display user-defined pages in the home page layout. It is recommended to configure and utilize multiple home pages for specific operations.

(For more information on the Layout Manager, reference GreenStar™ 3 2630 Display Operator's Manual.)

The following layout is recommended for iGrade™ applications:



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



Layout Manager Button

PC22100—UN—28JAN16

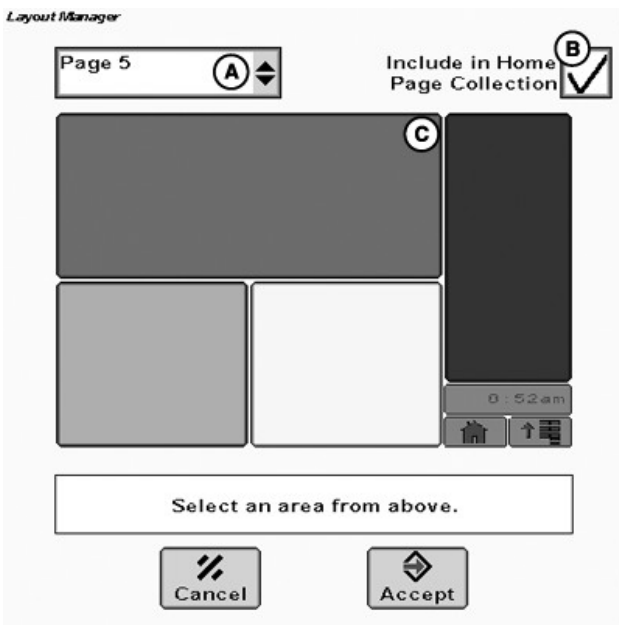
2. Select the Layout Manager button.



Softkey H

PC22101—UN—28JAN16

3. Select softkey H.



PC25732—UN—24MAY18

A—Page Number Drop-Down Menu  
B—Home Page Collection Checkbox  
C—Half Area

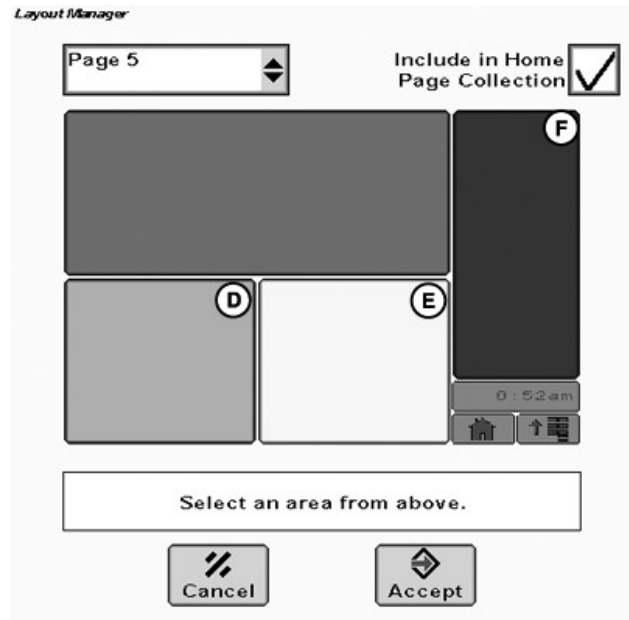
4. Select a page number from the drop-down menu (A).
5. Select Include in Home Page Collection checkbox (B).
6. Select area (C).



GreenStar™ Button

PC22104—UN—01FEB16

7. Select the GreenStar™ button.
8. Select a screen for specific operation.



PC25734—UN—24MAY18

D—Quarter Area  
E—Quarter Area  
F—Softkey Area

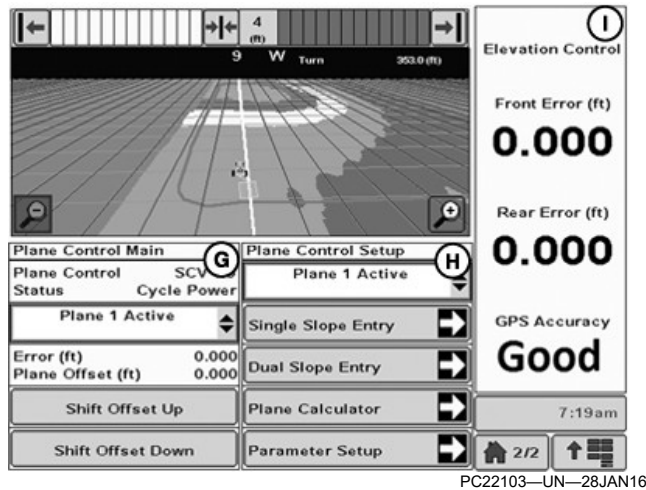
9. Select area (D—F).



Application Controller 1100 Button

PC14926—UN—27APR12

10. Select the Application Controller 1100 button.



G—Control Main  
H—Control Setup  
I—Elevation Control

11. Select Control Main (G), Control Setup (H), or Elevation Control (I).



Accept Button

PC22267—UN—14MAR16

12. Select the Accept button.

RW00482,00006C0-19-14JUN18

# Disabling and Disconnecting iGrade™

## Disable iGrade™

**CAUTION:** Do not use iGrade™ on roadways. To prevent serious injury, disable iGrade™ by removing selective control value (SCV) control before entering roadways.



Setup Softkey

PC12961—UN—13APR15

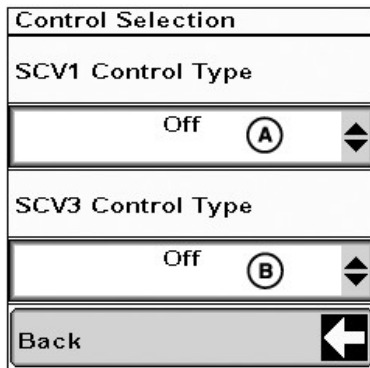
1. Select the Setup softkey.



Control Selection Button

PC17972—UN—07NOV13

2. Select the Control Selection button.



SCV Control Selection

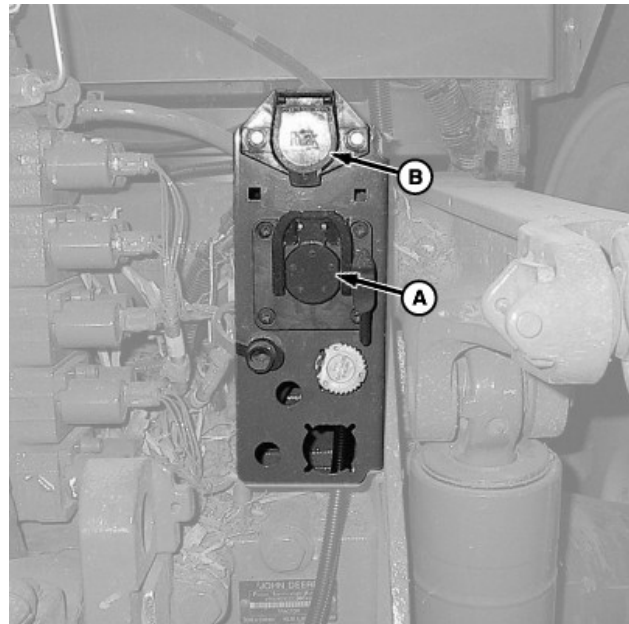
PC18270—UN—02JAN14

A—SCV 1 Control Type  
B—SCV 3 Control Type

3. Set SCV 1 (A) and SCV 3 (B) Control Type to Off.

RW00482.00006C1-19-05JUN18

## Disconnect iGrade™ System



Rear View of Machine

PC12191—UN—05OCT09

A—ISO Connector  
B—Lighting Connector

*NOTE: If an electronic failure occurs, hydraulic control can be set to operate in normal, manual mode.*

*Without electronic control, automatic implement height adjustments are not possible.*

### Disconnection procedure for changing machine or implement:

1. Shut off machine, set parking brake, and remove key.
2. Disconnect implement receiver harness at ISO 9-pin connector (A).
3. Disconnect constant power harness.

*NOTE: Once completed, machine SCV control reverts to normal manual operation.*

4. Disconnect lighting connector (B) and all other implement connections related to releasing equipment from machine.

### Disconnection procedure for electronic failure:

- On Application Controller Setup menu, select Control Selection.
- On Control Selection drop-down, select Off.
- After Off has been selected, cycle machine power and iGrade™ will be disabled.

### Disconnection procedure for permanent removal:

- Shut off machine, set parking brake, and remove key.

- Disconnect application controller from rear ISO connector.
- Remove controller and components following procedures in Application Controller installation instructions.

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RW00482,000024D-19-12FEB14

# Third-Party Installation

## Message Definition

John Deere UCC2 Application Controller uses two types of message protocols.

### Elevation Set Point

Application controller can use third-party elevation messages to control implement to match set point elevation. An implement receiver is required. Supported elevation data is in meters with up to two decimal places. Ensure message has no spaces and a carriage return ends the message. The message protocol is as follows:

\$JD,ELEV,<Value><Carriage Return>

### Depth Set Point

Application controller can use third-party elevation messages to control implement to match set point depth. Machine and implement receivers are required to calculate the difference between ground surface and implement depth. Offsets are used to account for height differences between machine and implement receivers.

### Cross Slope Point

Application controller can use third-party elevation messages to control implement to match set point cross slope. An implement receiver is required. Supported cross slope value is the desired cross slope percentage. The message protocol is as follows:

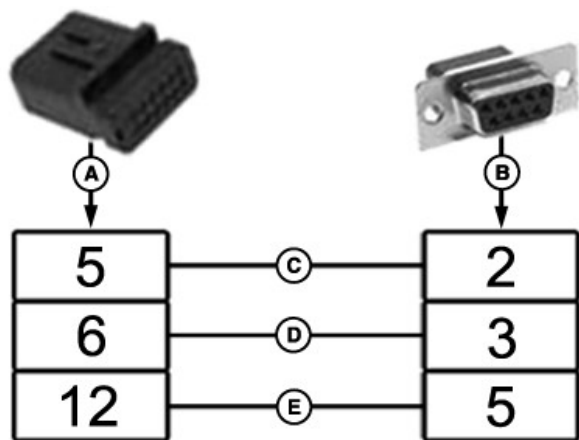
\$JD,CROSS,<Value><Carriage Return>

A positive value commands right-hand side of scraper blade lower than the left-hand side. A negative value commands the opposite.

RW00482,00004EC-19-04AUG15

## Remote Control Serial Port Hardware

Use the following guidelines to configure Remote Control harnesses for third-party software.



PC21135—UN—05MAY15

Serial Port Wiring Pinouts

A—57M9804

B—DB9 Receptacle  
C—RS232 Transmit  
D—RS232 Receive  
E—RS232 Ground

*NOTE: Contact your John Deere dealer to order parts. Harness does not come assembled.*

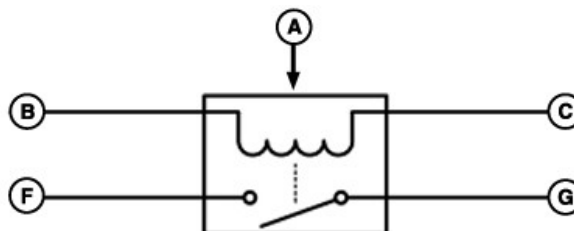
| Part Number | Description                                       | Quantity |
|-------------|---------------------------------------------------|----------|
| 57M9804     | Mating Connector to Controller Harness            | 1        |
| 57M8164     | Pins for 57M9804                                  | 3        |
| —           | DB9 Plug Connector Assembly                       | 1        |
| —           | 2.5 m (8 ft) of 0.5 mm <sup>2</sup> (20 AWG) wire | 3        |

RW00482,00006C2-19-05JUN18

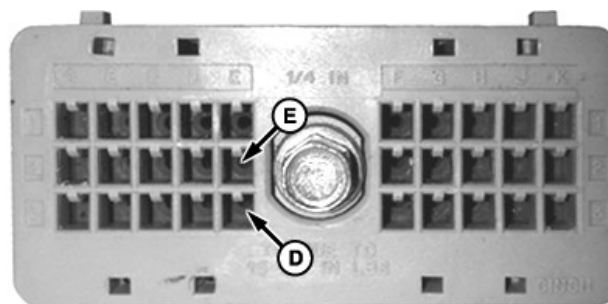
## Distance Trip Low Side Driver

**IMPORTANT:** To avoid damaging application controller, use a relay coil (A) that is rated at 1 A or less, and does not exceed 12 V.

*NOTE: The required relay to use application controller low side driver is not provided.*



PC21178—UN—18MAY15



PC21147—UN—15MAY15

A—1 A (Max) Relay  
B—Low Current Power Supply  
C—Ground (E3 or E2)  
D—E3  
E—E2  
F—High Current Power Supply  
G—Electronic Device

Distance trip has the ability to connect relay to a 5—12 V DC low current power supply (B) and ground (C). To connect to the low side driver, the operator has two options, pin E3 or pin E2. Low side drivers activate in

succession and have different hold times. After distance interval is reached, E3 low side driver closes (grounds) and holds for duration of Trip Time (sec). Immediately after E3 low side driver opens, E2 closes (grounds) and holds for 1.5 times the duration of Trip Time (sec).

RW00482,0000046-19-18NOV16

## Long Trip Time Applications

| Distance Trip Setup          |              |
|------------------------------|--------------|
| Furrow Heading (deg)         | 0            |
| Interval Distance (ft)       | 6.561        |
| GPS Offset to Implement (ft) | 0.000        |
| Implement Width (ft)         | 0.000        |
| Trip Time (sec)              | 0.5 <b>A</b> |

PC23095—UN—26SEP16

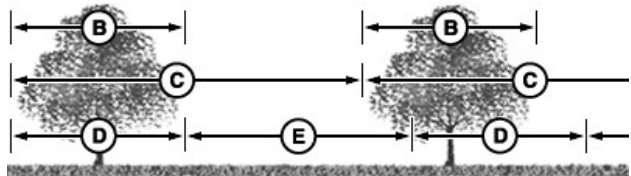
### A—Trip Time

E3 low side driver closes (grounds) and holds for duration of Trip Time (A). Immediately after E3 low side driver opens, E2 closes (grounds) and holds for 1.5 times the duration of Trip Time. If Trip Time plus 1.5 times Trip Time exceeds travel time of the trip distance, the next trip delays by the difference.

For long trip time applications:

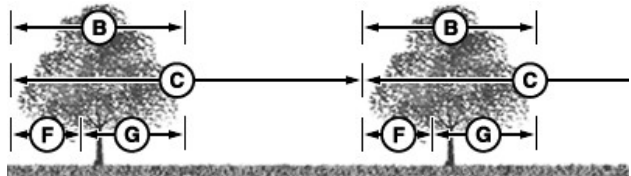
1. Connect both E3 and E2 drivers from the application controller to relay ground.
2. Calculate and enter Trip Time.

$$\text{Trip Time} = \text{desired trip time} / 2.5$$



PC23101—UN—26SEP16

Trip Time—E3 Driver Only



PC23102—UN—26SEP16

Trip Time—E3 and E2 Drivers

- B—Desired Application Time**  
**C—Trip Distance**  
**D—E3 Driver (E3 Only)**  
**E—E2 Driver (E3 Only)**  
**F—E3 Driver (E3 and E2)**

### G—E2 Driver (E3 and E2)

Example: Desired application time (B) is 5 seconds and trip distance (C) is 10 seconds.

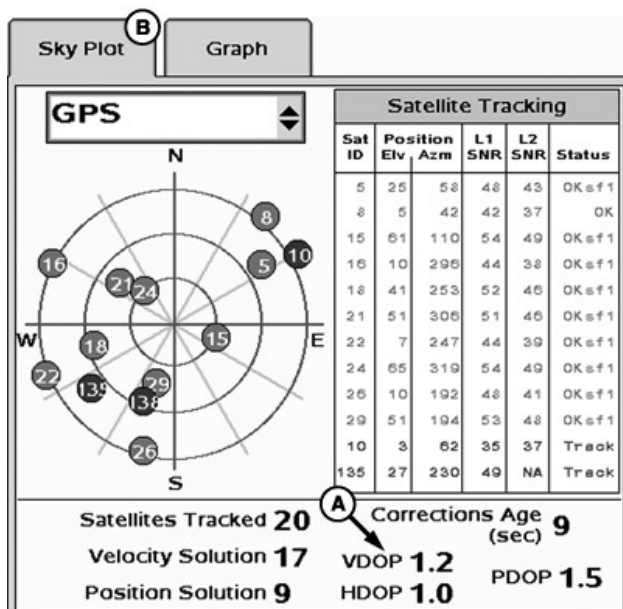
Using only E3 low side driver to trigger implement with a 5 seconds Trip Time exceeds trip distance time. E3 driver (D) triggers for 5 seconds, then E2 driver (E) triggers for 7.5 seconds.

Using both E3 and E2 low side driver to trigger implement with a 2 seconds Trip Time does not exceed trip distance time. E3 driver triggers (F) for 2 seconds, then E2 driver triggers (G) for 3 seconds to trigger implement for a total of 5 seconds.

RW00482,00006C3-19-05JUN18

# Troubleshooting

## Satellite Information



PC21069—UN—07APR15

A—VDOP  
B—Sky Plot Tab

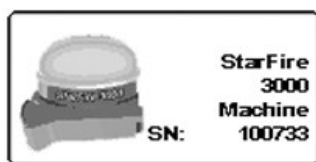
iGrade™ depends on satellites that provide global positioning system (GPS) signals. Vertical dilution of precision (VDOP) (A) is an indicator of GPS satellite coverage at receiver. A lower VDOP value indicates better satellite coverage for calculating vertical position. Before tuning or adjusting iGrade™, verify that VDOP value is below 1.6. Adjustments made when VDOP value is above 1.6 are inaccurate and must be readjusted.



Menu Button

PC8663—UN—29APR15

1. Select the Menu button.



StarFire™ Button

PC13006—UN—05NOV14

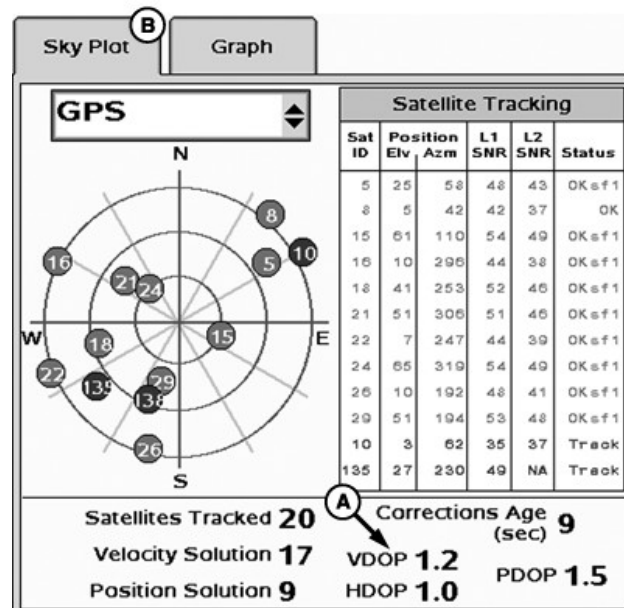
2. Select the StarFire™ button.



Satellite Information Softkey

PC13048—UN—10NOV10

3. Select the Satellite Information softkey.



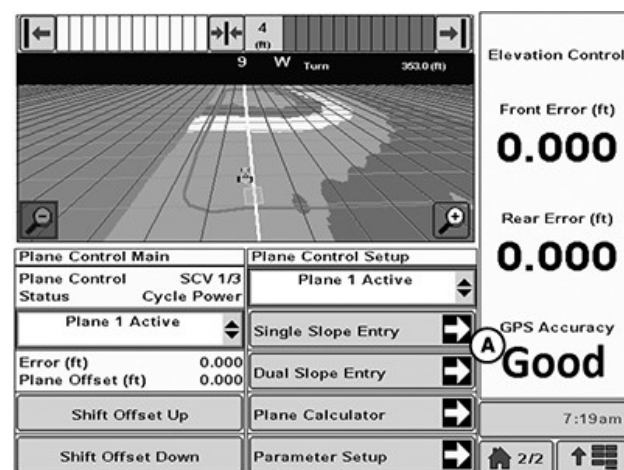
PC21069—UN—07APR15

A—VDOP  
B—Sky Plot Tab

4. Select the Sky Plot tab (B).

RW00482,00006C4-19-05JUN18

## iGrade™ Performance



PC22432—UN—06APR16

A—GPS Accuracy Status

iGrade™ relies on global positioning system (GPS) signal, the application controller, and machine

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StarFire is a trademark of Deere & Company

hydraulics to control the machine and implement. Use GPS Accuracy status (A) found on Elevation Control page to determine quality of signal from satellites. If signal is good, adjust control parameters of application controller and (or) machine hydraulics.

#### Good GPS Accuracy

- Adjust control parameters, such as elevation sensitivity, selective control valve (SCV) flow settings, SCV thresholds, and (or) counterbalance valve (if applicable).
- Ensure clear line of sight within 1.6 km (1 mi) of base station, and that global navigation satellite system (GNSS) external antenna and (or) choke ring antenna are functioning.

#### Marginal GPS Accuracy

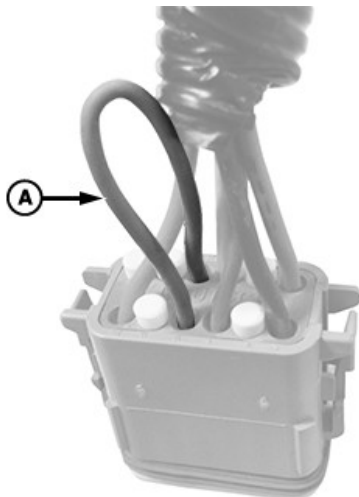
- Expect degraded iGrade™ performance. If operator decides to adjust control parameters, record values so they can be reentered when GPS accuracy improves.

#### Bad GPS Accuracy

- Discontinue using iGrade™ until GPS accuracy improves.

AE77568,00001C4-19-13APR16

### Install Jumper Wire



PC22462—UN—08APR16

#### A—Jumper Wire

**NOTE:** If jumper wire (A) is installed on a machine with AutoTrac™, AutoTrac™ is disabled until the wire is removed.

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Some iGrade™ operations can be performed without an implement. For example, operators can use a Gator™ or vehicle to survey a field. To function, iGrade™ requires an implement receiver though.

A jumper wire must be installed on the machine receiver for the system to see it as an implement receiver. Install wire between pin 3 and pin 10 on the machine receiver connector.

CZ76372,0000756-19-08APR16

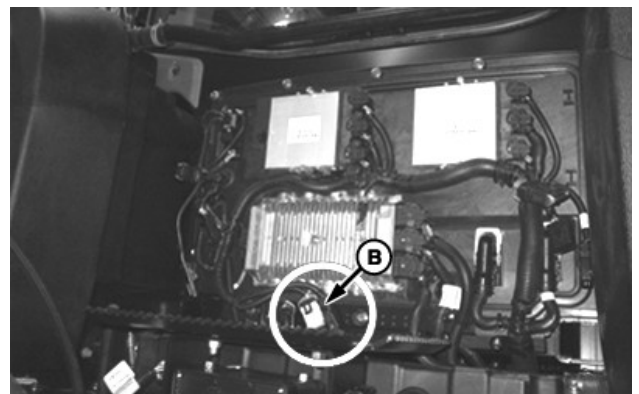
### Reset UCC2 Application Controller

**IMPORTANT:** Do not connect the UCC2 Application Controller while machine is powered ON. Connecting while powered can create CAN bus communication errors and generate hydraulic control unit faults.

1. Turn OFF the machine.



PC22232—UN—29FEB16

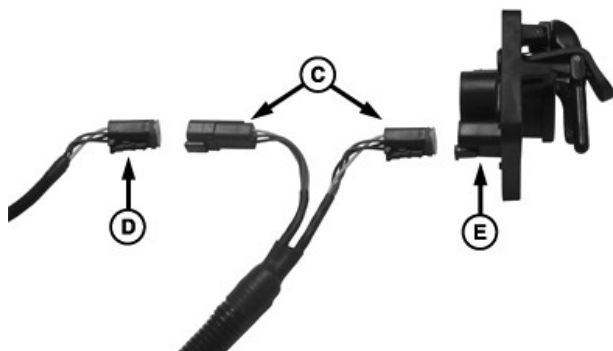


PC22233—UN—29FEB16

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Gator is a trademark of Deere & Company

A—Constant Power Connector  
B—Option Connector

- Disconnect the constant power connector (A) and the option connector (B).



C—CAN Bus T-Connectors  
D—4-Pin CAN Bus Connector  
E—ISO Implement Connector

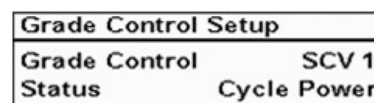
PC22234—UN—29FEB16

connect the 4-pin CAN bus connector (D) directly to the ISO implement connector (E).

- Start the machine. Once all systems start up, view and clear all machine diagnostic trouble codes, then turn OFF the machine.
- Reconnect the constant power and option connectors.
- Reconnect the CAN bus T-connectors between the 4-pin connector and the ISO implement connector.

RW00482,00005B8-19-24NOV20

## Troubleshooting—iGrade™ System



PC18096—UN—13NOV13

Grade Control Setup

- Disconnect the CAN bus T-connectors (C) and

A—iGrade™ Status

| Plane Control | Grade Control | Cross Slope | Distance Trip | Remote Control | iGrade™ Status (A)   | Description                                                                                                            | Solution                                                                                                                                                                                                                          |
|---------------|---------------|-------------|---------------|----------------|----------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X             | X             | X           | X             | X              | OK                   | System is ready to be operated. Any faults still occurring are likely to be independent of the iGrade™ control system. | System is working properly.                                                                                                                                                                                                       |
| X             | X             | X           | X             | X              | Cycle Power          | Application controller must be restarted to operate with the new control function.                                     | Shut off machine, wait for display to power down, then restart machine.                                                                                                                                                           |
| X             | X             | X           | X             | X              | Not Activated        | No iGrade™ activation.                                                                                                 | Select activation input box and enter activation code.<br>If iGrade™ is activated, Activation Entry page displays: <ul style="list-style-type: none"> <li>Distance Trip</li> <li>Remote Control</li> <li>Grade Control</li> </ul> |
| X             | X             | X           | X             | X              | Tractor SCV not Auto | Selective control valve (SCV) control lever is not in detent position.                                                 | Place SCV control lever into detent position.                                                                                                                                                                                     |
| X             | X             | X           | X             | X              | No GPS               | No global position system (GPS) correction available.                                                                  | Verify that StarFire™ Receiver on implement and machine are connected and functioning properly.                                                                                                                                   |
| X             | X             | X           | X             | X              | No GPS RTK           | No real time kinematic (RTK) corrections are being received, or RTK not currently available.                           | Activate RTK on implement StarFire™ Receiver and machine StarFire™ Receiver. Verify that receiver has line of sight with base station.                                                                                            |
| X             | X             | X           | X             | X              | Update GPS SW        | Incompatible software loaded.                                                                                          | Update software on StarFire™ Receivers to newest version.                                                                                                                                                                         |
|               |               | X           |               | X              | No Remote Cmds       | Remote Control mode is selected and application controller is not receiving external commands.                         | Verify serial cable connections, pinouts, baud rates, and that external device is sending commands.                                                                                                                               |
| X             | X             |             |               | X              | Load Limit Active    | Defined Engine Speed or Slip Threshold is exceeded.                                                                    | Position throttle lever to allow full rpm. Properly ballast machine. Verify that threshold limits are set to reasonable values.                                                                                                   |
| X             | X             |             |               | X              | Max Cut Active       | Defined Max Cut depth is met.                                                                                          | Continue to remove material until defined grade or plane is achieved.                                                                                                                                                             |

## Troubleshooting

| Plane Control | Grade Control | Cross Slope | Distance Trip | Remote Control | iGrade™ Status (A) | Description                | Solution                                                                                         |
|---------------|---------------|-------------|---------------|----------------|--------------------|----------------------------|--------------------------------------------------------------------------------------------------|
|               | X             |             |               |                | Paused             | iGrade™ control is paused. | Verify that the SCV is in detent position. Select the Start Grade button or Pause/Resume button. |
|               | X             |             |               |                | Running            | System is operating.       | System is working properly.                                                                      |

### iGrade™ Status

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| Symptom                                                                                                | Problem                                                                                                               | Solution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Implement is not moving for any control mode.</b>                                                   | iGrade™ Status does not display OK.                                                                                   | Reference iGrade™ Status table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                        | Selective control valve (SCV) thresholds have not been adjusted.                                                      | Reference Set Up Hydraulic Control—Selective Control Valve (SCV) Threshold in System Setup.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                                        | Application controller was connected while machine was powered ON, creating hydraulic control unit fault codes.       | Reference Reset Application Controller 1100 for more information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Scraper is raising or lowering without operator selecting Shift Offset Up or Shift Offset Down.</b> | Scraper is being commanded to move by application controller based on Load Limiting of either Slip % or Engine Speed. | <p>Adjust Elevation Control Sensitivity and Load Limiting thresholds to operator's preference.</p> <p>Select the Application Controller 1100 button &gt; Main softkey &gt; select Plane Control Setup, Remote Control Setup, or Grade Control Setup button &gt; Parameter Setup button &gt; Load Limit Setup button.</p> <p>Adjust Elevation Load Sensitivity to change the rate of movement.</p> <p>Adjust Load Limit thresholds to change when the movement occurs.</p> <p>(Reference Load Limiting for more information.)</p> |
| <b>Display not readable after connecting to machine.</b>                                               | There is no communications with the implement control unit.                                                           | <p>Shut off power, check connections, and power up to reboot system.</p> <p>Clean and reconnect the 4-pin DEUTSCH® connector at back of the ISO implement connector on machine.</p> <p><i>NOTE: If a rear extension harness is not used, a terminator is required at the end of the harness.</i></p> <p>Verify the connection at the front of the implement.</p>                                                                                                                                                                 |

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| Symptom                                                             | Problem                                                                            | Solution                                                                                                                                                                                                        |
|---------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Graphics are not displaying or are not displaying correctly.</b> | Graphics did not load correctly.                                                   | Remove graphic files from the display cache.<br><br>(If using a GreenStar™ Display, reference Data Cleanup.)<br><br>(If using a Generation 4 CommandCenter™, reference Clean Up ISOBUS VT.)                     |
| <b>Implement is not receiving remote commands.</b>                  | Display is not set up to send proper elevation error from Surface Water Pro™ Plus. | Ensure that display software is updated and that Surface Water Pro™ Plus is set up correctly.                                                                                                                   |
| <b>Plane Calculator produces unexpected values.</b>                 | Not enough data points have been collected.                                        | Reference Data Collection Drive Patterns and collect more data points.                                                                                                                                          |
| <b>Periodically, iGrade™ performs erratically.</b>                  | Vertical dilution of precision (VDOP) value is high.                               | Reference StarFire™ Global Navigation Satellite System (GNSS) Antenna and Choke Ring Antenna for more information. If needed, install external antennas.                                                        |
|                                                                     | Multipathing is occurring at the implement receiver and (or) base station.         | Verify that external antenna is recognized.<br><br>Select Menu button > StarFire™ button > Diagnostic softkey > Readings tab > select Receiver Status from the drop-down menu > verify external antenna status. |
| <b>External antenna status is disconnected.</b>                     | There is a faulty antenna connection.                                              | Ensure that coaxial cable from radio to antenna is not damaged, and that antenna is not loose. Ensure that antenna is not broken.                                                                               |
| <b>Grade Control performs erratically.</b>                          | Inconsistent travel distance during each pass results in poor performance.         | Reference Guidance Lines for more information.                                                                                                                                                                  |
|                                                                     |                                                                                    | Reference Optimize Grade Quality for more information.                                                                                                                                                          |
| <b>iGrade™ performance is poor.</b>                                 | SCV thresholds are not set correctly.                                              | Reference Set Up Hydraulic Control — Selective Control Valve (SCV) Thresholds.                                                                                                                                  |
| <b>One side of the furrow bed is lower than the other side.</b>     | Gauge wheel cylinders are out of phase.                                            | Cycle hydraulics for the gauge wheel cylinders.                                                                                                                                                                 |

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## Troubleshooting—Machine

| Symptom                                                                   | Problem                                                                                                                 | Solution                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>The tractor stalls.</b>                                                | Load Limit thresholds are not set properly.                                                                             | Reference Load Limit and set thresholds.                                                                                                                                                                                                            |
|                                                                           | Max Cut is too aggressive.                                                                                              | Reference Max Cut and change setting.                                                                                                                                                                                                               |
| <b>Auto mode indicator is not showing on the display.</b>                 | Dirty or loose 10-pin connector at rear of machine.                                                                     | Power down machine and disconnect all iGrade™ components. Clean all connectors and check for loose or dirty pins. Reconnect all iGrade™ components and power up machine.<br><br>(Reference Reset Application Controller 1100 for more information.) |
|                                                                           |                                                                                                                         | Verify that correct control type and selective control valve (SCV) are selected in iGrade™ setup, and cycle power.                                                                                                                                  |
| <b>Implement is not adjusting to desired grade.</b>                       | AUTO with a strike through it or EC is displayed.                                                                       | Push correct SCV control lever into detent to enable auto mode.                                                                                                                                                                                     |
| <b>Display and operation of implement lost.</b>                           | Dirty or loose 4-pin connection at rear of machine.                                                                     | Clean and reconnect connectors.                                                                                                                                                                                                                     |
|                                                                           | The GreenStar™ harness is improperly connected.                                                                         | Power down machine and system. Disconnect harness, clean, and install properly.                                                                                                                                                                     |
|                                                                           | There is an electrical short in harness.                                                                                | Check electrical wiring for breaks, shorts, and damage.                                                                                                                                                                                             |
| <b>Washboarding—scraper overly sensitive and causes washboard effect.</b> | SCV flow rate is too high.                                                                                              | Decrease SCV flow rate.                                                                                                                                                                                                                             |
|                                                                           | Counterbalance valve improperly adjusted.                                                                               | Adjust counterbalance valve cartridges and perform threshold calibration.                                                                                                                                                                           |
|                                                                           | Cross slope sensitivity set too high or low.                                                                            | Adjust cross slope sensitivity values up or down.                                                                                                                                                                                                   |
| <b>Control and load limit functionality impaired or limited.</b>          | SCV flow rate is too low.                                                                                               | Increase SCV flow rate.                                                                                                                                                                                                                             |
| <b>Unable to create a grade while unloading or filling.</b>               | Distance between the cutting edge and receiver does not stay constant while unloading or filling due to scraper design. | Unloading or filling can only be done when distance between the cutting edge and receiver is constant.                                                                                                                                              |

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## External Valve

| Symptom                               | Problem                                                                                                                                                                      | Solution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>External valve not responding.</b> | Selective control valve (SCV) 3 selected during system setup.                                                                                                                | Verify the correct operation mode is selected for SCV 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                       | Machine-side implement feedback sensor connector at rear of machine for integrated SCV control is plugged in. Early versions of harness used a 10-pin rectangular connector. | Disconnect machine-side implement feedback sensor connector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                       | External valve wiring harness disconnected.                                                                                                                                  | Connect external valve wiring harness. LED on external valve should light up.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                       | External valve installed is not compatible with machine hydraulic system design. Open-center versus closed-center designs.                                                   | Verify part number of valve installed on implement is compatible with machine hydraulic system design.<br>(Reference Application Controller 1100 and External Valve Installation Instructions or contact your John Deere dealer for more information.)                                                                                                                                                                                                                                                                                                                          |
|                                       | SCV control harness has loose or no connection to application controller harness.                                                                                            | Verify connections.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                       | SCV control harness is plugged into implement receiver or front extension harness.                                                                                           | Verify that SCV control harness is plugged into application controller harness.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>LED light is red.</b>              | Inline check valve on pump hose not functioning or not present.                                                                                                              | Install, repair, or replace check valve.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                       | Back pressure buildup in external valve.                                                                                                                                     | <p> <b>CAUTION: When moving external valve control lever the implement may move.</b></p> <p>Hoses connected in reverse, causing back pressure. Verify hoses are connected properly. If problem still exists, perform the following:</p> <ol style="list-style-type: none"> <li>1. With tractor running, put hydraulics in float.</li> <li>2. Key off machine.</li> <li>3. Cycle external valve control lever manually several times.</li> <li>4. Cycle power to clear red light.</li> </ol> |
|                                       | External Valve Error.                                                                                                                                                        | Contact your John Deere dealer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Troubleshooting — I/O Voltages Page

| Description               | Reading                                                                                                                                    | System Definitions                                                                                                                     |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Analog In Pin 1 (Pin G2)  | Wheel angle sensor voltage reading:<br>SCV 1 = 0–5 V,<br>2.5 V = neutral (center)                                                          | Not applicable for iGrade™ system.                                                                                                     |
| Analog In Pin 2 (Pin K2)  | Wheel angle sensor voltage reading:<br>SCV 2 = 0–5 V,<br>2.5 V = neutral (center)                                                          |                                                                                                                                        |
| Analog Out Pin 1 (Pin H1) | Command SCV 1 voltage value 0–5 V,<br>2.5 V = neutral                                                                                      | When set up for SCV 1, voltage commanded to hydraulics controller, or current command voltage of respective SCV when not in Auto mode. |
| Analog Out Pin 2 (Pin J1) | Command SCV 3 voltage value 0–5 V,<br>2.5 V = neutral                                                                                      | When set up for SCV 3, voltage commanded to hydraulics controller, or current command voltage of respective SCV when not in Auto mode. |
| 5 Volt Out                | Supplied voltage 0–5 V for system.                                                                                                         | Voltage supplied to the system, should read close to 5 V.                                                                              |
| Sense Volt                | Sense voltage 0–5 V:<br>with 9-pin implement feedback harness connected = 5 V,<br>with paddle pot connected = 0 V and changes with command | Voltage coming from hydraulic controller system, should read approximately 5 V.                                                        |
| Digital In 1 (Pin G1)     | External valve paddle pot:<br>0 = no command,<br>1 = command                                                                               | Value is used for External Valve SCV 1 and reads 0 at rest and changes to a 1 when moved.                                              |
| Digital In 2 (Pin K1)     | Value displays a 1                                                                                                                         | Not available with External Valve.                                                                                                     |
| Line Count                | Not applicable for iGrade™ system.                                                                                                         |                                                                                                                                        |

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RW00482,00001F0-19-01JUN15

## Data Cleanup

Data cleanup function removes control unit VI graphic files from the display. This can be done in case the implement's user interface does not show up anymore or if it does not show up correctly. The cleanup forces the implement control unit to send its data to the display again after a restart.

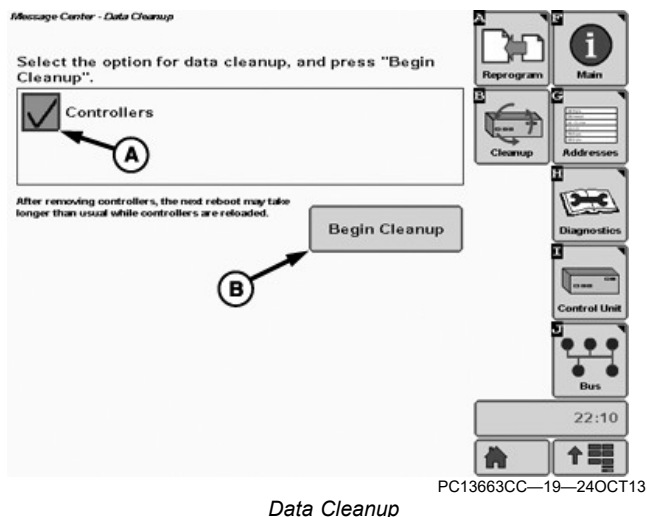
Select the Menu button > Message Center button > Cleanup softkey.

**A—Controllers Checkbox**  
**B—Begin Cleanup Button**

Select the checkbox (A) for the data to be removed and then select the Begin Cleanup button (B).

After a restart, the control unit displays a bar graph in the main menu until the user interface is reloaded.

RW00482,0000196-19-15MAR18



## Clean Up ISOBUS VT

If using a Generation 4 Display and the implement user interface does not show up or does not show up correctly, clean up ISOBUS VT. This function clears the cached ISOBUS control unit object pools. Clearing the cache forces the implement control unit to send its data to the display again after a restart.



ISOBUS VT Softkey

PC23372—UN—15NOV16

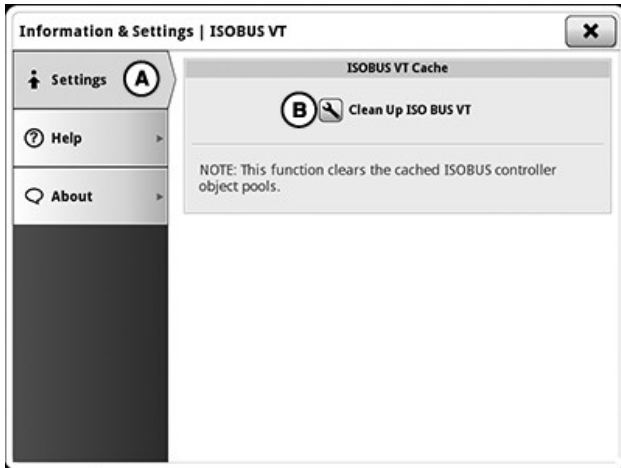
1. Select the ISOBUS VT softkey.



Settings Icon

PC15305—UN—19MAR13

2. Select the Settings icon.



PC23373—UN—15NOV16

A—Settings Tab

B—Clean Up ISOBUS VT Button

3. Select the Settings tab (A).

4. Select the Clean Up ISOBUS VT button (B).

RW00482,0000074-19-13MAR18

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# Maintenance

## iGrade System



PC13509—UN—27APR11

**A—USB Flash Drive**  
**B—GreenStar 3 2630 Display Console**

Being an electronic controller, minimal service is required to maintain performance levels. However, John Deere Ag Management Solution's commitment to continued improvement and quality may lead to periodical software updates available for this controller. To maintain optimum performance, these updates should be loaded.

For the GreenStar system, this is accomplished when performing a "live update" using a connection to the StellarSupport™ website ([www.stellarsupport.com](http://www.stellarsupport.com)). Updates, once downloaded, must be loaded onto a USB flash drive (A). After updating the USB flash drive, the next time the flash drive is inserted into the display console (B) the operating system will prompt the operator of available updates. Accepting updates will automatically update iGrade system to the most recent version.

JS56696,00009B5-19-27APR11

## 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 the system.
- A hydraulic system component is repaired, replaced, or adjusted.
- An Ag Management Solutions (AMS) component is replaced.

## Preseason Checklist

- ☐ Obtain the latest Operator's Manual.

(Reference John Deere Technical Information Bookstore for more information.)

**NOTE:** Ensure that the equipment has an uninterrupted power supply while updating software. Software update times vary based on the equipment, network or CAN bus speed, and file size of the program. For example, updating the UCC2 Application Controller takes an average of 30 minutes.

- ☐ Update software. Refer to [StellarSupport.com](http://StellarSupport.com) for latest software.
  - ☐ Display
  - ☐ Machine receiver
  - ☐ Implement receiver(s)
  - ☐ Base station receiver
  - ☐ Controller
- ☐ Activate applications on display.
- ☐ 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 repair as necessary.
  - ☐ ISO connector
  - ☐ Receivers
  - ☐ Display
- ☐ Inspect mounting hardware. Retorque as necessary.
  - ☐ Display
  - ☐ Receivers
  - ☐ Mast
- ☐ Adjust selective control valve (SCV) flow rates.
- ☐ Adjust counterbalance valve (if applicable).
- ☐ Calibrate SCV thresholds.
- ☐ Calibrate machine and implement terrain compensation modules (TCMs).
- ☐ Inspect implement hydraulic cylinder for leaks.
- ☐ Set up applicable machine features:
  - ☐ IVT™ (Infinitely Variable Transmission)
  - ☐ Automatic PowerShift™
  - ☐ PowerShift™ Efficiency Manager™
  - ☐ Foot Decelerator

(Reference implement Operator's Manual for detailed checklists.)

RW00482,00005AF-19-07DEC20

*StellarSupport is a trademark of Deere & Company*

*IVT is a trademark of Deere & Company  
PowerShift is a trademark of Deere & Company  
Efficiency Manager is a trademark of Deere & Company*

### Daily Checklist

- ☐ Calibrate benchmark.
- ☐ 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
  - ☐ Receivers
  - ☐ Mast
- ☐ Inspect implement hydraulic cylinder for leaks.

(Reference implement Operator's Manual for detailed checklists.)

RW00482,00002AD-19-11NOV14

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### 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
  - ☐ Receivers
  - ☐ Display
- ☐ Inspect mounting hardware. Retorque as necessary.
  - ☐ Display
  - ☐ Receivers
  - ☐ Mast
- ☐ Inspect implement hydraulic cylinder for leaks.

(Reference implement Operator's Manual for detailed checklists.)

RW00482,00002B0-19-11NOV14

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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:

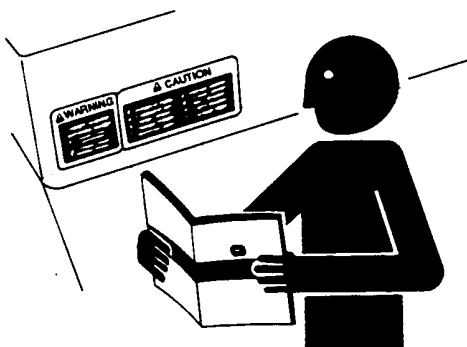
- Agricultural Primer series covers technology in farming and ranching.
- Farm Business Management series examines “real-world” problems and offers practical solutions in the areas of marketing, financing, equipment selection, and compliance.
- Fundamentals of Services manuals show you how to repair and maintain off-road equipment.
- Fundamentals of Machine Operation manuals explain machine capacities and adjustments, how to improve machine performance, and how to eliminate unnecessary field operations.
- Fundamentals of Compact Equipment manuals provide instruction in servicing and maintaining equipment up to 40 PTO horsepower.

DX,SERVIT-19-07DEC16

# John Deere Service Keeps You on The Job

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## 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/](http://www.deere.com/en_US/ag/contactus/).

DX,IBC,2-19-02APR02

