DB Series Planters with ExactEmerge™ or MaxEmerge™ 5e

(Serial No. 810101 -)

JOHN DEERE

OPERATOR'S MANUAL

DB Series Planters with ExactEmerge™ or MaxEmerge™ 5e

OMA142897 ISSUE J5 (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 Seeding Group
North American Edition
PRINTED IN U.S.A.

Introduction

Foreword

THANK YOU for purchasing a John Deere product.

READ THIS MANUAL carefully to learn how to operate and service your product correctly. Failure to do so could result in personal injury or equipment damage. This manual and safety signs on your product may also be available in other languages. See www.techpubs.deere.com (Ag&Turf/JDPS), www.johndeeretechinfo.com (C&F), or 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 product or implement will travel when going forward.

WRITE PRODUCT IDENTIFICATION NUMBERS (PIN) in the Specification or Product Numbers section. Accurately record all the numbers to help in tracing the product should it be stolen. PIN information is helpful when ordering parts. File the identification numbers in a secure place off the product.

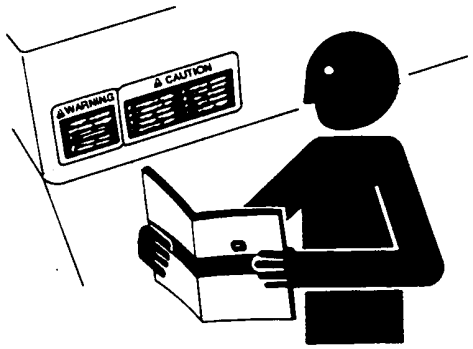
WARRANTY is provided as part of John Deere's support program for customers who operate and maintain their equipment as described in this manual. The warranty is explained on the warranty certificate or statement which you should have received at time of purchase.

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.

DX,IFC5E-19-08SEP25

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.

• **John Deere replacement parts, repair services, and information for maintenance or repair are available. For more information, please visit deere.com or deere.ca.**

DX,IFC,JDS-19-30SEP25

Trademark

Trademarks	
John Deere	Trademark of Deere & Company
SeedStar™	Trademark of Deere & Company
Roll-Gard™	Trademark of Deere & Company
CCS™	Trademark of Deere & Company
BrushBelt™	Trademark of Deere & Company
ExactEmerge™	Trademark of Deere & Company
ExactRate™	Trademark of Deere & Company
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MaxEmerge™	Trademark of Deere & Company
Tru-Vee™	Trademark of Deere & Company
Grease-Gard™	Trademark of Deere & Company

Trademarks	
RowCommand™	Trademark of Deere & Company
Twister™	Trademark of Yetter Manufacturing Co.
Hy-Gard™	Trademark of Deere & Company
Bio Hy-Gard™	Trademark of Deere & Company
TORX®	Trademark of Acument Intellectual Properties, LLC
JohnBlue™	Trademark of CDS-John Blue Company
Quik-Fill™	Trademark of Deere & Company
Hypro®	Trademark of Pentair Flow Technologies, LLC
NyoGel®	Trademark of Nye Lubricants Inc.
Erase™	Trademark of Precision Laboratories, LLC
SprayMaster™	Trademark of Deere & Company
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Apple®	Trademark of Apple Inc
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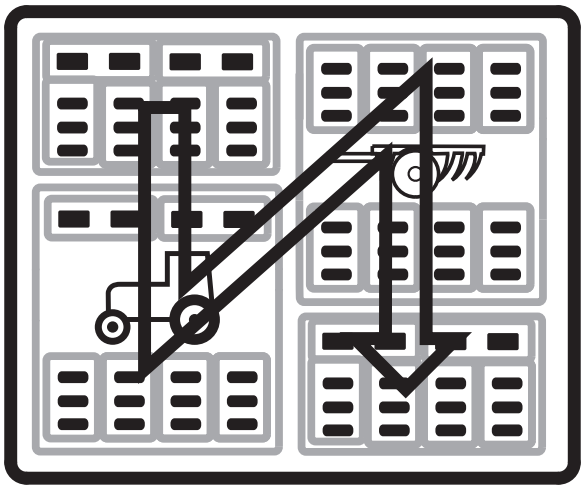
OUO6074,000126B-19-27OCT25

A Message to Our Customers

We appreciate the confidence placed in us by the purchase of this machine. To ensure that the machine performs at the highest level, countless hours were spent designing and testing, before this machine was produced. To achieve the maximum performance, it is imperative that this machine is operated in accordance with the procedures outlined in this manual.

Information in this manual is divided into sections. The section names are identified in the table of contents and at the top of each page. Each section has a unique number and page count. Specific information within each section is organized into topics identified with bold headings.

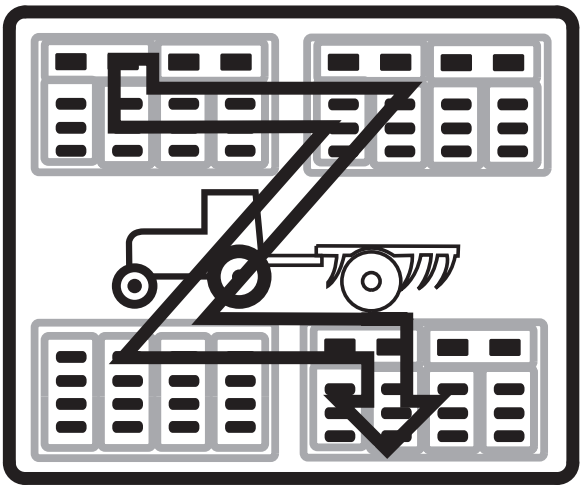
The topic headings are listed in the table of contents with the section number and page number where the topic begins. Topics and information related to each topic are also referenced in the index along with the section and page number.



A100767—UN—07JUN18

Content Flow

The topic content flows down the left-hand side, then down the right-hand side, and repeats on the next page. Images precede the related text in the flow.



A100768—UN—07JUN18

Content Flow with Page Wide Interuption

Images and tables that span the width of a page separate the flow both before and after the image or table.

To learn where to look for information, review this manual often.

Thanks again for purchasing this machine.

OUO6074,000106B-19-06JUN23

ADDITIONAL INFORMATION REQUIRED



TS190—UN—17JAN89

SeedStar Monitor:

This manual is used with the SeedStar seed monitor for seed monitoring and row unit control.

OUO6074,0000E5B-19-08OCT25

Contents

Page

Safety
Recognize Safety Information 05-1
Service Accumulator Systems Safely 05-1
Service Pressurized Systems Safely 05-1
Service Machine Safely 05-2
Understand Signal Words 05-2
Follow Safety Instructions 05-2
Read Operator's Manuals for ISOBUS Controllers 05-2
Park Machine Safely 05-3
Live With Safety 05-3
Prevent Machine Runaway 05-3
Handling Batteries Safely 05-3
Prevent Battery Explosions 05-4
Work Safely Around the Electric Drive System 05-4
Keep Electronic Control Unit Connectors Clean 05-5
Welding Near Electronic Control Units 05-5
Operator Ability 05-5
Operate the Machine Safely 05-5
Use Safe Service Procedures 05-6
Service Tires Safely 05-6
Keep Riders Off Machine 05-7
Use Steps and Handholds Correctly 05-7
Avoid Tip-overs 05-7
Prepare for Emergencies 05-7
Wear Protective Clothing 05-8
Handle Agricultural Chemicals Safely 05-8
Seed Lubricant and Seed Treatments 05-9
Use Safety Lights and Devices 05-9
Light Enhancement Module 05-9
Follow Tire Recommendations 05-10
Transport Safely 05-10
Use a Safety Chain 05-11
Tow Loads Safely 05-11
Observe Maximum Transport Speed 05-12
Practice Safe Maintenance 05-12
Remove Paint Before Welding or Heating 05-13
Avoid Heating Near Pressurized Fluid Lines 05-13
Avoid High-Pressure Fluids 05-13
Store Attachments Safely 05-14
Charge Row Marker Hydraulic System 05-14
Decommissioning — Proper Recycling and Disposal of Fluids and Components 05-14
Replace Safety Signs 05-15

Safety Signs
Hydraulic Injection 10-1
Sudden Hitch Movement 10-2
Transport Guidelines 10-3
Sudden Crushing Movement 10-4
Component Entanglement 10-5
Sudden Crushing Movement 10-6
Electrical Line Contact 10-7
Falling Marker 10-8
Chemical Inhalation 10-9
Sudden Crushing Movement 10-10
Sudden Crushing Movement and Hydraulic Injection 10-11
Chemical Use 10-12
Component Entanglement 10-13
Electrical Shock 10-14
Electrical Shock 10-15
Electrical Shock 10-16
Chemical Inhalation 10-17
Do Not Ride 10-18
Falling Frame 10-19
Exploding Components 10-20
Eye Impact 10-21
Hydraulic Injection 10-22
Chemical Use 10-23
Liquid Under Pressure 10-24

Information Signs
Information Signs 15-1

Disclosures-End User License Agreement
End User License Agreement 20-1

Preparing the Tractor
Use Your Tractor Operator's Manual 25-A-1
Set the Selective Control Valves—8000 and 9000 Series Tractors 25-A-1
Hitch Loads 25-A-1
ExactEmerge Tractor Requirements 25-A-2
MaxEmerge 5e Tractor Requirements 25-A-2
Verify Orifice in Load Sense for Power Beyond on 9030, and 9R Series Tractors 25-A-3
Check the Tractor Hydraulic System 25-A-3
Calculate the Minimum Tractor Weight for Safe Transport 25-A-4
Case Drain and Hydraulic Motor Requirements 25-A-5
Recommended Tractor Settings 25-A-6

Preparing the Planter
Initial Use of CCS System 25-B-1
Before Use 25-B-1
Determine Tractor Drawbar and Planter Hitch Ring Compatibility 25-B-1
Tractor Drawbar Position on Split Row Machines 25-B-1
Tighten the Wheel Bolts 25-B-2

Continued on next page

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Page

Check the Tire Pressure 25-B-3
Checking Frame Height 25-B-3
Adjust the Main Frame Height 25-B-3
Adjust the Wing Frame Height 25-B-4
Liquid Fertilizer without John Deere Openers ... 25-B-4
Change from 38 cm (15 in) to 76 cm (30 in) Row Spacing 25-B-5
Change from 76 cm (30 in) To 38 cm (15 in) Rows 25-B-6
Adjust the Marker Length 25-B-8
Adjust the Marker Rod 25-B-9
Adjust Marker Disk 25-B-9

Attaching the Planter
Use Your Tractor Operator's Manual 30-A-1
Blower Motor Hydraulic Requirements 30-A-2
Hydraulic Motor Return Coupler 30-A-2
Power Beyond Couplers 30-A-2
Connect the Frame Control Harness 30-A-3
Check the Hydraulic System 30-A-3
Use a Safety Chain 30-A-3
Attach the Warning Light Harness 30-A-3
Connect SeedStar Harness 30-A-4
Connect the Ethernet Harness 30-A-4
Tractor Power Generation System 30-A-4
Warning Lights and Slow-Moving Vehicle (SMV) Emblem (Style A) 30-A-5
Recommendations for Hydraulic Connections 30-A-6
Individual Row Hydraulic Downforce (IRHD) Hydraulic Hose Cleanout 30-A-8
Level the Hitch 30-A-8

Attaching the Tractor Power Generation
Work Safely Around the Electric Drive System 30-B-1
Tractor Power Generation 30-B-1
Install the Tractor Power Generation System on 7R John Deere Tractors 30-B-1
Install the Tractor Power Generation System on 8R John Deere Tractors 30-B-4
Install the Tractor Power Generation System on 9R John Deere Tractors 30-B-7
Install the Tractor Power Generation System on 9RT and 9x30T John Deere Tractors 30-B-10
Install the Tractor Power Generation System on Other Tractors 30-B-18
Remove the Tractor Power Generation System 30-B-21

Detaching the Planter
Detach Machine 35-1

Operating the Planter
General 40-A-1
Vacuum System Hydraulic Operation 40-A-1
Frame Controls 40-A-1
Recommended Operating Speed 40-A-1
Frame Weight Distribution (FWD) 40-A-2
Frame Weight Distribution (FWD) for 5-Section Frames 40-A-2
Rear Steering Operation (If Equipped) 40-A-4
Rear Steering Calibration 40-A-4
Unfold and Fold Planters 40-A-6

Page

Adjust the Planting Depth 40-A-6
Adjust the Closing Wheel Downforce 40-A-7
Center the Closing Wheels 40-A-8
Adjust the Closing Wheel Spacing 40-A-8
Stagger the Closing Wheels 40-A-8
Marker Float Range 40-A-9

Operating the ExactEmerge Seed Meter
Seed Meter Settings 40-B-1
Access the Vacuum Meter 40-B-5
Remove the Seed Disk (Bowl) 40-B-5
Install the Cartridge Seal 40-B-6
Change the Meter Strip (Agitation or Smooth) .. 40-B-6
Adjust the Inner Double Eliminator (3-Tine) 40-B-7
Install the Seed Disk (Bowl) 40-B-9
Adjust the Meter Hub Height 40-B-9
Seed Knockout Wheel Operation 40-B-10
Install the Knockout Wheel Assembly 40-B-11
Install the BrushBelt Residue Shield 40-B-11
Remove the ExactEmerge Seed Meter 40-B-14
Install the ExactEmerge Seed Meter 40-B-14
Inspect the ExactEmerge Meter Unit 40-B-15
Remove and Install the BrushBelt Cartridge ... 40-B-15
Clean Out the ExactEmerge Meter 40-B-17
Set the Vacuum Level 40-B-18
Vacuum Level Recommendations for Corn and Soybean 40-B-19
Vacuum Level Recommendations for Corn and Soybeans (Optional) 40-B-20
Vacuum Level Recommendations for Cotton and Popcorn 40-B-20
Vacuum Level Recommendations for Sugar Beet 40-B-21
Vacuum Level Recommendations for Milo/ Sorghum 40-B-22
Vacuum Level Recommendations for Sunflower 40-B-23

Operating the MaxEmerge 5e Seed Meter
Seed Meter Settings 40-C-1
Seed Disk Recommendations for Optimum Performance with Field Corn 40-C-3
Seed Disk Recommendations for Crops other than Field Corn 40-C-5
Clean Out the Vacuum Seed Meter 40-C-10
Remove the MaxEmerge 5e Seed Meter 40-C-12
Install the MaxEmerge 5e Seed Meter 40-C-12
Seed Knockout Wheel Operation 40-C-13
Set the Vacuum Level 40-C-13
Vacuum Level for Field Corn Using H136478, A43215, A50617, or A52391 Seed Disks ... 40-C-15
Vacuum Level for Oil Sunflower 40-C-16
Vacuum Level for Confectionary Sunflower 40-C-17
Vacuum Level for Sweet Corn 40-C-18
Vacuum Level for Wheat 40-C-19
Vacuum Level for Cotton Using a ProMax Disk 40-C-20
Vacuum Level for Common Edible Beans and Peas Using a ProMax 50 Disk 40-C-21
Vacuum Level for Peanuts 40-C-22
Vacuum Level for Sugar Beet 40-C-23
Optimize Seed Spacing 40-C-23
Check Meter Performance 40-C-23

Page

Operating the Central Commodity System
CCS Operation 40-F-1
Tank Level Sensors with Display Controls 40-F-1
Operate CCS Tank Fill Lights—Optional 40-F-2
Operate the Tank Lids 40-F-2
Level the CCS Tanks 40-F-2
Operate the Mini-Hopper Lids 40-F-3
Fill a CCS Tank 40-F-3
Fill the Row Unit Hoppers 40-F-4
Set the CCS Tank Pressure 40-F-4
Operate the CCS System with Heavily Treated Seed or Very Large Seed Corn 40-F-6
Operate the CCS System when Planting Standard or Small Seed 40-F-6
Plant Seed Plots with the CCS System 40-F-7
Partially Cleaning Out a CCS Tank 40-F-7
Clean Out the CCS Tanks 40-F-8
Clean Out the CCS Delivery Hoses (Planters with Display Frame Controls) 40-F-9
Bridged and Blocked CCS System 40-F-10

Checking the Seed Population
Check the Seed Population 45-1

Operating the Liquid Fertilizer System, ExactRate
ExactRate Onscreen Overview 50-A-1
Fertilizer Distribution Overview 50-A-2
Service Fertilizer System Safely 50-A-3
Access ExactRate 50-A-3
ExactRate 50-A-4
Liquid Fertilizer Use with the BrushBelt 50-A-5
Quik-Fill Liquid Fertilizer 50-A-5
Prime and Start the Fertilizer Pump with Wing Mounted Pump—ExactRate (Onboard Tank) 50-A-6
Prime and Start the Fertilizer Pump with Wing Mounted Pump—ExactRate (Offboard Tank) 50-A-9
Prime and Start the ExactRate Pump with Centrally Mounted Pump—ExactRate (Onboard Tank) 50-A-11
Prime and Start the ExactRate Pump with Centrally Mounted Pump—ExactRate (Offboard Tank 50-A-12
Operate or Adjust the Pump with the Keypad . 50-A-14
Operating Condition of the Valve Body 50-A-15
Rinse Tank Usage 50-A-15
Short- or Long-Term Storage Guidelines 50-A-16
Strainer Recommendations 50-A-16
DB Planters—Winterize the ExactRate Pump . 50-A-17

Operating the Liquid Fertilizer System, ExactShot
ExactShot Onscreen Overview 50-B-1
Fertilizer Distribution Overview 50-B-4
ExactShot 50-B-5
Access ExactShot 50-B-6
Service Fertilizer System Safely 50-B-7
Liquid Fertilizer Use with the BrushBelt 50-B-7
Prime and Start the Fertilizer Pump with Wing Mounted Pump—ExactShot (Onboard Tank) 50-B-7

Page

Prime and Start the Fertilizer Pump with Wing Mounted Pump—ExactShot (Offboard Tank) 50-B-10
Prime and Start the Fertilizer Pump with Centrally Mounted Pump—ExactShot (Onboard Tank) 50-B-12
Prime and Start the Fertilizer Pump with Centrally Mounted Pump—ExactShot (Offboard Tank) 50-B-13
Operate or Adjust the Pump with the Keypad . 50-B-15
Nozzle Tip Recommendations 50-B-16
Specific Gravity 50-B-29
Strainer Recommendations 50-B-30
Rinse Tank Usage 50-B-30
Short- or Long-Term Storage Guidelines 50-B-31
DB Planters—Winterize the ExactRate Pump . 50-B-31

Operating the Liquid Fertilizer System, Piston Pump
Adjust the John Blue (Fixed Rate) Pump Setting Number 50-C-1
Fertilizer Distribution 50-C-1
Prime and Start the Pump 50-C-2
How to Use Liquid Fertilizer Rate Charts 50-C-2
Check Fertilizer Rates 50-C-3
Liquid Fertilizer For Unit Mounted Double Disk Openers 50-C-3
Strainer Recommendations 50-C-5
Liquid Fertilizer Use with the BrushBelt 50-C-5
Liquid Fertilizer Rate Charts for Non-Injection Openers (Frame, Unit Mounted, and In-Furrow Placement) 50-C-6
Change the In-Line Orifices for Liquid Fertilizer 50-C-6

Liquid Fertilizer Rate Charts-Piston Pump
DB60 24-Row 76cm (30 in) Rate Chart 50-E-1
DB90 36-Row 76 cm (30 in) Rate Chart 50-E-1
DB80 32-Row 76 cm (30 in) Rate Chart 50-E-2

Liquid Fertilizer—ExactRate Fertilizer Transfer System
Front Fill and Fertilizer Tank Overview 50-F-1
Rear Fill and Fertilizer Tank Overview 50-F-1
Tank Clean Out or Pump Hose Overview 50-F-1
Valve Position Guide 50-F-2
Connect or Disconnect the Implement or Fill Hose 50-F-2
Fill Liquid Fertilizer Tanks from Tractor 50-F-3
Fill Liquid Fertilizer Tanks from Rear of Implement 50-F-3
Drain ExactRate Fertilizer Transfer System 50-F-4
Rinse ExactRate Fertilizer Transfer System 50-F-5
Ready System to Apply Fertilizer 50-F-6

Attachments—General
General 70-A-1
SeedStar Integrated Pneumatic Downforce System 70-A-1
SeedStar Electric Drive System 70-A-1
RowCommand 70-A-1
Walking Gauge Wheels 70-A-1
Rigid Scraper 70-A-2

Page

Pneumatic Closing Wheels 70-A-2
Heavy-Duty Scraper 70-A-2
Heavy-Duty Closing Wheels 70-A-3
Yetter Twister Closing Wheels 70-A-3
Unit-Mounted Coulter 70-A-3
Unit Mounted Row Cleaners (Manual Adjust) ... 70-A-5
Easy Adjust Row Cleaners 70-A-5
Install or Remove the Pneumatic Orifices 70-A-6
Ballast Attachment 70-A-7
Seed Tubes 70-A-7
Liquid Fertilizer without John Deere Openers ... 70-A-8

Attachments—Pneumatic Downforce
Pneumatic Downforce 70-B-1
Depressurize The Pneumatic Downforce System 70-B-2
Drain Air Storage Tank 70-B-3

Lubricating the Seed Meter
Use of Talc Lubricant 75-A-1
Use of Blended Talc and Graphite Lubricant 75-A-2
Use of Wax-Based Lubricant 75-A-3

Lubricating the Planter
Lubricate and Maintain the Machine Safely 75-B-1
Perform Lubrication and Maintenance Procedures 75-B-1
Multipurpose Extreme Pressure (EP) Grease ... 75-B-1
Transmission, Steering, Brake, Hydraulic, and Gear Case Oil 75-B-2
Lubrication Symbols 75-B-2
Alternative Lubricants 75-B-2
Tractor Power Generator 75-B-2
Lubrication Intervals 75-B-3

Servicing and Adjusting—General
Planter Inspection 80-A-1
Safety Before Service 80-A-5
Service Intervals 80-A-5
Use Safe Service Procedures 80-A-6
Service Pressurized Systems Safely 80-A-6
Practice Safe Maintenance 80-A-7
Service Tires Safely 80-A-7
Service and Operate Chemical Sprayers Safely 80-A-8
Welding Near Electronic Control Units 80-A-8
Keep Electronic Control Unit Connectors Clean 80-A-9
Work Safely Around the Electric Drive System 80-A-9
Electric Drive Fuse Box Location 80-A-9
Electric Drive Fuse Identification 80-A-11
Install Service Locks—DB Series 80-A-13
Tighten the Wheel Bolts 80-A-14
Align Track Undercarriage 80-A-15
Remove and Install the Wheel Speed Sensor (DB Only) 80-A-18
Individual Row Hydraulic Downforce (IRHD) Valve Flush and Test 80-A-20
Accumulator Test—Gen 2 IRHD 80-A-21
Charge the Accumulator—Gen 2 IRHD 80-A-23
Bleeding Frame Weight Distribution Cylinders 80-A-25
Adjust Marker Disk 80-A-26

Page

Adjust the Marker Rod 80-A-26
Replace the Marker Breakaway Bolt 80-A-27
Adjust the Marker Length 80-A-28
Clean the CCS Tank Level Sensors 80-A-28
Zero the CCS Blower Pressure Gauge 80-A-29
Inspect the Vacuum Sensor Vent 80-A-29
Clean the Vacuum System 80-A-29
Vacuum Gauge Filter 80-A-29
Change the Hydraulic Filter on Implement Power Generation System 80-A-30
Battery Safety 80-A-30
Access and Inspect the Batteries 80-A-31
Check, Charge, or Replace the Batteries 80-A-33
Clean the Batteries 80-A-34
Cable Installation and Terminal Torque 80-A-36
Set the Row Unit Switch 80-A-38
Fertilizer Distribution Tube 80-A-38
Clean Carrier Tank Strainer 80-A-41
Tighten the Drive Chains 80-A-42
Coulter Maintenance 80-A-42
Disk Closing Attachment 80-A-43
Adjust the Twister Closing Wheels for Wear ... 80-A-43
Inspect and Replace the Vacuum Motor 80-A-43
CCS Blower Gauge Filter 80-A-44
Drain Air Storage Tank 80-A-44
Clean or Replace Pneumatic-Compressor Air Filter 80-A-44
Check the Hydraulic Air-Compressor Oil 80-A-46
Fill or Change the Hydraulic Air-Compressor Oil 80-A-46
Inspect the Pneumatic System Air Tank 80-A-47

Servicing and Adjusting—MaxEmerge 5e Seed Meter
Service Intervals 80-C-1
Install and Remove the Seed Tube 80-C-1
Clean the Seed Tube Sensor 80-C-2
Clean the Row Unit Hopper Screen 80-C-2
Replace Meter Handle 80-C-2
Install a New Vacuum Meter Seal 80-C-3
Change the Vacuum Seed Meter Brush 80-C-3
Adjust the Baffle in the Vacuum Seed Meter ... 80-C-4
Install the Knockout Wheel Assembly 80-C-5
Inspect the Seed Disk Cell 80-C-6
Install Seed Disk 80-C-7
Adjust Seed Meter Hub 80-C-7
Calibrate the Double Eliminator 80-C-9
Operate Double Eliminator 80-C-10
Install The Hopper Extension (Mini-Hopper Only) 80-C-11
Inspect and Adjust the Furrow Opener Disks . 80-C-12
Replace the Furrow Opener Disks 80-C-13
Adjust the Depth Gauge Wheels 80-C-14
Inspect and Service the Seed Meter 80-C-15

Servicing and Adjusting—ExactEmerge Seed Meter
Service Intervals 80-D-1
Component Wear Guidelines 80-D-2
Remove the ExactEmerge Seed Meter 80-D-7
Install the ExactEmerge Seed Meter 80-D-7
Replace or Clean the BrushBelt Cartridge Components 80-D-8
Change the Meter Strip (Agitation or Smooth) 80-D-12

Page

Replace the Wear Pads 80-D-13
Replace or Clean the Segue 80-D-14
Install A New Vacuum Seal 80-D-16
Install the Cartridge Seal 80-D-16
Replace the Inner and Outer Double Eliminator and the Baffle Brush 80-D-16
Tighten the Meter Latch 80-D-18
Inspect and Adjust the Furrow Opener Disks . 80-D-18
Replace the Furrow Opener Disks 80-D-20
Adjust the Depth Gauge Wheels 80-D-21
Inspect and Service the Meter 80-D-22

Servicing and Adjusting-Liquid Fertilizer, Piston Pump
Clean Strainer Screen 80-E-1
Fertilizer Distribution Tube 80-E-1
Clean the Liquid Fertilizer Tank Lid Fitting and Drip Line Hose 80-E-4
Safety Before Service 80-E-4
Install Service Locks—DB Series 80-E-5
Piston Pump Fertilizer Service Intervals 80-E-5
Clean Liquid Fertilizer Tank 80-E-6

Servicing and Adjusting—Liquid Fertilizer, ExactRate
Safety Before Service 80-F-1
ExactRate Service Intervals 80-F-1
Install Service Locks—DB Series 80-F-1
Remove Valve Body 80-F-2
Install Valve Body 80-F-3
Repair Valve Body Components 80-F-5
Assemble Valve Body Components 80-F-7
Repair Valve Body Solenoid 80-F-8
Assemble Valve Body Solenoid 80-F-11
Repair the Half Clamp 80-F-13
Clean Liquid Fertilizer Tank 80-F-13
Clean the Liquid Fertilizer Tank Lid Fitting and Drip Line Hose 80-F-14
Fertilizer Distribution Tube 80-F-15
Clean the Strainer Screen 80-F-18
Chamber Fluid Maintenance 80-F-18

Servicing and Adjusting—Liquid Fertilizer, ExactShot
Safety Before Service 80-G-1
ExactShot Service Intervals 80-G-1
Install Service Locks—DB Series 80-G-2
Remove Fertilizer Dosing Valve 80-G-2
Install the Fertilizer Dosing Valve 80-G-4
Disassemble and Inspect Fertilizer Dosing Valve 80-G-5
Assemble Fertilizer Dosing Valve 80-G-8
Disassemble and Inspect Fertilizer Dosing Solenoid 80-G-11
Assemble Fertilizer Dosing Solenoid 80-G-13
Inspect and Replace Fertilizer Manifold T-Fittings 80-G-15
Clean Liquid Fertilizer Tank 80-G-16
Clean the Liquid Fertilizer Tank Lid Fitting and Drip Line Hose 80-G-18
Inspect and Replace Fertilizer Distribution Hoses and Manifold Tubes 80-G-18
Replace Fertilizer Tubes 80-G-24
Clean the Strainer Screen 80-G-24

Page

Chamber Fluid Maintenance 80-G-24

Troubleshooting
Electric Drive System 90-1
Row Units 90-1
ExactEmerge Seed Meter 90-3
MaxEmerge 5e Seed Meter 90-10
CCS Blower Assembly 90-15
CCS Product Delivery 90-17
ExactRate Liquid Fertilizer System 90-21
ExactShot Liquid Fertilizer System 90-25
Liquid Fertilizer System 90-27
Liquid Fertilizer—Piston Pump System 90-29

Storage
Removing from Storage 95-1
Store the Planter 95-1
Liquid Fertilizer System Storage with ExactRate Pumps 95-4
Liquid Fertilizer Sensor (If Equipped) 95-4
Liquid Fertilizer System Storage Procedures with John Blue Pumps 95-5

Specifications
Metric Bolt and Screw Torque Values 100-1
Unified Inch Bolt and Screw Torque Values 100-2
Specifications 100-3
Liquid Fertilizer Specifications—Ground-Driven Pump 100-4
Record Serial Number 100-4
Keep Proof of Ownership 100-4
Keep Machines Secure 100-5
Limited Battery Warranty 100-5

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

Service Accumulator Systems Safely



TS281—UN—15APR13

Escaping fluid or gas from pressurized hydraulic accumulator systems can cause serious injury. Extreme heat can cause the accumulator to burst, and pressurized lines can be accidentally cut. Do not weld or use a torch near a pressurized accumulator or pressurized line.

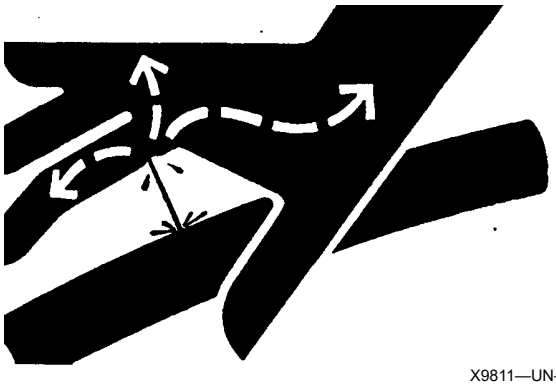
Relieve pressure from the hydraulic system before removing accumulator. Never attempt to relieve the hydraulic system or accumulator pressure by loosening a fitting.

Bladder style accumulators cannot be repaired.

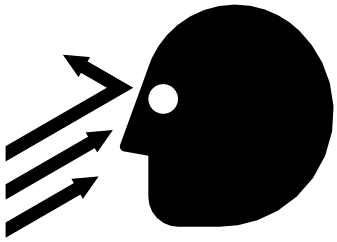
Piston style accumulators can be repaired.

ouo6074,1701367232952-19-30NOV23

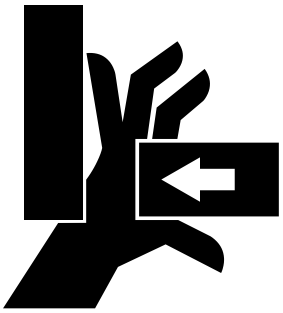
Service Pressurized Systems Safely



X9811—UN—23AUG88



A87927—UN—29SEP15



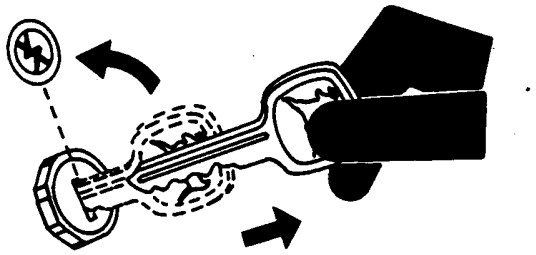
A87928—UN—29SEP15

Escaping fluid under pressure can penetrate the skin causing serious injury. Escaping air under pressure can discharge fast moving material. Avoid the hazard by relieving the pressure before disconnecting hydraulic or pneumatic lines. Tighten all of the connections before applying pressure.

Avoid crushing injury from components that move unexpectedly. Avoid the hazard by relieving the pressure before working on the machine.

OUO6074,0000EDA-19-03MAR16

Service Machine Safely



TS230—UN—24MAY89

To help prevent personal injury caused by unexpected movement, position the planter on a level surface before performing services.

If the planter must be in a raised position while working on or near it, verify that the service locks are installed or the planter is adequately supported.

If the planter is connected to the tractor, engage the park brake and/or place the transmission in **Park**, shut off the engine and remove the key.

If the planter is detached from the tractor, block the wheels and use the safety stands to prevent movement.

OM63945A,05F-19-16APR18

Understand Signal Words

⚠ DANGER

⚠ 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.

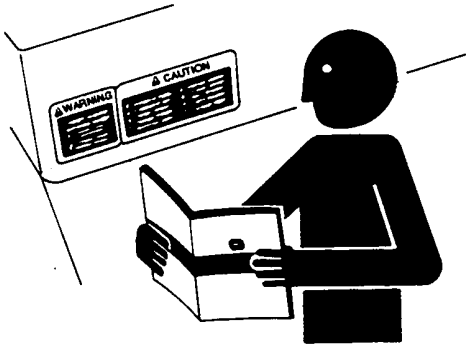
WARNING; The signal word WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

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

Read Operator's Manuals for ISOBUS Controllers

In addition to GreenStar Applications, this display can be used as a display device for any ISOBUS Controller that meets ISO 11783 standard. The display includes capability to control ISOBUS implements. When used in this manner, information and control functions placed on the display are provided by the ISOBUS Controller and are the responsibility of the ISOBUS Controller manufacturer.

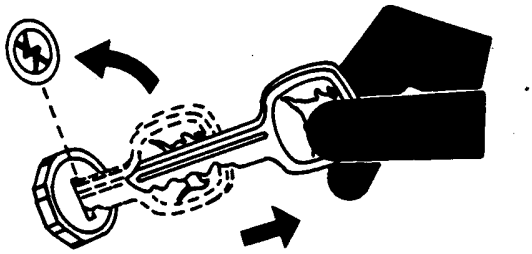
Some of these functions could pose hazard to either the operator or a bystander. Read the Operator's Manual

provided by the ISOBUS Controller manufacturer and observe all safety messages in manual and on ISOBUS Controller product before use.

NOTE: ISOBUS refers to the ISO Standard 11783.

DX,WW,ISOBUS(T)-19-04APR22

Park Machine Safely



TS230—UN—24MAY89

Before working on the machine:

- Lower all equipment to the ground.
- Stop the engine and remove the key.
- Disconnect the battery ground strap.
- Hang a "DO NOT OPERATE" tag in operator station.

DX,PARK-19-04JUN90

Live With Safety



TS231—19—07OCT88

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.

DX,LIVE-19-25SEP92

Prevent Machine Runaway



TS177—UN—11JAN89

Avoid possible injury or death from machinery runaway.

Do not start engine by shorting across starter terminals. Machine will start in gear if normal circuitry is bypassed.

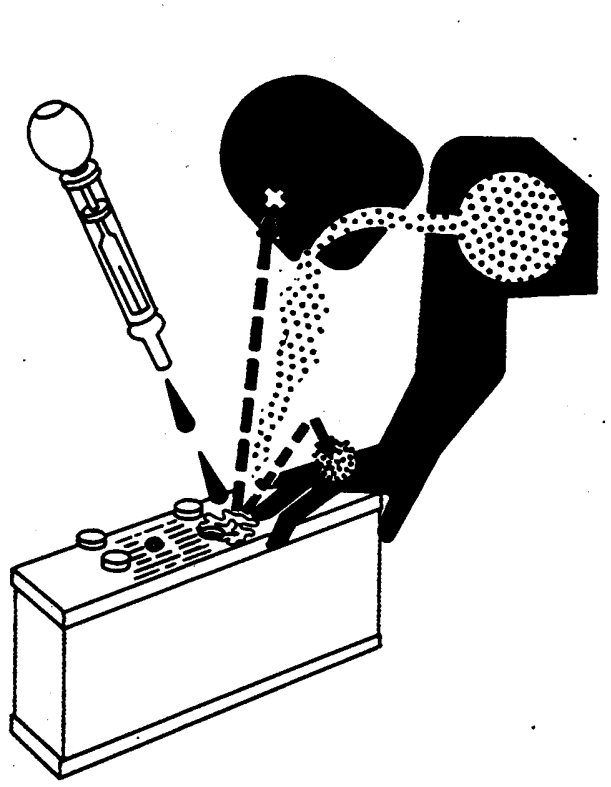
NEVER start engine while standing on ground. Start engine only from operator's seat, with transmission in neutral or park.

DX,BYPAS1-19-29SEP98

Handling Batteries Safely



TS204—UN—15APR13



TS203—UN—23AUG88

Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level.

Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove grounded (-) battery clamp first and replace grounded clamp last.

Sulfuric acid in battery electrolyte is poisonous and strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid hazards by:

- Filling batteries in a well-ventilated area
- Wearing eye protection and rubber gloves
- Avoiding use of air pressure to clean batteries
- Avoiding breathing fumes when electrolyte is added
- Avoiding spilling or dripping electrolyte
- Using correct battery booster or charger procedure.

If acid is spilled on skin or in eyes:

1. Flush skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush eyes with water for 15—30 minutes. Get medical attention immediately.

If acid is swallowed:

1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 qt.).
3. Get medical attention immediately.

WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. **Wash hands after handling.**

DX,WW,BATTERIES-19-02DEC10

Prevent Battery Explosions



TS204—UN—15APR13

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).

DX,SPARKS-19-03MAR93

Work Safely Around the Electric Drive System



A82413—UN—22APR14

Shock Hazard

CAUTION: Avoid an electrical shock. This implement is equipped with a 56 volt electrical system. Always use caution when interacting with the electrical circuit on the implement.

Do not touch exposed electrical connections when the electric power generation (EPG) system is running.

See a John Deere dealer or other service provider for service on the electric drive system.

OUO6074,0000F26-19-17OCT25

Keep Electronic Control Unit Connectors Clean

IMPORTANT: Do not open control unit and do not clean with a high-pressure spray. Moisture, dirt, and other contaminants may cause permanent damage.

1. Keep terminals clean and free of foreign debris. Moisture, dirt, and other contaminants may cause the terminals to erode over time and not make a good electrical connection.
2. If a connector is not in use, put on the proper dust cap or an appropriate seal to protect it from foreign debris and moisture.
3. Control units are not repairable.
4. Since control units are the components LEAST likely to fail, isolate failure before replacing by completing a diagnostic procedure.
5. The wiring harness terminals and connectors for electronic control units are repairable.

DX,WW,ECU04-19-11JUN09

Welding Near Electronic Control Units



TS953—UN—15MAY90

IMPORTANT: Do not jump-start engines with arc welding equipment. Currents and voltages are too high and may cause permanent damage.

1. Disconnect the negative (-) battery cable(s).
2. Disconnect the positive (+) battery cable(s).
3. Connect the positive and negative cables together. Do not attach to vehicle frame.
4. Clear or move any wiring harness sections away from welding area.
5. Connect welder ground close to welding point and away from control units.
6. After welding, reverse Steps 1—5.

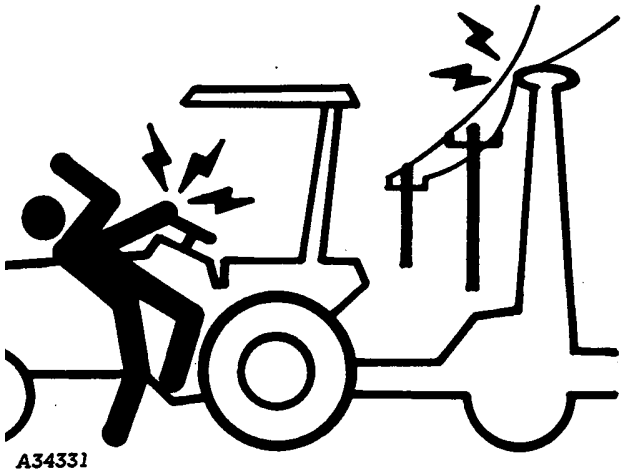
DX,WW,ECU02-19-14AUG09

Operator Ability

- Machine owners must make sure that operators are responsible, trained, have read the operating instructions and warnings, and know how to operate the machine properly and safely.
- Age, physical ability, and mental capacity can be factors in machine-related injuries. Operators must be mentally and physically capable of accessing the operator station and/or controls, and operating the machine properly and safely.
- Never allow a child or an untrained person to operate the machine. Instruct all operators not to give children a ride on the machine or an attachment.
- Never operate machine when distracted, fatigued, or impaired. Proper machine operation requires the operator's full attention and awareness.

DX,ABILITY-19-07DEC18

Operate the Machine Safely



A34331—UN—13OCT88

Be careful when operating the machine to avoid injury.

If the machine must be in a raised position for repair,

verify that the service locks are installed or the machine is adequately supported. Anytime hydraulic work must be done, lower the machine.

Serious injury or death can result from contact with electric lines. Avoid contact with electric lines when moving or operating the machine.

Stand clear of the machine when hydraulic components are being used. Mechanical or hydraulic failure can allow the machine components to move rapidly.

Verify that the cylinder and attaching hoses are fully charged with oil before operating the system.

Be careful when operating the system on hillsides; the tractor can tip sideways if it strikes a hole, ditch, or other irregularity.

Permit only one person, the operator, on the tractor platform while the tractor and machine are in operation.

AG,OUO6074,1162-19-17MAY16

Use Safe Service Procedures

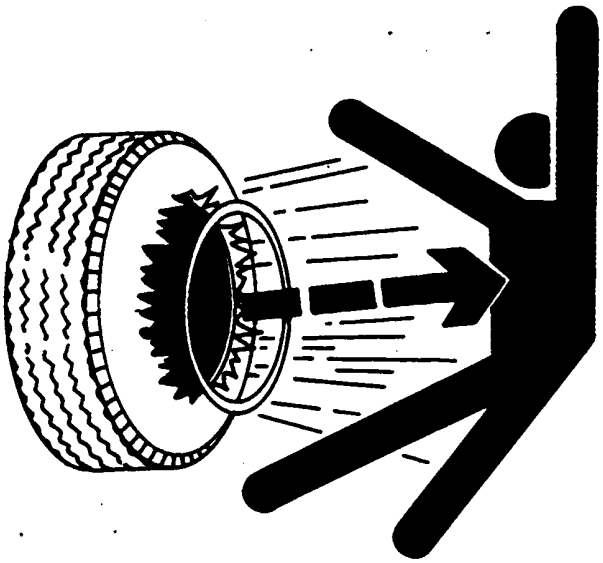


N40000—UN—28SEP88

CAUTION: To help prevent serious injury or death to you or others caused by unexpected movement, service the machine on a level surface. Lower the machine to the ground or sufficiently lock or block the raised machine before servicing. If the machine is connected to a tractor, engage the park brake and place the transmission in park, shut off the engine and remove the key. If the machine is detached from the tractor, block the wheels and use shop stands to prevent movement.

AG,OUO6074,1362-19-29MAR18

Service Tires Safely



TS211—UN—15APR13

CAUTION: Explosive separation of a tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.

Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure.

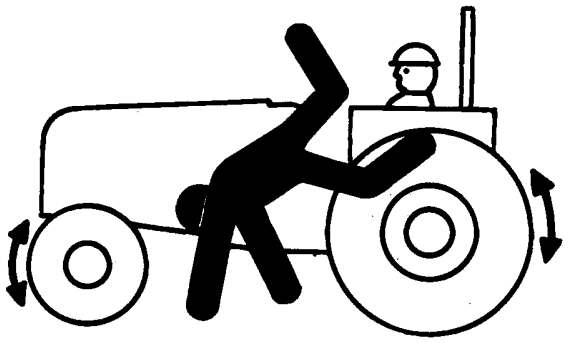
Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly. Use a safety cage if available.

Check wheels for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.

DX,RIM1-19-27OCT08

Keep Riders Off Machine



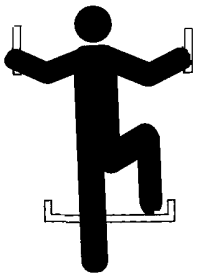
TS290—UN—23AUG88

Only allow the operator on the machine. Keep riders off.

Riders on machine are subject to injury such as being struck by foreign objects and being thrown off of the machine. Riders also obstruct the operator's view resulting in the machine being operated in an unsafe manner.

DX,RIDER-19-03MAR93

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

Avoid Tip-overs



N39084—UN—30MAR89

Use a seat belt when present in the machine.

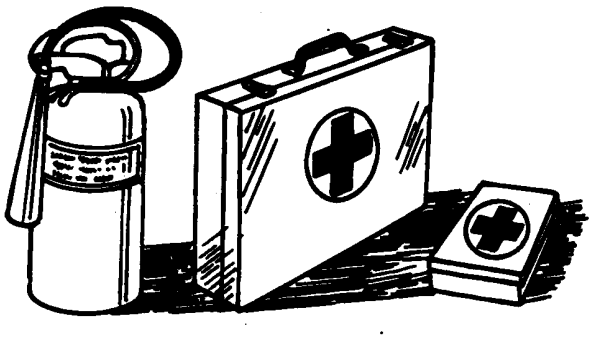
Avoid holes, ditches, and obstructions when operating the machine which cause it to tip, especially on hillsides.

Never drive near the edge of a ditch, creek, gully, or steep embankment.

Slow down when turning, traveling over rough ground, and when turning on hillsides.

OM63945A,05B-19-16APR18

Prepare for Emergencies



TS291—UN—15APR13

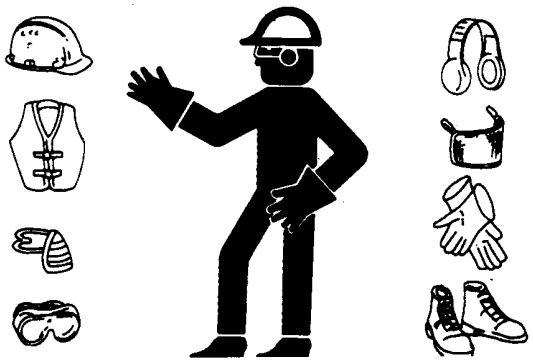
Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.

DX,FIRE2-19-03MAR93

Wear Protective Clothing



TS206—UN—15APR13

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

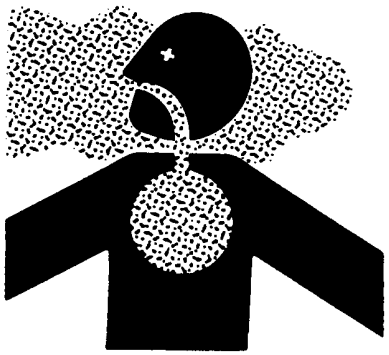
Prolonged exposure to loud noise can cause impairment or loss of hearing.

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

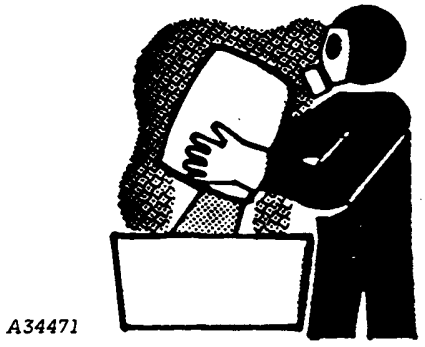
Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.

DX,WEAR-19-10SEP90

Handle Agricultural Chemicals Safely



TS220—UN—15APR13



A34471—UN—11OCT88

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

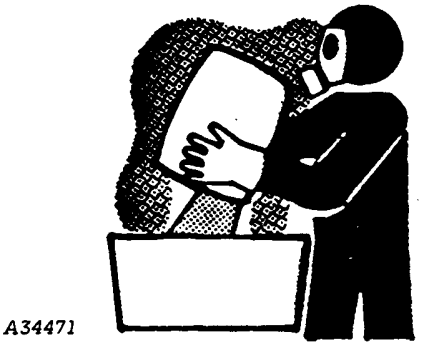
Always follow all label directions for effective, safe, and legal use of agricultural chemicals.

Reduce risk of exposure and injury:

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

DX,WW,CHEM01-19-24AUG10

Seed Lubricant and Seed Treatments

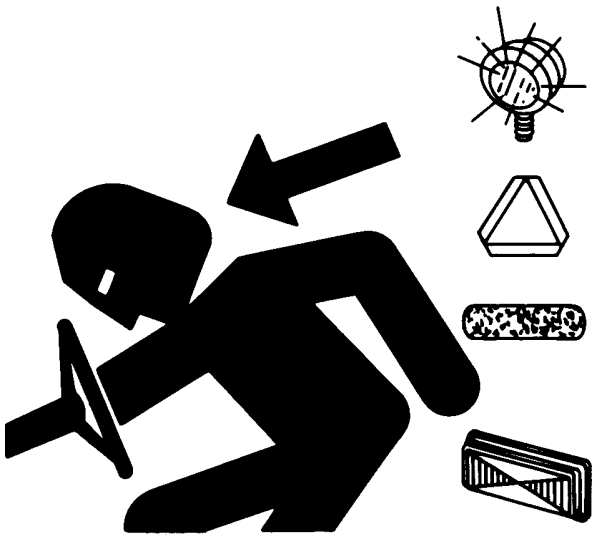


A34471—UN—11OCT88

Use an appropriate seed lubricant for your conditions. Follow the instructions and warnings provided by the provider, including use of personal protective equipment against potential skin and respiratory exposures. Be aware of seed treatments that may also create risks of skin and respiratory exposures to chemicals and other substances and take appropriate precautions, including the use of personal protective equipment. Avoid touching or inhaling any seed treatment, seed lubricant, or the dust created by the use of seed treatment or seed lubricant. Reports of potentially fatal cancer and other serious illnesses have been made from exposure to these products.

ouo6074,1715091739063-19-07MAY24

Use Safety Lights and Devices



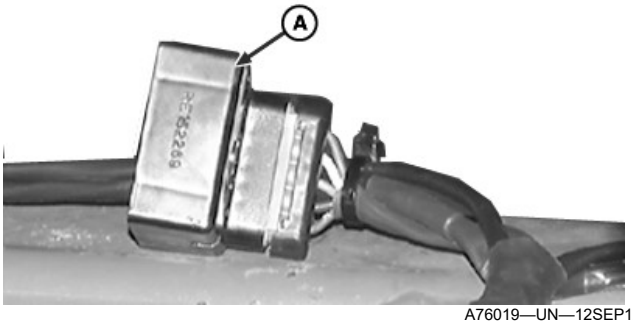
TS951—UN—12APR90

Prevent collisions between other road users, slow moving tractors with attachments or towed equipment, and self-propelled machines on public roads. Frequently check for traffic from the rear, especially in turns, and use turn signal lights.

Use headlights, flashing warning lights, and turn signals day and night. Follow local regulations for equipment lighting and marking. Keep lighting and marking visible, clean, and in good working order. Replace or repair lighting and marking that has been damaged or lost.

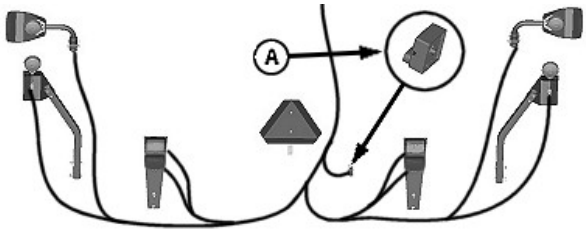
DX,FLASH-19-07JUL99

Light Enhancement Module



A76019—UN—12SEP12

Light Enhancement Module



A82355—UN—16APR14

Light Configuration—Style A



A82236—UN—16APR14

Light Configuration—Style B

A—Light Enhancement Module

CAUTION: When transporting the planter on a roadway, use flashing warning lights and turn signals both day and night. Prevent collisions between other road users. Check local governmental regulations. Various safety devices can be obtained via regular spare part channels. Keep safety items in good condition. Replace missing or damaged items.

IMPORTANT: The construction of this planter may not meet all local or national requirements for transport on a public roadway. In regions or countries that have national certification requirements for roadway transport, it may be impossible for this planter to be approved for such roadway transport. The customer is responsible for understanding and complying with all local, regional, and national requirements regarding roadway transport.

NOTE: Keep all reflective material including the slow moving vehicle (SMV) emblem (if equipped) or signaling panels, clean, and visible.

Keep the lighting visible, clean, and in good working condition.

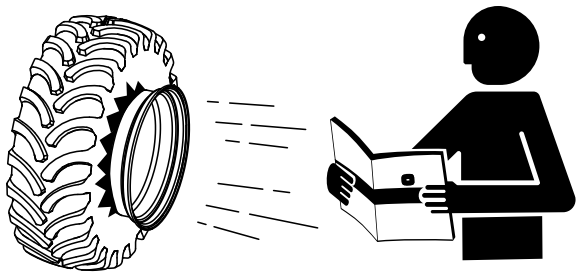
Planters are equipped with the light configuration typically used in the destination country. The customer is responsible for checking local government regulations.

Light configuration—A includes a light enhancement module (A) to control certain light functions.

For operation in Australia, remove the light enhancement module. The specific functions of the enhancement module are not used in Australia.

WP29706,00003D4-19-20OCT25

Follow Tire Recommendations



H111235—UN—13MAY14

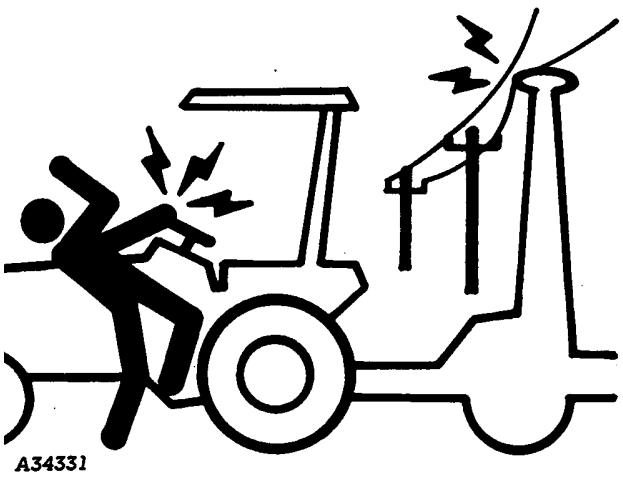
Keep your machine in proper working order.

Use only prescribed tire sizes with correct ratings and inflate to the pressure specified in this manual.

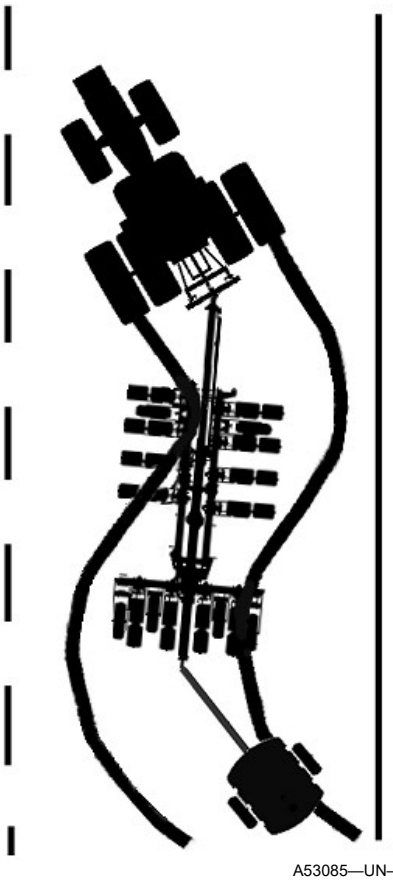
Use of other than prescribed tires may decrease stability, affect steering, result in premature tire failure, or cause other durability or safety issues.

DX,TIRE,INFO-19-19MAY14

Transport Safely



A34331—UN—13OCT88



A53085—UN—23OCT03

Avoid serious injury or death resulting from loss of control or rear end collision during transport of implement and any towed load behind implement.

Always raise parking stand before transporting.

Tractor brakes must be latched together.

Attach a properly sized safety chain between machine and any towed load.

Shift tractor into a lower gear when transporting down steep slopes or hills.

Always travel at a reasonable and safe speed. Never exceed 32 km/h (20 mph).

Never transport machine when more than half full.

Never exceed 13 600 kg (30 000 lb.) of towed weight behind machine while in field.

Always use flashing warning lights, day, and night when transporting on a public roadway.

Keep reflective material and SMV emblem clean and visible on implement and any towed load.

Prevent collisions between motorists and slow moving equipment on public roads. Frequently check for traffic from the rear, especially in turns and use the turn signals.

Everyone must be clear of machine.

For stability and operator safety, tractor must be properly ballasted.

If tractor has Roll-Gard Safety Canopy, keep seatbelt fastened when transporting.

Know transport height and width of machine.



A34333—UN—13OCT88

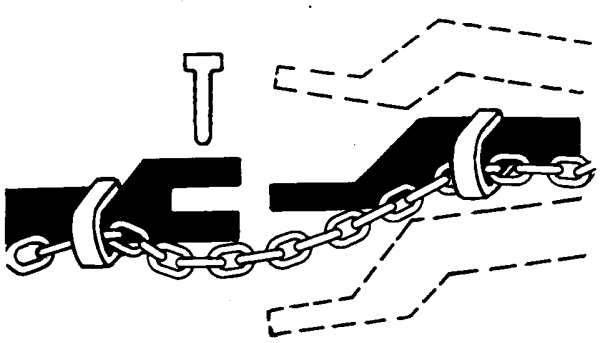
Install marker lockup straps (if equipped), to prevent injury from lowered marker.

Keep marker arms away from overhead power lines. Serious injury or death can result. Proceed cautiously under overhead power lines and around utility poles. Know the transport height of machine.

This implement does not meet all local or national requirements for transport on a public roadway. In regions or countries that have national certification requirements for roadway transport, it can be impossible for implement to be approved for such roadway transport. The customer is responsible for understanding and complying with all local, regional, and national requirements regarding roadway transport.

WP29706,000036D-19-22OCT25

Use a Safety Chain



TS217—UN—23AUG88

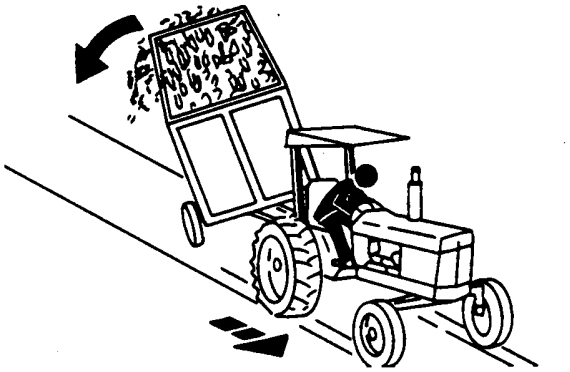
A safety chain will help control drawn equipment should it accidentally separate from the drawbar.

Using the appropriate adapter parts, attach the chain to the tractor drawbar support or other specified anchor location. Provide only enough slack in the chain to permit turning.

Use chain with a strength rating equal to or greater than the gross weight of the towed machine. Do not use safety chain for towing.

DX,CHAIN-19-03MAR93

Tow Loads Safely



TS216—UN—23AUG88

Stopping distance increases with speed and weight of towed loads, and on slopes. Towed loads with or without brakes that are too heavy for the tractor or are towed too fast can cause loss of control. Consider the total weight of the equipment and its load.

Observe these recommended maximum road speeds, or local speed limits which may be lower:

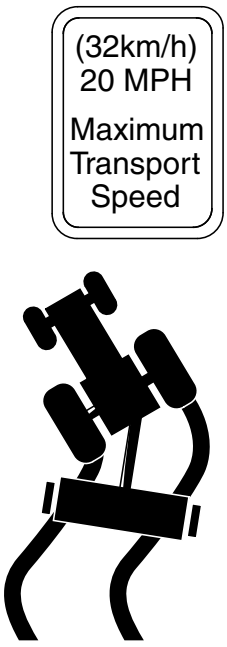
- If towed equipment does not have brakes, do not travel more than 32 km/h (20 mph) and do not tow loads more than 1.5 times the tractor weight.
- If towed equipment has brakes, do not travel more than 40 km/h (25 mph) and do not tow loads more than 4.5 times the tractor weight.

Ensure the load does not exceed the recommended

weight ratio. Add ballast to recommended maximum for tractor, lighten the load, or get a heavier towing unit. The tractor must be heavy and powerful enough with adequate braking power for the towed load. Use additional caution when towing loads under adverse surface conditions, when turning, and on inclines.

DX,TOW-19-02OCT95

Observe Maximum Transport Speed



A46805—19—16JUL10

The maximum transport speed for this implement is 32 km/h (20 mph).

Some tractors are capable of operating at speeds that exceed the maximum transport speed of this implement. Regardless of the maximum speed capability of the tractor being used to tow this implement, do not exceed the implement's maximum transport speed.

Exceeding the implement's maximum transport speed can result in:

- Loss of control of the tractor/implement combination
- Reduced or no ability to stop during braking
- Implement tire failure
- Damage to the implement structure or its components

Use additional caution and reduce speed when towing under adverse surface conditions, when turning, and when on inclines.

Do not attempt transport if the fully loaded implement weighs more than 1.5 t (3 300 lb) and more than 1.5 times the weight of the tractor.

Never tow this implement with a motor vehicle. Tow only with a properly ballasted tractor.

DX,TOW2-19-11APR07

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.

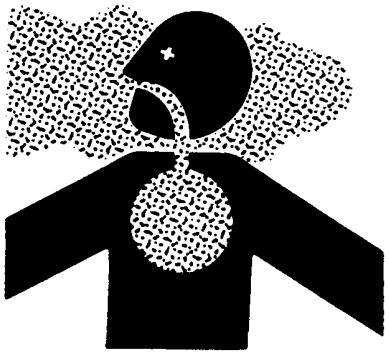
On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.

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

Remove Paint Before Welding or Heating



TS220—UN—15APR13

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Remove paint before heating:

- Remove paint a minimum of 100 mm (4 in.) from area to be affected by heating. If paint cannot be removed, wear an approved respirator before heating or welding.
- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

Do not use a chlorinated solvent in areas where welding will take place.

Do all work in an area that is well ventilated to carry toxic fumes and dust away.

Dispose of paint and solvent properly.

DX,PAINT-19-24JUL02

Avoid Heating Near Pressurized Fluid Lines

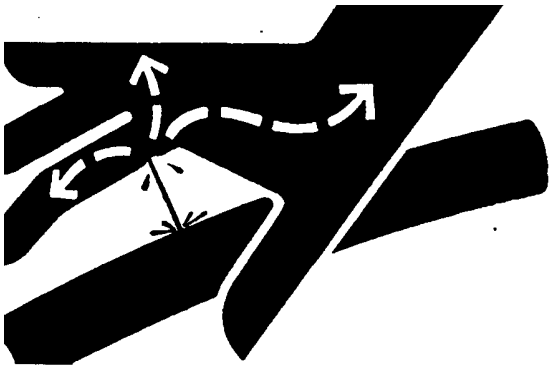


TS953—UN—15MAY90

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can accidentally burst when heat goes beyond the immediate flame area.

DX,TORCH-19-10DEC04

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

Store Attachments Safely



TS219—UN—23AUG88

Stored attachments such as dual wheels, cage wheels, and loaders can fall and cause serious injury or death.

Securely store attachments and implements to prevent falling. Keep playing children and bystanders away from storage area.

DX,STORE-19-03MAR93

Charge Row Marker Hydraulic System



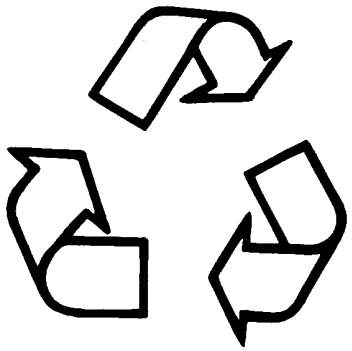
N39213—UN—22SEP88

Falling row markers can cause personal injury. Verify that the cylinders and attaching hoses are fully charged with oil before operating. Failure to do so allows the markers to fall rapidly.

ALWAYS stay clear of the markers when raising or lowering.

NX,515,C9-19-17MAY16

Decommissioning — Proper Recycling and Disposal of Fluids and Components



TS1133—UN—15APR13

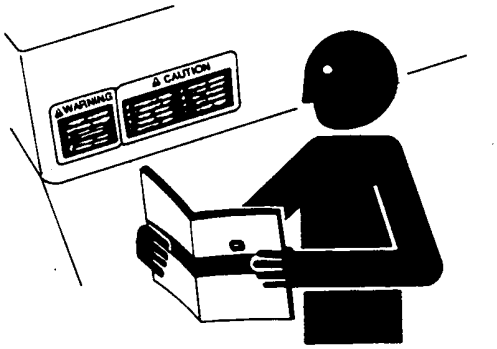
Safety and environmental stewardship measures must be taken into account when decommissioning a machine and/or component. These measures include the following:

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

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

DX,DRAIN-19-01JUN15

Replace Safety Signs



TS201—UN—15APR13

Replace missing or damaged safety signs. Use this operator's manual for correct safety sign placement.

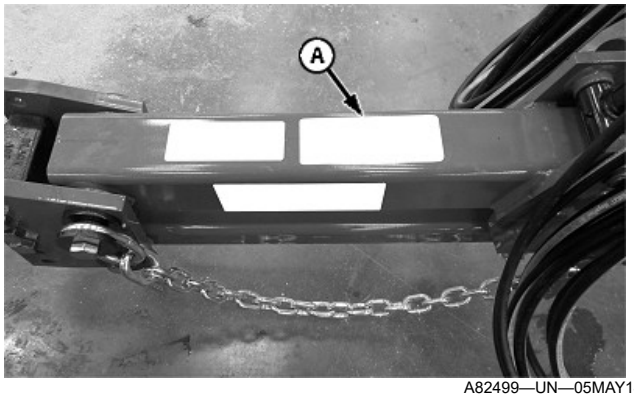
There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this operator's manual.

DX,SIGNS-19-18AUG09

Hydraulic Injection



A82498—UN—05MAY14



A82499—UN—05MAY14

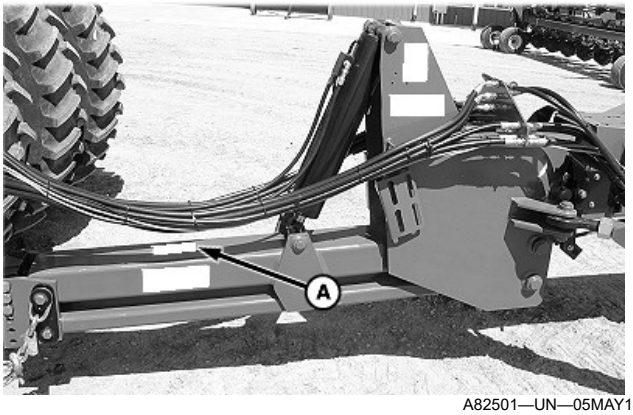


SSA80683—19—08MAR05

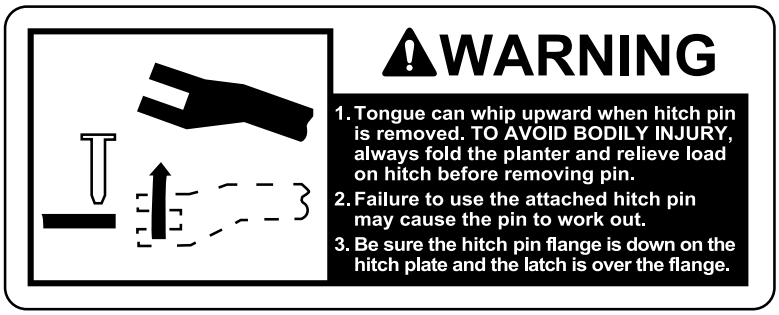
A—Warning

JF72098,00000DF-19-28MAY19

Sudden Hitch Movement



A82501—UN—05MAY14

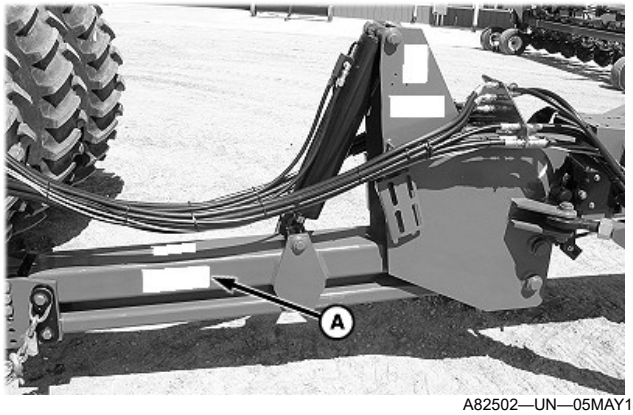


SSA56821—19—25JUN09

A—Warning

JF72098,00000CE-19-25JUN18

Transport Guidelines



A82502—UN—05MAY14



SSH177618—19—18MAR05

A—Warning

JF72098,00000CF-19-25JUN18

Sudden Crushing Movement



A82500—UN—05MAY14

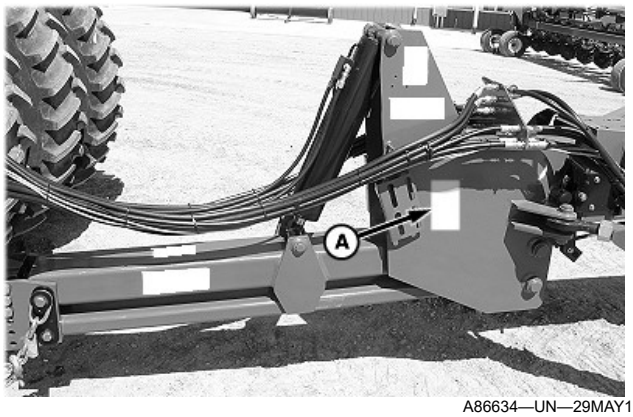


SSA54634—19—17APR06

A—Warning

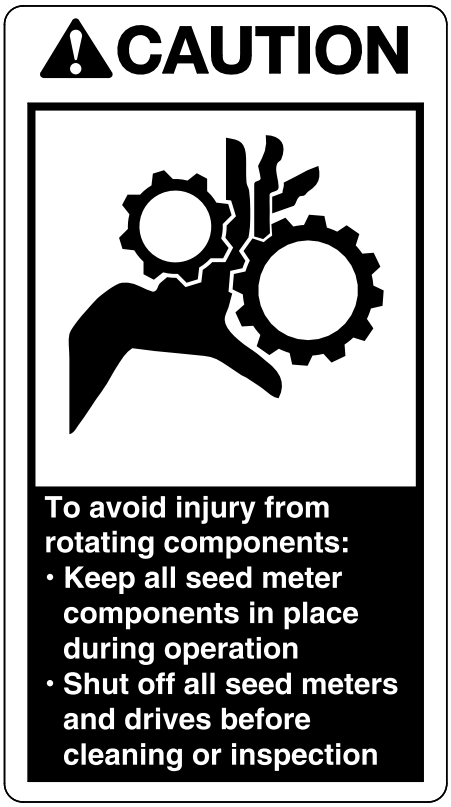
JF72098,00000CD-19-28MAY19

Component Entanglement



A86634—UN—29MAY15

Hitch Location



SSA97092—19—26MAR14

A—Caution

JF72098,00000D0-19-25JUN18

Sudden Crushing Movement



A82504—UN—05MAY14



SSA54634—19—17APR06

A—Warning

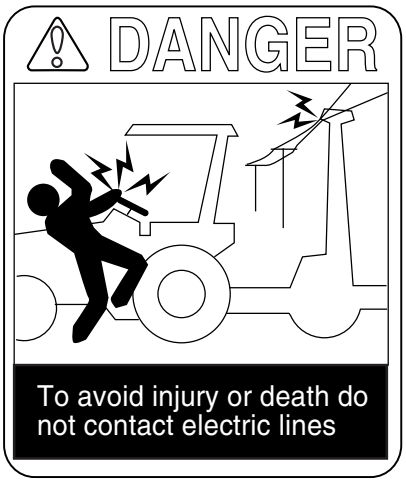
JF72098,00000D1-19-28MAY19

Electrical Line Contact



A67440—UN—19MAY10

Both Markers



SSA54611—19—23MAY05

A—Danger

JF72098,00000D3-19-28MAY19

Falling Marker



A67443—UN—20MAY10

Both Markers

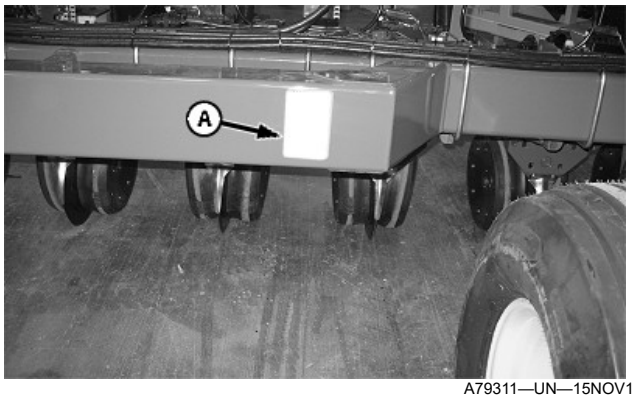


SSA54615—19—05APR19

A—Warning

JF72098,00000D4-19-28MAY19

Chemical Inhalation



A79311—UN—15NOV13

Left Wing Frame

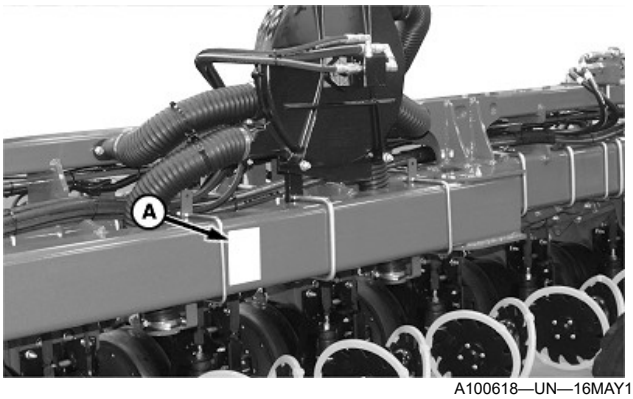


SSA77616—19—30MAR06

A—Warning

JF72098,00000D5-19-28MAY19

Sudden Crushing Movement



A100618—UN—16MAY18

Pneumatic Row Cleaner

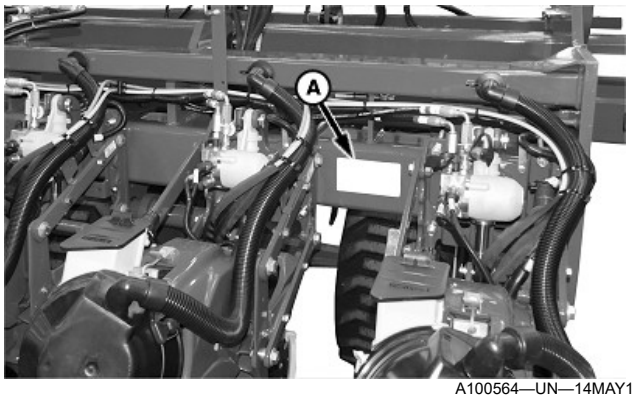


SSA105005—19—30SEP15

A—Caution

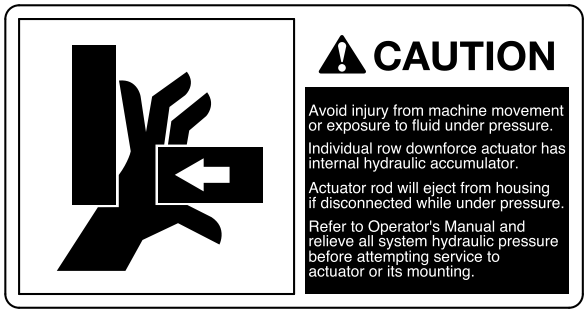
JF72098,00000DC-19-31MAY19

Sudden Crushing Movement and Hydraulic Injection



A100564—UN—14MAY18

Individual Row Hydraulic Downforce

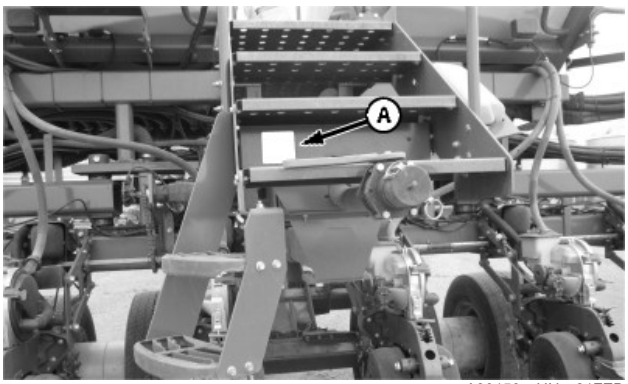


SSA106932—19—12FEB16

A—Caution

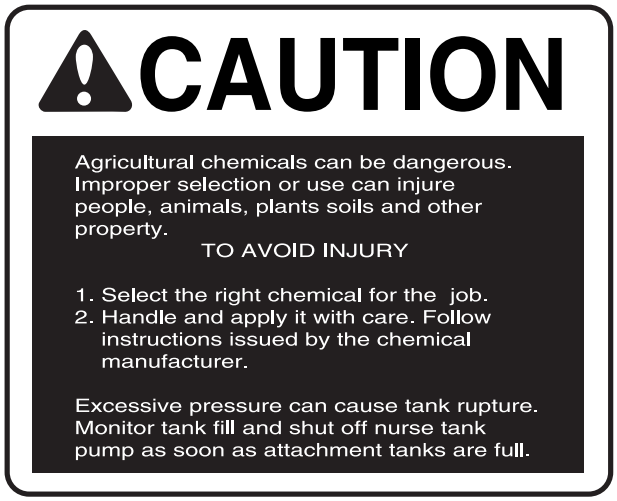
WP29706,0000D59-19-31MAY19

Chemical Use



A80150—UN—21FEB14

When Equipped with Fertilizer

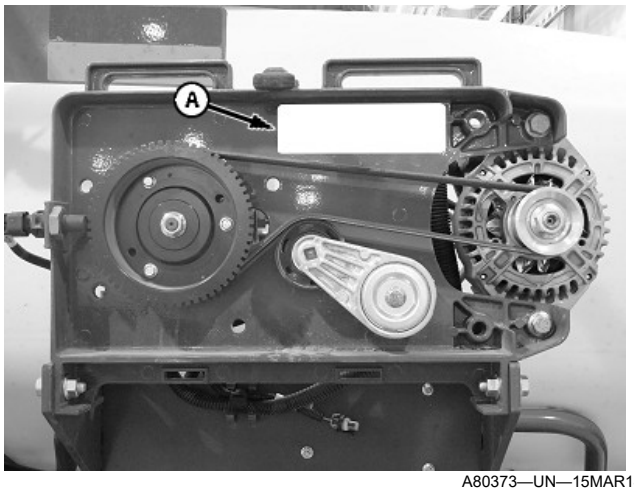


SSA53349—19—13OCT04

A—Caution

JF72098,00000D6-19-28MAY19

Component Entanglement



A80373—UN—15MAR14

Alternator Drive System

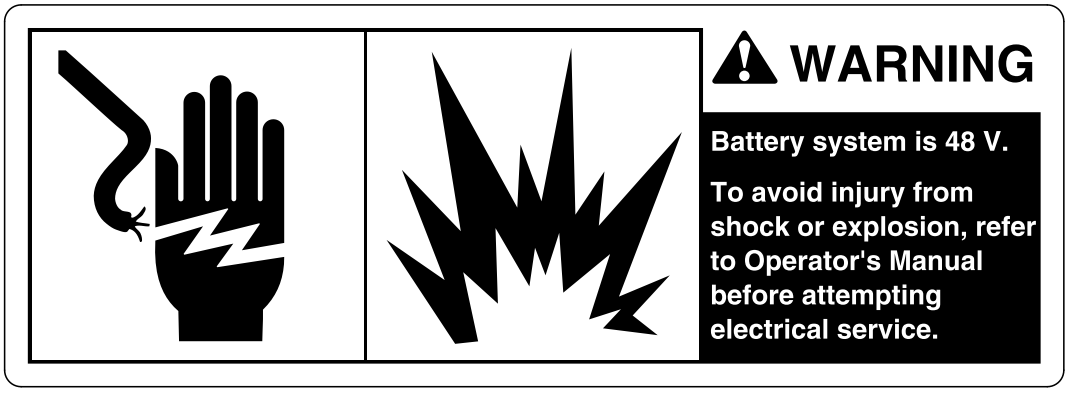


SSMT3082—19—27MAR14

A—Warning

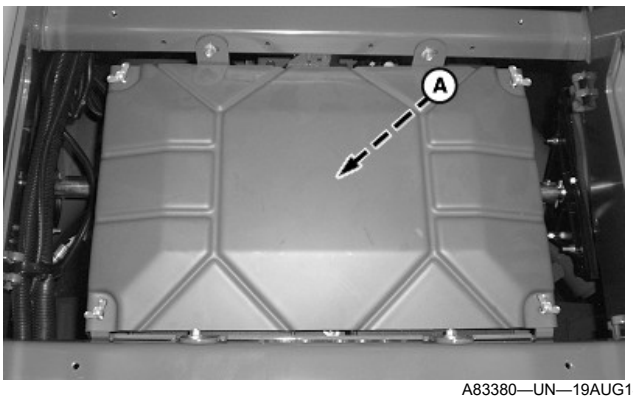
JF72098,00000D7-19-31MAY19

Electrical Shock



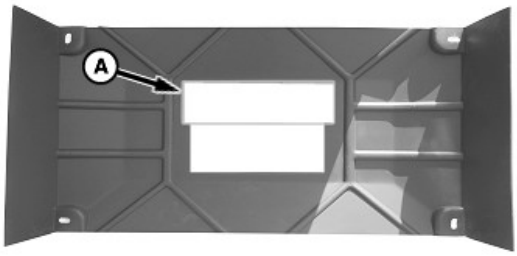
SSA96916—19—26MAR14

A—Warning



A83380—UN—19AUG14

Battery Cover Under CCS Deck

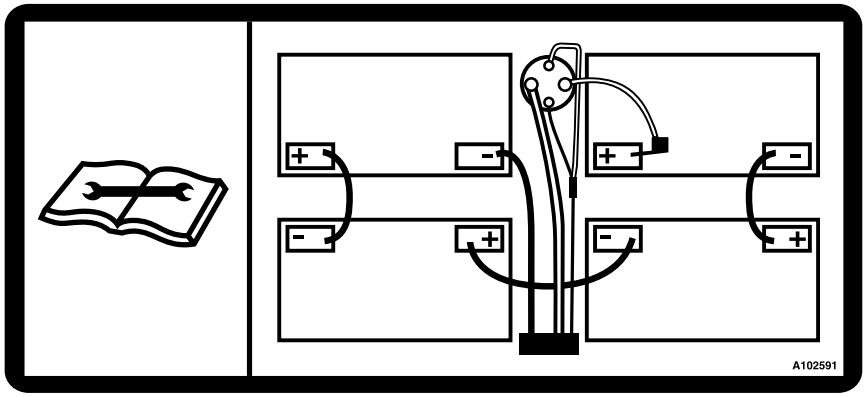


A100680—UN—31MAY18

Under the Battery Cover

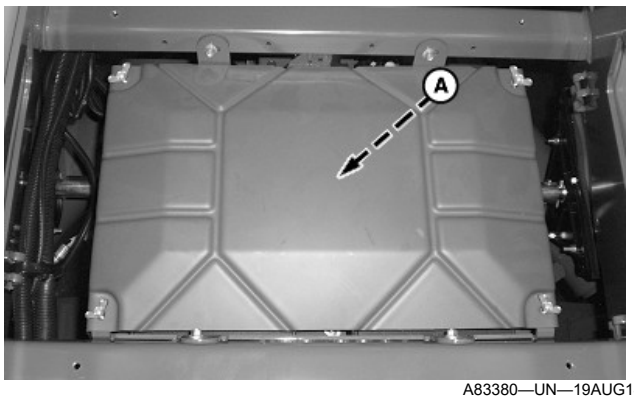
JF72098,00000D8-19-14OCT25

Electrical Shock



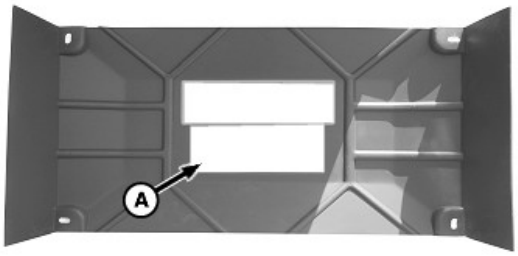
A84083—UN—29OCT14

A—Battery Cable Hook Up



A83380—UN—19AUG14

Battery Cover Under the CCS Deck



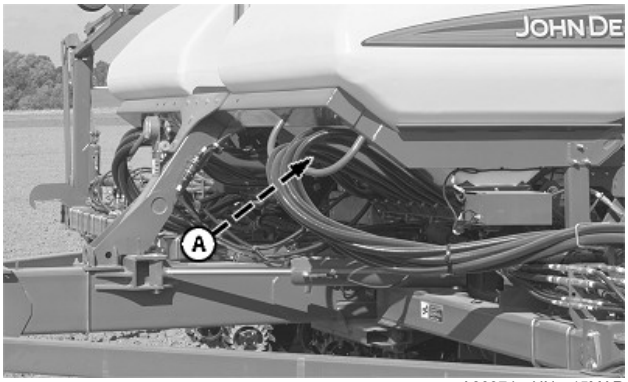
A100681—UN—31MAY18

Under the Battery Cover

The batteries are used with the implement power generation system.

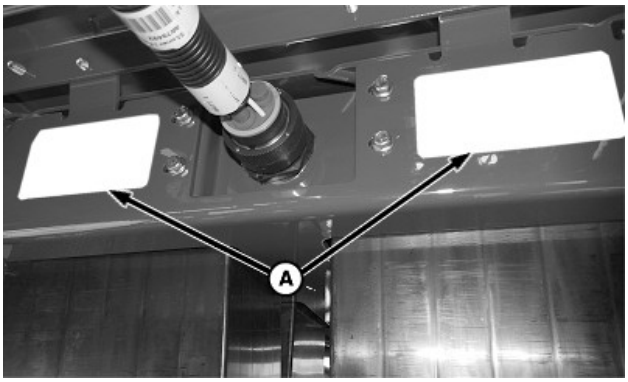
JF72098,00000E0-19-14OCT25

Electrical Shock



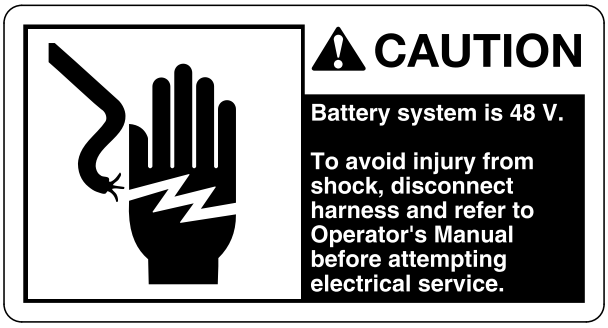
A80374—UN—15MAR14

Under the CCS Deck



A84708—UN—08DEC14

Battery Box Near the Harness Disconnect

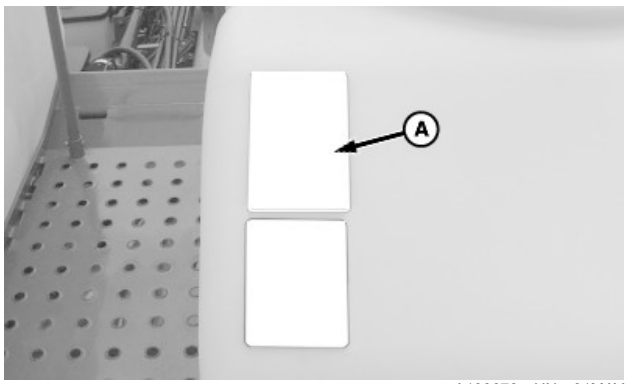


SSA97865—19—27MAR14

A—Caution

JF72098,00000D9-19-14OCT25

Chemical Inhalation



A100678—UN—31MAY18

CCS Tank

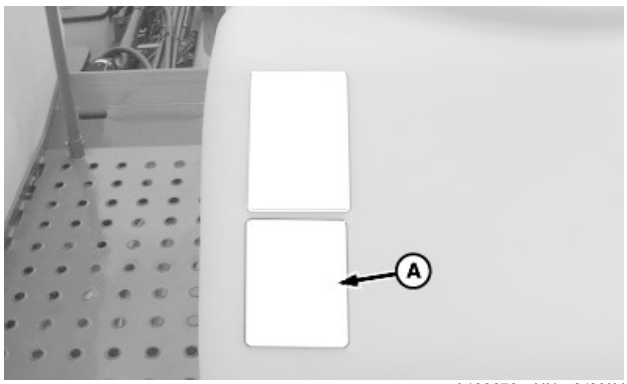


SSA74150—19—17FEB25

A—Warning

JF72098,00000DD-19-13OCT25

Do Not Ride



A100679—UN—31MAY18

CCS Tank

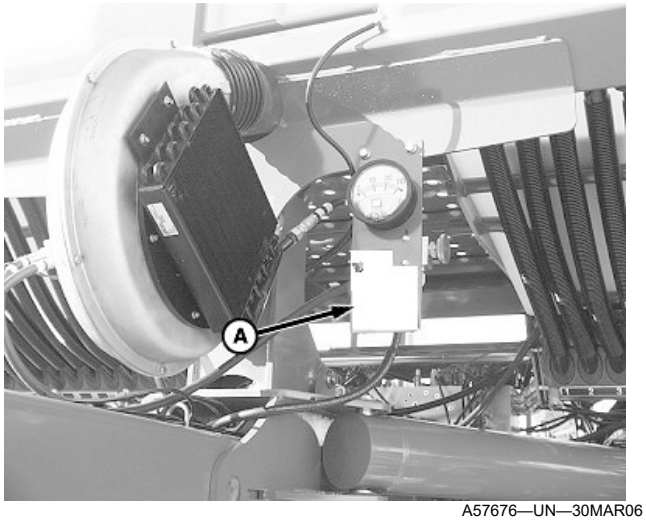


SSA91843—19—25MAR11

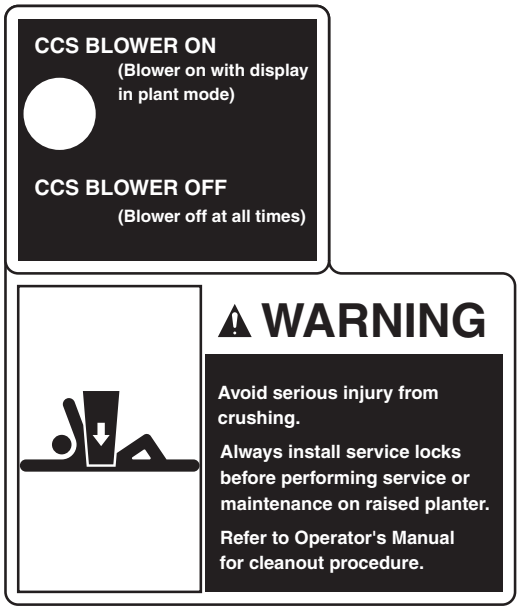
A—Warning

JF72098,00000E3-19-13OCT25

Falling Frame



A57676—UN—30MAR06

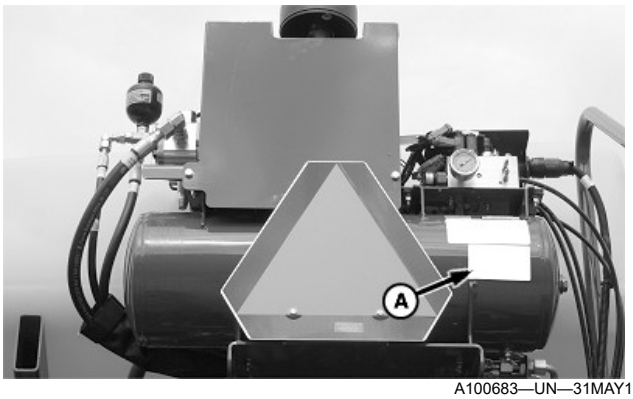


SSA108381—19—24MAY16

A—Warning

WP29706,0000EDA-19-05NOV20

Exploding Components



A100683—UN—31MAY18

Active Pneumatic Downforce

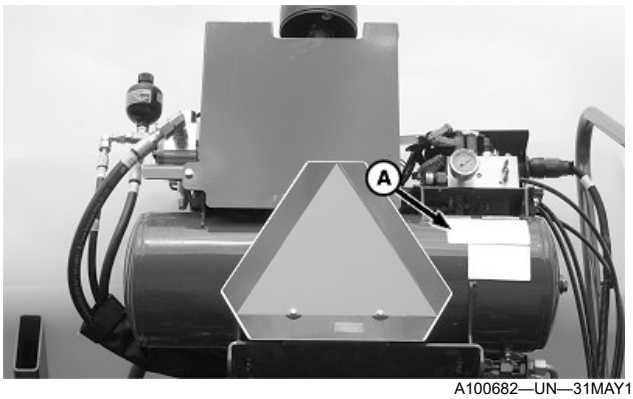


SSA90364—19—02JUL10

A—Warning

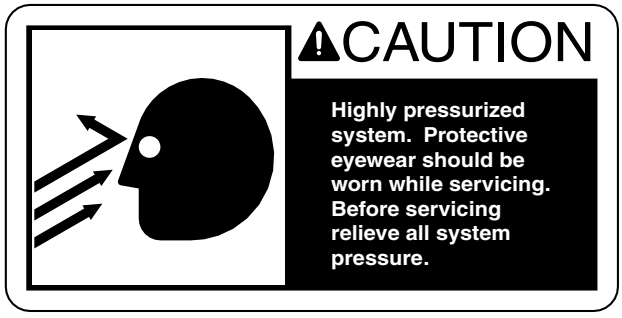
JF72098,00000DA-19-28MAY19

Eye Impact



A100682—UN—31MAY18

Active Pneumatic Downforce

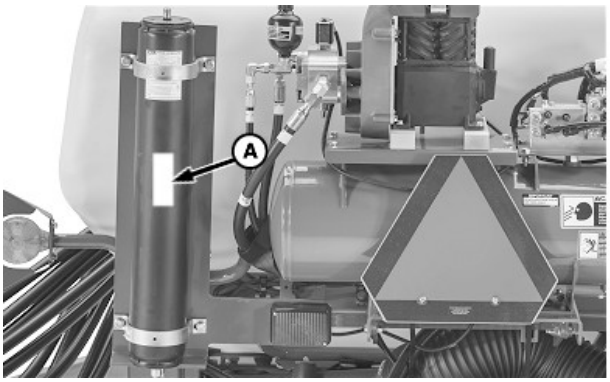


SSA89518—19—14JUN10

A—Caution

JF72098,00000E1-19-28MAY19

Hydraulic Injection



A89687—UN—04MAR16

Frame Weight Distribution Accumulator

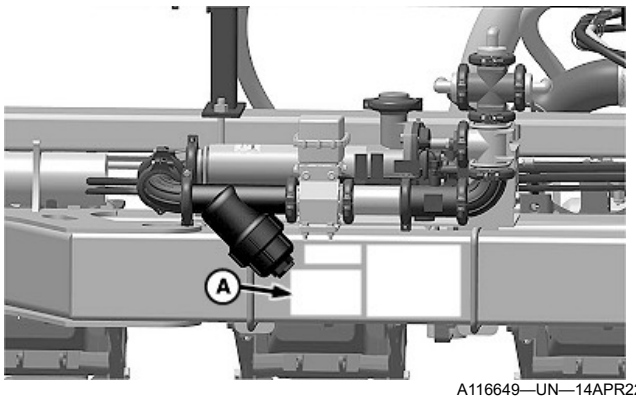


SSR210276—19—04AUG15

A—Caution

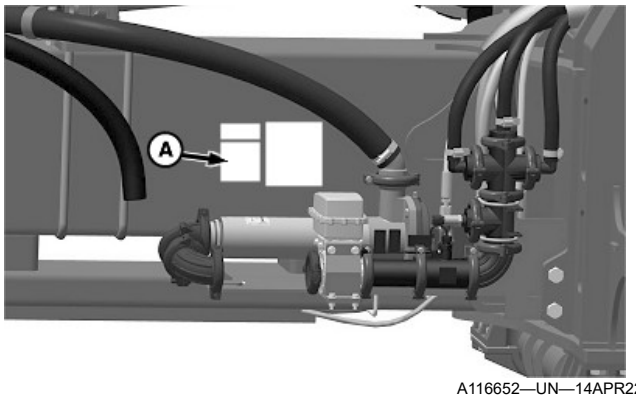
JF72098,00000DB-19-25JUN18

Chemical Use



A116649—UN—14APR22

ExactRate Pump, DB44



A116652—UN—14APR22

ExactRate Pump, Other DB Models

CAUTION

Agricultural chemicals can be dangerous. Improper selection or use can injure people, animals, plants soils and other property.

TO AVOID INJURY

1. Select the right chemical for the job.
2. Handle and apply it with care. Follow instructions issued by the chemical manufacturer.

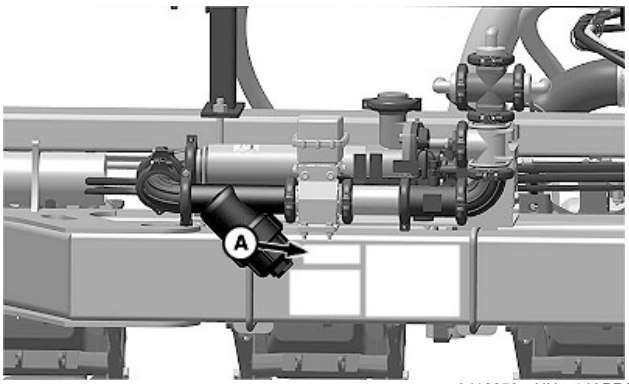
Excessive pressure can cause tank rupture. Monitor tank fill and shut off nurse tank pump as soon as attachment tanks are full.

SSA53349—19—13OCT04

A—Caution

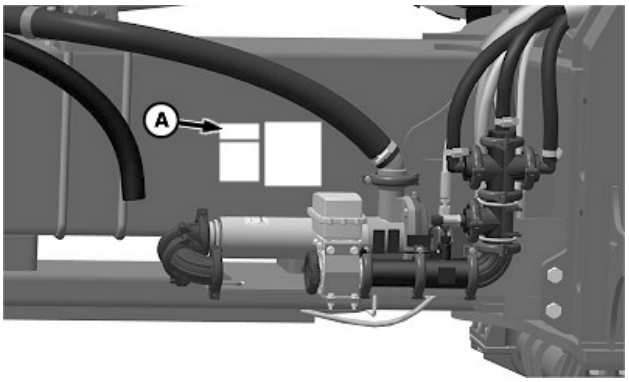
WP29706,0000F5C-19-14OCT25

Liquid Under Pressure



A116650—UN—14APR22

ExactRate Pump, DB44



A116653—UN—14APR22

ExactRate Pump, Other DB Models

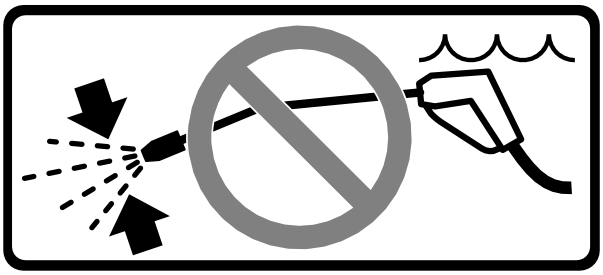


SSA112410—19—30MAR22

A—Caution

WP29706,0000F5D-19-14OCT25

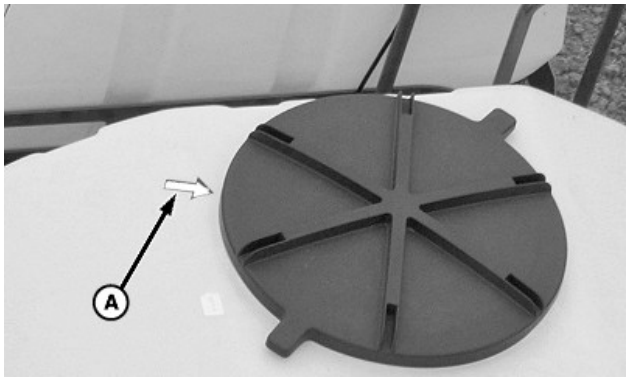
Information Signs



SSN408933—UN—23SEP15

IMPORTANT:

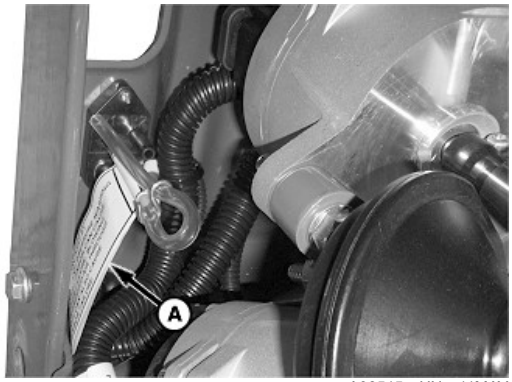
Avoid moisture damage to electrical components. Do not direct the spray from a high-pressure washer onto electrical components. Use caution when power washing the machine.



A74097—UN—20MAR14

A—Decal, Lid Index

To align the threads, position a handle here before screwing the lid onto the tank. (See Operate the Tank Lids.)

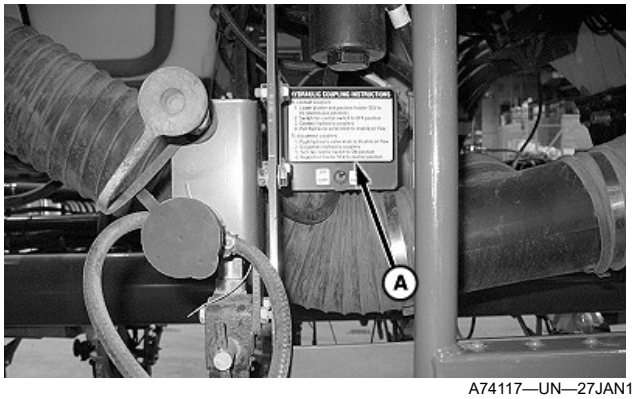


A96515—UN—11MAY17

A—Decal, Vacuum Sensor

IMPORTANT:

Avoid damage to the vacuum sensor. Do not direct high-pressure water at the sensor. Do not blow compressed air through the sensor hoses while connected to the sensor.



A74117—UN—27JAN12

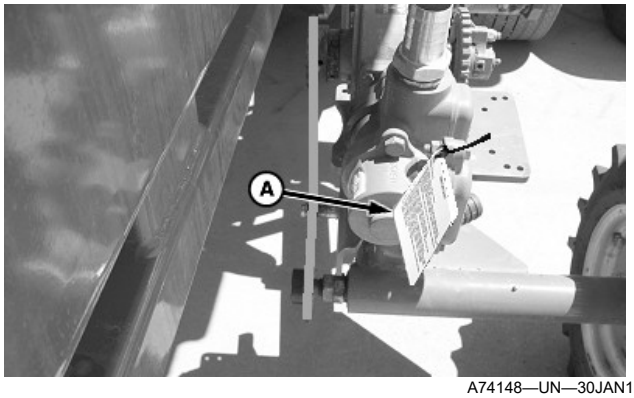
A—Decal, Hydraulic Coupling Instruction

To connect couplers:

1. Lower the planter and position the tractor selective control valve (SCV) to the forward detent (continuous flow) position.
2. Place the blower control switch to the OFF position.
3. Connect the hydraulic couplers.
4. Pull the hydraulic valve knob to enable the oil flow.

To disconnect couplers:

1. Push the hydraulic valve knob to disable the oil flow.
2. Disconnect the hydraulic couplers.
3. Turn the blower control switch to the ON position.
4. Reposition the tractor SCV to the neutral position.



A74148—UN—30JAN12

A—Decal, Fertilizer Pump

IMPORTANT:

Lubrication

- Pump is shipped filled with oil. At initial start-up and daily afterwards, check the oil level.
- Single piston pump: Fill with TY6296 SAE 80/90 W EP oil or the equivalent to the oil port level.
- Double piston pump: Fill both of the cavities with non-detergent SAE 30 oil to the check plug level.
- Fill the pump lube fittings with multipurpose grease every 10 operating hours.

Prevent damage to pump

1. Keep the pump filled with fluid always.

2. Protect from freezing - see overnight storage above freezing temperatures information.
3. Remove the drive chain when not in use.

Overnight storage above freezing temperatures

1. Clear liquids with steady or rising temperatures: Leave the pump and hoses filled with the solution.
2. Clear liquids with falling temperatures (solution may precipitate out): Fill the pump with water and leave filled (do not admit air).
3. Suspension fertilizer: This system not recommended for use with suspension fertilizers.

Extended Storage (Over 1 Week) Including Winter Storage: Refer to the frame decal and the operator's manual.

Important:

Pump priming

1. Open the shutoff valve at the tank and the strainer.
2. Fill the tank with a minimum of 75 L (20 gal) and check the system for leaks

IMPORTANT: Avoid excessive system pressure. Do not exceed maximum recommended rate for the orifice or the nozzle size.

3. Refer to the rate chart and set the pump to the maximum rate for the in-line orifice or nozzle that is installed.
4. Lower the planter into the planting position and drive 90 m (100 yd) at planting speed 9.7 km/h (6 mph).
5. Raise the planter and turn the drive wheel of the fertilizer pump by hand.
6. Check all the rows for liquid exiting the opener tubes in a steady stream. Repeat steps 2—5 until a steady flow of liquid is apparent at all the openers and all the air is flushed from the distribution hoses.
7. Select a target fertilizer rate from the rate chart. Set the pump range and install the in-line orifices or nozzles for the selected fertilizer rate.

NOTE: As the travel speed increases, the fertilizer system pressure also increases.

8. Verify that the system pressure is within 103—621 kPa (1.0—6.2 bar) (15—90 psi) when traveling at the desired planting speed.
9. If the planter is stationary for a long period, air bubbles can develop and become trapped in the distribution hoses. Prime the system as necessary.

   See Prime and Start the Pump.

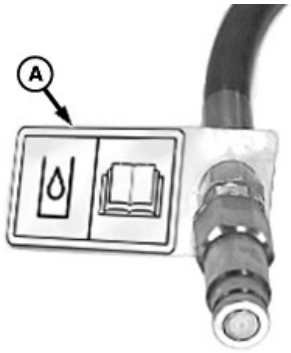


A74120—UN—27JAN12

A—Decal, Air Tank Drain

IMPORTANT:

Drain the moisture from the air tank daily (See Drain Air Storage Tank).



A85534—UN—09MAR15

A—Decal, Case Drain

IMPORTANT: Hydraulic Motor Case-Drain Hose

To avoid motor failure, this hose must be connected during hydraulic motor operation.

(See the Case Drain and Hydraulic Motor Requirements in the Preparing the Tractor section for additional information.)

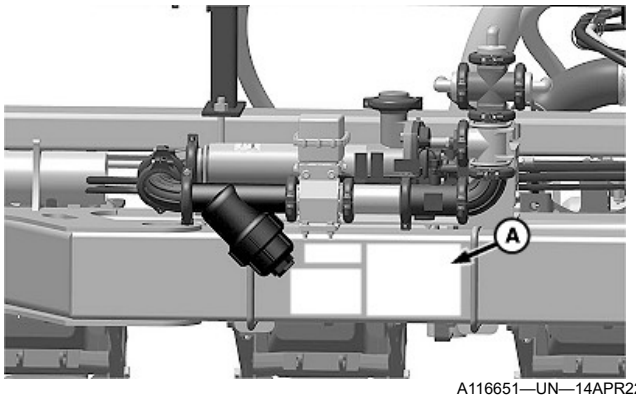


A91472—UN—15JUL16

A—Decal, Gear Lubrication
B—Gear

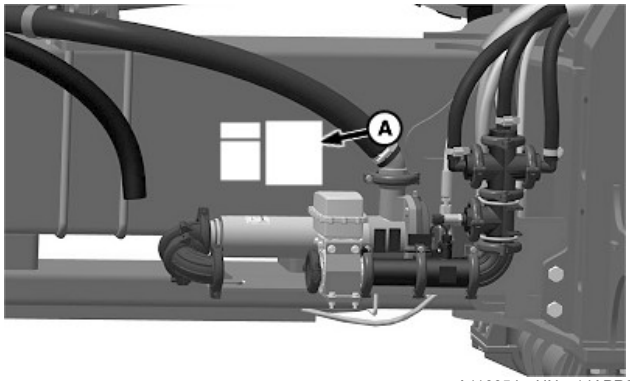
IMPORTANT: Apply molybdenum grease to both the alternator gear (B) and the gear case each time the alternator is installed and annually.

(See Lubricating the Planter section for additional information.)



A116651—UN—14APR22

ExactRate Pump, DB44



A116654—UN—14APR22

ExactRate Pump, Other DB Models

A—Decal, Winterize

IMPORTANT

TO PREVENT DAMAGE TO THE PUMP:

1. Keep pump filled with fertilizer, water, or winterizing fluid at all times. Exposure to air will cause rapid corrosion of internal parts.
2. Keep pump from freezing.

RECOMMENDED STORAGE PROCEDURES:

OVERNIGHT IN ABOVE FREEZING TEMPERATURES

- Clear liquids with steady or rising temperatures: Leave pump and hoses filled with solution.
- Clear liquids with cooling weather (solution is likely to salt out): Fill pump with water and leave filled. (Do not admit air.)
- Suspension fertilizers: This system is **not** recommended for use with suspension fertilizers.

ONE TO TWO WEEKS IN ABOVE FREEZING TEMPERATURES

- Acceptable: Draw in fresh water to dilute and flush out solution. Do not drain. Keep pump sealed to exclude air.
- Preferred: Follow winter storage guidelines.

WINTER STORAGE

- Reference the Operator's Manual for winter storage procedure. (See the Storage section for more information.)

WP29706,0000875-19-14OCT25

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End User License Agreement

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    Please include name of the product and the version number of the software in the request letter. This offer is valid to anyone in receipt of this information.

ouo6074,1692297809659-19-24OCT25

Use Your Tractor Operator's Manual



TS190—UN—17JAN89

Always refer to your tractor operator's manual for specific detailed information regarding the operation of your equipment.

The following tractor-related information uses John Deere tractors to illustrate preparation, attachment, and operational procedures. Use your tractor operator's manual for detailed information, as procedures vary by equipment.

NX,1200V,A1-19-07OCT25

Set the Selective Control Valves—8000 and 9000 Series Tractors

(See the Hydraulic Connection Recommendations in the Attaching the Machine section.)

OUO6045,000011D-19-12MAY16

Hitch Loads

IMPORTANT: It is recommended that product tanks are empty when the planter is folded.

NOTE: Weights are with typical optional equipment. Weights with other optional equipment vary.

The maximum weight for the static vertical load occurs for implement when it is folded in the road transport position.

Static Vertical Load on Tractor Drawbar	
CCS Planters	**Maximum Empty Weight kg (lb)**
DB44	2177 (4800)
DB60 24R30	3493 (7700)
DB60 36R20	3561 (7850)
DB60 47R15	3783 (8340)
DB60 48R15	3874 (8540)
DB66	3239 (7141)
DB80 32R30	4309 (9500)
DB80 48R20	5443 (12 000)

Static Vertical Load on Tractor Drawbar	
CCS Planters	**Maximum Empty Weight kg (lb)**
DB88	5956 (13 131)
DB90 36R30	5579 (12 300)
DB90 54R20	7500 (16 545)

WP29706,0000B8E-19-14OCT25

ExactEmerge Tractor Requirements

NOTE: Tractors with more horsepower are required when operating with additional attachments or when planting in soft seedbeds and rolling ground.

ExactEmerge Planter	Engine Power
DB44 24-Row 56 cm (22 in)	217 kW (291 hp)
DB60 24-Row 76 cm (30 in)	217 kW (291 hp)
DB60 36-Row 51 cm (20 in)	296 kW (397 hp)
DB60 47-Row 38 cm (15 in)	368 kW (494 hp)
DB60 48-Row 38 cm (15 in)	368 kW (494 hp)
DB66 36-Row 56 cm (22 in)	296 kW (397 hp)
DB80 32-Row 76 cm (30 in)	270 kW (362 hp)
DB80 48-Row 51 cm (20 in)	375 kW (503 hp)
DB88 48-Row 56 cm (22 in)	375 kW (503 hp)
DB90 36-Row 76 cm (30 in)	296 kW (397 hp)
DB90 54-Row 51 cm (20 in)	416 kW (558 hp)

WP29706,0000B8D-19-14OCT25

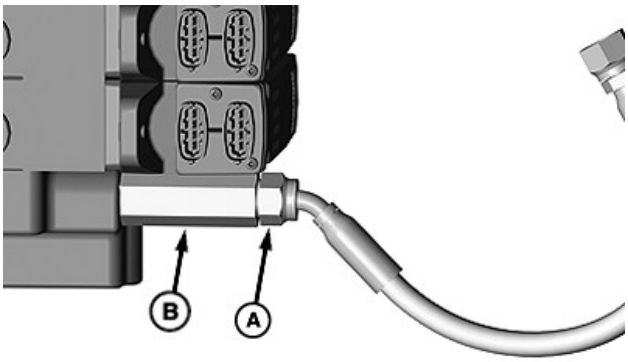
MaxEmerge 5e Tractor Requirements

NOTE: Tractors with more horsepower are required when operating with additional attachments or when planting in soft seedbeds and rolling ground.

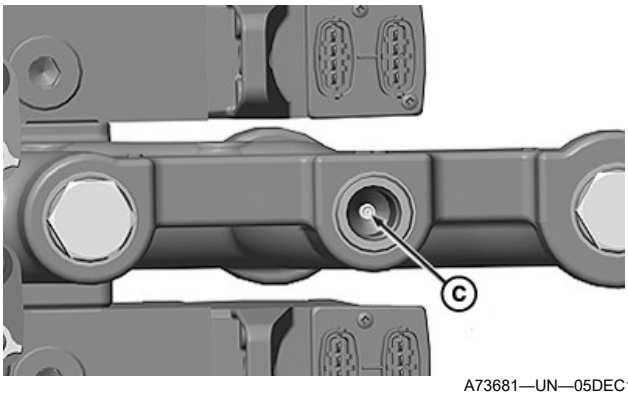
MaxEmerge 5e Planter	Engine Power
DB44 24-Row 56 cm (22 in)	136 kW (183 hp)
DB60 24-Row 76 cm (30 in)	136 kW (183 hp)
DB60 36-Row 51 cm (20 in)	188 kW (252 hp)
DB60 47-Row 38 cm (15 in)	235 kW (315 hp)
DB60 48-Row 38 cm (15 in)	235 kW (315 hp)
DB66 36-Row 56 cm (22 in)	188 kW (252 hp)
DB80 32-Row 76 cm (30 in)	172 kW (230 hp)
DB80 48-Row 51 cm (20 in)	239 kW (320 hp)
DB88 48-Row 56 cm (22 in)	239 kW (320 hp)
DB90 36-Row 76 cm (30 in)	188 kW (252 hp)
DB90 54-Row 51 cm (20 in)	245 kW (329 hp)

WP29706,0000BA1-19-14OCT25

Verify Orifice in Load Sense for Power Beyond on 9030, and 9R Series Tractors

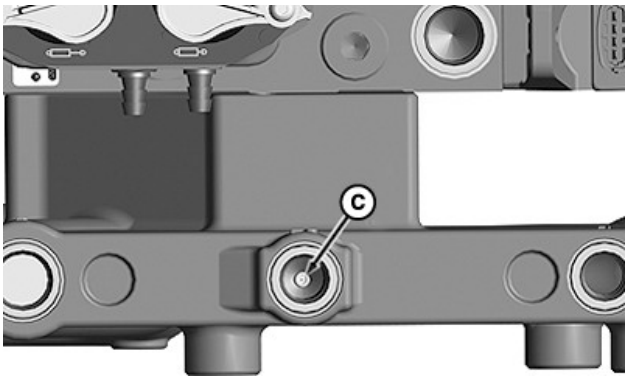


A91789—UN—08AUG16



A73681—UN—05DEC11

9030 and 9R—Upper Section Manifold Shown



A73680—UN—15DEC11

9030 and 9R—Lower Section Manifold Shown

A—Hose
B—Straight Fitting
C—Orifice

1. Disconnect hose (A) from the straight fitting (B).
2. Remove and retain straight fitting (B).
3. Verify orifice (C) is installed.
4. If necessary, install R285855 orifice (C).
5. Install previously removed straight fitting (B).
6. Connect hose (A).

LD45720,0000559-19-17APR19

Check the Tractor Hydraulic System

IMPORTANT: Avoid damage to the tractor pump. Do not use an open center tractor hydraulic system to operate the implement.

For the tractor operating instructions, refer to the tractor Operator's Manual.

The hydraulic motors on this implement are designed for closed center tractor hydraulic systems. Tractors with load sensing or pressure on-demand hydraulics are classified as closed center systems. Open center tractor hydraulics are not compatible.

The minimum pressure requirement varies slightly depending on the frame configuration, planting speed, and number of rows.

Item	Measurement	Specification
Hydraulic Requirements (Closed Center)		
Tractor Minimum	Standby Pressure	15 513 kPa (155 bar) (2250 psi)
Tractor System	Working Pressure	20 684 kPa (207 bar) (3000 psi)
System	Burst Pressure	82 737 kPa (827 bar) (11 999 psi)

OUO6074,0000A10-19-23OCT18

Calculate the Minimum Tractor Weight for Safe Transport

CAUTION: Avoid a loss of control, serious injury, or death during transport. Properly ballast the tractor. Do not transport a planter with the product tanks more than half full. Do not transport a towed load (such as a fertilizer tank) with any product in the tank.

IMPORTANT: Always consult the tractor operator's manual to obtain more information on safe transport.

Add the weight of a towed load and the weight of attachments to the weight of the planter before dividing by 1.5.

FORMULA: Total Weight of the Planter and Towed Load ÷ 1.5 = Minimum Tractor Weight for Safe Transport

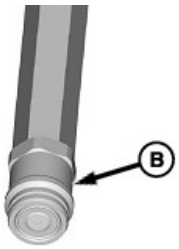
Total Planter Weight		Towed Load Weight				Minimum Tractor Weight
Base Planter Weight Planter Attachments Product Weight	+	Empty Towed Load	÷	1.5	=	Minimum Tractor Weight

OUO1074,00013A6-19-26SEP17

Case Drain and Hydraulic Motor Requirements



A85287—UN—09MAR15



A85597—UN—10MAR15

A—Machine Drain Coupler
B—Tractor Drain Connection

IMPORTANT: Avoid damage to the hydraulic motors, equip the tractor with a low-pressure drain coupler. Install the coupler in a port with less than 172 kPa (1.72 bar) (25 psi). See the Case Drain Connection Kits table.

Use the connection kits listed in the table on John Deere tractors. If a drain kit is already installed, verify that it matches what is listed on the table.

The case drain hose (A) must be attached to a low-pressure drain connection before any other hose connection.

Order one of the following kits for a John Deere tractor. For other tractors, see the tractor dealer for a suitable connection kit.

Some hydraulic motors are low flow, high-pressure motors. The motors are designed to operate on a closed-center hydraulic system. Connecting low flow, high-pressure hydraulic motors to an open-center system is not recommended. See a John Deere dealer or other service provider for more information.

NOTE: John Deere connection kits include installation instructions.

Case Drain Connection Kits[a]	
Tractor Model	**Kit Number**
5M Tier3 and iT4 Series	RE243887
5M FT4 Series	BSJ10092
6000 and 6010 Series 7420 and 7520 Series with serial numbers (- 12451)	BA30216[b]
6020, 7220, 7320, 7420, 7520 Series	AL169965
6030 Series, 6R Series	RE228000
6D Series (Except iT4)	SJ288860
6D Series iT4	BSJ10048
7200, 7400, 7600, 7700, 7800 and 10 Series	BA30218[b]
7720, 7820 and 7920 Series	RE211441
7030 Series Small Frame and Premium Tractors	RE228000
7030 Series Large Frame Tractors	RE211441
7R Series Tractors	RE327561
8000, 8000T, 8010, 8010T, 8020, 8020T, 8030, and 8030T 8R and 8RT Series (Through 2014)	RE222721
8R, 8RT, and 8RX Series (2014 and later)	RE327561
9000, 9000T, 9010, 9010T, 9020, 9020T, 9030 and 9030T Series	RE218665
9R Series Tractors (Tractor with a single reduction axle only.) (015000 -)	BRE10112
9R Series Tractors (Tractor with a double reduction axle only.) (015000 -)	BRE10113
9RT Series Tractors (906000 -)	BRE10115
9RX Series Tractors	BRE10114
[a]All available kits are shown. Match the kit to the tractor.	
[b]Order through service parts	

OUO6074,0000968-19-15OCT25

Recommended Tractor Settings

See the tractor Operator's Manual for the complete operating instructions.

Tractor Settings	
Item	**Setting**
Drawbar Distance from the Ground	43 cm (17 in)
Drawbar Position	Centered in Short Position
Drawbar Support	Installed
Drawbar Category	Match the planter and tractor hitch category. Planters are equipped with either a category 4 or category 5 hitch.
Tire Ballast	Limit the liquid or cast weight on rear tires.[ab]
Hydraulic System Requirements	Closed Center Only Minimum Tractor Hydraulic Pressure—15 513 kPa (155 bar) (2250 psi) Working Pressure—20 684 kPa (207 bar) (3000 psi)
Tire Pressures	See the tractor Operator's Manual for additional information.
Hydraulic Controls	See Recommendations for Hydraulic Connections for additional information.

[a]Dual rear tractor tires are recommended for stability and for load carrying capacity, especially when the implement is folded for transport.
[b]Tractor tire loads are greatest during transport. Limit the liquid or cast wheel weight on rear tractor tires. Weighted wheels have a decreased load carrying capacity.

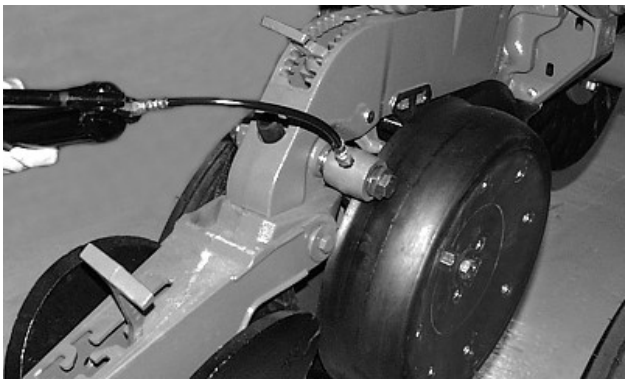
OUO6045,00003CE-19-22JAN21

Initial Use of CCS System

Coat the inside bottom of the bulk seed tanks with a thin layer of talc the first time a new planter is used. Mix triple the amount of talc into the first two or three bushels of seed placed in the bulk tank. (See the Meter Lubrication section.) The talc coating provides the CCS system and hoses with a protective layer to resist the buildup of seed coatings.

OUO6074,0000EC8-19-22OCT25

Before Use



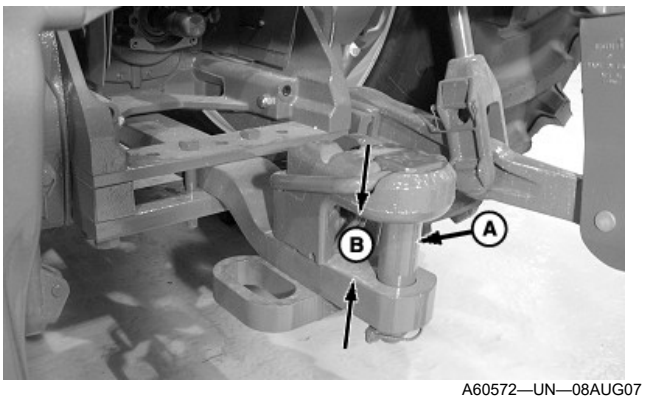
A53141—UN—04NOV03

Refer to Lubricating the Planter section for more information.

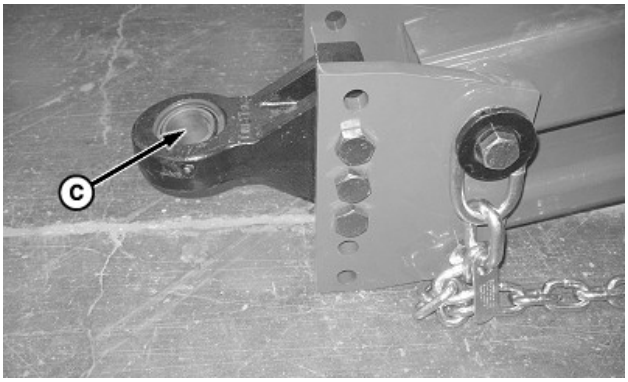
AG,OUO6074,1171-19-22OCT18

Determine Tractor Drawbar and Planter Hitch Ring Compatibility

IMPORTANT: Avoid damage to the machine. Match tractor drawbar and planter hitch. (See tractor Operator's Manual for additional information.)

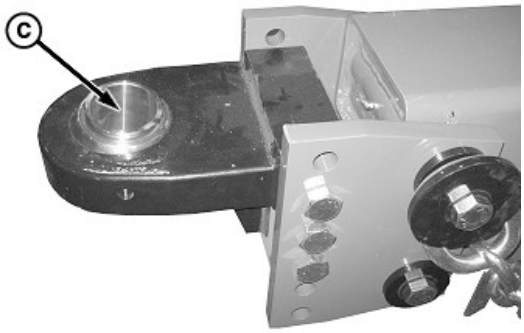


A60572—UN—08AUG07



A71336—UN—21APR11

Category 4 Planter Hitch



A71337—UN—21APR11

Category 5 Planter Hitch

A—Drawbar Pin
B—Drawbar Opening
C—Ring

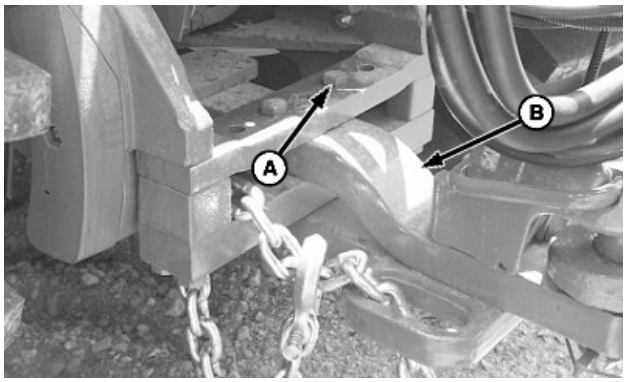
Match the tractor drawbar and the planter hitch. Never exceed the vertical load limit. (See Hitch Loads for additional information.)

A category 4 drawbar uses a 51 mm (2 in) pin.

A category 5 drawbar uses a 70 mm (2-3/4 in) pin.

OUO6064,0000476-19-27JAN21

Tractor Drawbar Position on Split Row Machines



A52437—UN—16JUL03

A—Cap Screw

B—Hitch

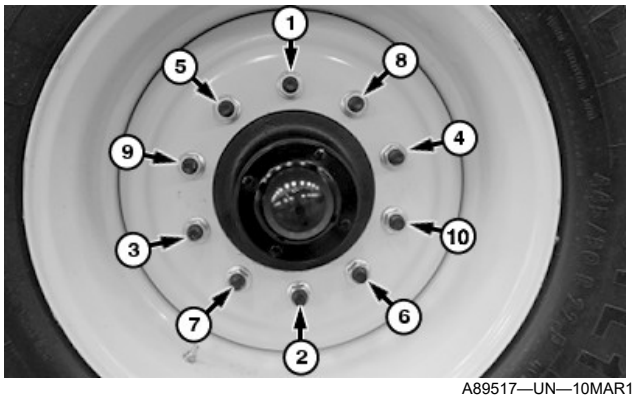
When planting on 38 cm (15 in) rows, the tractor drawbar must be positioned so hitch pin hole is right-of-center 191 mm (7.5 in).

To move hitch, proceed as follows:

1. Remove cap screw (A).
2. Slide hitch (B) to right and reinstall cap screw.
3. If drawbar is not capable of adjusting the full 191 mm (7.5 in) right-of-center, do the following:
   - Increase left marker length by the difference in distance.
   - Decrease right marker length by the difference in distance.
   - For initial marker adjustment, see Adjust Marker Length in Service and Adjustments section.
   - **Example:** The John Deere 8220 tractor drawbar offsets 178 mm (7 in). Left marker length must be increased 13 mm (1/2 in) and right marker length must be decreased 13 mm (1/2 in) to compensate.

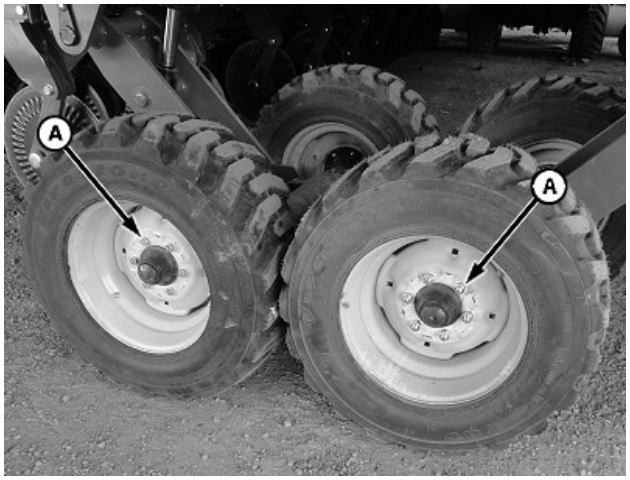
WP29706,0000934-19-28SEP15

Tighten the Wheel Bolts



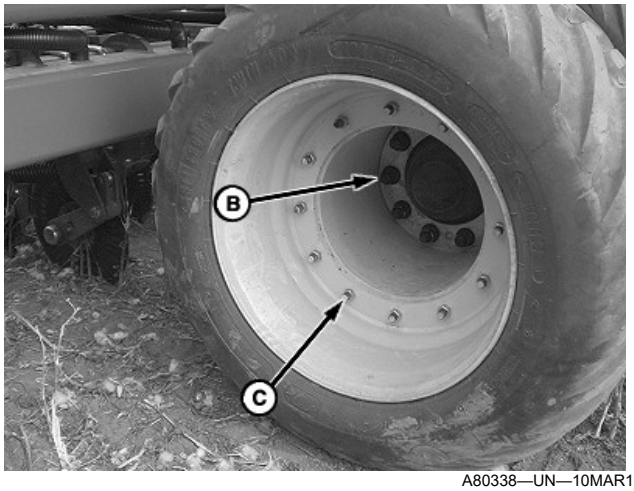
A89517—UN—10MAR16

Torque Sequence (steerable axle shown)



A80337—UN—10MAR14

Wing Wheel



A80338—UN—10MAR14

Center Frame Wheel with Rim Extension

A—Wing Wheel Bolt (6 used per wheel)
B—Center Frame Hub Nut (10 used per hub)
C—Center Frame Cap Screw and Nut (12 used per wheel)

IMPORTANT: Avoid planter damage from loose hardware. Verify that the wheel hardware is tight before initial use, after the initial 10 hours, and after every 50 hours of operation.

Tighten all wheel nuts in an alternating sequence.

Wheel Fasteners				
Location	**Type**	**Fastener**	**Quantity**	**Torque (dry)**
Wing	Six-Bolt Hub	Wheel Bolt (A)	6	176 N·m (130 lb·ft)
Center Frame	Rim Extension	Hub Nut (B)	10	754 N·m (556 lb·ft)
Center Frame	Rim Extension	Cap Screw and Nut (C)	12	339 N·m (250 lb·ft)
Center Frame	Steerable Axle	Nut	10	420 N·m (310 lb·ft)
Center Frame	Eight-Bolt Hub	Nut	8	122 N·m (90 lb·ft)

WP29706,00002B1-19-16OCT19

Check the Tire Pressure

Tire Size	Tire Pressure		
	kPa	bar	psi
265/70D16.5	262	2.6	38
330/55D16.5	413	4.1	60
31-13.5 x 15 6-Ply Wing Frame Implement Tires	152	1.5	22
31-15.5 x 16.50 8-Ply Wing Frame Skid Steer Tires	241	2.4	35
400/55-R22.5 Center Frame Tires	552	5.5	80
600/40-R22.5 Center Frame Tires	379	3.8	55
31-13.5 x 15 14-Ply Center Frame Tires	621	6.2	90
Center Frame Tires Center Frame Tires 445/50R22.5 VF Steel Belted Radial Tires	448	4.5	65
18 x 8.5-8 Marker Tire	152	1.5	22
4.8-8 Marker Tire	276	2.8	40

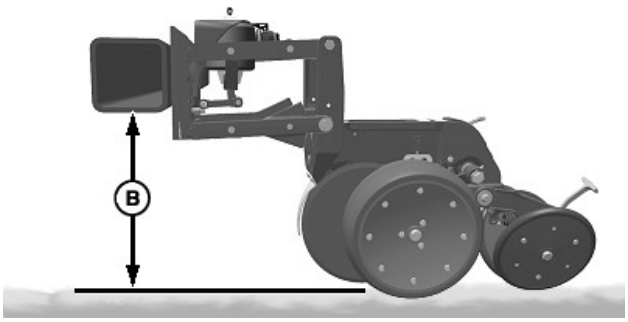
WP29706,00008B1-19-07JAN21

Checking Frame Height

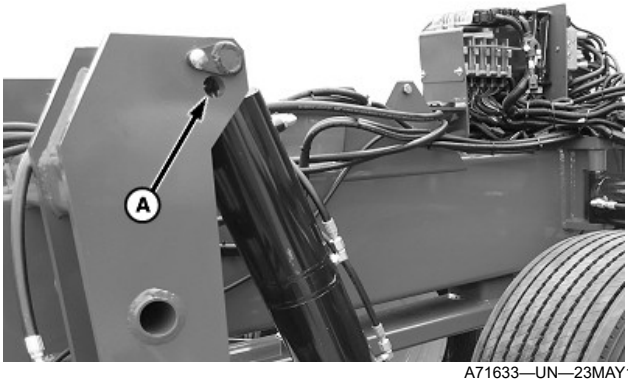
NOTE: The following procedures are to be done in the field:

1. Set adjustable down force system to zero pressure.
2. Unfold and lower machine on level ground.
3. Level hitch on planter front to rear. See LEVEL HITCH TUBE in Attach Machine section.
4. Measure from ground to bottom of 7 X 7 in. frame. Measurement is approximately 533—560 mm (21—22 in.) at the following locations:
   - Center of Planter
   - End of Left Hand Wing
   - End of Right Hand Wing
   - Middle of Left Hand and Right Hand wings if machine is a five section (DB90)
5. If frame height measurement is not 533—560 mm (21—22 in.), see ADJUST MAIN FRAME HEIGHT and ADJUST WING FRAME HEIGHT in this section.

OUO6064,00001FE-19-27APR11



A105166—UN—26SEP19



A71633—UN—23MAY11

A—Hole
B—Distance

Adjust the Main Frame Height

NOTE: Soil conditions affect the frame height.

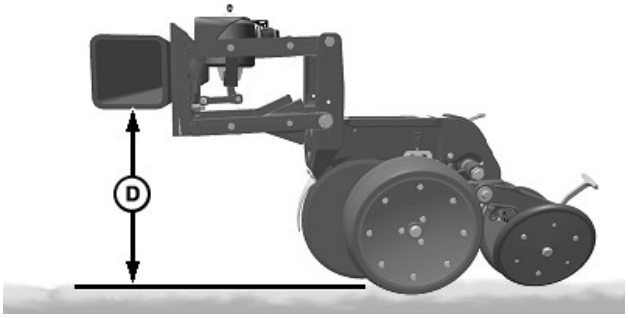
To increase distance (B) from the soil to the main frame, move the top cylinder pin to hole (A).

Specification	
Frame Height—Distance (B).	51—56 cm (20—22 in)

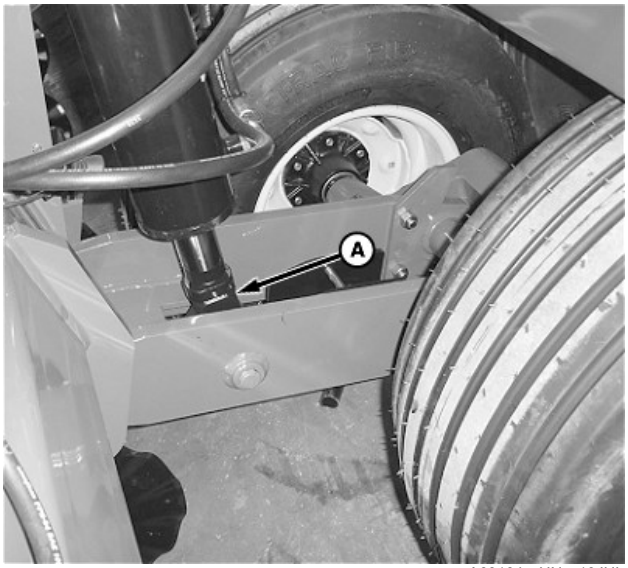
CR53390,0000163-19-01OCT19

Adjust the Wing Frame Height

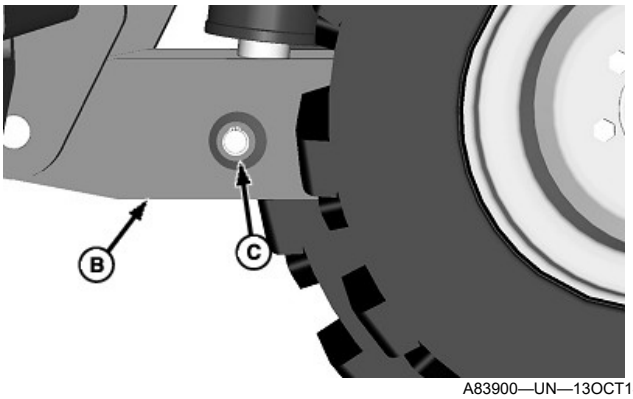
NOTE: To accommodate varying attachments and frame configurations, the wing wheels can be adjusted separately from the main frame wheels.



A105183—UN—26SEP19



A68164—UN—13JUL10



A83900—UN—13OCT14

A—Clevis
B—Wheel Support
C—Pin Location
D—Distance

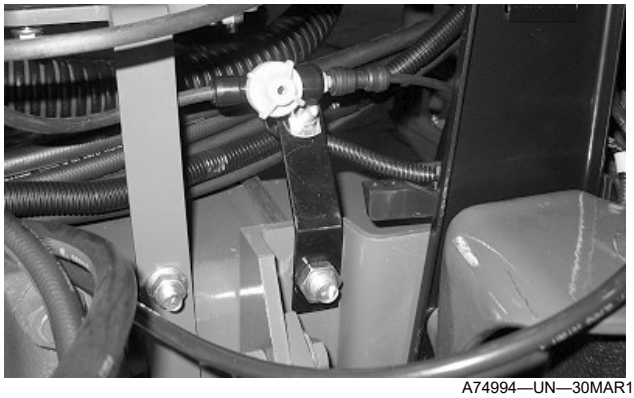
If distance (D) from the soil differs between the center frame and the wing frames, adjust the clevis (A) on the wing-wheel cylinder.

If more adjustment is required, reverse the wheel support (B). The pin location (C) is not centered in the support, which allows adjustment by reversing the mounting orientation.

Specification	
Frame Height—Distance (D).	51—56 cm (20—22 in)

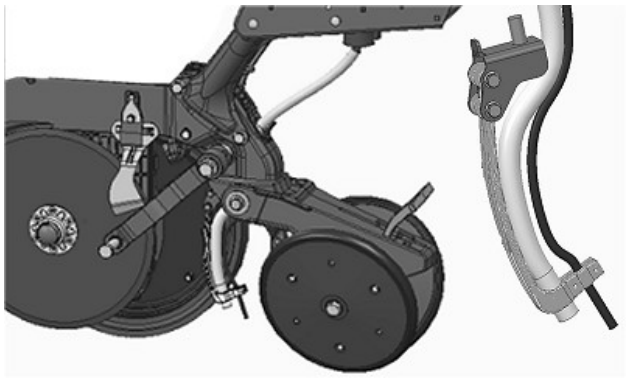
CR53390,0000164-19-01OCT19

Liquid Fertilizer without John Deere Openers



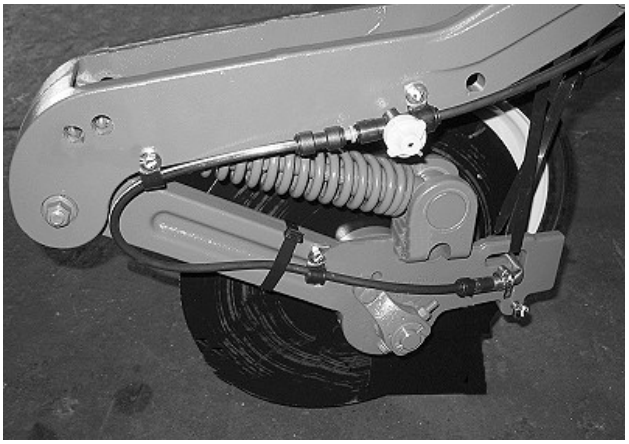
A74994—UN—30MAR12

Valve Location With Unit Mounted Openers



A86695—UN—09JUN15

John Deere In-Furrow Fertilizer



A75012—UN—04APR12
Valve Location with Frame Mounted Openers

IMPORTANT: To prevent BrushBelt malfunction, do not apply fertilizer directly to the seed furrow in front of the BrushBelt.

NOTE: When using the John Deere fertilizer distribution with aftermarket openers, position the check valves as close as possible to the openers.

See a John Deere dealer or other service provider for more information.

John Deere unit mounted and frame-mounted openers are shown for reference. John Deere in-furrow distribution can be obtained via regular spare part channels.

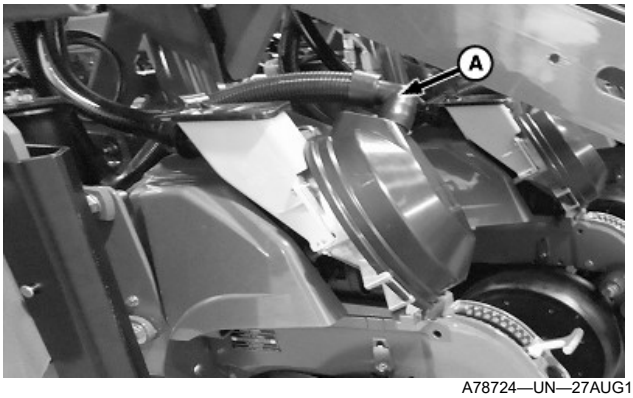
WP29706,0000A34-19-22OCT25

Change from 38 cm (15 in) to 76 cm (30 in) Row Spacing

Check List for Following Procedure:

- ☐ If the planter is equipped with the individual row hydraulic downforce (IRHD), shut the tractor power off before doing this procedure.
- ☐ Move the tractor hitch to the correct offset position.
- ☐ Adjust the markers to the proper length.
- ☐ Remove the seed from the CCS tanks and the row unit meters.
- ☐ Change the meter settings for the crop type.
- ☐ Remove and install the correct seed disk bowls or seed disks.
- ☐ Install the yellow plugs on all the split row units (vacuum and seed delivery hoses).
- ☐ Manually lock up the split rows.
- ☐ Adjust the seed population.
- ☐ Adjust the vacuum level.
- ☐ Adjust the CCS tank pressure.
- ☐ Select the correct number of rows for planting in the monitor.

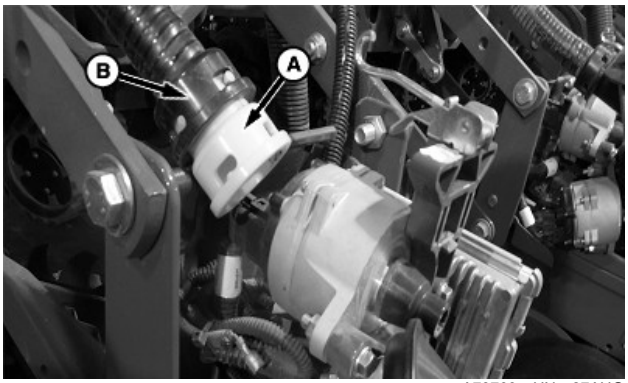
1. If the planter is equipped with the individual row hydraulic downforce (IRHD), shut the tractor power off before performing these steps.
2. Move the tractor hitch to the correct offset position. (See Tractor Drawbar Position in this section.)
3. Adjust the markers to the correct length. (See Adjust Marker Length in the General Service and Adjustments section.) To show correct row spacing, adjust AutoTrac settings on the monitor.



A78724—UN—27AUG13

A—Hose

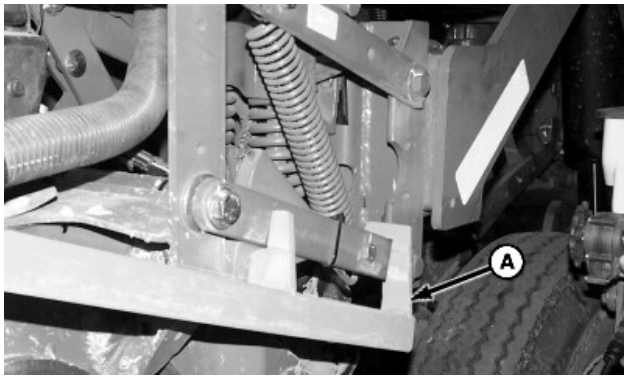
4. Remove the seed from the CCS tanks and all the row unit meters. (See Clean Out Seed Hoppers and Metering Units in this section.)
5. Install the yellow plug between the vacuum hose (A) and the meter dome or cover on all the split row meters.



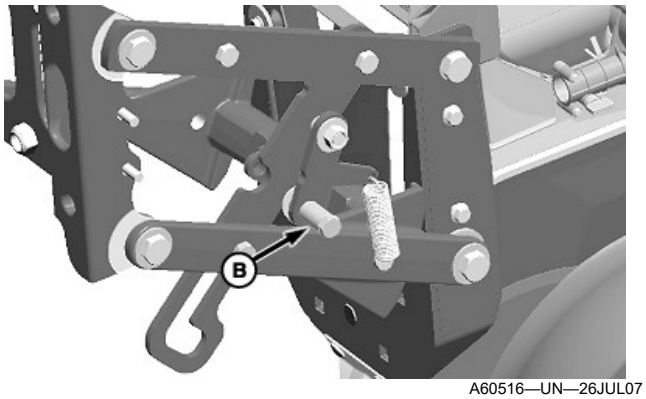
A78703—UN—27AUG13

A—Hose
B—Plug

6. Install the yellow plug (B) between the seed delivery hose (A) and the hopper inlet on all the split row meters.
7. Change the crop type and the number of rows for planting in the SeedStar monitor. The split row units automatically reduce the down pressure. (See SeedStar Operator's Manual.)



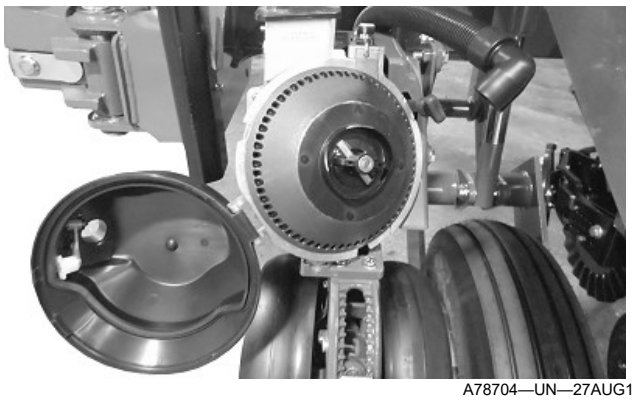
A51033—UN—08NOV02



A60516—UN—26JUL07

A—Lock-up Bar
B—Lock-up Latch

8. Place the lock-up latch (B) in the position shown.
9. Lock the split row units into upper position. Use the lock-up bar (A) or raise the hitch, then slowly lower the frame until the row units travel to the maximum height. Raise the planter and confirm that all the row units are in the locked position.



A78704—UN—27AUG13

Seed Bowl

10. Select all the necessary adjustments for the row unit meters and install the seed disk bowls or seed disks. (See ExactEmerge Meter Operation or MaxEmerge 5e Meter Operation sections for the meter adjustments.)
11. Select the proper seed rate in the SeedStar monitor.
12. Set the vacuum level. (See ExactEmerge Meter Operation or MaxEmerge 5e Meter Operation sections.)
13. Adjust the seed depth and the closing wheels on the row units for the seed type being planted.

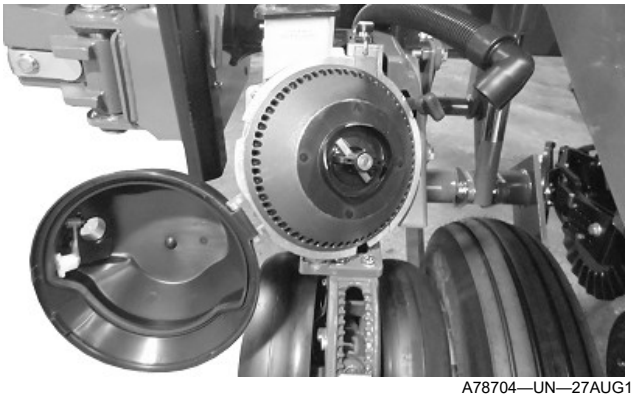
WP29706,000085E-19-14OCT25

Change from 76 cm (30 in) To 38 cm (15 in) Rows

Check List for Following Procedure:

- ☐ If the planter is equipped with the individual row hydraulic downforce (IRHD), shut tractor power off before doing this procedure.
- ☐ Move the tractor hitch in the center position.
- ☐ Adjust the markers to the proper length.
- ☐ Remove the seed from the CCS tanks and row unit meters.
- ☐ Change the meter settings for the crop type.
- ☐ Remove and install the correct seed disk bowls or seed disks.
- ☐ Remove the yellow plugs from all the split row units (vacuum and seed delivery hoses).
- ☐ Manually unlock and lower the split rows.
- ☐ Adjust the seed population.
- ☐ Adjust the vacuum level.
- ☐ Adjust the CCS tank pressure.
- ☐ Select all the rows for planting in the seed monitor.

1. If the planter is equipped with the individual row hydraulic downforce (IRHD), shut the tractor power off before performing these steps.
2. Move the tractor hitch to the center position.(See Tractor Drawbar Position in this section.)
3. Adjust the markers to the correct length. (See Adjust Marker Length in the General Service and Adjustments section.) To show the correct row spacing, adjust the AutoTrac settings on the monitor.

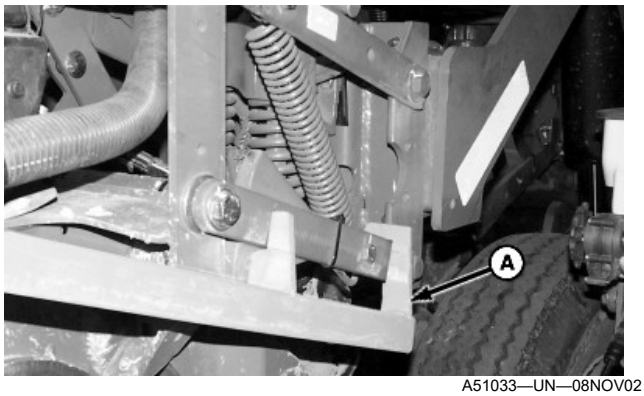


A78704—UN—27AUG13

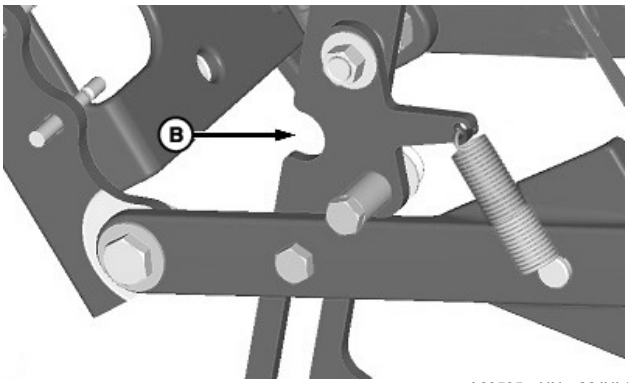
Seed Bowl

4. Remove the seed from the CCS tanks and all the

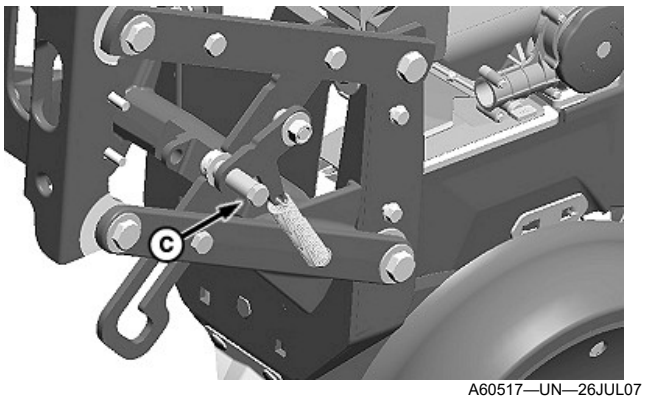
row unit meters. (See Clean Out Seed Hoppers and Metering Units in this section.)



A51033—UN—08NOV02



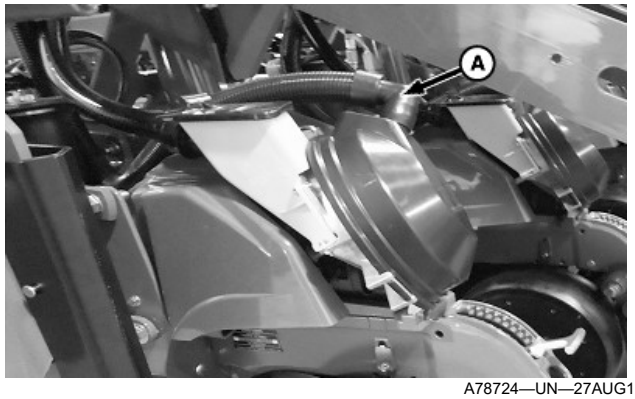
A60505—UN—26JUL07



A60517—UN—26JUL07

A—Lock-up Bar
B—Notch
C—Lock-up Latch

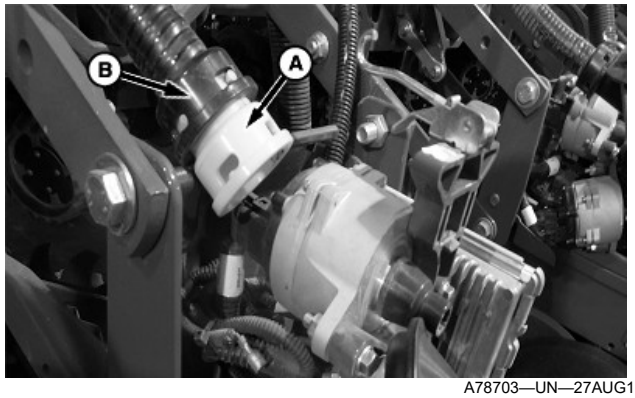
5. Place the lock-up latch (C) in the notch (B) as shown.
6. Unlock the split row units into lower position. Use the lock-up bar (A) or raise the hitch, then slowly lower the frame until the row units travel to the maximum height. Raise the planter and confirm that all the row units are unlocked.



A78724—UN—27AUG13

A—Hose

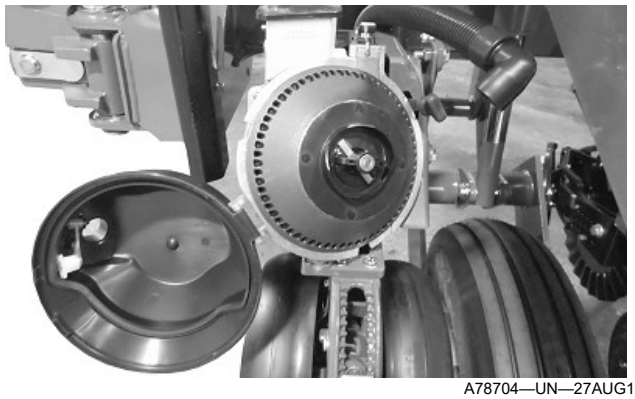
7. Remove the yellow plugs from all the vacuum hoses (A).



A78703—UN—27AUG13

A—Hose
B—Plug

8. Remove the yellow plugs (B) from all the seed delivery hoses (A).



A78704—UN—27AUG13

Seed Bowl

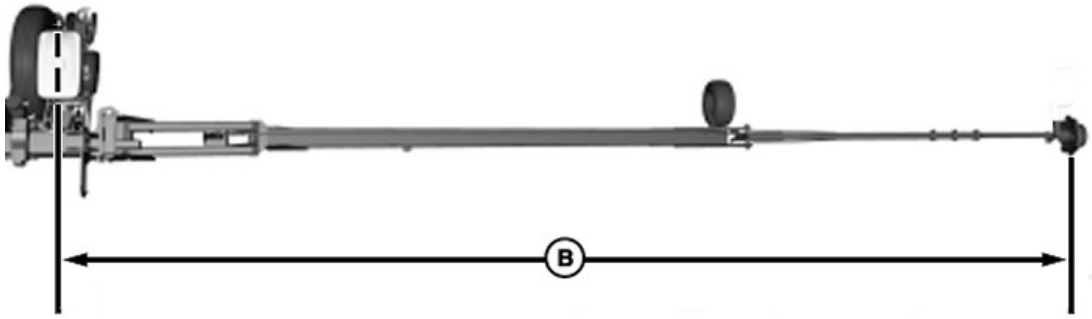
9. Select all the necessary adjustments for the row unit meters and install the seed disk bowls or seed disks. (See ExactEmerge Meter Operation or MaxEmerge 5e Meter Operation sections for the meter adjustments.)
10. Change the crop type and the number of rows for planting in the SeedStar monitor. The split row units

automatically increase the down pressure. (See SeedStar Operator's Manual.)

11. Select the proper seed rate in the SeedStar monitor.
12. Set the vacuum level. (See ExactEmerge Meter Operation or MaxEmerge 5e Meter Operation sections.)
13. Adjust the seed depth and the closing wheels on the row units for the seed type being planted.

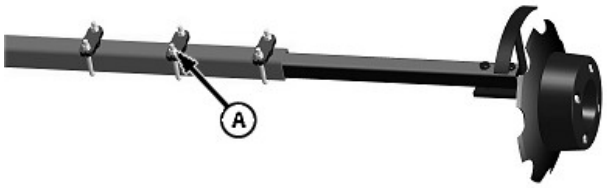
WP29706,000085F-19-14OCT25

Adjust the Marker Length



A89581—UN—09MAY16

A—Lock Nut (6 used)
B—Dimension



A109431—UN—17MAR21

IMPORTANT: Avoid gaps or overlaps on outer rows. Sight line varies for each operator and affects how a marker track is followed. Check the spacing of the outer seed furrows in the field.

NOTE: When adjusting, lower the marker just above the ground.

1. Lower the marker.
2. Loosen lock nuts (A) on the U-bolts.

NOTE: The outer row unit on some split-row planters is locked up (inactive) when using the wide row spacing.

3. Measure dimension (B) from the furrow openers on the outer (active) row unit to the marker disk. Adjust the marker and tighten the lock nuts. Significant adjustments to marker length affect the marker float range. (See Adjust the Marker Rod for additional information.)

Specification

Lock Nut (A)—Torque. . . . . 50 N·m (37 lb·ft)

4. Without planting, make short passes in the field. Measure the distance between the outer seed furrows. If the distance does not equal the row spacing, adjust the marker accordingly.

Planter	Row Spacing	Dimension (B)
DB44 24-Row	56 cm (22 in)	6.99 m (22 ft 11 in)
DB60 24-Row	76 cm (30 in)	9.53 m (31 ft 3 in)
DB60 36-Row	51 cm (20 in)	9.40 (30 ft 10 in)
DB60 47-Row and 48-Row	Wide Spacing 76 cm (30 in)	9.53 m (31 ft 3 in)
DB60 47-Row	Narrow Spacing 38 cm (15 in)	9.14 m (30 ft)
DB60 48-Row	Narrow Spacing 38 cm (15 in)	9.33 m (30 ft 8 in)
DB66 36-Row	56 cm (22 in)	10.34 m (33 ft 11 in)
DB80 32-Row	76 cm (30 in)	12.57 m (41 ft 3 in)
DB80 48-Row	51 cm (20 in)	12.45 (40 ft 10 in)
DB88 48-Row	56 cm (22 in)	13.69 (44 ft 11 in)
DB90 36-Row	76 cm (30 in)	14.10 m (46 ft 3 in)
DB90 54-Row	51 cm (20 in)	13.97 m (45 ft 10 in)

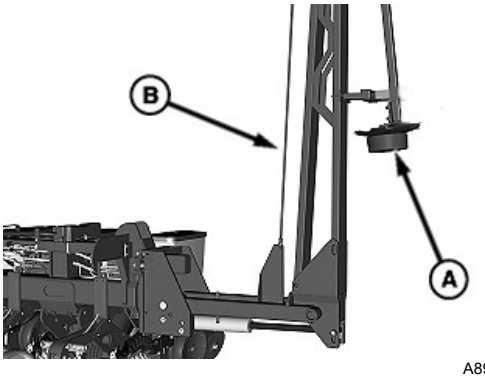
CR53390,000025C-19-16MAR21

Adjust the Marker Rod

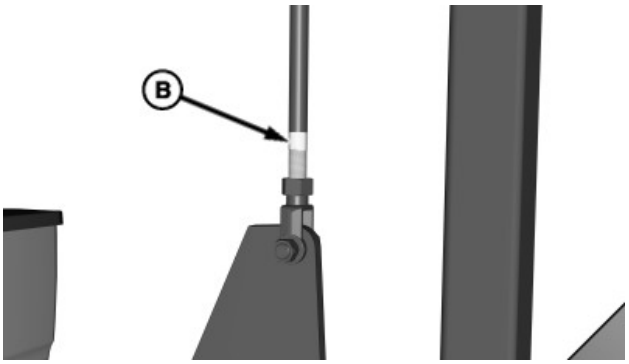


A109165—UN—29JAN21

Ground Clearance



A89582—UN—09MAY16



A89583—UN—11FEB16

A—Disk
B—Rod

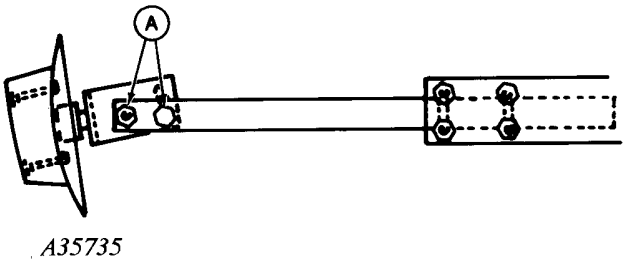
IMPORTANT: Avoid limiting the float range or disk (A) impact with the ground. Use the correct rod (B) adjustment.

NOTE: Adjust the marker length before setting rod length.

1. Lower the planter into plant position.
2. Observe the marker as it extends.
   - If the disk contacts the ground during extension, shorten the threaded rod adjustment.
   - If the disk is far above the ground during extension, lengthen the threaded rod adjustment.

LM78752,00002AB-19-02FEB21

Adjust Marker Disk



A35735—UN—06SEP94

A—Cap Screw (2 used)

The marker disk creates a furrow in the soil. This adjustment changes the size of the furrow.

1. Loosen the nuts on cap screws (A) and adjust the disk angle.

Specification	
Cap Screw—Torque (dry).	240 N·m (175 lb·ft)

2. Tighten the cap screws to specification.

WP29706,0000DB3-19-26MAR19

Use Your Tractor Operator's Manual



TS190—UN—17JAN89

Always refer to the tractor operator's manual for specific tractor information.

The tractor information in this manual uses John Deere tractors to illustrate the procedures. Use the tractor operator's manual for detailed information, since features vary by tractor model.

OUO1074,00014B5-19-20FEB19

Blower Motor Hydraulic Requirements

IMPORTANT: Avoid blower motor damage. Ensure that the tractor case drain has less than 172 kPa (1.72 bar) (25 psi).

Case drain hose (A) must be attached to a low-pressure drain connection before any other hose connection.



A85599—UN—25SEP18

Case Drain Connected First

A—Case Drain Hose

The hydraulic blower motors are low flow, high-pressure motors. The motors are designed to operate on a closed center hydraulic system. Connecting the blower motor to an open center system is not recommended. See a John Deere dealer or other service provider for more information.

WP29706,00007FE-19-15OCT25

Hydraulic Motor Return Coupler



A53457—UN—02MAR04

All hydraulic motors are equipped with a special coupler on the return hoses.

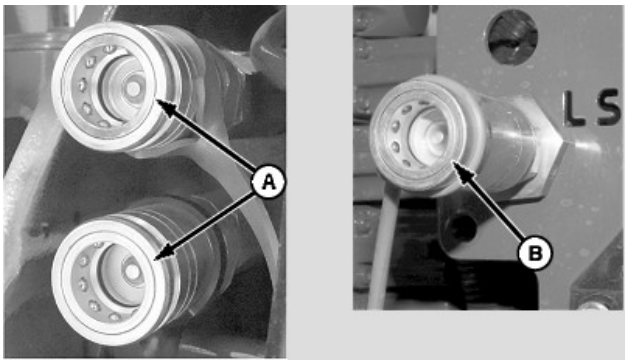
Each return coupler has a check valve that prevents the motor from turning backward.

IMPORTANT: Avoid a pressure spike. Use the recommended procedure to connect and deactivate hydraulic motors.

Connect the case drain hose first. To deactivate hydraulic motors, place the selective control valve (SCV) in the Float position. See the Recommendations for Hydraulic Connections for additional information.

WP29706,00007F1-19-04APR19

Power Beyond Couplers



A100372—UN—19APR18

A—Pressure and Return Couplers
B—Load Sense Coupler

CAUTION: Avoid injury caused by the sudden movement of a hydraulic motor or cylinder. Keep people clear of the implement when starting the tractor. The power beyond system activates instantly when the tractor is started. To relieve pressure and halt component movement, the tractor engine must be off.

NOTE: Coupler locations vary by tractor model.

The power beyond system provides constant hydraulic pressure and flow from the tractor. Pressure and flow are constant any time the tractor engine is running. The power beyond system consists of pressure and return couplers (A) and a load sense coupler (B).

If a power beyond system is not installed on the tractor, a kit is available. See a John Deere dealer or other service provider for more information.

Do not mix hydraulic hose connections. Do not connect power beyond fittings to the selective control valves.

The following are some systems that operate with the power beyond hydraulics:

- **Independent Row Hydraulic Downforce (IRHD)**

NOTE: If the IRHD is the only system on the power beyond, a load sense hose is not required.

If equipped with individual row hydraulic downforce (IRHD), particulates must be cleaned out of the hydraulic hoses after repairing the IRHD system. Use the bypass hose to warm the oil and clean particulates out of the hoses after connecting to the tractor. (See IRHD Hydraulic Hose Cleanout for additional information.)

- **Frame Weight Distribution (FWD)**

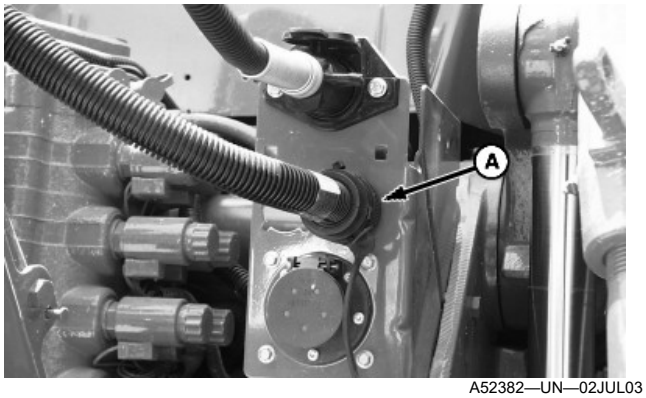
If a hydraulic repair allows air into the FWD system, bleed the FWD hydraulics. (See Bleeding Frame Weight Distribution Cylinders in the service section.)

- **Hydraulic Motors**
  - Implement power generation
  - Pneumatic compressor
  - Variable rate seed drives
  - Variable rate fertilizer

OUO6074,0001040-19-15OCT25

Connect the Frame Control Harness

NOTE: Harness locations will vary from tractor to tractor.



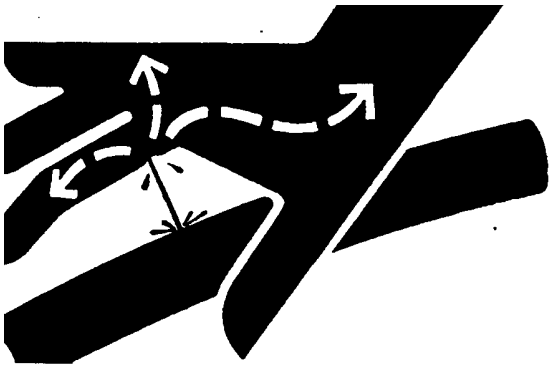
A52382—UN—02JUL03

A—Frame Control Harness

Connect the frame control harness (A).

OUO6074,0000987-19-12JUL18

Check the Hydraulic System



X9811—UN—23AUG88

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

Relieve the pressure before disconnecting the hydraulic or other lines to avoid this hazard. Tighten all of the connections before applying pressure.

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

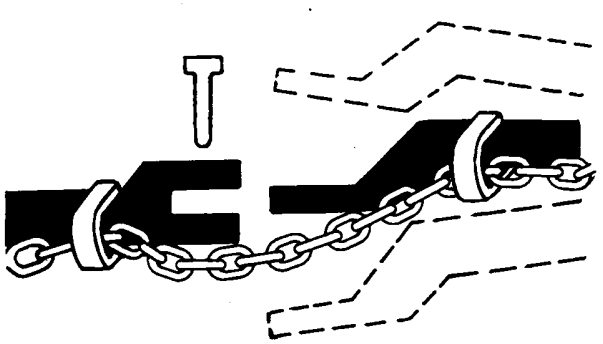
If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be removed within a few hours or gangrene can occur. Doctors unfamiliar with this type of injury must reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

Hydraulic hoses can fail due to physical damage, kinks, age, and exposure. Check your hoses regularly. Replace any damaged hoses.

After applying pressure to the system, check all of the hydraulic connections and hoses for leaks.

OUO6074,000080D-19-11MAY16

Use a Safety Chain



TS217—UN—23AUG88

A safety chain will help control drawn equipment should it accidentally separate from the drawbar.

Using the appropriate adapter parts, attach the chain to the tractor drawbar support or other specified anchor location. Provide only enough slack in the chain to permit turning.

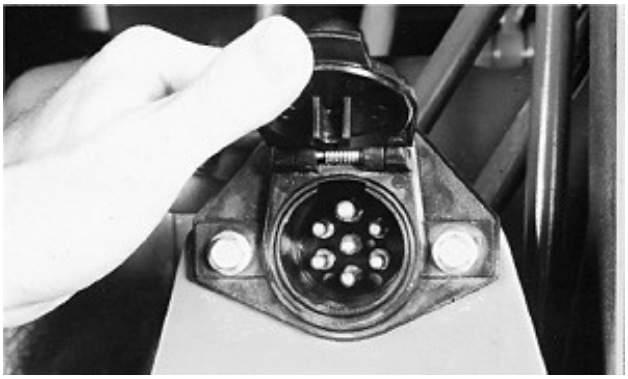
Use chain with a strength rating equal to or greater than the gross weight of the towed machine. Do not use safety chain for towing.

DX,CHAIN-19-03MAR93

Attach the Warning Light Harness

NOTE: Before connecting the 7-pin connector, verify that the pins and connectors are clean and in good condition.

NOTE: Harness locations vary from tractor to tractor.



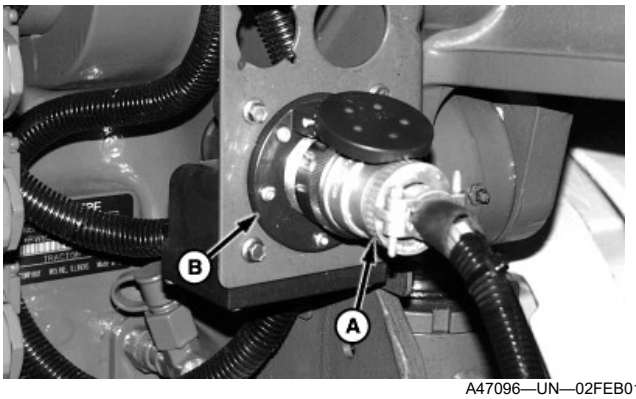
RW20845—UN—07MAY92

Attach the light harness to the 7-pin connector.

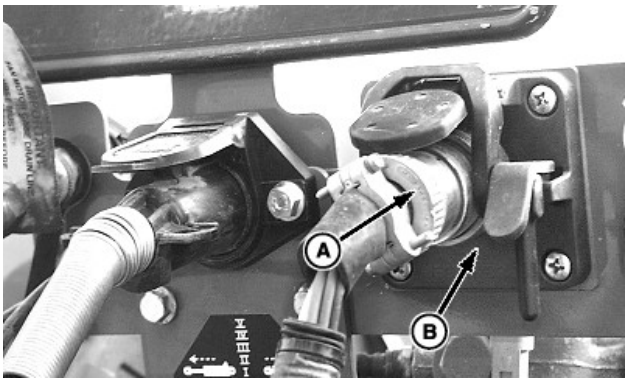
OUO1074,0000042-19-11MAY16

Connect SeedStar Harness

NOTE: Harness locations vary from tractor to tractor.



A47096—UN—02FEB01



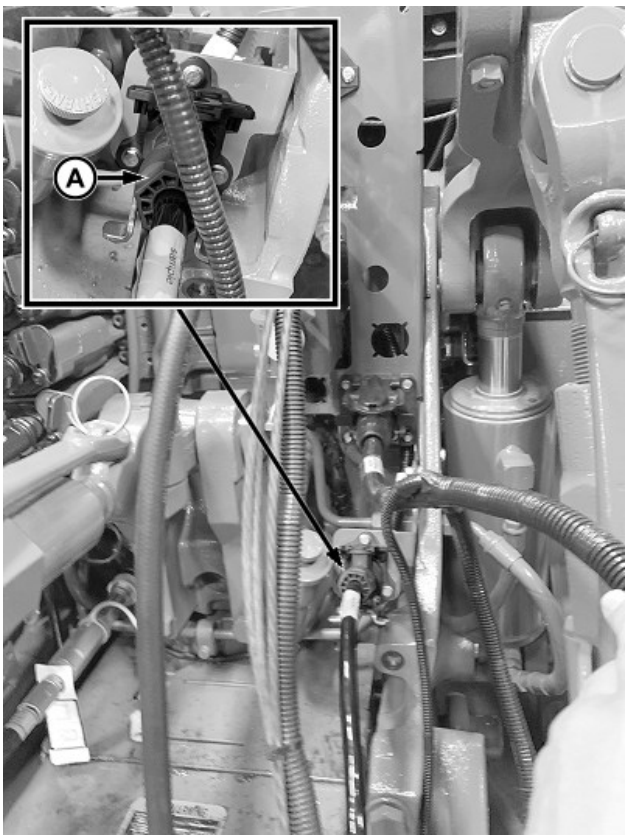
A54356—UN—20MAY04

A—Monitor Harness
B—Connector

Connect SeedStar monitor harness (A) to connector (B).

OUO6064,000008E-19-08OCT25

Connect the Ethernet Harness



A120163—UN—07DEC23

A—Ethernet Harness

ouo6074,1701810739390-19-05DEC23

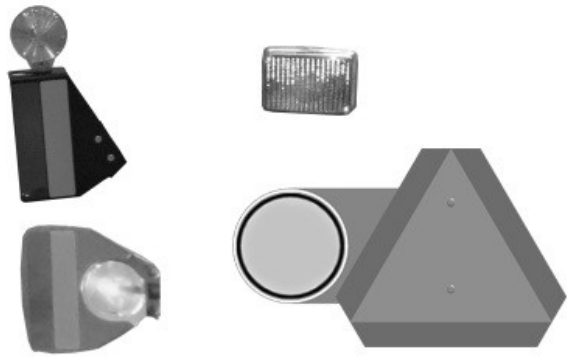
Tractor Power Generation System

The tractor power generation system (PTO gearbox and altenator) is used when the implement is not equipped with the implement power generation system (hydraulic motor and altenator).

If the implement uses the tractor power generation, (see the Tractor Power Generation section for the installation procedure).

OUO6074,0000ECE-19-05DEC23

Warning Lights and Slow-Moving Vehicle (SMV) Emblem (Style A)

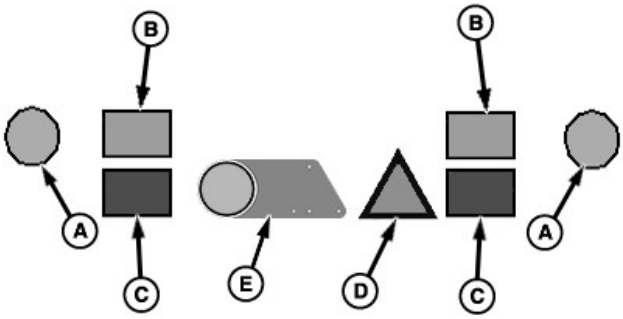


A106667—UN—16APR20

CAUTION: Avoid roadway accidents. Use safety lights and devices when transporting on a roadway. (See Use Safety Lights and Devices in the Safety section.) The construction of this implement does not meet all local or national requirements for transport on a public roadway. Some regions and countries have national certification requirements for roadway transport. If its construction does not meet these requirements, this implement cannot be approved for roadway transport. The customer is responsible for understanding and complying with all local, regional, and national requirements regarding roadway transport.

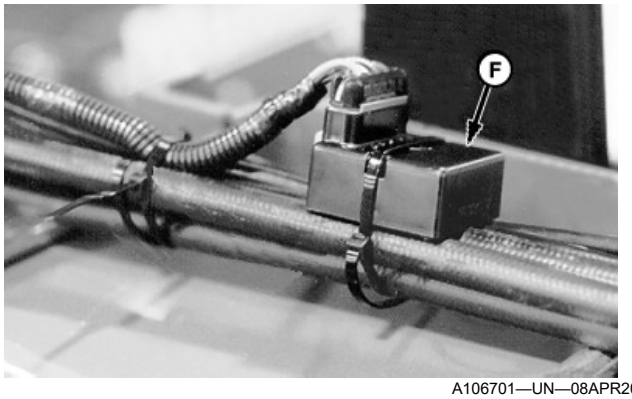
NOTE: Keep lights, reflective material, and the slow-moving vehicle (SMV) emblem visible, clean, and in good working order.

See a John Deere dealer or other service provider for devices that meet local roadway compliance.



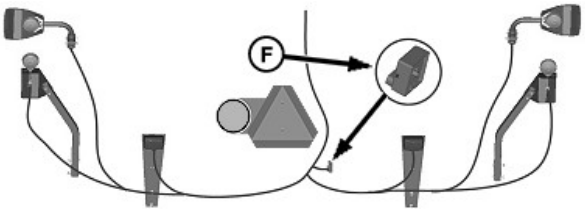
A106670—UN—23APR20

Implement Components (drawn and integral)



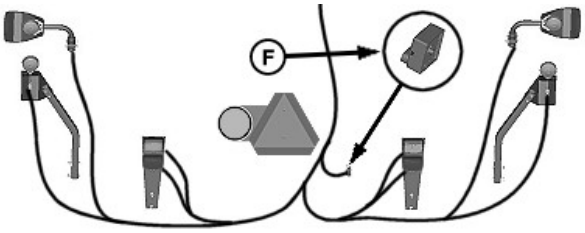
A106701—UN—08APR20

Light Enhancement Module



A106668—UN—23APR20

Light Configuration on Drawn Implements



A106669—UN—23APR20

Light Configuration on Integral Implements

A—Amber Clearance Light
B—Amber Tail Light
C—Red Tail Light
D—Slow-Moving Vehicle (SMV) Emblem
E—Speed Identification Sign (SIS)
F—Light Enhancement Module

NOTE: The implement is equipped with the configuration typically used in the destination country. Component placement varies slightly on each implement model.

The specific functions of the light enhancement module (F) are not used in Australia. Remove the module when the implement is used in Australia.

Amber clearance lights (A) are positioned near the outer edges of the implement. On integral implements, amber tail lights (B) are positioned next to the red tail lights (C).

Red tail lights (C) are installed approximately 1.52 m (5 ft) from the center of the implement.

SMV emblem (D) and the speed identification sign (SIS) (E) are centralized on the rear of the implement.

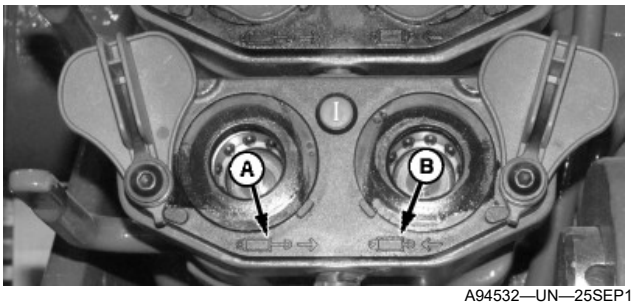
WP29706,0000701-19-15OCT25

Recommendations for Hydraulic Connections



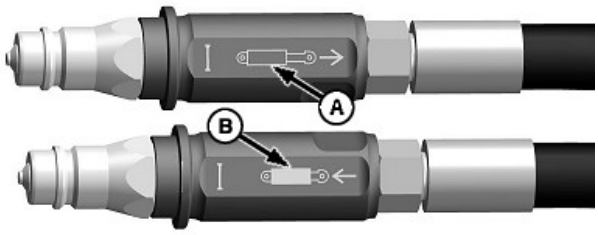
A109318—UN—24FEB21

Case Drain



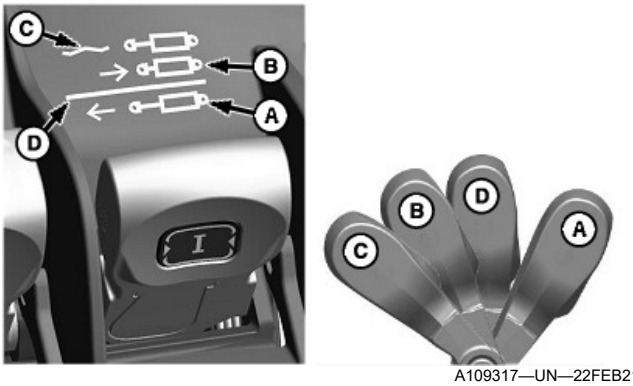
A94532—UN—25SEP18

Tractor SCV Valve



A109316—UN—22FEB21

Hose Grips



A109317—UN—22FEB21

Lever Positions

A—Extend
B—Retract
C—Float
D—Neutral

The extend (A) and retract (B) symbols are on the tractor selective control valve (SCV), hose grips, and SCV levers.

Refer to the tractor Operator's Manual for specific hydraulic operational details.

If equipped with individual row hydraulic downforce (IRHD), particulates must be cleaned out of the hydraulic hoses after repairing the IRHD system. Use the bypass hose to warm the oil and clean particulates out of the hoses. (See IRHD Hydraulic Hose Cleanout for additional information.)

CAUTION: Avoid injury due to hydraulic hose failure. Inspect the hoses regularly. Replace damaged hoses.

Avoid serious injury from fluid injection. Do not connect or disconnect hoses with the tractor engine running. (See Avoid High-Pressure Fluids for additional information.)

IMPORTANT: Avoid motor seal damage. Connect the case drain hose before any other hose. Connect return hoses for hydraulic motors to a tractor extend (A) SCV.

To turn off hydraulic motors, move the tractor SCV to the float (C) (not neutral [D]) position. Match the extend and retract symbols on the tractor and hose grips. The SCV number is not a required match.

NOTE: Functions connected to power beyond are active when the tractor engine is running. Port locations for pressure, return, and load sense vary by tractor model. (See the tractor Operator's Manual for additional information.)

Each vacuum blower must be connected to a separate SCV when using vacuum automation. When not using the vacuum automation and the vacuum blower is connected to the power beyond circuit, use in-line flow control valves.

Keep the matching colored grips together on an SCV. Match the extend and retract symbols. Connect the frame hose grips to SCV I.

Some tractors, such as a 9R, have SCVs on separate pumps with different flow rates. SCVs I, II, and III are associated with the bottom pump. SCVs IV, V, and VI are associated with the top pump. Connect hydraulic motors to the higher flow pump. (See the tractor Operator's Manual for additional information.)

Frames without Fold Assist			
Hose Connections		**Function Settings for John Deere Tractors**	
Hose Tag	**Implement Function (if equipped)**	**Flow Rate**	**Detent (time)**
Case Drain	Hydraulic Motor Return Connect case drain hose before any other hose.	Non-Pressurized Hydraulic Return	Not Applicable
Extend (A)	CCS (deactivate) Plant Frame (raise) Wing Wheels (raise)	Adjust for the preferred raise and lower rate.	3—10 seconds depending on the target lift height.
Retract (B)	CCS (activate) Plant Frame (lower) Wing Wheel (lower)		Continuous “C”
Extend (A)	Hitch (latch) Tongue (raise) Transport Frame (raise) Frame (fold) Independent Marker (raise)	Start at 5 and adjust as necessary.	10 seconds or as required for full extend and retract.
Retract (B)	Hitch (unlatch) Tongue (lower) Transport Frame (lower) Frame (unfold) Independent Marker (lower)		
Extend (A)	Rear Steer (left)	Start at 3 and adjust as necessary.	Do not use.
Retract (B)	Rear Steer (right)		
Extend (A)	Vacuum (hydraulic return)	When using vacuum automation, set flow rate at 7. During manual vacuum operation, set flow rate at 4 and adjust as necessary. With two or more vacuums on one SCV, set at 10 (maximum).	Continuous “C”
Retract (B)	Vacuum (activate)		
Float (C)	Vacuum (deactivate)		
Extend (A)	VRD (hydraulic return)	Set at 10 (maximum).	Continuous “C”
Retract (B)	VRD (activate)		
Float (C)	VRD (deactivate)	Not Applicable	Not Applicable

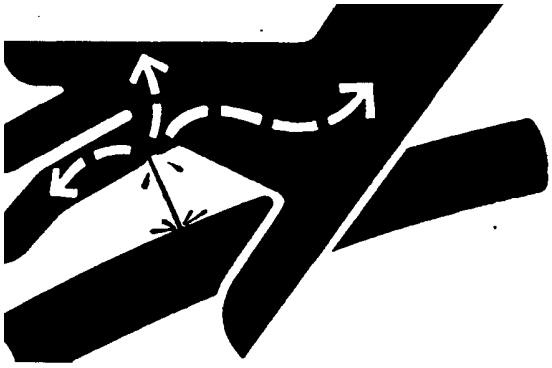
Power Beyond Connections			
Hydraulic Function	**Hose Tag**	**Tractor Port**	**Implement Function**
Power Beyond	P	Pressure	Frame Weight Distribution Variable Rate Drive Individual Row Hydraulic Downforce ExactRate Fertilizer Pump with Load Sense Do not connect power beyond hoses to an SCV. Power-beyond port locations for pressure, return, and load sense vary by tractor model. The 9R Tractors have two hydraulic pumps. If the IRHD is the only function on the power beyond, a load sense hose is not required. An SCV must be set to maximum flow and in the continuous detent position. If equipped with IRHD, particulates must be cleaned out of the hydraulic hoses after repairing the IRHD system. Use the IRHD bypass hose to warm the oil and clean particulates out of the hoses.
	R	Return	
	LS	Load Sense	

IMPORTANT: On tractors with separate SCVs for high and low volume, connect to the high-volume pump for implement power generation.

The Central Commodity System (CCS) control valve is used to adjust the CCS tank pressure. The SeedStar system is used to control the variable rate drive, power generation, IRHD, ExactRate, and vacuum automation.

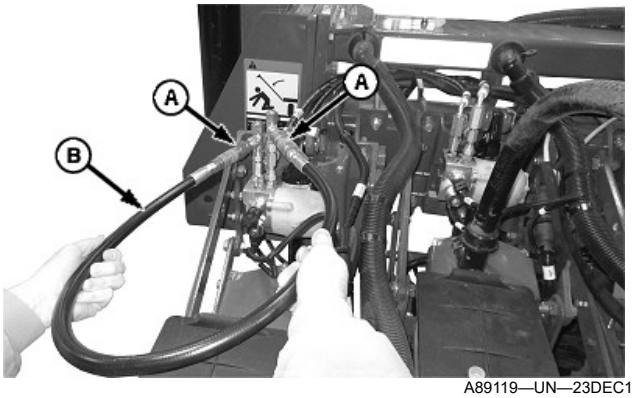
WP29706,0000E99-19-14OCT25

Individual Row Hydraulic Downforce (IRHD) Hydraulic Hose Cleanout



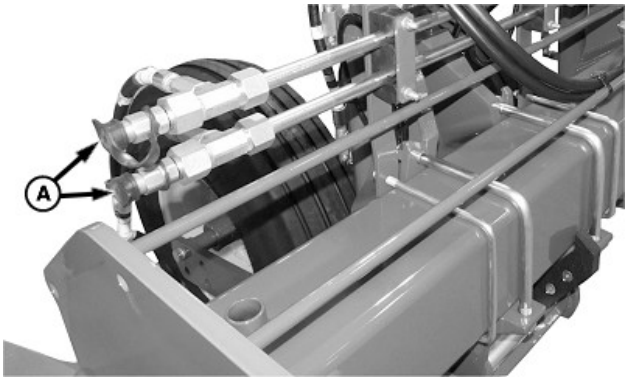
X9811—UN—23AUG88

Fluid Injection Hazard



A89119—UN—23DEC15

Bypass Hose and Row Unit with IRHD Couplers



A100619—UN—23MAY18

Steel Tube with IRHD Couplers

A—Couplers
B—Bypass Hose

To warm the hydraulic fluid and remove particulates from the system, use the bypass hose (B) when IRHD hoses are connected.

If the IRHD system has been repaired, there is erratic performance, or there are erratic readings on the display, perform flush and test procedures. (See Individual Row Hydraulic Downforce (IRHD) Flush and Test in the Service section.)

CAUTION: Avoid serious injury from fluid injection. Do not connect or disconnect hoses with the tractor engine running. (See Avoid High-Pressure Fluids.)

1. Turn off the tractor.
2. There are couplers (A) on one end of each IRHD section. Locate a set of couplers, remove the coupler caps, and attach the bypass hose (B).
3. Connect the power beyond hoses to the tractor.
4. Keep bystanders clear and start the tractor.

NOTE: See the tractor Operator's Manual for oil temperature specifics.

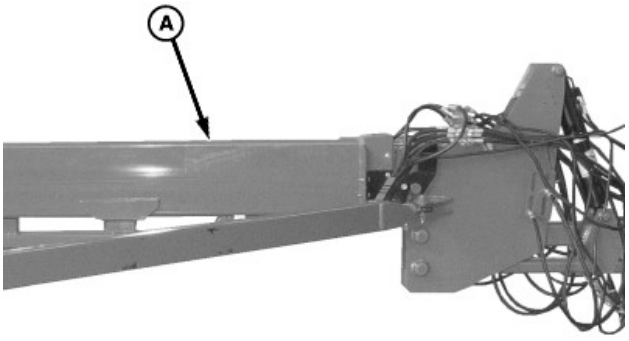
5. Continue the hydraulic flow until the oil is approximately 50°C (120°F) (hoses are warm when touched). Observe the IRHD hoses. Erratic vibrations in an IRHD hose is a sign that air is in the system.
6. Turn off the tractor.
7. Remove the bypass hose and replace the coupler caps.

NOTE: Set a low idle and deactivate all SCVs for low hydraulic pressure during the air purge test.

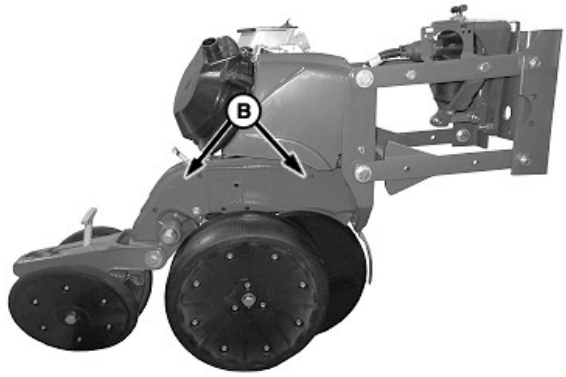
8. If there is a sign of air in the system, perform the Air Purge Test procedure using the SeedStar application software (see the Planter Diagnostics Procedures). Verify that all rows on the display show green bars and that the procedure is successful.

OUO6074,0000F3B-19-07OCT25

Level the Hitch



A68031—UN—02JUL10



A82474—UN—01MAY14

A—Hitch Tube
B—Planting Unit Frame

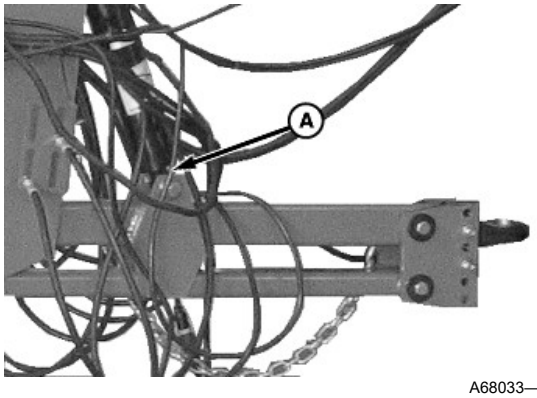
Periodically verify that the hitch tube (A) and the planting unit frames (B) are parallel to the ground during operation.

IMPORTANT: Avoid planter damage. If the planter has a Category 4 clevis, the tractor must have a Category 4 drawbar. If the planter has a Category 5 clevis, the tractor must have a Category 5 drawbar.

NOTE: Adjustments are more accurate when performed in the field.

If the center frame is higher or lower than the wings, rephase the hydraulic lift system. To rephase, lower the frame and hold the selective control valve (SCV) lever for several seconds. If the center frame on the planter is lower than the wings after rephasing see Adjust Main Frame Height.

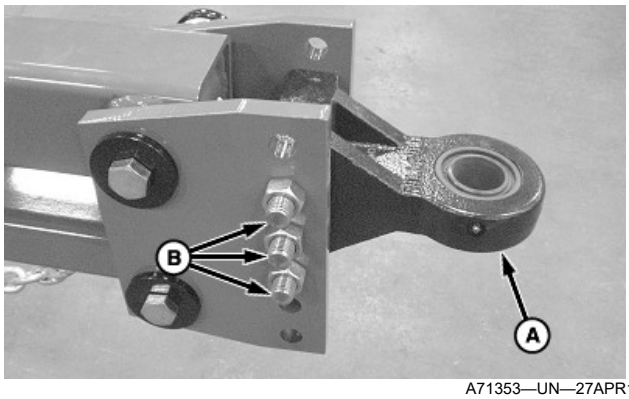
1. Set the adjustable downforce system to zero pressure.
2. Lower the planter on level ground.



A68033—UN—02JUL10

A—Drawbar Hitch Cylinder

3. Retract the drawbar hitch cylinder (A).
4. Raise and lower the planter.
5. Verify that the hitch tube is parallel with the ground. If the hitch is not parallel, measure the difference in height at the front and rear of the hitch tube and proceed with the remaining steps.



A71353—UN—27APR11

A—Clevis
B—Cap Screws, Clevis

6. Park the planter in a proper location and detach the planter (See Detaching the Planter).

NOTE: Turn the clevis over for a minor adjustment. Move the clevis to a new position for a major adjustment.

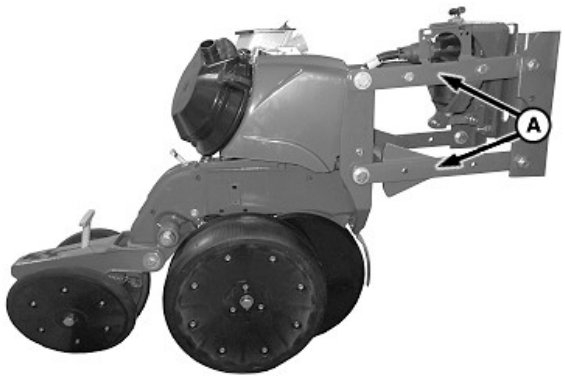
7. To account for the difference in height measured earlier, reposition the clevis (A).

IMPORTANT: Avoid inaccurate torque values. Tighten the cap screws before a load is placed on the hitch.

8. Tighten the clevis cap screws (B) to specification.

Specification	
Clevis Cap Screws—Dry Torque	916 N·m (676 lb·ft)

9. Attach and unfold the planter.
10. Lower the planter and retract the drawbar cylinder.
11. Verify that the hitch tube is parallel with the ground. If the hitch is not parallel, reposition and tighten the clevis again.



A84273—UN—11NOV14

A—Parallel Arms

12. Periodically check the following when the planter is lowered in the field:

    - That the hitch tube is level
    - That the frame height is optimal
    - That the parallel arms (A) are parallel to the ground

    If the center frame becomes higher or lower than the wings during operation, rephase the hydraulic lift system.

WP29706,0000860-19-12JUL18

Work Safely Around the Electric Drive System



A82413—UN—22APR14

Shock Hazard

CAUTION: Avoid an electrical shock. This implement is equipped with a 56 volt electrical system. Always use caution when interacting with the electrical circuit on the implement.

Do not touch exposed electrical connections when the electric power generation (EPG) system is running.

See a John Deere dealer or other service provider for service on the electric drive system.

OUO6074,0000F26-19-17OCT25

Tractor Power Generation



A87733—UN—21SEP15

IMPORTANT: Avoid an unexpected tractor shut down. Do not leave the tractor seat with the PTO engaged. When an operator leaves the tractor seat, the tractor sensor disengages the PTO. The implement sends an error code to the tractor when PTO power is expected, but lost. The tractor cannot distinguish the implement code from a tractor emergency shut-down code and shuts the engine off.

The alternator provides power for the metering motors and related components.

The tractor PTO must be engaged and the engine speed over 1100 rpm for proper operation and response of the metering motors and related components.

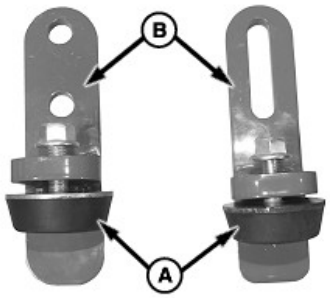
Verify that all of the harnesses are connected to the alternator and tractor. The harness on the alternator provides the primary 56 V power. The other harnesses connect the tractor monitoring and other functions. (See the SeedStar monitor information for the system operation.)

OUO6074,0000ED0-19-06DEC23

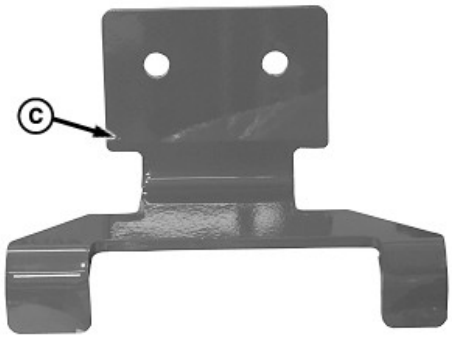
Install the Tractor Power Generation System on 7R John Deere Tractors



A87021—UN—31JUL15



A100557—UN—08MAY18



A100560—UN—08MAY18

A—Rubber Footing (2 used)

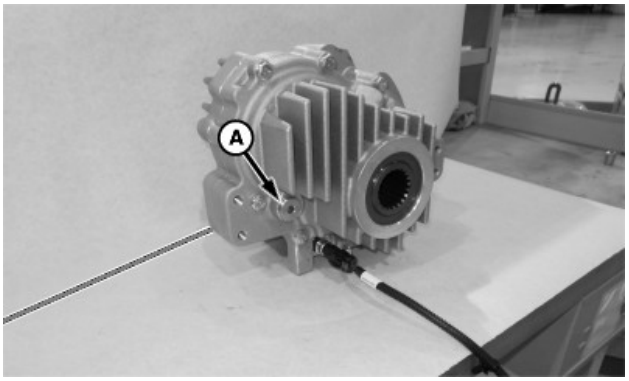
B—Bracket (2 used)
C—Support

1. Place the tractor in park, turn off the engine, and remove the key.
2. Attach rubber footings (A) to both brackets (B) and tighten to specification.

Specification

Rubber Footing (A)—Torque (dry). . . . . 18 N·m (159 lb·in)

3. From the kit, identify support (C) that matches the tractor frame.



A88356—UN—03NOV15

Gear Case Oil

A—Plug

IMPORTANT: Avoid damage to the sensor. Do not rest the weight of the gear case on the sensor.

Avoid damage to the gear case. Verify the oil level.

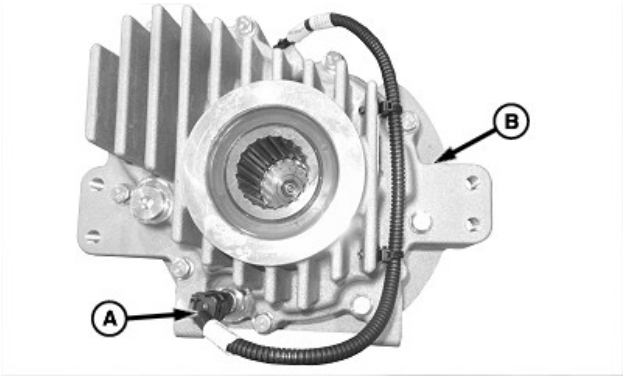
4. Place the gear case on a level surface with the vanes vertical. Remove plug (A). Check the oil level in the gear case. Fill the gear case to the specified volume or until the oil is level with the bottom of the hole.

Specification

John Deere Hy-Gard Oil—Volume. . . . . 0.5 L (17 fl oz)



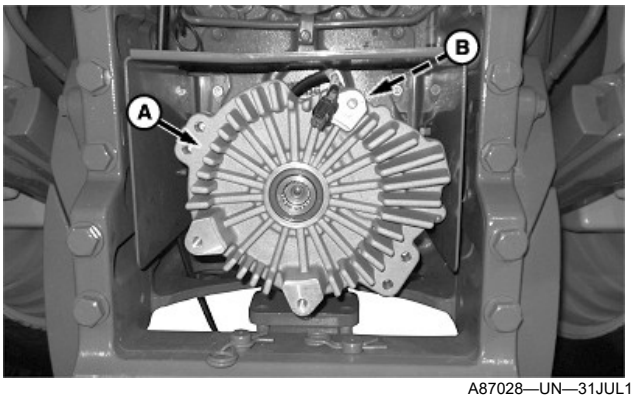
A87025—UN—31JUL15



A87027—UN—31JUL15

A—Temperature Harness
B—Gear Case

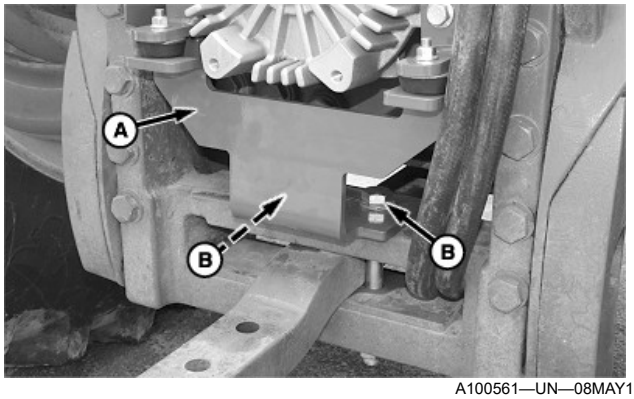
5. Connect temperature harness (A) to gear case (B).
6. If there are hitch rail components installed, remove them.



A87028—UN—31JUL15

A—Gear Case
B—PTO Shaft

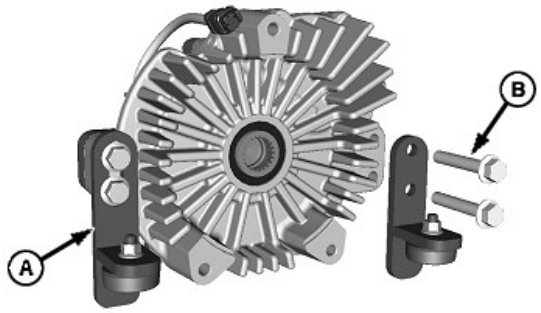
7. With harness positioned behind the gear case, attach gear case (A) to PTO shaft (B).



A100561—UN—08MAY18

A—Support
B—Cap Screw, Washer, and Nut (2 of each used)

8. Attach support (A) using cap screws, washers, and nuts (B).



A88430—UN—06NOV15

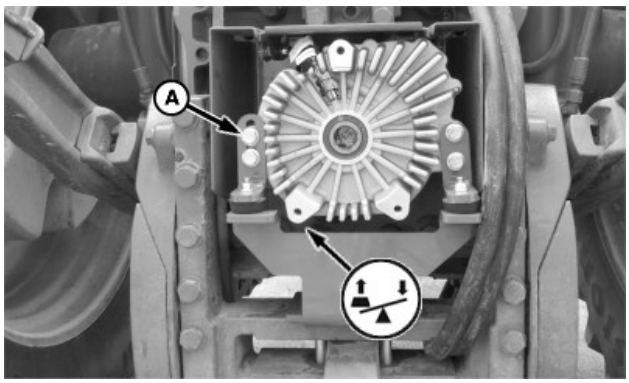
A—Footing Bracket (2 used)
B—Flange Cap Screw, M12 x 70 (4 used)

NOTE: Hand-tighten flange cap screws (B) in slotted footing bracket (A). Final tightening is performed in a later step.

9. Attach footing brackets (A) to the gear case after the support is in position. Tighten flange cap screws (B) in the non-slotted footing bracket to specification.

Specification

Flange Cap Screw (B)—Torque
(dry). . . . . 125 N·m (92 lb·ft)



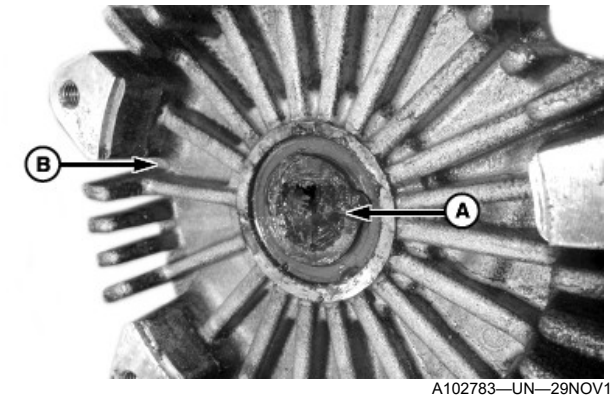
A100562—UN—08MAY18

A—Flange Cap Screw (2 used)

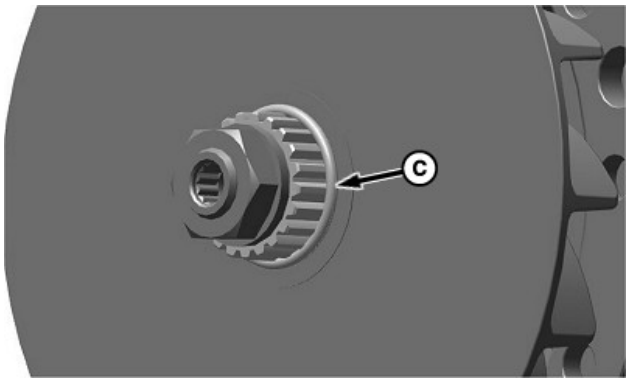
10. Pry up on the gear case slightly, push down on the footing bracket, and tighten flange cap screws (A) to specification.

Specification

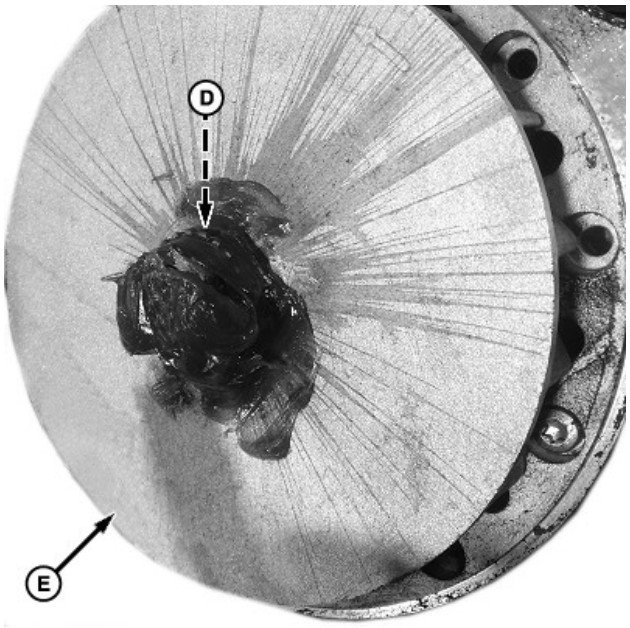
Flange Cap Screw (A)—Torque
(dry). . . . . 125 N·m (92 lb·ft)



A102783—UN—29NOV18



A105819—UN—24SEP19



A105820—UN—24SEP19

A—Cavity

B—Gear Case
C—O-Ring (A120963)
D—Gear
E—Alternator

IMPORTANT: Avoid damage to gear (D) and shaft. Lubricate the gear every time alternator (E) is installed and annually.

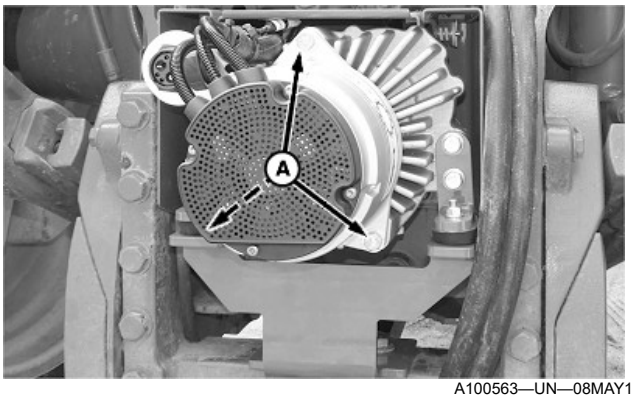
NOTE: O-ring (C) helps retain the grease on the gear after grease has been applied.

11. Using the specified lubricant, fill cavity (A) on gear case (B). Verify that O-ring (C) is installed on gear (D) of alternator (E). Apply the same amount of lubricant to gear (D) on alternator (E).

Gear Lubrication — Specification

Gear Grease—Type. . . . . Class GC-LB with 3—5% Molybdenum Disulfide

Interval—Time. . . . . Each Installation and Annually



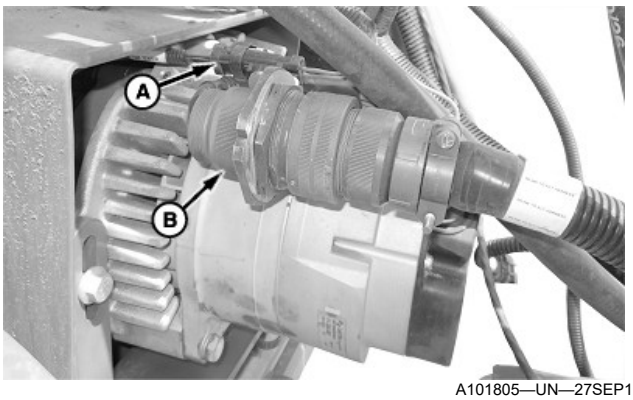
A100563—UN—08MAY18

A—Cap Screw, M12 x 45 and Flat Washer (3 used)

12. Attach the alternator to the gear case using cap screws and flat washers (A). Tighten the cap screws to specification.

Specification

Cap Screw (A)—Torque (dry). . . . . 125 N·m (92 lb·ft)



A101805—UN—27SEP18

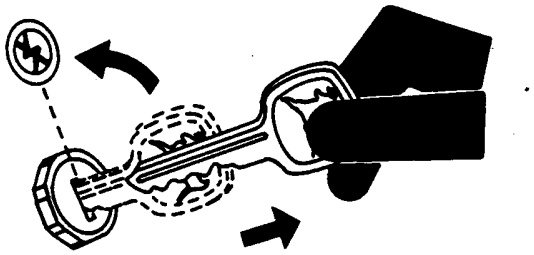
A—Temperature Harness
B—Power Generation Harness

13. Connect temperature harness (A).

14. Connect power generation harness (B).

WP29706,0000CF1-19-31JAN25

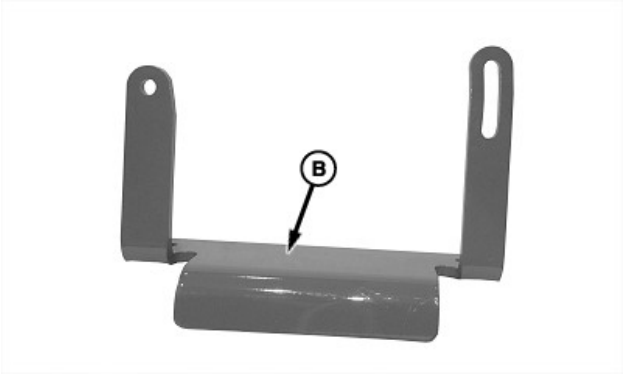
Install the Tractor Power Generation System on 8R John Deere Tractors



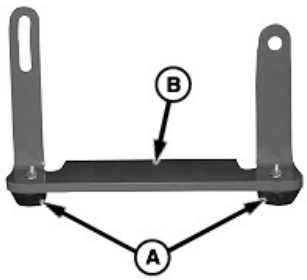
TS230—UN—24MAY89



A87021—UN—31JUL15



A87022—UN—31JUL15



A87023—UN—31JUL15

A—Rubber Footing (2 used)
B—Support

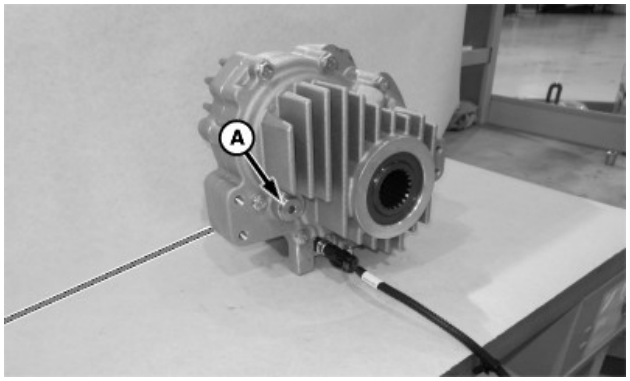
1. Place the tractor in park, turn off the engine, and remove the key.

NOTE: One style of support bracket is represented in the graphic. Other support bracket installations are similar.

2. Within the kit, identify support (B) that matches the tractor frame.
3. Install rubber footings (A) on support (B) and tighten to specification.

Specification

Rubber Footing (A)—Torque (dry). . . . . 18 N·m (159 lb·in)



A88356—UN—03NOV15

Gear Case Oil

A—Plug

IMPORTANT: Avoid damage to the sensor. Do not rest the weight of the gear case on the sensor.

Avoid damage to the gear case. Verify the oil level.

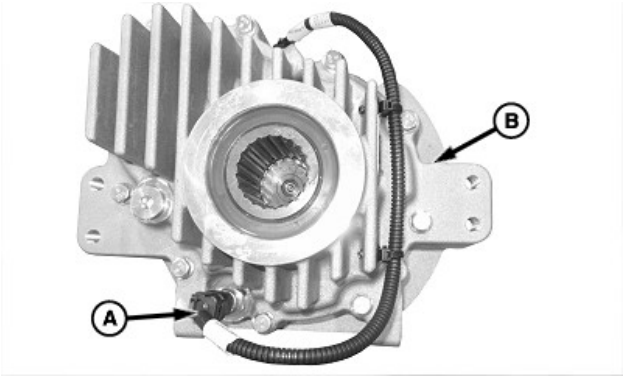
4. Place the gear case on a level surface with the vanes vertical. Remove plug (A). Check the oil level in the gear case. Fill the gear case to the specified volume or until the oil is level with the bottom of the hole.

Specification

John Deere Hy-Gard Oil—Volume. . . . . 0.5 L (17 fl oz)



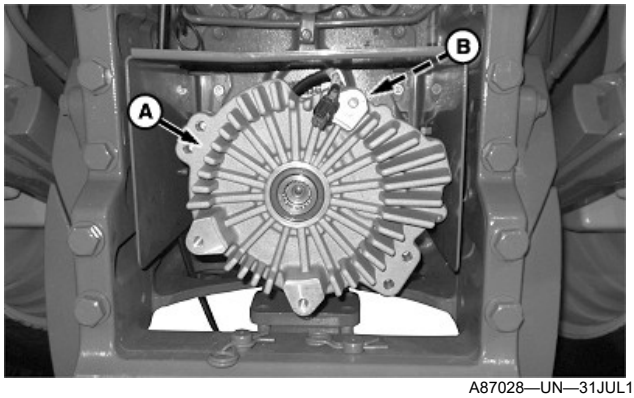
A87025—UN—31JUL15



A87027—UN—31JUL15

A—Temperature Harness
B—Gear Case

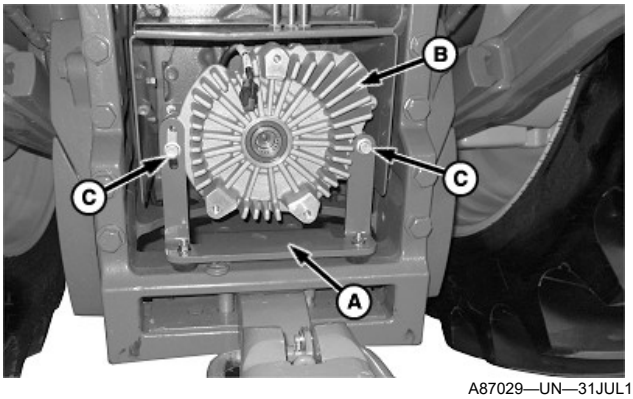
5. Connect temperature harness (A) to gear case (B).



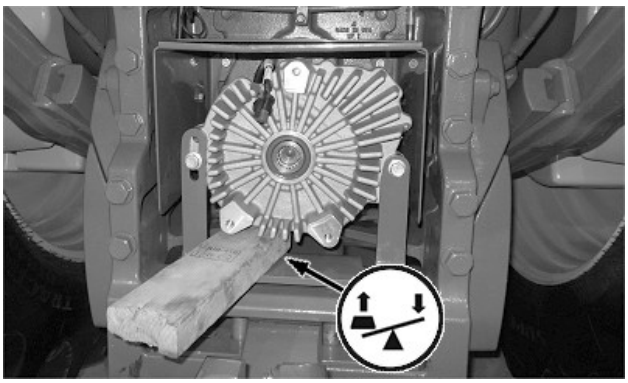
A87028—UN—31JUL15

A—Gear Case
B—PTO Shaft

6. With the harness positioned behind the gear case, attach gear case (A) to PTO shaft (B).



A87029—UN—31JUL15



A87030—UN—27JUL16

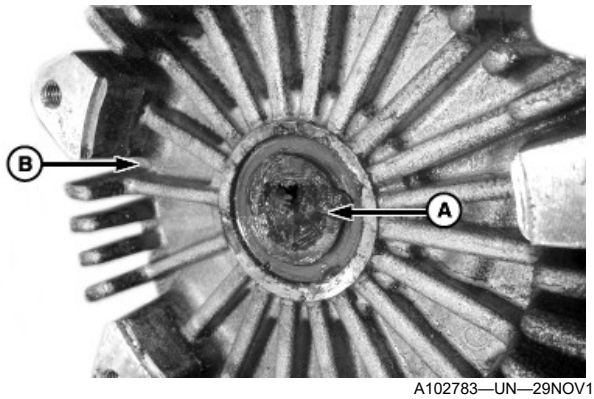
A—Support
B—Gear Case
C—Flange Cap Screw (2 used)

7. Align support (A) for attachment to gear case (B).
8. Insert and tighten flange cap screws (C) slightly, leaving them loose enough for gear case adjustment.
9. Pry up on the gear case slightly while pushing down on support (A) and then tighten flange cap screws (C) to specification.

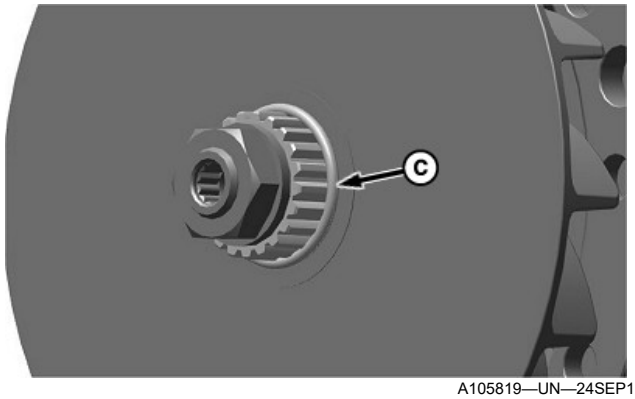
Specification

Flange Cap Screw (C)—Torque (dry). . . . . 125 N·m (92 lb·ft)

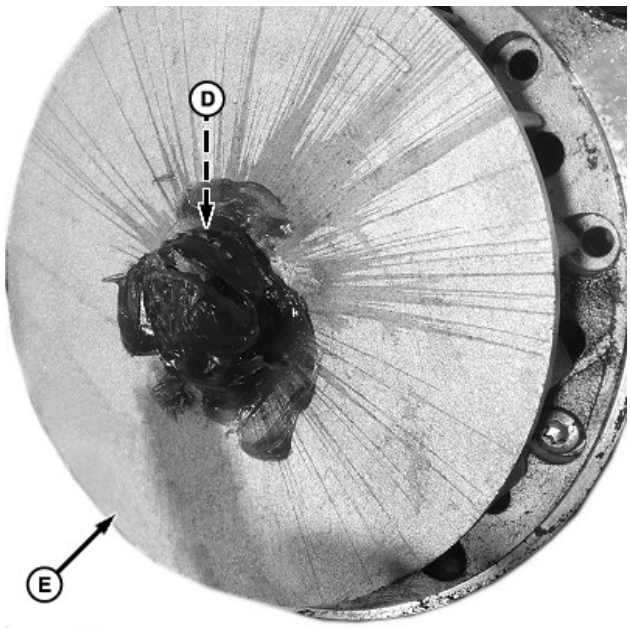
10. Remove the prying device.



A102783—UN—29NOV18



A105819—UN—24SEP19



A105820—UN—24SEP19

A—Cavity
B—Gear Case
C—O-Ring (A120963)
D—Gear
E—Alternator

IMPORTANT: Avoid damage to gear (D) and shaft. Lubricate the gear every time alternator (E) is installed and annually.

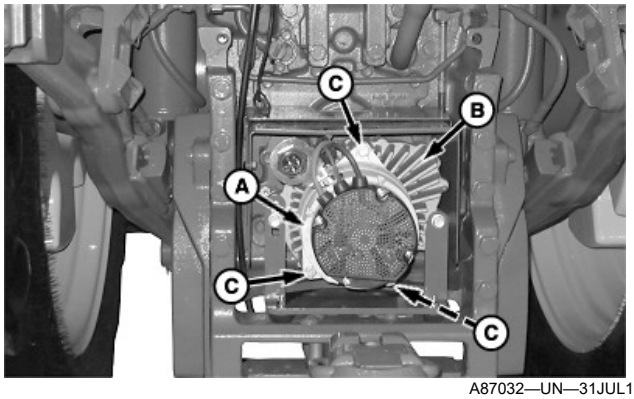
NOTE: O-ring (C) helps retain the grease on the gear after grease has been applied.

11. Using the specified lubricant, fill cavity (A) on gear case (B). Verify that O-ring (C) is installed on gear (D) of alternator (E). Apply the same amount of lubricant to gear (D) on alternator (E).

Gear Lubrication — Specification

Gear Grease—Type. . . . . Class GC-LB with 3—5% Molybdenum Disulfide

Interval—Time. . . . . Each Installation and Annually



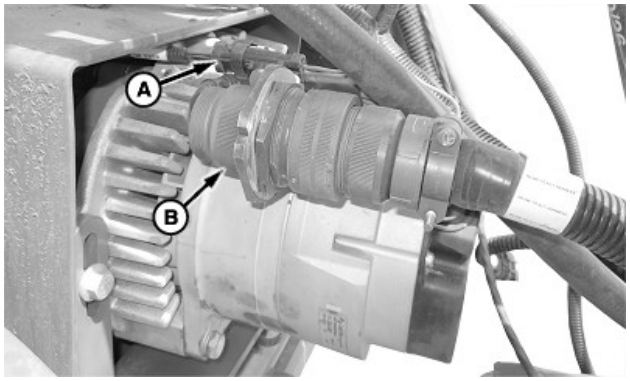
A87032—UN—31JUL15

A—Alternator
B—Gear Case
C—Cap Screw, M12 x 45 and Flat Washer (3 used)

12. Attach alternator (A) to gear case (B) using cap screws and flat washers (C). Tighten the cap screws to specification.

Specification

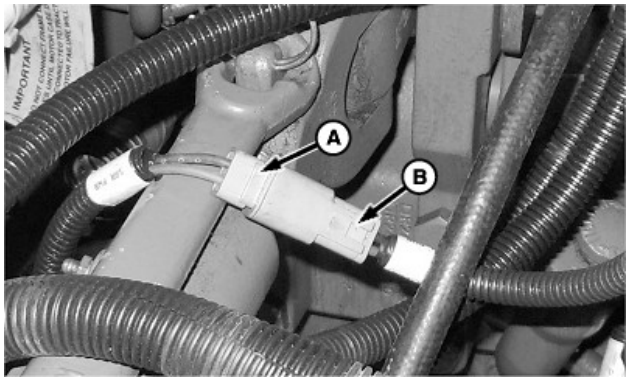
Cap Screw (C)—Torque (dry). . . . . 125 N·m (92 lb·ft)



A101805—UN—27SEP18

A—Temperature Harness
B—Power Generation Harness

13. Connect temperature harness (A).
14. Connect power generation harness (B).



A83273—UN—12AUG14

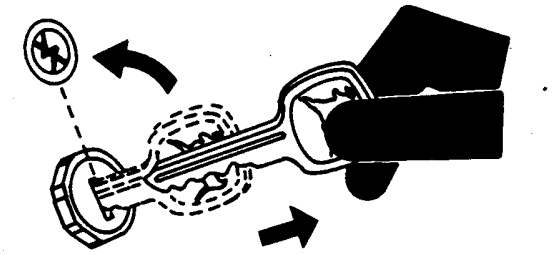
Implement-to-Tractor Connection

A—POWER IN Harness (tractor power generator)
B—AUX PWR Harness (implement bulkhead)

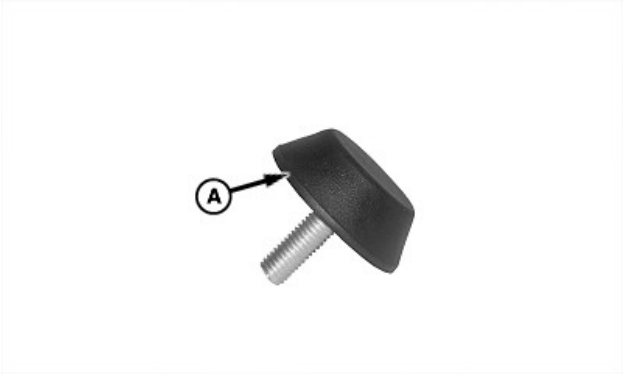
15. Connect POWER IN harness (A) from the generator to implement AUX PWR harness (B) from the implement bulkhead.

WP29706,0000DB8-19-31JAN25

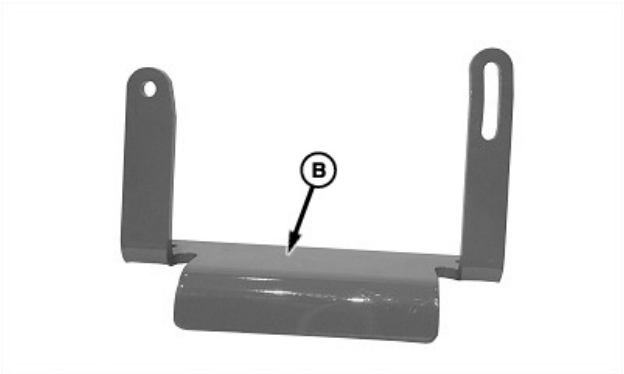
Install the Tractor Power Generation System on 9R John Deere Tractors



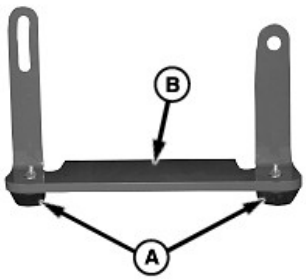
TS230—UN—24MAY89



A87021—UN—31JUL15



A87022—UN—31JUL15



A87023—UN—31JUL15

A—Rubber Footing (2 used)
B—Support

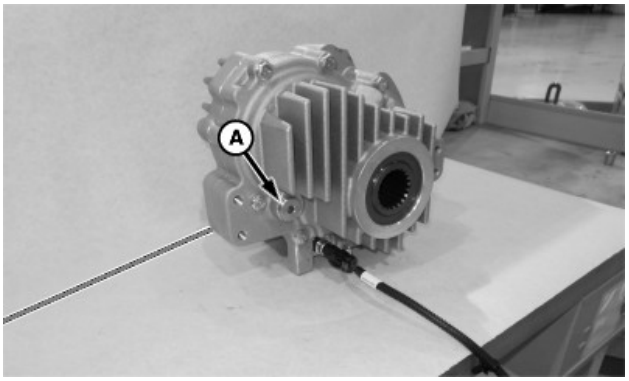
1. Place the tractor in park, turn off the engine, and remove the key.

NOTE: One style of support bracket is represented in the graphic. Other support bracket installations are similar.

2. Within the kit, identify support (B) that matches the tractor frame.
3. Install rubber footings (A) on support (B) and tighten to specification.

Specification

Rubber Footing (A)—Torque
(dry). . . . . 18 N·m
(159 lb·in)



A88356—UN—03NOV15

Gear Case Oil

A—Plug

IMPORTANT: Avoid damage to the sensor. Do not rest the weight of the gear case on the sensor.

Avoid damage to the gear case. Verify the oil level.

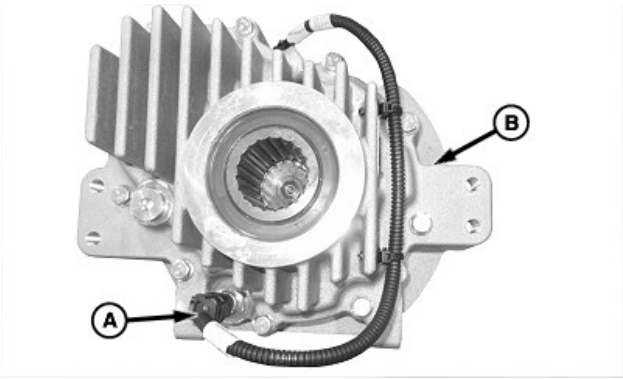
4. Place the gear case on a level surface with the vanes vertical. Remove plug (A). Check the oil level in the gear case. Fill the gear case to the specified volume or until the oil is level with the bottom of the hole.

Specification

John Deere Hy-Gard
Oil—Volume. . . . . 0.5 L
(17 fl oz)



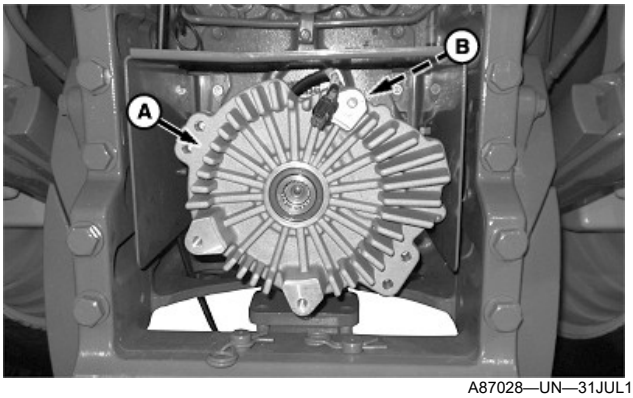
A87025—UN—31JUL15



A87027—UN—31JUL15

A—Temperature Harness
B—Gear Case

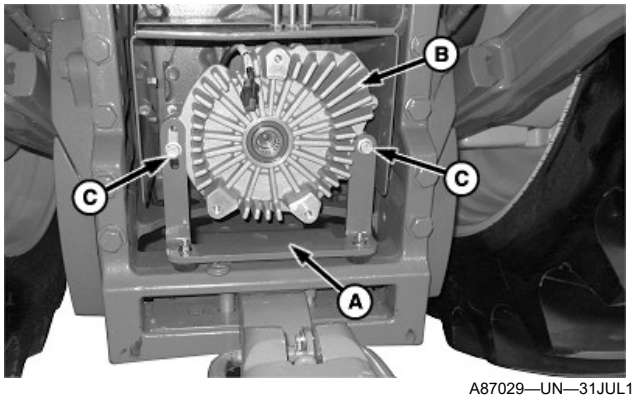
5. Connect temperature harness (A) to gear case (B).



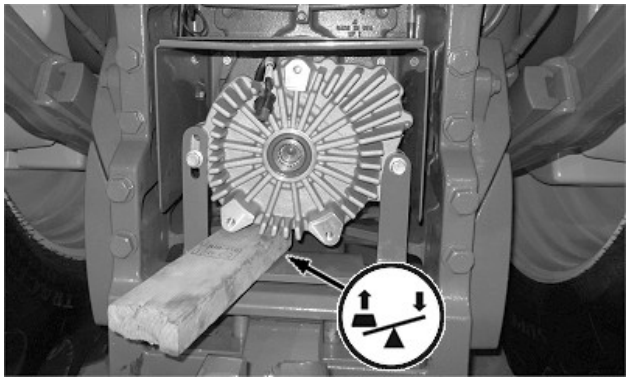
A87028—UN—31JUL15

A—Gear Case
B—PTO Shaft

6. With the harness positioned behind the gear case, attach gear case (A) to PTO shaft (B).



A87029—UN—31JUL15



A87030—UN—27JUL16

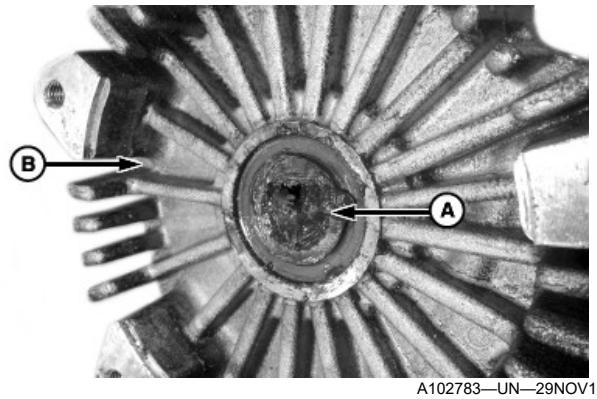
A—Support
B—Gear Case
C—Flange Cap Screw (2 used)

7. Align support (A) for attachment to gear case (B).
8. Insert and tighten flange cap screws (C) slightly, leaving them loose enough for gear case adjustment.
9. Pry up on the gear case slightly while pushing down on support (A) and then tighten flange cap screws (C) to specification.

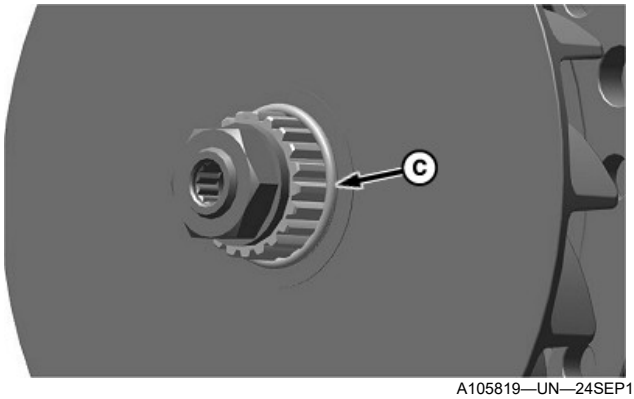
Specification

Flange Cap Screw (C)—Torque (dry)	125 N·m (92 lb·ft)

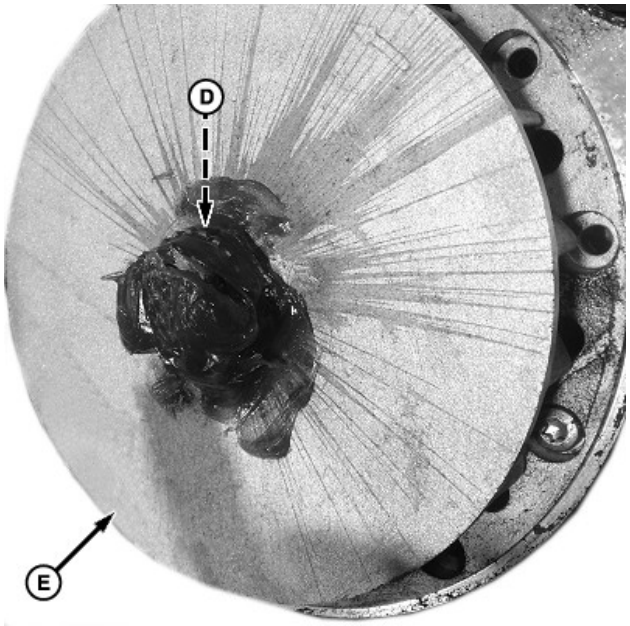
10. Remove the prying device.



A102783—UN—29NOV18



A105819—UN—24SEP19



A105820—UN—24SEP19

A—Cavity
B—Gear Case
C—O-Ring (A120963)
D—Gear
E—Alternator

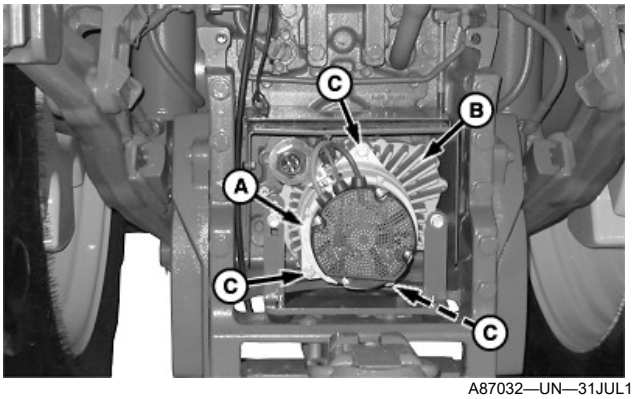
IMPORTANT: Avoid damage to gear (D) and shaft. Lubricate the gear every time alternator (E) is installed and annually.

NOTE: O-ring (C) helps retain the grease on the gear after grease has been applied.

11. Using the specified lubricant, fill cavity (A) on gear case (B). Verify that O-ring (C) is installed on gear (D) of alternator (E). Apply the same amount of lubricant to gear (D) on alternator (E).

Gear Lubrication — Specification

Gear Grease—Type	Class GC-LB with 3—5% Molybdenum Disulfide
Interval—Time	Each Installation and Annually



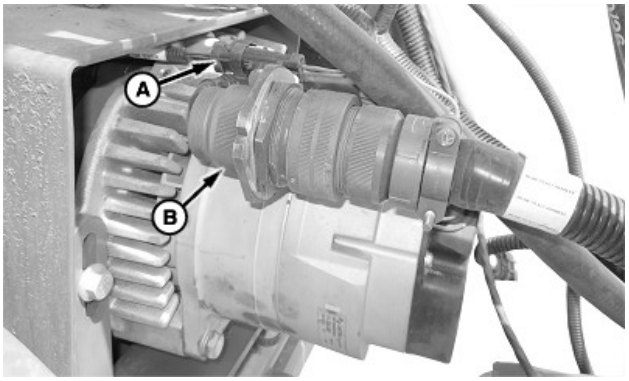
A87032—UN—31JUL15

A—Alternator
B—Gear Case
C—Cap Screw, M12 x 45 and Flat Washer (3 used)

12. Attach alternator (A) to gear case (B) using cap screws and flat washers (C). Tighten the cap screws to specification.

Specification

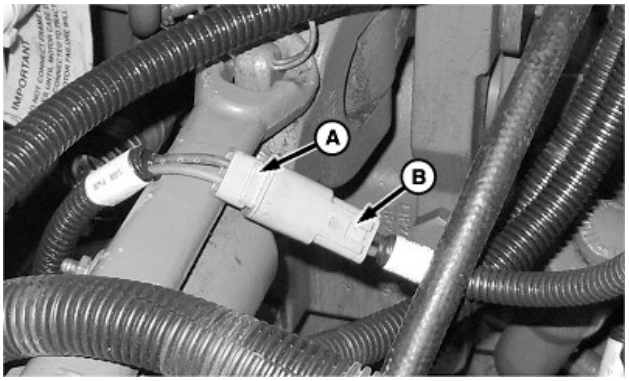
Cap Screw (C)—Torque (dry). . . . . 125 N·m (92 lb·ft)



A101805—UN—27SEP18

A—Temperature Harness
B—Power Generation Harness

13. Connect temperature harness (A).
14. Connect power generation harness (B).



A83273—UN—12AUG14

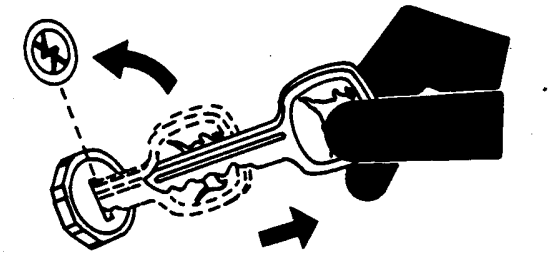
Implement-to-Tractor Connection

A—POWER IN Harness (tractor power generator)
B—AUX PWR Harness (implement bulkhead)

15. Connect POWER IN harness (A) from the generator to implement AUX PWR harness (B) from the implement bulkhead.

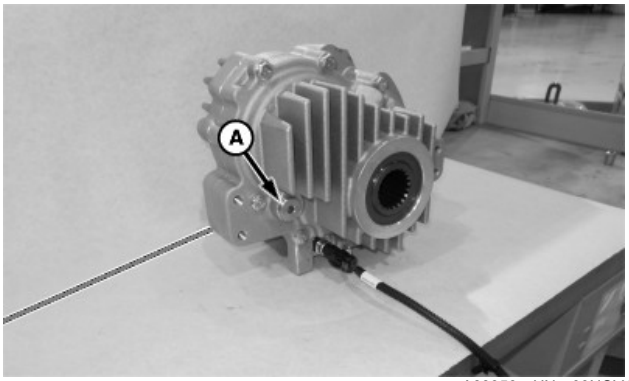
WP29706,0000DB9-19-31JAN25

Install the Tractor Power Generation System on 9RT and 9x30T John Deere Tractors



TS230—UN—24MAY89

Place the tractor in park, turn off the engine, and remove the key.



A88356—UN—03NOV15

Gear Case Oil

A—Plug

IMPORTANT: Avoid damage to the sensor. Do not rest the weight of the gear case on the sensor.

Avoid damage to the gear case. Verify the oil level.

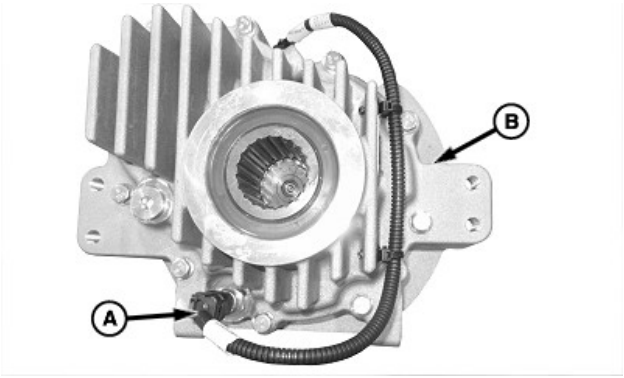
1. Place the gear case on a level surface with the vanes vertical. Remove plug (A). Check the oil level in the gear case. Fill the gear case to the specified volume or until the oil is level with the bottom of the hole.

Specification

John Deere Hy-Gard
Oil—Volume. . . . . 0.5 L (17 fl oz)



A87025—UN—31JUL15

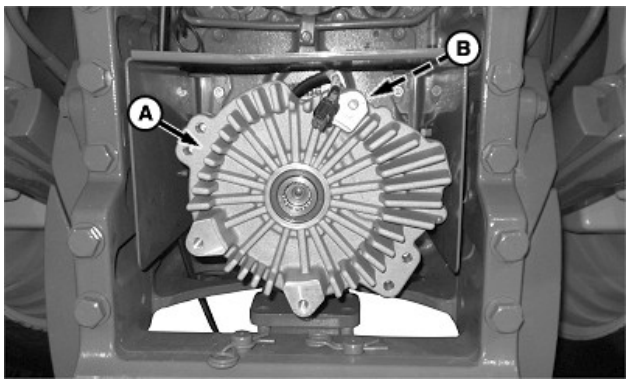


A87027—UN—31JUL15

A—Temperature Harness
B—Gear Case

2. Connect temperature harness (A) to gear case (B).
3. The following procedures are different for each tractor and drawbar type. Choose the one that matches.

9RT with Fixed Drawbar

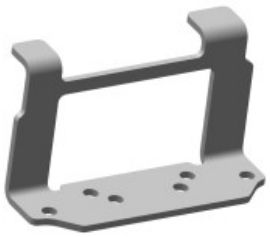


A87028—UN—31JUL15

A—Gear Case
B—PTO Shaft

NOTE: Graphics in this procedure have parts removed for clarity.

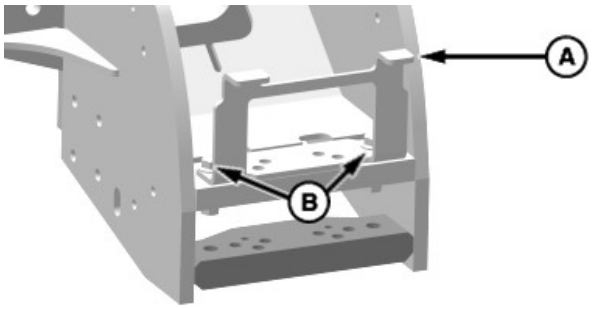
1. With the harness positioned behind the gear case, attach gear case (A) to PTO shaft (B).



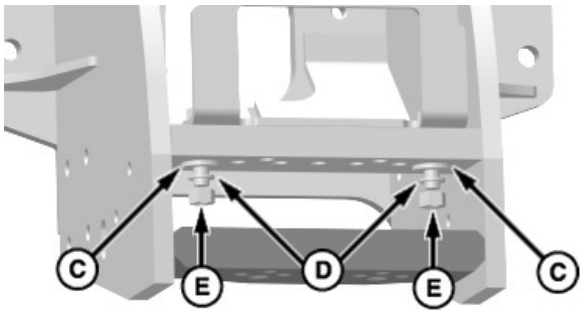
A99938—UN—15MAR18

9RT Fixed Drawbar Bracket

2. Locate the supplied bracket.



A99941—UN—20MAR18



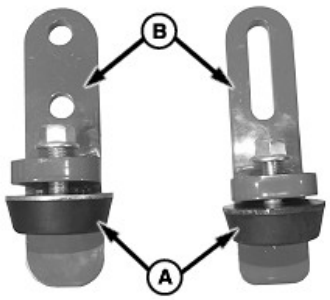
A99942—UN—20MAR18

A—Bracket
B—Cap Screw (2 used)
C—Washer (2 used)
D—Lock Washer (2 used)
E—Nut (2 used)

3. Install bracket (A) using cap screws (B), washers (C and D), and nuts (E).



A87021—UN—31JUL15



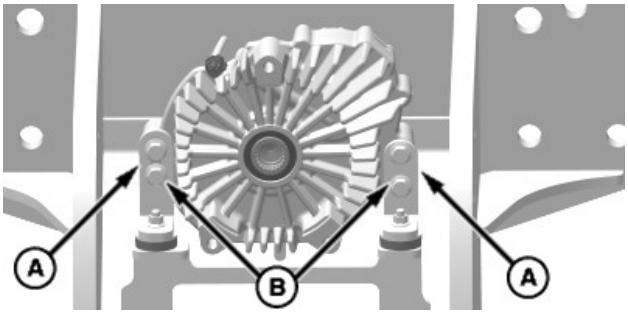
A100557—UN—08MAY18

A—Rubber Footing (2 used)
B—Bracket (2 used)

4. Attach rubber footings (A) to both brackets (B) and tighten to specification.

Specification

Rubber Footing (A)—Torque (dry). . . . . 18 N·m (159 lb·in)



A99943—UN—20MAR18

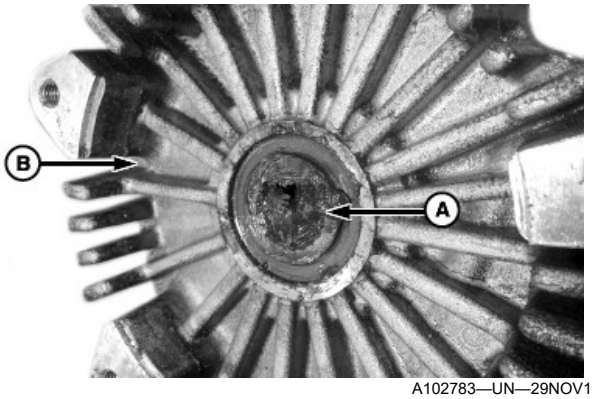
A—Support Bracket (2 used)
B—Flange Cap Screw (2 used)

NOTE: Leave the flange cap screws (B) loose enough for gear case adjustment.

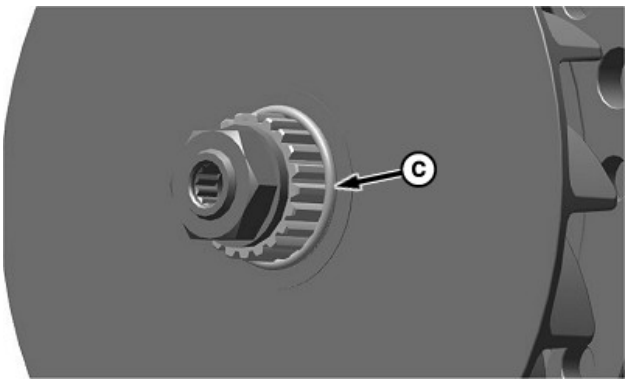
5. Install support brackets (A) using flange cap screws (B).
6. Slightly pry up on the gear case while pushing down on bracket (A). Tighten flange cap screws (B) to specification.

Specification

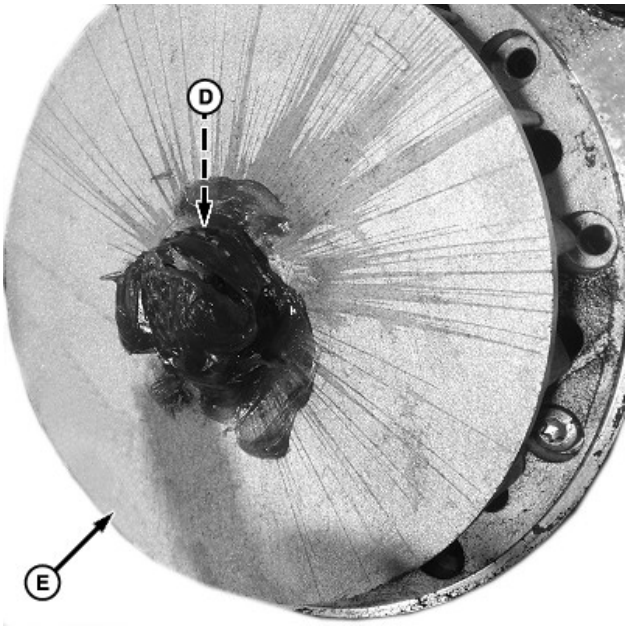
Flange Cap Screw (B)—Torque (dry). . . . . 125 N·m (92 lb·ft)



A102783—UN—29NOV18



A105819—UN—24SEP19



A105820—UN—24SEP19

A—Cavity
B—Gear Case
C—O-Ring (A120963)
D—Gear
E—Alternator

IMPORTANT: Avoid damage to gear (D) and shaft. Lubricate the gear every time alternator (E) is installed and annually.

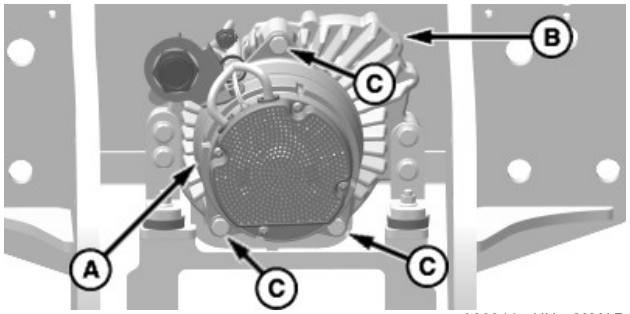
NOTE: O-ring (C) helps retain the grease on the gear after grease has been applied.

7. Using the specified lubricant, fill cavity (A) on gear case (B). Verify that O-ring (C) is installed on gear (D) of alternator (E). Apply the same amount of lubricant to gear (D) on alternator (E).

Gear Lubrication — Specification

Gear Grease—Type. . . . . Class GC-LB with 3—5% Molybdenum Disulfide

Interval—Time. . . . . Each Installation and Annually



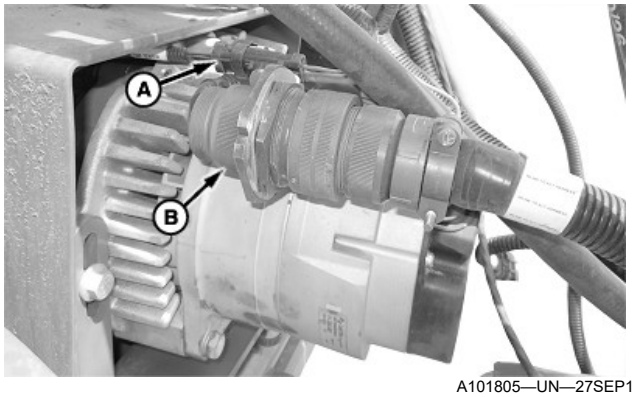
A99944—UN—20MAR18

A—Alternator
B—Gear Case
C—Cap Screw, M12 x 45 and Flat Washer (3 used)

8. Attach alternator (A) to gear case (B) using cap screws and flat washers (C). Tighten to specification.

Specification

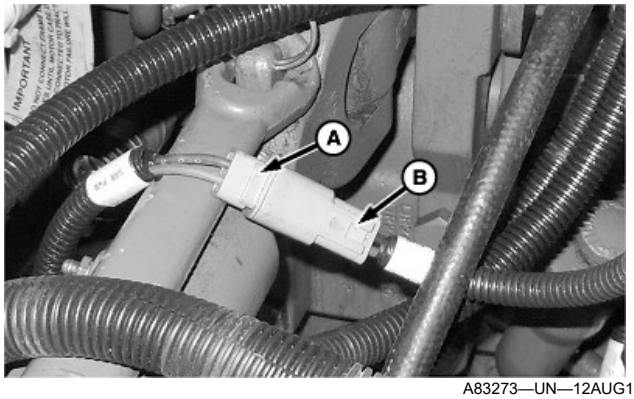
Cap Screw (C)—Torque (dry). . . . . 125 N·m (92 lb·ft)



A101805—UN—27SEP18

A—Temperature Harness
B—Power Generation Harness

9. Connect temperature harness (A).
10. Connect power generation harness (B).



A83273—UN—12AUG14

Implement-to-Tractor Connection

A—POWER IN Harness (tractor power generator)
B—AUX PWR Harness (implement bulkhead)

11. Connect POWER IN harness (A) from the generator to implement AUX PWR harness (B) from the implement bulkhead.

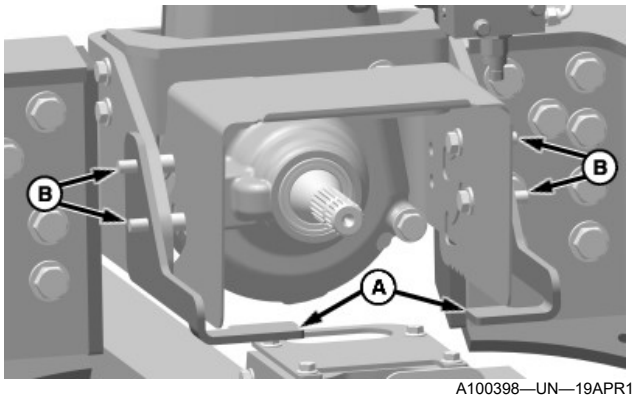
9RT with Wide-Swing Drawbar



A99940—UN—15MAR18

9RT Wide-Swing Drawbar Brackets

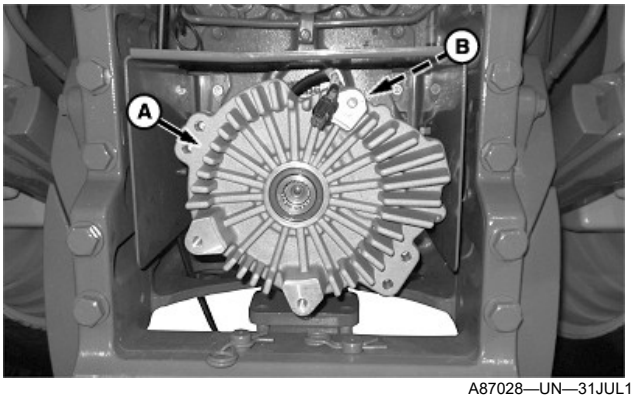
1. Locate the supplied brackets.



A100398—UN—19APR18

A—Bracket (2 used)
B—Cap Screw (4 used)

2. Install brackets (A) using longer cap screws (B) supplied.



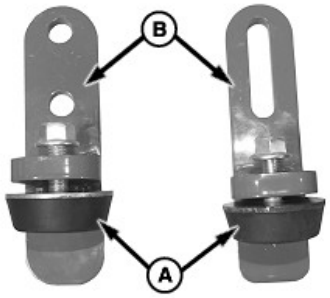
A87028—UN—31JUL15

A—Gear Case
B—PTO Shaft

3. With the harness positioned behind the gear case, attach gear case (A) to PTO shaft (B).



A87021—UN—31JUL15



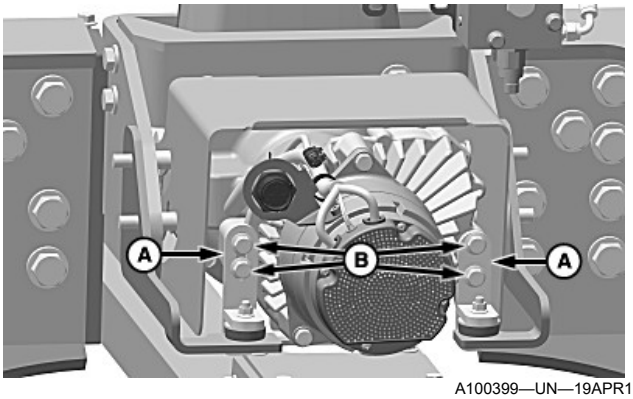
A100557—UN—08MAY18

A—Rubber Footing (2 used)
B—Bracket (2 used)

4. Attach rubber footings (A) to both brackets (B) and tighten to specification.

Specification

Rubber Footing (A)—Torque
(dry). . . . . 18 N·m
(159 lb·in)



A100399—UN—19APR18

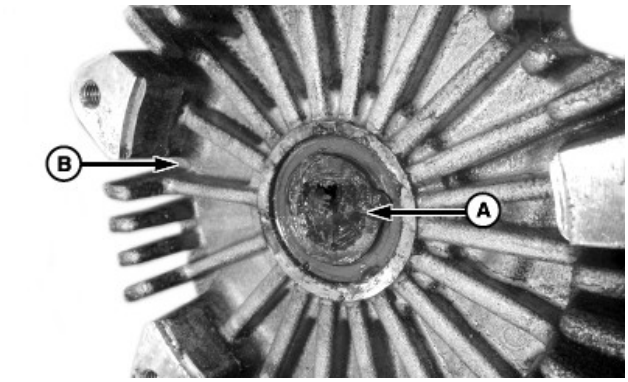
A—Bracket (2 used)
B—Flange Cap Screw (4 used)

NOTE: Leave flange cap screws (B) loose enough for gear case adjustment.

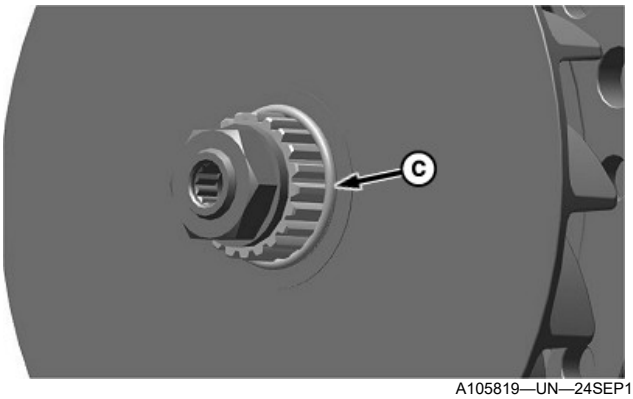
5. Attach brackets (A) using flange cap screws (B), but do not tighten.
6. Slightly pry up on the gear case while pushing down on slotted bracket (A). Tighten flange cap screws (B) to specification.

Specification

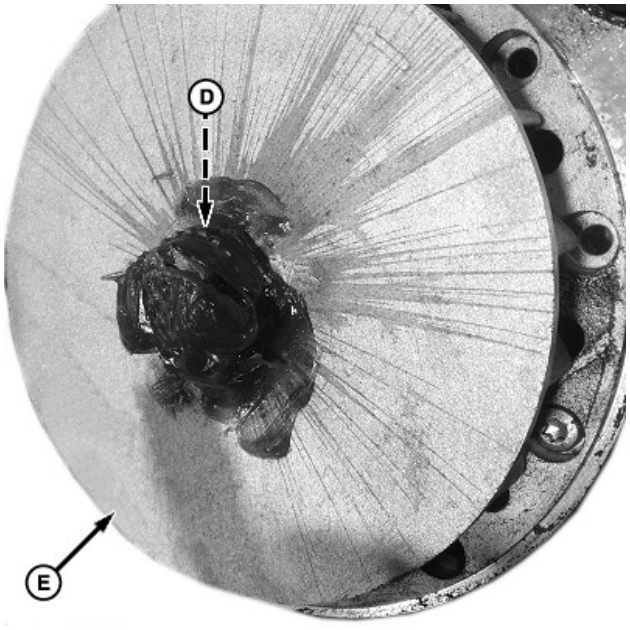
Flange Cap Screw (B)—Torque
(dry). . . . . 125 N·m
(92 lb·ft)



A102783—UN—29NOV18



A105819—UN—24SEP19



A105820—UN—24SEP19

A—Cavity
B—Gear Case
C—O-Ring (A120963)
D—Gear
E—Alternator

IMPORTANT: Avoid damage to gear (D) and shaft. Lubricate the gear every time alternator (E) is installed and annually.

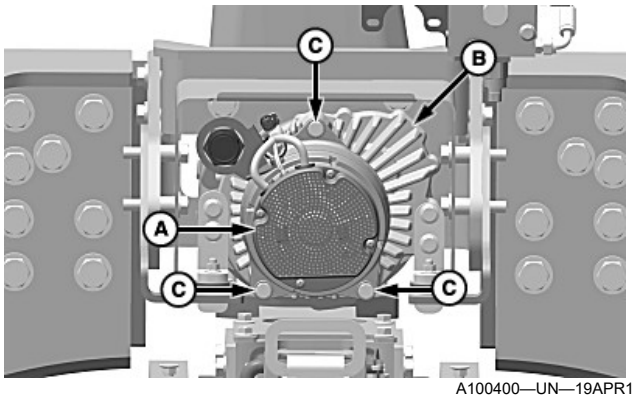
NOTE: O-ring (C) helps retain the grease on the gear after grease has been applied.

7. Using the specified lubricant, fill cavity (A) on gear case (B). Verify that O-ring (C) is installed on gear (D) of alternator (E). Apply the same amount of lubricant to gear (D) on alternator (E).

Gear Lubrication — Specification

Gear Grease—Type. . . . . Class GC-LB with 3—5% Molybdenum Disulfide

Interval—Time. . . . . Each Installation and Annually



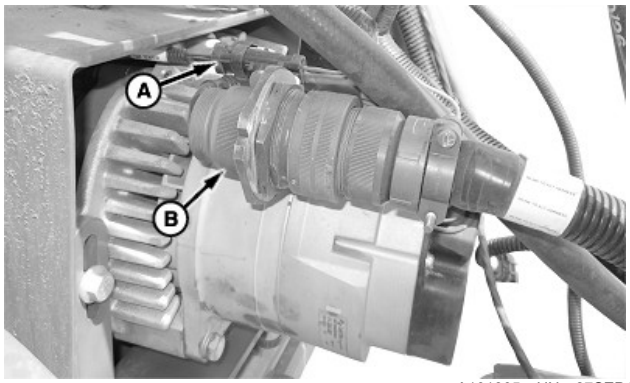
A100400—UN—19APR18

A—Alternator
B—Gear Case
C—Cap Screw, M12 x 45 and Flat Washer (3 used)

8. Attach alternator (A) to gear case (B) using cap screws and flat washers (C). Tighten to specification.

Specification

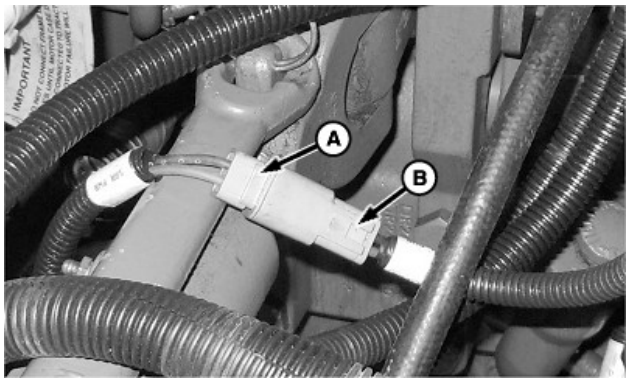
Cap Screw (C)—Torque (dry). . . . . 125 N·m (92 lb·ft)



A101805—UN—27SEP18

A—Temperature Harness
B—Power Generation Harness

9. Connect temperature harness (A).
10. Connect power generation harness (B).



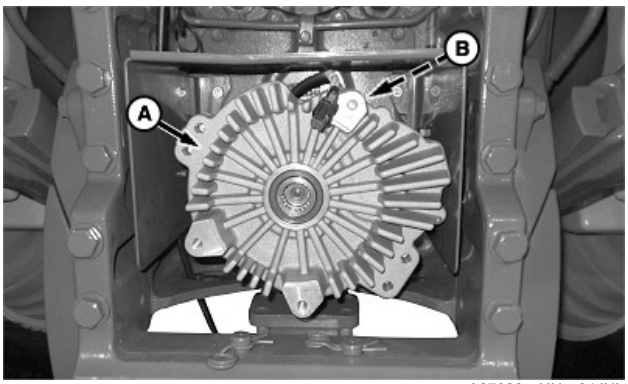
A83273—UN—12AUG14

Implement-to-Tractor Connection

A—POWER IN Harness (tractor power generator)
B—AUX PWR Harness (implement bulkhead)

11. Connect POWER IN harness (A) from the generator to implement AUX PWR harness (B) from the implement bulkhead.

9x30T with Fixed Drawbar

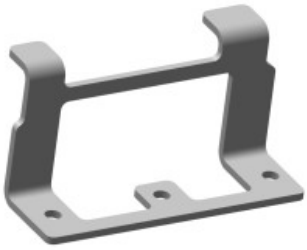


A87028—UN—31JUL15

A—Gear Case
B—PTO Shaft

NOTE: Graphics in this procedure have parts removed for clarity.

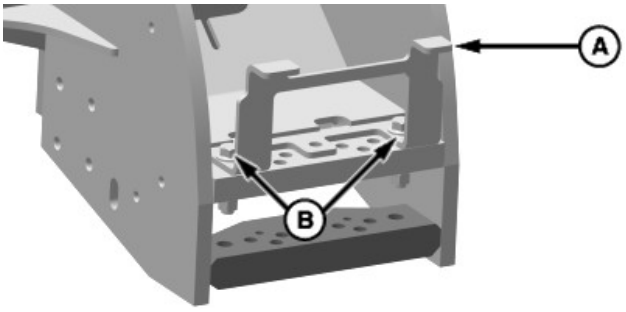
1. With the harness positioned behind the gear case, attach gear case (A) to PTO shaft (B).



A99939—UN—15MAR18

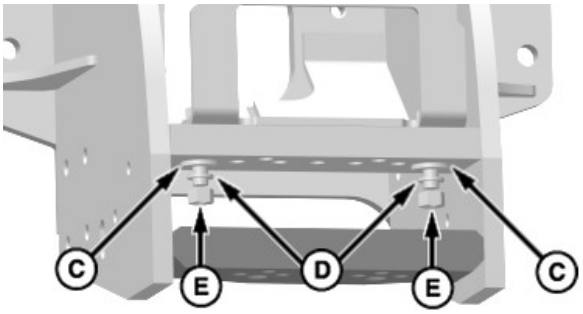
9x30T Fixed Drawbar Bracket

2. Locate the supplied bracket.



A99948—UN—20MAR18

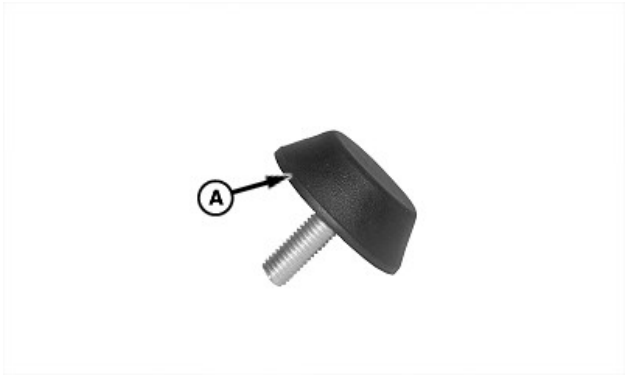
9x30T Fixed Drawbar



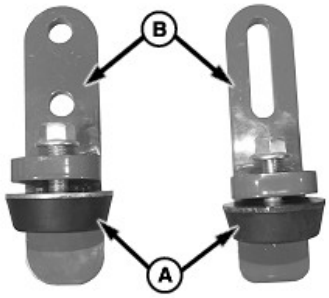
A99942—UN—20MAR18

A—Bracket
B—Cap Screw (2 used)
C—Washer (2 used)
D—Lock Washer (2 used)
E—Nut (2 used)

3. Install bracket (A) using cap screws (B), washers (C and D), and nuts (E).



A87021—UN—31JUL15



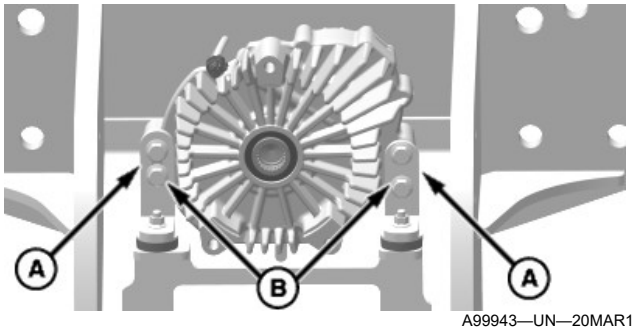
A100557—UN—08MAY18

A—Rubber Footing (2 used)
B—Bracket (2 used)

4. Attach rubber footings (A) to both brackets (B) and tighten to specification.

Specification

Rubber Footing (A)—Torque
(dry). . . . . 18 N·m (159 lb·in)



A99943—UN—20MAR18

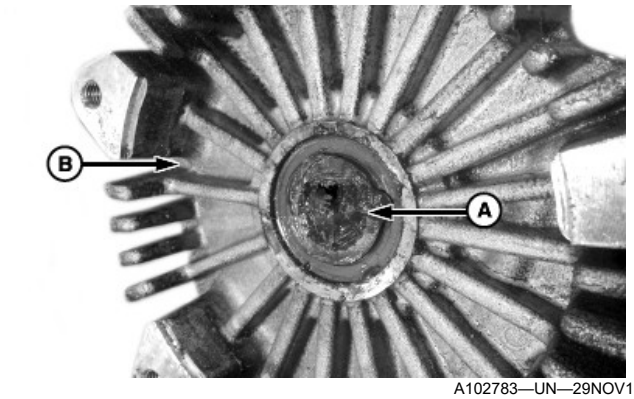
A—Bracket (2 used)
B—Flange Cap Screw (4 used)

NOTE: Leave flange cap screws (B) loose enough for gear case adjustment.

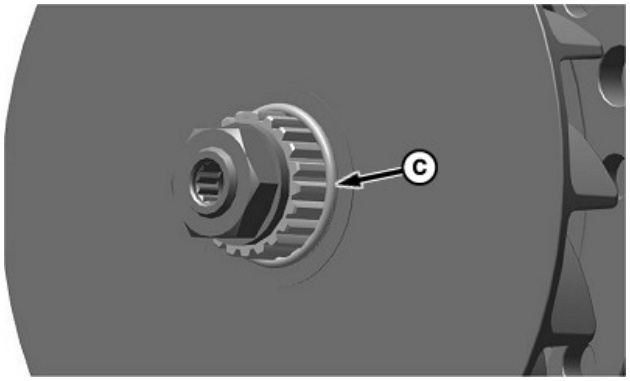
5. Attach brackets (A) using flange cap screws (B), but do not tighten.
6. Slightly pry up on the gear case while pushing down on slotted bracket (A). Tighten flange cap screws (B) to specification.

Specification

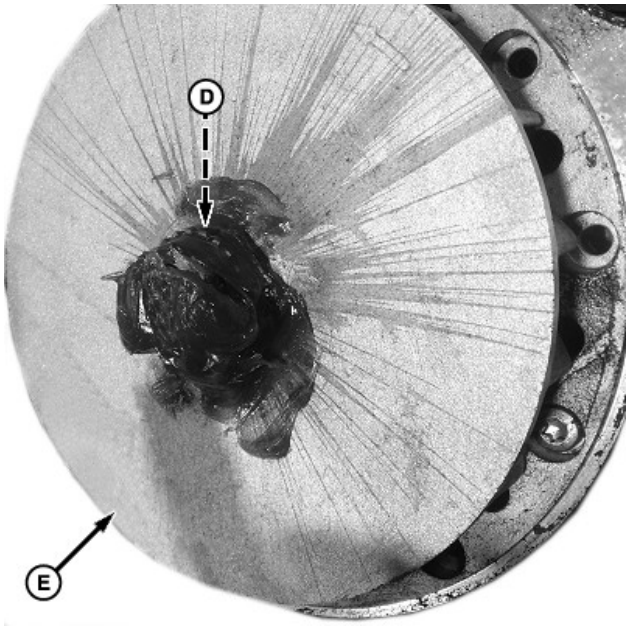
Flange Cap Screw (B)—Torque (dry). . . . . 125 N·m (92 lb·ft)



A102783—UN—29NOV18



A105819—UN—24SEP19



A105820—UN—24SEP19

A—Cavity
B—Gear Case
C—O-Ring (A120963)
D—Gear
E—Alternator

IMPORTANT: Avoid damage to gear (D) and shaft. Lubricate the gear every time alternator (E) is installed and annually.

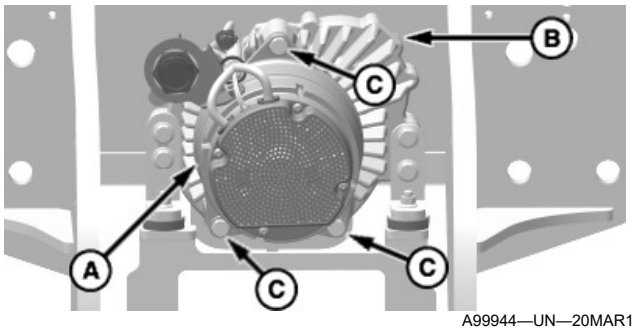
NOTE: O-ring (C) helps retain the grease on the gear after grease has been applied.

7. Using the specified lubricant, fill cavity (A) on gear case (B). Verify that O-ring (C) is installed on gear (D) of alternator (E). Apply the same amount of lubricant to gear (D) on alternator (E).

Gear Lubrication — Specification

Gear Grease—Type. . . . . Class GC-LB with 3—5% Molybdenum Disulfide

Interval—Time. . . . . Each Installation and Annually

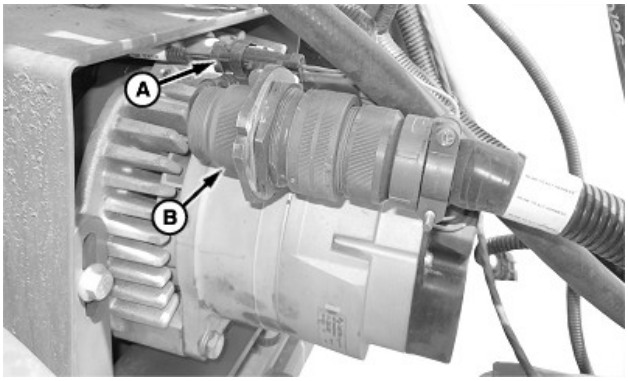


A99944—UN—20MAR18

A—Alternator
B—Gear Case
C—Cap Screw, M12 x 45 and Flat Washer (3 used)

8. Attach alternator (A) to gear case (B) using cap screws and flat washers (C). Tighten to specification.

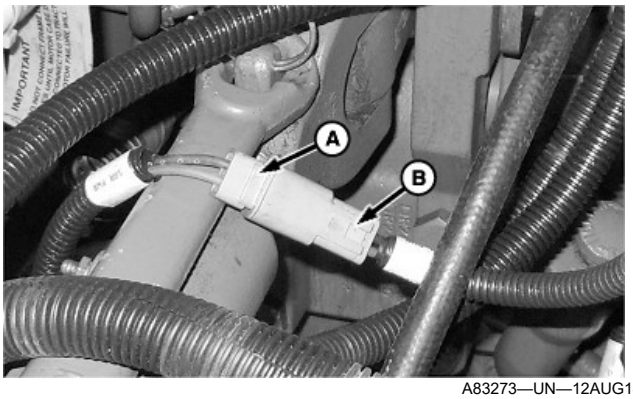
Specification	
Cap Screw (C)—Torque (dry)	125 N·m (92 lb·ft)



A101805—UN—27SEP18

A—Temperature Harness
B—Power Generation Harness

9. Connect temperature harness (A).
10. Connect power generation harness (B).



A83273—UN—12AUG14

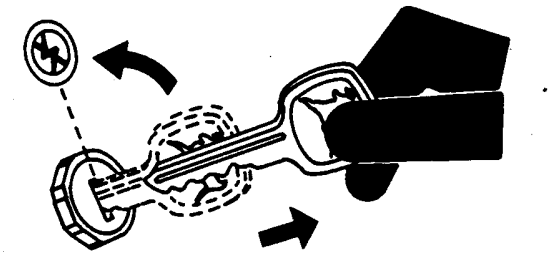
Implement-to-Tractor Connection

A—POWER IN Harness (tractor power generator)
B—AUX PWR Harness (implement bulkhead)

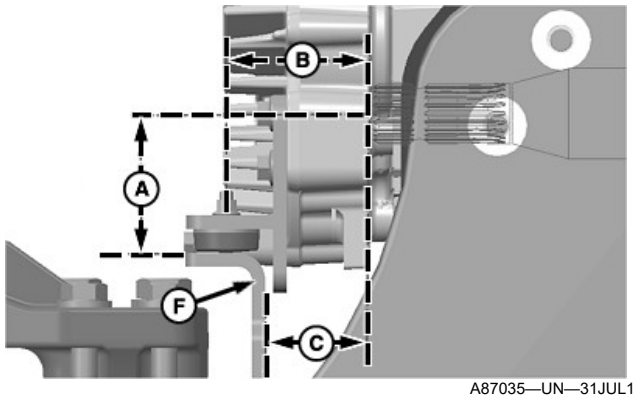
11. Connect POWER IN harness (A) from the generator to implement AUX PWR harness (B) from the implement bulkhead.

LM78752,00006A3-19-31JAN25

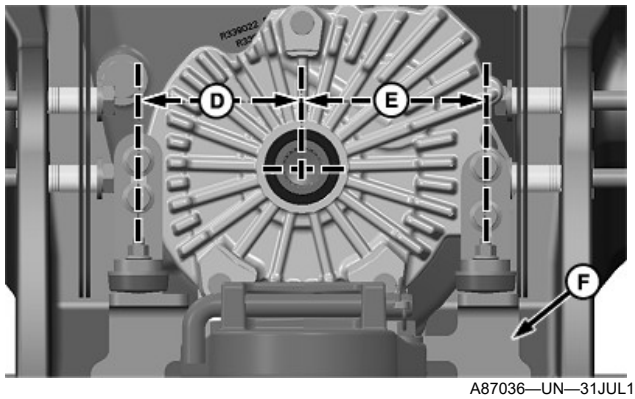
Install the Tractor Power Generation System on Other Tractors



TS230—UN—24MAY89



A87035—UN—31JUL15



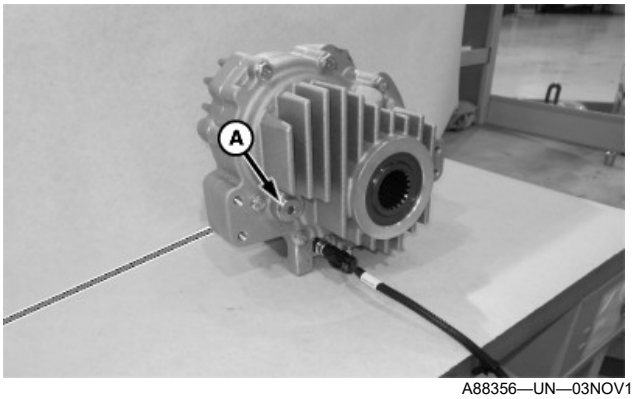
A87036—UN—31JUL15

A—103 mm (4 in)
B—107 mm (4-1/4 in)
C—76 mm (3 in)
D—134 mm (5-1/4 in)
E—150 mm (5-7/8 in)
F—Lower Support

1. Place the tractor in park, turn off the engine, and remove the key.
2. To fabricate a lower support (F), use dimensions (A—E).

IMPORTANT: Avoid damage to the power generation system. Verify that the lower support is tightly fastened to the tractor frame.

3. Install the fabricated support on tractor.



A88356—UN—03NOV15

Gear Case Oil

A—Plug

IMPORTANT: Avoid damage to the sensor. Do not rest the weight of the gear case on the sensor.

Avoid damage to the gear case. Verify the oil level.

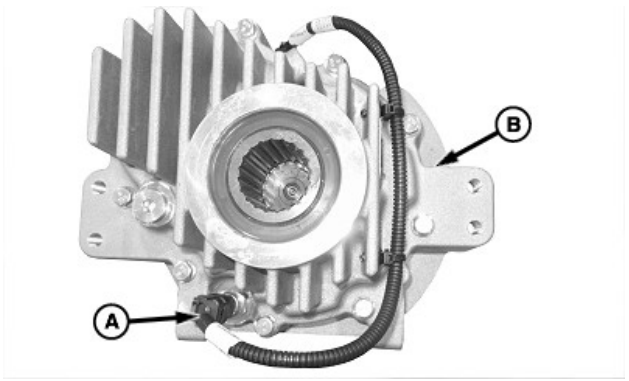
4. Place the gear case on a level surface with the vanes vertical. Remove plug (A). Check the oil level in the gear case. Fill the gear case to the specified volume or until the oil is level with the bottom of the hole.

Specification

John Deere Hy-Gard
Oil—Volume. . . . . 0.5 L (17 fl oz)



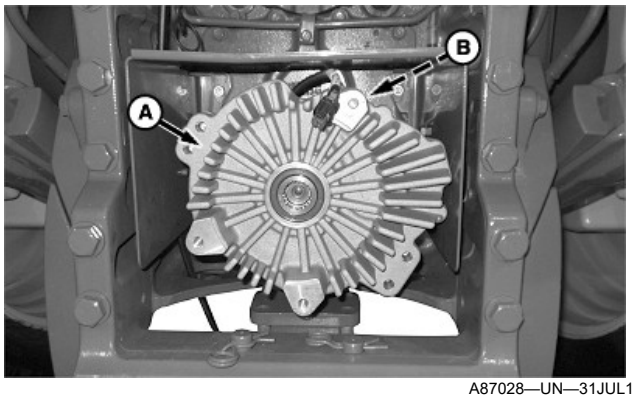
A87025—UN—31JUL15



A87027—UN—31JUL15

A—Temperature Harness
B—Gear Case

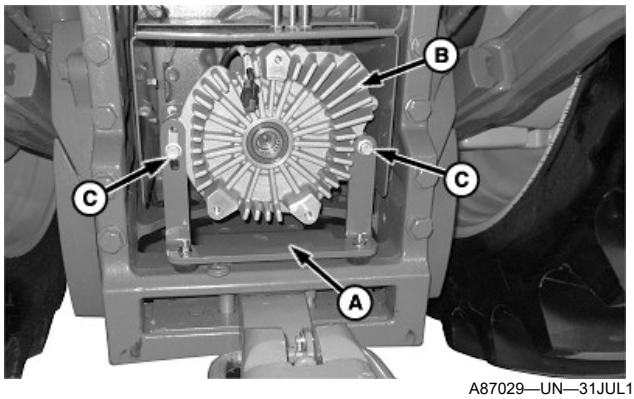
5. Install temperature harness (A) on gear case (B).



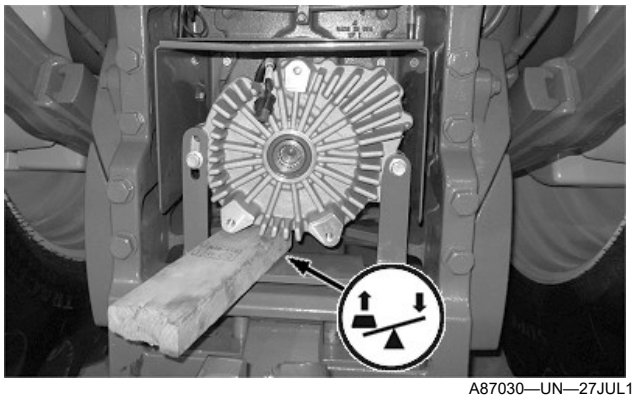
A87028—UN—31JUL15

A—Gear Case
B—PTO Shaft

6. Place the harness behind the gear case and attach gear case (A) to PTO shaft (B).



A87029—UN—31JUL15



A87030—UN—27JUL16

A—Support
B—Gear Case
C—Flange Cap Screw (2 used)

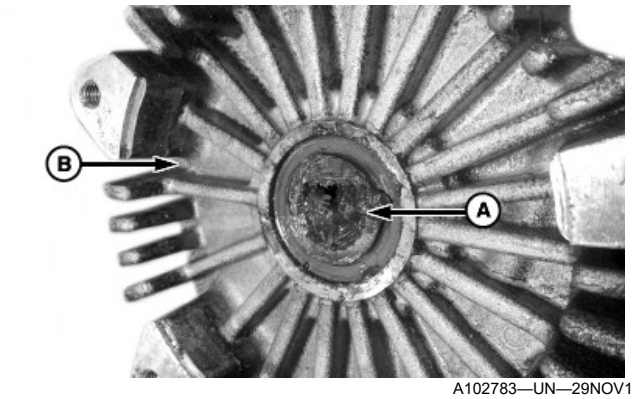
7. Align support (A) for attachment to gear case (B).
8. Attach flange cap screws (C). Tighten the cap screws slightly, leaving them loose enough for gear case adjustment.
9. Pry up on the gear case slightly while pushing down

on the footing bracket and then tighten flange cap screws (C) to specification.

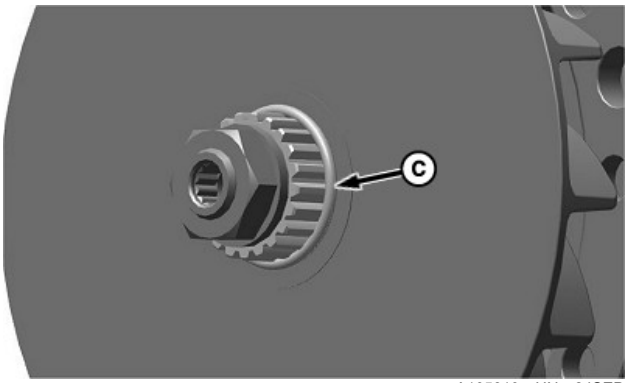
Specification

Flange Cap Screw (C)—Torque (dry). . . . . 125 N·m (92 lb·ft)

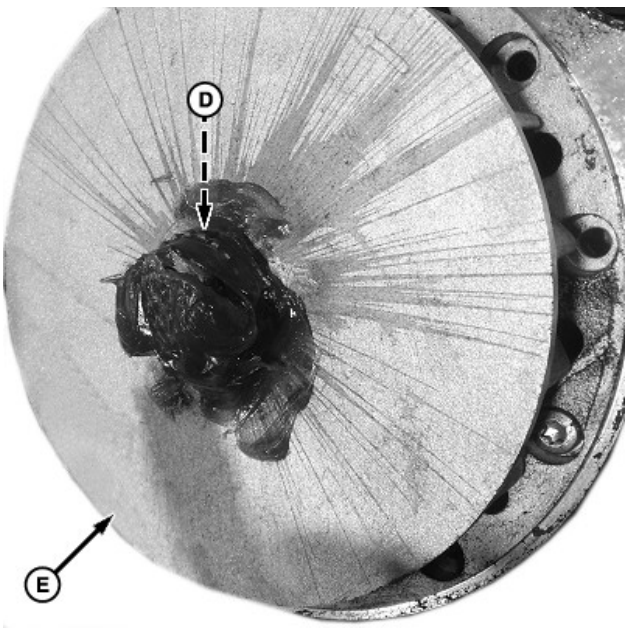
10. Remove the prying device.



A102783—UN—29NOV18



A105819—UN—24SEP19



A105820—UN—24SEP19

A—Cavity
B—Gear Case
C—O-Ring (A120963)
D—Gear
E—Alternator

IMPORTANT: Avoid damage to the gear (D) and shaft. Lubricate gear every time alternator (E) is installed and annually.

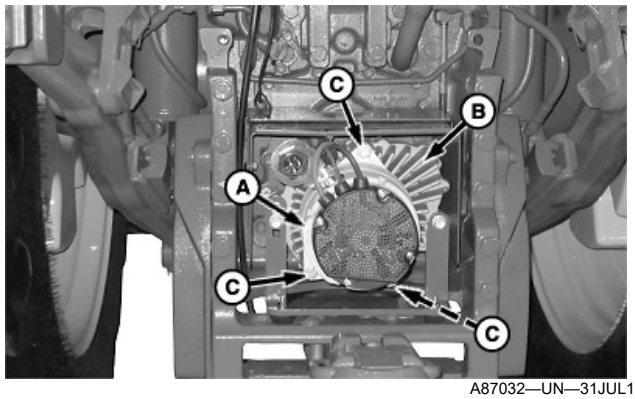
NOTE: O-ring (C) helps retain the grease on the gear after grease has been applied.

11. Using the specified lubricant, fill cavity (A) on gear case (B). Verify that O-ring (C) is installed on gear (D) of alternator (E). Apply the same amount of lubricant to gear (D) on alternator (E).

Gear Lubrication — Specification

Gear Grease—Type. . . . . Class GC-LB with 3—5% Molybdenum Disulfide

Interval—Time. . . . . Each Installation and Annually



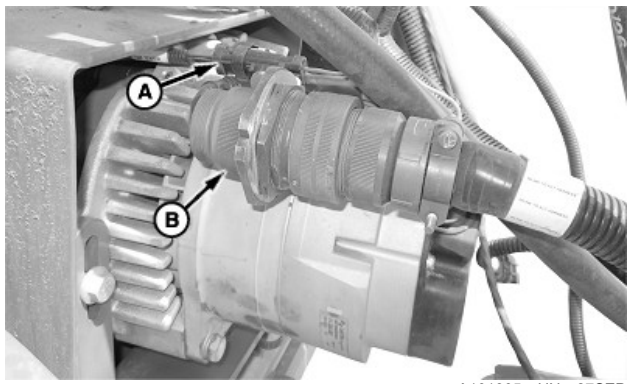
A87032—UN—31JUL15

A—Alternator
B—Gear Case
C—Cap Screw, M12 x 45 and Flat Washer (3 used)

12. Attach alternator (A) to gear case (B) using cap screws and flat washers (C). Tighten the cap screws to specification.

Specification

Cap Screw (C)—Torque (dry). . . . . 125 N·m (92 lb·ft)



A101805—UN—27SEP18

A—Temperature Harness
B—Power Generation Harness

13. Connect temperature harness (A).

14. Connect power generation harness (B).

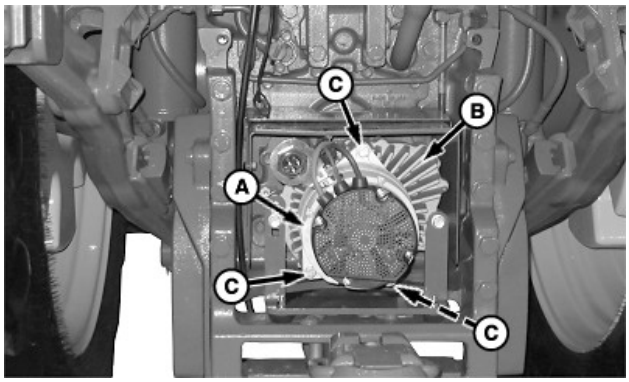
OUO6074,0000EC1-19-31JAN25

Remove the Tractor Power Generation System



TS198—UN—23AUG88

PTO Entanglement

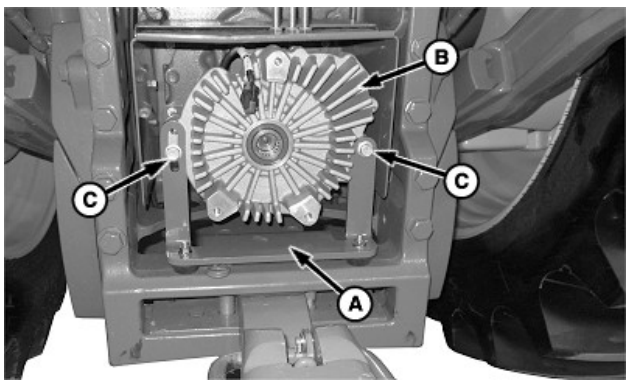


A87032—UN—31JUL15

A—Alternator
B—Gear Case
C—Cap Screws

CAUTION: Avoid serious injury or death. Keep the driveline shields in place.

1. Remove the cap screws (C) and the alternator (A) from the gear case (B).



A87029—UN—31JUL15

A—Support
B—Gear Case
C—Cap Screws

IMPORTANT: Protect the temperature sensor from damage during removal or storage of the gear case for the tractor power generation.

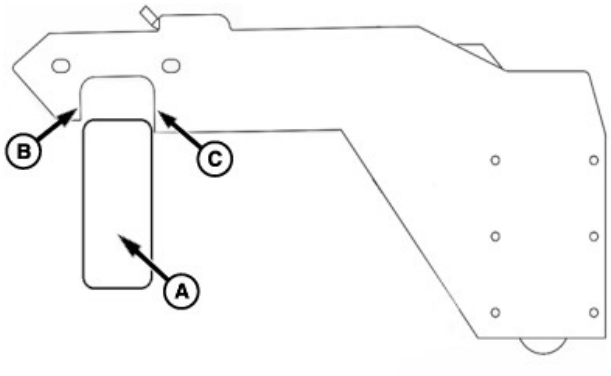
NOTE: Leave the support (A) attached unless there is interference with other attachments.

2. Loosen the cap screws (C) and remove the gear case (B) from the tractor.
3. Install any components removed earlier when installing the tractor power generation.

OUO6074,0000ECF-19-18MAY17

Detaching the Planter

Detach Machine



A79379—UN—21NOV13

A—Hitch
B—Frontside (wing latch)
C—Backside (wing latch)

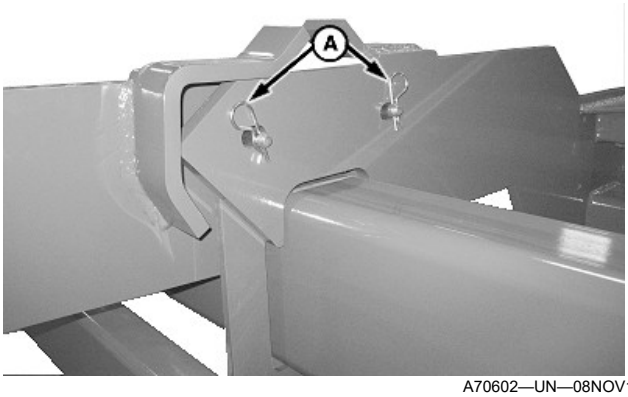
Prevent one wing from traveling past the hitch as the second wing nears the hitch.

Raise the tongue until the hitch (A) is high enough for the frontside (B) of the first wing latch to clear the hitch while the backside (C) of the wing latch contacts the hitch.

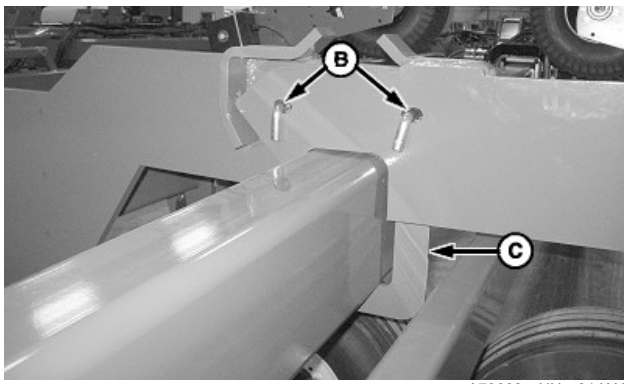
The first wing is held in place as the second wing nears the hitch.

Once both of the wings are over the hitch (A), raise the hitch to latch both of the wings.

Non-Fold Assist Planters



A70602—UN—08NOV11



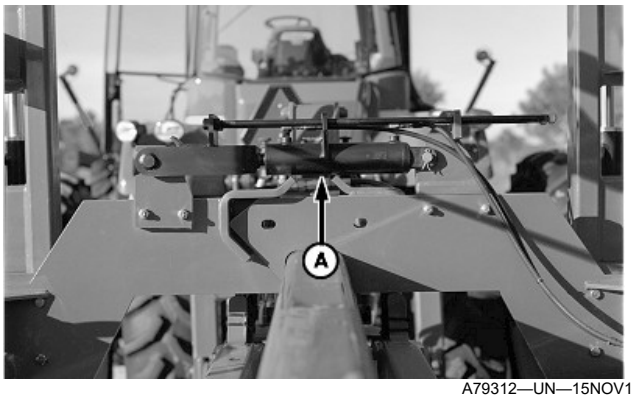
A70603—UN—31JAN11

A—Spring Locking Pin (2 used)
B—Pin (2 used)
C—Collar

CAUTION: Avoid injury from the tongue whipping upward when the hitch pin is removed. Fold the machine and relieve the load from the hitch before removing pins (B).

1. Fold the machine, but do not raise into high transport position. (See Unfold And Fold Planters (Non-Fold Assist) in Operating Machine section.)
2. To retain a folded position, install collar (C), pins (B), and spring locking pins (A) on the wing latches.
3. Install the service locks on the wing wheels and mainframe wheels.
4. Lower the machine on the service locks.
5. To remove weight from the drawbar and relieve the tension from the hitch pin, maneuver the hitch cylinder.
6. Remove the safety chain and hitch pin.
7. Remove all the hoses and harnesses.
8. If the planter uses the tractor power generation, (see Tractor Power Generation section for removal procedure).

Fold-Assist Planters



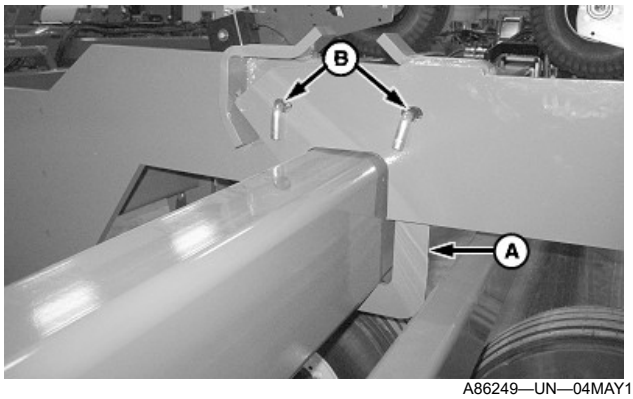
A79312—UN—15NOV13

A—Fold Assist Cylinder

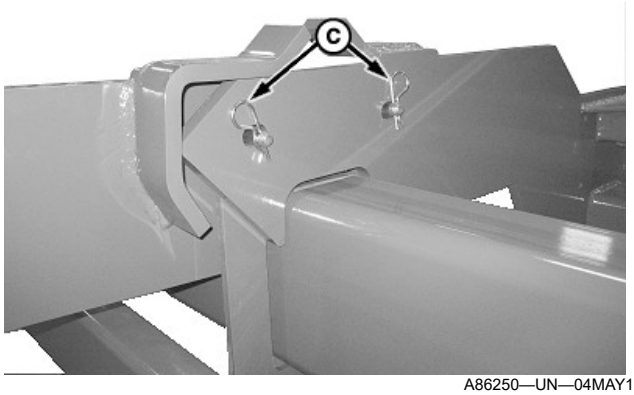
CAUTION: Avoid injury from the tongue whipping upward when the hitch pin is removed. Fold the machine and relieve the load from the hitch before removing pins (B).

1. Fold the machine, but do not raise into high transport position. (See Unfold And Fold Planters (Fold Assist) in Operating Machine section.)
2. Attach fold assist cylinder (A) from the right-hand wing plate onto the left-hand wing plate.
3. Retract the fold assist cylinder to draw the wings into a complete folded position.

4. Raise the tongue until the wing latches are locked over the hitch.



A86249—UN—04MAY15



A86250—UN—04MAY15

A—Transport Collar
B—Pin (2 used)
C—Spring Locking Pin (2 used)

5. Attach transport collar (A) to the wing latches with pins (B) and spring locking pins (C).
6. Install the service locks on the wing wheels and mainframe wheels.
7. Lower the machine on the service locks.
8. To remove weight from the drawbar and relieve tension from the hitch pin, maneuver the hitch cylinder.
9. Remove the safety chain and hitch pin.
10. Remove all the hoses and harnesses.
11. If the planter uses the tractor power generation, (see Tractor Power Generation section for removal procedure).

OUO6074,0000ED9-19-24MAY24

General

IMPORTANT: DO NOT put the selective control valve (SCV) lever in “Float” when raising and lowering machine. Correct procedure for raising and lowering machine is to power completely up or down.

To prevent plugging of BrushBelt or seed openers, lower the machine when moving forward.

DO NOT back up with machine lowered.

For proper machine operation, it is important that the machine frame is fully lowered into correct planting position. Achieving this position is difficult with some attachment combinations, especially when planting in hard-to-penetrate soil conditions. If this situation is encountered, the following action is warranted: Reduce attachment down force levels. Avoid using more attachment down force than required.

To prevent BrushBelt malfunction, do not apply fertilizer directly to the seed furrow in front of the BrushBelt.

1. Use recommended size tractor. (See Specifications.)
2. Verify that the tractor and planter have been properly prepared. (See Preparing the Tractor and Preparing the Planter.)
3. Use clean seed for best results.
4. Check seed rates carefully.
5. Check tire pressure before seeding.
6. Before seeding, allow tractor hydraulic oil to warm up thoroughly.

WP29706,000080E-19-12NOV24

Vacuum System Hydraulic Operation

The vacuum motor hydraulic hoses must be connected to the tractor with the pressure hose connected to the “Retract” coupler on the tractor.

To engage the vacuum system, move the SCV lever forward and lock it into forward (retract) detent.

Avoid damaging pressure spikes in the hydraulic system. Move the SCV lever forward into "Float" position, not “Neutral”, to stop the vacuum system.

Once the hydraulic vacuum motors and blowers have come to a stop, the SCV lever must be returned to “Neutral” position.

WP29706,000080F-19-18FEB16

Frame Controls

If equipped with the frame control functions on the display or the Easy Fold system:

- See your SeedStar Application Help or the SeedStar operator’s manual for additional information.
- Leave the frame control in the Transport mode during transport. The transport mode disables the independent row hydraulic downforce, reduces the downforce to a minimal setting, and avoids trouble codes during transport.

WP29706,0000B7E-19-14OCT25

Recommended Operating Speed

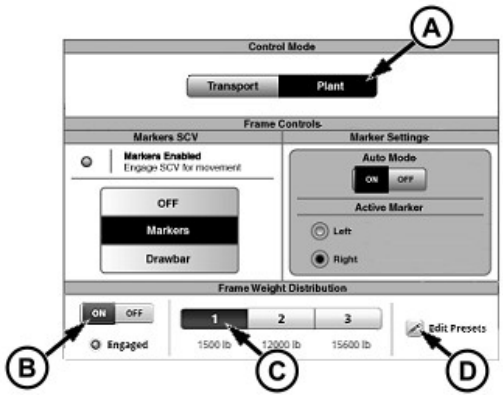
With ExactEmerge		With MaxEmerge 5e	
Configuration	**Ground Speed km/h (mph)**	**Configuration**	**Ground Speed km/h (mph)**
Without fertilizer	2.5—16 (1.5—10)	Any	2.5—9 (1.5—5.5)
With in-furrow ExactRate	2.5—16 (1.5—10)		
IMPORTANT: Avoid damage to the ground-driven fertilizer system. Do not travel at speeds that cause the system pressure to exceed the maximum pressure of 620 kPa (6.2 bar) (90 psi). To avoid exceeding the maximum pressure, adjust the orifice sizes or ground speed.			
With a ground-driven fertilizer pump	2.5—11 (1.5—7)[a]		
Any fertilizer using frame-mounted fertilizer openers	2.5—11 (1.5—7)[a]		

[a] *Optimum pump performance is at 8—11 km/h (5—7 mph).*

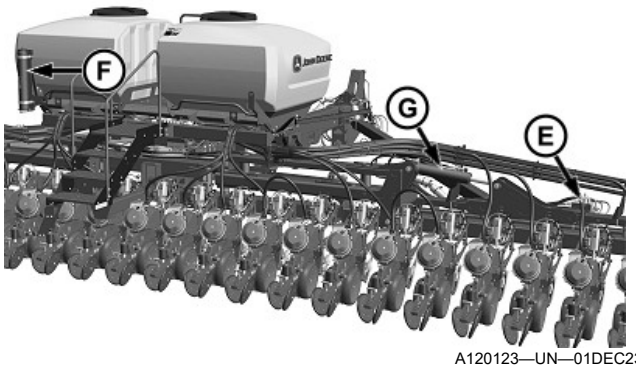
IMPORTANT: Avoid adverse effects on seed placement. Do not operate the planter outside of these speed recommendations.

WP29706,00007A4-19-07OCT25

Frame Weight Distribution (FWD)



A120120—UN—01DEC23



A120123—UN—01DEC23

A—Plant
B—ON/OFF
C—Preset
D—Edit Presets
E—FWD Valve
F—Accumulator
G—FWD Cylinder

NOTE: If a hydraulic repair allows air into the FWD system, bleed the FWD hydraulics. (See Bleeding the Frame Weight Distribution Cylinders in the Service and Adjustments—General section for additional information.)

The weight distribution does not change automatically as seed levels change in the CCS tanks or as ground conditions change. The FWD system does not interact with the row unit downforce system or the frame control.

To enable the FWD system, the display must be in plant (A) mode and ON/OFF (B) switch must be ON. The FWD is powered when the planter is unfolded and the power beyond hydraulics are active.

See your SeedStar Application Help for the frame control and frame weight distribution functions on the display. ON/OFF (B) switch pressurizes and depressurizes the system between FWD valve (E), accumulator (F), and FWD cylinders (G). The tractor power beyond hydraulics pressurize and depressurize the system between the tractor and FWD valve (E).

Use the presets for quick adjustment to various conditions, including different soil conditions.

NOTE: Establish the final FWD setting when the CCS tanks are half full.

1. Enter the field and location that represents the soil conditions for the preset.
2. Unfold and lower the planter, then drive a short distance.
3. Adjust the row unit downforce, closing wheels, and all other settings for the field condition before enabling the FWD system.
4. With the tractor running, turn on the FWD while observing the FWD cylinders and the planter wings. Verify that there is slight movement indicating that the system is enabled.
5. Select preset (C).

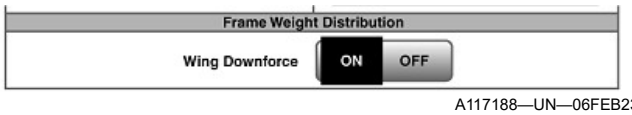
NOTE: The maximum and minimum FWD values are set at the factory and cannot be changed.

6. Drive a short distance and compare the wing wheel and the center frame wheel depth in the soil. If the depth is not equal, adjust the FWD using edit presets (D), drive a short distance, and compare the depth again.
7. Verify that the wing and center frame height is to specification. If not, adjust the wheel position (frame height), verify the row unit adjustments (depth, closing, and others), and recheck the FWD setting.

Specification	
Frame—Height	510—560 mm (20—22 in)

WP29706,00009AA-19-12NOV24

Frame Weight Distribution (FWD) for 5-Section Frames



A117188—UN—06FEB23

Toggle Button

IMPORTANT: The on-screen toggle button must be set to ON for the FWD system to automatically react to the frame position.

NOTE: The FWD pressure is supplied from the power beyond circuit on the tractor. If a hydraulic repair allows air into the FWD system, bleed the FWD hydraulics. (See Bleed the Frame Weight Distribution Cylinders in the Service section.)

Establish the gauge pressure when the CCS tanks are full.

The FWD pressure does not change automatically as product levels change in the CCS tanks.

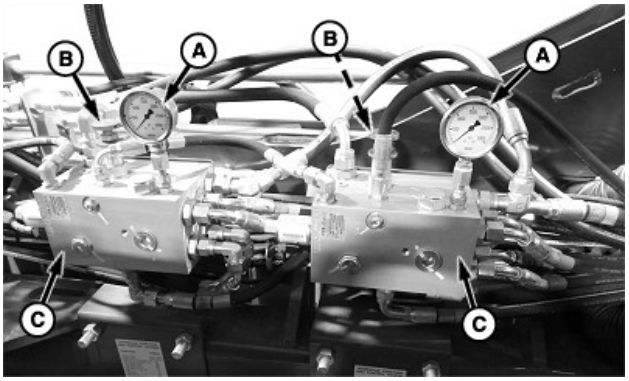
See your SeedStar Application Help for the frame control functions on the display. The FWD system is turned on and off using an on-screen toggle button.

- When the button is set to OFF, FWD movement does not occur.
- When the frame is folded, FWD movement does not occur.

Effective Pressure Range kPa (bar) (psi)	
Inner Distribution	Outer Distribution
4826—16 203 (48—162) (700—2350)	2413—8102 (24—81) (350—1175)

To operate the frame weight distribution, proceed as follows.

1. Unfold and lower the planter in the field.
2. Verify that the downforce system for the row units is adjusted properly for the field conditions before engaging the FWD system.



A116645—UN—08APR22

A—Pressure Gauge (2 used)
B—Adjustment Knob (2 used)
C—Valve Block (2 used)

NOTE: The outer valve block controls the outer cylinder and the inner block controls the inner cylinders.

3. Adjust the operational pressure on pressure gauges (A) using the adjustment knobs (B) on the valve blocks (C).

NOTE: Maintain the outer valve pressure near 50% of the inner valve pressure.

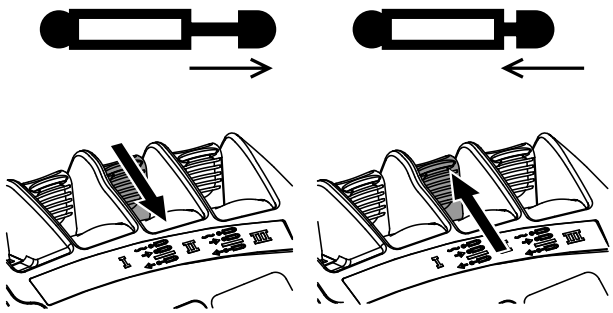
4. Set the initial FWD pressure when the planter is full of product (seed/liquid).

Initial Pressure Range kPa (bar) (psi)	
Inner Valve	Outer Valve
6895—7584 (69—76) (1000—1100)	3448—3792 (35—38) (500—550)

5. Verify that FWD system is operational.
   a. Unfold and lower the planter in a clear area with the FWD toggle button set to OFF.
   b. Move the selective control valve (SCV) for the frame functions into the detent position.
   c. Turn the FWD toggle button on while observing the FWD cylinders and wing frames. If the cylinders extend slightly and the wing frames move, the system is active.
6. Pull the planter a short distance and verify that the wing wheels press into the soil at the same depth as the center frame wheels. Adjust the FWD pressure as needed.
7. Operate the planter until the CCS tanks are 50% full.
8. Verify that the wing wheels press into the soil at the same depth as the center frame wheels. Lower the FWD pressure in small increments and operate the planter in the field until the wing wheels no longer sink into the soil. This pressure setting represents the minimum FWD pressure needed.
9. Increase the FWD pressure as necessary starting from the minimum.
10. Use the following guidelines with the FWD.
    - If the wing wheels sink too deep, reduce the gauge pressure.
    - If the wing wheels lose ground contact, increase the gauge pressure or reduce the downforce on the row units.
    - If more weight needs transferred to the wings, increase the gauge pressure.
    - If the wing wheels sink too deep with the system pressure at minimum, turn off the FWD system.
    - If the row unit gauge wheels sink too deep, lower the downforce on the row units. Adjust the wing and center frame wheel positions for the proper frame height.

WP29706,0000F5B-19-01DEC23

Rear Steering Operation (If Equipped)



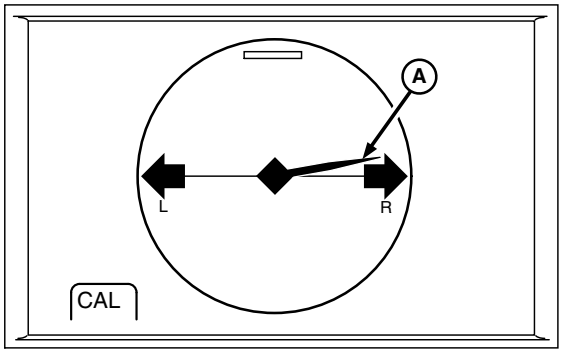
A96251—UN—18APR17

Extend and Retract SCV Positions

IMPORTANT: Avoid damage to the planter. Never place the selective control valve for the rear steering function in the detent position.

NOTE: To use the rear steering operation as stated in these steps, the rear steering hoses must be connected as described in this operator's manual (See Hydraulic Connection Recommendations).

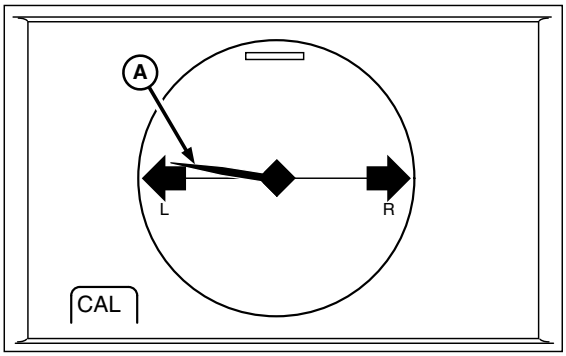
The rear steering function is controlled with a selective control valve (SCV). By moving the SCV toward the extend or retract positions, the rear steering wheels move the rear of the planter right or left.



A101216—UN—26JUN18

A—Extend and Direction of Rear Wheel Turn

1. To move the rear of the planter to the right (A), move the SCV toward the retract position. The rate that the wheels change direction is determined by how far the SCV is moved into the retract position. The extent of the wheel turn is shown on-screen.



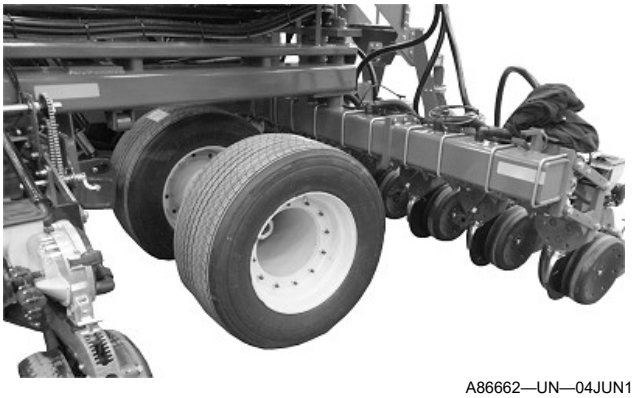
A101217—UN—26JUN18

A—Retract and Direction of Rear Wheel Turn

2. To move the rear of the planter to the left (A), move the SCV toward the extend position. The rate that the wheels change direction is determined by how far the SCV is moved into the extend position. The extent of the wheel turn is shown on-screen.

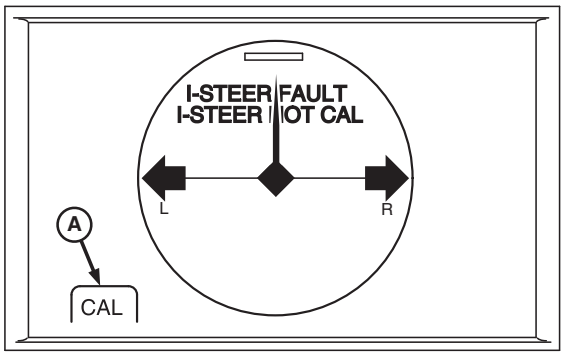
WP29706,0000D5A-19-03JUL18

Rear Steering Calibration



A86662—UN—04JUN15

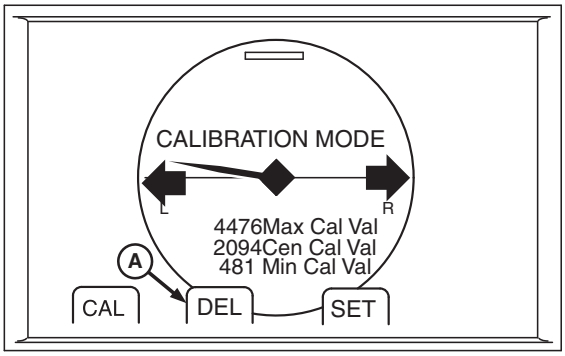
1. Set center frame tires square with the planter.



A86669—UN—09JUN15

A—Calibration Softkey

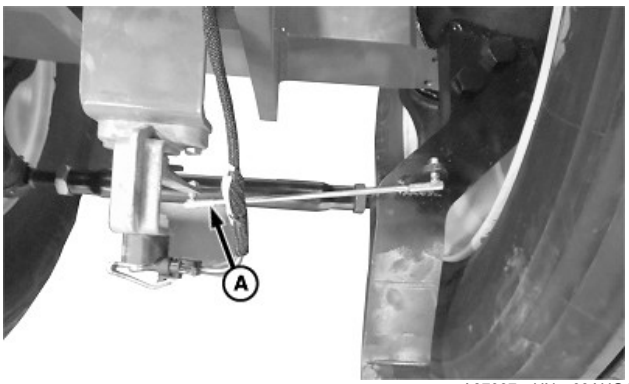
2. To start process, press calibration (CAL) softkey (A) on the display.



A86670—UN—09JUN15

A—Delete Softkey

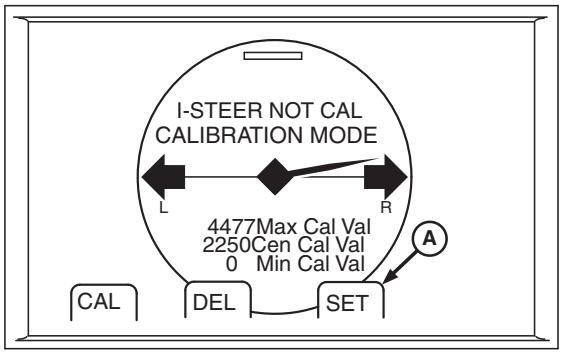
3. To remove any values that are present, press the delete (DEL) softkey (A).



A87037—UN—03AUG15

A—Rod

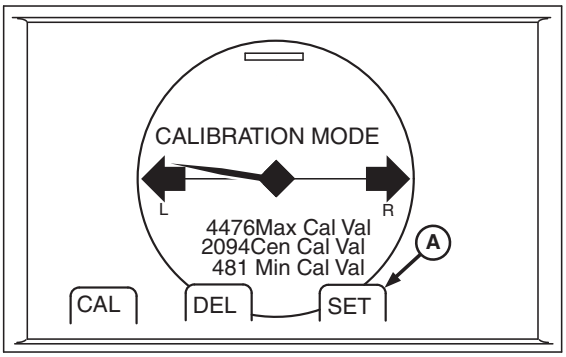
4. Adjust rod (A) on potentiometer until display shows that the tires are centered.
5. Remove the rod (A) from the steering sensor.



A86672—UN—09JUN15

A—Set Softkey

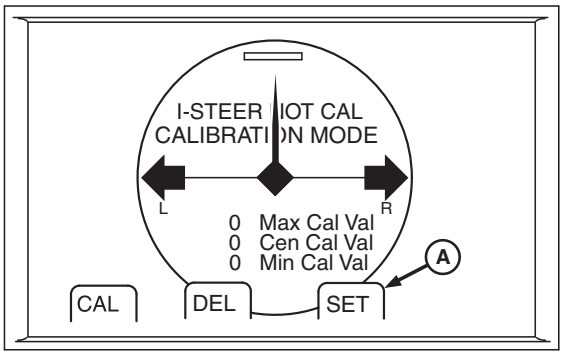
6. Manually steer the sensor all the way to the right. Set right calibration value by pressing SET softkey (A) on display.



A86673—UN—10JUN15

A—Set Softkey

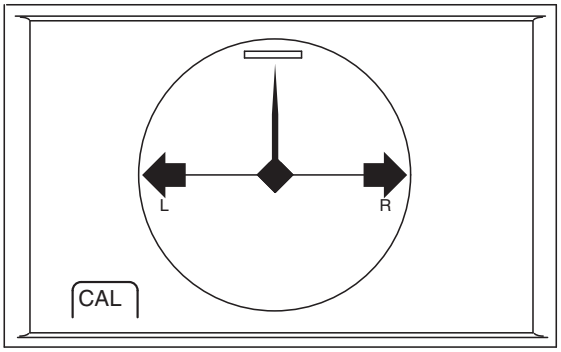
7. Manually steer the sensor all the way to the left. Set left calibration value by pressing SET softkey (A) on display.



A86671—UN—09JUN15

A—Set Softkey

8. Return sensor to the center position and reconnect rod. Set center calibration value by pressing SET softkey (A) on display.



A86674—UN—09JUN15

9. If display reading is correct, calibration is complete.

   If display reading is not as shown, start calibration procedure again.

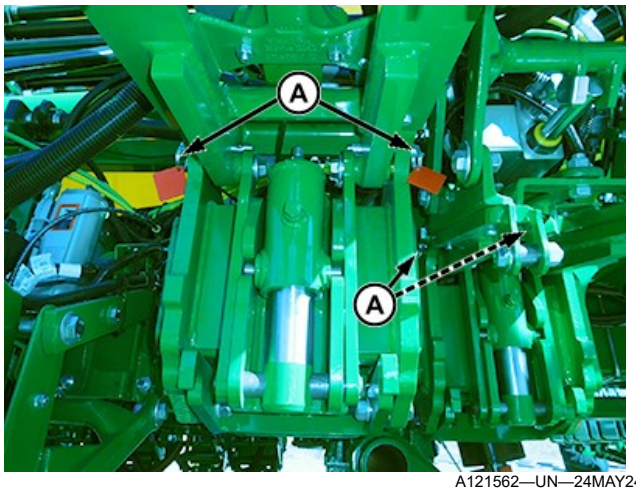
WP29706,0000902-19-07AUG15

Unfold and Fold Planters

NOTE: For the frame control functions on the display or the easy fold system, see the SeedStar Application Help or the SeedStar operator's manual for additional information.



A121561—UN—24MAY24

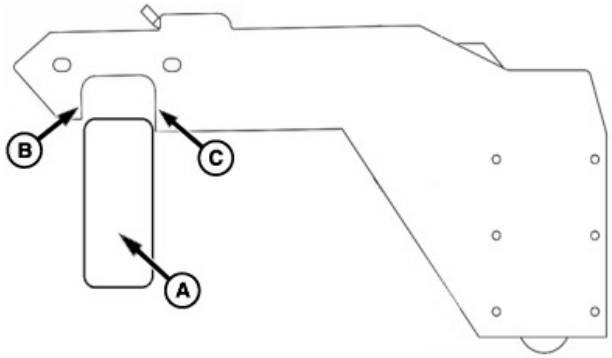


A121562—UN—24MAY24

A—Transport Pins

Before transporting, install transport pins (A).

Before unfolding, remove transport pins (A).



A79379—UN—21NOV13

A—Hitch
B—Frontside (wing latch)
C—Backside (wing latch)

Prevent one wing from traveling past the hitch as the second wing nears the hitch.

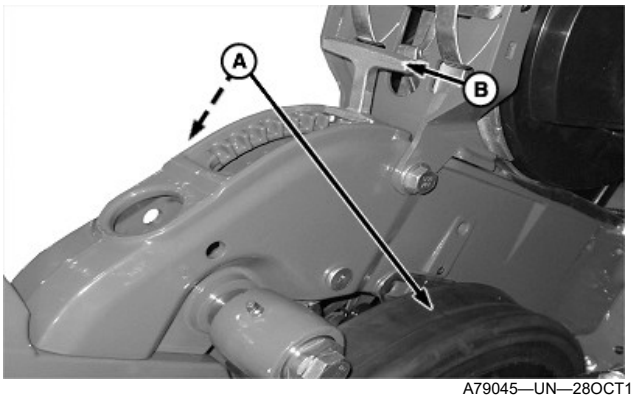
Raise the tongue until hitch (A) is high enough for frontside (B) of the first wing latch to clear the hitch while backside (C) of the wing latch contacts the hitch.

The first wing is held in place as the second wing nears the hitch.

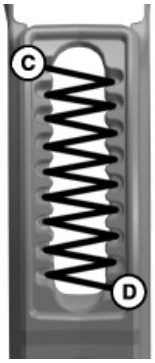
Once both of the wings are over hitch (A), raise the hitch to latch both of the wings.

WP29706,0000D5C-19-28MAY24

Adjust the Planting Depth



A79045—UN—28OCT13



A103834—UN—01MAR19

Handle Positions

A—Depth Gauge Wheel
B—Depth Adjustment Handle
C—Minimum Depth
D—Maximum Depth

NOTE: The closing wheel downforce affects the seed placement and depth. Do not use more force than necessary on the seed furrow, especially in light soils.

The depth gauge wheels (A) control the seed depth. Adjust the planting depth as follows:

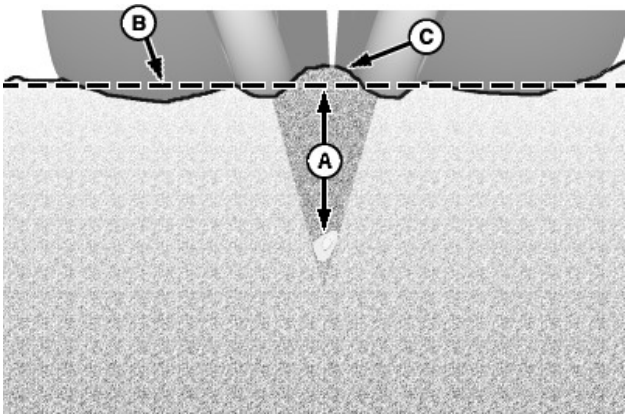
1. To remove weight from the depth gauge wheels, raise the planter.
2. Lift the depth adjustment handle (B). To decrease

planting depth, move the handle forward. To increase planting depth, move the handle rearward. If small increments are needed, walk the handle from side-to-side along the depth adjustment channel. Each position changes the planting depth by 6 mm (1/4 in).

3. Adjust all rows to the same initial setting.

NOTE: Prevent the seed tubes from plugging. When operating in the field, lower the planter when the tractor is moving forward.

4. Lower planter and drive a short distance at the normal planting speed.



A57713—UN—20APR06

Soil Cross Section



A103836—UN—04MAR19

Seed Digging Tool

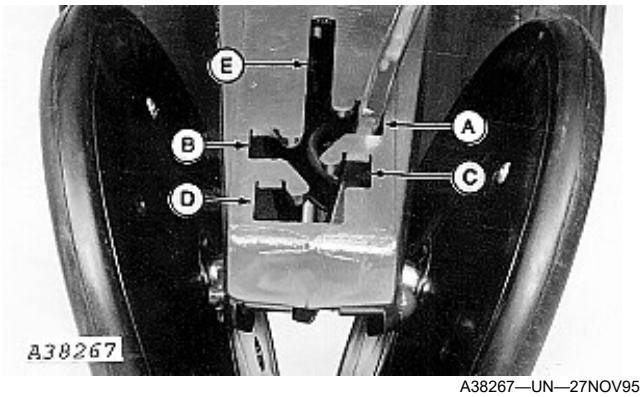
A—Depth
B—Top of Soil Profile
C—Ridge

NOTE: Make it easier to see seed depth. Strap or chain up closing wheels when performing a check (see Check Seed Population). A seed digging tool is provided with the implement or can be obtained via regular special tool order channels.

5. Check the planting depth on each row as follows:
   a. Dig through soil to locate the seed.
   b. Measure depth (A) between the seed and the top of the soil profile (B). Do not measure to the top of the ridge (C) created by the closing wheels.
   c. Adjust the depth gauge wheels as needed.

OUO6074,00009B4-19-22OCT25

Adjust the Closing Wheel Downforce



A38267—UN—27NOV95

A—Position A (Minimum)
B—Position B
C—Position C
D—Position D (Maximum)
E—Position E (Float)

If equipped with pneumatic closing wheels, see your SeedStar Application Help for adjustment.

The closing wheels close and firm the seed furrow created by the Tru-Vee openers.

NOTE: Avoid adverse effects on seed placement and depth. Do not use more force than necessary to close the seed furrow, especially in light soils.

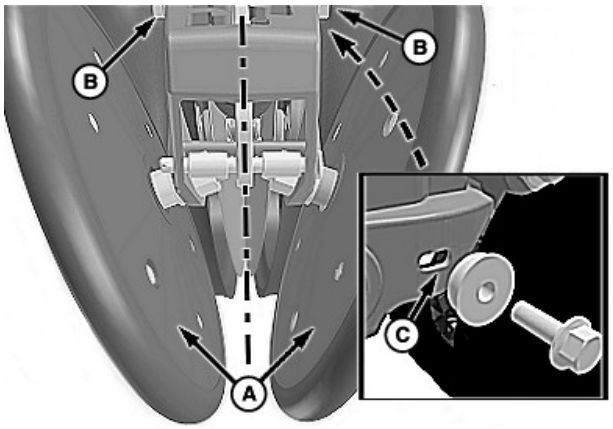
The proper amount of downforce closes and firms the seed furrow without compacting the area around the seed.

Select the optimum handle position (A), (B), (C) or (D) for the current soil conditions. The middle position (E) only applies the weight of the closing wheels as they float on the soil surface.

Verify that the closing wheels are centered over the seed furrow. (See Center the Closing Wheels in this section.)

AG,OUO6074,1203-19-07OCT25

Center the Closing Wheels



A116097—UN—18FEB22

A—Closing Wheel (2 used)
B—Cap Screw (2 used)
C—Slot

If the closing wheels (A) are not centered over the seed furrow, proceed as follows:

1. Raise the machine and install service locks.

NOTE: Slots (C) allow for adjustment.

2. Loosen the cap screws (B) and adjust the closing wheels to the right or left. Visually center as required.
3. Tighten cap screws (B) to specification.

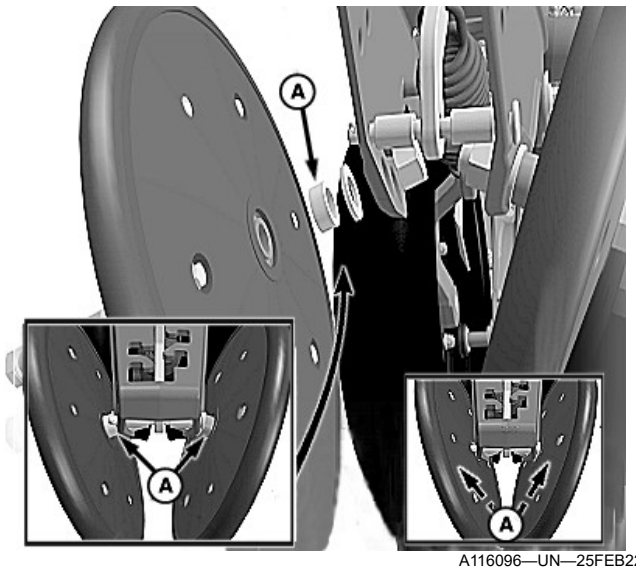
Specification

Cap Screw (B)—Torque (dry). . . . . 115 N·m (85 lb·ft)

4. Plant a short distance and verify that the wheels are pressing equally on both sides of the seed furrow.

AG,OUO6074,1204-19-07MAR22

Adjust the Closing Wheel Spacing



A116096—UN—25FEB22

Wide Spacing and Narrow Spacing

A—Spacer

NOTE: To match the soil conditions and the depth of the planted seeds, the closing wheels can be adjusted. Use the standard (wide) spacing for the majority of planting conditions. For planting small seeds at shallow depth, use the narrow spacing.

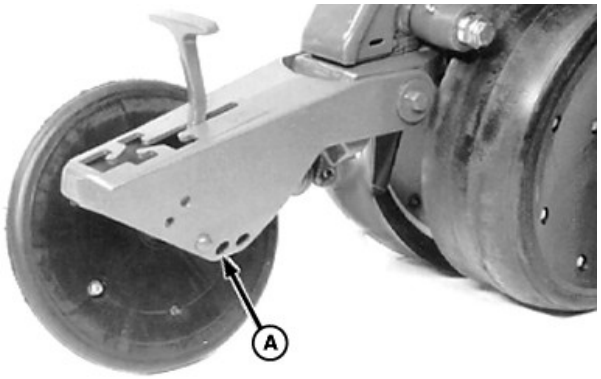
To change the spacing, position spacers (A) to the inner side of wheels (wide spacing) or outer side of wheels (narrow spacing). Tighten hardware to specification.

Specification

Hardware—Torque (dry). . . . . 115 N·m (85 lb·ft)

OUO6064,0000249-19-25FEB22

Stagger the Closing Wheels



A46776—UN—12OCT00

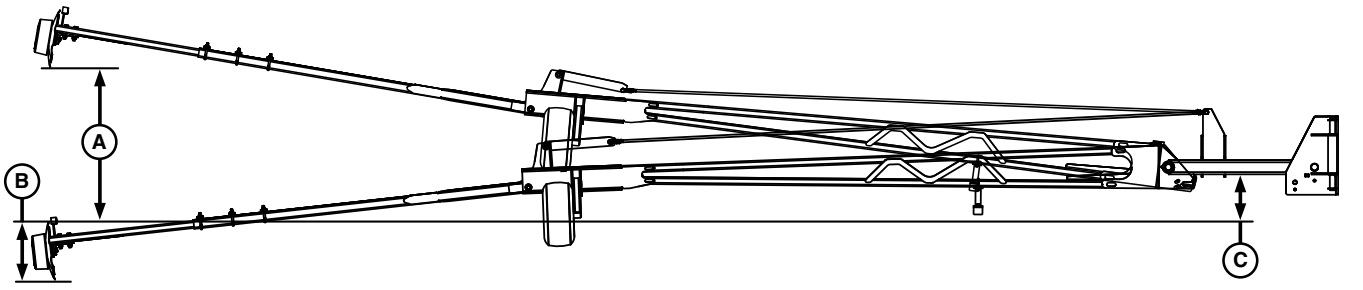
A—Rear Hole

If residue or root balls get lodged between the closing wheels in a mulch till or no-till conditions, remove one of

the closing wheels from the planting unit and install it in the rear hole (A) of the casting.

AG,OUO6074,1206-19-12JUL18

Marker Float Range



A90521—UN—10MAY16

A—Dimension A
B—Dimension B
C—Dimension C

The marker has an approximate float range (see table) which cannot be exceeded.

Exceeding this float range can result in damage to the marker inner arm.

If this range must be exceeded, raise the marker by operating the marker SCV lever.

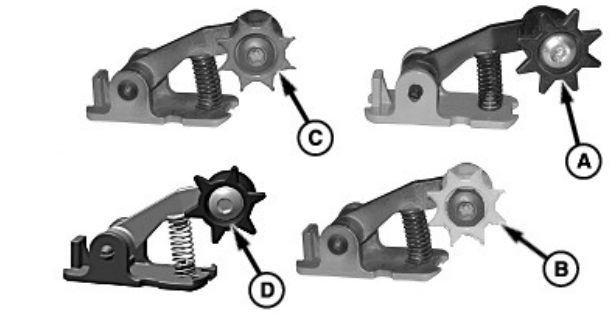
Machine	Row Spacing	Dimension "A"	Dimension "B"	Dimension "C"
DB60 24R	76 cm (30 in)	11°	5°	56 cm (22 in)[a]
DB60 36R	51 cm (20 in)	11°	5°	56 cm (22 in)[a]
DB60 47R	38 cm (15 in)	11°	5°	56 cm (22 in)[a]
DB60 48R	38 cm (15 in)	11°	5°	56 cm (22 in)[a]
DB80 32R	76 cm (30 in)	11°	5°	56 cm (22 in)[a]
DB88 48R	51 cm (20 in)	11°	5°	56 cm (22 in)[a]
DB90 36R	76 cm (30 in)	11°	5°	56 cm (22 in)[a]

[a] *Approximate distance from ground.*

LM78752,00002AD-19-11MAY16

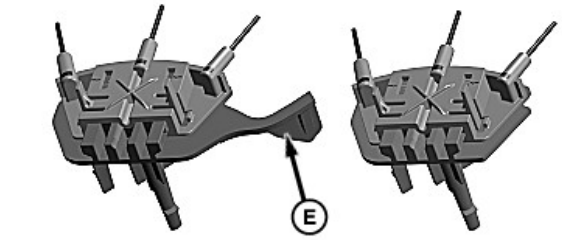
Seed Meter Settings

NOTE: Refer to specific procedures in this section when changing components.



A115630—UN—07FEB22

Wheel Assemblies



A115631—UN—08FEB22

A—Wheel Assembly, 8-Tine (black)
B—Wheel Assembly, 8-Tine (yellow)
C—Wheel Assembly, 8-Tine (green)
D—Wheel Assembly, 6-Tine (black)
E—Baffle

Meter Setup Recommendations (round and large flat corn)	
Item	**Description or Setting**
Seed Disk (32-hole bowl)	A92777 Standard Rate
Seed Disk (16-hole bowl)	A109781 Low Rate
Outer Double Eliminator	Poly 5-Tine
Inner Double Eliminator	Poly 3-Tine
Inner Double Eliminator Position	Standard
Inner Double Eliminator Base	With Baffle (E)
Meter Strip	Agitation
Wheel Assembly	(A) AA85925
BrushBelt	A98765
Seeds/ kg (lb)	**Nominal Vacuum**
<2645 (<1200)	23 +/- 6
3525 (1600)	20 +/- 8
4410 (2000)	18 +/- 6
>5290 (>2400)	16 +/- 4

Meter Setup Recommendations (round and large flat corn)	
Item	**Description or Setting**
NOTE: On planters equipped with CCS, verify that the correct nozzle and elbow are used. (See Operating the Central Commodity System for additional information.)	

Meter Setup Recommendations (small and medium flat corn)	
Item	**Description or Setting**
Seed Disk (32-cell bowl)	A135462 Standard Rate
Outer Double Eliminator	Poly 5-Tine
Inner Double Eliminator	Poly 3-Tine
Inner Double Eliminator Position	Less Aggressive
Inner Double Eliminator Base	With Baffle (E)
Meter Strip	Agitation
Wheel Assembly	(A) AA85925
BrushBelt	A98765
Seeds/ kg (lb)	**Nominal Vacuum**
<2645 (<1200)	25+/- 5
3525 (1600)	20 +/- 8
4410 (2000)	18 +/- 8
>5290 (>2400)	16 +/- 8
NOTE: On planters equipped with CCS, verify that the correct nozzle and elbow are used. (See Operating the Central Commodity System for additional information.)	

Meter Setup Recommendations (soybean)	
Item	**Description or Setting**
Seed Disk (bowl)	A103836
Outer Double Eliminator	Poly 5-Tine
Inner Double Eliminator	Poly 3-Tine
Inner Double Eliminator Position	Disengaged
Inner Double Eliminator Base	With Baffle (E)
Meter Strip	Smooth
Wheel Assembly	(A) AA85925
BrushBelt	A98765
Seeds/ kg (lb)	**Nominal Vacuum**
<4410 (<2000)	26 +/- 4
5510 (2500)	18 +/- 8
6615 (3000)	12 +/- 6
>7715 (>3500)[a]	8 +/- 4
NOTE: On planters equipped with CCS, verify that the correct nozzle and elbow are used. (See Operating the Central Commodity System for additional information.)	

Meter Setup Recommendations (soybean)	
Item	**Description or Setting**
[a]If the soybeans are >7715 seeds/kg (>3500 seeds/lb), use the inner double eliminator in the less aggressive position.	

Meter Setup Recommendations (sugar beet)		
Item	**Description or Setting**	
Seed Disk (bowl)	A105352	A104014
Outer Double Eliminator	Brush	Brush
Inner Double Eliminator	Poly 3-Tine	Poly 3-Tine
Inner Double Eliminator Position	Standard	Standard
Inner Double Eliminator Base	With Baffle (E)	With Baffle (E)
Meter Strip	Smooth	Smooth
Wheel Assembly	(B) AA88629	(C) AA89179
BrushBelt	A119678	A119678
Cartridge Seal	A104012 146 mm (5-3/4 in) Length	A104012 146 mm (5-3/4 in) Length
Seed Size	**Nominal Vacuum**	
Mini	NR[a]	9 +/- 5
Regular	15 +/- 10	NR[a]
Large	21 +/- 9	NR[a]
NOTE: On planters equipped with CCS, verify that the correct nozzle and elbow are used. (See Operating the Central Commodity System for additional information.)		
[a]Not recommended for optimal performance.		

Meter Setup Recommendations (cotton)			
Item	**Description or Setting**		
Seed Disk (bowl)	A95892	A95892	A92777
Outer Double Eliminator	Poly 5-Tine	Brush[a]	Poly 5-Tine
Inner Double Eliminator	Poly 3-Tine	Poly 3-Tine	Poly 3-Tine
Inner Double Eliminator Position	Standard	Standard	Standard
Inner Double Eliminator Base	With Baffle (E)	With Baffle (E)	With Baffle (E)
Meter Strip	Agitation	Agitation	Agitation
Wheel Assembly	(A) AA85925	(A) AA85925	(A) AA85925
BrushBelt	A98765	A98765	A98765
Cartridge Seal	A104012 146 mm (5-3/4 in) Length	A104012 146 mm (5-3/4 in) Length	A104012 146 mm (5-3/4 in) Length
NOTE: If cotton residue contaminates the metering system, install the BrushBelt Residue Shield AA112155. The shield does not need removed when planting other crops. The shield is only intended to protect against cotton residue.			

Meter Setup Recommendations (cotton)			
Item	**Description or Setting**		
Seeds/ kg (lb)	**Nominal Vacuum**	**Nominal Vacuum**	**Nominal Vacuum**
<7715 (<3500)	NR[b]	20 +/- 10	15 +/- 6
9480 (4300)	NR[b]	15 +/- 5	NR[b]
11465 (5200)	23 +/- 7	11 +/- 4	NR[b]
>13890 (>6300)	14 +/- 2	NR[b]	NR[b]
NOTE: On planters equipped with CCS, verify that the correct nozzle and elbow are used. (See Operating the Central Commodity System for additional information.)			
[a]If the poly tine is too aggressive with large seed, use the brush-type double eliminator.			
[b]Not recommended for optimal performance.			

Meter Setup Recommendations (hilldrop cotton)		
Item	**Description or Setting**	
Seed Disk (bowl)	A138643	
Outer Double Eliminator	Poly 5-Tine	
Inner Double Eliminator	Poly 3-Tine	
Inner Double Eliminator Position	Less Aggressive	
Meter Strip	AA83215	
BrushBelt	A98765	A119678
Knockout Wheel	AA113949	
Planter Ground Speed	Recommend 5 mph	
Cartridge Seal	AA114015	A104012 146 mm (5-3/4 in) Length
Seeds/ kg (lb)	**Nominal Vacuum**	
<3500 (<7720)	26 +/- 4	
4300 (9480)	20 +/- 4	
5200 (11460)	20 +/- 5	
>6300 (>13890)	18 +/- 6	
NOTE: On planters equipped with CCS, verify that the correct nozzle and elbow are used. (See Operating the Central Commodity System for additional information.)		

Meter Setup Recommendations (popcorn)			
Item	**Description or Setting**		
Seed Disk (bowl)	A95892	A95892	A92777
Outer Double Eliminator	Poly 5-Tine	Brush[a]	Poly 5-Tine
Inner Double Eliminator	Poly 3-Tine	Poly 3-Tine	Poly 3-Tine
Inner Double Eliminator Position	Standard	Standard	Standard
Inner Double Eliminator Base	With Baffle (E)	With Baffle (E)	With Baffle (E)
Meter Strip	Agitation	Agitation	Agitation
Wheel Assembly	(A) AA85925	(A) AA85925	(A) AA85925

Meter Setup Recommendations (popcorn)			
Item	**Description or Setting**		
BrushBelt	A98765	A98765	A98765
Cartridge Seal (small seeds only)	A104012 146 mm (5-3/4 in) Length	A104012 146 mm (5-3/4 in) Length	A104012 146 mm (5-3/4 in) Length
Seeds/ kg (lb)	**Nominal Vacuum**	**Nominal Vacuum**	**Nominal Vacuum**
<5510 (<2500)	NR[b]	22 +/- 8	20 +/- 10
6615 (3000)	NR[b]	19 +/- 10	NR[b]
8820 (4000)	NR[b]	19 +/- 10	NR[b]
>11025 (>5000)	23 +/- 7	10 +/- 2	NR[b]
NOTE: On planters equipped with CCS, verify that the correct nozzle and elbow are used. (See Operating the Central Commodity System for additional information.)			
[a]If the poly tine is too aggressive with large seed, use the brush-type double eliminator.			
[b]Not recommended for optimal performance.			

Meter Setup Recommendations (milo and sorghum)	
Item	**Description or Setting**
Seed Disk (bowl)	A104014
Outer Double Eliminator	Poly 5-Tine
Inner Double Eliminator	Poly 3-Tine
Inner Double Eliminator Position	Standard
Inner Double Eliminator Base	With Baffle (E)
Meter Strip	Smooth
Wheel Assembly	(C) AA89179
BrushBelt	A98765
Cartridge Seal	A104012 146 mm (5-3/4 in) Length
Seeds/ kg (lb)	**Nominal Vacuum**
<5443 (<12000)	18 +/- 2
6804 (15000)	12 +/- 2
>8165 (>18000)	9 +/- 2
NOTE: On planters equipped with CCS, verify that the correct nozzle and elbow are used. (See Operating the Central Commodity System for additional information.)	

Meter Setup Recommendations (sunflower)	
Item	**Description or Setting**
Seed Disk (bowl)	A95896
Outer Double Eliminator	Poly 5-Tine
Inner Double Eliminator	Poly 3-Tine
Inner Double Eliminator Position	Standard
Inner Double Eliminator Base	With Baffle (E)
Meter Strip	Smooth

Meter Setup Recommendations (sunflower)	
Item	**Description or Setting**
Wheel Assembly	(A) AA85925
BrushBelt	A98765
Seeds/ kg (lb)	**Nominal Vacuum**
<2268 (<5000)	25 +/- 5
3175 (7000)	15 +/- 2
>4082 (>9000)	10 +/- 1
NOTE: On planters equipped with CCS, verify that the correct nozzle and elbow are used. (See Operating the Central Commodity System for additional information.)	

Meter Setup Recommendations (sweet corn)		
Item	**Description or Setting**	
Seed Disk (bowl)	A92777	A95896
Outer Double Eliminator	Poly 5-Tine	Poly 5-Tine
Inner Double Eliminator	Poly 3-Tine	Poly 3-Tine
Inner Double Eliminator Position	Standard	Standard
Inner Double Eliminator Base	With Baffle (E)	With Baffle (E)
Meter Strip	Smooth	Smooth
Wheel Assembly	(A) AA85925	(A) AA85925
BrushBelt	A119678	A119678
Seeds/ kg (lb)	**Nominal Vacuum**	**Nominal Vacuum**
<1497 (<3300)	23 +/- 5	NR[a]
>1497 (>3300)	NR[a]	16 +/- 2
NOTE: On planters equipped with CCS, verify that the correct nozzle and elbow are used. (See Operating the Central Commodity System for additional information.)		
[a]Not recommended for optimal performance.		

Meter Setup Recommendations (large common edible bean)	
Item	**Description or Setting**
Seed Disk (bowl)	A128431
Outer Double Eliminator	Poly 5-Tine
Inner Double Eliminator	Poly 3-Tine
Inner Double Eliminator Position	Disengaged
Inner Double Eliminator Base	Without Baffle (E)
Meter Strip	Smooth
Wheel Assembly	(D) AA106419
BrushBelt	A98765
Cartridge Seal	NR[a]
Seeds/ kg (lb)	**Nominal Vacuum**

Meter Setup Recommendations (large common edible bean)	
Item	**Description or Setting**
<2650 (<1200)	25 +/- 5
2650—3970 (1200—1800)	NR[a]
>3970 (>1800)	NR[a]
NOTE: Common edible beans are not approved for CCS delivery. If CCS is used, start with tank pressure at 18 and adjust as needed. Verify settings using mobile runoff. *Planter width, seed size, population, ground speed, and CCS splitters impact seed delivery to the mini-hoppers. If using CCS, perform a planter mobile runoff.*	
[a]Not recommended for optimal performance.	

Meter Setup Recommendations (medium common edible bean)	
Item	**Description or Setting**
Seed Disk (bowl)	A92778
Outer Double Eliminator	Poly 5-Tine
Inner Double Eliminator	Poly 3-Tine
Inner Double Eliminator Position	Disengaged
Inner Double Eliminator Base	Without Baffle (E)
Meter Strip	Smooth
Wheel Assembly	(A) AA85925
BrushBelt	A98765
Cartridge Seal	NR[a]
Seeds/ kg (lb)	**Nominal Vacuum**
<2650 (<1200)	NR[a]
2650—3970 (1200—1900)	20 +/- 6
>3970 (>1900)	NR[a]
NOTE: Common edible beans are not approved for CCS delivery. If CCS is used, start with tank pressure at 18 and adjust as needed. Verify settings using mobile runoff. *Planter width, seed size, population, ground speed, and CCS splitters impact seed delivery to the mini-hoppers. If using CCS, perform a planter mobile runoff.*	
[a]Not recommended for optimal performance.	

Meter Setup Recommendations (small common edible bean)	
Item	**Description or Setting**
Seed Disk (bowl)	A126064
Outer Double Eliminator Base	Poly 5-Tine
Inner Double Eliminator Base	Poly 3-Tine
Inner Double Eliminator Position	Disengaged
Inner Double Eliminator Base	Without Baffle (E)
Meter Strip	Smooth
Wheel Assembly	(A) AA85925
BrushBelt	A98765
Cartridge Seal	Not Required

Meter Setup Recommendations (small common edible bean)	
Item	**Description or Setting**
Seeds/ kg (lb)	**Nominal Vacuum**
<2650 (<1200)	NR[a]
2650—3970 (1200—1800)	NR[a]
>3970 (>1800)	16 +/- 6
NOTE: Common edible beans are not approved for CCS delivery. If CCS is used, start with tank pressure at 18 and adjust as needed. Verify settings using mobile runoff. *Planter width, seed size, population, ground speed, and CCS splitters impact seed delivery to the mini-hoppers. If using CCS, perform a planter mobile runoff.*	
[a]Not recommended for optimal performance.	

Troubleshooting Large Common Edible Bean

High Percentage of Skips or Low Population:

- Verify that wheel assembly (D) is properly installed.
- Use the double eliminator base (without baffle [E]).
- Place the double eliminator in the disengaged position.
- Use the smooth meter strip.
- Increase vacuum up to a maximum of 30.
- Inspect the seed disk (bowl) for broken paddles.
- Increase the disk (bowl) hub height.
- Use the brush-style double eliminator.

High Percentage of Doubles or High Population:

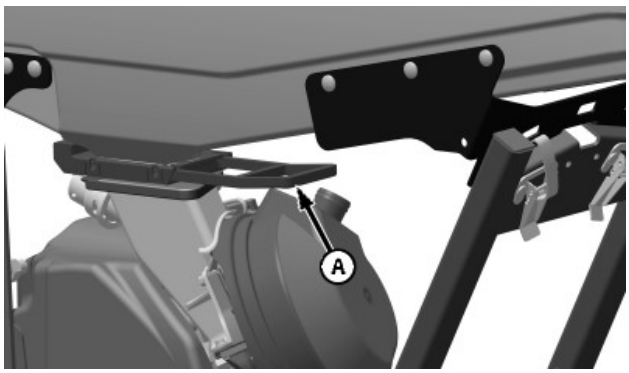
- Reduce the vacuum.
- Move the double eliminator from the disengaged position to the less aggressive position.
- If seed size is smaller than 2650—3090 seeds/kg (1200—1400 seeds/lb), try seed disk (bowl) (A92778).

Mini-Hopper Does Not Stay Full:

- Use the recommended amount of blended 80/20 talc/graphite lubricant.
- Increase the CCS pressure.
- Reduce ground speed.

WP29706,000093D-19-13FEB25

Access the Vacuum Meter

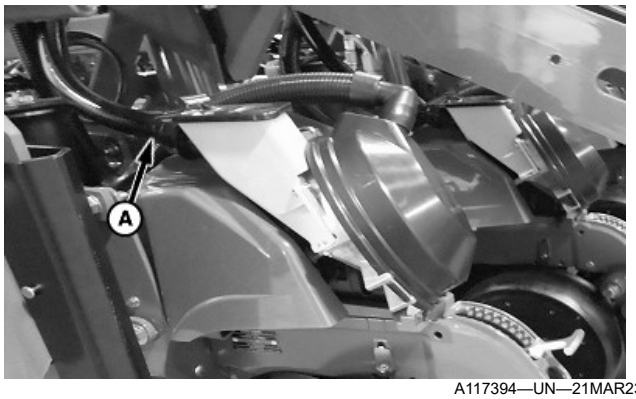


A116219—UN—21MAR22

A—Shutoff Gate

1. **Full-size seed hopper:** Close the shutoff gate (A).

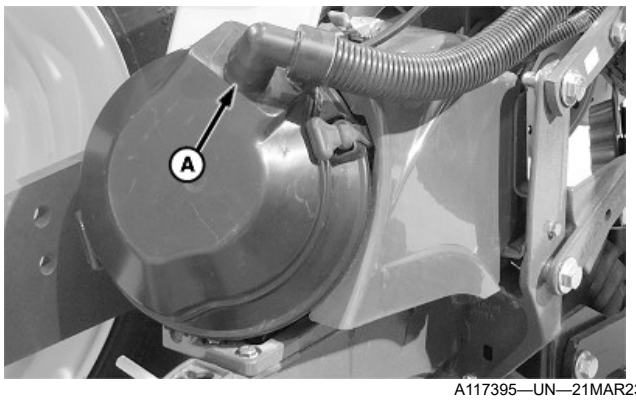
   95 L (2.7 bu) hopper: Unlatch, remove, and set the hopper aside.



A117394—UN—21MAR23

A—CCS Hose

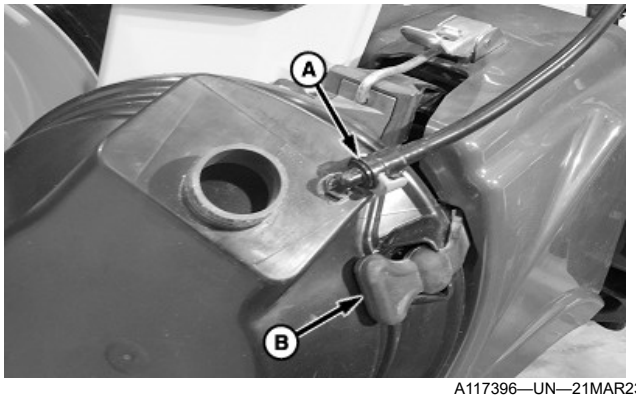
2. Disconnect the CCS hose (A) (mini hopper only).



A117395—UN—21MAR23

A—Vacuum Hose

3. Disconnect vacuum hose (A).



A117396—UN—21MAR23

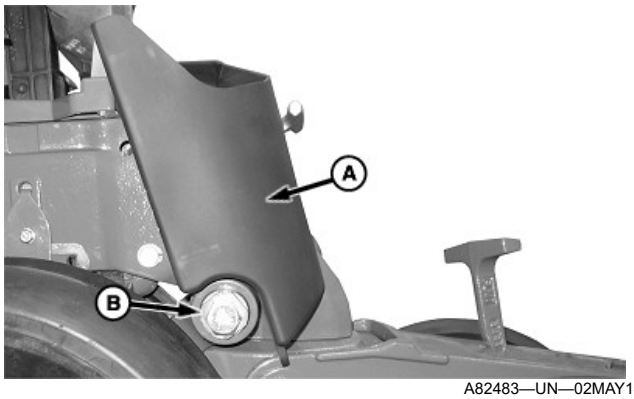
A—Vacuum Sensor Hose
B—Dome Latch

4. Disconnect vacuum sensor hose (A), where equipped.
5. Release dome latch (B) and open the dome.

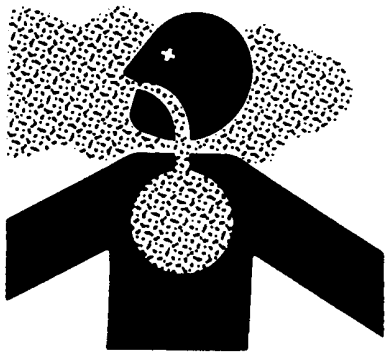
WP29706,0000408-19-24MAR23

Remove the Seed Disk (Bowl)

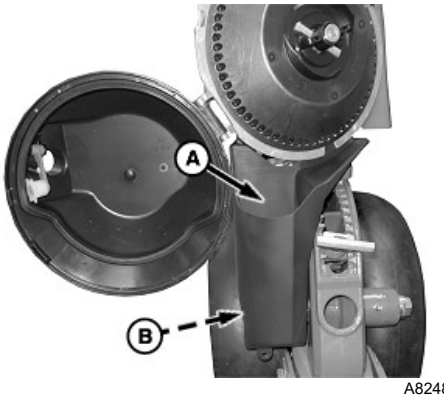
1. Access the vacuum meter. (See procedure in this section.)
2. **95 L (2.7 bu) hopper:** Remove the ExactEmerge seed meter and hold the meter over a container while removing the seed disk (bowl). (See Remove ExactEmerge Seed Meter in this section.)



A82483—UN—02MAY14



TS220—UN—15APR13



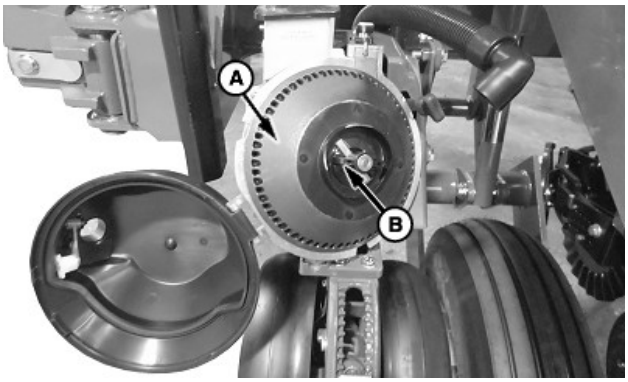
A82484—UN—02MAY14

A—Cleanout Tray
B—Depth Gauge Wheel Arm

CAUTION: Use caution if using seed treatments when opening the seed meter dome. Chemicals cause eye, skin, or breathing problems. Wear mask, gloves, and goggles. Read and follow the safety instructions on the product label.

NOTE: The cleanout tray is not compatible with the 95 L (2.7 bu) hopper.

3. Install the cleanout tray (A) by seating it on the depth gauge wheel arm (B) of the row unit as shown.



A78022—UN—27AUG13

A—Seed Disk (bowl)
B—Hub Handle

4. Rotate the hub handle (B) until it aligns with the slots in the seed disk (bowl) (A).
5. Pull the seed disk (bowl) from the hub.
6. Return the cleanout tray to the storage position.

WP29706,0000409-19-24MAR23

Install the Cartridge Seal



A89526—UN—08FEB16

A—Cartridge Seal

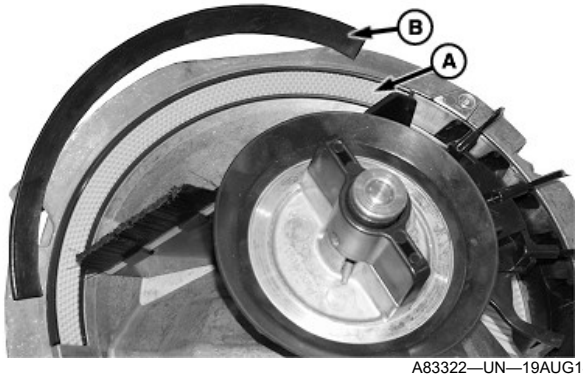
NOTE: Refer to the Meter Settings charts for the seal part number.

*When planting Sugar Beet, Sorghum, Small Popcorn, or Small Cotton seeds, the cartridge seal **must** be used. The cartridge seal does not interfere when planting other seeds.*

Install the cartridge seal (A) on the edge of the BrushBelt cartridge as shown. If the seal is damaged during operation, replace the seal.

WP29706,000099E-19-07OCT25

Change the Meter Strip (Agitation or Smooth)

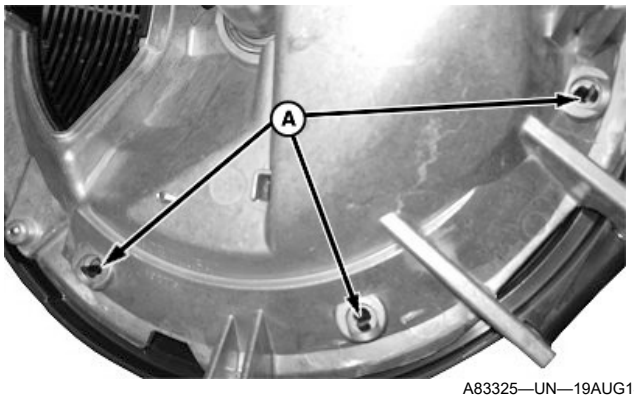


A83322—UN—19AUG14

A—Agitator Strip
B—Smooth Strip

1. Determine which agitator strip is need for the crop being planted. The agitator strip (A) has a rough surface. The smooth strip (B) has a smooth surface. (See ExactEmerge Meter Settings for the recommended agitator strip by crop.)
2. Remove the meter from the row unit (See Remove and Install the ExactEmerge Seed Meter).
3. Open the seed meter dome (See Clean Out the ExactEmerge Meter).

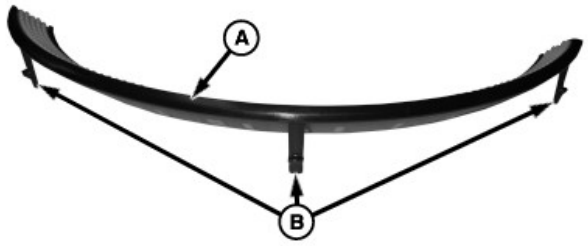
4. Remove the seed disk (bowl) (See Clean Out the ExactEmerge Meter).



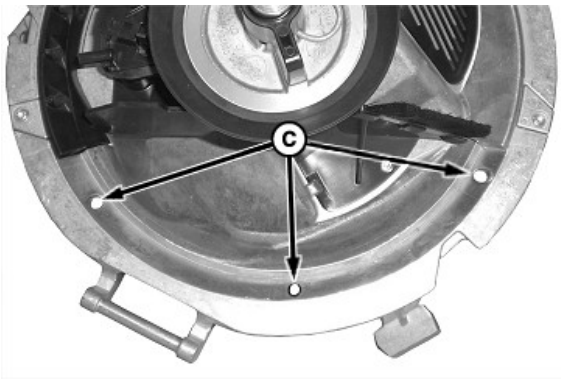
A83325—UN—19AUG14

A—Tabs

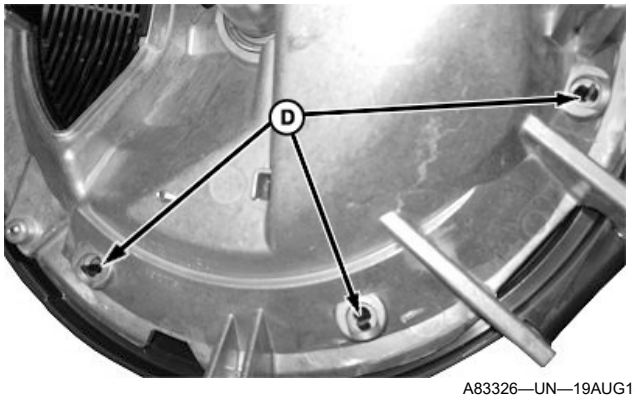
5. To release the agitator strip, squeeze the tabs (A) on the back of the meter then pull out on the strip.



A83323—UN—19AUG14



A83324—UN—19AUG14



A83326—UN—19AUG14

A—Agitator Strip
B—Tabs
C—Holes
D—Tabs

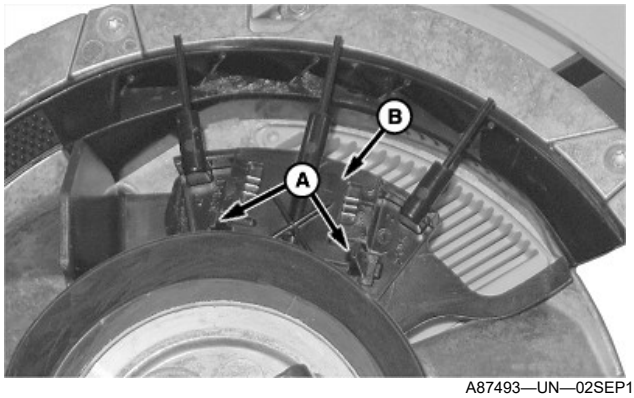
6. To install the correct agitator strip (A) in the meter, align the tabs (B) with the holes (C). Push the strip into position until the tabs (D) latch into the holes.
7. Install the correct seed disk (bowl) (See Install the Seed Disk).

NOTE: The meter hub height must be checked when the seed disk (bowl) is changed.

8. Adjust the meter hub height (See Adjust the Meter Hub Height).
9. Close the seed meter dome.
10. Install the meter on the row unit (See Remove and Install the ExactEmerge Seed Meter).

WP29706,00007E0-19-07OCT25

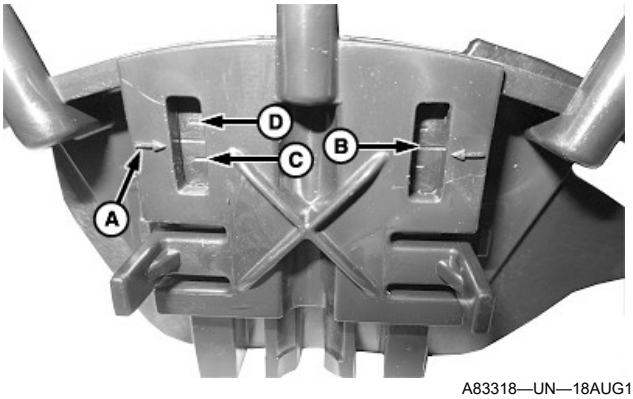
Adjust the Inner Double Eliminator (3-Tine)



A87493—UN—02SEP15

A—Tab (2 used)
B—Double Eliminator

1. Open the seed meter dome and remove the seed disk (bowl).
2. Squeeze tabs (A) on double eliminator (B).



A83318—UN—18AUG14



A83319—UN—18AUG14

A—Pointer
B—Standard Position
C—Less Aggressive Position
D—Aggressive Position
E—Soybean Position

NOTE: To retain the new position, release the tabs on the double eliminator and verify that the tabs latch into a locked position.

3. Slide the eliminator until pointer (A) is level with the adjustment line required.

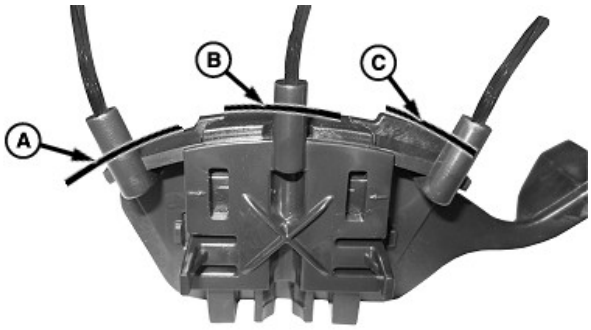
Double Eliminator Positions		
Position	**Seed**	**Setting**
B	All approved crops except soybeans.	Standard
C	All approved crops except soybeans.	Less Aggressive
D	All approved crops except soybeans.	Aggressive
E	Soybeans	Disengaged If the number of soybeans exceed 7700 per kg (3500 per lb), use the less aggressive position (C).

- Middle position (B) is the standard position for most crops.

NOTE: If skips are present, first verify that the knock out wheel is engaged with the holes in the seed disk (bowl) (See Knockout Wheel Operation).

NOTE: If multiples are present, first verify whether the double eliminator Tines or Brushes are worn down and needing replacement (See Inspect and Service the Meter).

- If the monitor shows that skips are occurring and increasing the vacuum does not help, use position (C).
- If the monitor shows that multiples are occurring and decreasing the vacuum does not help, use position (D).
- Disengaged position (E) is for soybeans.



A83320—UN—18AUG14

A—Left Side of Support
B—Middle of Support
C—Right Side of Support

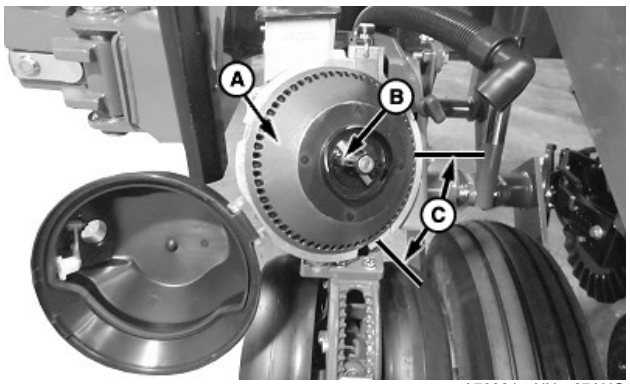
NOTE: To retain the new position, release the tabs on the double eliminator and verify that the tabs latch into a locked position.

When reading the pointer position is difficult, use the top of the double eliminator in relation to the rear support as an indicator of the position.

- The left side of the eliminator is level with the left side of support (A) when in a less aggressive position.
- The middle of the eliminator is level with the middle of support (B) when in the standard adjustment position.
- The right side of the eliminator is level with the right side of support (C) when in an aggressive position.

WP29706,000040A-19-10FEB25

Install the Seed Disk (Bowl)



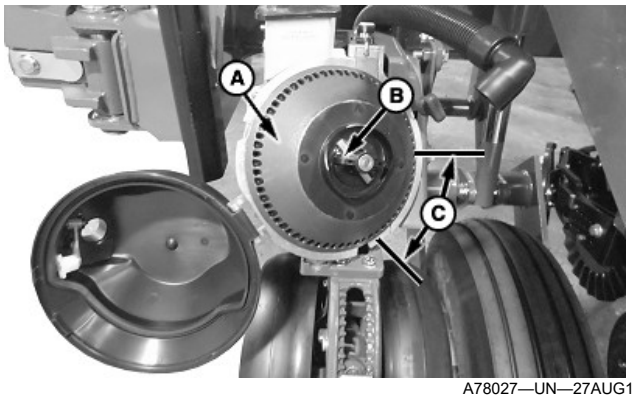
A78024—UN—27AUG13

A—Seed Disk (bowl)
B—Hub Handle
C—Section

1. Open the seed meter.
2. Fit the seed disk (bowl) (A) into the housing. Hold the seed disk (bowl) (A) stationary and rotate the hub handle (B) into the locked position.
3. Inspect the hub adjustment. **Release the meter latch and tilt the seed meter assembly away from the motor drive**. (See Adjust Meter Hub Height if the following conditions are not met.)
   - Verify that there is light contact between the seed disk (bowl) (A) and the four wear pads. When the seed disk (bowl) (A) is rotated, it must not rotate freely.
   - Verify that no seed loss occurs through any gaps in the section (C) as the seed disk (bowl) (A) is rotated.

WP29706,000040B-19-21MAR23

Adjust the Meter Hub Height

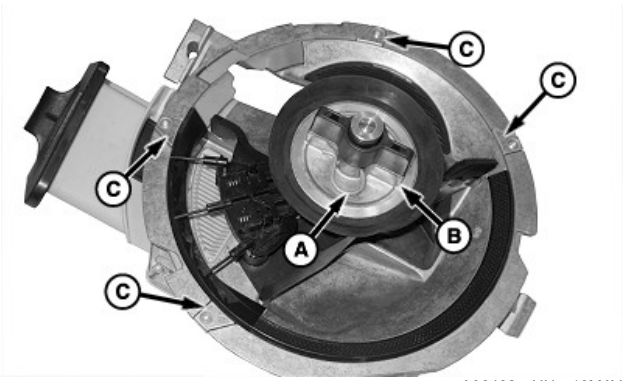


A78027—UN—27AUG13

A—Seed Disk (bowl)
B—Hub Handle
C—Area

Improve the meter accuracy and minimize seed damage with a properly adjusted meter hub. Check this adjustment every 50 hours or whenever a seed disk (bowl) (A) is changed.

1. Access the vacuum meter. (See the procedure in this section.)
2. Release the meter latch and **tilt the meter assembly away from the motor drive**.
3. Rotate the hub handle (B) clockwise.
   - If the hub clicks out of the seed disk (bowl) (A) detent, the hub is too tight.
   - If the seed disk (bowl) (A) spins freely, the hub is too loose.
   - If area (C) has a gap that allows seed to pass through or wedge between the housing and seed disk (bowl) (A), the hub is too loose or the seed disk (bowl) (A) is warped. Replace excessively warped seed disks (bowls) (A).
4. Hold the seed disk (bowl) (A) stationary, turn the hub handle (B) counterclockwise, and then remove the seed disk (bowl) (A).

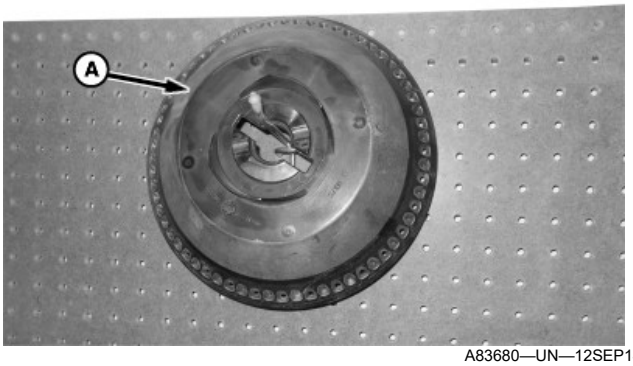


A96462—UN—10MAY17

A—Spring Clip
B—Seed Meter Hub
C—Wear Pad (4 used)

5. Inspect components for wear and replace as necessarily. (See the Component Wear Guidelines in the Seed Meter Service section for additional information.)
6. Remove the spring clip (A).
7. Adjust the seed meter hub (B).
   - Make small adjustments.
   - Thread the seed meter hub (B) clockwise to move the seed disk (bowl) closer to the wear pads (C).
   - Thread the seed meter hub (B) counterclockwise to move the seed disk (bowl) away from the wear pads (C).
8. Align the slot in seed meter hub (B) with the hole in the shaft and insert the spring clip (A).
9. Attach the seed disk (bowl) and lock the seed meter hub (B).

10. Inspect the adjustment and adjust as necessarily.
11. When hub adjustment is complete, install the meter assembly onto the drive coupler and fasten the meter latch.
12. Connect the seed delivery hose, vacuum hose, and the vacuum sense hose (if equipped).



A83680—UN—12SEP14

Storage

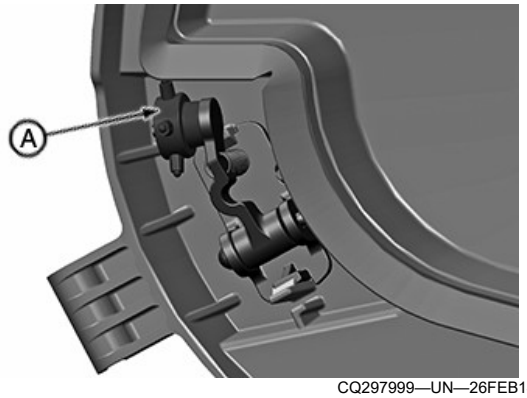
A—Seed Disk (bowl)

IMPORTANT: Avoid warped seed disks (bowls) (A). Do not store the seed disks (bowls) (A) in the meters. Do not store the seed disks (bowls) (A) under heavy items or hang them from the seed cell. Store them away from high heat and sunlight.

13. Remove and store the seed disks (bowls) (A) during implement storage.

WP29706,000040C-19-21MAR23

Seed Knockout Wheel Operation



CQ297999—UN—26FEB14

A—Seed Knockout Wheel

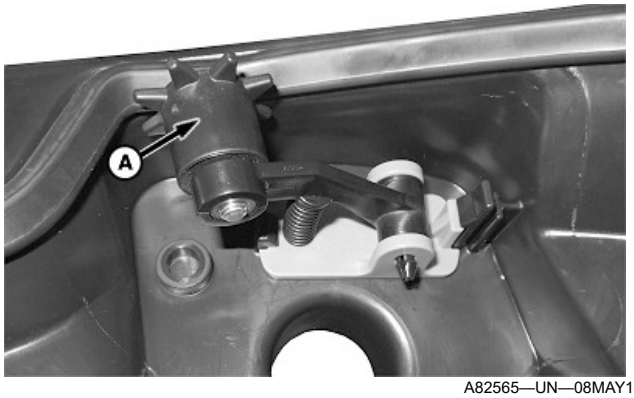
The seed knockout wheel (A) is used to push seeds from the seed cell. Wheel projections engage the seed cell holes, forcing all the seeds and foreign material from the seed cell.

The seed knockout wheel is required when planting sorghum, monogerm sugar beet, canola, wheat, cucumber, and seed planted with flat-type seed disks. Sugar beet and sweet corn seeds can have sharp edges and are typically irregular in shape, which contributes to seed lodging in the seed cell. Some sorghum seed contains large amounts of foreign material, which can also become trapped in the seed cell.

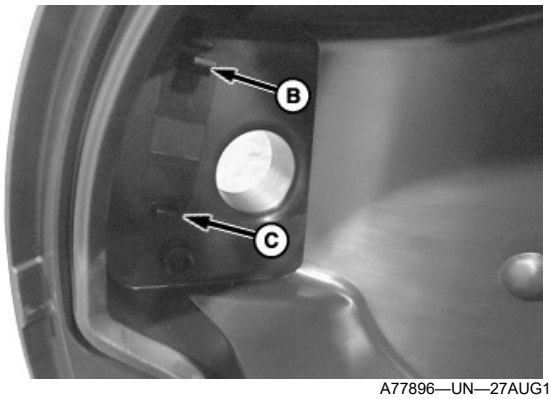
WP29706,000051F-19-24FEB22

Install the Knockout Wheel Assembly

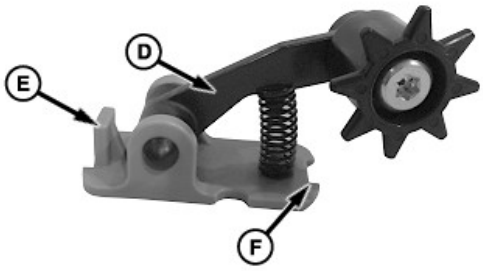
IMPORTANT: Damage to the knockout wheel occurs when the runoff function is performed without installing the seed disk (bowl).



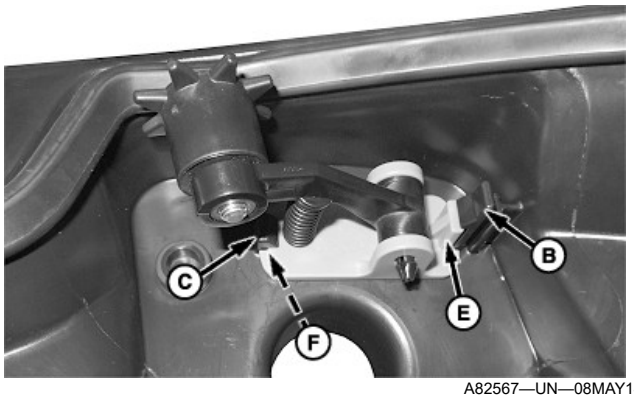
A82565—UN—08MAY14



A77896—UN—27AUG13



A82575—UN—09MAY14



A82567—UN—08MAY14

A—Knockout Wheel
B—Clip
C—Fastener
D—Knockout Assembly
E—Tab
F—Slot

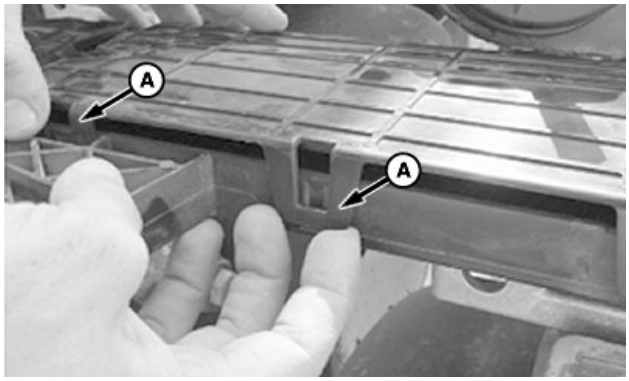
NOTE: The knockout wheel (A) is used to ensure that the seeds are fully released from the seed cell holes. Wheel projections engage the seed cells to eject all of the seeds and foreign material.

1. Open the meter (See Clean Out the ExactEmerge Meter).
2. Install the knockout assembly (D) inside the seed meter dome by sliding the slot (F) into position under the fastener (C).
3. Slightly pull back on the clip (B). Position the tab (E) and release the clip. Verify that the clip locks over the position of the tab as shown.

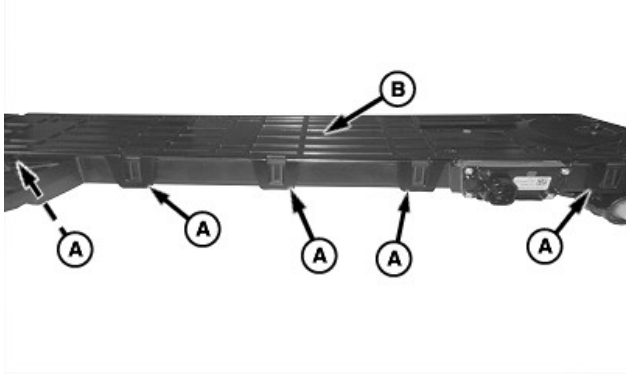
NOTE: When closing the seed meter dome, verify that the knockout wheel is aligned with the row of the seed cells on the seed disk (bowl).

WP29706,000040E-19-07OCT25

Install the BrushBelt Residue Shield



A77772—UN—30APR13



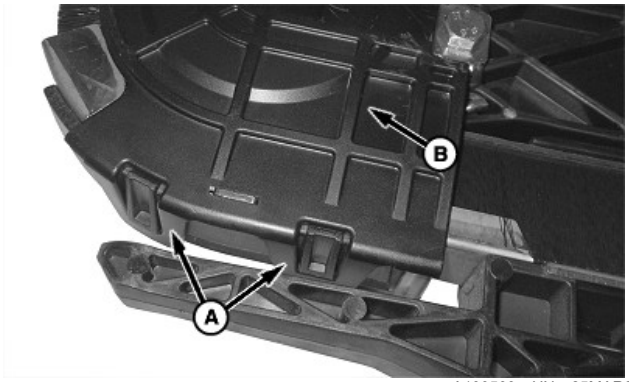
A79835—UN—22JAN14

A—Tab (5 used)
B—Upper Cartridge Cover

NOTE: The BrushBelt Residue Shield protects the meter components from cotton field residue. The shield does not need removed when planting other crops. The shield is only intended to protect against cotton residue.

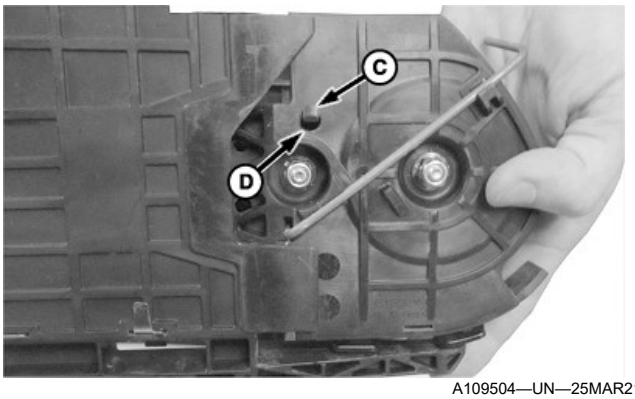
Periodically clean the seed sensor area inside the BrushBelt cartridge. If dust or heavily treated seed causes an excessive buildup on the seed sensor, false warnings appear for low population or low limits.

1. Remove the BrushBelt cartridge (see Remove and Install the BrushBelt Cartridge).
2. Release upper cartridge cover (B). Pull back on tabs (A) and lift the cover.



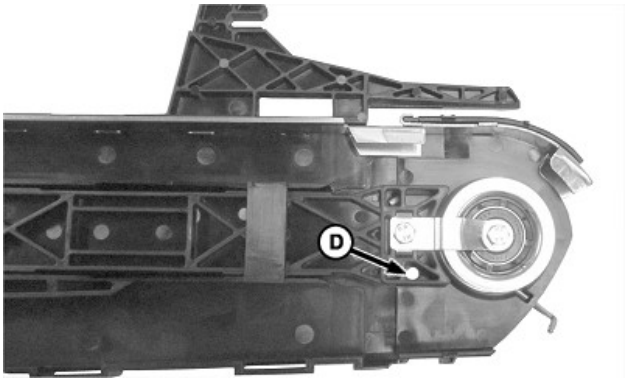
A109503—UN—25MAR21

Lower Cartridge Cover



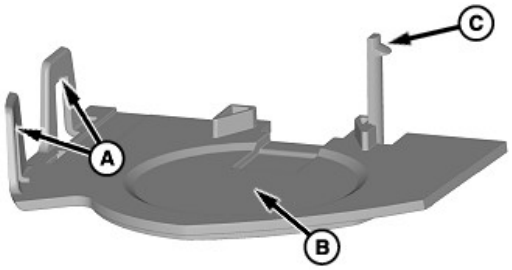
A109504—UN—25MAR21

Outside of Cartridge



A109505—UN—25MAR21

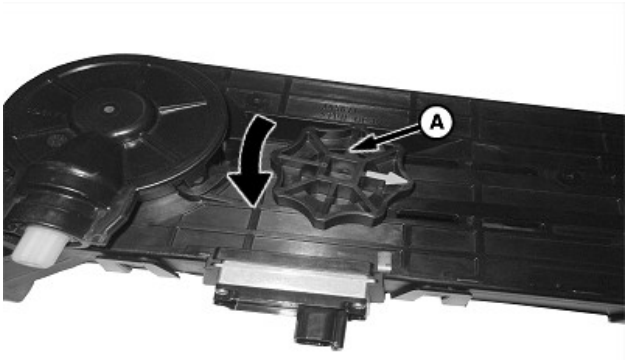
Inside of Cartridge



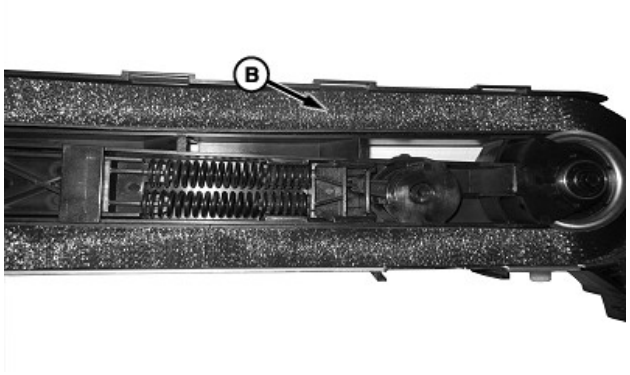
A109506—UN—25MAR21

A—Tab (2 used)
B—Lower Cartridge Cover
C—Retaining Clip
D—Hole

3. Release tabs (A) on lower cartridge cover (B) and push retaining clip (C) through hole (D).



A79872—UN—22JAN14



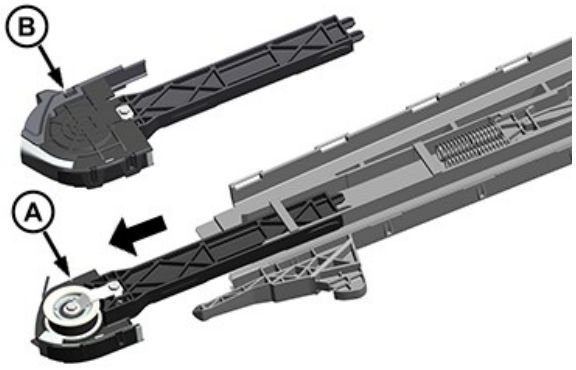
A79896—UN—22JAN14



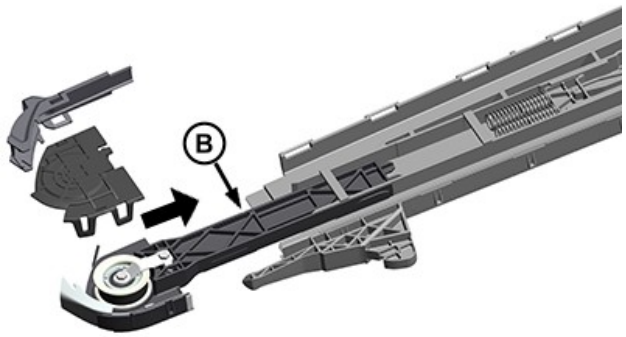
A82226—UN—09APR14

A—Belt Tensioner
B—BrushBelt

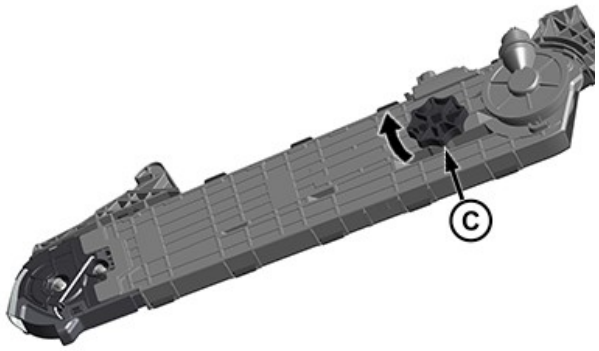
4. Remove the spring tension. Turn belt tensioner (A) counterclockwise. Remove BrushBelt (B) from the cartridge.



A121365—UN—24APR24



A121366—UN—24APR24



A121367—UN—24APR24

A—Standard Idler Assembly
B—Residue Shield Idler
C—Belt Tensioner

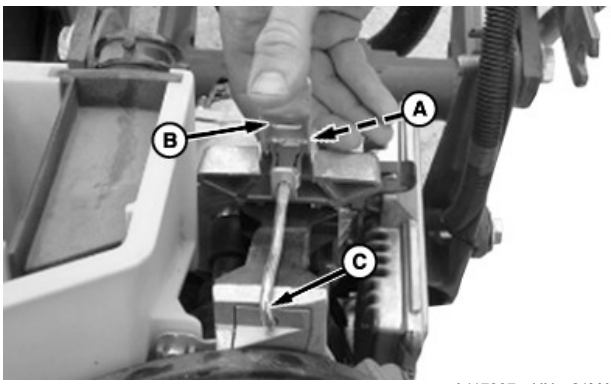
5. Remove standard idler assembly (A).
6. Insert residue shield idler (B).
7. Replace the BrushBelt and cartridge covers.
8. Apply belt tension. Turn belt tensioner (C) clockwise.

NOTE: The residue shield does not interfere while planting other crops, but the shield is only designed for cotton residue.

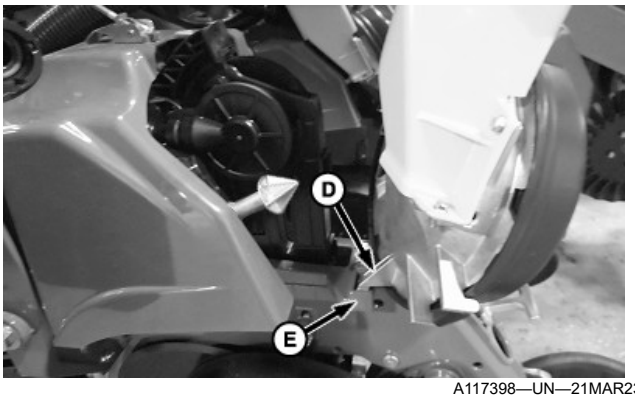
9. Install the BrushBelt cartridge (see Remove and Install the BrushBelt Cartridge).

ouo6074,1713961490433-19-27JAN25

Remove the ExactEmerge Seed Meter



A117397—UN—21MAR23



A117398—UN—21MAR23

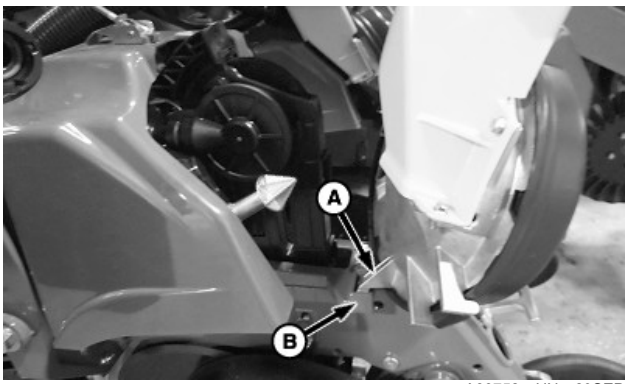
A—Clip
B—Latch
C—Hook
D—Housing Tab
E—Bracket Base

IMPORTANT: Avoid breaking housing tab (D). Carefully remove the seed meter from the drive motor.

1. Access the vacuum meter. (See the procedure in this section.)
2. Push down on clip (A) while lifting on latch (B) to unlock the seed meter from the top area of the BrushBelt cartridge.
3. Remove the hook (C) from the slot in the meter tab.
4. Slowly remove the seed meter coupler from the drive motor shaft.
5. Remove the housing tab (D) from the bracket base (E).

WP29706,0000CE8-19-24MAR23

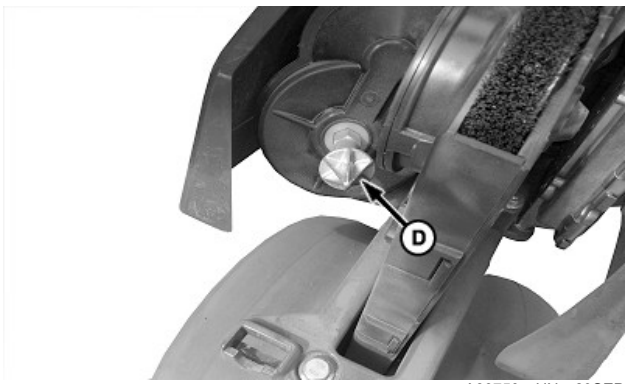
Install the ExactEmerge Seed Meter



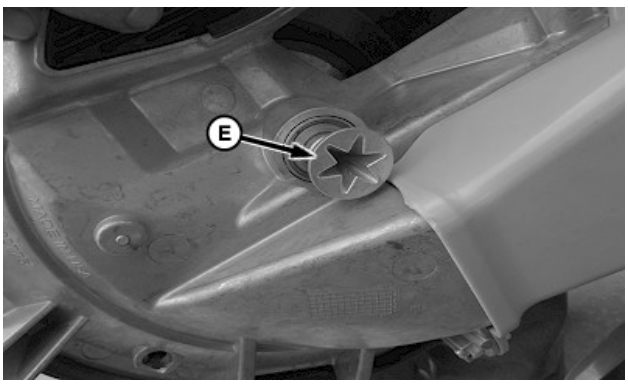
A83752—UN—29SEP14



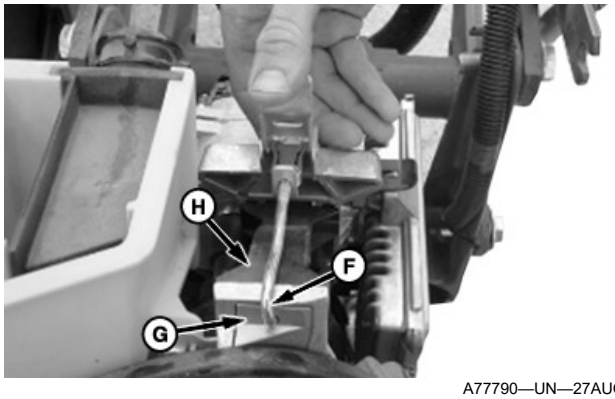
A77995—UN—27AUG13



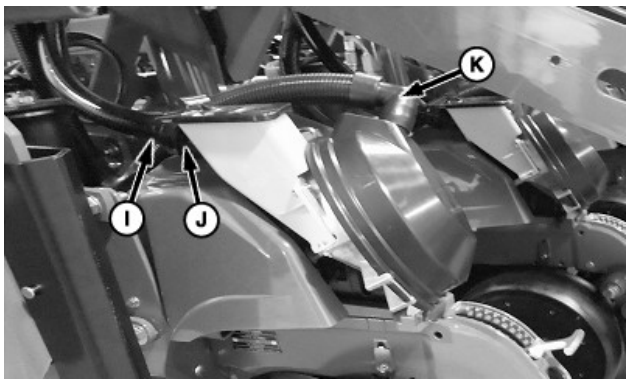
A83750—UN—29SEP14



A83751—UN—29SEP14



A77790—UN—27AUG13



A77791—UN—27AUG13

A—Housing Tab
B—Bracket
C—Seed Meter Assembly
D—Motor Shaft
E—Seed Meter Coupler
F—Hook
G—Tab
H—Top Area
I—Delivery Hose
J—Fill Neck
K—Vacuum Hose

1. Position the housing tab (A) into the bracket (B) of the seed meter assembly (C).

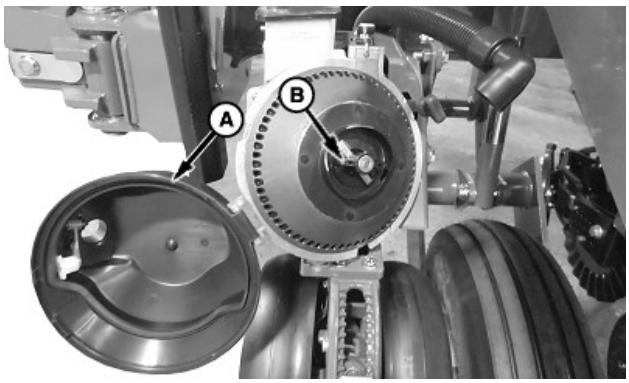
NOTE: Turn the driveshaft to align it with the coupler as needed.

2. Align the motor shaft (D) and the seed meter coupler (E), being careful to align the meter housing to the BrushBelt cartridge.
3. Position the hook (F) through tab (G) on the meter and the top area (H) of the BrushBelt cartridge.
4. Fasten the latch until the clip snaps. If the latch is out of adjustment, meter is loose, or has side-to-side motion, proceed as follows:
   a. Release the latch and hook.
   b. Rotate the hook one full revolution. Clockwise rotation moves the hook inward. Counterclockwise rotation moves the hook outward.
   c. Install the meter and position the hook into the meter tab and the BrushBelt cartridge.
   d. Close the latch until the clip snaps, then check the latch for proper adjustment and no side-to-side movement. Repeat these steps as necessary for other meter latches.

WP29706,0000CE9-19-24MAR23

Inspect the ExactEmerge Meter Unit

NOTE: If using the seed treatments, remove any buildup occurring in the bottom of the hopper.



A77812—UN—27AUG13

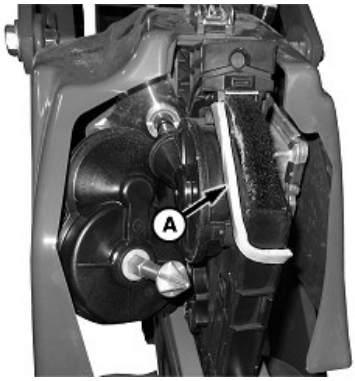
A—Seed Meter Dome
B—Meter Hub

To inspect the meter, lay the hopper on its side and open the seed meter dome (A) to remove the seed disk (bowl). Determine if the mechanism is free of dirt, chaff, or other foreign material by turning the meter hub (B) by hand. Inspect the brush for gaps, the hub seal for cracks, and the vacuum seal for cracks or wear areas. If replacement of components is necessary then see the ExactEmerge Service And Adjustments section.

WP29706,00003F5-19-08OCT25

Remove and Install the BrushBelt Cartridge

Remove the BrushBelt Cartridge



A89526—UN—08FEB16

A—Cartridge Seal

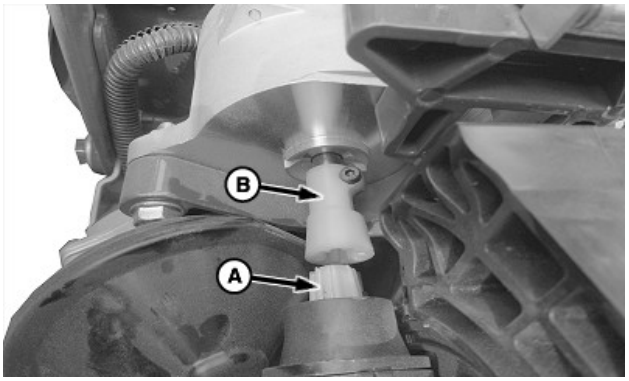
IMPORTANT: To prevent a BrushBelt malfunction, do not apply fertilizer directly in the seed furrow near the front of the BrushBelt.

NOTE: To dry the BrushBelts before planting in wet conditions, perform a meter runoff. (See the SeedStar Application Help for the Runoff procedure.)

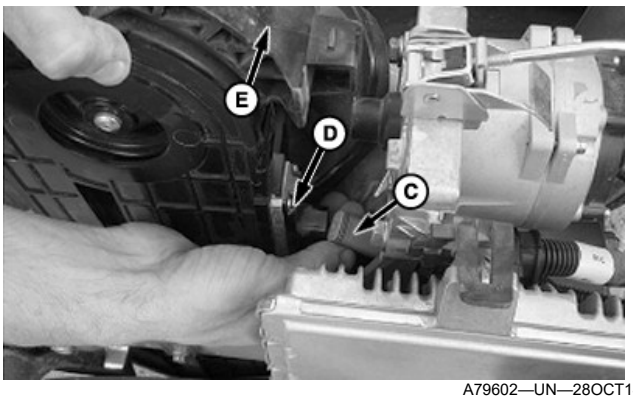
1. Remove the seed meter and hopper. (See Remove and Install the ExactEmerge Seed Meter.)
2. Note the position of the depth adjusting handle and then move the handle to the minimum (shallowest) position before attempting to remove the BrushBelt cartridge.

*NOTE: When planting Sugar Beet, Sorghum, Small Popcorn, or Small Cotton seeds, the cartridge seal **must** be used. The cartridge seal does not interfere when planting other seeds.*

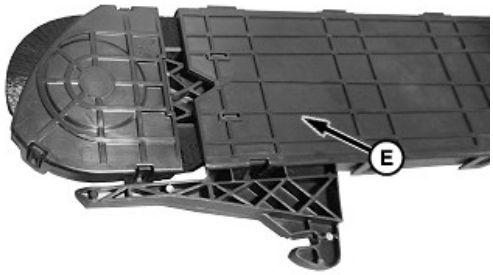
3. Inspect the cartridge seal (A) on the edge of the BrushBelt cartridge. The seal is used when planting small seeds. Replace the seal when damaged.



A83749—UN—29SEP14



A79602—UN—28OCT14

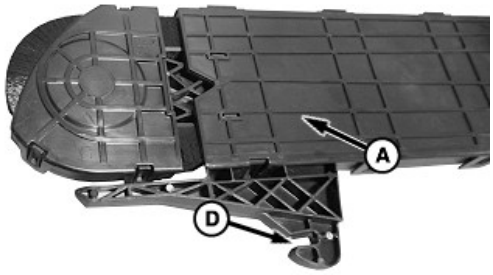


A83280—UN—13AUG14

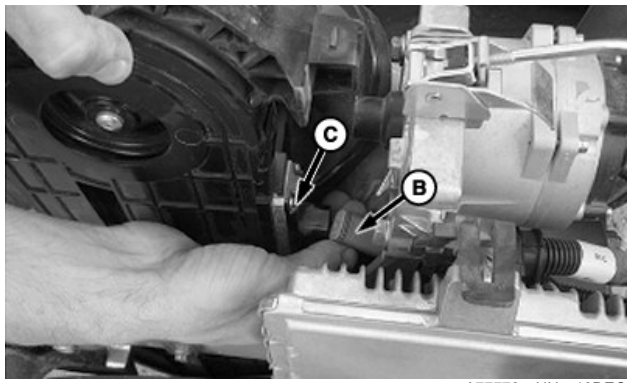
A—Driveshaft
B—Motor Coupler
C—Harness Connector
D—Seed Sensor
E—BrushBelt Cartridge

4. To separate the driveshaft (A) and the motor coupler (B), pull back on the top of the BrushBelt cartridge (E).
5. Pull slightly upward on the cartridge to expose and disconnect the harness connector (C) from the seed sensor (D).
6. Remove the cartridge from the row unit.

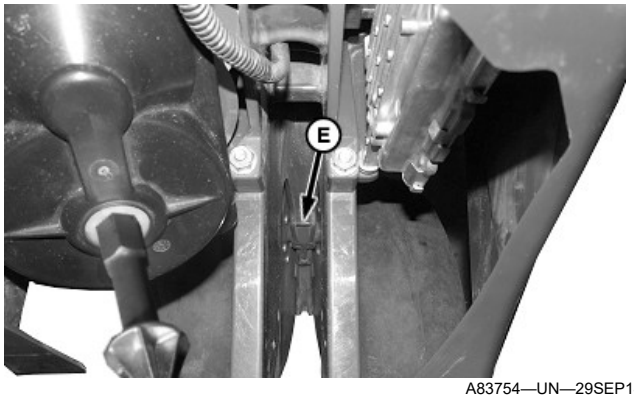
Install the BrushBelt Cartridge



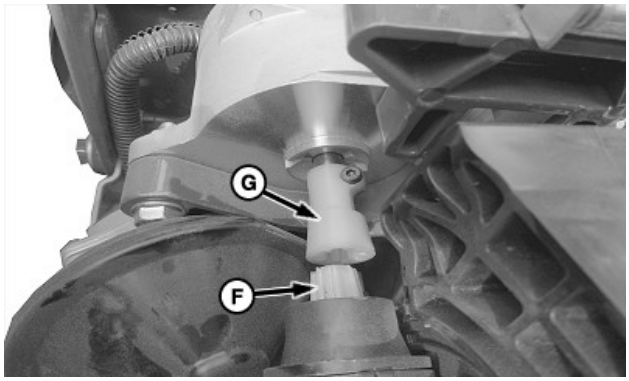
A78705—UN—13DEC13



A77770—UN—13DEC13



A83754—UN—29SEP14



A83755—UN—29SEP14

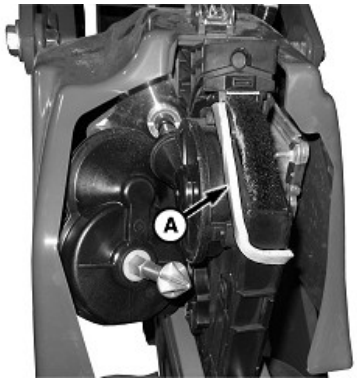
A—BrushBelt Cartridge
B—Harness Connector
C—Seed Sensor
D—Hook
E—Alignment Pin
F—Driveshaft
G—Motor Coupler

1. Note the position of the depth adjusting handle and then move the handle to the minimum (shallowest) position before attempting to install the BrushBelt cartridge.

NOTE: Place the cartridge and harness connector inside the planting unit at the same time.

2. Partially install the BrushBelt cartridge (A) into the row unit, then connect the harness connector (B) to the seed sensor (C).
3. Align and push the hook (D) onto the alignment pin (E) until the cartridge locks onto the pin.
4. To lock the cartridge in place, align the driveshaft (F) with the motor coupler (G) and press the cartridge forward. Verify that the seed sensor harness has not been pinched during the installation of the BrushBelt cartridge.

NOTE: To verify a proper installation, pull rearward on the cartridge assembly. If the bottom of the cartridge moves, the cartridge hook (D) is not properly seated. Remove and repeat the installation process until the cartridge is seated properly.



A89526—UN—08FEB16

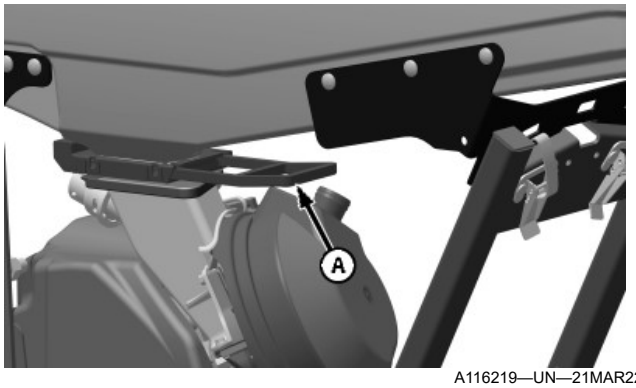
A—Cartridge Seal

*NOTE: When planting Sugar Beet, Sorghum, Small Popcorn, or Small Cotton seeds, the cartridge seal **must** be used. The cartridge seal does not interfere when planting other seeds.*

5. If planting Sugar Beet, Sorghum, Small Popcorn, or Small Cotton, install the cartridge seal (A) on the edge of the BrushBelt cartridge as shown.
6. Install the seed meter and the hopper. (See Remove and Install the ExactEmerge Seed Meter.)
7. Return the depth adjusting handle to the previous position.

WP29706,0000406-19-07OCT25

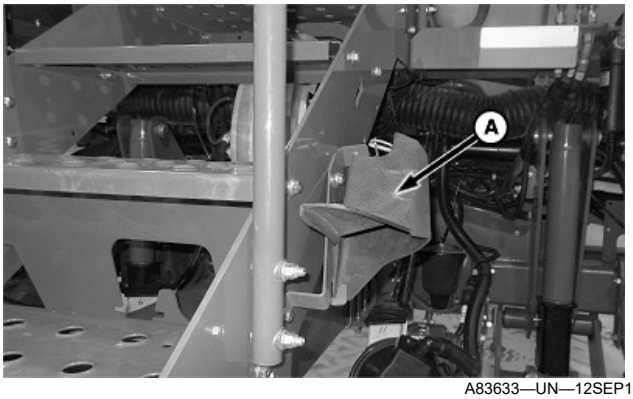
Clean Out the ExactEmerge Meter



A116219—UN—21MAR22

A—Shutoff Gate

1. When equipped with full-size seed hopper, close the shutoff gate (A).

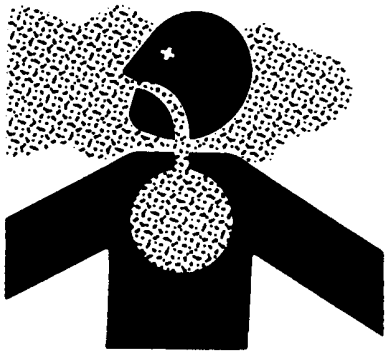


A83633—UN—12SEP14

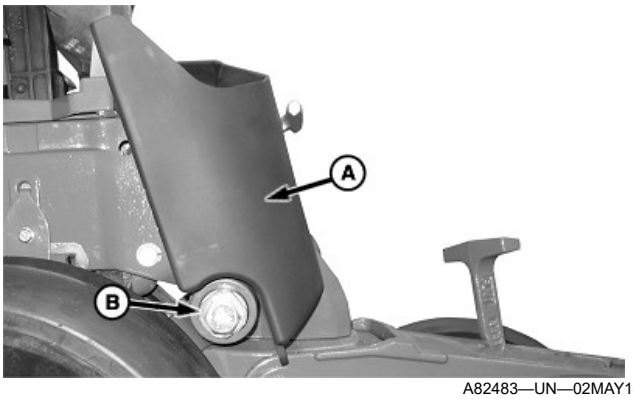
Cleanout Tray Location Varies per Model

A—Storage Location

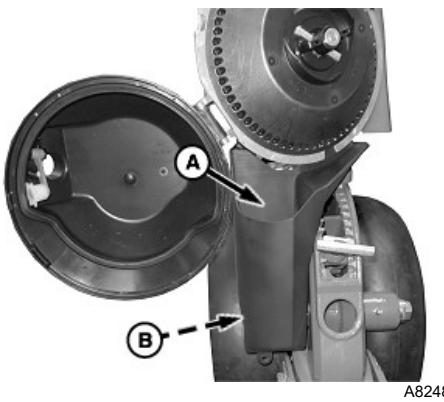
2. Remove the cleanout tray from the storage location (A).



TS220—UN—15APR13



A82483—UN—02MAY14

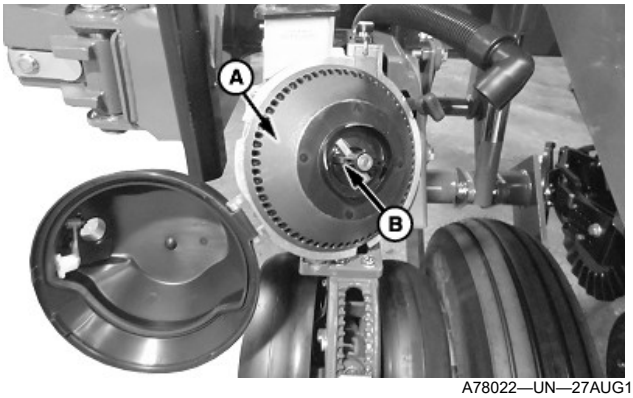


A82484—UN—02MAY14

A—ExactEmerge Cleanout Tray
B—Depth Gauge Wheel Arm

CAUTION: Avoid chemical injury to eyes, skin, and lungs when accessing and handling components coated with seed treatment. Wear the appropriate personal protective equipment. Read and follow the safety instructions on the product label.

3. Seat the ExactEmerge cleanout tray (A) on the depth gauge wheel arm (B) as shown.



A78022—UN—27AUG13

A—Seed Disk (bowl)
B—Handle

4. Open the seed meter dome.
5. Rotate the hub handle (B) until it aligns with the slots in the seed disk (bowl) (A).
6. Remove the seed disk (bowl).
7. Empty the cleanout tray and return it to the storage position.

WP29706,0000B60-19-07OCT25

Set the Vacuum Level

Some seed sizes, seed shapes, and situations require vacuum levels slightly higher or lower than the settings shown. Always verify the vacuum level with a field check. The vacuum charts are a guide and are accurate in most conditions.

The hydraulic hose configuration and connections determine whether the vacuum level is controlled with the tractor hydraulic settings or the in-line planter valve. If the hydraulic hoses for more than one blower are routed to a single selective control valve (SCV), the vacuum is controlled with the planter valve. (See the Attaching Machine section for hydraulic connections and flow rate recommendations.)

Use the vacuum level charts for the initial vacuum setting and adjust the level as needed. The charts are based on a typical ground speed and population rate. If high population rates or high ground speeds affect seed placement, increase the vacuum level. If low population

rates or low ground speeds affect seed placement, decrease the vacuum level.

NOTE: At any setting, the vacuum level is slightly lower when the hydraulic oil is cold or when seeds are not covering holes in the seed disk (bowl). Make the final setting after the oil has warmed and the seed disks (bowls) are full.

Set the vacuum level as follows:

1. Verify that the seed meters are set up for the crop.
2. Engage the vacuum (SCV lever in the detent position). Let the oil warm (approximately 15 minutes).
3. Fill the CCS tanks with seed and engage the blower until the meter hoppers fill with seed.

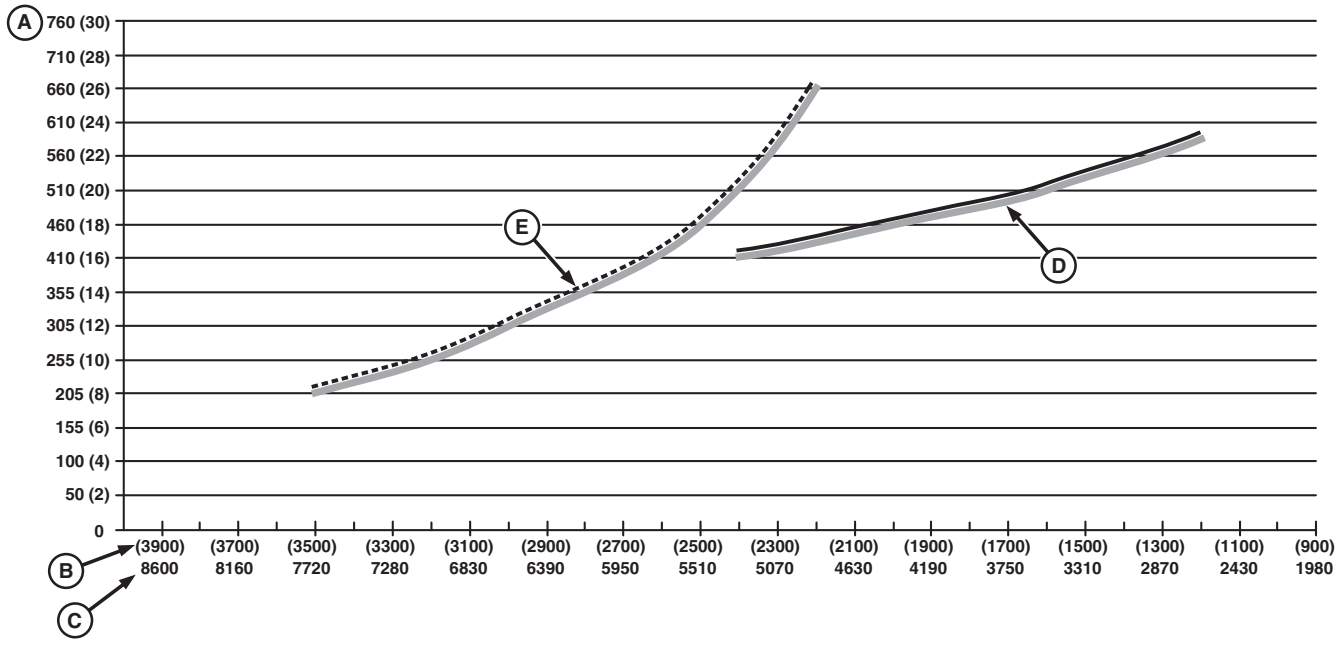
NOTE: See your SeedStar Application Help or the SeedStar Operator's Manual for additional information about all on-screen functions.

4. To fill the seed meters and seed disks (bowls) with seed, Plant a short distance or use the meter fill function shown on-screen.
5. Adjust the vacuum level manually with the tractor or the planter valves or activate the on-screen control of the vacuum automation.
6. To refine the vacuum level, perform an on-screen meter performance test using the runoff feature.

   If rough field conditions cause seed skips, an increase in vacuum can help. Extra downforce can improve the ride quality, but do not exceed a level of downforce that degrades the seed furrow or compacts the side walls. If all the possible adjustments do not reduce seed skips, reduce ground speed.

WP29706,000079D-19-07OCT25

Vacuum Level Recommendations for Corn and Soybean



A96351—UN—04MAY17

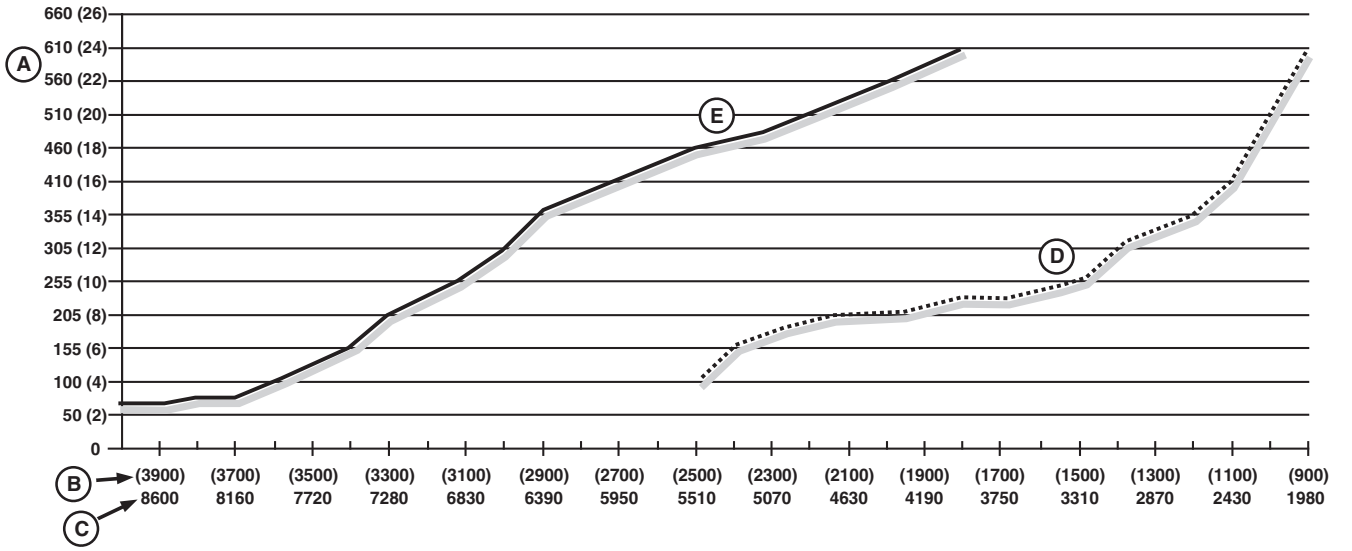
A—Vacuum Level, mm (in) of Water
B—Seeds per lb
C—Seeds per kg
D—Corn
E—Soybean

NOTE: If the Soybeans are >7700/kg (3500/lb), use the inner double eliminator at the less aggressive position. (See Double Eliminator Adjustment in this section.)

Outer Double Eliminator—Polytine

OUO6074,0000ED1-19-01MAY17

Vacuum Level Recommendations for Corn and Soybeans (Optional)



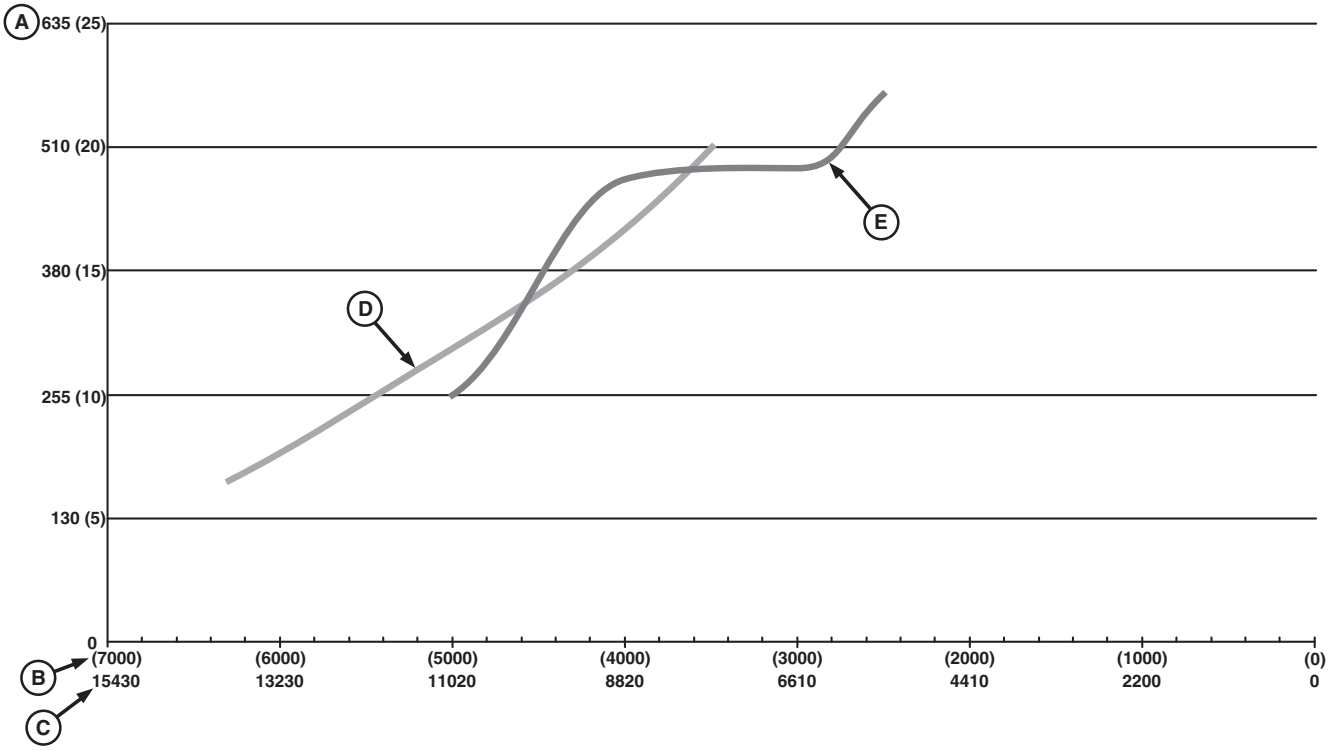
A96352—UN—04MAY17

A—Vacuum Level, mm (in) of Water
B—Seeds per lb
C—Seeds per kg
D—Corn
E—Soybean

Outer Double Eliminator—Brush Type

OUO6074,0000ED2-19-14JUN18

Vacuum Level Recommendations for Cotton and Popcorn



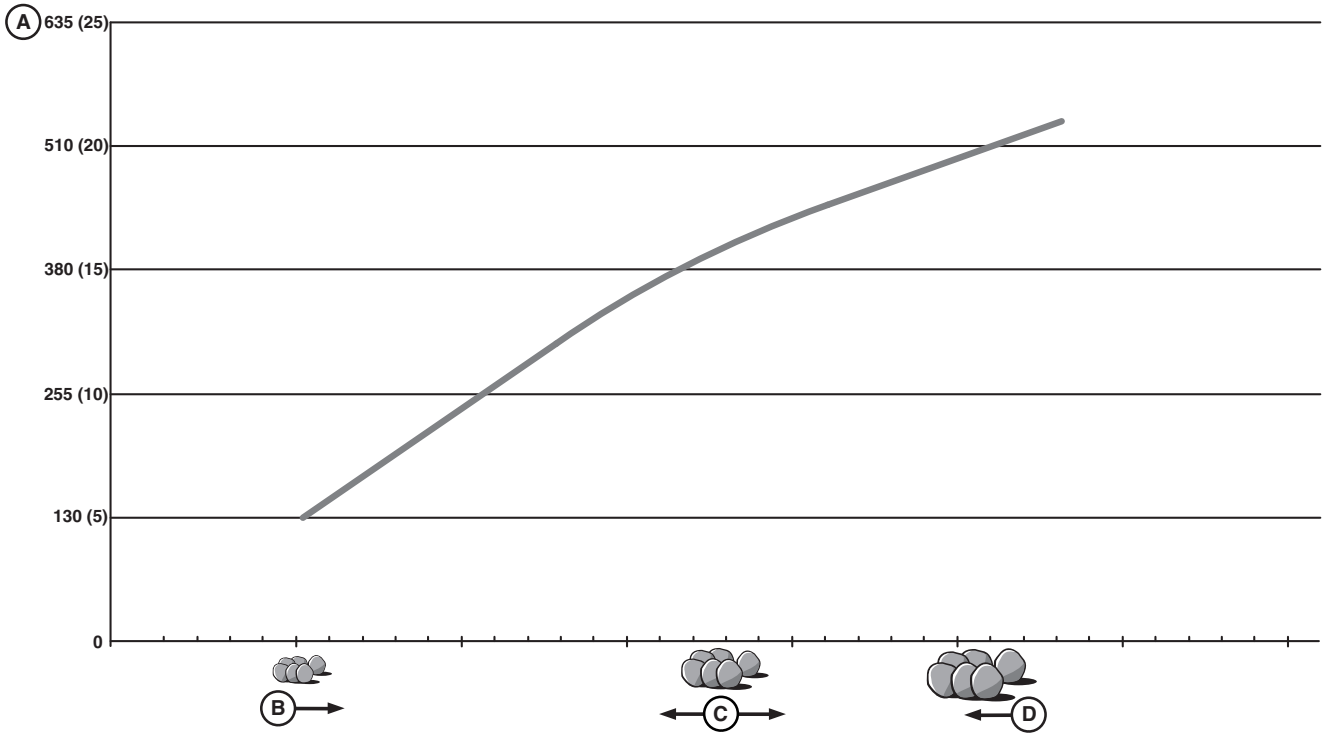
A96353—UN—04MAY17

A—Vacuum Level, mm (in) of Water
B—Seeds per lb
C—Seeds per kg
D—Cotton
E—Popcorn

Outer Double Eliminator—Polytine

OUO6074,0000ED3-19-01MAY17

Vacuum Level Recommendations for Sugar Beet



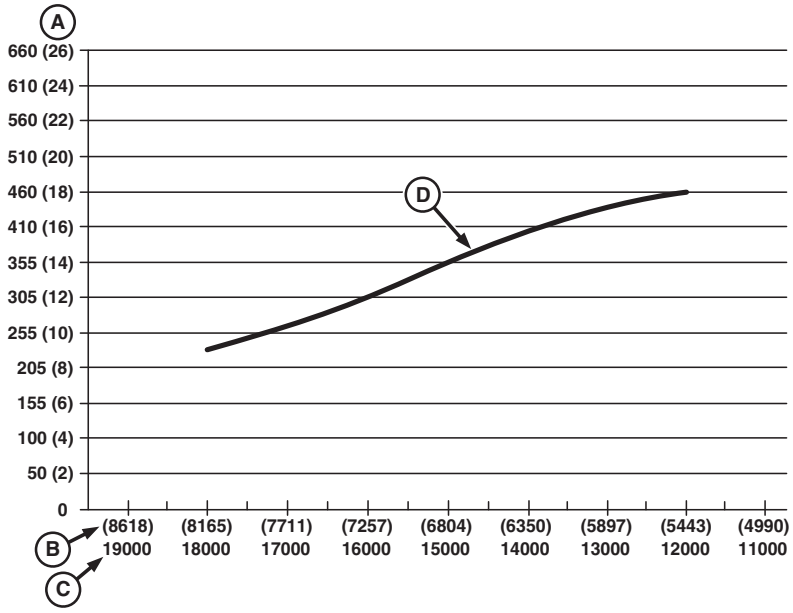
A96354—UN—03MAY17

A—Vacuum Level, mm (in) of Water
B—Mini Seed
C—Regular Seed
D—Large Seed

Outer Double Eliminator—Brush Type

OUO6074,0000ED4-19-01MAY17

Vacuum Level Recommendations for Milo/Sorghum



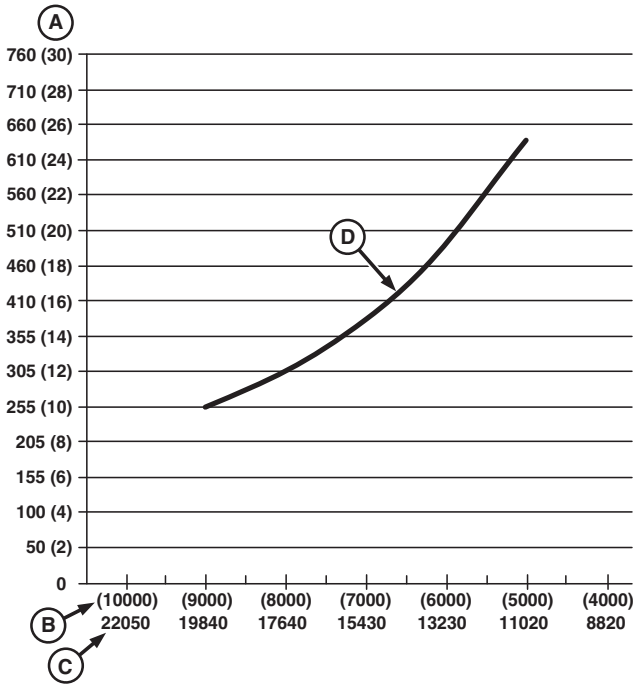
A96355—UN—04MAY17

A—Vacuum Level, mm (in) of Water
B—Seeds per lb
C—Seeds per kg
D—Milo/Sorghum

Outer Double Eliminator—Polytine

WP29706,0000A1B-19-01MAY17

Vacuum Level Recommendations for Sunflower



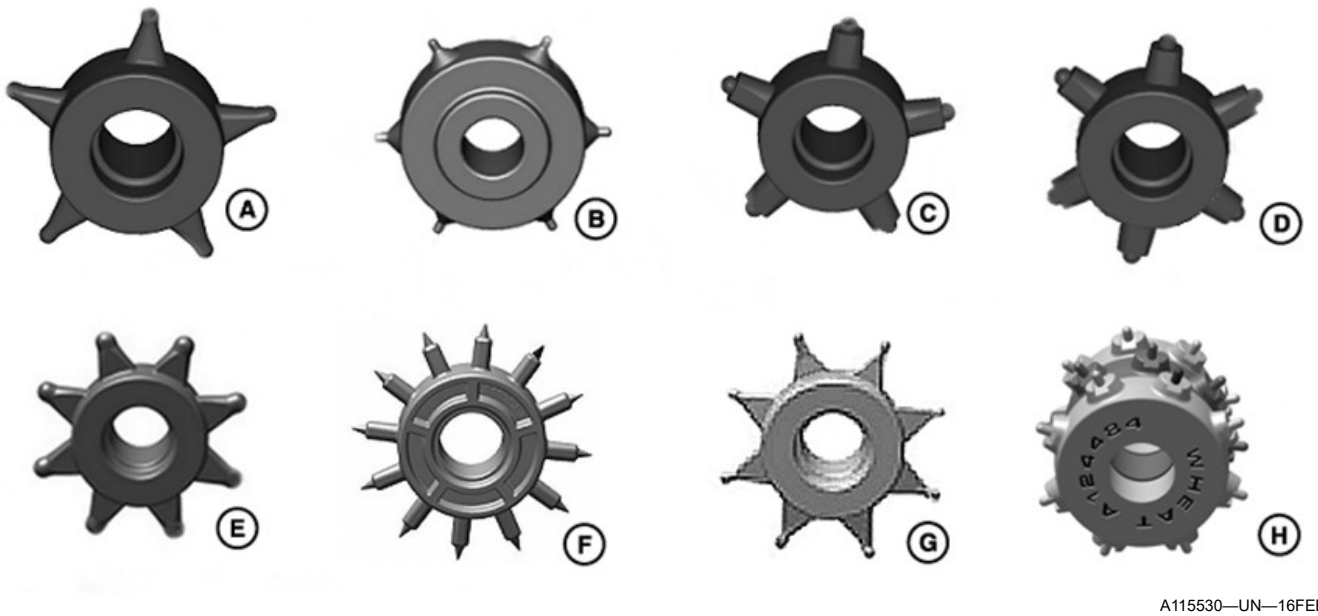
A104087—UN—10APR19

A—Vacuum Level, mm (in) of Water
B—Seeds per lb
C—Seeds per kg
D—Sunflowers

Outer Double Eliminator—Polytine

WP29706,0000A1C-19-10APR19

Seed Meter Settings

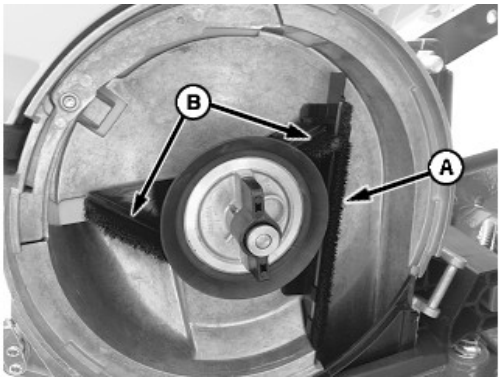


A115530—UN—16FEB22

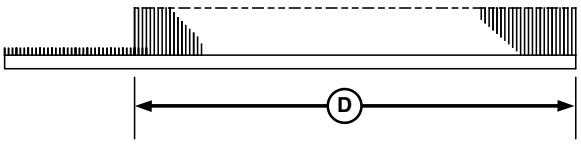
Knockout Wheels

Knockout wheels are used with some seed disks and crops.

Knockout Wheel Identification		
Knockout Wheel	**Wheel Part Number**	**Assembly Part Number**
Type A	A102718	AA85899
Type B	H136448	AA79986
Type C	A52389	AA81736
Type D	A53272	AA85089
Type E	A106147	AA89145
Type F	A119983	AA103137
Type G	A123990	AA103153
Type H	A124484, A124483, and A124473	AA103597

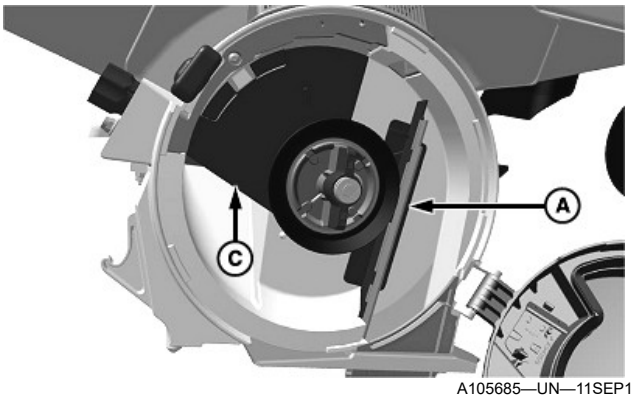


A82570—UN—09MAY14

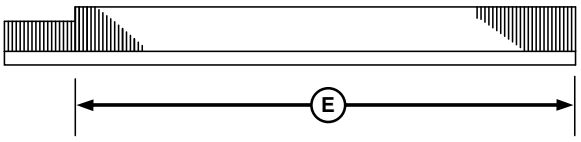


A109249—UN—16FEB21

Front Brush (short)



A105685—UN—11SEP19



A109250—UN—16FEB21

Front Brush (long)

A—Front Brush
B—Rear Brush
C—Baffle
D—Dimension, 146 mm (5.75 in)

E—Dimension, 165 mm (6.5 in)

The front brush (A) is available in two sizes for different crops. The rear brush (B) is used with mini-hoppers, except when planting canola. The baffle (C) is used with large hoppers or mini-hoppers when planting canola.

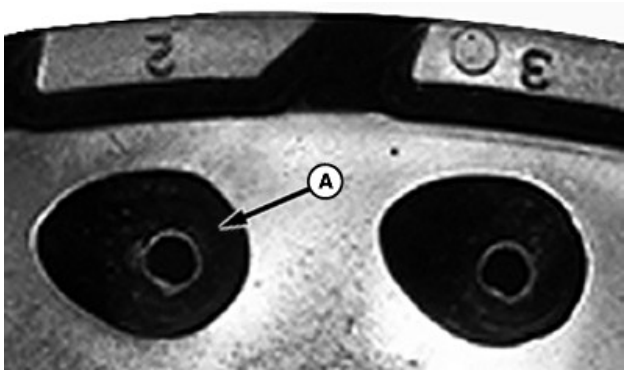
CCS Compatible	Crop	Disk Name (Part Number)	Front Brush (A)	Baffle Position[a]	Double Eliminator	Knockout Wheel
[a]A rear brush is used with mini-hoppers instead of a baffle, except when planging canola.						
NOTE: The nozzle insert and hopper elbow recommendations are shown in the CCS operation. Use this table as a quick reference for common settings. (See Seed Disk Recommendations in this section for additional information.) ProMax are flat-type disks that are visually identified by the quantity and the diameter (in millimeters) of the holes in the disk. For example, ProMax 40 x 4.5 has 40 holes that are 4.5 mm in diameter.						
Yes	Field Corn	Large Corn (A50617) or Medium Corn (A43215)	Long	Upper	See Footnote[b]	No[c]
Yes	Field Corn	ProMax 40 x 4.5 (A52391)	Long	Upper	See Footnote[d]	Wheel C
Yes	Sweet Corn	ProMax 40 x 4.5 (A52391)	Long	Upper	See Footnote[e]	Wheel C
Yes	Sweet Corn	ProMax 40 x 3.75 (A52390)	Long	Upper	See Footnote[e]	Wheel C
Yes	Popcorn	Small Corn, Sunflower, and Popcorn (H136478)	Long	Lower	See Footnote[b]	No[c]
Yes	Popcorn	Sorghum (A43066)	Long	Lower	See Footnote[b]	Wheel B
Yes	Oil Sunflower	Small Corn, Sunflower, and Popcorn (H136478)	Long	Lower	See Footnote[b]	No[c]
Yes	Oil Sunflower	ProMax 40 x 2.5 (A102717)	Long	Lower	See Footnote[b]	Wheel A
Yes	Confection Sunflower	ProMax 40 x 4.5 (A52391)	Long	Upper	See Footnote[e]	Wheel C
Yes	Confection Sunflower	ProMax 40 x 3.75 (A52390)	Long	Upper	See Footnote[e]	Wheel C
Yes	Wheat	Wheat (A124486)	Long	Lower	See Footnote[b]	Wheel H
Yes	Cotton	Low-Rate Cotton (A70163)	Long	Upper	See Footnote[b]	No[c]
Yes	Cotton	Cotton and Soybean (A56251)	Long	Upper	See Footnote[b]	No[c]
Yes	Cotton	ProMax 50 x 3.75 (A52903)	Long	Upper	See Footnote[d]	Wheel D
Yes	Cotton	ProMax 64 x 2.8 (A121489)	Long	Upper	See Footnote[d]	Wheel G
Yes	Hilldrop Cotton (4-Seed)	4-Seed Hilldrop Cotton (A65622)	Short	Upper	See Footnote[b]	No[c]
Yes	Hilldrop Cotton (2-Seed)	2-Seed Hilldrop Cotton (A74961)	Long	Upper	See Footnote[b]	No[c]
Yes	Low-Rate Sorghum	Sorghum (A43066)	Long	Lower	See Footnote[b]	Wheel B
Yes	High-Rate Sorghum	High-Rate Sorghum (A52802)	Long	Lower	See Footnote[b]	No[c]
Yes	Sorghum	Sugar Beet (A51712) (H136445) (A51713)	Long	Lower	See Footnote[b]	Wheel B
Yes	Canola	Canola (A119979)	Long	Lower	See Footnote[b]	Wheel F
Yes	Canola	Canola with High-Rate Sorghum (A52802)	Long	Lower	See Footnote[b]	No[c]
Yes	Soybean	Soybean (A42586)	Long	Upper	See Footnote[b]	No[c]
Yes	Soybean	Cotton and Small Soybean (A56251)	Long	Upper	See Footnote[b]	No[c]
Yes	Soybean[f]	ProMax 64 x 4.5 (A105848)	Long	Upper	See Footnote[h]	Wheel E
Yes	Sugar Beet	Sugar Beet (A51712) (H136445) (A51713)	Long	Lower	See Footnote[b]	Wheel B
Yes	Sugar Beet	Sugar Beet (A43066)	Long	Lower	See Footnote[b]	Wheel B
The following crops are not approved for the Central Commodity System (CCS) delivery.						
No	Small Common Edible Bean and Smooth Pea	Small Edible Bean Cell-Type (H136468)	Long	Upper	See Footnote[b]	No[c]
No	Medium Common Edible Bean, Black-Eyed Pea, and Wrinkle Pea	Medium Edible Bean Cell-Type (A51696)	Short	Upper	See Footnote[b]	No[c]
No	Large Common Edible Bean	Large Edible Bean Cell-Type (H136092)	Short	Upper	See Footnote[b]	No[c]
No	Small Common Edible Bean	ProMax 50 x 3.75 (A52903)	Long	Upper	See Footnote[e]	Wheel D
No	Medium Common Edible Bean	ProMax 50 x 4.5 (A52904)	Long	Upper	See Footnote[e]	Wheel D
No	Large Common Edible Bean	ProMax 50 x 5.0 (A52878)	Long	Upper	See Footnote[e]	Wheel D

CCS Compatible	Crop	Disk Name (Part Number)	Front Brush (A)	Baffle Position[a]	Double Eliminator	Knockout Wheel
No	Runner and Spanish Peanuts	Large Edible Bean Cell-Type (H136092)	Short	Upper	See Footnote[b]	No[c]
No	Virginia Peanut	Virginia Peanut (H138722)	Short	Upper	See Footnote[b]	No[c]
No	Cucumber	Sorghum (A43066)	Long	Lower	See Footnote[b]	Wheel B
No	Cucumber	Blank (A52554)[g]	Long	Lower	See Footnote[d]	No[c]

[b]The double eliminator is not used with this disk. Set the double eliminator to position “0.”
[c]Install the wiper attachment when a knockout wheel is not used.
[d]Set the double eliminator to 5 (50% hole coverage). (See Operate Double Eliminator for additional information.)
[e]Adjust the tip of the eliminator towards the center of the meter as far as possible.
[f]The ProMax 64 x 4.5 disk is only recommended for 38, 51, and 56 cm (15, 20, and 22 in) row spacing.
[g]See the Seed Disk Recommendations for disk configuration.
[h]Start with the double eliminator at 5 (50% hole coverage) and adjust as needed to eliminate doubles. (See Operate Double Eliminator for additional information.)

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Seed Disk Recommendations for Optimum Performance with Field Corn

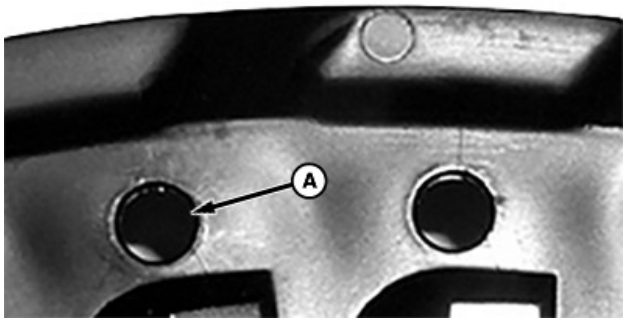


A106624—UN—27MAR20

Cell-Type Disk Close-Up

A—Cell-Type

Vacuum seed disks come in two types, cell-type and flat-type. Cell-type (A) disks have recessed cells around each vacuum hole in the disk. The cell sizes, hole quantity, and hole diameter vary by disk.



A106625—UN—27MAR20

Flat-Type Disk Close-Up

A—Flat-Type

Flat-type (A) disks only have holes on the flat surface of the disk. The hole quantity and diameter vary by disk. The variety of disks provide optimized control of population and spacing for different seed types, shapes, and sizes. Follow all recommendations for seed meter settings and vacuum level for each disk. Maintain the meter components and disk hub adjustment.

Seed Disk Guide for Field Corn					
Seed Shape	**Seeds/kg (seeds/lb)**	**Disk Name**	**Part Number (type)**	**Number of Holes (hole diameter [mm])**	**If population is difficult to control:**
Non-Uniform (mixed shapes)	Mixed Sizes (mixed sizes)	ProMax 40 x 4.5	A52391 (flat-type)	40 (4.5)	If over or under seed populating, adjust the double eliminator.
Uniform Flat	Less than 3308 (1500)	ProMax 40 x 4.5	A52391 (flat-type)	40 (4.5)	If over or under seed populating, adjust the double eliminator.
Uniform Flat	3308—6175 (1500—2800)	Medium Corn	A43215 (cell-type)	30 (3.6)	Adjust vacuum first. If problems persist, switch to an overlapping disk shown in the vacuum level chart.[a]
Uniform Flat	Greater than 6175 (2800)	Small Corn, Sunflower, and Popcorn	H136478 (cell-type)	30 (2.6)	Adjust vacuum first. If problems persist, switch to the Medium Corn Disk (A43215).
Uniform Round	Less than 3308 (1500)	Large Corn	A50617 (cell-type)	30 (3.6)	Adjust vacuum.

Seed Disk Guide for Field Corn					
Seed Shape	**Seeds/kg (seeds/lb)**	**Disk Name**	**Part Number (type)**	**Number of Holes (hole diameter [mm])**	**If population is difficult to control:**
Uniform Round	3308—6175 (1500—2800)	Medium Corn	A43215 (cell-type)	30 (3.6)	Adjust vacuum first. If problems persist, switch to Large Corn Disk (A50617).
Uniform Round	Greater than 6175 (2800)	Small Corn, Sunflower, and Popcorn	H136478 (cell-type)	30 (2.6)	Adjust vacuum first. If problems persist, switch to Medium Corn Disk (A43215).

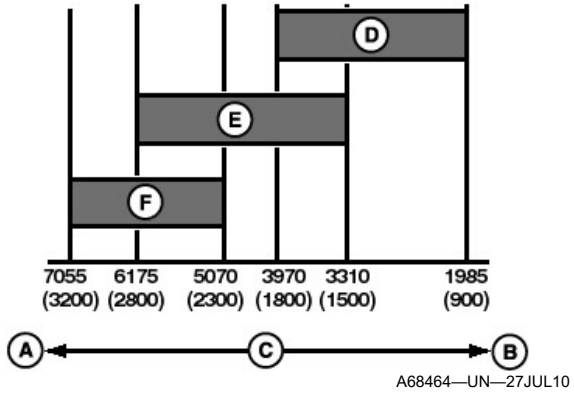
[a]For larger seed sizes less than 3970 seeds/kg (1800 seeds/lb), switch to the Large Corn Disk (A50617). If population control problems persist, switch to the ProMax 40 x 4.5 Disk (A52391) with a double eliminator. For smaller seed sizes greater than 5072 seeds/kg (2300 seeds/lb), switch to the Small Corn, Sunflower, and Popcorn Disk (H136478). If population control problems persist, switch to the ProMax 40 x 4.5 Disk (A52391) with a double eliminator.

For optimum performance, use the Seed Disk Guide for Field Corn, adjust the seed meter (see Seed Meter Settings), and then refer to the vacuum level chart for an initial vacuum setting.

Nearly 100% of target population is achievable when the proper vacuum level and the medium corn or large corn seed disks (with seed cells) are used.

Using cell-type disks (medium and large corn disks) requires careful seed selection for optimum performance.

Metering performance is directly dependent on the consistency of seed size. Seeds that are mixed shapes and sizes do not perform optimally with cell-type disks. The ProMax 40 x 4.5 Disk (A52391) with a double eliminator is required for optimum seed singulation and seed release when seeds vary in size.



Overlapping Seed Disk Chart

A—Small Seeds
B—Large Seeds
C—Seed Size, Seeds/kg (seeds/lb)
D—Large Corn Disk
E—Medium Corn Disk
F—Small Corn, Sunflower, and Popcorn Disk

NOTE: A knockout wheel is required when using John Deere flat disks.

For seed sizes that overlap the Medium Corn Disk (A43215) and the Large Corn Disk (A50617), choose the medium corn disk for initial setting. If population is difficult to control, switch to the large corn disk.

DIFFICULT TO PLANT SEEDS

IMPORTANT: Avoid population errors. Adjust all settings on the planter and monitor when using a ProMax disk.

- Difficult to plant seeds include varieties with mixed sizes, mixed shapes, combinations of sizes and shapes, long and slender seeds, seeds with a sharp point (germ), and others.
- A ProMax disk is a flat disk used to improve seed singulation with difficult to plant seeds. The ProMax requires higher vacuum levels than cell-type disks and requires the installation of a double eliminator and knockout wheel in each meter assembly.
- Quality-graded seed also requires proper seed disk selection for optimal performance.

PLANTING CORN IN HILLSIDE CONDITIONS

Diminished meter performance is possible on steep hillsides or when changing directions on a hillside. If the left side of machine is the downhill side, skips are possible due to the seeds falling away from the seed disk and a smaller seed reservoir next to the seed disk. If the right side of machine is the downhill side, overpopulation is possible due to the seeds being forced against the seed disk and a large seed reservoir next to the seed disk. To maximize seed meter performance on hillsides, follow these steps:

- Use a disk with the fewest holes possible when using cell-type disks. Fewer holes provide less opportunity for doubles.
- Use round seed. Round seed remains in the cell of a cell-type disk better and reduces the chance for doubles.

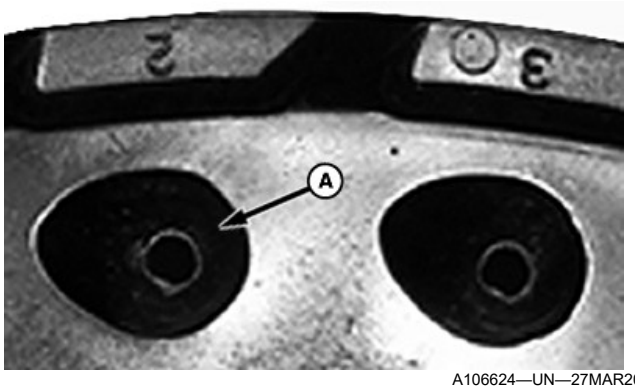
IMPORTANT: Avoid population errors. Adjust all settings on the planter and monitor when using a ProMax disk.

- If round seed is not available or hillsides are steep, use a flat-type disk with a double eliminator. The flat-type disk has no seed cells and requires higher vacuum levels, a double eliminator, and a knockout wheel. The double eliminator is used to remove one

of two seeds covering a single hole in a seed disk. The knockout wheel is used to remove debris from holes in a seed disk.

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Seed Disk Recommendations for Crops other than Field Corn

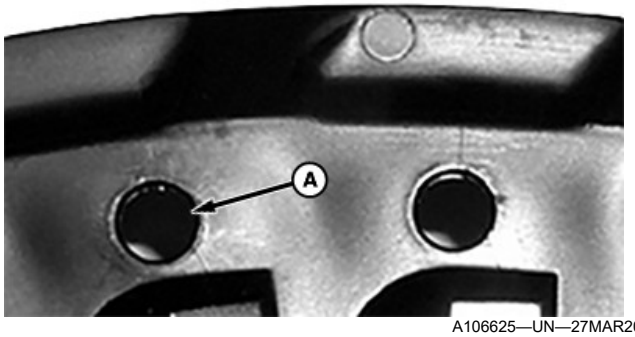


A106624—UN—27MAR20

Cell-Type Disk Close-Up

A—Cell-Type

Vacuum seed disks come in two types, cell-type and flat-type. Cell-type (A) disks have recessed cells around each vacuum hole in the disk. The cell sizes, hole quantity, and hole diameter vary by disk.



A106625—UN—27MAR20

Flat-Type Disk Close-Up

A—Flat-Type

Flat-type (A) disks only have holes on the flat surface of the disk. The hole quantity and diameter vary by disk. The various disks provide optimized control of population and spacing for different seed types, shapes, and sizes.

NOTE: Flat-type disks require higher vacuum than cell-type disks.

Follow all recommendations for seed meter settings and vacuum level for each disk. Maintain the meter components and disk hub adjustment.

John Deere flat-type disks meter a wide variety of seed sizes and shapes, including crops that are non-approved for the CCS system. For optimum performance, select the seed disk, adjust the seed meter (see Seed Meter Settings), and then refer to the vacuum level chart for the initial vacuum setting.

Sweet Corn

Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
ProMax 40 x 4.5	A52391 (flat-type)	<8600 (<3900)	40	4.5
ProMax 40 x 3.75	A52390 (flat-type)	>7700 (>3500)	40	3.75

Popcorn

Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
Small Corn, Sunflower, and Popcorn	H136478 (cell-type)	5500—9900 (2500—4500)	30	2.6
Sorghum	A43066 (cell-type)	>9900 (>4500)	45	1.5
On difficult to plant seeds, the ProMax 40 x 4.5 (A52390) improves performance. Sometimes a Medium Corn Disk (A43215) or Small Corn, Sunflower, and Popcorn Disk (H136478) can provide satisfactory performance.				

Confection Sunflower

Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
ProMax 40 x 4.5	A52391 (flat-type)	5000—7200 (2250—3250)	40	4.5
ProMax 40 x 3.75	A52390 (flat-type)	7200—11 600 (3250—5250)	40	3.75

Oil Sunflower

Disk Name	Part Number (type)	Seed Sizes	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
Small Corn, Sunflower, and Popcorn	H136478 (cell-type)	4 (small) 3 (medium) 2 (large)	30	2.6
ProMax 40 x 2.5	A102717 (flat-type)	4 (small) 3 (medium) 2 (large)	40	2.5
For oil sunflower seed sizes 1 (extra large) and 5 (extra small), see the recommendations for confectionary sunflowers. Small Corn, Sunflower, and Popcorn Disk (H136478) is recommended for oil sunflower seed sizes 4 (small), 3 (medium), and 2 (large). Small Corn, Sunflower, and Popcorn Disk (H136478) is not recommended for oil sunflower seed sizes 1 (extra large) and 5 (extra small) or confectionary sunflower seeds.				

Wheat

Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
Wheat	A124486 (cell-type)	22 710—37 920 (10 300—17 200)	210	2
For small seeds that result in doubles on the cotton and small soybean disk, using a Small Edible Bean Disk (A52903) with the double eliminator is recommended. The ProMax 64 disk has better seed singulation than the Cotton and Small Soybean Disk (A56251). The ProMax 64 disk is recommended for 91, 97, and 102 cm (36, 38, and 40 in) rows. If seed singulation is below expectations when using wax-based meter lubrication, try a talc and graphite blend (see the Meter Lubrication section).				

Drilled Cotton

Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
Cotton and Small Soybean	A56251 (cell-type)	8800—13 200 (4000—6000)	64	2.5
Low-Rate Cotton	A70163 (cell-type)	8800—13 200 (4000—6000)	32	2.5
ProMax 50 x 3.75	A52903 (flat-type)	3520—7260 (1600—3300)	50	3.75
ProMax 64 x 2.8	A121489 (flat-type)	7260—13 900 (3300—6300)	64	2.8
For small seeds that result in doubles on the cotton and small soybean disk, using a Small Edible Bean Disk (A52903) with the double eliminator is recommended. The ProMax 64 disk has better seed singulation than the Cotton and Small Soybean Disk (A56251). The ProMax 64 disk is recommended for 91, 97, and 102 cm (36, 38, and 40 in) rows. If seed singulation is below expectations when using wax-based meter lubrication, try a talc and graphite blend (see the Meter Lubrication section).				

4-Seed Hilldrop Cotton

Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
4-Seed Hilldrop Cotton	A65622 (cell-type)	8800—13 200 (4000—6000)	48	2.5
For small seeds that result in dropping more than four seeds, use of the 2-seed hilldrop cotton disk is recommended.				

2-Seed Hilldrop Cotton

Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
2-Seed Hilldrop Cotton	A74961	8800—13 200 (4000—6000)	64	2.5

Soybean

Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
Soybean	A42586 (cell-type)	<7700 (<3500)	108	4.4
Cotton and Small Soybean	A56251 (cell-type)	>7700 (>3500)	64	2.5
ProMax 64 x 4.5	A105848 (flat-type)	<7700 (<3500)	64	4.5
For smaller seed sizes that result in doubles, Cotton and Small Soybean Disk (A56251) can provide improved performance. The ProMax 64 disk is recommended for narrow row spacing with the following rates and ground speeds.				

ProMax 64			
Maximum Rates for Row Spacing and Ground Speed			
	38 cm (15 in)	51 cm (20 in)	56 cm (22 in)
Ground Speed kPh (mph)	Population Seeds/ha (acre)		

ProMax 64			
6.5 (4)	733 900 (297 000)	550 400 (222 750)	500 400 (202 500)
7.25 (4.5)	652 400 (264 000)	489 300 (198 000)	444 800 (180 000)
8 (5)	587 100 (237 600)	440 300 (178 200)	400 300 (162 000)
9 (5.5)	533 700 (216 000)	400 300 (162 000)	363 900 (147 273)
9.75 (6)	489 300 (198 000)	367 000 (148 500)	333 600 (135 000)
10.5 (6.5)	451 600 (182 769)	338 700 (137 077)	307 900 (124 615)
11.25 (7)	419 400 (169 714)	314 500 (127 286)	285 900 (115 714)

Low-Rate Sorghum

Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
Low-Rate Sorghum	A43066 (cell-type)	22 000—35 300 (10 000—16 000)	45	1.5
For smaller seed sizes, a Medium Sugar Beet Disk (H136445) or a Small Sugar Beet Disk (A51712) can provide improved performance.				

High-Rate Sorghum

Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
High-Rate Sorghum	A52802 (cell-type)	22 000—35 300 (10 000—16 000)	90	1.5

Canola

Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
Canola	A119979 (cell-type)	189 200—199 200 (86 000—96 000)	90	2.5
High-Rate Sorghum	A52802 (cell-type)	189 200—199 200 (86 000—96 000)	90	1.5

Monogerm Sugar Beet

Disk Name	Part Number (type)	Seed Size mm (in)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
Small Sugar Beet	A51712 (cell-type)	2.6—3.2 (6.5/64—8/64)	45	1.5
Medium Sugar Beet	H136445 (cell-type)	3.0—3.6 (7.5/64—9/64)	45	1.5
Large Sugar Beet	A51713 (cell-type)	3.4—4.0 (8.5/64—10/64)	45	1.6

Pelleted Sugar Beet

Disk Name	Part Number (type)	Seed Size mm (in)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
Medium Sugar Beet	H136445 (cell-type)	3.2—4.0 (8/64—10/64)	45	1.5
Large Sugar Beet	A51713 (cell-type)	3.6—4.6 (9/64—11.5/64)	45	1.5
Sorghum	A43066 (cell-type)	3.6—4.6 (9/64—11.5/64)	45	1.5

Small Common Edible Bean and Pea with Disk H136468 (cell-type)

Seed	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.			
Black Turtle	4180—5720 (1900—2600)	108	3.5
Navy	3960—5500 (1800—2500)	108	3.5
Pink Viva	3740—4290 (1700—1950)	108	3.5
Small White	5280—6600 (2400—3000)	108	3.5
Smooth Pea	6160—7040 (2800—3200)	108	3.5

Medium Common Edible Bean and Pea with Disk A51696 (cell-type)

Seed	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.			
Black-Eyed Pea	3520—4400 (1600—2000)	56	4
Green Bean (garden)	2200—4840 (1000—2200)	56	4
Kidney (small)	2530—3080 (1150—1400)	56	4
Pinto	1760—3080 (800—1400)	56	4
Red Mexican (small)	2640—3300 (1200—1500)	56	4
Wrinkle Pea	3960—5060 (1800—2300)	56	4

Large Common Edible Bean and Peanut with Disk H136092 (cell-type)

Seed	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.			
Cranberry Bean	1760—2640 (800—1200)	50	4.8
Kidney (medium)	2090—2530 (950—1150)	50	4.8
Great Northern	1980—2860 (900—1300)	50	4.8
Garbanzo	1650—1980 (750—900)	50	4.8
Peanut (runner)	1430—1760 (650—800)	50	4.8
Peanut (Spanish)	2200—2750 (1000—1250)	50	4.8

Small Common Edible Bean and Pea with ProMax 50 X 3.75 Disk (A52903)

Seed	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.			
Green Garden (small)	3520—5280 (1600—2400)	50	3.75
Black Turtle	4180—5720 (1900—2600)	50	3.75
Navy	3960—5720 (1800—2600)	50	3.75
Small White	5280—7260 (2400—3300)	50	3.75
Wrinkle Pea	3740—5060 (1700—2300)	50	3.75

Medium Common Edible Bean and Pea with ProMax 50 X 4.5 Disk (A52904)

Seed	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.			
Green Garden (medium)	2640—3520 (1200—1600)	50	4.5
Small Red	2640—3300 (1200—1500)	50	4.5
Pinto	All Sizes	50	4.5
Medium Kidney	2530—3080 (1150—1400)	50	4.5
Lima	2640—3520 (1200—1600)	50	4.5
Pink Viva	3740—4180 (1700—1900)	50	4.5
Black-Eyed Pea	3520—4400 (1600—2000)	50	4.5
Smooth Pea	6160—7040 (2800—3200)	50	4.5

Large Common Edible Bean with ProMax 50 X 5.0 Disk (A52878)

Seed	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.			
Green Garden (large)	1540—2640 (700—1200)	50	5.0
Cranberry	1760—2640 (800—1200)	50	5.0
Large Kidney	1870—2530 (850—1150)	50	5.0
Great Northern	1980—2860 (900—1300)	50	5.0
Garbanzo	1650—1980 (750—900)	50	5.0

Virginia Peanut

Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
NOTE: On planters equipped with CCS, see the CCS section for nozzle and elbow recommendations.				
Virginia Peanut	H138722 (cell-type)	1100—1760 (500—800)	46	5.3

Cucumber

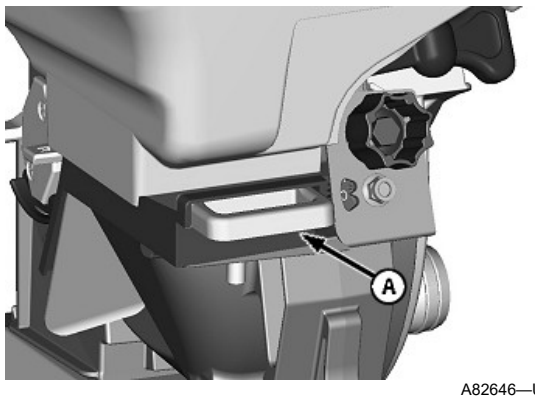
Disk Name	Part Number (type)	Seeds/kg (seeds/lb)	Number of Holes	Hole Diameter (mm)
Sorghum	A43066 (cell-type)	22 000—35 300 (10 000—16 000)	45	1.5
Blank	A52554 (flat-type)	22 000—35 300 (10 000—16 000)	60	2
To improve performance with the blank disk, use small seed tube inserts.				

Blank Seed Disk

The Blank ProMax Seed Disk (A52554) (flat-type) allows custom drilling of a specific hole size for specialty crops. (See a John Deere dealer or other service provider for additional information.)

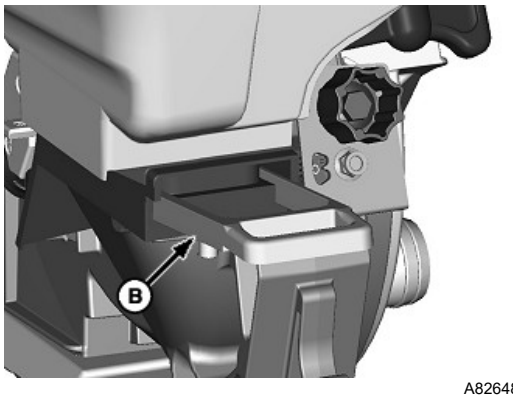
WP29706,00005BA-19-23OCT25

Clean Out the Vacuum Seed Meter



A82646—UN—23MAY14

Open Position



A82648—UN—23MAY14

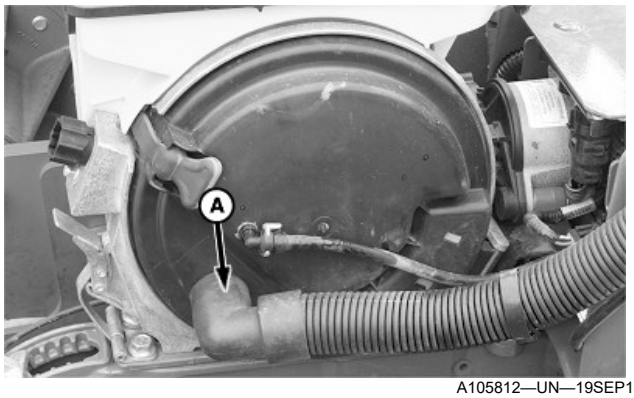
Closed Position

A—Open Gate Position
B—Closed Gate Position

NOTE: If the planter is equipped with a mini hopper, proceed to step 3.

NOTE: If seed bridging occurs, verify that the gate is open (A) and add more meter lubricant to the seed.

1. Shutoff gates are used on 1.6 bu and 3 bu hoppers. Open the gate when the meter is in use. Close the gate before inspection or cleanout of the seed meter.

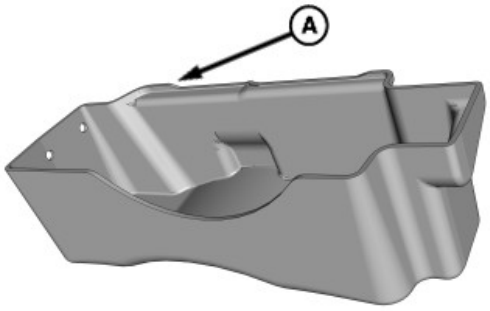


A105812—UN—19SEP19

A—Vacuum Hose

2. Remove the vacuum hose (A).

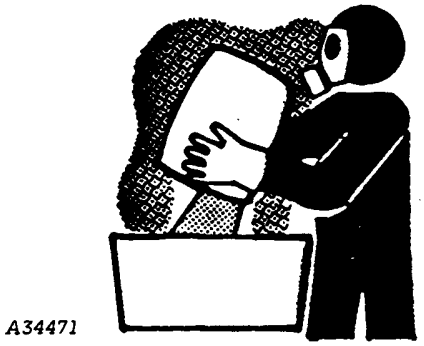
NOTE: The catch pan (A) is either on the planter frame, inside the planter frame, or on the ladder.



A89605—UN—01MAR16

A—Catch Pan

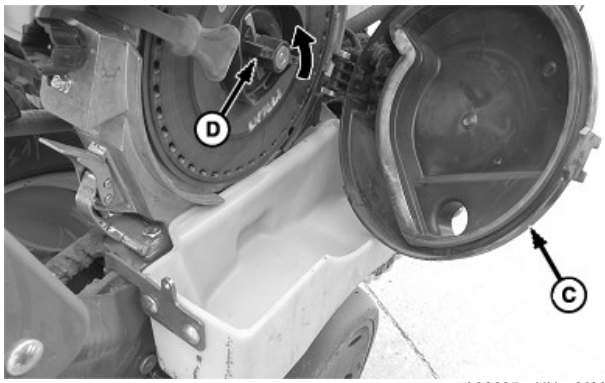
3. Locate the catch pan (A).



A34471—UN—11OCT88



A82664—UN—29MAY14



A82665—UN—29MAY14

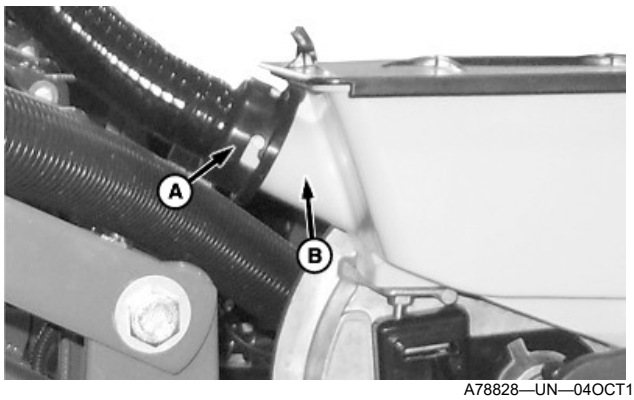
A—Front Edge
B—Hooked Plate
C—Cover
D—Handle

CAUTION: Avoid chemical injury to eyes, skin, and lungs. When using seed treatments, use caution when accessing and handling components coated with seed treatment. Read and follow the safety instructions on the product label.

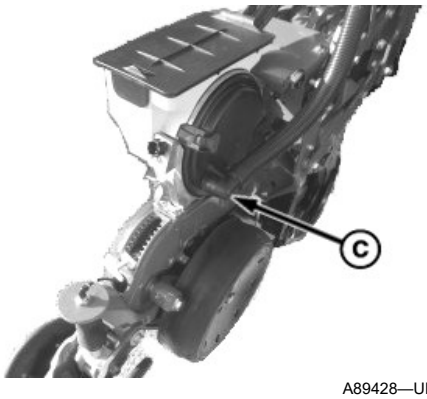
4. Install front edge (A) into position near the parallel arms.
5. Install hooked plate (B) into the notched area as shown.
6. Open cover (C), rotate the handle (D) into the unlocked position, and remove the seed disk.

WP29706,00008BC-19-19SEP19

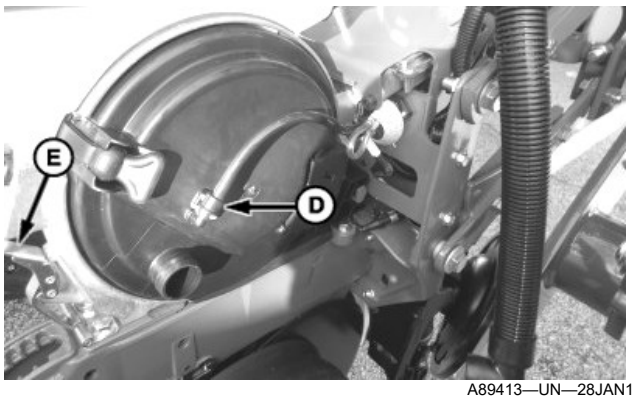
Remove the MaxEmerge 5e Seed Meter



A78828—UN—04OCT13



A89428—UN—01FEB16



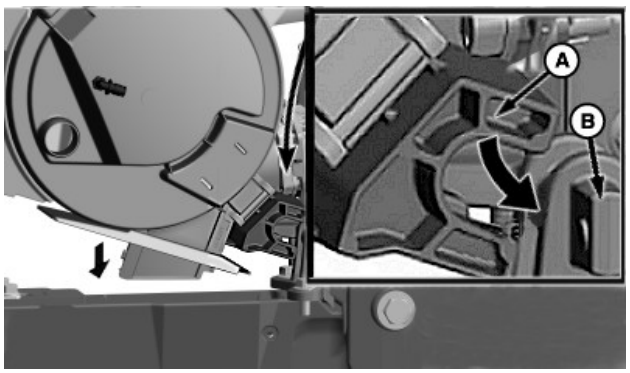
A89413—UN—28JAN16

A—CCS Seed Delivery Hose
B—Fill Neck
C—Vacuum Hose
D—Vacuum Sense Hose
E—Latch

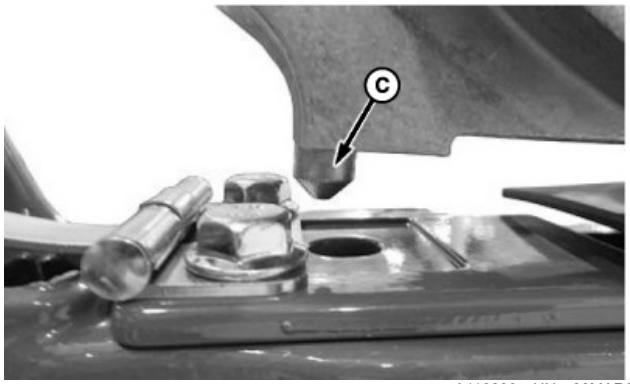
1. Rotate the CCS seed delivery hose (A) counterclockwise until it unsnaps from the hopper fill neck (B) and pull off the hose.
2. Remove the vacuum hose (C).
3. Remove the vacuum sense hose (D). (On rows equipped)
4. Unlock the meter assembly by pushing down on the latch (E).
5. Remove the meter.

WP29706,0000D55-19-07OCT25

Install the MaxEmerge 5e Seed Meter



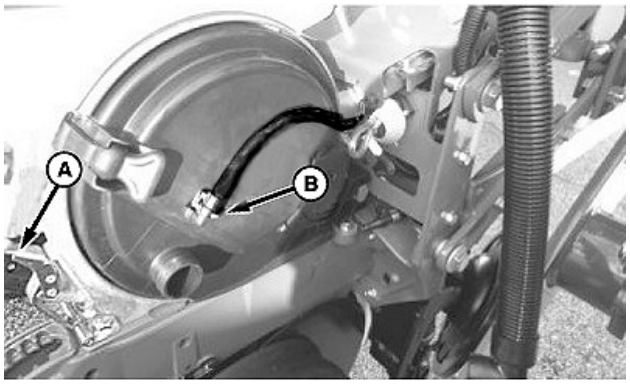
A116275—UN—18MAR22



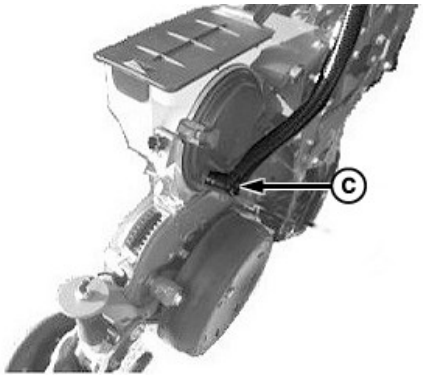
A116280—UN—22MAR22

A—Hopper Bracket
B—Support Bracket
C—Alignment Pin

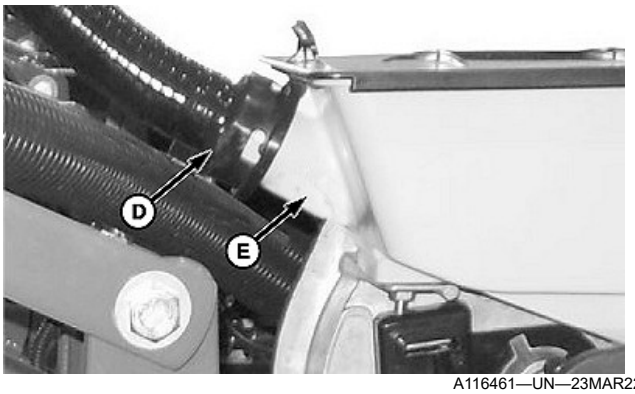
1. Position hopper bracket (A) on the support bracket (B).
2. Verify that the alignment pin (C) on bottom of the meter is aligned with the hole in the shank latch plate.



A116459—UN—23MAR22



A116460—UN—23MAR22



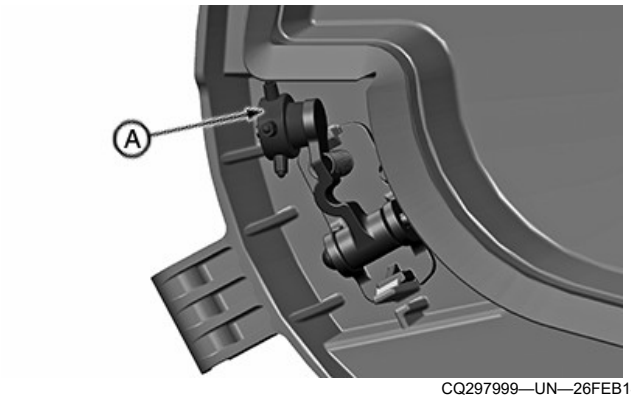
A116461—UN—23MAR22

A—Latch
B—Vacuum Sense Hose
C—Vacuum Hose
D—Seed Delivery Hose
E—Fill Neck

3. Lock the meter assembly to the row unit by pushing up on latch (A).
4. If equipped with seed hoppers larger than the mini-hoppers, lock hopper latch to the row unit.
5. Attach the vacuum sense hose (B) (when equipped).
6. Install the vacuum hose (C).
7. Rotate the CCS seed delivery hose (D) clockwise until it snaps onto the hopper fill neck (E).

WP29706,0000D56-19-07OCT25

Seed Knockout Wheel Operation



CQ297999—UN—26FEB14

A—Seed Knockout Wheel

The seed knockout wheel (A) is used to push seeds from the seed cell. Wheel projections engage the seed cell holes, forcing all the seeds and foreign material from the seed cell.

The seed knockout wheel is required when planting sorghum, monogerm sugar beet, canola, wheat, cucumber, and seed planted with flat-type seed disks. Sugar beet and sweet corn seeds can have sharp edges and are typically irregular in shape, which contributes to seed lodging in the seed cell. Some sorghum seed contains large amounts of foreign material, which can also become trapped in the seed cell.

WP29706,000051F-19-24FEB22

Set the Vacuum Level

Vacuum Level Chart	
Crop	**Vacuum Level, mm (in) of Water**
Sugar Beet	See Chart
Corn	See Chart
Sweet Corn	See Chart
Popcorn	See Chart
Common Edible Beans, Peas, and Peanuts with an Edible Bean Cell-Type Seed Disk	Use 203 (8) for common edible beans except the following: Use 152 (6) for small common edible beans with 6160 seeds/kg (2800 seeds/lb) or more. Use 152 (6) for medium common edible beans with 3960 seeds/kg (1800 seeds/lb) or more.
Common Edible Beans and Peas with a ProMax Seed Disk	See Chart
Wheat	See Chart
Cotton (cell-type disk)	203 (8)
Cotton Hilldrop	203 (8)
Cotton with a ProMax Seed Disk	See Chart

Vacuum Level Chart	
Crop	**Vacuum Level, mm (in) of Water**
Runner, Spanish, and Virginia Peanuts	See Chart
Sorghum	203 (8)
High-Rate Sorghum	203 (8)
Canola	Use 203 (8) when planting 556 000—667 200 seeds/ha (225 000—270 000 seeds/acre). Use 254 (10) when planting 667 200—889 600 seeds/ha (270 000—360 000 seeds/acre).
Oil Sunflower	See Chart
Confection Sunflower	See Chart
Soybean	203 (8)
Soybean with a Cotton Disk	127—178 (5—7)
Soybean with a ProMax 64 Disk	280—560 (11—22)
Cucumber with a Sorghum Disk	254 (10)
Cucumber with a Blank (custom) Disk	203—305 (8—12)

Some seed sizes, seed shapes, and situations require vacuum levels slightly higher or lower than the settings shown. Always verify the vacuum level with a field check. The vacuum charts are a guide and are accurate in most conditions.

Blower control is determined by the blower configuration and hose attachment to the tractor. Multiple vacuum blowers on one selective control valve (SCV) use in-line flow control valves for adjustment. A single blower on an SCV uses the tractor flow control for adjustment.

Use the vacuum level charts for the initial vacuum setting and adjust the level as needed. The charts are based on a typical ground speed and population rate. If high population rates or high ground speeds affect seed placement, increase the vacuum level. If low population rates or low ground speeds affect seed placement, decrease the vacuum level.

NOTE: At any setting, the vacuum level is slightly lower when the hydraulic oil is cold or when seeds are not covering holes in the seed disk. Make the final setting after the oil has warmed and the seed disks are full.

If rough field conditions cause seed skips, an increase in vacuum can help. Extra downforce can improve the ride quality, but do not exceed a level of downforce that degrades the seed furrow. If all the possible adjustments do not reduce seed skips, reduce ground speed.

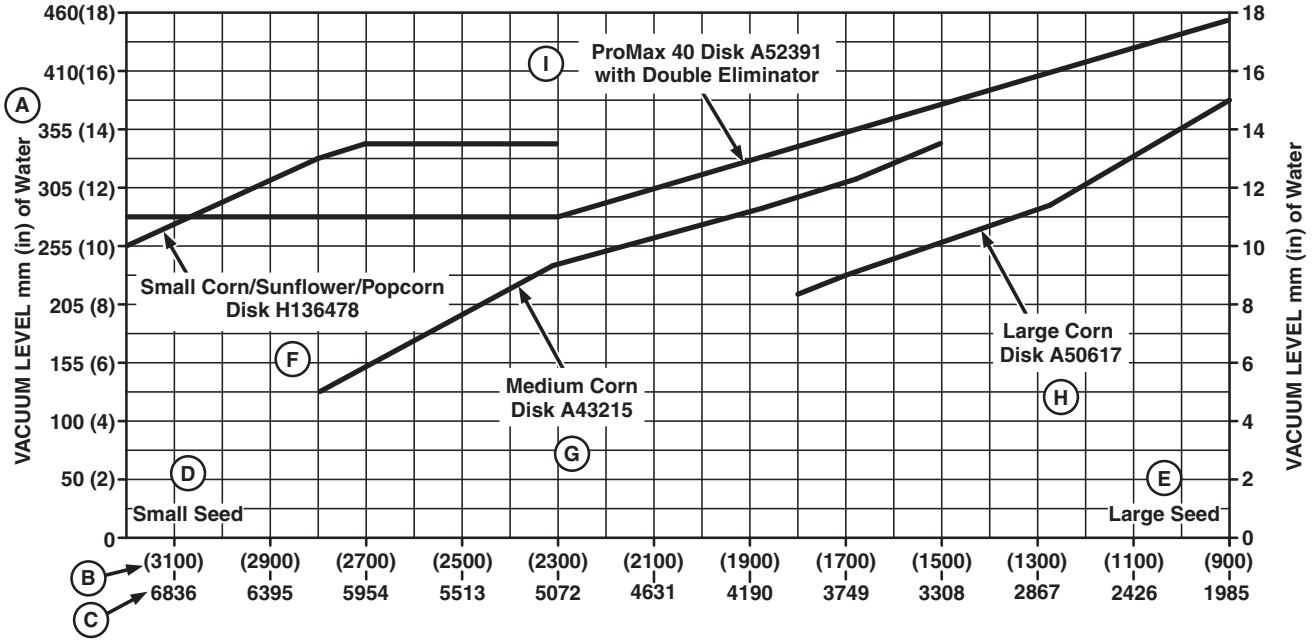
The vacuum level is indicated on the vacuum gauge or on the screen.

Set the vacuum level as follows:

1. Verify that the seed meters are set up for the crop.
2. Engage the vacuum (SCV lever in the detent position). Let the oil warm (approximately 15 minutes).
3. Fill all the tanks and hoppers with seed.
4. Plant a short distance or use the on-screen meter fill function to fill the seed disks with seed.
5. Adjust the vacuum level manually with the tractor or the in-line valves, or activate the vacuum automation on the screen.
6. To refine the vacuum level (when using electric driven seed meters), use the runoff feature on the screen.

OUO6064,000015A-19-05APR23

Vacuum Level for Field Corn Using H136478, A43215, A50617, or A52391 Seed Disks



A106657—UN—01APR20

A—Vacuum Level, mm (in) of Water
B—Seeds per Pound
C—Seeds per Kilogram
D—Small Seed
E—Large Seed
F—Small Corn, Sunflower, and Popcorn Disk
G—Medium Corn Disk
H—Large Corn Disk
I—ProMax 40 Disk

Determine the vacuum level based on the seeds per kg (lb). To calculate the seeds per kg (lb), divide the number of seeds in a bag by the weight of the bag.

EXAMPLE: If there are 4190 seeds per kg (1900 seeds per lb), the chart indicates a vacuum level of 280 mm (11 in) with a medium corn disk.

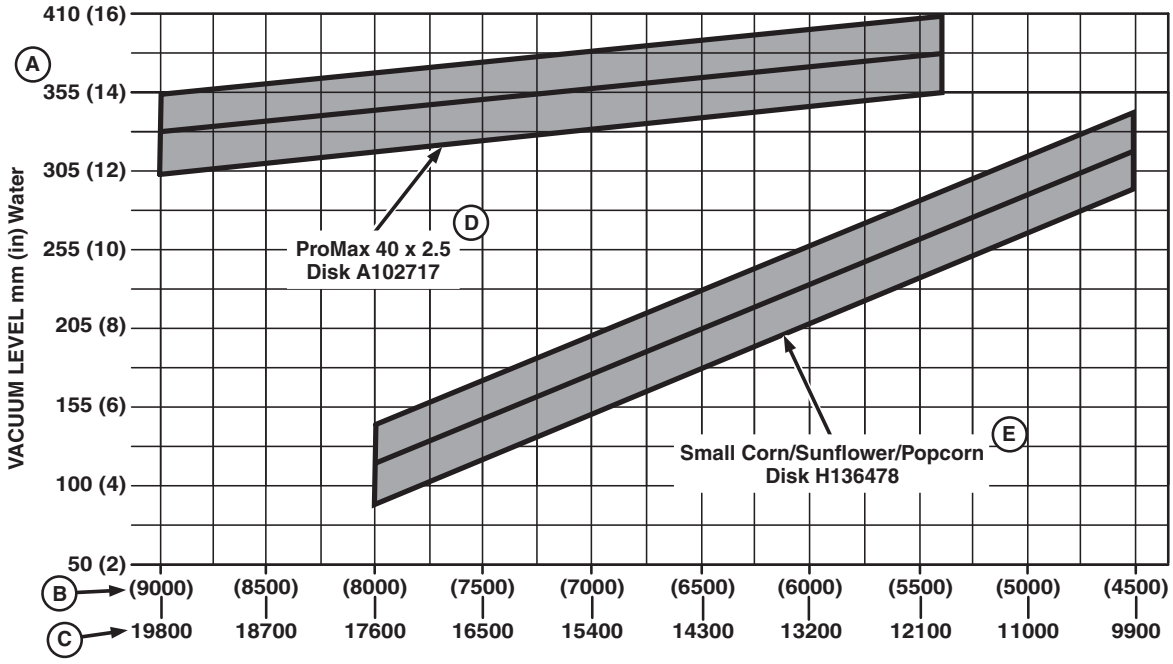
Use the vacuum level charts for the initial vacuum setting and adjust the level as needed. The charts are based on a typical ground speed and population rate. If high population rates or high ground speeds affect seed placement, increase the vacuum level. If low population rates or low ground speeds affect seed placement, decrease the vacuum level.

If rough field conditions cause seed skips, an increase in vacuum can help. Extra downforce can improve the ride quality, but do not exceed a level of downforce that degrades the seed furrow. If all the possible adjustments do not reduce seed skips, reduce ground speed.

Where the medium and large corn disks overlap, select the medium seed disk initially. If the target rate is difficult to control, switch to the large corn disk.

MH69740,000055C-19-15APR20

Vacuum Level for Oil Sunflower



A106658—UN—01APR20

A—Vacuum Level, mm (in) of Water
B—Seeds per Pound
C—Seeds per Kilogram
D—ProMax 40 x 2.5 Disk
E—Small Corn, Sunflower, and Popcorn Disk

Determine the vacuum level based on the seeds per kg (lb). To calculate the seeds per kg (lb), divide the number of seeds in a bag by the weight of the bag.

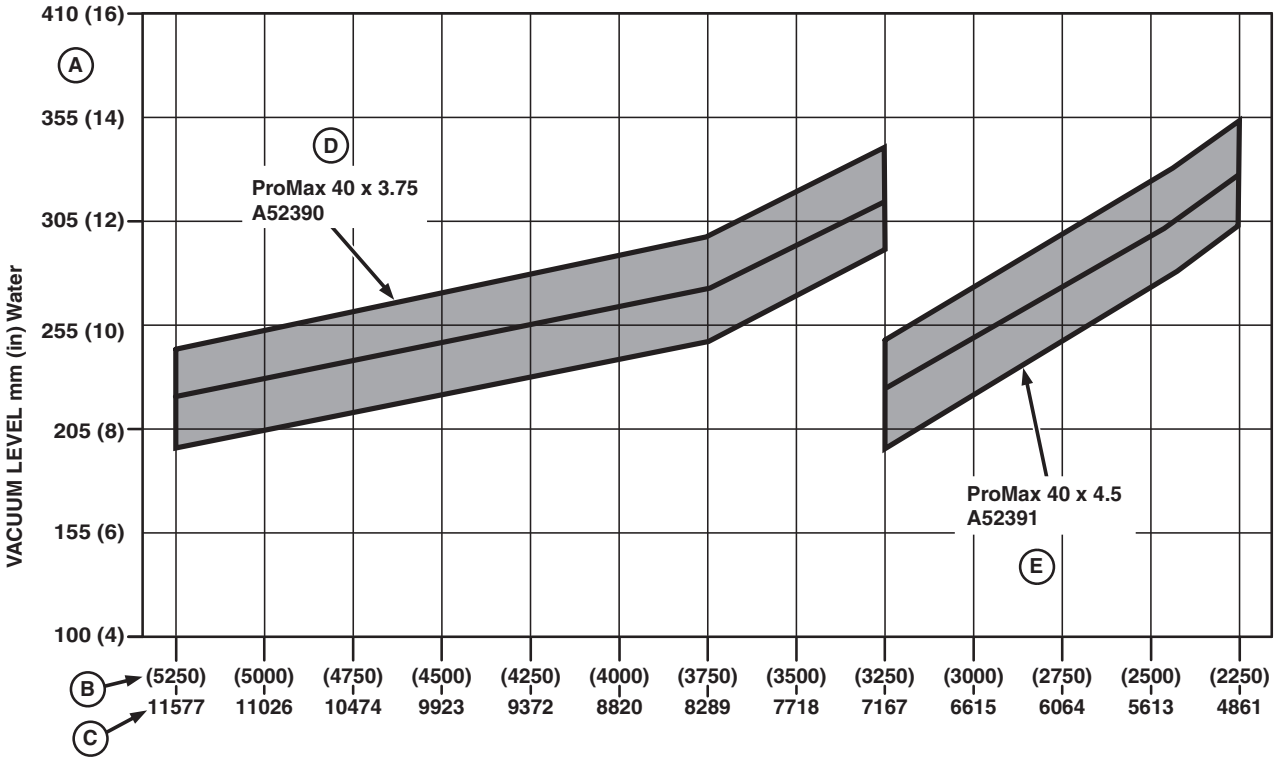
EXAMPLE: If there are 12 100 seeds per kg (5500 seeds per lb), the chart indicates a vacuum level of 254 mm (10 in) with the small corn, sunflower, and popcorn disk (E).

Use the vacuum level charts for the initial vacuum setting and adjust the level as needed. The charts are based on a typical ground speed and population rate. If high population rates or high ground speeds affect seed placement, increase the vacuum level. If low population rates or low ground speeds affect seed placement, decrease the vacuum level.

If rough field conditions cause seed skips, an increase in vacuum can help. Extra downforce can improve the ride quality, but do not exceed a level of downforce that degrades the seed furrow. If all the possible adjustments do not reduce seed skips, reduce ground speed.

MH69740,000055D-19-15APR20

Vacuum Level for Confectionary Sunflower



A106659—UN—01APR20

A—Vacuum Level, mm (in) of Water
B—Seeds per Pound
C—Seeds per Kilogram
D—ProMax 40 x 3.75 Disk
E—ProMax 40 x 4.5 Disk

Determine the vacuum level based on the seeds per kg (lb). To calculate the seeds per kg (lb), divide the number of seeds in a bag by the weight of the bag.

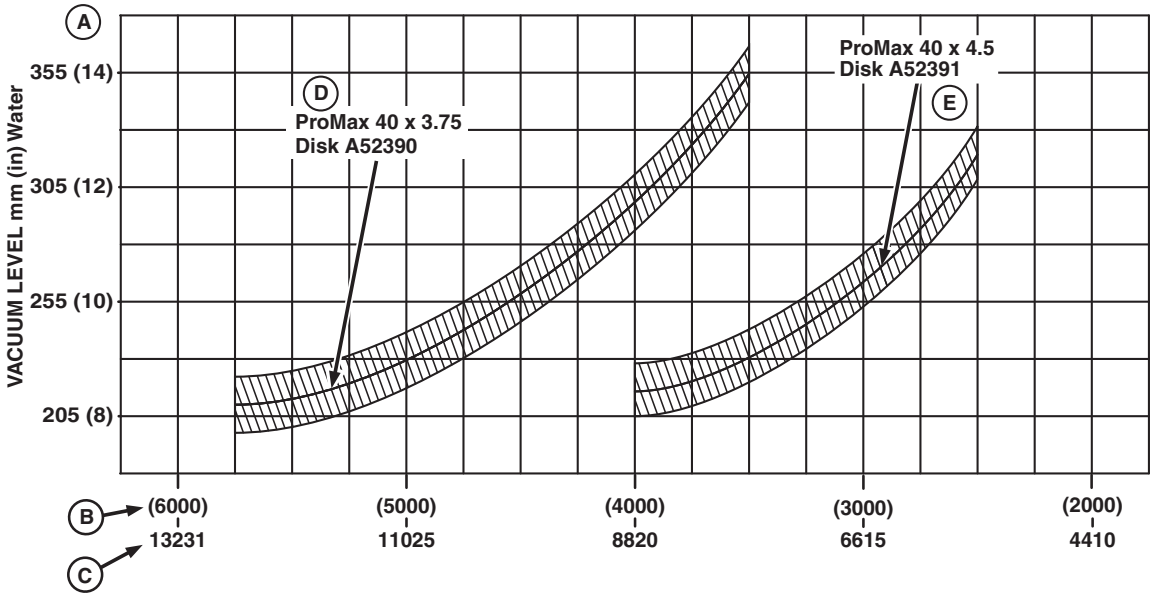
EXAMPLE: If there are 9372 seeds per kg (4250 seeds per lb), the chart indicates a vacuum level of 254 mm (10 in) with a ProMax 40 x 3.75 disk.

Use the vacuum level charts for the initial vacuum setting and adjust the level as needed. The charts are based on a typical ground speed and population rate. If high population rates or high ground speeds affect seed placement, increase the vacuum level. If low population rates or low ground speeds affect seed placement, decrease the vacuum level.

If rough field conditions cause seed skips, an increase in vacuum can help. Extra downforce can improve the ride quality, but do not exceed a level of downforce that degrades the seed furrow. If all the possible adjustments do not reduce seed skips, reduce ground speed.

MH69740,000055E-19-15APR20

Vacuum Level for Sweet Corn



A106660—UN—01APR20

A—Vacuum Level, mm (in) of Water
B—Seeds per Pound
C—Seeds per Kilogram
D—ProMax 40 x 3.75 Disk
E—ProMax 40 x 4.5 Disk

Determine the vacuum level based on the seeds per kg (lb). To calculate the seeds per kg (lb), divide the number of seeds in a bag by the weight of the bag.

EXAMPLE: If there are 9370 seeds per kg (4250 seeds per lb), the chart indicates a vacuum level of 280 mm (11 in) with a ProMax 40 x 3.75 disk.

Use the vacuum level charts for the initial vacuum setting and adjust the level as needed. The charts are based on a typical ground speed and population rate. If high population rates or high ground speeds affect seed placement, increase the vacuum level. If low population rates or low ground speeds affect seed placement, decrease the vacuum level.

If rough field conditions cause seed skips, an increase in vacuum can help. Extra downforce can improve the ride quality, but do not exceed a level of downforce that degrades the seed furrow. If all the possible adjustments do not reduce seed skips, reduce ground speed.

MH69740,000055F-19-15APR20

Vacuum Level for Wheat

Seed Size Seeds/kg (Seeds/lb)	**Seed Size Seeds/kg (Seeds/lb)**	**Seed Size Seeds/kg (Seeds/lb)**	**Seed Size Seeds/kg (Seeds/lb)**
22 710 (10 300)	**27 560 (12 500)**	**29 760 (13 500)**	**37 920 (17 200)**
Vacuum mm (in) of Water	Vacuum mm (in) of Water	Vacuum mm (in) of Water	Vacuum mm (in) of Water
203 (8)	203 (8)	178 (7)	51 (2)
305 (12)	305 (12)	254 (10)	76 (3)
381 (15)	356 (14)	279 (11)	102 (4)
457 (18)	432 (17)	305 (12)	152 (6)
559 (22)	559 (22)	356 (14)	178 (7)
660 (26)	584 (23)	457 (18)	279 (11)

Determine the vacuum level based on the seeds per kg (lb). To calculate the seeds per kg (lb), divide the number of seeds in a bag by the weight of the bag.

Use the vacuum level charts for the initial vacuum setting and adjust the level as needed. The charts are based on a typical ground speed and population rate. If high population rates or high ground speeds affect the seed placement, increase the vacuum level. If low population rates or low ground speeds affect the seed placement, decrease the vacuum level.

If rough field conditions cause seed skips, an increase in the vacuum level can help. Extra downforce can improve the ride quality, but do not exceed a level of downforce that degrades the seed furrow. If all the possible adjustments do not reduce the seed skips, reduce the ground speed.

WP29706,0000F59-19-10FEB22

Vacuum Level for Cotton Using a ProMax Disk

Disk	Seed Size	Vacuum Range
ProMax	Recommendations Seeds/kg (Seeds/lb)	mm (in) of Water
50 x 3.75 (A52903)	3520—7260 (1600—3300)	305—457 (12—18)
64 x 2.8 (A121489)	6610—8600 (3000—3900)	280—508 (11—20)
64 x 2.8 (A121489)	8600—10 360 (3900—4700)	228—407 (9—16)
64 x 2.8 (A121489)	10 360—14 330 (4700—6500)	152—305 (6—12)

NOTE: To maintain the vacuum levels when using a ProMax 50 disk, do not exceed 12 row units per vacuum blower.

Determine the vacuum level based on the seeds per kg (lb). To calculate the seeds per kg (lb), divide the number of seeds in a bag by the weight of the bag.

Use the vacuum level charts for the initial vacuum setting and adjust the level as needed. The charts are based on a typical ground speed and population rate. If high population rates or high ground speeds affect the seed placement, increase the vacuum level. If low population rates or low ground speeds affect the seed placement, decrease the vacuum level.

If rough field conditions cause seed skips, an increase in the vacuum level can help. Extra downforce can improve the ride quality, but do not exceed a level of downforce that degrades the seed furrow. If all the possible adjustments do not reduce the seed skips, reduce the ground speed.

OUO6074,00011D7-19-31MAR21

Vacuum Level for Common Edible Beans and Peas Using a ProMax 50 Disk

	Vacuum Chart Using the ProMax Edible Beans and Peas Disk					
	ProMax 50 Disks			Vacuum Range	Double Eliminator	Seed Size
Crop	50 x 3.75 (A52903)	50 x 4.5 (A52904)	50 x 5 (A52878)	mm (in) of Water	Percent of Hole Covered	Recommendations Seeds/kg (Seeds/lb)
Small Common Edible Beans						
Small Green Garden	X			406—457 (16—18)	0—50	3528—5292 (1600—2400)
Black Turtle	X			406—457 (16—18)	0—50	4190—5733 (1900—2600)
Navy	X			406—457 (16—18)	0—50	3969—5733 (1800—2600)
Small Whites	X			305—356 (12—14)	0—50	5292—7277 (2400—3300)
Pink Viva		X		457—508 (18—20)	0—50	3749—4190 (1700—1900)
Medium Common Edible Beans						
Medium Green Garden		X		457—508 (18—20)	0—50	2649—3528 (1200—1600)
Small Red		X		457—508 (18—20)	0—50	2649—3308 (1200—1500)
Pinto		X		508—559 (20—22)	0—50	All Sizes
Medium Kidney		X		356—406 (14—16)	0—50	2536—3087 (1150—1400)
Lima		X		457—508 (18—20)	0—50	2649—3528 (1200—1600)
Large Common Edible Beans						
Large Green Garden			X	508—559 (20—22)	0—25	1544—2649 (700—1200)
Cranberry			X	508—559 (20—22)	0—50	1764—2649 (800—1200)
Large Kidney			X	457—508 (18—20)	0—50	1874—2536 (850—1150)
Great Northern			X	457—508 (18—20)	0—50	1985—2867 (900—1300)
Garbanzo			X	406—457 (16—18)	0—50	1654—1985 (750—900)
Edible Peas						
Black-Eyed		X		406—457 (16—18)	0—50	3528—4410 (1600—2000)
Smooth		X		356—406 (14—16)	0—50	6174—7056 (2800—3200)
Wrinkle	X			305—356 (12—14)	0—50	3749—5072 (1700—2300)

NOTE: To maintain the vacuum levels when using a ProMax 50 disk, do not exceed 12 row units per vacuum blower.

AA38407 Vacuum Gauge with a 762 mm (30 in) vacuum range can be obtained via regular spare part channels.

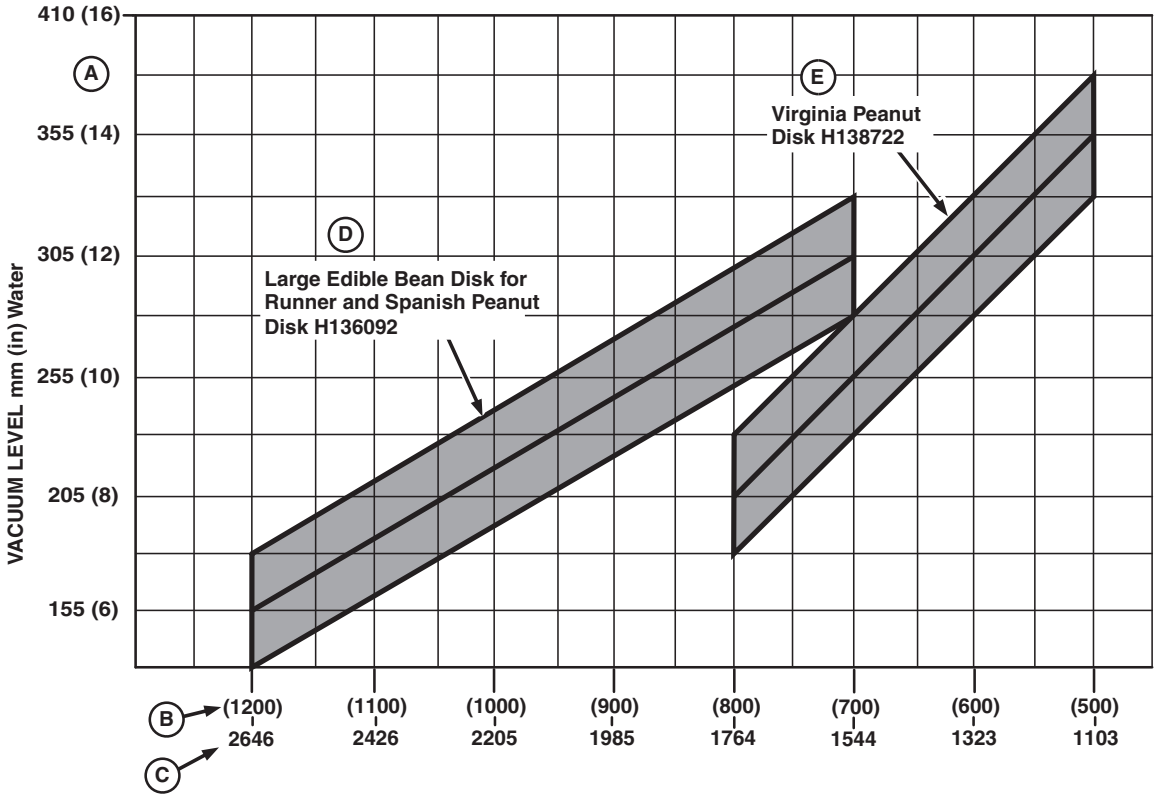
Determine the vacuum level based on the seeds per kg (lb). To calculate the seeds per kg (lb), divide the number of seeds in a bag by the weight of the bag.

Use the vacuum level charts for the initial vacuum setting and adjust the level as needed. The charts are based on a typical ground speed and population rate. If high population rates or high ground speeds affect the seed placement, increase the vacuum level. If low population rates or low ground speeds affect the seed placement, decrease the vacuum level.

If rough field conditions cause seed skips, an increase in the vacuum level can help. Extra downforce can improve the ride quality, but do not exceed a level of downforce that degrades the seed furrow. If all the possible adjustments do not reduce the seed skips, reduce the ground speed.

MH69740,0000564-19-22OCT25

Vacuum Level for Peanuts



A96361—UN—04MAY17

A—Vacuum Level, mm (in) of Water
B—Seeds Per Pound
C—Seeds Per Kilogram
D—Large Edible-Bean Disk for Runner and Spanish Peanut
E—Virginia Peanut Disk

Determine the vacuum level based on the seeds per kg (lb). To calculate the seeds per kg (lb), divide the number of seeds in a bag by the weight of the bag.

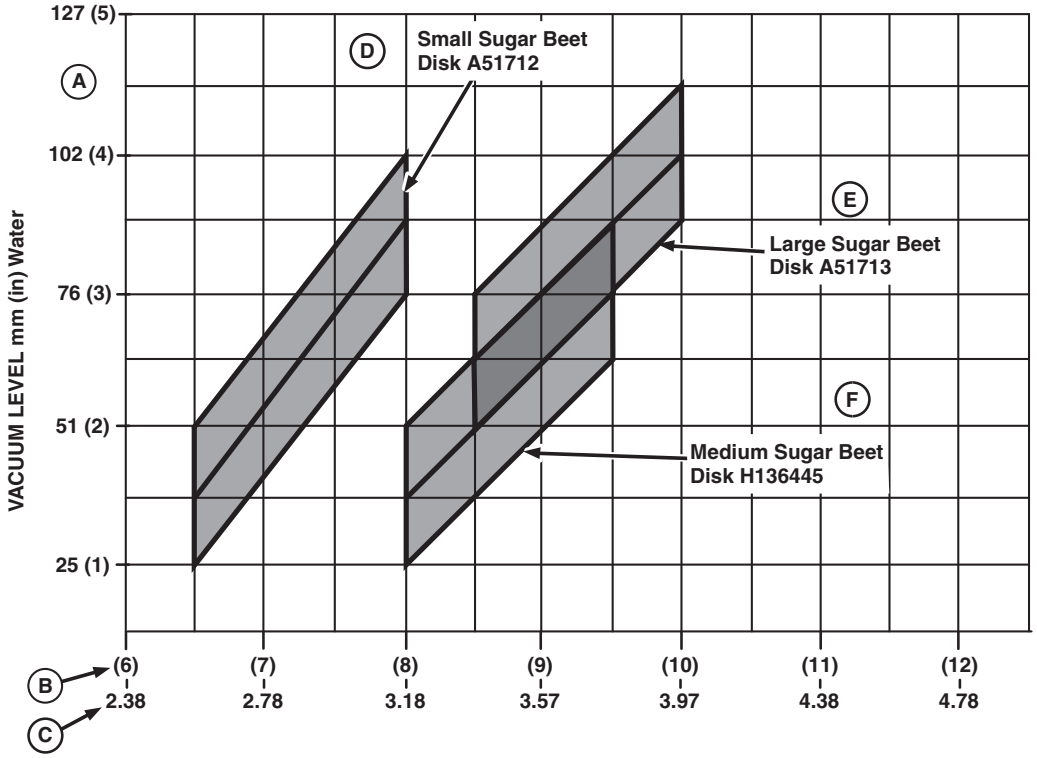
EXAMPLE: If there are 1764 seeds per kg (800 seeds per lb), the chart indicates a vacuum level of 280 mm (11 in) with the large edible-bean disk for Runner Peanuts or a vacuum level of 203 mm (8 in) with the Virginia Peanut disk.

Use the vacuum level charts for the initial vacuum setting and adjust the level as needed. The charts are based on a typical ground speed and population rate. If high population rates or high ground speeds affect seed placement, increase the vacuum level. If low population rates or low ground speeds affect seed placement, decrease the vacuum level.

If rough field conditions cause seed skips, an increase in vacuum can help. Extra downforce can improve the ride quality, but do not exceed a level of downforce that degrades the seed furrow. If all the possible adjustments do not reduce seed skips, reduce ground speed.

MH69740,0000562-19-03MAY17

Vacuum Level for Sugar Beet



A96362—UN—04MAY17

A—Vacuum Level, mm (in) of Water
B—Seed Diameter (per 64th of an inch)
C—Seed Diameter (per Millimeter)
D—Small Sugar Beet
E—Large Sugar Beet
F—Medium Sugar Beet

EXAMPLE: If the seed label indicates a medium seed diameter of 3.6 mm (9/64 in), set the vacuum level to 64 mm (2.5 in) with the medium sugar-beet disk.

Use the vacuum level charts for the initial vacuum setting and adjust the level as needed. The charts are based on a typical ground speed and population rate. If high population rates or high ground speeds affect seed placement, increase the vacuum level. If low population rates or low ground speeds affect seed placement, decrease the vacuum level.

If rough field conditions cause seed skips, an increase in vacuum can help. Extra downforce can improve the ride quality, but do not exceed a level of downforce that degrades the seed furrow. If all the possible adjustments do not reduce seed skips, reduce ground speed.

MH69740,0000563-19-03MAY17

Optimize Seed Spacing

Match the seed disk to the seed for optimal meter performance. Seed spacing depends on ground conditions, meter speed, and ground speed.

IMPORTANT: Avoid poor seed spacing. Avoid rough ground conditions, high metering speeds, and high ground speeds. The operator determines if the planting timeline is more important than optimal spacing.

To optimize the seed spacing, observe the following:

GROUND CONDITIONS—To achieve optimal spacing, slow down in rough ground conditions.

METER SPEED—With high seed populations, reduce ground speed to reduce meter speed.

GROUND SPEED—Ground speed directly affects in-ground seed spacing. As the ground speeds rise above 8 km/h (5 mph), seed spacing performance decreases.

OUO6074,0000ED1-19-29MAR18

Check Meter Performance

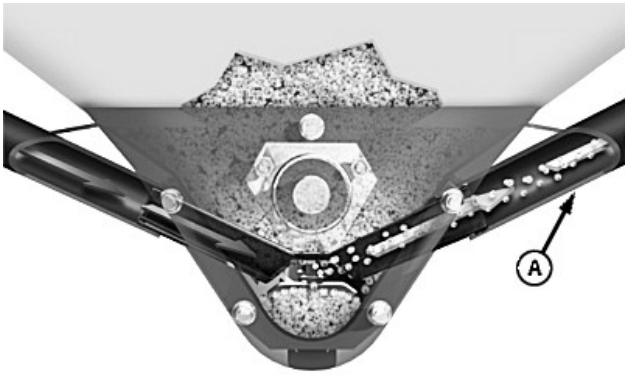
IMPORTANT: After a Seed Disk is selected, in ground spacing checks are required to determine the level of metering performance. (See Checking Seed Population section.)

The seed-disk selection guidelines are

recommendations resulting from tests with seed from various sources. Because of changes in seed shape and size from year to year, there is always the possibility that an alternative disk provides better performance.

WP29706,0000855-19-07NOV14

CCS Operation



A53379—UN—20NOV03

A—Delivery Hose

Seed treatments, field conditions, humidity, and the seed size alter the CCS pressures required to deliver the seed to all the rows. Talc lubrication is required on **all** crops to lubricate the seed. Chemically treated seed can require 2—3 times the rate of lubrication to avoid plugging. When changing crops, use the initial setting found in the Set CCS Tank Pressure in this section before the adjusting for field conditions.

Generally, the CCS system performs best when using the lowest possible pressure setting to deliver the seed to all the row units.

Some lightweight varieties of seed, such as sorghum-milo, are picked up too easily by the nozzles. Nozzle inserts are installed over the nozzles to restrict the opening slightly, limiting the amount of seed a nozzle picks up. Nozzle inserts allow the lightweight seeds to flow at the optimum rates and reasonable pressures ensuring reliable seed delivery to all the rows.

IMPORTANT: Avoid hydraulic motor and tank lid damage. Do not exceed 24 in of tank pressure.

Random drops in the population that last only short periods (5—20 seconds) can indicate the CCS system is not maintaining adequate seed flow.

Verify that the seed meters and the vacuum system are functioning properly before adjusting the CCS system.

Increase the CCS pressure in 2 inch increments until the random population drops stop.

If the monitor issues a “Row Failed” warning, first determine if the failure is caused by bridging or plugging.

Correcting Nozzle Bridging and Seed Delivery Hose Plugging:

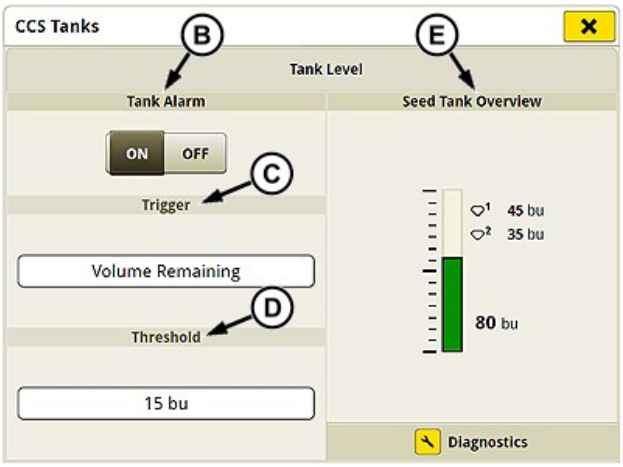
See Bridged and Blocked CCS System in this section.

OUO6435,0001DBD-19-07OCT25

Tank Level Sensors with Display Controls



AX1381716—UN—08NOV24



AX1382093—UN—07NOV24

A—Tank Level Sensor
B—Tank Alarm
C—Trigger
D—Threshold
E—Seed Tank Overview

Tank level sensor (A) detects the actual seed level using an ultrasonic signal. The CCS Tanks screen provides the following:

- Tank Alarm (B): Turn the alarm notifications on or off.
- Trigger (C): Options for the trigger modes are acres remaining, tank percentage, or tank volume.
- Threshold (D): An operator value that triggers the alarm.

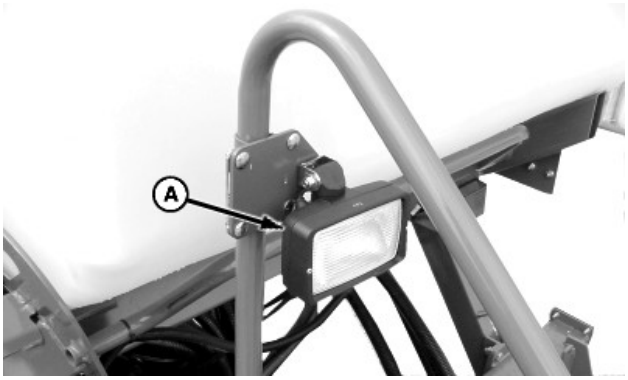
Seed tank overview (E) displays the status of each tank and the total of all tanks based on trigger (C) mode selected.

WP29706,0000B91-19-13NOV24

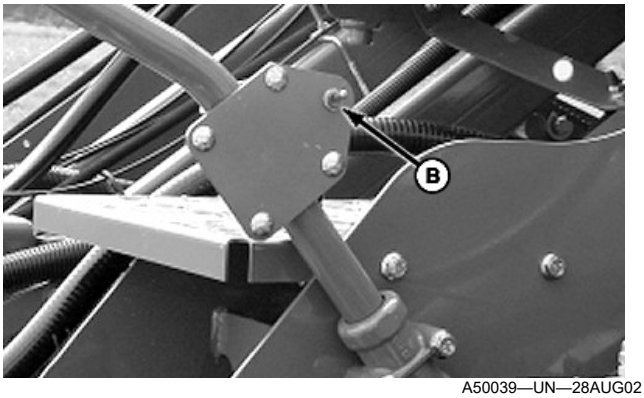
Operate CCS Tank Fill Lights—Optional

IMPORTANT: Tractor field lights must be on for fill lights to be used.

IMPORTANT: Never transport with field or fill lights on.



A50038—UN—28AUG02



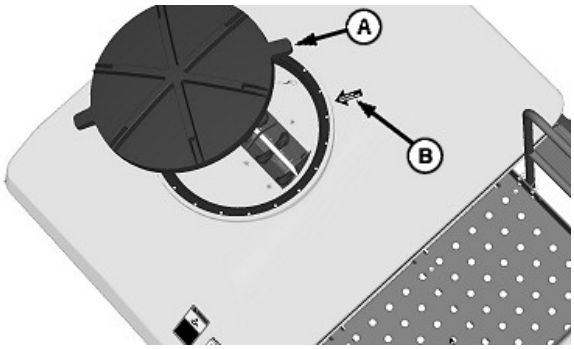
A50039—UN—28AUG02

A—Fill Lights
B—Fill Light Switch

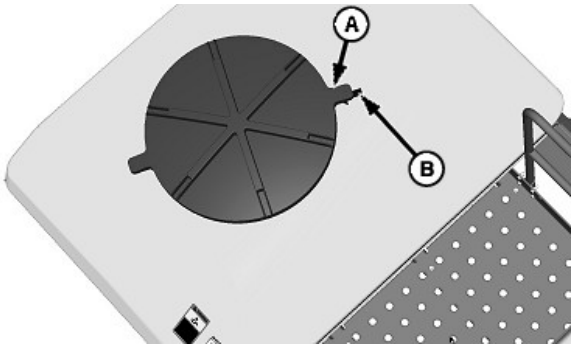
With tractor field lights on, fill lights (A) can be operated at the fill light switch (B).

OUO1074,0001419-19-25JUN18

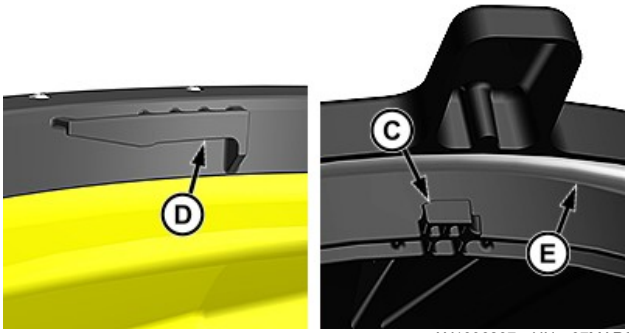
Operate the Tank Lids



A53374—UN—20NOV03



A53375—UN—20NOV03



AX1396287—UN—07MAR25

A—Handle
B—Arrow
C—Lid Tab (6 used)
D—Tank Latch (6 used)
E—Seal

CAUTION: Do not open lids when CCS blower is running. Lids and harmful chemicals may be blown into face and the seed hoses will plug.

To open, turn lid counterclockwise. Inspect seal (E) for damage and replace as needed.

NOTE: Verify that there is no dust or debris build-up on seal.

To close lid, align handle (A) with arrow (B) and turn clockwise. Verify that lid tabs (C) are engaged with tank latches (D).

OUO6074,00009BC-19-10MAR25

Level the CCS Tanks

CAUTION: Avoid injury from lids and harmful chemicals being blown into your face. Avoid plugging the delivery hoses. Do not open the lids when the CCS blower is running.

Follow the chemical manufacturers precautions when handling parts coated with seed treatments. Use proper skin, eye, and respiratory protection.

When a low rate warning occurs or a low tank level alert

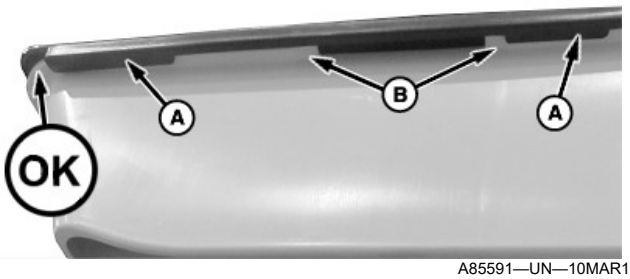
occurs, use a broom with stiff wide bristles and a handle to distribute the seed in the CCS tanks evenly. Also, use this brush to level the seed after filling the CCS tanks.

Specification

Broom Bristle—Width	203 mm (8 in)
Broom Handle—Length	1372 mm (4.5 ft)

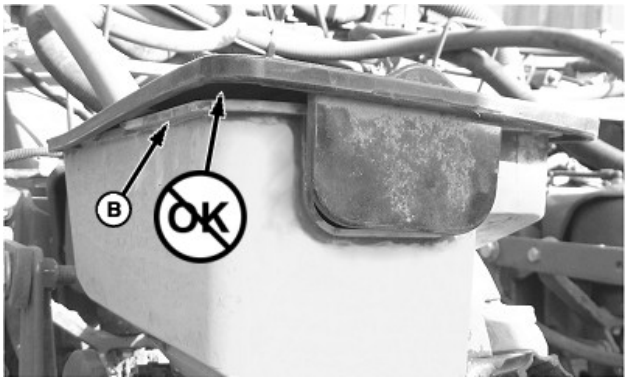
OUO6074,0000B25-19-07NOV24

Operate the Mini-Hopper Lids



A85591—UN—10MAR15

Lid Sealed Properly



A85592—UN—10MAR15

Lid Not Sealed Properly

A—Lid Tabs
B—Hopper Tabs

CAUTION: Do not open the lids when the CCS blower is running. The lids and harmful chemicals may be blown into your face and the seed lines will plug.

To avoid loss of seed and treatments, the lid tabs (A) must seal properly on the hopper tabs (B).

WP29706,0000904-19-07OCT25

Fill a CCS Tank



A89301—UN—20JAN16

CAUTION: Never transport the planter with any CCS tank more than half full.

Avoid physical or chemical injury from the lid or chemicals blowing into your face. Do not open a tank lid when the CCS blower is running. The delivery hoses plug if the CCS blower is running while filling the tank.

Follow the chemical label precautions when handling parts coated with seed treatments. Use proper skin, eye, and respiratory protection.

IMPORTANT: Remove any buildup of seed treatments or meter lubricant before each CCS tank fill.

Avoid blockages at the tank nozzles and keep the seed free of debris. An optional fill screen can be obtained via regular spare part channels.

Clean the seed level sensor before filling the seed tanks.

The first time a new tank is used, coat the inside of the tank with meter lubricant. Mix triple the amount of meter lubricant into the first 2 or 3 bushels of seed placed into the bulk tank (See the Lubricating the Seed Meter section).

The extra meter lubricant coats the inside of the CCS system with a protective layer that resists the buildup of seed treatments. Add meter lubricant as the bulk tank is filled.

Avoid plugging the delivery hoses at the CCS tanks. The tank agitators always run when the planter is lowered and the tractor key is on. Do not run the agitator when the CCS blower is off. If the planter is lowered for extended periods with seed in the CCS tanks, turn off the tractor key or unplug the agitator.

Crops approved for delivery through the CCS system are corn, soybeans, sorghum, cotton, sunflower, sweet corn, popcorn, and sugar beets. All other seed types must be placed directly into the row unit hoppers.

Row unit mini-hopper extensions are available for more capacity when planting non-CCS approved crops. See a John Deere dealer or other service provider.

To minimize the amount of seed that remains after reaching the bottom of the tank, level the seed in all tanks after filling. To level the seed in a CCS tank use a 20 cm (8 in) wide, stiff bristled broom with a 137 cm (4 ft 6 in) handle .

To avoid plugging the delivery hoses when the CCS system is activated, close the lid tightly after filling.

LM78752,0000173-19-20OCT25

Fill the Row Unit Hoppers

CAUTION: Avoid injury from lids and harmful chemicals being blown into your face. Avoid plugging the delivery hoses. Do not open the lids when the CCS blower is running.

Lower the machine until the CCS blower starts operating and begins to fill the row units with seed. The row unit hoppers are usually at operating level in under 30 seconds. However, large seeds and wide planters increase this time up to 2 minutes.

OUO6074,0000B26-19-08OCT25

Set the CCS Tank Pressure



A54380—UN—28JUL04

A—Flow Control Valve Handle

CAUTION: Avoid exposure to harmful chemicals and plugging the seed delivery hoses. Do not operate the CCS blower before the tank lids are installed.

To set the tank pressure, proceed as follows:

1. Verify that the tank lids are closed.

IMPORTANT: Avoid plugged delivery hoses. Do not use the CCS blower to warm the oil. Warm the oil by running the vacuum blowers or install a hose loop in the selective control valve (SCV), per tractor Operator's Manual.

2. Warm the oil for 15 minutes before setting the pressure.
3. Lower the planter, then leave the SCV in the constant retract detent position.
4. Turn the flow control valve handle (A) counterclockwise until seed starts flowing to the seed hoppers.

IMPORTANT: Avoid damage to components. Do not exceed 24 inches of tank pressure.

NOTE: If low population warnings are received while planting and the row meters are empty, increase the tank pressure by 2 inches until the meters stay full.

5. When the hoppers are full and the planter is not moving, adjust the CCS pressure according to the crop being planted. See the pressure settings in the following table:

DB44			
Product	**Pressure in Inches of Water (recommended)**	**Nozzle Insert**	**Small Seed Discharge Elbow (vacuum only)**
Soybean	12	No	No
Small Corn >4400 seeds/kg (2000 seeds/lb)	10	No	No
Medium Corn 2640—4400 seeds/kg (1200—2000 seeds/lb)	12	No	No
Large Corn <2640 seeds/kg (1200 seeds/lb)	14	No	No
Cotton	10	No	No

DB44			
Product	**Pressure in Inches of Water (recommended)**	**Nozzle Insert**	**Small Seed Discharge Elbow (vacuum only)**
Sorghum	8	A73214	Yes
Canola	4	A118482	Yes
Sunflower	6	No	No
Sugar Beet	4	A73214	Yes
Wheat	12	A73214	Yes

DB60 and DB66			
Product	**Pressure in Inches of Water (recommended)**	**Nozzle Insert**	**Small Seed Discharge Elbow (vacuum only)**
Soybean	14	No	No
Small Corn >4400 seeds/kg (2000 seeds/lb)	12	No	No
Medium Corn 2640—4400 seeds/kg (1200—2000 seeds/lb)	14	No	No
Large Corn <2640 seeds/kg (1200 seeds/lb)	16	No	No
Cotton	12	A73214	Optional
Sorghum	10	A73214	Yes
Canola	4	A118482	Yes
Sunflower	6	No	No
Sugar Beet	6	A73214	Yes
Wheat	14	A73214	Yes

DB80, DB88, and DB90			
Product	**Pressure in Inches of Water (recommended)**	**Nozzle Insert**	**Small Seed Discharge Elbow (vacuum only)**
Soybean	16	No	No
Small Corn >4400 seeds/kg (2000 seeds/lb)	14	No	No
Medium Corn 2640—4400 seeds/kg (1200—2000 seeds/lb)	16	No	No
Large Corn <2640 seeds/kg (1200 seeds/lb)	18	No	No
Cotton	12	A73214	Optional
Sorghum	10	A73214	Yes
Canola	4	A118482	Yes
Sunflower	8	No	No
Sugar Beet	8	A73214	Yes
Wheat	16	A73214	Yes

WP29706,0000861-19-14OCT25

Operate the CCS System with Heavily Treated Seed or Very Large Seed Corn

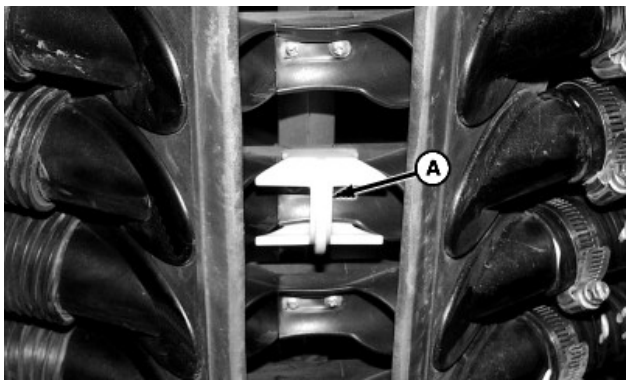
IMPORTANT: Talc or graphite must be mixed thoroughly when filling the tank.

IMPORTANT: Remove any buildup of seed treatment or meter lubricant with a stiff bristled 137 cm (4 ft 6 in) handle 20 cm (8 in) wide broom.

Seed Meters: When operating the CCS system with heavily treated seed or very large seed corn, use 2 to 3 times the rate of meter lubricant (See Lubricating the Seed Meter section).

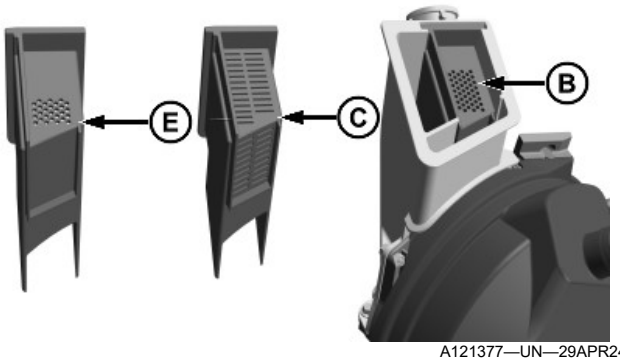
WP29706,00007E6-19-08OCT25

Operate the CCS System when Planting Standard or Small Seed



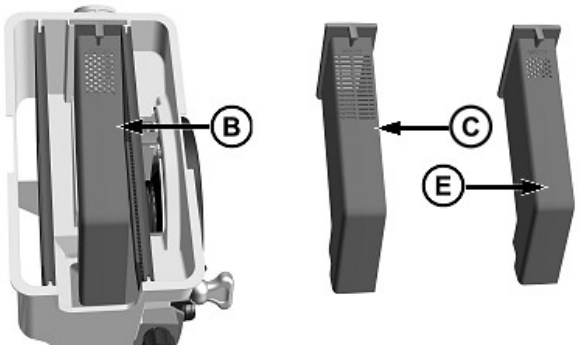
A50710—UN—17OCT02

Nozzle Insert (size varies)



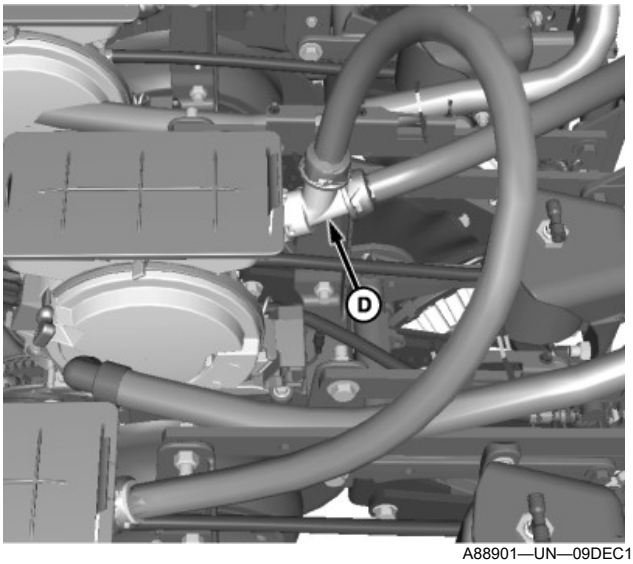
A121377—UN—29APR24

ExactEmerge



A121378—UN—29APR24

MaxEmerge 5



A88901—UN—09DEC15

A—Nozzle Insert (size and use varies)
B—Elbow (standard seed)
C—Elbow (small seed)
D—Splitter Coupler
E—Elbow (jumper row)

IMPORTANT: The nozzle inserts are only accessible when the tank is empty. Remove or install the nozzle inserts (A) as needed. The inserts restrict the flow of larger seed. (See Set the CCS Tank Pressure for the recommended use.)

NOTE: Seeds that are especially small require nozzle inserts and small seed discharge elbows. See the recommendations in Set the CCS Tank Pressure.

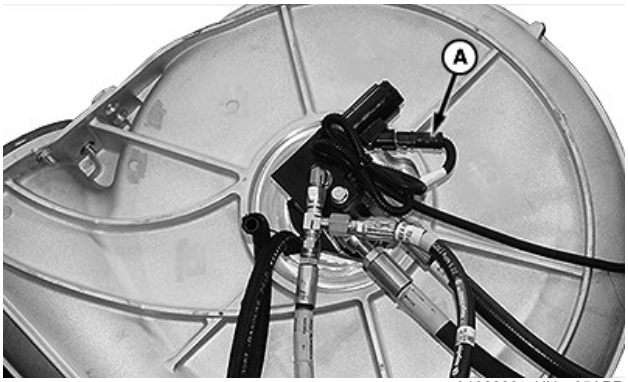
1. Attach the nozzle inserts (A) over every nozzle before filling the tank.
2. Use the small seed elbow (C) in each of the mini hoppers.

NOTE: Some planters use a splitter coupler (D) and a jumper hose.

3. If both rows connected to splitter coupler (D) are in use, insert the jumper elbow (E) in each joined hopper. If the jumper hose and joined meter are not in use, insert the small seed elbow (C) that is used in all other individual hoppers.

CR53390,0000165-19-01MAY24

Plant Seed Plots with the CCS System



A100239—UN—05APR18

A—Harness Connector

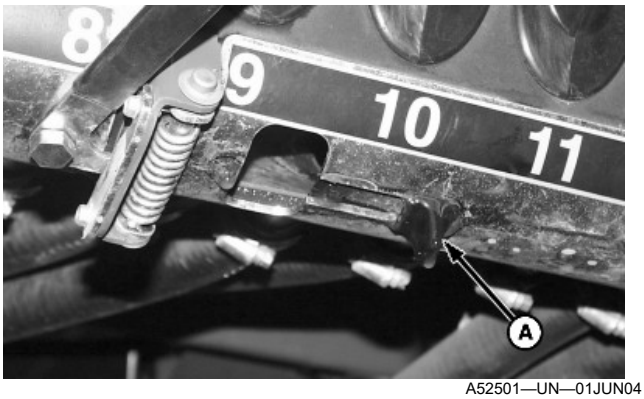
NOTE: Due to the small quantity of seed being planted, removing the CCS system from operation and filling the row units individually is recommended.

Disconnect the harness connector (A) from the CCS blower.

Fill the row units individually instead of using the CCS tanks.

OUO6074,0000D2C-19-07OCT25

Partially Cleaning Out a CCS Tank



A52501—UN—01JUN04

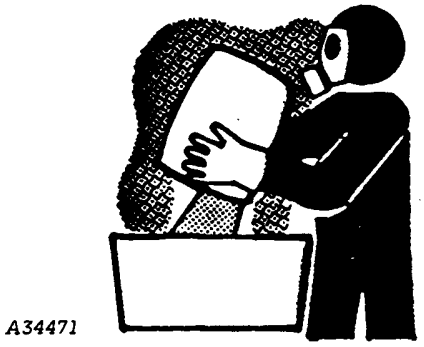
A—Door

To remove only a portion of the seed from a CCS tank, there is a small variable cleanout door that can be opened or closed to control the amount of the seed being removed.

Slide the door (A) until the desired amount of the seed is coming out.

OUO1074,0001425-19-07OCT25

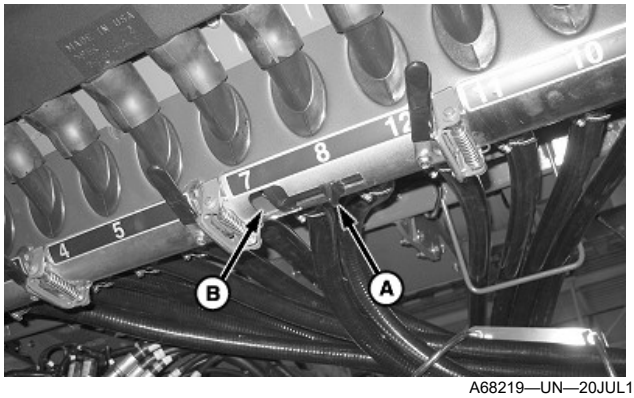
Clean Out the CCS Tanks



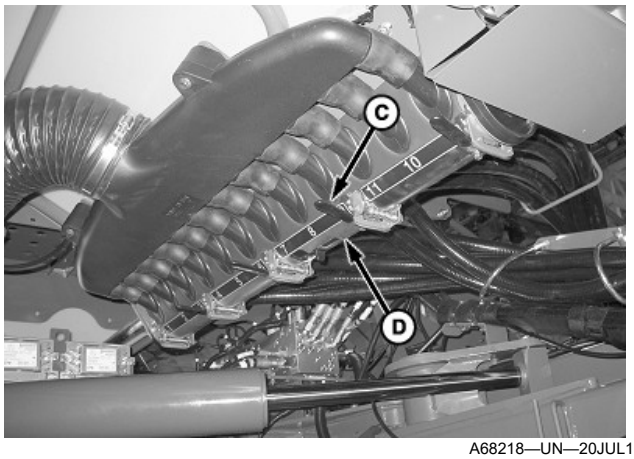
A34471—UN—11OCT88

CAUTION: Chemicals can be harmful to your health or the environment. Follow the label instructions from the chemical manufacturer when working with treated seed.

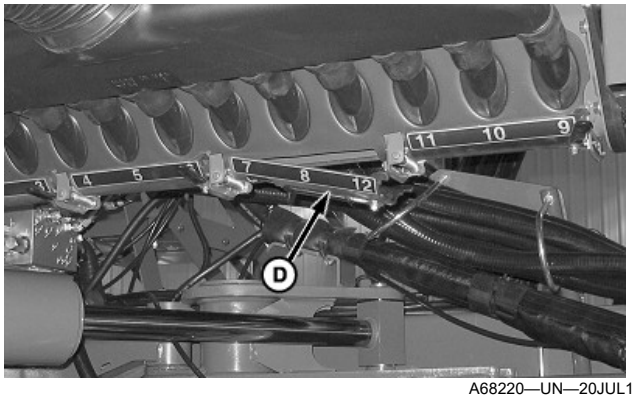
1. Shut off the CCS blower.



A68219—UN—20JUL10



A68218—UN—20JUL10



A68220—UN—20JUL10

A—Handle
B—Drain Door
C—Handle
D—Cleanout Door

IMPORTANT: Avoid damage to the cleanout doors. Verify that the cleanout doors on the CCS tanks are closed before folding the planter.

NOTE: The drain door (B) is used to even out the level of the seed in the tanks and for a controlled cleanout.

The cleanout door (D) cannot be closed once the cleanout has been started.

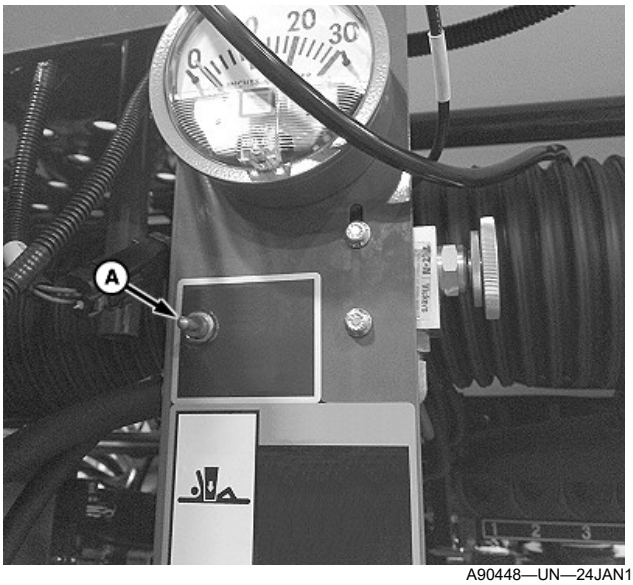
Clean certified seed from the tank using a broom that has stiff 203 mm (8 in) wide bristles and a 1.4 m (4.5 ft) handle.

Remove any buildup of seed treatment or talc with a broom that has stiff 203 mm (8 in) wide bristles and a 1.4 m (4.5 ft) handle.

2. To catch the seed from the tank, place a container under the cleanout doors.
3. Slide the handle (A) to operate the drain door (B). Once most of the seed has been removed, close the door.
4. To catch the remaining seed from the tank, open the cleanout door (D) and rotate the lever (C).
5. Close the cleanout door.
6. Repeat for all of the other cleanout doors.

OUO6074,00009BF-19-07OCT25

Clean Out the CCS Delivery Hoses (Planters with Display Frame Controls)



A90448—UN—24JAN17

A—Blower Override Switch

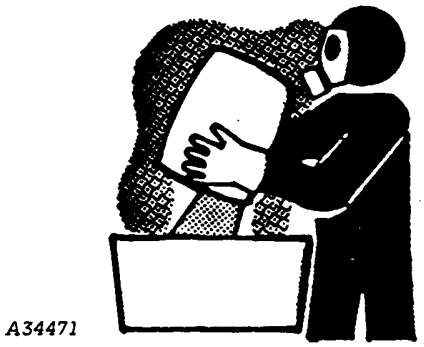
CAUTION: Avoid injury from crushing. The service locks must be installed and the following procedure must be followed as outlined.

NOTE: To turn off the blower at any time, press the blower override switch (A) down and then release it.

An on-screen version of the override switch for the CCS blower is also available on the tractor display.

The blower override switch (A) allows the central commodity system (CCS) blower to operate while the planter is raised and allows completion of the following procedure without numerous trips to the tractor cab. The following procedure must be completed in the order given to avoid possible injury or planter damage.

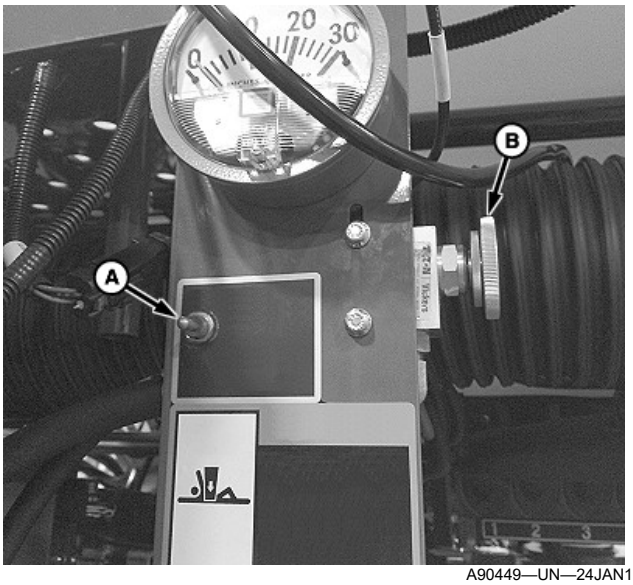
1. Place the tractor in park and apply the parking brake.
2. Raise the planter.
3. Deactivate the vacuum system.
4. Install the service locks (See Install Service Locks).
5. Verify that the frame control function is in Plant mode.
6. Lower the planter onto the service locks and engage the selective control valve (SCV) lever into the detent position.



A34471—UN—11OCT88

CAUTION: Chemicals can be harmful to your health or the environment. Follow the label instructions from the chemical manufacturer when working with treated seed.

7. Remove the residual seed from the CCS tank (See Clean Out the CCS Tanks).
8. Verify that the tank lids and cleanout doors are closed.



A90449—UN—24JAN17

A—Blower Override Switch
B—Blower Control Knob

NOTE: To turn off the blower at any time, press the blower override switch (A) down and then release it.

An on-screen version of the override switch for the CCS blower is also available on the tractor display.

9. To activate the CCS blower, press the blower override switch (A) up and then release it.
10. Adjust the blower control knob (B) until the gauge indicates 24.



A96363—UN—28APR17

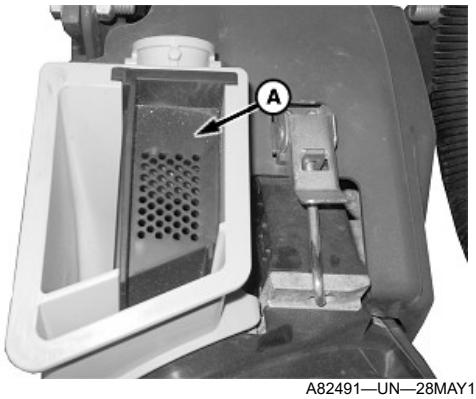


A96364—UN—28APR17

11. Remove the cleanout tray from the storage position. (See Clean Out the ExactEmerge Meter or Clean Out the Vacuum Meter).
12. Install the cleanout tray on a row unit. Slowly remove the seed disk or seed disk (bowl) until the seed is expelled from the meter, hopper, and delivery hose (See Clean Out the ExactEmerge Meter or Clean Out the Vacuum Meter).
13. Install the seed disk or seed disk (bowl), close the seed meter dome, and repeat the clean out on each row.
14. Return the cleanout tray to the storage position, reset the tank pressure, and raise the planter.
15. Remove the service locks and return them to the storage positions (See Install Service Locks).

WP29706,0000B80-19-14OCT25

Bridged and Blocked CCS System



A82491—UN—28MAY14

ExactEmerge Hopper



A79241—UN—21NOV13

MaxEmerge 5e Hopper

A—ExactEmerge Discharge Elbow
B—MaxEmerge 5e Discharge Elbow

If seed monitor issues a **Row Failed** warning, first determine if seed delivery tube is plugged or product is bridged in the CCS tank. To determine cause, do the following:

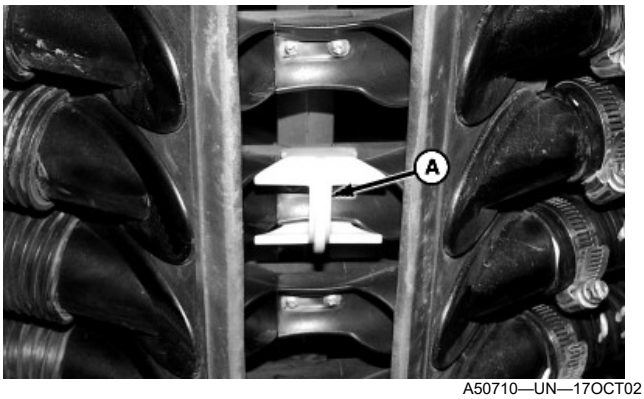
1. Start CCS blower.
2. Remove the lid from the affected row unit hopper.
3. Depending which type of meter being used on the planter, observe the amount of air flowing through the hopper discharge elbow. ExactEmerge meter has a short discharge elbow (A) with a mini-hopper. MaxEmerge 5e meter has a longer discharge elbow (B) which accommodates the various sized hoppers.
   - If **Low Air Flow** happens, the CCS delivery hose has plugged. See Remove CCS Hose Blockage in this procedure.
   - If **High Air Flow** happens, product has bridged in CCS manifold. See Product Has Bridged in CCS Tank Manifold in this procedure.

Remove CCS Hose Blockage

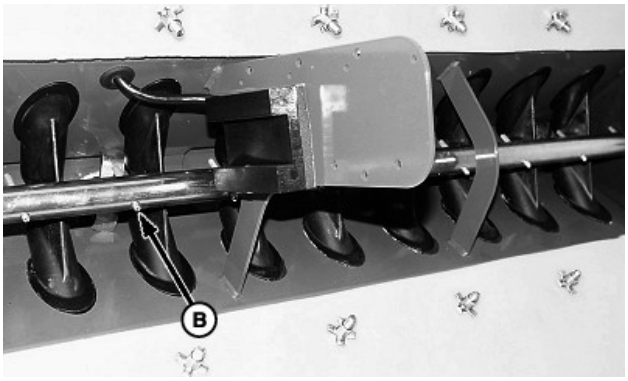
1. Turn off the CCS blower.

2. Remove the seed delivery hose from the affected row unit.
3. Shake the seed delivery hose vigorously from the hopper to the CCS tank. Shake hose until blockage spills from the end of hose.
4. Reconnect hose.
5. Start CCS blower and check that seed flows into hopper.
6. If no seed flow is observed, repeat procedure.

Product Has Bridged in CCS Tank Manifold



A50710—UN—17OCT02



A62189—UN—06MAR08

A—Nozzle Insert
B—Pins

1. The following items must be checked to ensure proper operation of the CCS system:
   - CCS tank pressure set to recommended setting for crop being planted.
   - Tank agitator turning when CCS blower is on.
2. Nozzle inserts (A) installed or removed for the specific crop being planted.
3. Agitator pins (B) centered between tank nozzles.

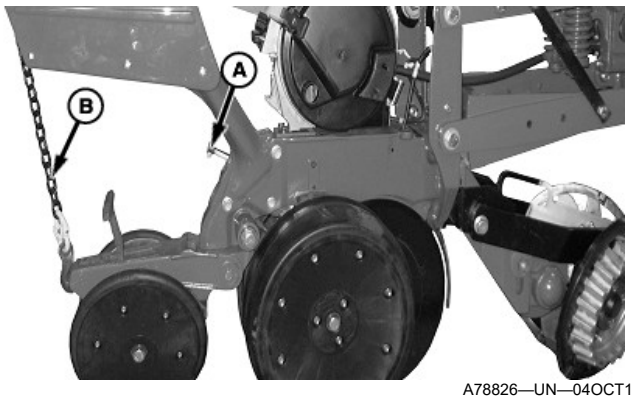
IMPORTANT: Do not exceed 24 in of tank pressure or damage occurs to the hydraulic motor and seed tank lids.

4. If all conditions are addressed and bridging still occurs, increase CCS tank pressure in 1 inch increments until seed flows properly to all rows.

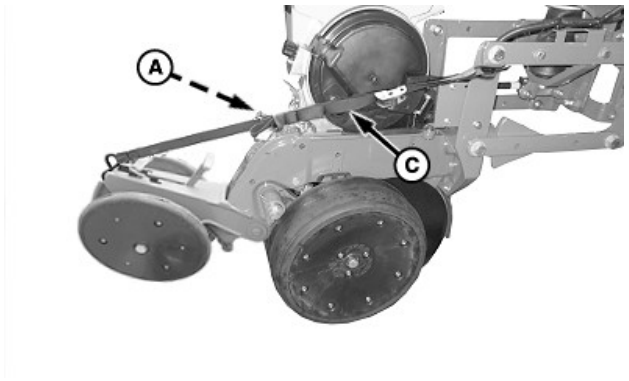
WP29706,00003F6-19-07OCT25

Checking the Seed Population

Check the Seed Population



A78826—UN—04OCT13



A78827—UN—04OCT13

A—Depth Handle
B—Chain
C—Ratchet Strap

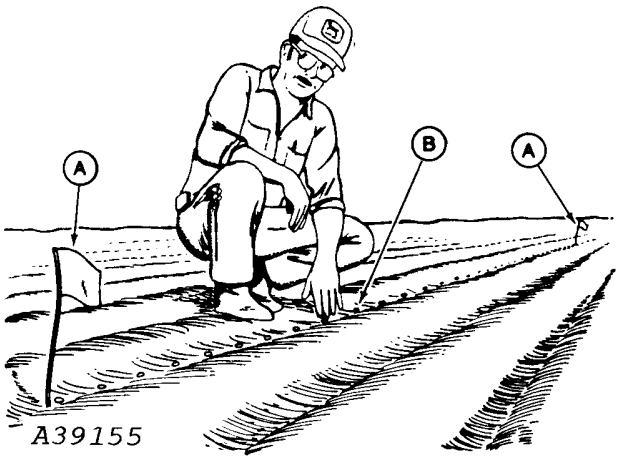
NOTE: Disregard the seed spacing when planting at a shallow depth with the closing wheels raised. Seeds roll or bounce under these conditions, which affects seed spacing.

1. Set the depth handle (A) two settings from the minimum.
2. Attach a chain (B) or a ratchet strap (C) to one or more closing wheels so the seed furrow remains open.
3. Plant a short distance and verify that the seeds are visible in the furrow. Adjust the depth handle as needed.
4. Plant approximately 91 m (100 yd) at the target ground speed.
5. Consult the following table. Determine what distance equals 1/1000 of a hectare, 1/1000 of an acre, or 1/200 of an acre for the row width.

	Row Width (in)								
	15	**18**	**19**	**20**	**22**	**30**	**36**	**38**	**40**
Fraction of an Acre	**Distance (ft) to Count for Population Check**								
1/1000[a]	34 ft 10 in	24 ft	27 ft 7 in	26 ft 1 in	23 ft 10 in	17 ft 5 in	14 ft 6 in	13 ft 10 in	13 ft 1 in
1/200[b]	174 ft	145 ft	138 ft	131 ft	119 ft	87 ft	72.5 ft	69 ft	66 ft
Distance Calculation for Row Width (in) Not Shown									
1/1000	(522 722 ÷ Row Width) ÷ 1000 = Feet to Count								
1/200	(522 722 ÷ Row Width) ÷ 200 = Feet to Count								

[a] *Used when the population is 100 000 seeds/acre or more.*
[b] *Used when the population is less than 100 000 seeds/acre.*

	Row Width (cm)										
	38	**46**	**48**	**51**	**56**	**70**	**76**	**80**	**91**	**97**	**101**
Fraction of a Hectare	**Distance (m) to Count for Population Check**										
1/1000	26.24	21.88	20.72	19.68	17.90	14.29	13.12	12.5	10.94	10.36	9.84
Distance Calculation for Row Width (cm) Not Shown											
1/1000	(1 000 000 ÷ Row Width) ÷ 1000 = Meters to Count										



A39155—UN—13FEB96

A—Flag
B—Seeds

6. Mark the distance with flags (A).
7. Count the seeds (B) between the flags.
8. Calculate the population.

   If 1/1000 of an area was counted, multiply the number of seeds by 1000.

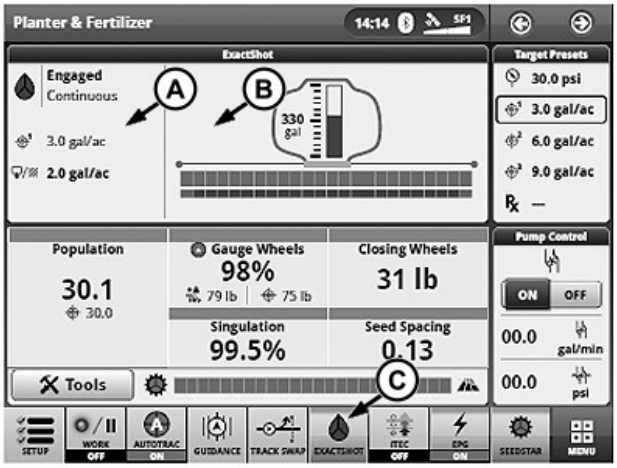
   If 1/200 of an area was counted, multiply the number of seeds by 200.

If the in-field checks are different from the target population, investigate the following in the order listed:

1. Check the monitor setup and settings.
2. Check the meter setup and condition. Adjust or repair the meters as needed.
3. Adjust the vacuum in 25 mm (1 in) increments. To reduce skips, increase the vacuum. To reduce doubles, decrease the vacuum.
4. Avoid excessive bounce of the row units. Increase the row unit downforce or reduce the ground speed.

WP29706,0000B9E-19-20MAR19

ExactRate Onscreen Overview

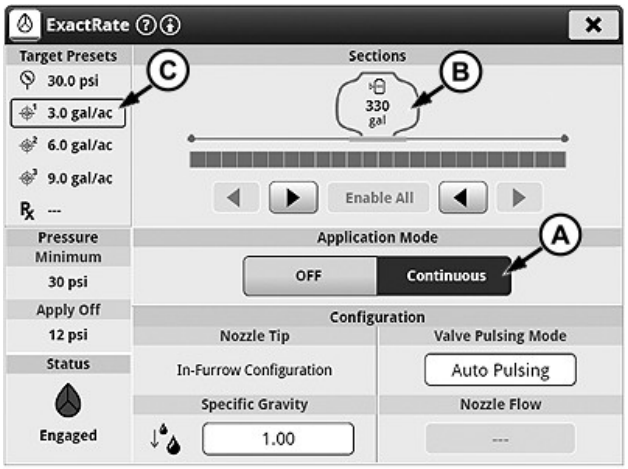


A121447—UN—09MAY24

Run Screen

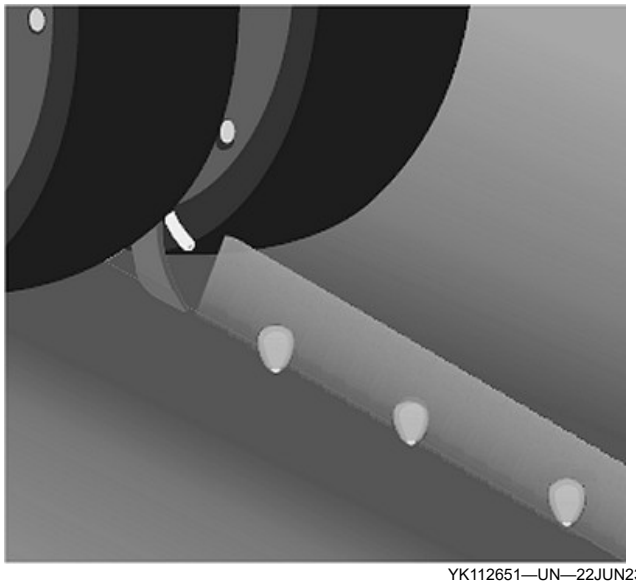
A—Left Panel
B—Right Panel
C—Shortcut Button

The left panel (A) on the run page shows information from and provides access to the ExactRate application. The target rate and actual rate always appear. The right panel (B) on the run page shows the tank and section information and provides access to the Tank System screen. An shortcut button (C) is available for the ExactRate application.



A121448—UN—09MAY24

ExactRate Application Screen

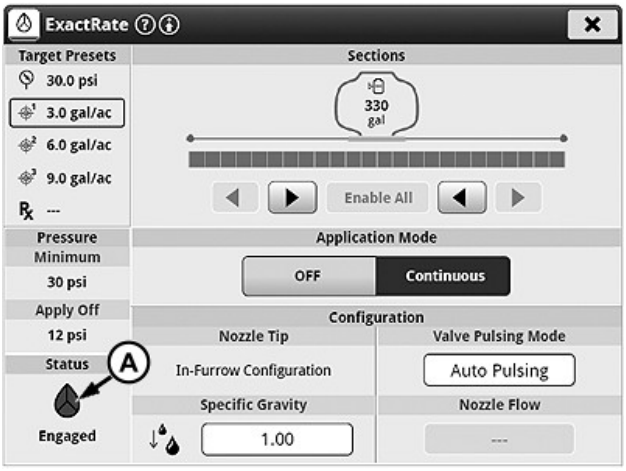


YK112651—UN—22JUN23

Delivery Pattern with Continuous Configuration

A—Continuous
B—Tank Level Indicator
C—Rate Selected

Continuous (A) mode applies a continuous quantity of fertilizer per area and does not require a subscription. The tank level indicator (B) displays the current (estimated) tank level. The indicator is selectable to adjust the tank size, low tank alarm, and preset fill levels. See the Help Information for details. The target presets show the rate selected (C) and other available presets.



A121449—UN—09MAY24

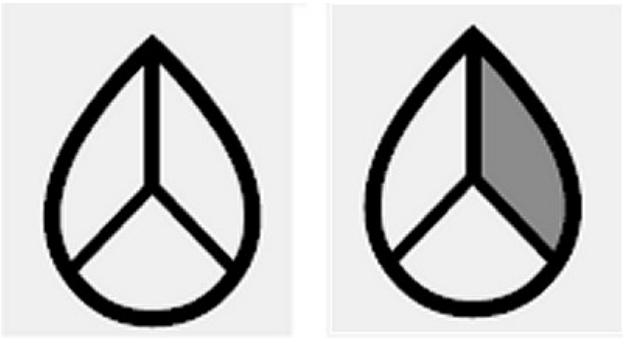


YK112655—UN—22JUN23

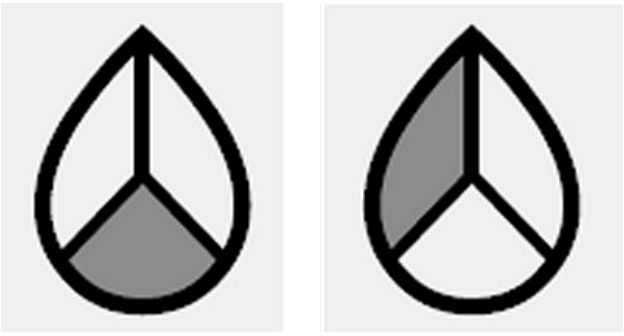
All Prerequisites Met

A—Status Indicator

The status indicator (A) displays which prerequisite conditions have been met for system engagement. The indicator sections must be full for the system to operate.



YK112653—UN—22JUN23



YK112654—UN—22JUN23

The indicator sections represent machine motion, machine lowered, power generation ON, and pump ON. See the Help Information for details about each indicator section.



A99081—UN—21MAR18

Calibrations and Procedures



PC29211—UN—23AUG23

Planter Liquid Runoff

To test the setup parameters by simulating the operating conditions, perform a runoff procedure. Access the feature through Calibrations and select the Planter Liquid Runoff.

ouo6074,1715268330424-19-14MAY24

Fertilizer Distribution Overview

The liquid fertilizer system uses a pump, distribution (solenoid) valves, and in-line orifices to dispense the product at various application rates. Distribution valves are mounted onto the distribution pipes on the planter frame. This distribution system is compatible with the frame-mounted openers and in-furrow distribution.

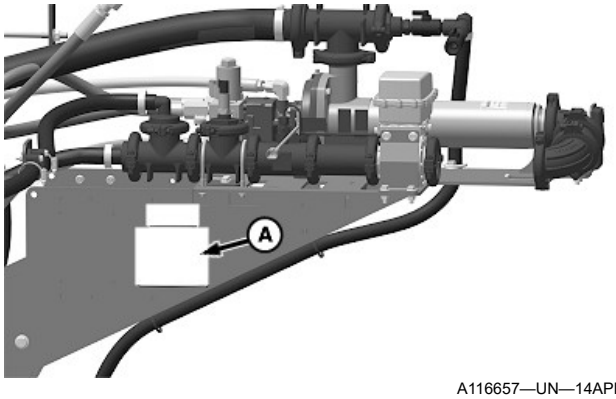
The ExactRate fertilizer software uses sensors in conjunction with user defined parameters to maintain the system rate during varying conditions. The application rate is input into the display. Oil temperature for the system must be warmed to a minimum of 60°C (140°F) before use. The system controls the in-line pressure and the distribution valves to achieve the correct application rate. Verify the row spacing and the application rate. Verify that the power generation system is ON and the fertilizer pump is ON. Verify that the system is operating at the application rate when traveling at the target planting speed.

In-Furrow System Suggested Rates	
Fertilizer Application Rate	Fertilizer Planting Speed
18.7—93.5 L/ha (3—10 gal/acre)	4.8—16.1 km/h (3—10 mph)

Frame-Mounted Fertilizer Opener Suggested Rates	
Fertilizer Application Rate	Fertilizer Planting Speed
46.8—280.6 L/ha (7—30 gal/acre)	4.8—16.1 km/h (3—10 mph)

Priming the fertilizer system is critical for obtaining the best performance. (See Prime and Start the Pump.) Eliminate any kinks, pinches, or sharp bends in the fertilizer hoses. Any restriction in the hoses reduces the fertilizer flow.

When sitting idle, follow the winter storage procedure when freezing temperatures are expected.



A116657—UN—14APR22

Center Frame

A—Decal, Winterize

IMPORTANT

TO PREVENT DAMAGE TO THE PUMP:

1. Keep pump filled with fertilizer, water, or winterizing fluid at all times. Exposure to air will cause rapid corrosion of internal parts.
2. Keep pump from freezing. When sitting idle, follow the winter storage procedure when freezing temperatures are expected.

RECOMMENDED STORAGE PROCEDURES:

OVERNIGHT IN ABOVE FREEZING TEMPERATURES

- Clear liquids with steady or rising temperatures: Leave pump and hoses filled with solution.
- Clear liquids with cooling weather (solution is likely to salt out): Fill pump with water and leave filled. (Do not admit air.)
- Suspension fertilizers: This system is **not** recommended for use with suspension fertilizers.

ONE TO TWO WEEKS IN ABOVE FREEZING TEMPERATURES

- Acceptable: Draw in fresh water to dilute and flush out solution. Do not drain. Keep pump sealed to exclude air.
- Preferred: Follow winter storage guidelines.

WINTER STORAGE

- Reference the Operator's Manual for winter storage procedure. (See the Storage section for more information.)

WP29706,0000C6D-19-08MAY24

Service Fertilizer System Safely



TS281—UN—15APR13

CAUTION: Avoid injury from pressurized fertilizer solution. The fertilizer system is under pressure. Before servicing any areas of the fertilizer system, relieve all pressure from the fertilizer system.

WP29706,0000C74-19-01AUG19

Access ExactRate

Access Application Through Display:



H113668—UN—22OCT15

Menu

1. Select Menu.



N119118—UN—23SEP16

Machine Settings

2. Select Machine Settings tab.



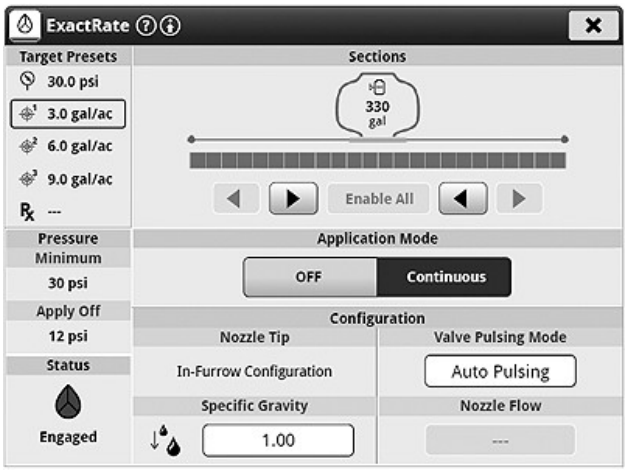
pc28229—UN—10AUG23

ExactRate

3. Select the Access ExactRate application.

ouo6074,1715268383852-19-09MAY24

ExactRate



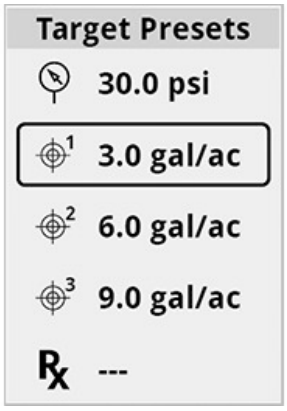
A121450—UN—09MAY24

ExactRate Main Page

ExactRate controls the delivery of fertilizer as seed is planted.

NOTE: Main page shown is for example only. Your main page may differ depending on options or connected equipment.

Items Accessible on ExactRate Main Page:



pc28230—UN—10AUG23

Target Presets

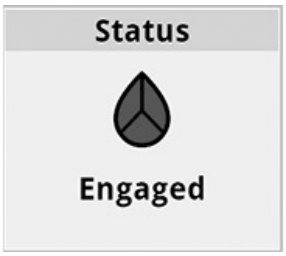
Target Presets— shows the currently selected rate. Select the area to change the preset rates or select a prescription rate.



pc28231—UN—10AUG23

Pressure

Pressure— select the area to modify system pressures.



pc28232—UN—10AUG23

Status

Status— select the area to view diagnostics for the current status of the ExactRate system.



A105162—UN—29JUL19

Sections

Sections— displays Status of each section. Select the tank icon to adjust the Tank System settings.



pc28233—UN—10AUG23

Index Sections

- **Index Sections**— Use left and right arrows to enable or disable sections one at a time from the left or right exterior sections.



A104091—UN—10APR19

Enable All

- **Enable All**— select to enable all sections.



A121451—UN—09MAY24

Application Mode

Application Mode— enables and disables the system.

Configuration



pc28235—UN—10AUG23

Nozzle Tip

- Nozzle Tip— indicates the delivery method. Select the nozzle tip used for the application.



pc28236—UN—10AUG23

Specific Gravity

- Specific Gravity— allows the system to compensate and maintain the target rate when the solution is lighter or heavier than water. Select to enter the specific gravity of the solution.
- Valve Pulsing Mode and Nozzle Flow— allows you to adjust how the valve regulates flow at each row.



N118004—UN—22OCT15

Advanced Settings

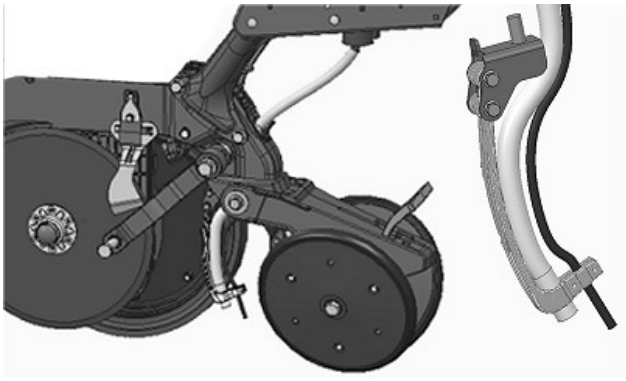
Advanced Settings— access further adjustments and less common settings.

Run Page Modules

Modules for this application can be added to the run pages using Layout Manager.

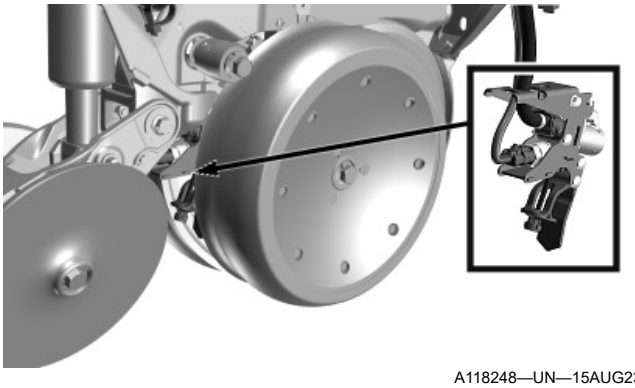
ouo6074,1715268383937-19-09MAY24

Liquid Fertilizer Use with the BrushBelt



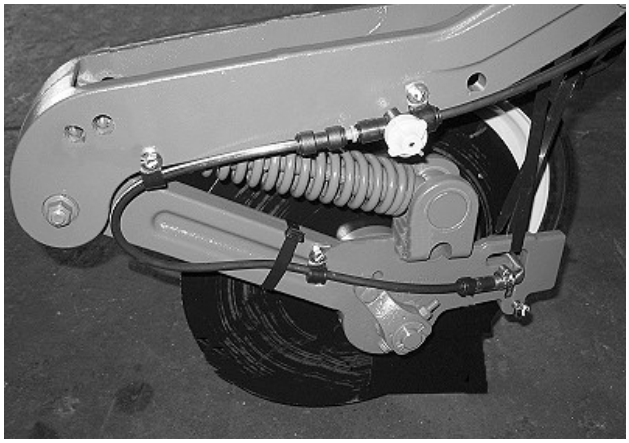
A86695—UN—09JUN15

ExactRate In-Furrow Applicator



A118248—UN—15AUG23

ExactShot In-Furrow Applicator



A75012—UN—04APR12

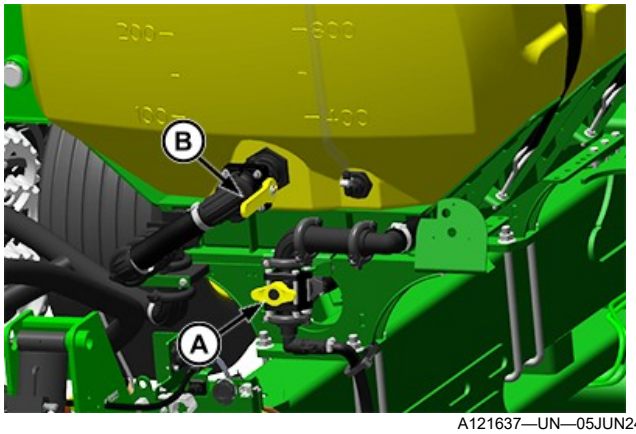
ExactRate Frame-Mounted Opener

IMPORTANT: Avoid plugging the ExactEmerge BrushBelt. Do not apply liquid fertilizer in front of and directly in-line with the seed furrow.

Use an in-furrow or a frame-mounted opener system that is compatible with the BrushBelt.

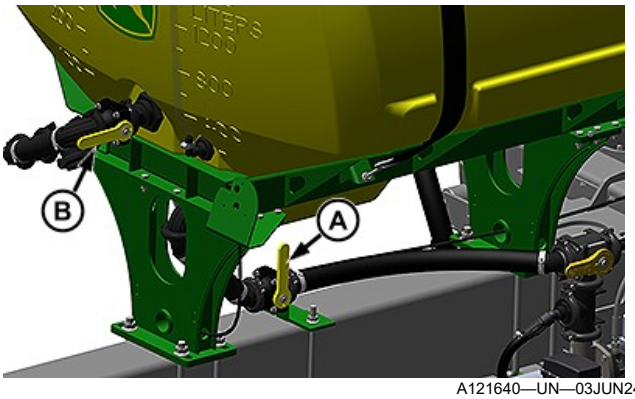
WP29706,0000C6C-19-17AUG23

Quik-Fill Liquid Fertilizer



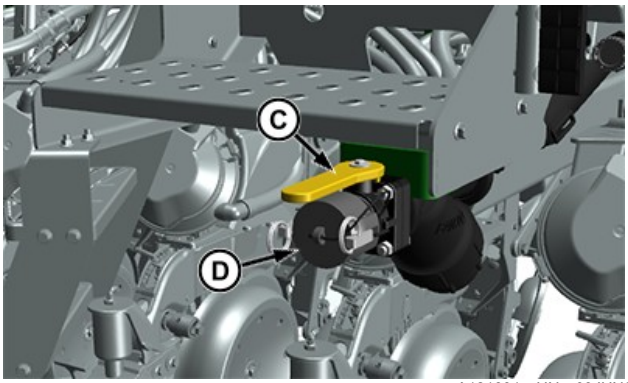
A121637—UN—05JUN24

Quik-Fill Valve (Wing Mounted Pump)



A121640—UN—03JUN24

Quik-Fill Valve (Centrally Mounted Pump)



A121631—UN—03JUN24

Quik-Fill Valve and Dust Cover

A—Tank Valve (closed)
B—Quik-Fill Valve (tank)
C—Quik-Fill Valve (hitch)
D—Dust Cover

The Quik-Fill system allows filling of the liquid tanks from one accessible point on the implement.

CAUTION: Chemicals used in agricultural applications, such as fungicides, herbicides, insecticides, pesticides, rodenticides, and fertilizers, can be harmful to your health and the environment. Always follow all label directions for effective, safe, and legal use of agricultural chemicals. Check all valves, fittings, hose clamps, plugs, and caps for tightness and soundness before adding chemical or fertilizer to the system. Check system at regular intervals and replace pipes and hoses when worn, cracked, or leaking.

IMPORTANT: Avoid O-ring damage. If a valve is hard to operate or leaks, adjust four housing cap screws evenly until lever moves smoothly and seals do not leak. Do not overtighten the bolt for the handle.

1. Close tank valve (A) and open Quik-Fill valve (B).
2. Close Quik-Fill valve (C) and remove dust cover (D).

IMPORTANT: Avoid damage to the liquid fertilizer tank. Larger pumps exceed the system pressure limit. Signs of excessive pressure are tank swelling and seal leakage. The recommended nurse tank pump is a maximum 40 mm (1-1/2 in) centrifugal pump with a 2.2 kW (3—5 hp) engine. Operate a 50 mm (2 in) centrifugal pump with a 3.7—5.5 kW (5—7-1/2 hp) engine at half throttle. A 75 mm (3 in) centrifugal pump is not recommended.

3. Connect the nurse tank hose to the coupler.
4. Open Quik-Fill valve (C).
5. After the fertilizer tank has been filled, stop the pump engine, then close Quik-Fill valve (C) and close Quik-Fill valve (B).
6. Disconnect the nurse tank hose from the implement.
7. Open tank valve (A).

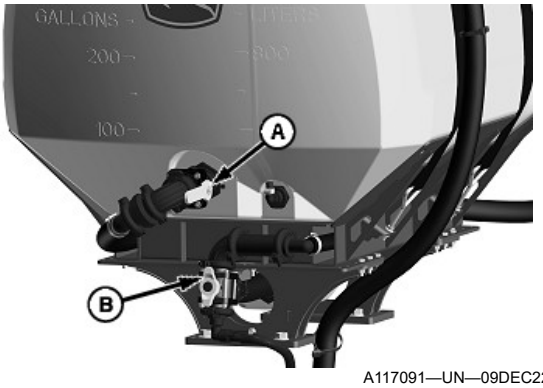
CR53390,0000135-19-03JUN24

Prime and Start the Fertilizer Pump with Wing Mounted Pump—ExactRate (Onboard Tank)

NOTE: Do not allow the fertilizer pump to run dry. Verify that the air is removed from supply hoses and that the supply tank has enough liquid before priming the fertilizer system. If an offboard tank is used, bypass the transfer pump unless filling the onboard tank.

Before priming, inspect the fertilizer distribution system. Verify that the strainer is clean and that there are no leaks in the pump inlet hose. Verify that there are no pinched, kinked, or otherwise restricted hoses. Verify that there are no extreme high or low variations in the path of the hose. Inspect all the in-line orifices and barbed fittings for debris and blockages.

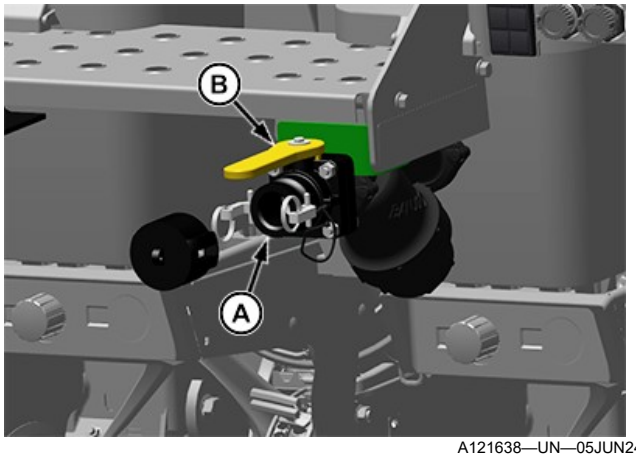
1. Ensure that the tank is filled with a minimum level higher than the pump inlet and check the system for leaks. (See Quik-Fill Liquid Fertilizer.)
2. Unfold and park the planter on a level surface.
3. When filling the liquid fertilizer tank, the fertilizer pump must be OFF.
4. Turn ON the electric power generation system.
5. Using the display, verify that distribution valves on the planter are enabled before priming the pump and the fertilizer system. (See the SeedStar Application Help on the display when entering the pump rates or operational functions.)



A117091—UN—09DEC22

A—Tank Inlet Valve
B—Tank Outlet Valve Handle (arrow up)

6. When an offboard tank is supplying the pump or transferring product to the planter tank, open the tank inlet valve (A). When operating the fertilizer system, open the tank outlet valve handle (B).

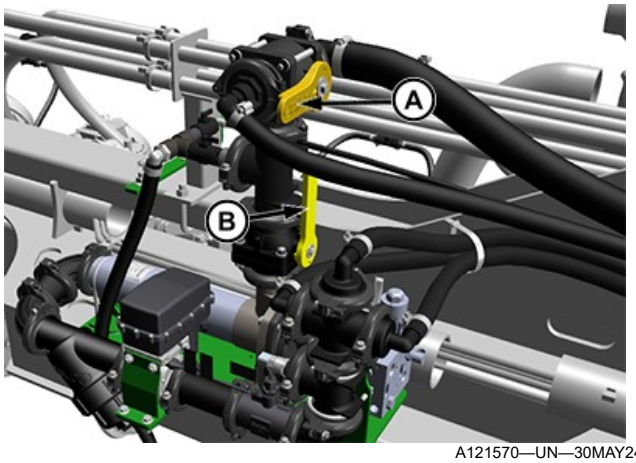


A121638—UN—05JUN24

A—Fill Port
B—Ball Valve

NOTE: Only use the transfer pump to fill the planter tank. If an offboard tank is supplying the fertilizer pump, bypass the transfer pump.

7. If using an offboard tank, connect the transfer hose to the fill port (A) and open the ball valve (B). Ensure that the tank inlet valve and the tank outlet valve are open.



A121570—UN—30MAY24

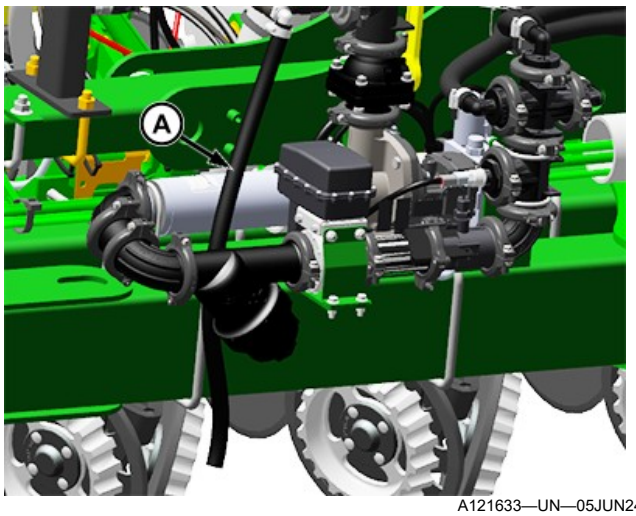
A—Valve
B—Valve

8. Open valve (A) and valve (B).



A106834—UN—14MAY20

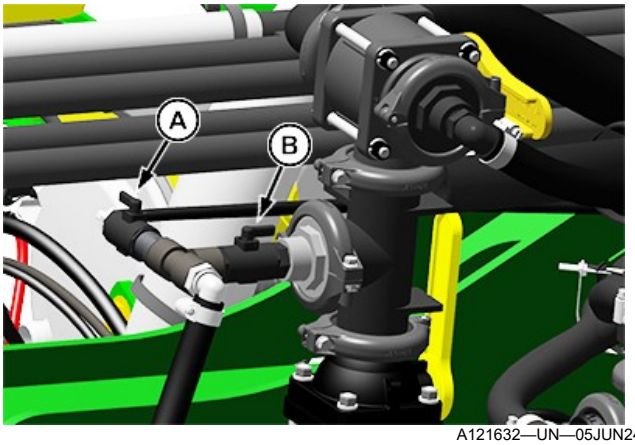
9. Verify that the compressor air tank is full. To activate the air compressor, place the hydraulic lever for lowering the planter into the continuous detent position until the compressor shuts off.



A121633—UN—05JUN24

A—Drain Hose

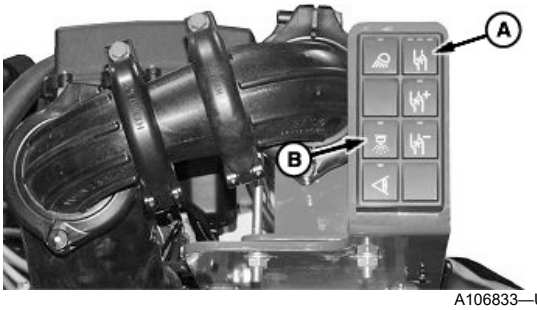
10. Place the drain hose (A) into a container or bucket.



A121632—UN—05JUN24

A—Air Valve
B—Solution Valve

11. Open the air valve (A) and the solution valve (B) at the same time.



A106833—UN—14MAY20

A—Pump Button
B—Master Spray Button

12. When there is a steady stream of liquid from the drain hose, turn the solution pump ON and activate the delivery system. Press the pump button (A) and master spray button (B).



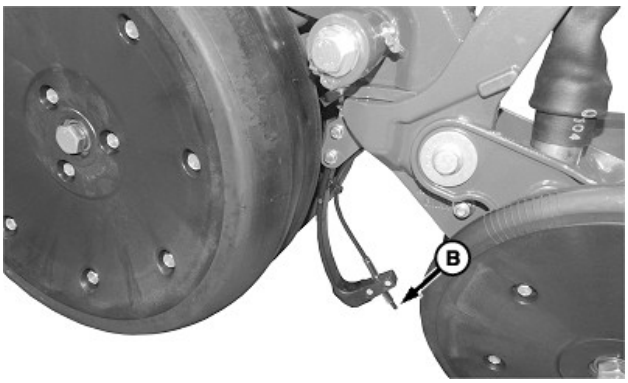
A117090—UN—08DEC22

Valve Configurations Vary

13. One at a time, open each bleed valve until there is a steady flow (no air) and then close the valve.
14. Once liquid is flowing from the delivery hoses, close the air valve and solution valve.



A100281—UN—05OCT18



A100282—UN—04APR18

A—Opener Tube
B—In-Furrow Tube

15. To effectively prime the distribution tubes, keep the pump enabled until all the rows have a continuous flow of fertilizer exiting the delivery tubes.
16. If the flow is not steady from a row, disable the pump and the valve bodies. Inspect for blockages at the rows that are not flowing correctly. Replace or repair any issues causing blockages.
17. Secondary Verification: Turn the fertilizer pump ON and leave the master spray button OFF. View the main screen. If the Apply OFF Pressure fluctuates ±35 kPa (0.5 bar) (5 psi), repeat the air removal procedure.
18. Once all the rows have a steady flow, set the target rate using the ExactRate application on the display.
19. Enable all rows on the planter.
20. Verify that the rows are applying the target rate by performing the nozzle flow check. Set the ground speed on the display. Verify the applied rate on the display. To set, adjust, or calibrate the fertilizer system, see the SeedStar Operator's Manual or Onscreen Help in the ExactRate application.
21. After the rate is verified and the solution flow is adequate, turn OFF the master spray function, then turn OFF the pump function.

h5snma9,1717072665516-19-07JUN24

Prime and Start the Fertilizer Pump with Wing Mounted Pump—ExactRate (Offboard Tank)

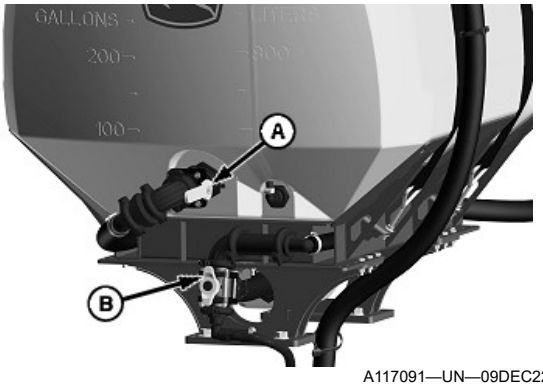
IMPORTANT: To avoid priming or suction issues, minimize restriction between the tank and the ExactRate pump. Remove the strainers between the pump and trailing tank, sharp elbows, and restrictive hosing from the tank to the pump inlet. The minimum hose size for plumbing between the tank and pump is 5 cm (2 in).

NOTE: Verify that all products are strained when filling the tank.

NOTE: Do not allow the solution pump to run dry. Verify that the air is removed from supply hoses and that the supply tank has enough liquid before priming the fertilizer system. If an offboard tank is used, bypass the transfer pump unless filling the onboard tank.

Before priming, inspect the fertilizer distribution system. Verify that the strainer is clean and that there are no leaks in the suction hose for the pump. Verify that there are no pinched, kinked, or otherwise restricted hoses. Verify that there are no extreme high or low variations in the path of the hose. Inspect all the in-line orifices and barbed fittings for debris and blockages.

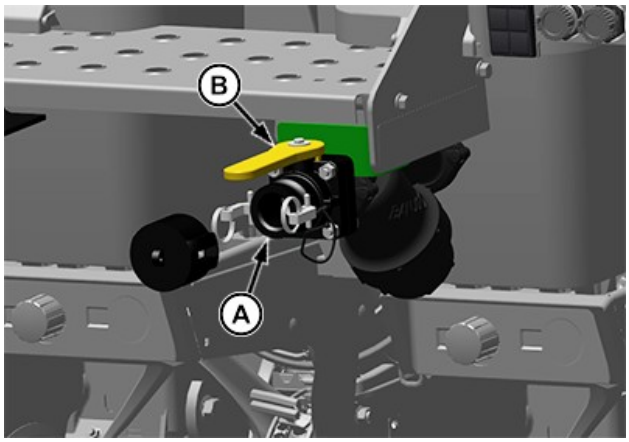
1. Unfold and park the planter on a level surface.
2. Verify that the offboard fertilizer tank or nurse tank is filled.
3. Turn ON the electric power generation system.
4. Using the display, verify that distribution valves on the planter are enabled before priming the pump and the fertilizer system. (See the SeedStar Application Help on the display when entering the pump rates or operational functions.)



A117091—UN—09DEC22

A—Tank Inlet Valve
B—Tank Outlet Valve

5. When an offboard tank is supplying the pump or transferring product to the planter tank, open tank inlet valve (A). When operating the fertilizer system, open tank outlet valve (B).

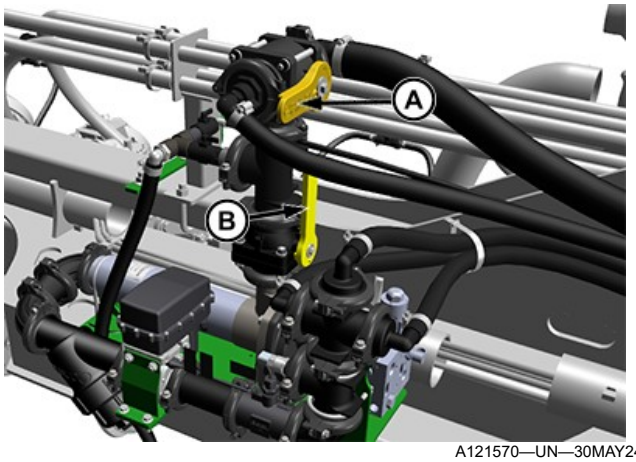


A121638—UN—05JUN24

A—Fill Port
B—Ball Valve

NOTE: Only use the transfer pump to fill the planter tank. If an offboard tank is supplying the solution pump, bypass the transfer pump.

6. If using an offboard tank, connect the transfer hose to fill port (A) and open ball valve (B). Ensure that the tank inlet valve and the tank outlet valve are open.



A121570—UN—30MAY24

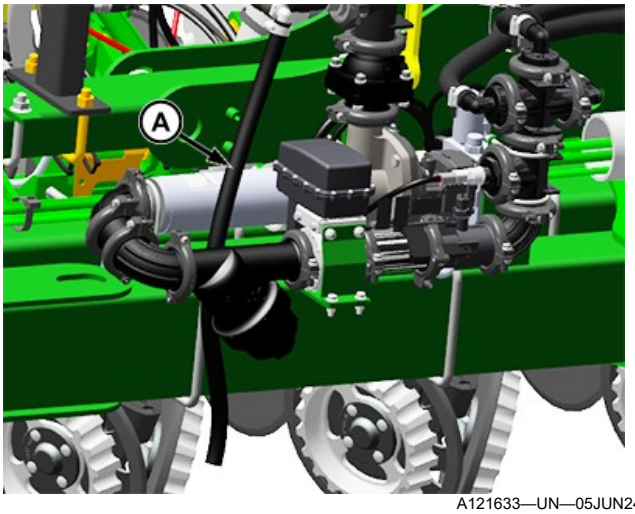
A—Valve
B—Valve

7. Open valve (A) and valve (B).



A106834—UN—14MAY20

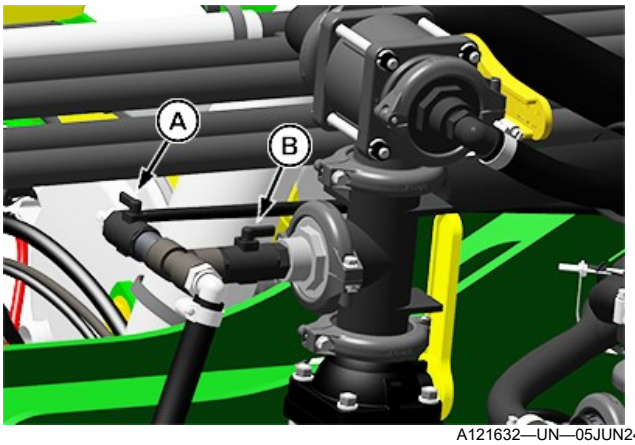
8. Use the pneumatic assist while priming.
    a. Verify that the compressor air tank is full. To activate the air compressor, place the hydraulic lever for lowering the planter into the continuous detent position until the compressor shuts off.



A121633—UN—05JUN24

A—Drain Hose

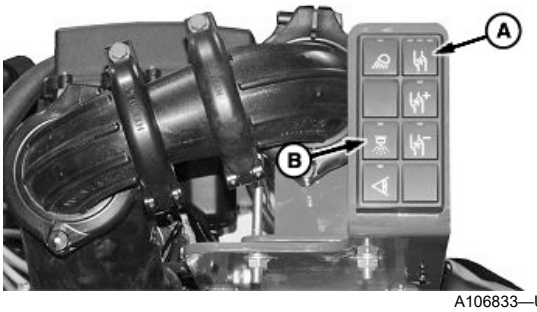
    b. Place drain hose (A) into a container or bucket.



A121632—UN—05JUN24

A—Air Valve
B—Solution Valve

    c. Open air valve (A) and solution valve (B) at the same time.



A106833—UN—14MAY20

A—Pump Button
B—Master Spray Button

9. When there is a steady stream of liquid from the drain hose, turn the solution pump ON and activate the delivery system. Press pump button (A) and master spray button (B).



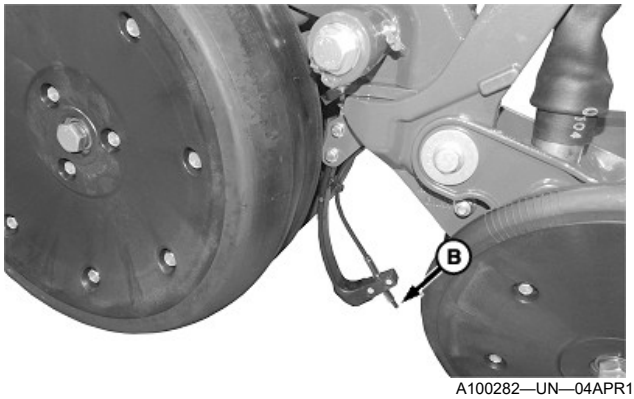
A117090—UN—08DEC22

Valve Configurations Vary

10. One at a time, open each bleed valve until there is a steady flow (no air) and then close the valve.
11. Once liquid is flowing from the delivery hoses, close the air valve and solution valve.



A100281—UN—05OCT18



A100282—UN—04APR18

A—Opener Tube
B—In-Furrow Tube

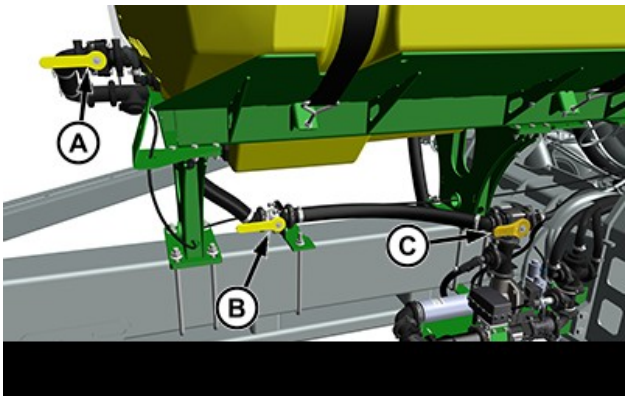
12. To effectively prime the distribution tubes, keep the pump enabled until all the rows have a continuous flow of fertilizer exiting the delivery tubes.
13. If the flow is not steady from a row, disable the pump and the valve bodies. Inspect for blockages at the rows that are not flowing correctly. Replace or repair any issues causing blockages.
14. Secondary Verification: Turn the fertilizer pump ON and leave the master spray button OFF. View the main screen. If the Apply OFF Pressure fluctuates ±35 kPa (0.5 bar) (5 psi), repeat the air removal procedure.
15. Once all the rows have a steady flow, set the target rate using the ExactRate application on the display.
16. Enable all rows on the planter.
17. Verify that the rows are applying the target rate by performing the nozzle flow check. Set the ground speed on the display. Verify the applied rate on the display. To set, adjust, or calibrate the fertilizer system, see the SeedStar Operator's Manual or Onscreen Help in the ExactRate application.
18. After the rate is verified and the solution flow is adequate, turn OFF the master spray function, then turn OFF the pump function.

h5snma9,1717072672654-19-07JUN24

Prime and Start the ExactRate Pump with Centrally Mounted Pump—ExactRate (Onboard Tank)

Before priming, inspect the fertilizer distribution system. Verify that the strainer is clean and that there are no leaks in the suction hose for the ExactRate pump. Verify that there are no pinched, kinked, or otherwise restricted hoses. Verify that there are no extreme high or low variations in the path of the hose. Inspect all the in-line orifices and barbed fittings for debris and blockages.

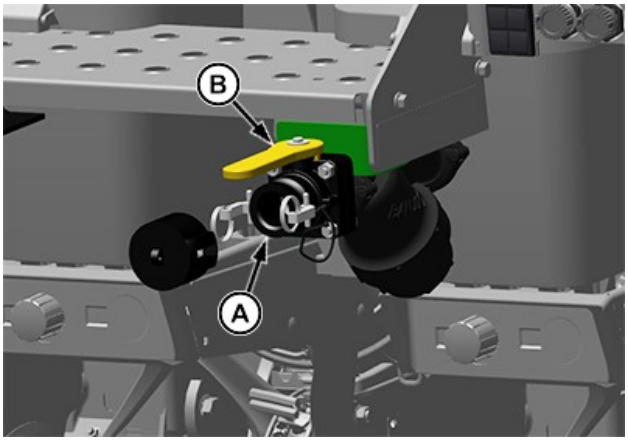
1. Ensure that the tank is filled with a minimum level and check the system for leaks. (See Quik-Fill Liquid Fertilizer.)
2. Unfold and park the planter on a level surface.
3. When filling up the liquid fertilizer tank, the ExactRate solution pump must be OFF.
4. Turn ON the electric power generation system.
5. Using the tractor display, verify that the first and last sections of valve bodies on the planter are enabled before priming pump and the fertilizer system. (See the SeedStar Application Help on the tractor display for entering the ExactRate pump rates or operational functions.)



A121710—UN—07JUN24

A—Tank Inlet Valve
B—Tank Outlet Valve
C—Pump Valve

6. When an offboard tank is supplying the pump or transferring product to the planter tank, open tank inlet valve (A). When operating the fertilizer system, open tank outlet valve (B). Open pump valve (C).

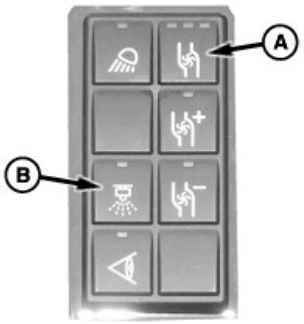


A121638—UN—05JUN24

A—Fill Port
B—Ball Valve

NOTE: Only use the transfer pump to fill the planter tank. If an offboard tank is supplying the solution pump, bypass the transfer pump.

7. If using an offboard tank, connect the transfer hose to fill port (A) and open ball valve (B). Ensure that the tank inlet valve and the tank outlet valve are open.



A107072—UN—18JUN20

A—Pump Button
B—Master Spray Button

8. Turn the solution pump ON and activate the delivery system. Press pump button (A) and master spray button (B).



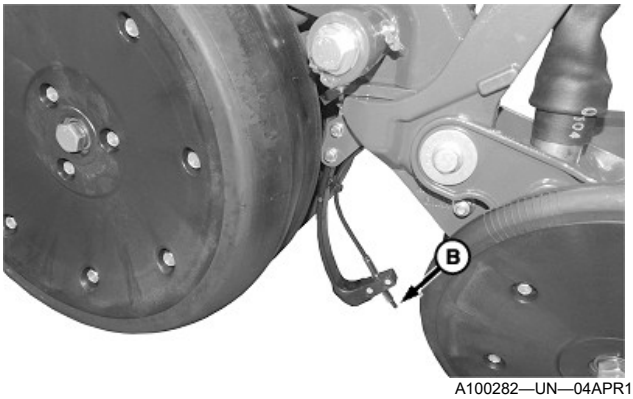
A117090—UN—08DEC22

Valve Configurations Vary

9. One at a time, open each bleed valve until there is a steady flow (no air) and then close the valve.
10. Allow the solution pump to run until there is a steady flow from every row and then shut the pump OFF.



A100281—UN—05OCT18



A100282—UN—04APR18

A—Opener Tube
B—In-Furrow Tube

11. In order to effectively prime the distribution tubes, keep the pump enabled until the first and last sections have continuous flow of liquid fertilizer exiting opener tubes (A) or in-furrow tubes (B).
12. If a steady flow of the liquid is not present at the designated rows, verify that there is not a significant variation of the system pressure and pump rate. If the system pressure and pump rate are correct but there is still a lack of flow, disable the pump and the valve bodies. Inspect for blockages at the designated rows that are not working correctly. Replace or repair any issues causing blockages.
13. Secondary Verification: Turn the solution pump ON and leave the master spray button OFF. View the main ExactRate screen. If the Apply OFF Pressure fluctuates ±35 kPa (0.5 bar) (5 psi), repeat the air removal procedure.
14. Once the designated rows have steady flow, set the active target rate using the ExactRate application on the tractor display.
15. Enable all rows on the planter.
16. Verify that the designated rows are applying at the desired target rate by performing the nozzle flow check. Set the rate of speed in the procedure on the tractor display. To ensure that the system is hitting the rate, monitor the applied rate on the tractor display. To set, adjust, or calibrate the fertilizer system, see the SeedStar Operator's Manual or the Onscreen Help in the ExactRate application.
17. After the rate is verified and the solution flow is adequate, turn OFF the master spray function, then turn OFF the pump function.

h5snma9,1717763187167-19-07JUN24

Prime and Start the ExactRate Pump with Centrally Mounted Pump—ExactRate (Offboard Tank

Before priming, inspect the fertilizer distribution system. Verify that the strainer is clean and that there are no

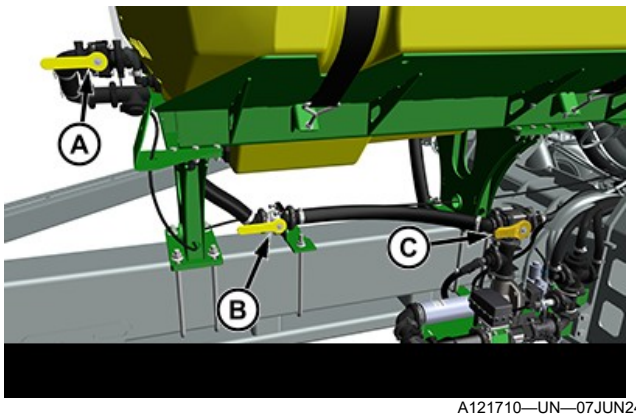
leaks in the suction hose for the ExactRate pump. Verify that there are no pinched, kinked, or otherwise restricted hoses. Verify that there are no extreme high or low variations in the path of the hose. Inspect all the in-line orifices and barbed fittings for debris and blockages.

IMPORTANT: To avoid priming or suction issues, minimize restriction between the tank and the ExactRate pump. Remove the strainers between the pump and trailing tank, sharp elbows, and restrictive hosing from the tank to the pump inlet. The minimum hose size for plumbing between the tank and pump is 5 cm (2 in).

NOTE: Verify that all products are strained when filling the tank.

NOTE: Do not allow the solution pump to run dry. Verify that the air is removed from supply hoses and that the supply tank has enough liquid before priming the fertilizer system. If an offboard tank is used, bypass the transfer pump unless filling the onboard tank.

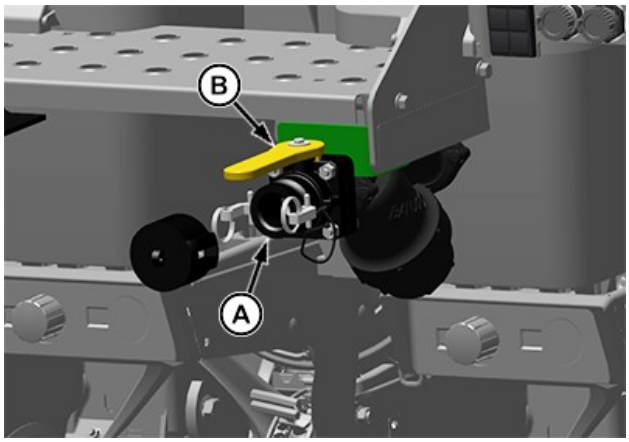
1. Unfold and park the planter on a level surface.
2. Verify that the trailing fertilizer tank or nurse tank is filled.
3. Start the tractor and enable the power generation system.
4. Using the tractor display, verify that the first and last sections of valve bodies on the planter are enabled before priming pump and the fertilizer system. (See the SeedStar Application Help on-screen for entering the ExactRate pump rates or operational functions.)
5. Lower the planter into a position just above the planting position.



A121710—UN—07JUN24

A—Tank Inlet Valve
B—Tank Outlet Valve
C—Pump Valve

6. When an offboard tank is supplying the pump or transferring product to the planter tank, open the tank inlet valve (A). When operating the fertilizer system, open tank outlet valve (B). Open pump valve (C).



A121638—UN—05JUN24

A—Fill Port
B—Ball Valve

7. Connect the transfer hose from the tow-behind tank to fill port (A) and hose leading to the ExactRate pump. Rotate ball valve (B) to the open position.
8. Rotate the handle to the open position on the transfer hose of the tow-behind tank.
9. Check the connections and distribution system for leaks.



A107072—UN—18JUN20

A—Pump Button
B—Master Spray Button

10. Using the rear keypad, depress pump button (A) to turn the solution pump ON.
11. Using the rear keypad, depress master spray button (B) to turn the master spray function ON.



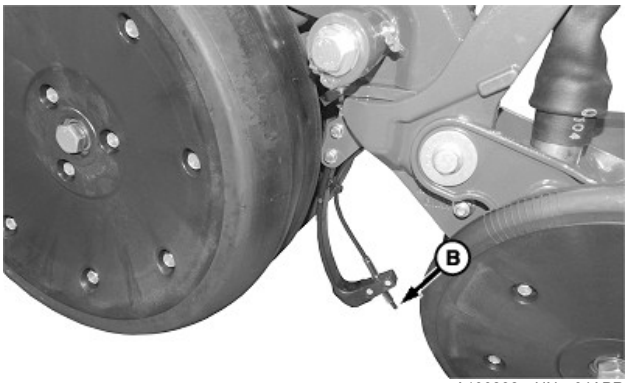
A117090—UN—08DEC22

Valve Configurations Vary

12. One at a time, open each bleed valve until there is a steady flow (no air) and then close the valve.



A100281—UN—05OCT18



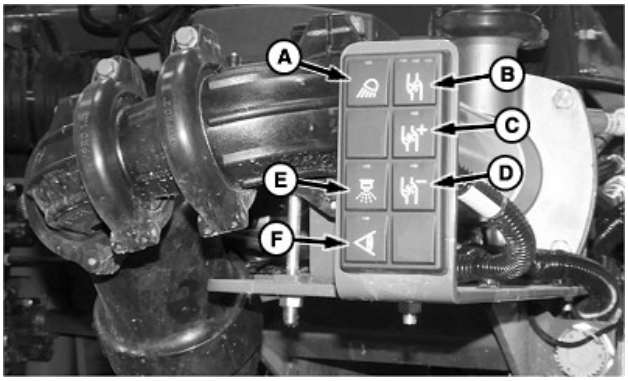
A100282—UN—04APR18

A—Opener Tube
B—In-Furrow Tube

13. In order to effectively prime the distribution tubes, keep the pump enabled until the first and last sections have continuous flow of liquid fertilizer exiting opener tubes (A) or in-furrow tubes (B).
14. If a steady flow of the liquid is not present at the designated rows, verify that there is not a significant variation of the system pressure and pump rate. If the system pressure and pump rate are correct but there is still a lack of flow, disable the pump and the valve bodies. Inspect for blockages at any rows that are not working correctly. Replace or repair any issues causing blockages.
15. When all rows have steady flow, set the target fertilizer rate using the ExactRate application on the display.
16. Enable all rows on the planter.
17. Verify that the designated rows are applying at the desired target rate by performing the nozzle flow check. Set the rate of speed in the procedure on the tractor display. To ensure that the system is hitting the rate, monitor the applied rate on the tractor display. To set, adjust, or calibrate the fertilizer system, see the SeedStar Operator's Manual or Onscreen Help in the ExactRate application.

h5snma9,1717763187083-19-07JUN24

Operate or Adjust the Pump with the Keypad



A100113—UN—12MAR18

A—Lights Button
B—Pump Button
C—Speed (+) Increase Button
D—Speed (-) Decrease Button
E—Master Valve Button
F—Visual Nozzle Check Button

NOTE: To enable all keypad functions, the power generation system must be turned ON. To enable fertilizer system functions, the fertilizer pump must also be turned ON.

See your SeedStar Application Help on-screen for entering the fertilizer pump rates or operational functions.

Some fertilizer pump functions are controlled either on the display or at the keypad. The keypad is at the rear of the planter near the fertilizer pump.

To turn ON or OFF the load station lights, press the lights button (A).

To turn ON or OFF the fertilizer pump, press the pump button (B). The pump button has three indicator lights above the icon on the keypad. These lights indicate the fertilizer pump speed (low=one light, medium=two lights, high=three lights).

To increase the pump speed, press the speed increase button (C).

To decrease the pump speed, press the speed decrease button (D).

NOTE: To relieve pressure in the system while the pump is OFF, enable the distribution valves using button (E).

The master valve button (E) activates all enabled distribution valves, allowing flow to every row. Use the master valve button when priming, flushing, or winterizing the system.

The visual nozzle check button (F) activates one section of distribution valves at a time, starting from the left side of the planter. To check for blockages, use the visual nozzle check button and observe the flow at each row in every section as they activate.

WP29706,0000C70-19-14MAY24

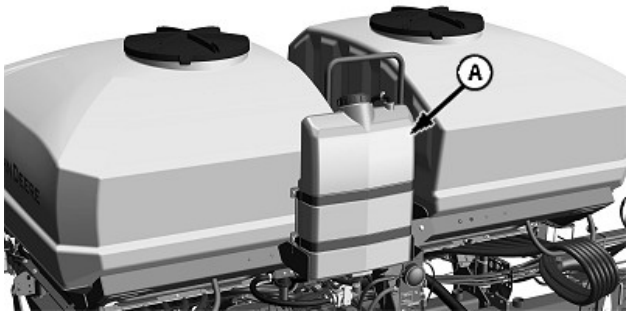
Operating Condition of the Valve Body

During operation of the ExactRate fertilizer system, the valve bodies have lights that show different status indications:

- Light on the valve body that is constantly ON indicates that the product is being applied.
- Light on the valve body that is blinking ON and OFF, accompanied by a diagnostic trouble code (DTC), indicates a system fault of the valve body or row flow error.

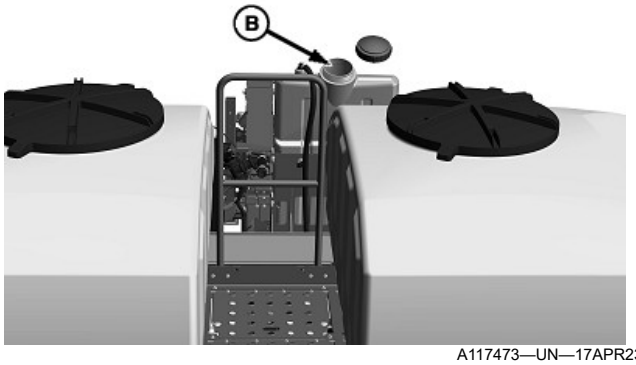
WP29706,0000E93-19-08OCT25

Rinse Tank Usage



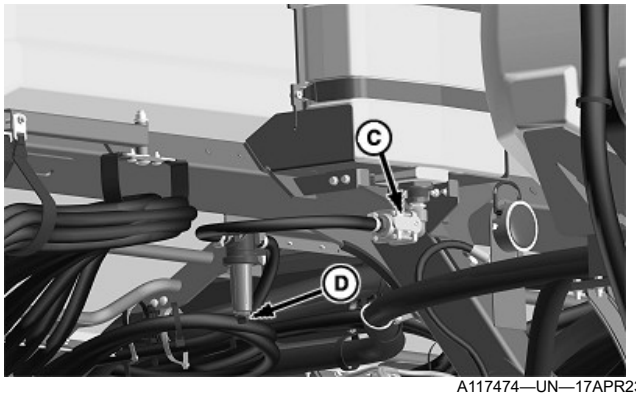
A117472—UN—17APR23

Rinse Tank



A117473—UN—17APR23

Tank Fill



A117474—UN—17APR23

Valve and Drain

A—Rinse Tank
B—Fill Opening
C—Tank Valve
D—Drain Plug

NOTE: Avoid algae growth. Do not store water more than a week.

The rinse tank (A) holds fresh water for rinsing the fertilizer pump and delivery system. Refer to the rinse procedure.

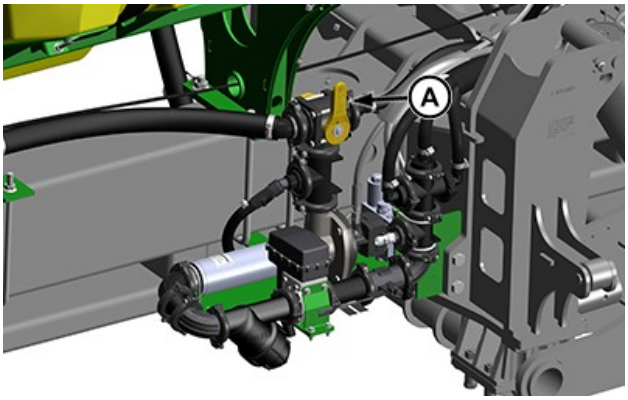
The rinse tank can also be used for the winterization procedure using winterizing fluid. Refer to the winterization procedure.

Access the fill opening (B) from the CCS platform.

Specification	
Rinse Tank—Volume	75 L (20 gal)

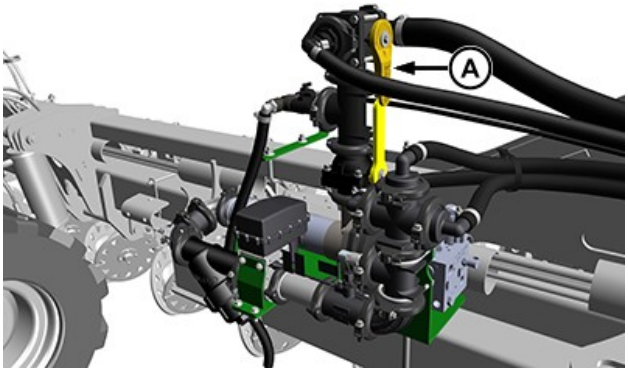
Control the flow using the tank valve (C).

Drain the tank by removing the drain plug (D).



A121657—UN—07JUN24

Centrally Mounted Pump Valve



A121658—UN—04JUN24

Wing Mounted Pump Valve

A—Pump Valve

Turn the pump valve (A) to the rinse position when using the rinse tank.

h5snma9,1717083716469-19-03JUN24

Short- or Long-Term Storage Guidelines

IMPORTANT: Do not discharge solutions onto the ground. Properly capture solutions discharged from the system. Perform the procedure where people, animals, vegetation, and water supplies cannot be contaminated.

If the forecasted temperature is below freezing, follow the winterization procedure.

Avoid losing prime. Do not allow the tanks or supply hoses to run out of fluid. If the prime is lost, refer to the priming procedure.

If the planter will sit for over a week with fertilizer in the system, perform the rinse procedure before the extended period.

If the planter will sit for less than a week with fertilizer in the system, draw water into the fertilizer pump before the sedentary period.

Use Erase or an equivalent cleaner for thorough cleaning.

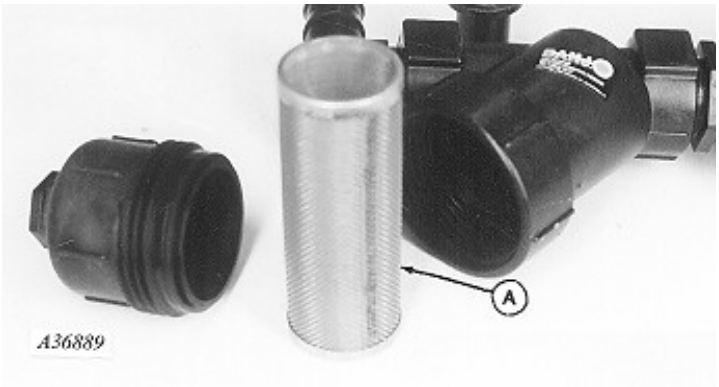
WP29706,0000C76-19-03APR23

Strainer Recommendations

IMPORTANT: Prevent damage to the fertilizer pump. See the Storage section for recommended storage procedures.

There are multiple 80 mesh strainers installed in the plumbing system on the planter. These strainers must remain installed during all applications to avoid plugging the distribution valves. When the planter is using an offboard fertilizer tank, the strainer between the offboard tank and the pump must be removed.

To prevent contamination, equip all the nurse tanks with strainers.



A36889—UN—10APR95

A—Strainer

A strainer (A) prevents obstructions in distribution valves, nozzles, and orifices. The strainer also prevents damage to the fertilizer pump, the fertilizer pipes, and the distribution tubes. A minimum 80 mesh strainer is

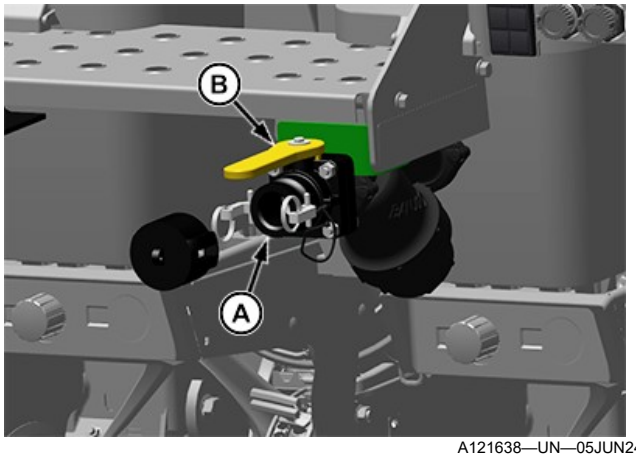
required for the distribution system and is recommended for the fill tank. Inspect and clean the strainer after the initial start-up, daily, or as required thereafter.

An increased pressure reading is an indication of an obstruction. Obstructions cause inconsistent fertilizer delivery.

If a fertilizer with a high solid content is plugging the 80 mesh strainer frequently, see a John Deere dealer or other service provider.

WP29706,0000C73-19-15OCT25

DB Planters—Winterize the ExactRate Pump



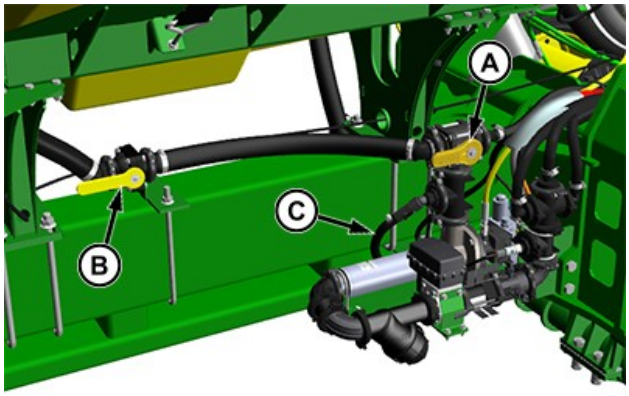
A121638—UN—05JUN24

A—Quik-Fill Port
B—Handle

IMPORTANT: Do not discharge solutions onto the ground. Properly capture solutions discharged from the system. Perform the procedure where people, animals, vegetation, and water supplies, cannot be contaminated.

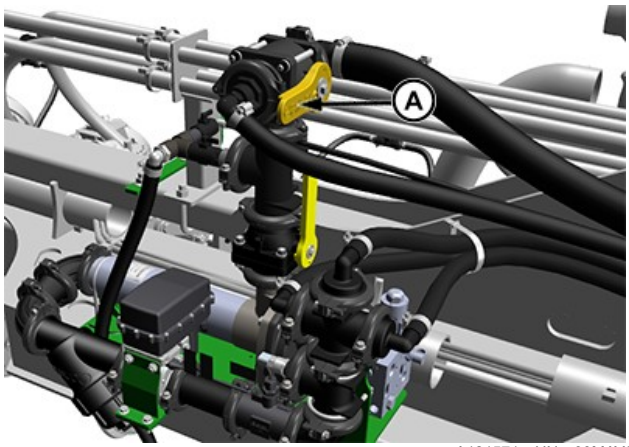
Avoid losing prime during the winterization procedure. Do not allow the tanks or supply hoses to run out of fluid. If the prime is lost, refer to the priming procedure.

1. If equipped with the Quik-Fill system, open all the Quik-Fill valves (A) and allow the hoses and primary tank to drain.
2. Turn on the electric power generation system.



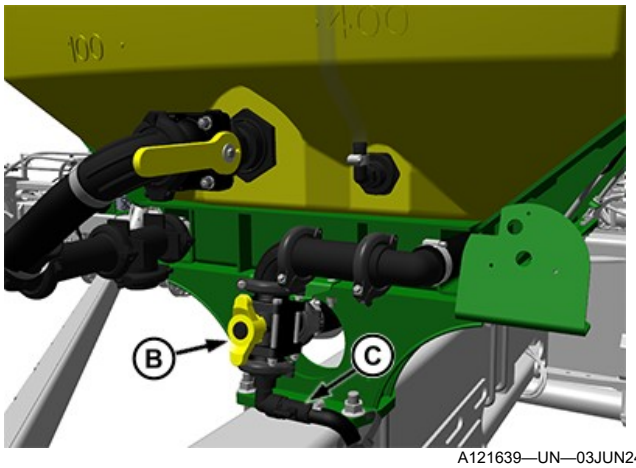
A121635—UN—31MAY24

Valves (Centrally Mounted Pump)



A121571—UN—30MAY24

Valves (Wing Mounted Pump)



A121639—UN—03JUN24

Valves (Wing Mounted Pump)

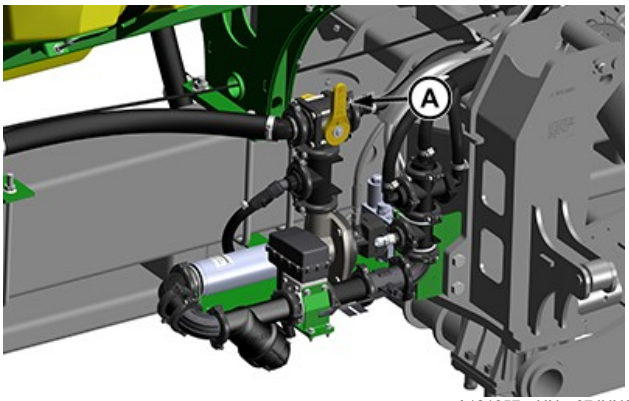
A—Pump Valve
B—Supply Valve
C—Drain Valve

3. Adjust the pump valve (A) to flow from the main tank.
4. Open the supply (B) and drain (C) valves so that the tank drains. Close the drain valve (C) when draining is complete.

5. Use water to rinse the system before winterizing. Drain the water before adding winterizer.

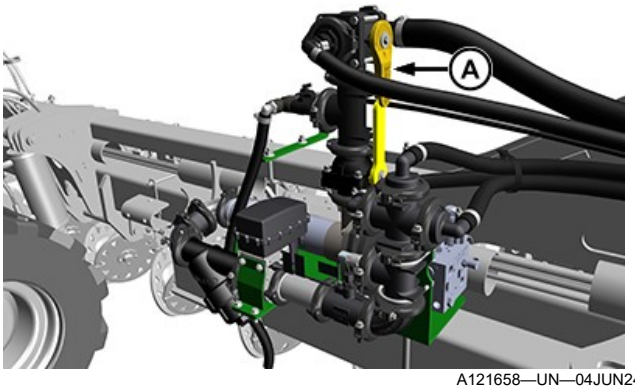
NOTE: If using an offboard tank as the only supply, bypass the transfer pump during the winterization procedure.

6. Add winterization fluid to the primary tank. If using an offboard tank, transfer the winterization fluid to the primary tank and draw from the primary tank for the procedure. Stop and add fluid as needed during the procedure.



A121657—UN—07JUN24

Pump Valve (Centrally Mounted Pump)

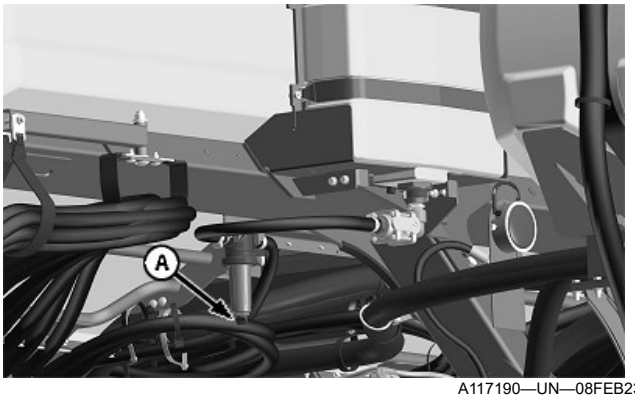


A121658—UN—04JUN24

Pump Valve (Wing Mounted Pump)

A—Pump Valve

7. Adjust the pump valve (A) to flow from the rinse tank.



A117190—UN—08FEB23

Rinse Tank Filter

A—Plug

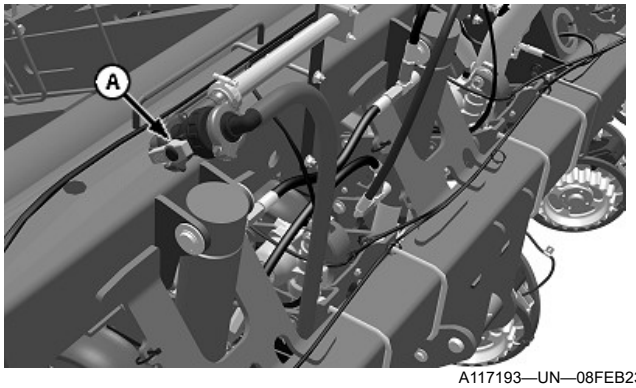
8. Remove the plug (A) and drain the rinse tank.
9. Replace the plug and add winterization fluid to the rinse tank.



A107072—UN—18JUN20

A—Fertilizer Pump
B—Master Spray

10. Activate the pump using button (A).
11. Activate the master spray function using button (B).
12. While drawing from the rinse tank, observe the fluid dispensing from the rows. When winterization fluid is steadily flowing from any row, shut the master spray (B) off.
13. Adjust the pump valve (A) to flow from the primary tank.
14. Open the primary tank supply valve.
15. Activate the master spray function using button (B).



A117193—UN—08FEB23

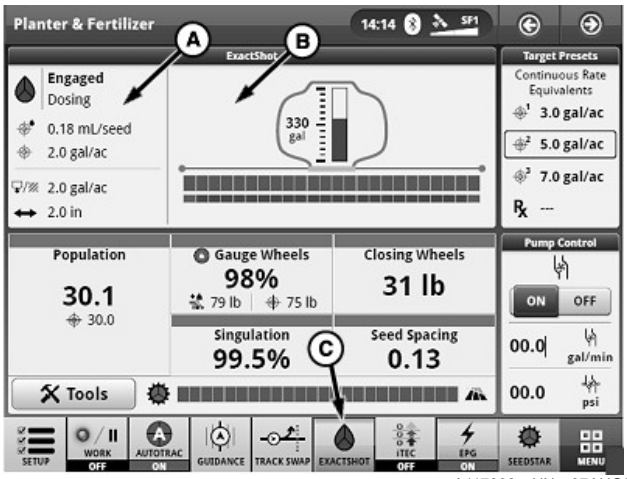
Valves and Locations Vary by Planter

A—Bleed Valve

16. One at a time, open each bleed valve (A) until there is a steady flow of winterization fluid and then close the valve.
17. After each valve has been bled, observe the flow at the rows. When winterization fluid is steadily flowing from all of the rows, deactivate the pump.

WP29706,0000E91-19-03JUN24

ExactShot Onscreen Overview

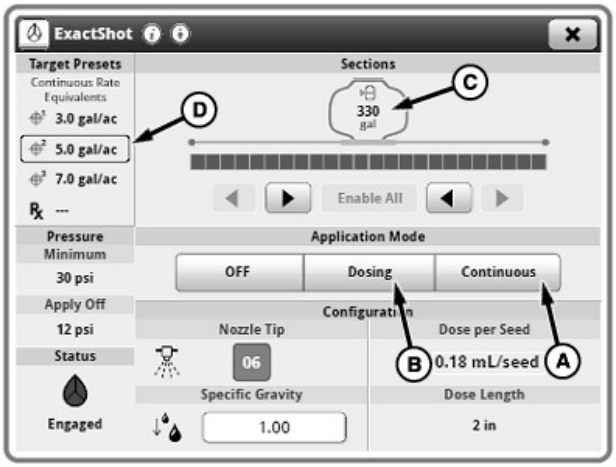


A117892—UN—07AUG23

Run Screen

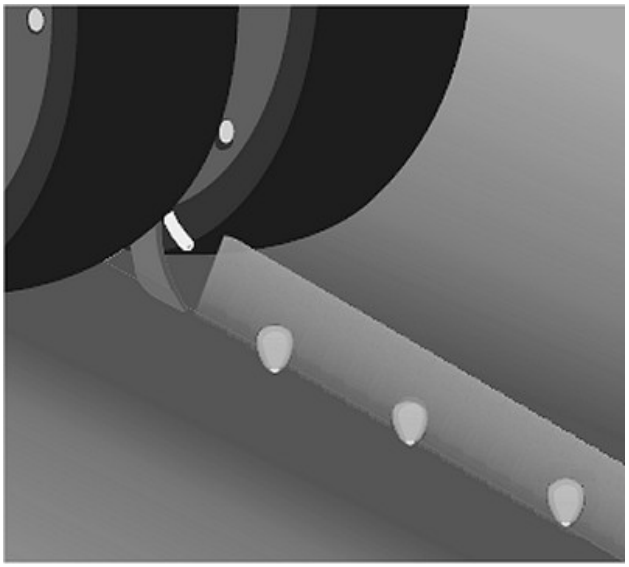
A—Left Panel
B—Right Panel
C—Shortcut Button

The left panel (A) on the run page shows information from and provides access to the ExactShot application. The target rate and actual rate always appear. In Dosing Mode the dose rate and dose length appear. The right panel (B) on the run page shows the tank and section information and provides access to the Tank System screen. An shortcut button (C) is available for the ExactShot application.



YK112650—UN—17JUL23

ExactShot Application Screen



YK112651—UN—22JUN23

Delivery Pattern with Continuous Configuration



YK112652—UN—22JUN23

Delivery Pattern with Dosing Configuration

A—Continuous
B—Dosing
C—Tank Level Indicator
D—Target Rate

The system has two application configurations, Continuous (A) and Dosing (B). The Continuous configuration applies a continuous quantity of fertilizer per area and does not require a subscription. The Dosing configuration applies a reduced dose of fertilizer directly on each seed and requires a subscription.

The tank level indicator (C) displays the current (estimated) tank level. The indicator is selectable to adjust the tank size, low tank alarm, and preset fill levels. See the Help Information for details.

The target rate (D) shows the rate selection applied either in the Continuous mode or in the Dosing mode. The Continuous mode applies the full rate selected. The

Dosing mode applies a reduced length dose to each individual seed that eliminates the excess fertilizer between seeds. The Dosing target rate is displayed as a traditional Continuous Rate Equivalent and the software converts that equivalent to a reduced actual rate. Both the rate equivalent and the actual rate are displayed together on multiple screens.

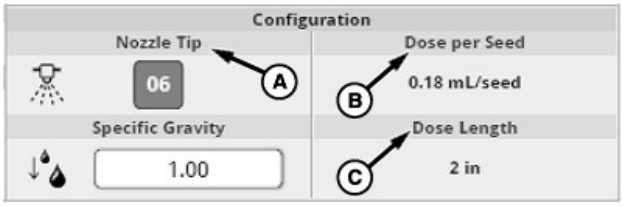


N118166—UN—30MAY17
Help Information, G4 Displays



AX1398598—UN—31MAR25
Help Information, G5 Displays

Select the Help information on any screen for additional information about items on the screen.



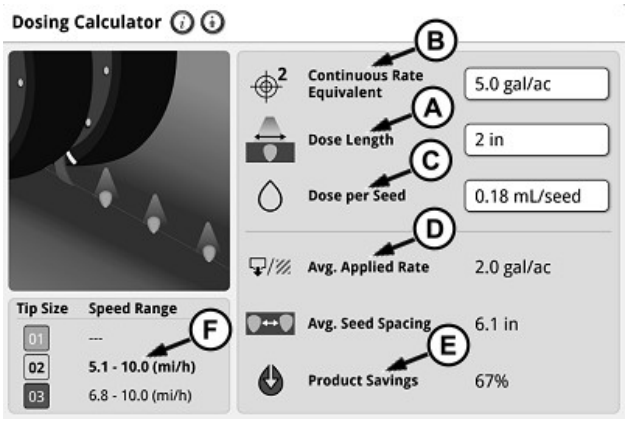
A117867—UN—13JUL23
Dosing Configuration

A—Nozzle Tip
B—Dose per Seed
C—Dose Length

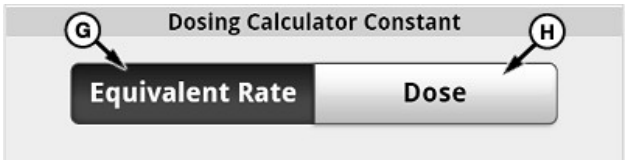
Dosing Mode: Install the correct standard nozzle tip (A) on the row units (see the Nozzle Tip Recommendations). The selected tip must be entered on the screen and installed on the row units. The dose per seed (B) is calculated based on the equivalent target rate and dose length. The dose length (C) defaults to 51 mm (2 in) and does not change when the equivalent rate or dose per seed are changed. The values are adjustable within the Dosing Calculator by selecting the Dosing screen area.



N118004—UN—22OCT15
Advanced Settings



A117893—UN—15AUG23



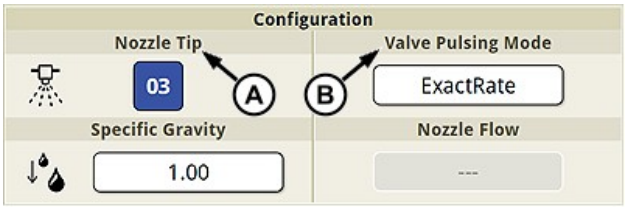
A117894—UN—17JUL23

A—Dose Length
B—Continuous Rate Equivalent
C—Dose per Seed
D—Applied Rate
E—Product Savings
F—Nozzle and Ground Speed Range
G—Equivalent Rate Constant
H—Dose Constant

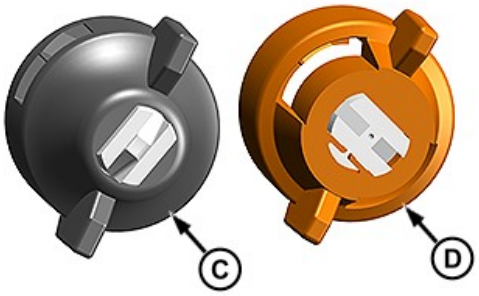
If the Dose Length (A) is adjusted, either the Continuous Rate Equivalent (B) or Dose per Seed (C) remains constant based on the Advanced Settings. When a traditional Continuous Rate Equivalent is applied in segmented Dose Lengths a reduced (actual) Applied Rate (D) is the result. The estimated Product Savings (E) are shown. There is a recommended ground speed range (F) for the nozzle tip selected (bold) and for the next smaller and larger nozzle tip.

Within the Advanced Settings, the Equivalent Rate constant is the default setting.

- Equivalent Rate Constant (G): The equivalent rate remains constant when the dose length is changed. The actual rate applied increases or decreases with the dose length. The rate delivered by the nozzle is consistent over a longer or shorter dose length.
- Dose Constant (H): The actual rate applied remains constant when the dose length is changed. The equivalent rate increases or decreases with the dose length. The rate delivered by the nozzle increases or decreases over a longer or shorter dose length. The set dose is spread out over a longer dose length or condensed over a shorter dose length.



AX1384816—UN—04DEC24



AX1385176—UN—06DEC24

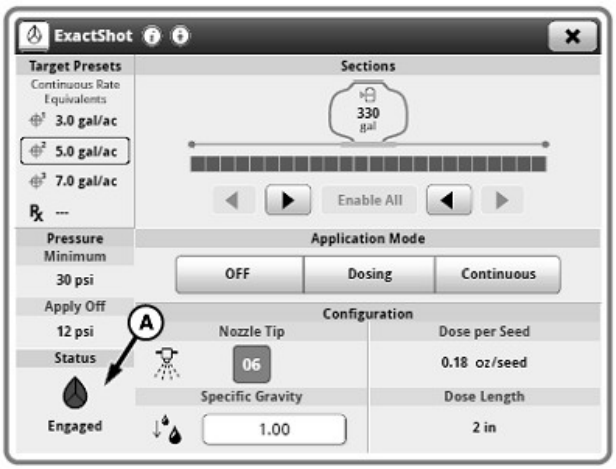
Nozzle Caps

A—Nozzle Tip
B—Pulsing Mode
C—Cap, ExactRate Equivalent
D—Cap, Standard

Continuous Mode: Input the nozzle tip (A) number installed on the row units. The valve pulsing mode (B) determines whether the rate adjusts along curves (ExactRate equivalent) or remains constant (Fixed Pulsing or No Pulsing).

IMPORTANT: The Standard caps and the ExactRate equivalent caps are oriented 90° from each other. The Standard tips and ExactRate equivalent tips have different spray patterns. Do not mix components and use as recommended.

Install an ExactRate equivalent nozzle tip and cap (C) on the row units when ExactRate equivalent mode is selected. Install a standard nozzle tip and cap (D) when Fixed Pulsing or No Pulsing is selected. (See the Nozzle Tip Recommendations.)



YK112656—UN—22JUN23

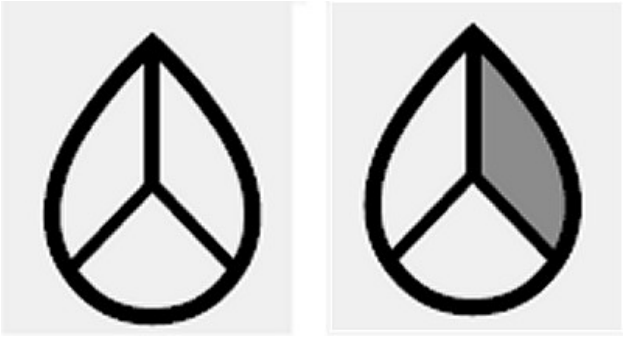


YK112655—UN—22JUN23

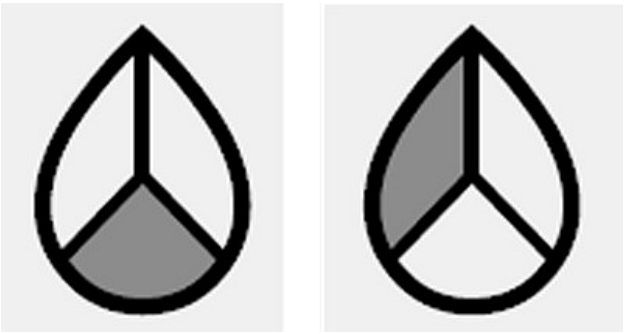
All Prerequisites Met

A—Status Indicator

The status indicator (A) displays which prerequisite conditions have been met for system engagement. The indicator sections must be full for the system to operate.



YK112653—UN—22JUN23



YK112654—UN—22JUN23

The indicator sections represent machine motion, machine lowered, power generation ON, and pump ON. See the Help Information for details about each indicator section.



A99081—UN—21MAR18

Calibrations and Procedures



PC29211—UN—23AUG23

Planter Liquid Runoff

To test the setup parameters by simulating the operating conditions, perform a runoff procedure. Access the feature through Calibrations and select the Planter Liquid Runoff.

ouo6074,1687380593749-19-06DEC24

Fertilizer Distribution Overview

The liquid fertilizer system uses a pump, distribution (solenoid) valves, and nozzles to dispense the product at various application rates. Distribution valves with interchangeable nozzles are mounted on each row unit.

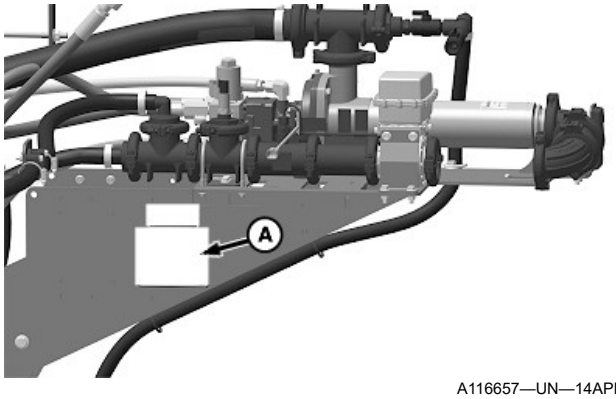
The ExactShot fertilizer software uses sensors in conjunction with user defined parameters to maintain the system rate during varying conditions.

- The application rate is input into the display.
- Oil temperature for the system must be warmed to a minimum of 60°C (140°F) before use.
- The system controls the in-line pressure and the distribution valves to achieve the correct application rate.
- Verify the row spacing and the application rate settings on the screen.
- Verify that the power generation system is ON and the fertilizer pump is ON.
- Verify that the system is operating at the application rate when traveling at the target planting speed. (See the Nozzle Tip Recommendations for rates and ground speeds.)

In-Furrow System Suggested Rate and Speed Ranges		
Fertilizer Application Rate L/ha (gal/acre)	Ground Speed in Dosing Mode km/h (mph)	Ground Speed in Continuous Mode km/h (mph)
18.7—93.5 (3—10)	1.6—16.1 (1—10)	4.8—16.1 (3—10)

Priming the fertilizer system is critical for obtaining the best performance. (See Prime and Start the Pump.) Eliminate any kinks, pinches, or sharp bends in the fertilizer hoses. Any restriction in the hoses reduces the fertilizer flow.

When sitting idle, follow the winter storage procedure when freezing temperatures are expected.



A116657—UN—14APR22

Center Frame

A—Decal, Winterize

IMPORTANT

TO PREVENT DAMAGE TO THE PUMP:

1. Keep the pump filled with fertilizer, water, or winterizing fluid at all times. Exposure to air causes rapid corrosion of internal parts.
2. Keep the pump from freezing. When sitting idle, follow the winterization procedure when freezing temperatures are expected.

RECOMMENDED STORAGE PROCEDURES:

OVERNIGHT IN ABOVE FREEZING TEMPERATURES

- With clear liquids and steady or rising temperatures: Leave the pump and hoses filled with solution.
- With clear liquids and cooling weather (solution is likely to salt out): Fill the pump with water and leave it filled (do not admit air).
- With suspension fertilizers: This system is **not** recommended for use with suspension fertilizers.

ONE TO TWO WEEKS IN ABOVE FREEZING TEMPERATURES

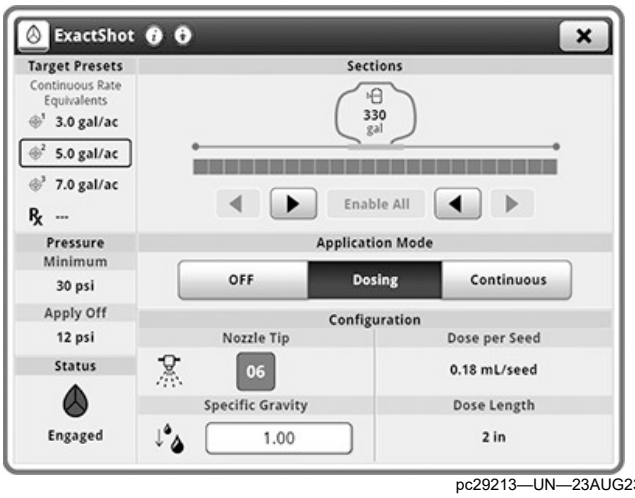
- Acceptable: Draw in fresh water to dilute and flush out solution. Do not drain. Keep the pump sealed to exclude air.
- Preferred: Follow the winterization guidelines.

WINTER STORAGE

- Reference to the winterization procedure.

ouo6074,1684180767634-19-10DEC24

ExactShot



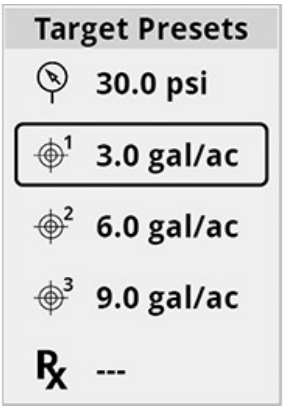
pc29213—UN—23AUG23

ExactShot Main Page

ExactShot controls the delivery of fertilizer to either apply a continuous stream of product to the seeds in the row or a targeted dose of product to each seed as it is planted.

NOTE: Main page shown is for example only. Your main page may differ depending on options or connected equipment.

Items Accessible on ExactShot Main Page:



pc28230—UN—10AUG23

Target Presets

Target Presets— shows the currently selected rate. Select the area to change the preset rates or select a prescription rate.

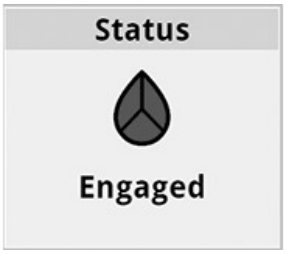
NOTE: Static pressure is only available when the application mode is set to continuous.



pc28231—UN—10AUG23

Pressure

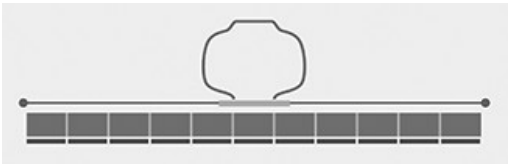
Pressure— select the area to modify system pressures.



pc28232—UN—10AUG23

Status

Status— select the area to view diagnostics for the current status of the ExactShot system.



A105162—UN—29JUL19

Sections

Sections— displays Status of each section. Select the tank icon to adjust the Tank System settings.



pc28233—UN—10AUG23

Index Sections

- **Index Sections**— Use left and right arrows to enable or disable sections one at a time from the left or right exterior sections.



A104091—UN—10APR19

Enable All

- **Enable All**— select to enable all sections.



pc28234—UN—23AUG23

Application Mode

Application Mode— selecting an application mode changes the configuration options.

Dosing Configuration



pc28235—UN—10AUG23

Standard Nozzle Tip

- Nozzle Tip— indicates the delivery method. Select the nozzle tip number used for the application. Install the standard tip and cap on the row units.



pc28236—UN—10AUG23

Specific Gravity

- Specific Gravity— allows the system to compensate and maintain the target rate when the solution is lighter or heavier than water. Select to enter the specific gravity of the solution.
- Dose Settings— select to open the dosing calculator to change settings.

Continuous Configuration



pc28235—UN—10AUG23

Nozzle Tip

- Nozzle Tip— indicates the delivery method. Select the nozzle tip number used for the application. Install the ExactRate equivalent nozzle tip and cap when ExactRate equivalent mode is selected. Install the standard nozzle tip and cap when using Fixed Pulsing or No Pulsing mode.



pc28236—UN—10AUG23

Specific Gravity

- Specific Gravity— allows the system to compensate and maintain the target rate when the solution is lighter or heavier than water. Select to enter the specific gravity of the solution.
- Valve Pulsing Mode and Nozzle Flow— allows you to adjust how the valve regulates flow at each row.



N118004—UN—22OCT15

Advanced Settings

Advanced Settings— access further adjustments and less common settings.

Run Page Modules

Modules for this application can be added to the run pages using Layout Manager.

cz76372,1691608197196-19-06DEC24

Access ExactShot

Access Application Through Display:



H113668—UN—22OCT15

Menu

1. Select Menu.



N119118—UN—23SEP16

Machine Settings

2. Select Machine Settings tab.



pc28229—UN—10AUG23

ExactShot

3. Select the Access ExactShot application.

cz76372,1691608197285-19-10AUG23

Service Fertilizer System Safely

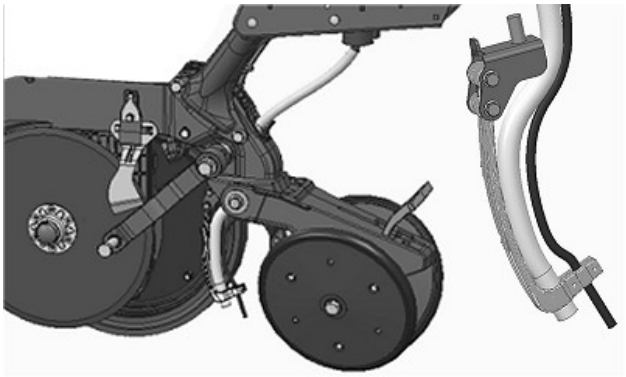


TS281—UN—15APR13

CAUTION: Avoid injury from pressurized fertilizer solution. The fertilizer system is under pressure. Before servicing any areas of the fertilizer system, relieve all pressure from the fertilizer system.

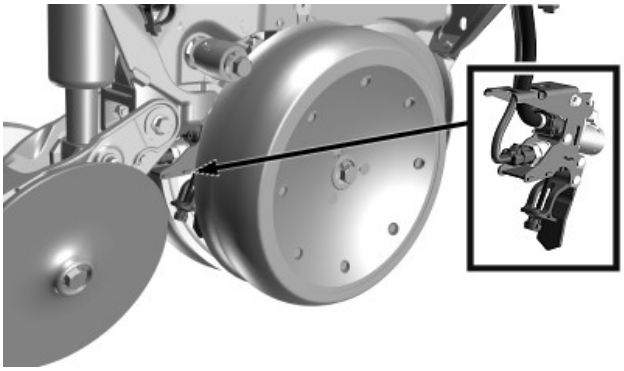
WP29706,0000C74-19-01AUG19

Liquid Fertilizer Use with the BrushBelt



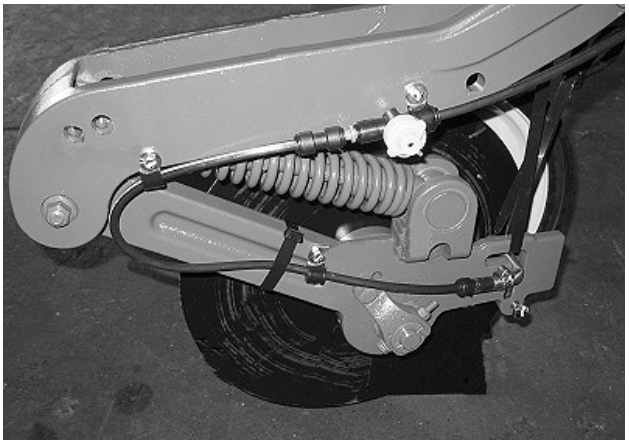
A86695—UN—09JUN15

ExactRate In-Furrow Applicator



A118248—UN—15AUG23

ExactShot In-Furrow Applicator



A75012—UN—04APR12

ExactRate Frame-Mounted Opener

IMPORTANT: Avoid plugging the ExactEmerge BrushBelt. Do not apply liquid fertilizer in front of and directly in-line with the seed furrow.

Use an in-furrow or a frame-mounted opener system that is compatible with the BrushBelt.

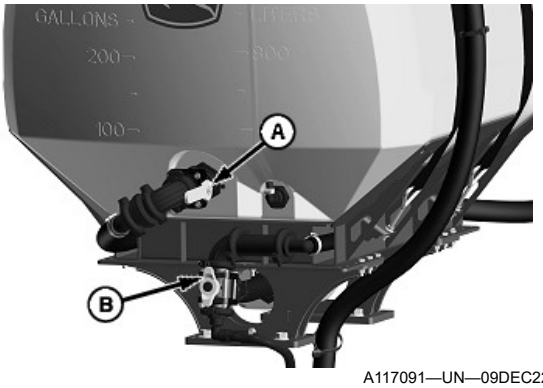
WP29706,0000C6C-19-17AUG23

Prime and Start the Fertilizer Pump with Wing Mounted Pump—ExactShot (Onboard Tank)

NOTE: Do not allow the fertilizer pump to run dry. Verify that the air is removed from supply hoses and that the supply tank has enough liquid before priming the fertilizer system. If an offboard tank is used, bypass the transfer pump unless filling the onboard tank.

Before priming, inspect the fertilizer distribution system. Verify that the strainer is clean and that there are no leaks in the pump inlet hose. Verify that there are no pinched, kinked, or otherwise restricted hoses. Inspect all the nozzle tips for debris and blockages.

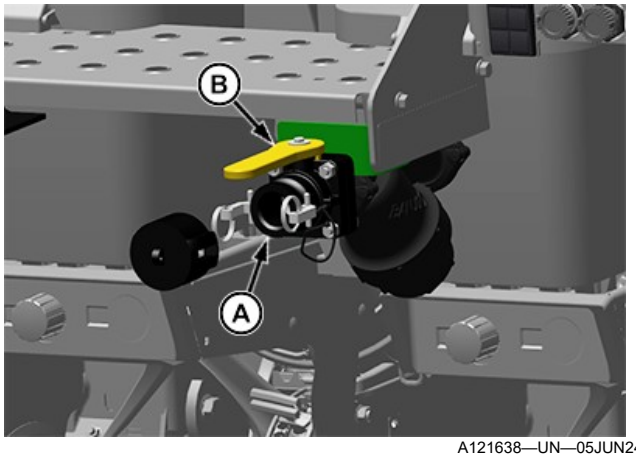
1. Ensure that the tank is filled with a minimum level higher than the pump inlet and check the system for leaks. (See Quik-Fill Liquid Fertilizer.)
2. Unfold and park the planter on a level surface.
3. When filling the liquid fertilizer tank, the fertilizer pump must be OFF.
4. Turn ON the electric power generation system.
5. Using the display, verify that distribution valves on the planter are enabled before priming the pump and the fertilizer system. (See the SeedStar Application Help on the display when entering the pump rates or operational functions.)



A117091—UN—09DEC22

A—Tank Inlet Valve
B—Tank Outlet Valve Handle (arrow up)

6. When an offboard tank is supplying the pump or transferring product to the planter tank, open the tank inlet valve (A). When operating the fertilizer system, open the tank outlet valve handle (B).

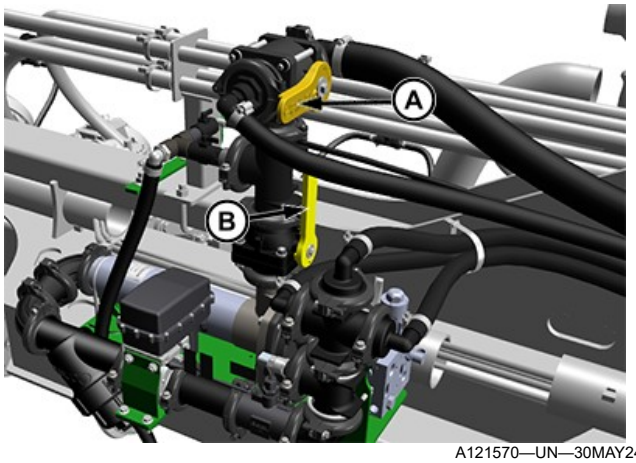


A121638—UN—05JUN24

A—Fill Port
B—Ball Valve

NOTE: Only use the transfer pump to fill the planter tank. If an offboard tank is supplying the fertilizer pump, bypass the transfer pump.

7. If using an offboard tank, connect the transfer hose to the fill port (A) and open the ball valve (B). Ensure that the tank inlet valve and the tank outlet valve are open.



A121570—UN—30MAY24

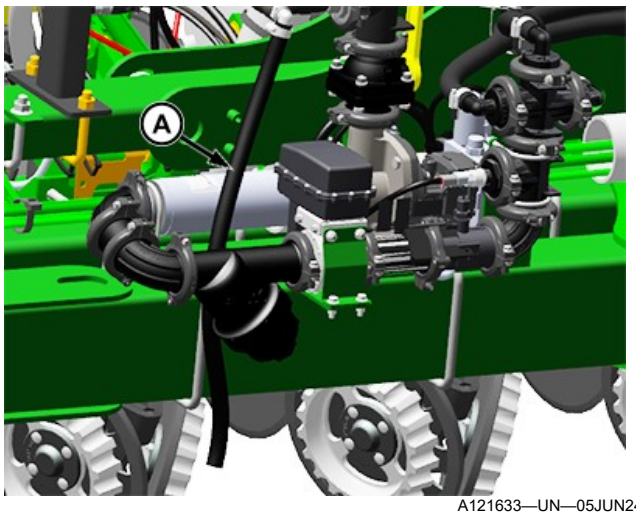
A—Valve
B—Valve

8. Open valve (A) and valve (B).



A106834—UN—14MAY20

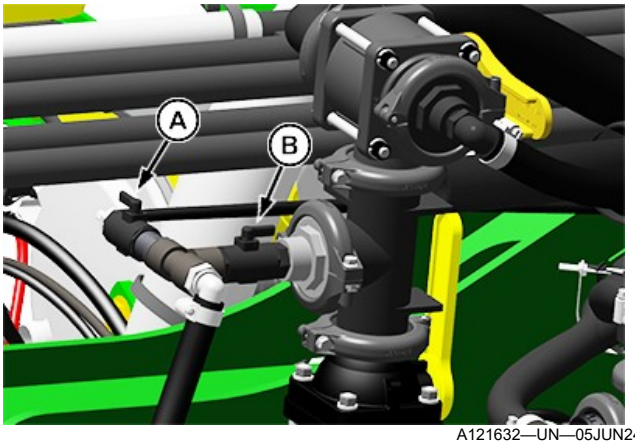
9. Verify that the compressor air tank is full. To activate the air compressor, place the hydraulic lever for lowering the planter into the continuous detent position until the compressor shuts off.



A121633—UN—05JUN24

A—Drain Hose

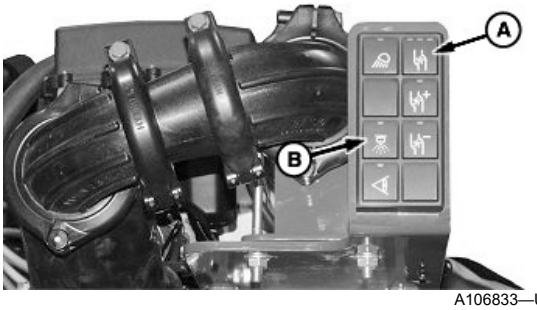
10. Place the drain hose (A) into a container or bucket.



A121632—UN—05JUN24

A—Air Valve
B—Solution Valve

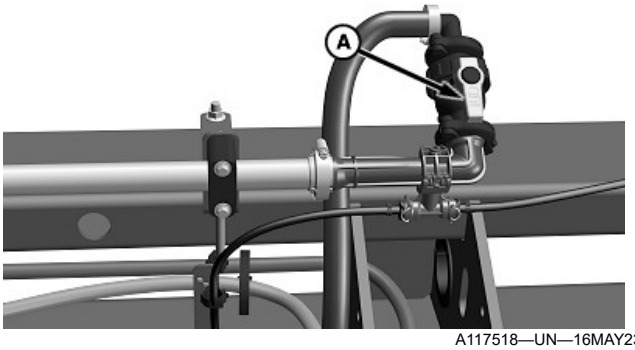
11. Open the air valve (A) and the solution valve (B) at the same time.



A106833—UN—14MAY20

A—Pump Button
B—Master Spray Button

12. When there is a steady stream of liquid from the drain hose, turn the solution pump ON and activate the delivery system. Press the pump button (A) and master spray button (B).

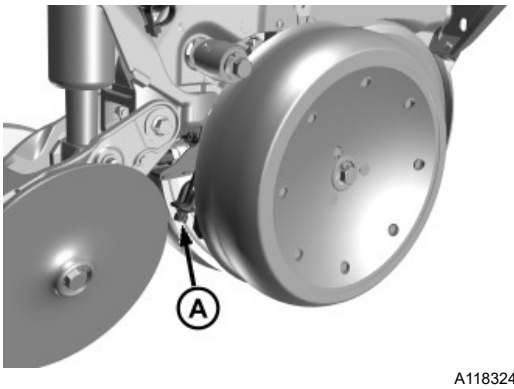


A117518—UN—16MAY23

Valve Configurations Vary

A—Bleed Valve

13. One at a time, open each bleed valve (A) until there is a steady flow (no air) and then close the valve.
14. Once liquid is flowing from the delivery hoses, close the air valve and solution valve.



A118324—UN—17AUG23

A—Nozzles

15. In order to effectively prime the distribution tubes, keep the pump enabled until the first and last sections have continuous flow of liquid fertilizer exiting the nozzles (A).
16. If the flow is not steady from a row, disable the pump and the valve bodies. Inspect for blockages at the rows that are not flowing correctly. Replace or repair any issues causing blockages.
17. Secondary Verification: Turn the fertilizer pump ON and leave the master spray button OFF. View the main screen. If the Apply OFF Pressure fluctuates ±35 kPa (0.5 bar) (5 psi), repeat the air removal procedure.
18. Once all the rows have a steady flow, set the target rate using the ExactShot application on the display.
19. Enable all rows on the planter.
20. Verify that the rows are applying the target rate by performing the nozzle flow check. Set the ground speed on the display. Verify the applied rate on the display. To set, adjust, or calibrate the fertilizer system, see the SeedStar Operator's Manual or Onscreen Help in the ExactShot application.
21. After the rate is verified and the solution flow is adequate, turn OFF the master spray function, then turn OFF the pump function.

h5snma9,1717170550556-19-07JUN24

Prime and Start the Fertilizer Pump with Wing Mounted Pump—ExactShot (Offboard Tank)

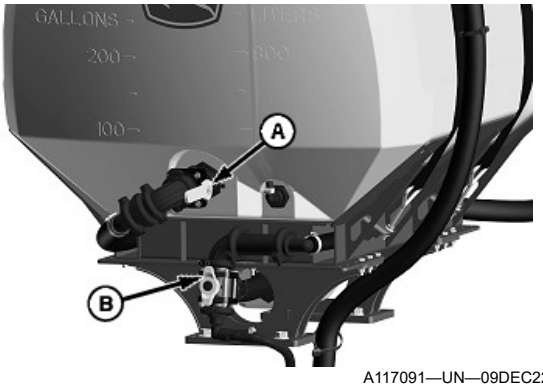
IMPORTANT: To avoid priming or suction issues, minimize restriction between the tank and the ExactRate pump. Remove the strainers between the pump and trailing tank, sharp elbows, and restrictive hosing from the tank to the pump inlet. The minimum hose size for plumbing between the tank and pump is 5 cm (2 in).

NOTE: Verify that all products are strained when filling the tank.

NOTE: Do not allow the solution pump to run dry. Verify that the air is removed from supply hoses and that the supply tank has enough liquid before priming the fertilizer system. If an offboard tank is used, bypass the transfer pump unless filling the onboard tank.

Before priming, inspect the fertilizer distribution system. Verify that the strainer is clean and that there are no leaks in the pump inlet hose. Verify that there are no pinched, kinked, or otherwise restricted hoses. Inspect all the nozzle tips for debris and blockages.

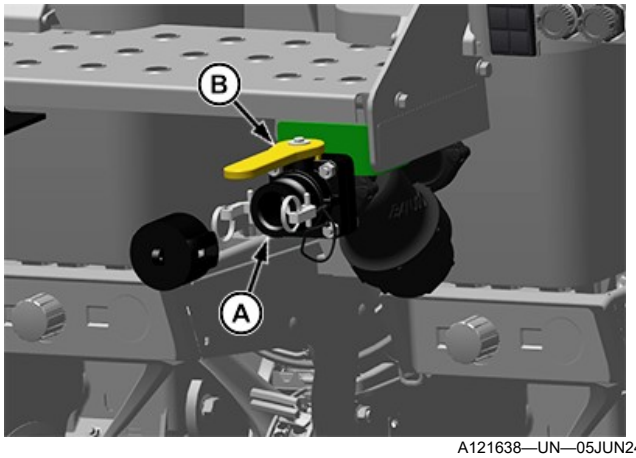
1. Unfold and park the planter on a level surface.
2. Verify that the offboard fertilizer tank or nurse tank is filled.
3. Turn ON the electric power generation system.
4. Using the display, verify that distribution valves on the planter are enabled before priming the pump and the fertilizer system. (See the SeedStar Application Help on the display when entering the pump rates or operational functions.)



A117091—UN—09DEC22

A—Tank Inlet Valve
B—Tank Outlet Valve

5. When an offboard tank is supplying the pump or transferring product to the planter tank, open tank inlet valve (A). When operating the fertilizer system, open tank outlet valve (B).

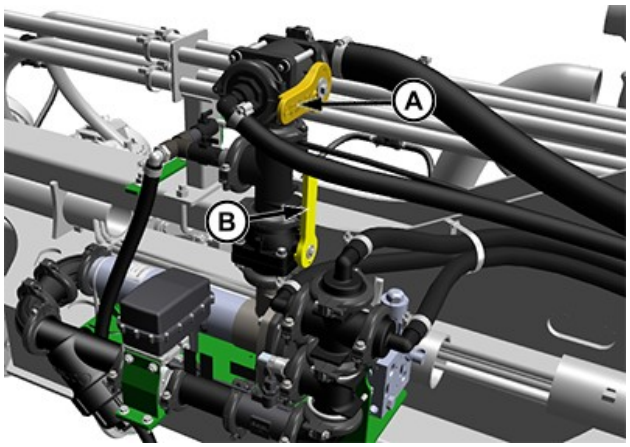


A121638—UN—05JUN24

A—Fill Port
B—Ball Valve

NOTE: Only use the transfer pump to fill the planter tank. If an offboard tank is supplying the solution pump, bypass the transfer pump.

6. If using an offboard tank, connect the transfer hose to fill port (A) and open ball valve (B). Ensure that the tank inlet valve and the tank outlet valve are open.



A121570—UN—30MAY24

A—Valve
B—Valve

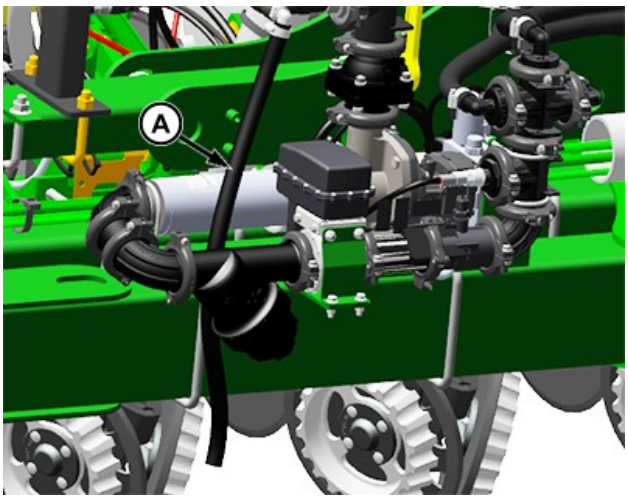
7. Open valve (A) and valve (B).



A106834—UN—14MAY20

8. Use the pneumatic assist while priming.

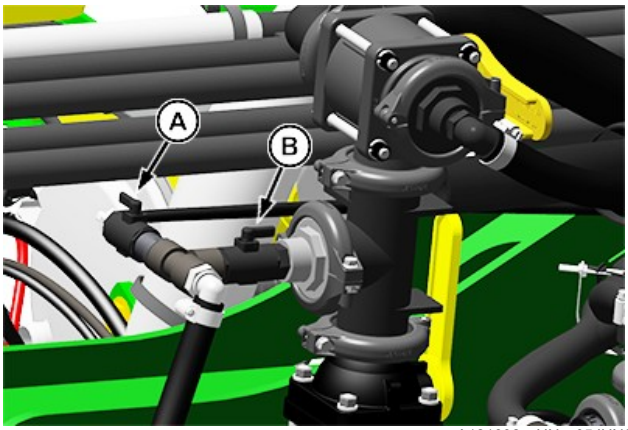
    a. Verify that the compressor air tank is full. To activate the air compressor, place the hydraulic lever for lowering the planter into the continuous detent position until the compressor shuts off.



A121633—UN—05JUN24

A—Drain Hose

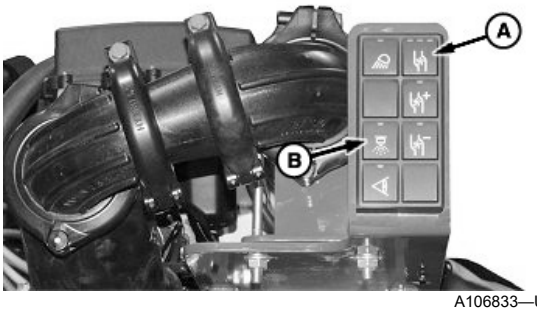
    b. Place drain hose (A) into a container or bucket.



A121632—UN—05JUN24

A—Air Valve
B—Solution Valve

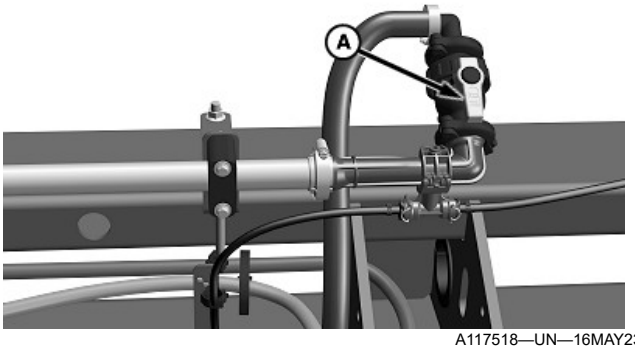
    c. Open air valve (A) and solution valve (B) at the same time.



A106833—UN—14MAY20

A—Pump Button
B—Master Spray Button

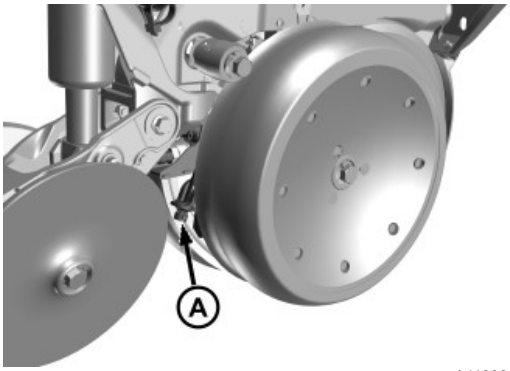
9. When there is a steady stream of liquid from the drain hose, turn solution pump ON and activate the delivery system. Press pump button (A) and master spray button (B).



A117518—UN—16MAY23

A—Bleed Valve

10. One at a time, open each bleed valve (A) until there is a steady flow (no air) and then close the valve.
11. Once liquid is flowing from the delivery hoses, close the air valve and solution valve.



A118324—UN—17AUG23

A—Nozzles

12. In order to effectively prime the distribution tubes, keep pump enabled until the first and last sections have continuous flow of liquid fertilizer exiting the nozzles (A).
13. If the flow is not steady from a row, disable the pump

and the valve bodies. Inspect for blockages at the rows that are not flowing correctly. Replace or repair any issues causing blockages.

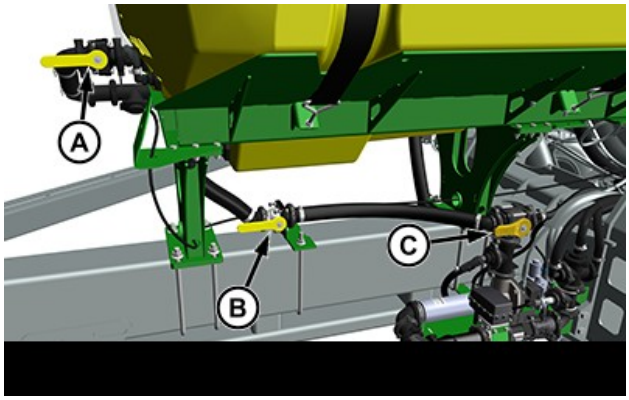
14. Secondary Verification: Turn the fertilizer pump ON and leave the master spray button OFF. View the main screen. If the Apply OFF Pressure fluctuates ±35 kPa (0.5 bar) (5 psi), repeat the air removal procedure.
15. Once all the rows have a steady flow, set the target rate using the ExactShot application on the display.
16. Enable all rows on the planter.
17. Verify that the rows are applying the target rate by performing the nozzle flow check. Set the ground speed on the display. Verify the applied rate on the display. To set, adjust, or calibrate the fertilizer system, see the SeedStar Operator's Manual or Onscreen Help in the ExactShot application.
18. After the rate is verified and the solution flow is adequate, turn OFF the master spray function, then turn OFF the pump function.

h5snma9,1717170559953-19-07JUN24

Prime and Start the Fertilizer Pump with Centrally Mounted Pump—ExactShot (Onboard Tank)

Before priming, inspect the fertilizer distribution system. Verify that the strainer is clean and that there are no leaks in the pump inlet hose. Verify that there are no pinched, kinked, or otherwise restricted hoses. Inspect all the nozzle tips for debris and blockages.

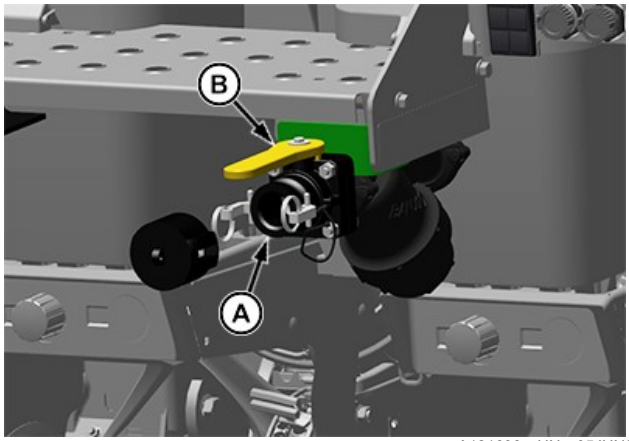
1. Ensure that the tank is filled with a minimum level and check the system for leaks. (See Quik-Fill Liquid Fertilizer.)
2. Unfold and park the planter on a level surface.
3. When filling up the liquid fertilizer tank, the ExactRate solution pump must be OFF.
4. Turn ON the electric power generation system.
5. Using the tractor display, verify that the first and last sections of valve bodies on the planter are enabled before priming pump and the fertilizer system. (See the SeedStar Application Help on the tractor display for entering the pump rates or operational functions.)



A121710—UN—07JUN24

A—Tank Inlet Valve
B—Tank Outlet Valve
C—Pump Valve

6. When an offboard tank is supplying the pump or transferring product to the planter tank, open tank inlet valve (A). When operating the fertilizer system, open tank outlet valve (B). Open pump valve (C).
7. If the planter tank is being filled from a transfer pump, open the tank ball valve by rotating tank inlet valve (A) to the opened position.
8. If an offboard tank is supplying the solution pump, open the pump ball valve by rotating the handle (B) to the opened position. If the planter tank is being filled from a transfer pump, close the pump ball valve.

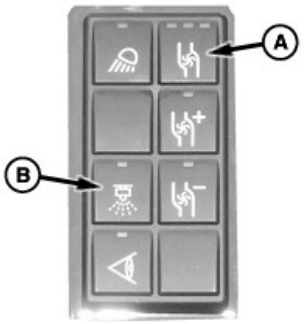


A121638—UN—05JUN24

A—Fill Port
B—Ball Valve

NOTE: Only use the transfer pump to fill the planter tank. If an offboard tank is supplying the solution pump, bypass the transfer pump.

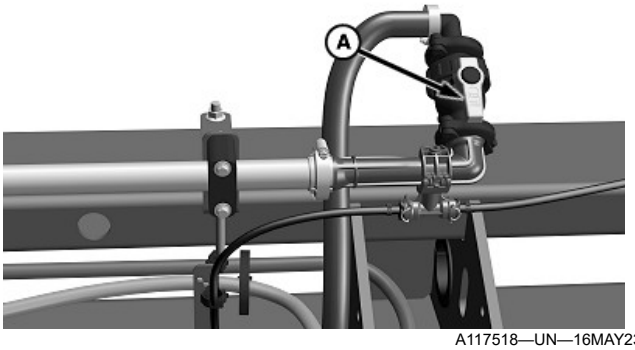
9. If using an offboard tank, connect the transfer hose to fill port (A) and open ball valve (B).



A107072—UN—18JUN20

A—Pump Button
B—Master Spray Button

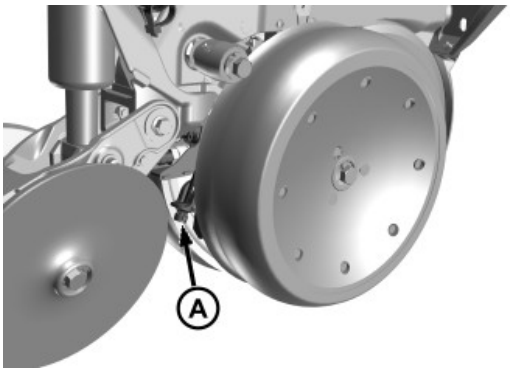
10. Turn the solution pump ON and activate the delivery system. Press pump button (A) and master spray button (B).



A117518—UN—16MAY23

A—Bleed Valve

11. One at a time, open each bleed valve (A) until there is a steady flow (no air) and then close the valve.
12. Once liquid is flowing from the delivery hoses, close the air valve and solution valve.



A118324—UN—17AUG23

A—Nozzles

13. In order to effectively prime the distribution tubes, keep pump enabled until the first and last sections have continuous flow of liquid fertilizer exiting the nozzles (A).
14. If the flow is not steady from a row, disable the pump and the valve bodies. Inspect for blockages at the rows that are not flowing correctly. Replace or repair any issues causing blockages.
15. Secondary Verification: Turn the fertilizer pump ON and leave the master spray button OFF. View the main screen. If the Apply OFF Pressure fluctuates ±35 kPa (0.5 bar) (5 psi), repeat the air removal procedure.
16. Once all the rows have a steady flow, set the target rate using the ExactShot application on the display.
17. Enable all rows on the planter.
18. Verify that the rows are applying the target rate by performing the nozzle flow check. Set the ground speed on the display. Verify the applied rate on the display. To set, adjust, or calibrate the fertilizer system, see the SeedStar Operator's Manual or Onscreen Help in the ExactShot application.
19. After the rate is verified and the solution flow is adequate, turn OFF the master spray function, then turn OFF the pump function.

h5snma9,1717765883532-19-07JUN24

Prime and Start the Fertilizer Pump with Centrally Mounted Pump—ExactShot (Offboard Tank)

Before priming, inspect the fertilizer distribution system. Verify that the strainer is clean and that there are no leaks in the pump inlet hose. Verify that there are no pinched, kinked, or otherwise restricted hoses. Inspect all the nozzle tips for debris and blockages.

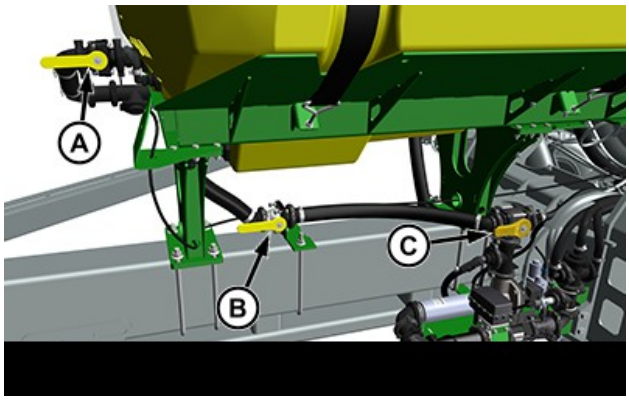
IMPORTANT: To avoid priming or suction issues, minimize restriction between the tank and the ExactRate pump. Remove the strainers between the pump and trailing tank, sharp elbows, and restrictive hosing from the tank to the pump inlet. The minimum hose size for plumbing between the tank and pump is 5 cm (2 in).

NOTE: Verify that all products are strained when filling the tank.

NOTE: Do not allow the solution pump to run dry. Verify that the air is removed from supply hoses and that the supply tank has enough liquid before priming the fertilizer system. If an offboard tank is used, bypass the transfer pump unless filling the onboard tank.

1. Unfold and park the planter on a level surface.
2. Verify that the trailing fertilizer tank or nurse tank is filled.
3. Start the tractor and enable the power generation system.

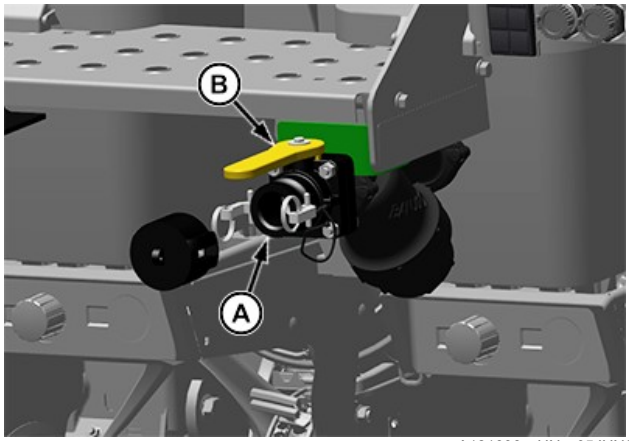
4. Using the tractor display, verify that the first and last sections of valve bodies on the planter are enabled before priming pump and the fertilizer system. (See the SeedStar Application Help on-screen for entering the pump rates or operational functions.)
5. Lower the planter into a position just above the planting position.



A121710—UN—07JUN24

A—Tank Inlet Valve
B—Tank Outlet Valve
C—Pump Valve

6. When an offboard tank is supplying the pump or transferring product to the planter tank, open the tank inlet valve (A). When operating the fertilizer system, open tank outlet valve (B). Open pump valve (C).



A121638—UN—05JUN24

A—Fill Port
B—Ball Valve

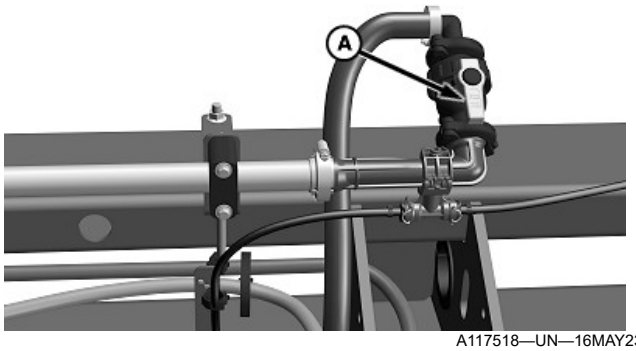
7. Connect the transfer hose from the tow-behind tank to fill port (A) and hose leading to the ExactRate pump. Rotate ball valve (B) to the open position.
8. Rotate the handle to the open position on the transfer hose of the tow-behind tank.
9. Check the connections and distribution system for leaks.



A107072—UN—18JUN20

A—Pump Button
B—Master Spray Button

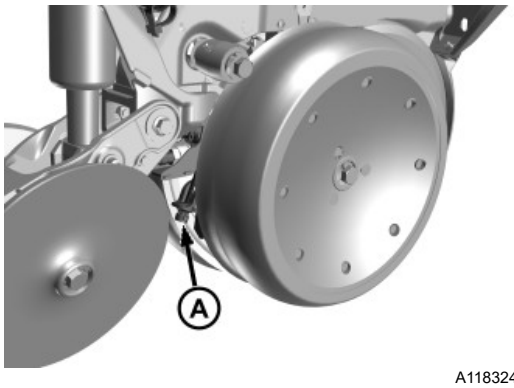
10. Using the rear keypad, depress the pump button (A) to turn the solution pump ON.
11. Using the rear keypad, depress the master spray button (B) to turn the master spray function ON.



A117518—UN—16MAY23

A—Bleed Valve

12. One at a time, open each bleed valve (A) until there is a steady flow (no air) and then close the valve.
13. Once liquid is flowing from the delivery hoses, close the air valve and solution valve.



A118324—UN—17AUG23

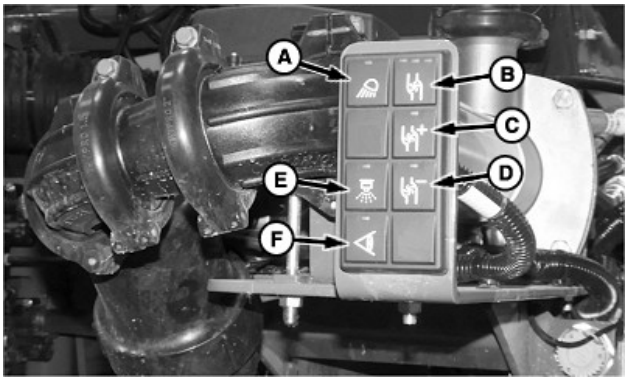
A—Nozzles

14. In order to effectively prime the distribution tubes, keep pump enabled until the first and last sections have continuous flow of liquid fertilizer exiting the nozzles (A).

15. If the flow is not steady from a row, disable the pump and the valve bodies. Inspect for blockages at the rows that are not flowing correctly. Replace or repair any issues causing blockages.
16. Secondary Verification: Turn the fertilizer pump ON and leave the master spray button OFF. View the main screen. If the Apply OFF Pressure fluctuates ±35 kPa (0.5 bar) (5 psi), repeat the air removal procedure.
17. Once all the rows have a steady flow, set the target rate using the ExactShot application on the display.
18. Enable all rows on the planter.
19. Verify that the rows are applying the target rate by performing the nozzle flow check. Set the ground speed on the display. Verify the applied rate on the display. To set, adjust, or calibrate the fertilizer system, see the SeedStar Operator's Manual or Onscreen Help in the ExactShot application.
20. After the rate is verified and the solution flow is adequate, turn OFF the master spray function, then turn OFF the pump function.

h5snma9,1717765883438-19-07JUN24

Operate or Adjust the Pump with the Keypad



A100113—UN—12MAR18

A—Not Used
B—Pump Button
C—Speed (+) Increase Button
D—Speed (-) Decrease Button
E—Master Valve Button
F—Visual Nozzle Check Button

NOTE: To enable all keypad functions, the power generation system must be turned ON. To enable fertilizer system functions, the fertilizer pump must also be turned ON.

See your SeedStar Application Help on-screen for entering the fertilizer pump rates or operational functions.

Some fertilizer pump functions are controlled either on the display or at the keypad. The keypad is at the rear of the planter near the fertilizer pump.

To turn ON or OFF the fertilizer pump, press the pump button (B). The pump button has three indicator lights above the icon on the keypad. These lights indicate the fertilizer pump speed (low=one light, medium=two lights, high=three lights).

To increase the pump speed, press the speed increase button (C).

To decrease the pump speed, press the speed decrease button (D).

NOTE: To relieve pressure in the system while the pump is OFF, enable the distribution valves using button (E).

The master valve button (E) activates all enabled distribution valves, allowing flow to every row. Use the master valve button when priming, flushing, or winterizing the system.

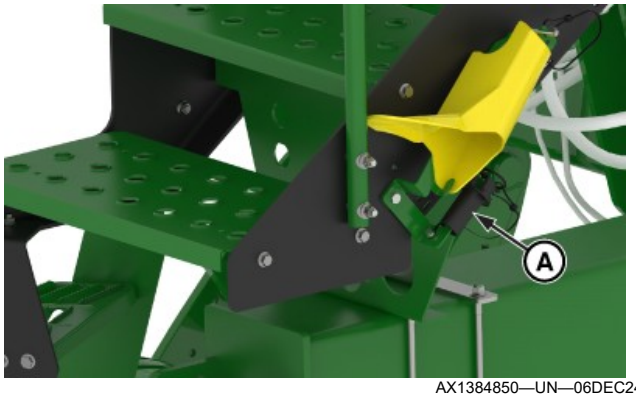
The visual nozzle check button (F) activates one section of distribution valves at a time, starting from the left side of the planter. To check for blockages, use the visual nozzle check button and observe the flow at each row in every section as they activate.

ouo6074,1684180767431-19-14MAY24

Nozzle Tip Recommendations

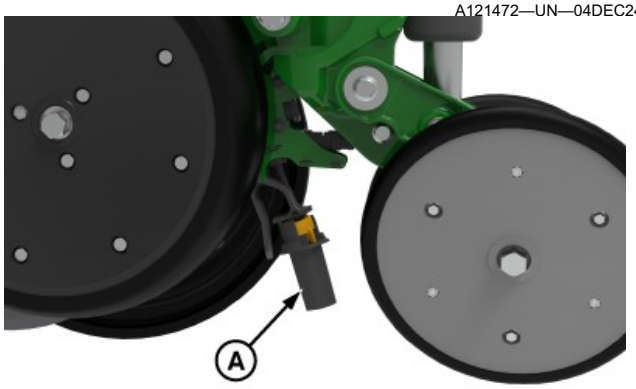


A121472—UN—04DEC24



AX1384850—UN—06DEC24

Storage Location



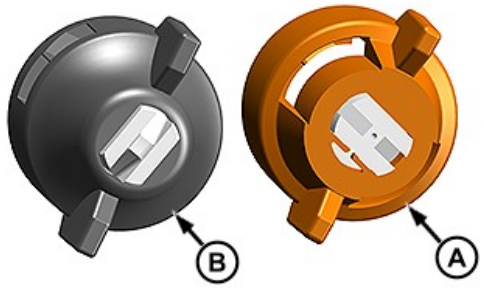
AX1384874—UN—06DEC24

Engaged with Nozzle Cap

A—Nozzle Tool
B—Gasket
C—Nozzle Tip
D—Nozzle Cap

NOTE: The nozzle tool (A) is stored near the seed meter cleanout tray. Locations vary by planter model.

Use the nozzle tool (A) when removing and installing the nozzle cap (D). Inspect the gasket (B) each time components are removed and installed.



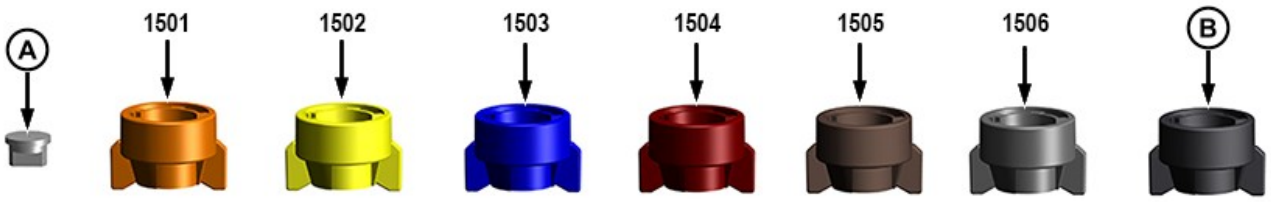
AX1385178—UN—06DEC24

Nozzle Caps and Tips

A—Cap, Standard
B—Cap, ExactRate Equivalent

IMPORTANT: The Standard caps (A) and the ExactRate equivalent caps (B) are oriented 90° from each other. The Standard tips and ExactRate equivalent tips have different spray patterns. Do not mix components and use as recommended.

Install a standard nozzle tip and cap (A) when Dosing or Continuous Fixed Pulsing or No Pulsing is selected. Refer to the standard nozzle orifice table. Install an ExactRate equivalent nozzle tip and cap (B) on the row units when ExactRate equivalent mode is selected.



A121475—UN—17MAY24

Standard Nozzle Tip and Caps

A—Nozzle Tip

Coordinate the correct nozzle tip (A) and colored cap. The tip size is stamped on the nozzle tip. Use the solid cover (B) (with gasket) when no nozzle tip is installed.

The nozzle rate tables are valid for the following configurations.

- Dosing
- Continuous: ExactRate equivalent and nozzle tip

B—Cover

- Continuous: No Pulsing with a target preset set to an application rate and standard nozzle tip

The nozzle rate tables are not valid for the following configurations. Follow the information on the screen.

- Continuous: Fixed Pulsing and standard nozzle tip
- Continuous: No Pulsing with a target preset set to a fixed pressure and standard nozzle tip

Standard Nozzle Tips (Dosing, Continuous Mode Fixed Pulsing, Continuous Mode No Pulsing)					
Orifice Size	**Nozzle Tip Stamp**	**Nozzle Tip Part Number**	**Gasket Part Number**	**Cap Part Number**	**Color**
01	1501	A134207	A136183	A136676	Orange
02	1502	A134208	A136183	A136678	Yellow
03	1503	A133921	A136183	A136289	Blue
04	1504	A133922	A136183	A136679	Red
05	1505	A133918	A136183	A136682	Brown
06	1506	A130859	A136183	A136684	Grey
Cover	---	Solid	A136183	A136685	Black

ExactRate Equivalent Nozzle Tips (Continuous Mode ExactRate)					
Orifice Size	**Nozzle Tip Stamp**	**Nozzle Tip Part Number**	**Gasket Part Number**	**Cap Part Number**	**Cap Color**
02	6502	A145666	A136183	A145663	Black
04	6504	A145667	A136183	A145663	Black
06	6506	A145668	A136183	A145663	Black
Cover	---	Solid	A136183	A136685	Black

Standard Nozzle Tips							
Specific Gravity 1.00		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
Standard 1501 Orange Cap	28.1 (3)	9.7—16.1 (6.0—10.0)	8.8—16.1 (5.5—10.0)	6.5—13.5 (4.0—8.4)	5.4—11.3 (3.4—7.0)	5.1—10.7 (3.2—6.6)	10.1—4.9 (3.0—6.3)
	37.4 (4)	7.3—15.2 (4.5—9.4)	6.6—13.8 (4.1—8.6)	4.9—10.1 (3.0—6.3)	4.1—8.4 (2.5—5.2)	3.8—8.0 (2.4—5.0)	3.6—7.6 (2.3—4.7)
	46.8 (5)	5.8—12.2 (3.6—7.5)	5.3—11.1 (3.3—6.9)	3.9—8.1 (2.4—5.0)	3.2—6.8 (2.0—4.2)	3.1—6.4 (1.9—4.0)	2.9—6.1 (1.8—3.8)

Standard Nozzle Tips							
Specific Gravity 1.00		Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size					
		Row Spacing cm (in)					
		51 cm (20 in)	56 cm (22 in)	76 cm (30 in)	91 cm (36 in)	97 cm (38 in)	102 cm (40 in)
Nozzle Tip Size Cap Color	L/ha (gal/acre)	Ground Speed Range km/h (mph)					
	56.1 (6)	4.9—10.1 (3.0—6.3)	4.4—9.2 (2.7—5.7)	3.2—6.8 (2.0—4.2)	2.7—5.6 (1.7—3.5)	2.6—5.3 (1.6—3.3)	2.4—5.1 (1.5—3.1)
	65.5 (7)	4.2—8.7 (2.6—5.4)	3.8—7.9 (2.4—4.9)	2.8—5.8 (1.7—3.6)	2.3—4.8 (1.4—3.0)	2.2—4.6 (1.4—2.8)	2.1—4.3 (1.3—2.7)
	74.8 (8)	3.6—7.6 (2.3—4.7)	3.3—6.9 (2.1—4.3)	2.4—5.1 (1.5—3.1)	2.0—4.2 (1.3—2.6)	1.9—4.0 (1.2—2.5)	1.8—3.8 (1.1—2.4)
	84.2 (9)	3.2—6.8 (2.0—4.2)	2.9—6.1 (1.8—3.8)	2.2—4.5 (1.3—2.8)	1.8—3.8 (1.1—2.3)	1.7—3.6) (1.1—2.2)	1.6—3.4 (1.0—2.1)
	93.5 (10)	2.9—6.1 (1.8—3.8)	2.7—5.5 (1.6—3.4)	1.9—4.1 (1.2—2.5)	1.6—3.4 (1.0—2.1)	1.6—3.2 (1.0—2.0)	1.6—3.0 (1.0—1.9)
Standard 1502 Yellow Cap	28.1 (3)	- - (- -)	- - (- -)	12.9—16.1 (8.0—10.0)	10.7—16.1 (6.7—10.0)	10.2—16.1 (6.3—10.0)	9.7—16.1 (6.0—10.0)
	37.4 (4)	14.5—16.1 (9.0—10.0)	13.2—16.1 (8.2—10.0)	9.7—16.1 (6.0—10.0)	8—16.1 (5.0—10.0)	7.6—15.9 (4.7—9.9)	7.2—15.1 (4.5—9.4)
	46.8 (5)	11.6—16.1 (7.2—10.0)	10.5—16.1 (6.5—10.0)	7.7—16.1 (4.8—10.0)	6.4—13.4 (4.0—8.3)	6.1—12.7 (3.8—7.9)	5.8—12.1 (3.6—7.5)
	56.1 (6)	9.7—16.1 (6.0—10.0)	8.8—16.1 (5.5—10.0)	6.4—13.4 (4.0—8.3)	5.4—11.2 (3.3—6.9)	5.1—10.6 (3.2—6.6)	4.8—10.1 (3.0—6.2)
	65.5 (7)	8.3—16.1 (5.1—10.0)	7.5—15.7 (4.7—9.7)	5.5—11.5 (3.4—7.1)	4.6—9.6 (2.9—5.9)	4.4—9.1 (2.7—5.6)	4.1—8.6 (2.6—5.4)
	74.8 (8)	7.2—15.1 (4.5—9.4)	6.6—13.7 (4.1—8.5)	4.8—10.1 (3.0—6.2)	4.0—8.4 (2.5—5.2)	3.8—7.9 (2.4—4.9)	3.6—7.5 (2.3—4.7)
	84.2 (9)	6.4—13.4 (4.0—8.3)	5.9—12.2 (3.6—7.6)	4.3—8.9 (2.7—5.6)	3.6—7.4 (2.2—4.6)	3.4—7.1 (2.1—4.4)	3.2—6.7 (2.0—4.2)
	93.5 (10)	5.8—12.1 (3.6—7.5)	5.3—11.0 (3.3—6.8)	3.9—8.0 (2.4—5.0)	3.2—6.7 (2.0—4.2)	3.1—6.3 (1.9—3.9)	2.9—6.0 (1.8—3.7)
Standard 1503 Blue Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	15.9—16.1 (9.9—10.0)	15.1—16.1 (9.4—10.0)	14.3—16.1 (8.9—10.0)
	37.4 (4)	- - (- -)	- - (- -)	14.3—16.1 (8.9—10.0)	11.9—16.1 (7.4—10.0)	11.3—16.1 (7.0—10.0)	10.7—16.1 (6.7—10.0)
	46.8 (5)	- - (- -)	15.6—16.1 (9.7—10.0)	11.4—16.1 (7.1—10.0)	9.5—16.1 (5.9—10.0)	9.0—16.1 (5.6—10.0)	8.6—16.1 (5.3—10.0)
	56.1 (6)	14.3—16.1 (8.9—10.0)	13.0—16.1 (8.1—10.0)	9.5—16.1 (5.9—10.0)	8.0—16.1 (4.9—10.0)	7.5—15.7 (4.7—9.7)	7.2—14.9 (4.4—9.3)
	65.5 (7)	12.3—16.1 (7.6—10.0)	11.2—16.1 (6.9—10.0)	8.2—16.1 (5.1—10.0)	6.8—14.2 (4.2—8.8)	6.5—13.4 (4.0—8.4)	6.1—12.8 (3.8—7.9)
	74.8 (8)	10.7—16.1 (6.7—10.0)	9.8—16.1 (6.1—10.0)	7.2—14.9 (4.4—9.3)	6.0—12.4 (3.7—7.7)	5.6—11.8 (3.5—7.3)	5.4—11.2 (3.3—6.9)
	84.2 (9)	9.5—16.1 (5.9—10.0)	8.7—16.1 (5.4—10.0)	6.4—13.2 (4.0—8.2)	5.3—11.0 (3.3—6.9)	5.0—10.5 (3.1—6.5)	4.8—9.9 (3.0—6.2)
	93.5 (10)	8.6—16.1 (5.3—10.0)	7.8—16.1 (4.9—10.0)	5.7—11.9 (3.6—7.4)	4.8—9.9 (3.0—6.2)	4.5—9.4 (2.8—5.8)	4.3—8.9 (2.7—5.6)
Standard 1504 Red Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	37.4 (4)	- - (- -)	- - (- -)	- - (- -)	15.6—16.1 (9.7—10.0)	14.8—16.1 (9.2—10.0)	14.1—16.1 (8.7—10.0)
	46.8 (5)	- - (- -)	- - (- -)	15—16.1 (9.3—10.0)	12.5—16.1 (7.8—10.0)	11.8—16.1 (7.4—10.0)	11.3—16.1 (7.0—10.0)
	56.1 (6)	- - (- -)	- - (- -)	12.5—16.1 (7.8—10.0)	10.4—16.1 (6.5—10.0)	9.9—16.1 (6.1—10.0)	9.4—16.1 (5.8—10.0)
	65.5 (7)	- - (- -)	14.6—16.1 (9.1—10.0)	10.7—16.1 (6.7—10.0)	8.9—16.1 (5.6—10.0)	8.5—16.1 (5.3—10.0)	8.0—16.1 (5.0—10.0)
	74.8 (8)	14.1—16.1 (8.7—10.0)	12.8—16.1 (7.9—10.0)	9.4—16.1 (5.8—10.0)	7.8—16.1 (4.9—10.0)	7.4—15.4 (4.6—9.6)	7.0—14.6 (4.4—9.1)

Standard Nozzle Tips							
Specific Gravity 1.00		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
	84.2 (9)	12.5—16.1 (7.8—10.0)	11.4—16.1 (7.1—10.0)	8.3—16.1 (5.2—10.0)	6.9—14.5 (4.3—9.0)	6.6—13.7 (4.1—8.5)	6.3—13.0 (3.9—8.1)
	93.5 (10)	11.3—16.1 (7.0—10.0)	10.2—16.1 (6.4—10.0)	7.5—15.6 (4.7—9.7)	6.3—13.0 (3.9—8.1)	5.9—12.3 (3.7—7.7)	5.6—11.7 (3.5—7.3)
Standard 1505 Brown Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	37.4 (4)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	46.8 (5)	- - (- -)	- - (- -)	- - (- -)	15.3—16.1 (9.5—10.0)	14.5—16.1 (9.0—10.0)	13.8—16.1 (8.6—10.0)
	56.1 (6)	- - (- -)	- - (- -)	15.3—16.1 (9.5—10.0)	12.8—16.1 (7.9—10.0)	12.1—16.1 (7.5—10.0)	11.5—16.1 (7.1—10.0)
	65.5 (7)	- - (- -)	- - (- -)	13.1—16.1 (8.2—10.0)	10.9—16.1 (6.8—10.0)	10.4—16.1 (6.4—10.0)	9.8—16.1 (6.1—10.0)
	74.8 (8)	- - (- -)	15.7—16.1 (9.7—10.0)	11.5—16.1 (7.1—10.0)	9.6—16.1 (5.9—10.0)	9.1—16.1 (5.6—10.0)	8.6—16.1 (5.4—10.0)
	84.2 (9)	15.3—16.1 (9.5—10.0)	13.9—16.1 (8.7—10.0)	10.2—16.1 (6.3—10.0)	8.5—16.1 (5.3—10.0)	8.1—16.1 (5.0—10.0)	7.7—15.9 (4.8—9.9)
	93.5 (10)	13.8—16.1 (8.6—10.0)	12.5—16.1 (7.8—10.0)	9.2—16.1 (5.7—10.0)	7.7—15.9 (4.8—9.9)	7.3—15.1 (4.5—9.4)	6.9—14.3 (4.3—8.9)
Standard 1506 Grey Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	37.4 (4)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	46.8 (5)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	56.1 (6)	- - (- -)	- - (- -)	- - (- -)	14.9—16.1 (9.3—10.0)	14.2—16.1 (8.8—10.0)	13.5—16.1 (8.4—10.0)
	65.5 (7)	- - (- -)	- - (- -)	15.4—16.1 (9.6—10.0)	12.8—16.1 (8.0—10.0)	12.1—16.1 (7.5—10.0)	11.5—16.1 (7.2—10.0)
	74.8 (8)	- - (- -)	- - (- -)	13.5—16.1 (8.4—10.0)	11.2—16.1 (7.0—10.0)	10.6—16.1 (6.6—10.0)	10.1—16.1 (6.3—10.0)
	84.2 (9)	- - (- -) - -	- - (- -)	12.0—16.1 (7.4—10.0)	10.0—16.1 (6.2—10.0)	9.4—16.1 (5.9—10.0)	9.0—16.1 (5.6—10.0)
	93.5 (10)	- - (- -)	14.7—16.1 (9.1—10.0)	10.8—16.1 (6.7—10.0)	9.0—16.1 (5.6—10.0)	8.5—16.1 (5.3—10.0)	8.1—16.1 (5.0—10.0)

ExactRate Equivalent Nozzle Tips							
Specific Gravity 1.00		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
ExactRate Equivalent 6502 Black Cap	Recommendation When Using the ExactRate Equivalent Tip						
	18.7 (2)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	28.1 (3)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.6 (3.0—9.7)	4.8—14.8 (3.0—9.2)	4.8—14.0 (3.0—8.7)

ExactRate Equivalent Nozzle Tips							
Specific Gravity 1.00		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
	37.4 (4)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—14.0 (3.0—8.7)	4.8—11.7 (3.0—7.3)	4.8—11.1 (3.0—6.9)	4.8—10.5 (3.0—6.5)
	46.8 (5)	4.8—16.1 (3.0—10)	4.8—15.3 (3.0—9.5)	4.8—11.3 (3.0—7.0)	4.8—9.3 (3.0—5.8)	4.8—8.9 (3.0—5.5)	4.8—8.4 (3.0—5.2)
	56.1 (6)	4.8—14.0 (3.0—8.7)	4.8—12.7 (3.0—7.9)	4.8—9.3 (3.0—5.8)	4.8—7.7 (3.0—4.8)	4.8—7.4 (3.0—4.6)	4.8—6.9 (3.0—4.3)
	65.5 (7)	4.8—12.1 (3.0—7.5)	4.8—10.9 (3.0—6.8)	4.8—8.0 (3.0—5.0)	4.8—6.6 (3.0—4.1)	4.8—6.3 (3.0—3.9)	4.8—6.0 (3.0—3.7)
	74.8 (8)	4.8—10.5 (3.0—6.5)	4.8—9.5 (3.0—5.9)	4.8—6.9 (3.0—4.3)	4.8—5.8 (3.0—3.6)	4.8—5.5 (3.0—3.4)	4.8—5.1 (3.0—3.2)
	84.2 (9)	4.8—10.5 (3.0—6.5)	4.8—9.5 (3.0—5.9)	4.8—6.9 (3.0—4.3)	4.8—5.6 (3.0—3.5)	4.8—5.1 (3.0—3.2)	-- (--)
	93.5 (10)	4.8—10.5 (3.0—6.5)	4.8—9.5 (3.0—5.9)	4.8—6.9 (3.0—4.3)	4.8—5.5 (3.0—3.4)	4.8—5.0 (3.0—3.1)	4.8—4.8 (3.0—3.0)
ExactRate Equivalent 6504 Black Cap	Recommendation When Using the ExactRate Equivalent Tip						
	18.7 (2)	4.8—11.1 (3.0—6.9)	4.8—11.6 (3.0—7.2)	4.8—15.0 (3.0—9.3)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	28.1 (3)	4.8—15.0 (3.0—9.3)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	37.4 (4)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	46.8 (5)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	56.1 (6)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.1 (3.0—9.4)	4.8—14.3 (3.0—8.9)	4.8—13.7 (3.0—8.5)
	65.5 (7)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.6 (3.0—9.7)	4.8—13.0 (3.0—8.1)	4.8—12.4 (3.0—7.7)	4.8—11.7 (3.0—7.3)
	74.8 (8)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—13.7 (3.0—8.5)	4.8—11.4 (3.0—7.1)	4.8—10.8 (3.0—6.7)	4.8—10.3 (3.0—6.4)
	84.2 (9)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—13.7 (3.0—8.5)	4.8—11.4 (3.0—7.1)	4.8—10.8 (3.0—6.7)	4.8—10.3 (3.0—6.4)
	93.5 (10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—13.7 (3.0—8.5)	4.8—11.4 (3.0—7.1)	4.8—10.8 (3.0—6.7)	4.8—10.3 (3.0—6.4)
ExactRate Equivalent 6506 Black Cap	Recommendation When Using the ExactRate Equivalent Tip						
	18.7 (2)	4.8—10.3 (3.0—6.4)	4.8—10.5 (3.0—6.5)	4.8—11.4 (3.0—7.1)	4.8—12.4 (3.0—7.7)	4.8—12.9 (3.0—8.0)	4.8—13.5 (3.0—8.4)
	28.1 (3)	4.8—11.4 (3.0—7.1)	4.8—11.7 (3.0—7.3)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	37.4 (4)	4.8—13.5 (3.0—8.4)	4.8—15.8 (3.0—9.8)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	46.8 (5)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	56.1 (6)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	65.5 (7)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	74.8 (8)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.4 (3.0—9.6)	4.8—14.8 (3.0—9.2)
	84.2 (9)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.4 (3.0—9.6)	4.8—14.8 (3.0—9.2)
	93.5 (10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.4 (3.0—9.6)	4.8—14.8 (3.0—9.2)

Standard Nozzle Tips							
Specific Gravity 1.20		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
Standard 1501 Orange Cap	28.1 (3)	8.9—16.1 (5.5—10.0)	8.1—16.1 (5.0—10.0)	5.9—12.3 (3.7—7.7)	4.9—10.3 (3.1—6.4)	4.7—9.7 (2.9—6.0)	4.4—9.2 (2.8—5.7)
	37.4 (4)	6.7—13.9 (4.1—8.6)	6.1—12.6 (3.8—7.8)	4.4—9.2 (2.8—5.7)	3.7—7.7 (2.3—4.8)	3.5—7.3 (2.2—4.5)	3.3—6.9 (2.1—4.3)
	46.8 (5)	5.3—11.1 (3.3—6.9)	4.8—10.1 (3.0—6.3)	3.6—7.4 (2.2—4.6)	3.0—6.2 (1.8—3.8)	2.8—5.8 (1.7—3.6)	2.7—5.5 (1.7—3.4)
	56.1 (6)	4.4—9.2 (2.8—5.7)	4.0—8.4 (2.5—5.2)	3.0—6.2) (1.8—3.8)	2.5—5.1 (1.5—3.2)	2.3—4.9 (1.5—3.0)	2.2—4.6 (1.4—2.9)
	65.5 (7)	3.8—7.9 (2.4—4.9)	3.5—7.2 (2.2—4.5)	2.5—5.3 (1.6—3.3)	2.1—4.4 (1.3—2.7)	2.0—4.2 (1.2—2.6)	1.9—4.0 (1.2—2.5)
	74.8 (8)	3.3—6.9 (2.1—4.3)	3.0—6.3 (1.9—3.9)	2.2—4.6 (1.4—2.9)	2.9—3.9 (1.2—2.4)	1.8—3.6 (1.1—2.3)	1.7—3.5 (1.0—2.2)
	84.2 (9)	3.0—6.2 (1.8—3.8)	2.7—5.6 (1.7—3.5)	2.0—4.1 (1.2—2.6)	1.6—3.4 (1.0—2.1)	1.6—3.2 (1.0—2.0)	1.6—3.1 (1.0—1.9)
	93.5 (10)	2.7—5.5) (1.7—3.4)	2.4—5.0 (1.5—3.1)	1.8—3.7 (1.1—2.3)	1.6—3.1 (1.0—1.9)	1.6—2.9 (1.0—1.8)	1.6—2.8 (1.0—1.7)
Standard 1502 Yellow Cap	28.1 (3)	- - (- -)	- - (- -)	11.8—16.1 (7.3—10.0)	9.8—16.1 (6.1—10.0)	9.3—16.1 (5.8—10.0)	8.8—16.1 (5.5—10.0)
	37.4 (4)	13.2—16.1 (8.2—10.0)	12.0—16.1 (7.5—10.0)	8.8—16.1 (5.5—10.0)	7.3—15.3 (4.6—9.5)	7.0—14.5 (4.3—9.0)	6.6—13.8 (4.1—8.6)
	46.8 (5)	10.6—16.1 (6.6—10.0)	9.6—16.1 (6.0—10.0)	7.1—14.7 (4.4—9.1)	5.9—12.2 (3.7—7.6)	5.6—11.6 (3.5—7.2)	5.3—11.0 (3.3—6.8)
	56.1 (6)	8.8—16.1 (5.5—10.0)	8.0—16.1 (5.0—10.0)	5.9—12.2 (3.7—7.6)	4.9—10.2 (3.0—6.3)	4.6—9.7 (2.9—6.0)	4.4—9.2 (2.7—5.7)
	65.5 (7)	7.6—15.7 (4.7—9.8)	6.9—14.3 (4.3—8.9)	5.0—10.5 (3.1—6.5)	4.2—8.7 (2.6—5.4)	4.0—8.3 (2.5—5.1)	3.8—7.9 (2.3—4.9)
	74.8 (8)	6.6—13.8 (4.1—8.6)	6.0—12.5 (3.7—7.8)	4.4—9.2 (2.7—5.7)	3.7—7.6 (2.3—4.8)	3.5—7.2 (2.2—4.5)	3.3—6.9 (2.1—4.3)
	84.2 (9)	5.9—12.2 (3.7—7.6)	5.3—11.1 (3.3—6.9)	3.9—8.2 (2.4—5.1)	3.3—6.8 (2.0—4.2)	3.1—6.4 (1.9—4.0)	2.9—6.1) (1.8—3.8)
	93.5 (10)	5.3—11.0 (3.3—6.8)	4.8—10.0 (3.0—6.2)	3.5—7.3) (2.2—4.6)	2.9—6.1) (1.8—3.8)	2.8—5.8 (1.7—3.6)	2.6—5.5 (1.6—3.4)
Standard 1503 Blue Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	14.5—16.1 (9.0—10.0)	13.8—16.1 (8.5—10.0)	13.1—16.1 (8.1—10.0)
	37.4 (4)	- - (- -)	- - (- -)	13.1—16.1 (8.1—10.0)	10.9—16.1 (6.8—10.0)	10.3—16.1 (6.4—10.0)	9.8—16.1 (6.1—10.0)
	46.8 (5)	15.7—16.1 (9.7—10.0)	14.3—16.1 (8.9—10.0)	10.5—16.1 (6.5—10.0)	8.7—16.1 (5.4—10.0)	8.3—16.1 (5.1—10.0)	7.8—16.1 (4.9—10.0)
	56.1 (6)	13.1—16.1 (8.1—10.0)	11.9—16.1 (7.4—10.0)	8.7—16.1 (5.4—10.0)	7.3—15.1 (4.5—9.4)	6.9—14.3 (4.3—8.9)	6.5—13.6 (4.1—8.4)
	65.5 (7)	11.2—16.1 (7.0—10.0)	10.2—16.1 (6.3—10.0)	7.5—15.5 (4.6—9.7)	6.2—12.9 (3.9—8.0)	5.9—12.3 (3.7—7.6)	5.6—11.7 (3.5—7.2)
	74.8 (8)	9.8—16.1 (6.1—10.0)	8.9—16.1 (5.5—10.0)	6.5—13.6 (4.1—8.4)	5.4—11.3 (3.4—7.0)	5.2—10.7 (3.2—6.7)	4.9—10.2 (3.0—6.3)
	84.2 (9)	8.7—16.1 (5.4—10.0)	7.9—16.1 (4.9—10.0)	5.8—12.1 (3.6—7.5)	4.8—10.1 (3.0—6.3)	4.6—9.5 (2.8—5.9)	4.4—9.1 (2.7—5.6)
	93.5 (10)	7.8—16.1 (4.9—10.0)	7.1—14.8 (4.4—9.2)	5.2—10.9 (3.2—6.8)	4.4—9.1 (2.7—5.6)	4.1—8.6 (2.6—5.3)	3.9—8.2 (2.4—5.1)
Standard 1504 Red Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	37.4 (4)	- - (- -)	- - (- -)	- - (- -)	14.3—16.1 (8.9—10.0)	13.5—16.1 (8.4—10.0)	12.8—16.1 (8.0—10.0)
	46.8 (5)	- - (- -)	- - (- -)	13.7—16.1 (8.5—10.0)	11.4—16.1 (7.1—10.0)	10.8—16.1 (6.7—10.0)	10.3—16.1 (6.4—10.0)

Standard Nozzle Tips							
Specific Gravity 1.20		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
	56.1 (6)	- - (- -)	15.6—16.1 (9.7—10.0)	11.4—16.1 (7.1—10.0)	9.5—16.1 (5.9—10.0)	9.0—16.1 (5.6—10.0)	8.6—16.1 (5.3—10.0)
	65.5 (7)	14.7—16.1 (9.1—10.0)	13.3—16.1 (8.3—10.0)	9.8—16.1 (6.1—10.0)	8.2—16.1 (5.1—10.0)	7.7—16.1 (4.8—10.0)	7.3—15.3 (4.6—9.5)
	74.8 (8)	12.8—16.1 (8.0 — 10.0)	11.7—16.1 (7.3—10.0)	8.6 — 16.1 (5.3 — 10.0)	7.1 — 14.9 (4.4 — 9.2)	6.8 — 14. (4.2 — 8.7)	6.4 — 13.4 (4.0 — 8.3)
	84.2 (9)	11.4 — 16.1 (7.1 — 10.0)	10.4—16.1 (6.5—10.0)	7.6 — 15.8 (4.7 — 9.8)	6.3 — 13.2 (3.9 — 8.2)	6 — 12.5 (3.7 — 7.8)	5.7 — 11.9 (3.5 — 7.4)
	93.5 (10)	10.3 — 16.1 (6.4 — 10.0)	9.3—16.1 (5.8—10.0)	6.9 — 14.3 (4.3 — 8.9)	5.7 — 11.9 (3.5 — 7.4)	5.4 — 11.3 (3.4 — 7.0)	5.1 — 10.7 (3.2 — 6.6)
Standard 1505 Brown Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	37.4 (4)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	15.7—16.1 (9.8—10.0)
	46.8 (5)	- - (- -)	- - (- -)	- - (- -)	14.0—16.1 (8.7—10.0)	13.2—16.1 (8.2—10.0)	12.6—16.1 (7.8—10.0)
	56.1 (6)	- - (- -)	- - (- -)	14.0—16.1 (8.7—10.0)	11.6—16.1 (7.2—10.0)	11.0—16.1 (6.9—10.0)	10.5—16.1 (6.5—10.0)
	65.5 (7)	- - (- -)	- - (- -)	12—16.1 (7.4—10.0)	10—16.1 (6.2—10.0)	9.5—16.1 (5.9—10.0)	9.0—16.1 (5.6—10.0)
	74.8 (8)	15.7—16.1 (9.8—10.0)	14.3—16.1 (8.9—10.0)	10.5—16.1 (6.5—10.0)	8.7—16.1 (5.4—10.0)	8.3—16.1 (5.1—10.0)	7.9—16.1 (4.9—10.0)
	84.2 (9)	14.0—16.1 (8.7—10.0)	12.7—16.1 (7.9—10.0)	9.3—16.1 (5.8—10.0)	7.8—16.1 (4.8—10.0)	7.4—15.3 (4.6—9.5)	7.0—14.6 (4.3—9.0)
	93.5 (10)	12.6—16.1 (7.8—10.0)	11.4—16.1 (7.1—10.0)	8.4—16.1 (5.2—10.0)	7.0—14.6 (4.3—9.0)	6.6—13.8 (4.1—8.6)	6.3—13.1 (3.9—8.1)
Standard 1506 Grey Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	37.4 (4)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	46.8 (5)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	15.5—16.1 (9.6—10.0)	14.7—16.1 (9.2—10.0)
	56.1 (6)	- - (- -)	- - (- -)	- - (- -)	13.6—16.1 (8.5—10.0)	12.9—16.1 (8.0—10.0)	12.3—16.1 (7.6—10.0)
	65.5 (7)	- - (- -)	- - (- -)	14—16.1 (8.7—10.0)	11.7—16.1 (7.3—10.0)	11.1—16.1 (6.9—10.0)	10.5—16.1 (6.5—10.0)
	74.8 (8)	- - (- -)	- - (- -)	12.3—16.1 (7.6—10.0)	10.2—16.1 (6.4—10.0)	9.7—16.1 (6.0—10.0)	9.2—16.1 (5.7—10.0)
	84.2 (9)	- - (- -)	14.9—16.1 (9.2—10.0)	10.9—16.1 (6.8—10.0)	9.1—16.1 (5.7—10.0)	8.6—16.1 (5.4—10.0)	8.2—16.1 (5.1—10.0)
	93.5 (10)	14.7—16.1 (9.2—10.0)	13.4—16.1 (8.3—10.0)	9.8—16.1 (6.1—10.0)	8.2—16.1 (5.1—10.0)	7.8—16.1 (4.8—10.0)	7.4—15.3 (4.6—9.5)

ExactRate Equivalent Nozzle Tips							
Specific Gravity 1.20		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
ExactRate Equivalent 6502 Black Cap	Recommendation When Using the ExactRate Equivalent Tip						
	18.7 (2)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	28.1 (3)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—14.3 (3.0—8.9)	4.8—13.5 (3.0—8.4)	4.8—12.9 (3.0—8.0)
	37.4 (4)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—12.9 (3.0—8.0)	4.8—10.8 (3.0—6.7)	4.8—10.1 (3.0—6.3)	4.8—9.7 (3.0—6.0)
	46.8 (5)	4.8—15.4 (3.0—9.6)	4.8—14.0 (3.0—8.7)	4.8—10.3 (3.0—6.4)	4.8—8.5 (3.0—5.3)	4.8—8.0 (3.0—5.0)	4.8—7.7 (3.0—4.8)
	56.1 (6)	4.8—12.9 (3.0—8.0)	4.8—11.7 (3.0—7.3)	4.8—8.5 (3.0—5.3)	4.8—7.1 (3.0—4.4)	4.8—6.8 (3.0—4.2)	4.8—6.4 (3.0—4.0)
	65.5 (7)	4.8—10.9 (3.0—6.8)	4.8—10.0 (3.0—6.2)	4.8—7.2 (3.0—4.5)	4.8—6.1 (3.0—3.8)	4.8—5.8 (3.0—3.6)	4.8—5.5 (3.0—3.4)
	74.8 (8)	4.8—9.7 (3.0—6.0)	4.8—8.7 (3.0—5.4)	4.8—6.4 (3.0—4.0)	4.8—5.3 (3.0—3.3)	4.8—5.0 (3.0—3.1)	4.8—4.8 (3.0—3.0)
	84.2 (9)	4.8—9.7 (3.0—6.0)	4.8—8.7 (3.0—5.4)	4.8—4.7 (3.0—2.9)	4.8—5.1 (3.0—3.2)	4.8—5.0 (3.0—3.1)	4.8—4.8 (3.0—3.0)
	93.5 (10)	4.8—9.7 (3.0—6.0)	4.8—8.7 (3.0—5.4)	4.8—6.1 (3.0—3.8)	4.8—4.8 (3.0—3.0)	-- (--)	-- (--)
ExactRate Equivalent 6504 Black Cap	Recommendation When Using the ExactRate Equivalent Tip						
	18.7 (2)	4.8—11.6 (3.0—7.2)	4.8—12.1 (3.0—7.5)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	28.1 (3)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	37.4 (4)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	46.8 (5)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.8 (3.0—9.8)	4.8—15.0 (3.0—9.3)
	56.1 (6)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—13.8 (3.0—8.6)	4.8—13.2 (3.0—8.2)	4.8—12.6 (3.0—7.8)
	65.5 (7)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—14.3 (3.0—8.9)	4.8—11.9 (3.0—7.4)	4.8—11.3 (3.0—7.0)	4.8—10.6 (3.0—6.6)
	74.8 (8)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—12.6 (3.0—7.8)	4.8—10.5 (3.0—6.5)	4.8—9.8 (3.0—6.1)	4.8—9.3 (3.0—5.8)
	84.2 (9)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—12.6 (3.0—7.8)	4.8—10.5 (3.0—6.5)	4.8—9.8 (3.0—6.1)	4.8—9.3 (3.0—5.8)
	93.5 (10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—12.6 (3.0—7.8)	4.8—10.5 (3.0—6.5)	4.8—9.8 (3.0—6.1)	4.8—9.3 (3.0—5.8)
ExactRate Equivalent 6506 Black Cap	Recommendation When Using the ExactRate Equivalent Tip						
	18.7 (2)	4.8—10.5 (3.0—6.5)	4.8—10.6 (3.0—6.6)	4.8—11.7 (3.0—7.3)	4.8—13.4 (3.0—8.3)	4.8—14.2 (3.0—8.8)	4.8—15.6 (3.0—9.7)
	28.1 (3)	4.8—11.7 (3.0—7.3)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	37.4 (4)	4.8—15.6 (3.0—9.7)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	46.8 (5)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	56.1 (6)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	65.5 (7)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.4 (3.0—9.6)
	74.8 (8)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.0 (3.0—9.3)	4.8—14.2 (3.0—8.8)	4.8—13.5 (3.0—8.4)

ExactRate Equivalent Nozzle Tips							
Specific Gravity 1.20		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
	84.2 (9)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.0 (3.0—9.3)	4.8—14.2 (3.0—8.8)	4.8—13.5 (3.0—8.4)
	93.5 (10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.0 (3.0—9.3)	4.8—14.2 (3.0—8.8)	4.8—13.5 (3.0—8.4)

Standard Nozzle Tips							
Specific Gravity 1.30		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
Standard 1501 Orange Cap	28.1 (3)	8.5—16.1 (5.3—10.0)	7.8—16.1 (4.8—10.0)	5.7—11.8 (3.5—7.4)	4.7—9.9 (2.9—6.1)	4.5—9.4 (2.8—5.8)	4.3—8.9 (2.7—5.5)
	37.4 (4)	6.4—13.3 (4.0—8.3)	5.8—12.1 (3.6—7.5)	4.3—8.9 (2.7—5.5)	3.6—7.4 (2.2—4.6)	3.4—7 (2.1—4.4)	3.2—6.7 (2.0—4.1)
	46.8 (5)	5.1—10.7 (3.2—6.6)	4.7—9.7 (2.9—6.0)	3.4—7.1 (2.1—4.4)	2.8—5.9 (1.8—3.7)	2.7—5.6 (1.7—3.5)	2.6—5.3 (1.6—3.3)
	56.1 (6)	4.3—8.9 (2.7—5.5)	3.9—8.1 (2.4—5.0)	2.8—5.9 (1.8—3.7)	2.4—4.9 (1.5—3.1)	2.2—4.7 (1.4—2.9)	2.1—4.4 (1.3—2.8)
	65.5 (7)	3.7—7.6 (2.3—4.7)	3.3—6.9 (2.1—4.3)	2.4—5.1 (1.5—3.2)	2.0—4.2 (1.3—2.6)	1.9—4.0 (1.2—2.5)	1.8—3.8 (1.1—2.4)
	74.8 (8)	3.2—6.7 (2.0—4.1)	2.9—6.1 (1.8—3.8)	2.1—4.4 (1.3—2.8)	1.8—3.7 (1.1—2.3)	1.7—3.5 (1.0—2.2)	1.6—3.3 (1.0—2.1)
	84.2 (9)	2.8—5.9 (1.8—3.7)	2.6—5.4 (1.6—3.3)	1.9—3.9 (1.2—2.5)	1.6—3.3 (1.0—2.0)	1.6—3.1 (1.0—1.9)	1.6—3.0 (1.0—1.8)
	93.5 (10)	2.6—5.3 (1.6—3.3)	2.3—4.8 (1.4—3.0)	1.7—3.6 (1.1—2.2)	1.6—3.0 (1.0—1.8)	1.6—2.8 (1.0—1.7)	1.6—2.7 (1.0—1.7)
Standard 1502 Yellow Cap	28.1 (3)	- -	15.4—16.1 (9.6—10.0)	11.3—16.1 (7.0—10.0)	9.4—16.1 (5.8—10.0)	8.9—16.1 (5.5—10.0)	8.5—16.1 (5.3—10.0)
	37.4 (4)	12.7—16.1 (7.9—10.0)	11.6—16.1 (7.2—10.0)	8.5—16.1 (5.3—10.0)	7.1—14.7 (4.4—9.1)	6.7—13.9 (4.2—8.7)	6.4—13.2 (3.9—8.2)
	46.8 (5)	10.2—16.1 (6.3—10.0)	9.2—16.1 (5.7—10.0)	6.8—14.1 (4.2—8.8)	5.6—11.8 (3.5—7.3)	5.4—11.1 (3.3—6.9)	5.1—10.6 (3.2—6.6)
	56.1 (6)	8.5—16.1 (5.3—10.0)	7.7—16.0 (4.8—10.0)	5.6—11.8 (3.5—7.3)	4.7—9.8 (2.9—6.1)	4.5—9.3 (2.8—5.8)	4.2—8.8 (2.6—5.5)
	65.5 (7)	7.3—15.1 (4.5—9.4)	6.6—13.7 (4.1—8.5)	4.8—10.1 (3.0—6.3)	4.0—8.4 (2.5—5.2)	3.8—8.0 (2.4—4.9)	3.6—7.6 (2.3—4.7)
	74.8 (8)	6.4—13.2 (3.9—8.2)	5.8—12.0 (3.6—7.5)	4.2—8.8 (2.6—5.5)	3.5—7.3 (2.2—4.6)	3.3—7.0 (2.1—4.3)	3.2—6.6 (2.0—4.1)
	84.2 (9)	5.6—11.8 (3.5—7.3)	5.1—10.7 (3.2—6.6)	3.8—7.8 (2.3—4.9)	3.1—6.5 (1.9—4.1)	3.0—6.2 (1.8—3.8)	2.8—5.9 (1.8—3.7)
	93.5 (10)	5.1—10.6 (3.2—6.6)	4.6—9.6 (2.9—6.0)	3.4—7.1 (2.1—4.4)	2.8—5.9 (1.8—3.7)	2.7—5.6 (1.7—3.5)	2.5—5.3 (1.6—3.3)
Standard 1503 Blue Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	13.9—16.1 (8.7—10.0)	13.2—16.1 (8.2—10.0)	12.6—16.1 (7.8—10.0)
	37.4 (4)	- - (- -)	- - (- -)	12.6—16.1 (7.8—10.0)	10.5—16.1 (6.5—10.0)	9.9—16.1 (6.2—10.0)	9.4—16.1 (5.8—10.0)
	46.8 (5)	15.1—16.1 (9.4—10.0)	13.7—16.1 (8.5—10.0)	10.0—16.1 (6.2—10.0)	8.4—16.1 (5.2—10.0)	7.9—16.1 (4.9—10.0)	7.5—15.7 (4.7—9.7)

Standard Nozzle Tips							
Specific Gravity 1.30		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
	56.1 (6)	12.6—16.1 (7.8—10.0)	11.4—16.1 (7.1—10.0)	8.4—16.1 (5.2—10.0)	7.0—14.5 (4.3—9.0)	6.6—13.8 (4.1—8.5)	6.3—13.1 (3.9—8.1)
	65.5 (7)	10.8—16.1 (6.7—10.0)	9.8—16.1 (6.1—10.0)	7.2—14.9 (4.5—9.3)	6.0—12.4 (3.7—7.7)	5.7—11.8 (3.5—7.3)	5.4—11.2 (3.3—7.0)
	74.8 (8)	9.4—16.1 (5.8—10.0)	8.6—16.1 (5.3—10.0)	6.3—13.1 (3.9—8.1)	5.2—10.9 (3.2—6.8)	5.0—10.3 (3.1—6.4)	4.7—9.8 (2.9—6.1)
	84.2 (9)	8.4—16.1 (5.2—10.0)	7.6—15.8 (4.7—9.8)	5.6—11.6 (3.5—7.2)	4.6—9.7 (2.9—6.0)	4.4—9.2 (2.7—5.7)	4.2—8.7 (2.6—5.4)
	93.5 (10)	7.5—15.7 (4.7—9.7)	6.8—14.3 (4.3—8.9)	5.0—10.5 (3.1—6.5)	4.2—8.7 (2.6—5.4)	4.0—8.3 (2.5—5.1)	3.8—7.8 (2.3—4.9)
Standard 1504 Red Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	37.4 (4)	- - (- -)	- - (- -)	- - (- -)	13.7—16.1 (8.5—10.0)	13.0—16.1 (8.1—10.0)	12.3—16.1 (7.7—10.0)
	46.8 (5)	- - (- -)	- - (- -)	13.2—16.1 (8.2—10.0)	11.0—16.1 (6.8—10.0)	10.4—16.1 (6.5—10.0)	9.9—16.1 (6.1—10.0)
	56.1 (6)	- - (- -)	15.0—16.1 (9.3—10.0)	11.0—16.1 (6.8—10.0)	9.1—16.1 (5.7—10.0)	8.7—16.1 (5.4—10.0	8.2—16.1 (5.1—10.0)
	65.5 (7)	14.1—16.1 (8.8—10.0)	12.8—16.1 (8.0—10.0)	9.4—16.1 (5.8—10.0)	7.8—16.1 (4.9—10.0)	7.4—15.5 (4.6—9.6)	7.1—14.7 (4.4—9.1)
	74.8 (8)	12.3—16.1 (7.7—10.0)	11.2—16.1 (7.0—10.0)	8.2—16.1 (5.1—10.0)	6.9—14.3 (4.3—8.9)	6.5—13.5 (4.0—8.4)	6.2—12.8 (3.8—8.0)
	84.2 (9)	11.0—16.1 (6.8—10.0)	10.0—16.1 (6.2—10.0)	7.3—15.2 (4.5—9.5)	6.1—12.7 (3.8—7.9)	5.8—12.0 (3.6—7.5)	5.5—11.4 (3.4—7.1)
	93.5 (10)	9.9—16.1 (6.1—10.0)	9.0—16.1 (5.6—10.0)	6.6—13.7 (4.1—8.5)	5.5—11.4 (3.4—7.1)	5.2—10.8 (3.2—6.7)	4.9—10.3 (3.1—6.4)
Standard 1505 Brown Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	37.4 (4)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	15.9—16.1 (9.9—10.0)	15.1—16.1 (9.4—10.0)
	46.8 (5)	- - (- -)	- - (- -)	- - (- -)	13.4—16.1 (8.3—10.0)	12.7—16.1 (7.9—10.0)	12.1—16.1 (7.5—10.0)
	56.1 (6)	- - (- -)	- - (- -)	13.4—16.1 (8.3—10.0)	11.2—16.1 (7.0—10.0)	10.6—16.1 (6.6—10.0)	10.1—16.1 (6.3—10.0)
	65.5 (7)	- - (- -)	15.7—16.1 (9.8—10.0)	11.5—16.1 (7.2—10.0)	9.6—16.1 (6.0—10.0)	9.1—16.1 (5.6—10.0)	8.6—16.1 (5.4—10.0)
	74.8 (8)	15.1—16.1 (9.4—10.0)	13.7—16.1 (8.5—10.0)	10.1—16.1 (6.3—10.0)	8.4—16.1 (5.2—10.0)	8.0—16.1 (4.9—10.0)	7.6—15.7 (4.7—9.8)
	84.2 (9)	13.4—16.1 (8.3—10.0)	12.2—16.1 (7.6—10.0)	9.0—16.1 (5.6—10.0)	7.5—15.5 (4.6—9.7)	7.1—14.7 (4.4—9.1)	6.7—14.0 (4.2—8.7)
	93.5 (10)	12.1—16.1 (7.5—10.0)	11.0—16.1 (6.8—10.0)	8.1—16.1 (5.0—10.0)	6.7—14.0 (4.2—8.7)	6.4—13.2 (4.0—8.2)	6.0—12.6 (3.8—7.8)
Standard 1506 Grey Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	37.4 (4)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	46.8 (5)	- - (- -)	- - (- -)	- - (- -)	15.7—16.1 (9.8—10.0)	14.9—16.1 (9.3—10.0)	14.2—16.1 (8.8—10.0)
	56.1 (6)	- - (- -)	- - (- -)	15.7—16.1 (9.8—10.0)	13.1—16.1 (8.1—10.0)	12.4—16.1 (7.7—10.0)	11.8—16.1 (7.3—10.0)
	65.5 (7)	- - (- -)	- - (- -)	13.5—16.1 (8.4—10.0)	11.2—16.1 (7.0—10.0)	10.6—16.1 (6.6—10.0)	10.1—16.1 (6.3—10.0)
	74.8 (8)	- - (- -)	- - (- -)	11.8—16.1 (7.3—10.0)	9.8—16.1 (6.1—10.0)	9.3—16.1 (5.8—10.0)	8.8—16.1 (5.5—10.0)

Standard Nozzle Tips							
Specific Gravity 1.30		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
	84.2 (9)	15.7—16.1 (9.8—10.0)	14.3—16.1 (8.9—10.0)	10.5—16.1 (6.5—10.0)	8.7—16.1 (5.4—10.0)	8.3—16.1 (5.1—10.0)	7.9—16.1 (4.9—10.0)
	93.5 (10)	14.2—16.1 (8.8—10.0)	12.9—16.1 (8.0—10.0)	9.4—16.1 (5.9—10.0)	7.9—16.1 (4.9—10.0)	7.5—15.5 (4.6—9.6)	7.1—14.7 (4.4—9.2)

Standard Nozzle Tips							
Specific Gravity 1.40		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
Standard 1501 Orange Cap	28.1 (3)	8.2—16.1 (5.1—10.0)	7.5—15.6 (4.6—9.7)	5.5—11.4 (3.4—7.1)	4.6—9.5 (2.8—5.9)	4.3—9.0 (2.7—5.6)	4.1—8.6 (2.6—5.3)
	37.4 (4)	6.2—12.8 (3.8—8.0)	5.6—11.7 (3.5—7.3)	4.1—8.6 (2.6—5.3)	3.4—7.1 (2.1—4.4)	3.2—6.8 (2.0—4.2)	3.1—6.4 (1.9—4.0)
	46.8 (5)	4.9—10.3 (3.1—6.4)	4.5—9.3 (2.8—5.8)	3.3—6.8 (2.0—4.3)	2.7—5.7 (1.7—3.5)	2.6—5.4 (1.6—3.4)	2.5—5.1 (1.5—3.2)
	56.1 (6)	4.1—8.6 (2.6—5.3)	3.7—7.8 (2.3—4.8)	2.7—5.7 (1.7—3.5)	2.3—4.8 (1.4—3.0)	2.2—4.5 (1.3—2.8)	2.1—4.3 (1.3—2.7)
	65.5 (7)	3.5—7.3 (2.2—4.6)	3.2—6.7 (2.0—4.1)	2.3—4.9 (1.5—3.0)	2.0—4.1 (1.2—2.5)	1.9—3.9 (1.2—2.4)	1.8—3.7 (1.1—2.3)
	74.8 (8)	3.1—6.4 (1.9—4.0)	2.8—5.8 (1.7—3.6)	2.1—4.3 (1.3—2.7)	1.7—3.6 (1.1—2.2)	1.6—3.4 (1.0—2.1)	1.6—3.2) (1.0—2.0)
	84.2 (9)	2.7—5.7 (1.7—3.5)	2.5—5.2 (1.5—3.2)	1.8—3.8) (1.1—2.4)	1.6—3.2 (1.0—2.0)	1.6—3.0 (1.0—1.9)	1.6—2.9 (1.0—1.8)
	93.5 (10)	2.5—5.1 (1.5—3.2)	2.2—4.7 (1.4—2.9)	1.6—3.4 (1.0—2.1)	1.6—2.9 (1.0—1.8)	1.6—2.7 (1.0—1.7)	1.6—2.6 (1.0—1.6)
Standard 1502 Yellow Cap	28.1 (3)	- - (- -)	14.8—16.1 (9.2—10.0)	10.9—16.1 (6.8—10.0)	9.1—16.1 (5.6—10.0)	8.6—16.1 (5.3—10.0)	8.2—16.1 (5.1—10.0)
	37.4 (4)	12.2—16.1 (7.6—10.0)	11.1—16.1 (6.9—10.0)	8.2—16.1 (5.1—10.0)	6.8—14.2 (4.2—8.8)	6.4—13.4 (4.0—8.3)	6.1—12.7 (3.8—7.9)
	46.8 (5)	9.8—16.1 (6.1—10.0)	8.9—16.1 (5.5—10.0)	6.5—13.6 (4.1—8.4)	5.4—11.3 (3.4—7.0)	5.2—10.7 (3.2—6.7)	4.9—10.2 (3.0—6.3)
	56.1 (6)	8.2—16.1 (5.1—10.0)	7.4—15.4 (4.6—9.6)	5.4—11.3 (3.4—7.0)	4.5—9.4 (2.8—5.9)	4.3—8.9 (2.7—5.6)	4.1—8.5 (2.5—5.3)
	65.5 (7)	7.0—14.6 (4.3—9.1)	6.4—13.2 (4.0—8.2)	4.7—9.7 (2.9—6.0)	3.9—8.1 (2.4—5.0)	3.7—7.7 (2.3—4.8)	3.5—7.3 (2.2—4.5)
	74.8 (8)	6.1—12.7 (3.8—7.9)	5.6—11.6 (3.5—7.2)	4.1—8.5 (2.5—5.3)	3.4—7.1 (2.1—4.4)	3.2—6.7 (2.0—4.2)	3.1—6.4 (1.9—4.0)
	84.2 (9)	5.4—11.3 (3.4—7.0)	4.9—10.3 (3.1—6.4)	3.6—7.6 (2.3—4.7)	3.0—6.3 (1.9—3.9)	2.9—6.0 (1.8—3.7)	2.7—5.7 (1.7—3.5)
	93.5 (10)	4.9—10.2 (3.0—6.3)	4.5—9.3 (2.8—5.8)	3.3—6.8 (2.0—4.2)	2.7—5.7 (1.7—3.5)	2.6—5.4 (1.6—3.3)	2.4—5.1 (1.5—3.2)
Standard 1503 Blue Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	13.4—16.1 (8.4—10.0)	12.7—16.1 (7.9—10.0)	12.1—16.1 (7.5—10.0)
	37.4 (4)	- - (- -)	- - (- -)	12.1—16.1 (7.5—10.0)	10.1—16.1 (6.3—10.0)	9.5—16.1 (5.9—10.0)	9.1—16.1 (5.6—10.0)
	46.8 (5)	14.5—16.1 (9.0—10.0)	13.2—16.1 (8.2—10.0)	9.7—16.1 (6.0—10.0)	8.1—16.1 (5.0—10.0)	7.6—15.9 (4.7—9.9)	7.3—15.1 (4.5—9.4)

Standard Nozzle Tips							
Specific Gravity 1.40		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
	56.1 (6)	12.1—16.1 (7.5—10.0)	11.0—16.1 (6.8—10.0)	8.1—16.1 (5.0—10.0)	6.7—14 (4.2—8.7)	6.4—13.3 (4.0—8.2)	6.0—12.6 (3.8—7.8)
	65.5 (7)	10.4—16.1 (6.4—10.0)	9.4—16.1 (5.9—10.0)	6.9—14.4 (4.3—8.9)	5.8—12.0 (3.6—7.4)	5.5—11.4 (3.4—7.1)	5.2—10.8 (3.2—6.7)
	74.8 (8)	9.1—16.1 (5.6—10.0)	8.2—16.1 (5.1—10.0)	6.0—12.6 (3.8—7.8)	5.0—10.5 (3.1—6.5)	4.8—9.9 (3.0—6.2)	4.5—9.4 (2.8—5.9)
	84.2 (9)	8.1—16.1 (5.0—10.0)	7.3—15.3 (4.6—9.5)	5.4—11.2 (3.3—7.0)	4.5—9.3 (2.8—5.8)	4.2—8.8 (2.6—5.5)	4.0—8.4 (2.5—5.2)
	93.5 (10)	7.3—15.1 (4.5—9.4)	6.6—13.7 (4.1—8.5)	4.8—10.1 (3.0—6.3)	4.0—8.4 (2.5—5.2)	3.8—8.0 (2.4—4.9)	3.6—7.6 (2.3—4.7)
Standard 1504 Red Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	15.9—16.1 (9.9—10.0)
	37.4 (4)	- - (- -)	- - (- -)	15.9—16.1 (9.9—10.0)	13.2—16.1 (8.2—10.0)	12.5—16.1 (7.8—10.0)	11.9—16.1 (7.4—10.0)
	46.8 (5)	- - (- -)	- - (- -)	12.7—16.1 (7.9—10.0)	10.6—16.1 (6.6—10.0)	10.0—16.1 (6.2—10.0)	9.5—16.1 (5.9—10.0)
	56.1 (6)	15.9—16.1 (9.9—10.0)	14.4—16.1 (9.0—10.0)	10.6—16.1 (6.6—10.0)	8.8—16.1 (5.5—10.0)	8.3—16.1 (5.2—10.0)	7.9—16.1 (4.9—10.0)
	65.5 (7)	13.6—16.1 (8.4—10.0)	12.4—16.1 (7.7—10.0)	9.1—16.1 (5.6—10.0)	7.6—15.7 (4.7—9.8)	7.2—14.9 (4.4—9.3)	6.8—14.1 (4.2—8.8)
	74.8 (8)	11.9—16.1) (7.4—10.0)	10.8—16.1 (6.7—10.0)	7.9—16.1 (4.9—10.0)	6.6—13.8 (4.1—8.5)	6.3—13.0 (3.9—8.1)	5.9—12.4 (3.7—7.7)
	84.2 (9)	10.6—16.1 (6.6—10.0)	9.6—16.1 (6.0—10.0)	7.0—14.7 (4.4—9.1)	5.9—12.2 (3.6—7.6)	5.6—11.6 (3.5—7.2)	5.3—11.0 (3.3—6.8)
	93.5 (10)	9.5—16.1 (5.9—10.0)	8.6—16.1 (5.4—10.0)	6.3—13.2 (3.9—8.2)	5.3—11.0 (3.3—6.8)	5.0—10.4 (3.1—6.5)	4.8—9.9 (3.0—6.2)
Standard 1505 Brown Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	37.4 (4)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	15.3—16.1 (9.5—10.0)	14.6—16.1 (9.0—10.0)
	46.8 (5)	- - (- -)	- - (- -)	15.5—16.1 (9.7—10.0)	12.9—16.1 (8.0—10.0)	12.3—16.1 (7.6—10.0)	11.6—16.1 (7.2—10.0)
	56.1 (6)	- - (- -)	- - (- -)	12.9—16.1 (8.0—10.0)	10.8—16.1 (6.7—10.0)	10.2—16.1 (6.3—10.0)	9.7—16.1 (6.0—10.0)
	65.5 (7)	- - (- -)	15.1—16.1 (9.4—10.0)	11.1—16.1 (6.9—10.0)	9.2—16.1 (5.7—10.0)	8.8—16.1 (5.4—10.0)	8.3—16.1 (5.2—10.0)
	74.8 (8)	14.6—16.1 (9.0—10.0)	13.2—16.1 (8.2—10.0)	9.7—16.1 (6.0—10.0)	8.1—16.1 (5.0—10.0)	7.7—16.0 (4.8—9.9	7.3—15.2 (4.5—9.4)
	84.2 (9)	12.9—16.1 (8.0—10.0)	11.8—16.1 (7.3—10.0)	8.6—16.1 (5.4—10.0)	7.2—15.0 (4.5—9.3)	6.8—14.2 (4.2—8.8)	6.5—13.5 (4.0—8.4)
	93.5 (10)	11.6—16.1 (7.2—10.0)	10.6—16.1 (6.6—10.0)	7.8—16.1 (4.8—10.0)	6.5—13.5 (4.0—8.4)	6.1—12.8 (3.8—7.9)	5.8—12.1 (3.6—7.5)
Standard 1506 Grey Cap	28.1 (3)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	37.4 (4)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)	- - (- -)
	46.8 (5)	- - (- -)	- - (- -)	- - (- -)	15.2—16.1 (9.4—10.0)	14.4—16.1 (8.9—10.0)	13.6—16.1 (8.5—10.0)
	56.1 (6)	- - (- -)	- - (- -)	15.2—16.1 (9.4—10.0)	12.6—16.1 (7.8—10.0)	12.0—16.1 (7.4—10.0)	11.4—16.1 (7.1—10.0)
	65.5 (7)	- - (- -)	- - (- -)	13—16.1 (8.1—10.0)	10.8—16.1 (6.7—10.0)	10.3—16.1 (6.4—10.0)	9.7—16.1 (6.1—10.0)
	74.8 (8)	- - (- -)	15.5—16.1 (9.6—10.0)	11.4—16.1 (7.1—10.0)	9.5—16.1 (5.9—10.0)	9.0—16.1 (5.6—10.0)	8.5—16.1 (5.3—10.0)

Standard Nozzle Tips							
Specific Gravity 1.40		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
	84.2 (9)	15.2—16.1 (9.4—10.0)	13.8—16.1 (8.6—10.0)	10.1—16.1 (6.3—10.0)	8.4—16.1 (5.2—10.0)	8.0—16.1 (5.0—10.0)	7.6—15.8 (4.7—9.8)
	93.5 (10)	13.6—16.1 (8.5—10.0)	12.4—16.1 (7.7—10.0)	9.1—16.1 (5.7—10.0)	7.6—15.8 (4.7—9.8)	7.2—14.9 (4.5—9.3)	6.8—14.2 (4.2—8.8)

ExactRate Equivalent Nozzle Tips							
Specific Gravity 1.40		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
ExactRate Equivalent 6502 Black Cap	Recommendation When Using the ExactRate Equivalent Tip						
	18.7 (2)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	28.1 (3)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.9 (3.0—9.9)	4.8—13.2 (3.0—8.2)	4.8—12.6 (3.0—7.8)	4.8—11.9 (3.0—7.4)
	37.4 (4)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—11.9 (3.0—7.4)	4.8—9.8 (3.0—6.1)	4.8—9.3 (3.0—5.8)	4.8—8.9 (3.0—5.5)
	46.8 (5)	4.8—14.3 (3.0—8.9)	4.8—13.0 (3.0—8.1)	4.8—9.5 (3.0—5.9)	4.8—7.9 (3.0—4.9)	4.8—7.4 (3.0—4.6)	4.8—7.1 (3.0—4.4)
	56.1 (6)	4.8—11.9 (3.0—7.4)	4.8—10.8 (3.0—6.7)	4.8—7.9 (3.0—4.9)	4.8—6.6 (3.0—4.1)	4.8—6.3 (3.0—3.9)	4.8—6.0 (3.0—3.7)
	65.5 (7)	4.8—10.1 (3.0—6.3)	4.8—9.3 (3.0—5.8)	4.8—6.8 (3.0—4.2)	4.8—5.6 (3.0—3.5)	4.8—5.3 (3.0—3.3)	4.8—5.0 (3.0—3.1)
	74.8 (8)	4.8—8.9 (3.0—5.5)	4.8—8.0 (3.0—5.0)	4.8—6.0 (3.0—3.7)	4.8—4.8 (3.0—3.0)	- - (- -)	- - (- -)
	84.2 (9)	4.8—8.9 (3.0—5.5)	4.8—8.0 (3.0—5.0)	4.8—5.8 (3.0—3.6)	4.8—4.8 (3.0—3.0)	- - (- -)	- - (- -)
	93.5 (10)	4.8—8.9 (3.0—5.5)	4.8—8.0 (3.0—5.0)	4.8—5.6 (3.0—3.5)	- - (- -)	- - (- -)	- - (- -)
ExactRate Equivalent 6504 Black Cap	Recommendation When Using the ExactRate Equivalent Tip						
	18.7 (2)	4.8—11.9 (3.0—7.4)	4.8—12.7 (3.0—7.9)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	28.1 (3)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	37.4 (4)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	46.8 (5)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.4 (3.0—9.6)	4.8—14.6 (3.0—9.1)	4.8—13.8 (3.0—8.6)
	56.1 (6)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.4 (3.0—9.6)	4.8—12.9 (3.0—8.0)	4.8—12.1 (3.0—7.5)	4.8—11.6 (3.0—7.2)
	65.5 (7)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—13.2 (3.0—8.2)	4.8—10.9 (3.0—6.8)	4.8—10.5 (3.0—6.5)	4.8—9.8 (3.0—6.1)
	74.8 (8)	4.8—16.1 (3.0—10)	4.8—15.8 (3.0—9.8)	4.8—11.6 (3.0—7.2)	4.8—9.7 (3.0—6.0)	4.8—9.0 (3.0—5.6)	4.8—8.7 (3.0—5.4)
	84.2 (9)	4.8—16.1 (3.0—10)	4.8—15.8 (3.0—9.8)	4.8—11.6 (3.0—7.2)	4.8—9.7 (3.0—6.0)	4.8—9.0 (3.0—5.6)	4.8—8.7 (3.0—5.4)
	93.5 (10)	4.8—16.1 (3.0—10)	4.8—15.8 (3.0—9.8)	4.8—11.6 (3.0—7.2)	4.8—9.7 (3.0—6.0)	4.8—9.0 (3.0—5.6)	4.8—8.7 (3.0—5.4)

ExactRate Equivalent Nozzle Tips							
Specific Gravity 1.40		**Ground Speed Range Based on Row Spacing, Target Rate, and Nozzle Tip Size**					
		Row Spacing cm (in)					
		51 cm (20 in)	**56 cm (22 in)**	**76 cm (30 in)**	**91 cm (36 in)**	**97 cm (38 in)**	**102 cm (40 in)**
Nozzle Tip Size Cap Color	**L/ha (gal/acre)**	**Ground Speed Range km/h (mph)**					
ExactRate Equivalent 6506 Black Cap	Recommendation When Using the ExactRate Equivalent Tip						
	18.7 (2)	4.8—10.6 (3.0—6.6)	4.8—10.8 (3.0—6.7)	4.8—12.2 (3.0—7.6)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	28.1 (3)	4.8—12.2 (3.0—7.6)	4.8—13.2 (3.0—8.2)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	37.4 (4)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	46.8 (5)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	56.1 (6)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)
	65.5 (7)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—15.8 (3.0—9.8)	4.8—15.0 (3.0—9.3)	4.8—14.2 (3.0—8.8)
	74.8 (8)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—13.8 (3.0—8.6)	4.8—13.0 (3.0—8.1)	4.8—12.4 (3.0—7.7)
	84.2 (9)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—13.8 (3.0—8.6)	4.8—13.0 (3.0—8.1)	4.8—12.4 (3.0—7.7)
	93.5 (10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—16.1 (3.0—10)	4.8—13.8 (3.0—8.6)	4.8—13.0 (3.0—8.1)	4.8—12.4 (3.0—7.7)

ouo6074,1714761495562-19-17DEC24

Specific Gravity

Use the table to identify the specific gravity for the weight of your solution. Specific gravity allows the system to compensate and maintain the target rate when the solution is lighter or heavier than water.

Solution Weight kg/L (lb/gal)	Example	Specific Gravity
0.84 (7)		0.84
0.96 (8)		0.96
1 (8.34)	Water	1.00
1.08 (9)		1.08
1.2 (10)		1.20
1.28 (10.65)	28% Nitrogen Solution	1.28
1.32 (11)	7-27-7 Fertilizer	1.32
1.33 (11.06)	32% Nitrogen Solution	1.33
1.37 (11.4)	10-34-0 Fertilizer	1.37
1.38 (11.5)	12-0-0-26 Fertilizer	1.38
1.39 (11.6)	11-37-0 Fertilizer	1.39
1.44 (12)		1.44
1.5 (12.5)		1.50
1.56 (13)		1.56
1.62 (13.5)		1.62
1.68 (14)		1.68

Fertilizer weights vary depending on such things as raw materials and impurities in the solution. The specific gravity values in the chart are approximate. To calculate the specific gravity of your solution, perform the following calculation.

Weigh a specific volume of fertilizer solution. Weigh an identical volume of water. Divide the fertilizer weight by the water weight.

$$\frac{\text{Fertilizer Weight}}{\text{Water Weight}} = \text{Specific Gravity}$$

Modify When:

Enter the corresponding specific gravity whenever you switch solutions.

Procedure to Modify:



A104096—UN—10APR19

Specific Gravity

Select the input box and use the number pad to enter the corresponding value from the chart.

Default Range: 0.84 to 1.96

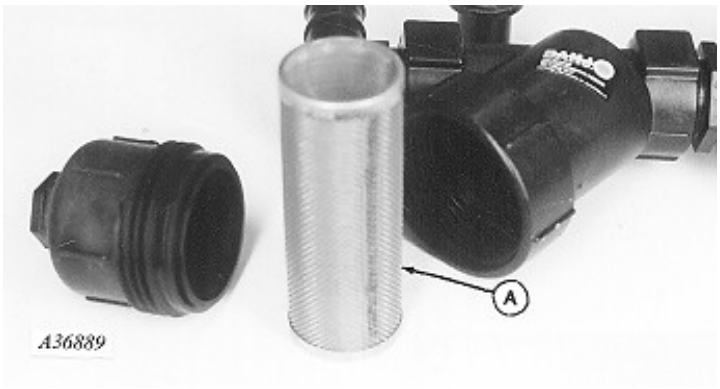
ouo6074,1692812791282-19-23AUG23

Strainer Recommendations

IMPORTANT: Prevent damage to the fertilizer pump. See the Storage section for recommended storage procedures.

There are multiple 80 mesh strainers installed in the plumbing system on the planter. These strainers must remain installed during all applications to avoid plugging the distribution valves. When the planter is using an offboard fertilizer tank, the strainer between the offboard tank and the pump must be removed.

To prevent contamination, equip all the nurse tanks with strainers.



A36889—UN—10APR95

A—Strainer

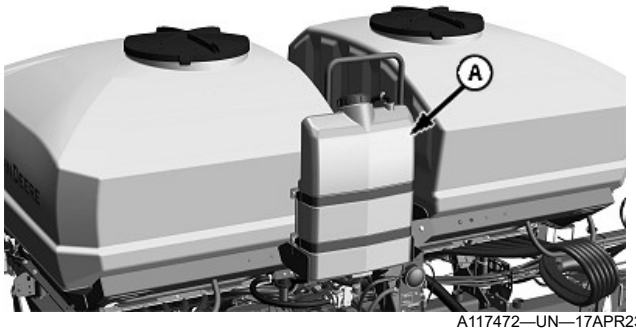
A strainer (A) prevents obstructions in distribution valves, nozzles, and orifices. The strainer also prevents damage to the fertilizer pump, the fertilizer pipes, and the distribution tubes. A minimum 80 mesh strainer is required for the distribution system and is recommended for the fill tank. Inspect and clean the strainer after the initial start-up, daily, or as required thereafter.

An increased pressure reading is an indication of an obstruction. Obstructions cause inconsistent fertilizer delivery.

If a fertilizer with a high solid content is plugging the 80 mesh strainer frequently, see a John Deere dealer or other service provider.

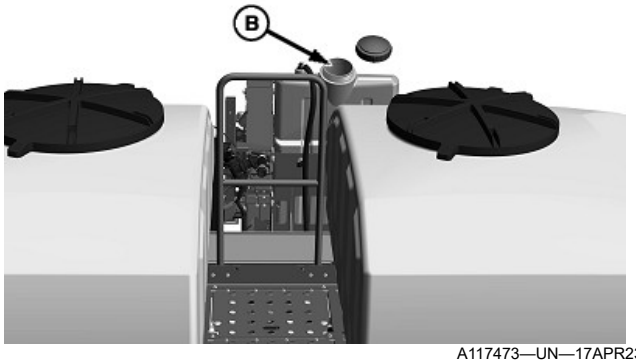
WP29706,0000C73-19-15OCT25

Rinse Tank Usage



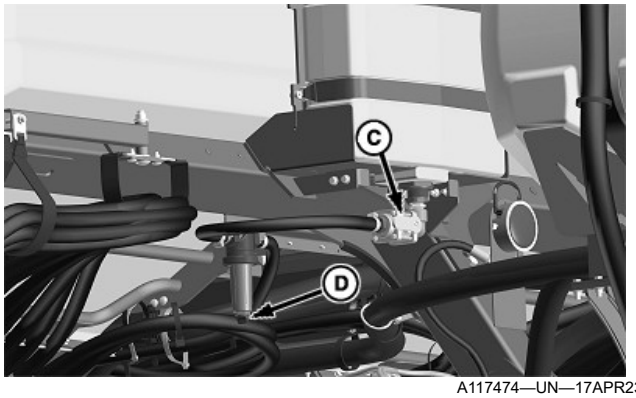
A117472—UN—17APR23

Rinse Tank



A117473—UN—17APR23

Tank Fill



A117474—UN—17APR23

Valve and Drain

A—Rinse Tank
B—Fill Opening
C—Tank Valve
D—Drain Plug

NOTE: Avoid algae growth. Do not store water more than a week.

The rinse tank (A) holds fresh water for rinsing the fertilizer pump and delivery system. Refer to the rinse procedure.

The rinse tank can also be used for the winterization procedure using winterizing fluid. Refer to the winterization procedure.

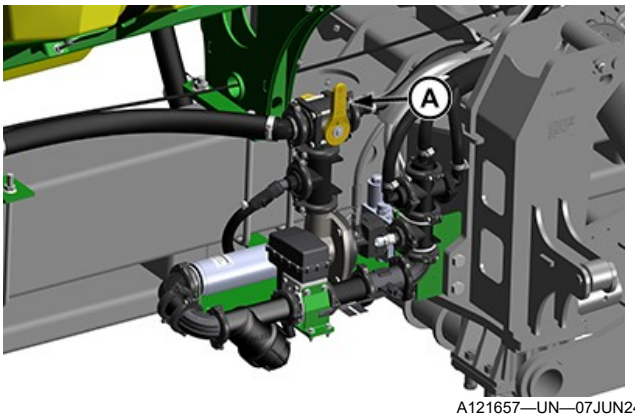
Access the fill opening (B) from the CCS platform.

Specification

Rinse Tank—Volume. . . . . 75 L (20 gal)

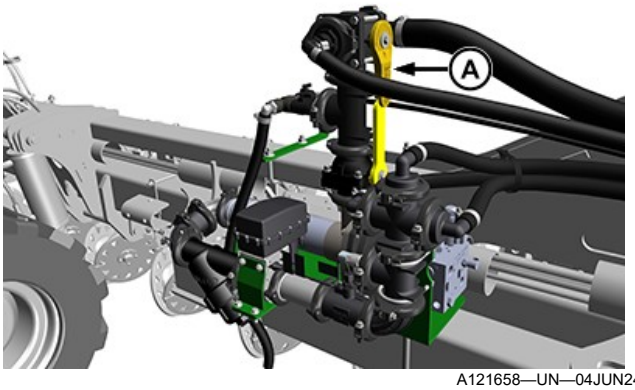
Control the flow using the tank valve (C).

Drain the tank by removing the drain plug (D).



A121657—UN—07JUN24

Centrally Mounted Pump Valve



A121658—UN—04JUN24

Wing Mounted Pump Valve

A—Pump Valve

Turn the pump valve (A) to the rinse position when using the rinse tank.

h5snma9,1717083716469-19-03JUN24

Short- or Long-Term Storage Guidelines

IMPORTANT: Do not discharge solutions onto the ground. Properly capture solutions discharged from the system. Perform the procedure where people, animals, vegetation, and water supplies cannot be contaminated.

If the forecasted temperature is below freezing, follow the winterization procedure.

Avoid losing prime. Do not allow the tanks or supply hoses to run out of fluid. If the prime is lost, refer to the priming procedure.

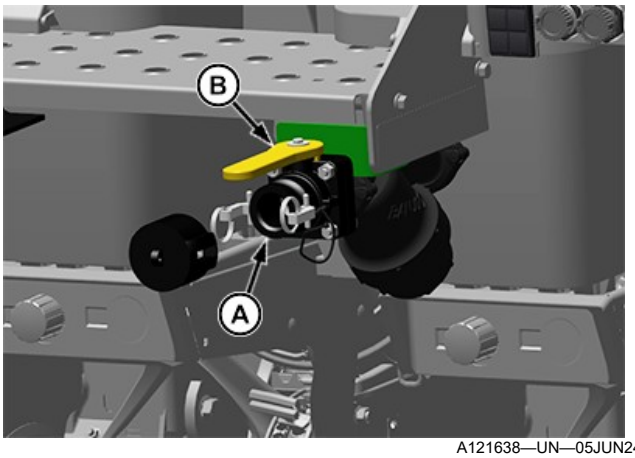
If the planter will sit for over a week with fertilizer in the system, perform the rinse procedure before the extended period.

If the planter will sit for less than a week with fertilizer in the system, draw water into the fertilizer pump before the sedentary period.

Use Erase or an equivalent cleaner for thorough cleaning.

WP29706,0000C76-19-03APR23

DB Planters—Winterize the ExactRate Pump



A121638—UN—05JUN24

A—Quik-Fill Port
B—Handle

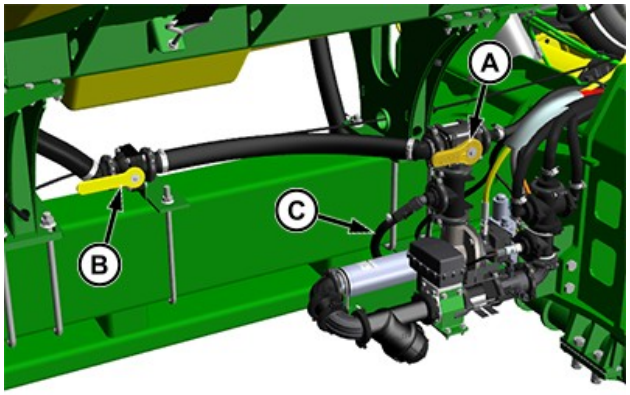
IMPORTANT: Do not discharge solutions onto the ground. Properly capture solutions discharged from the system. Perform the procedure where people, animals, vegetation, and water supplies, cannot be contaminated.

Avoid losing prime during the winterization procedure. Do not allow the tanks or supply hoses to run out of fluid. If the prime is lost, refer to the priming procedure.

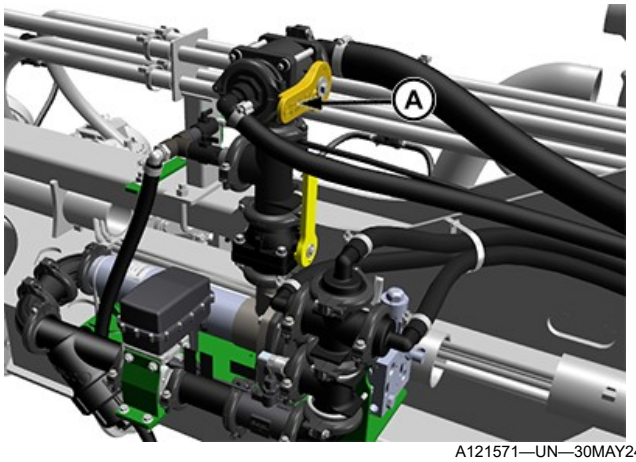
1. If equipped with the Quik-Fill system, open all the

Quik-Fill valves (A) and allow the hoses and primary tank to drain.

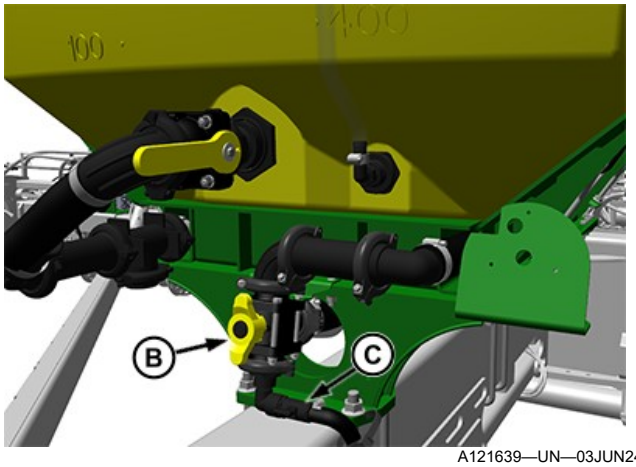
2. Turn on the electric power generation system.



A121635—UN—31MAY24
Valves (Centrally Mounted Pump)



A121571—UN—30MAY24
Valves (Wing Mounted Pump)



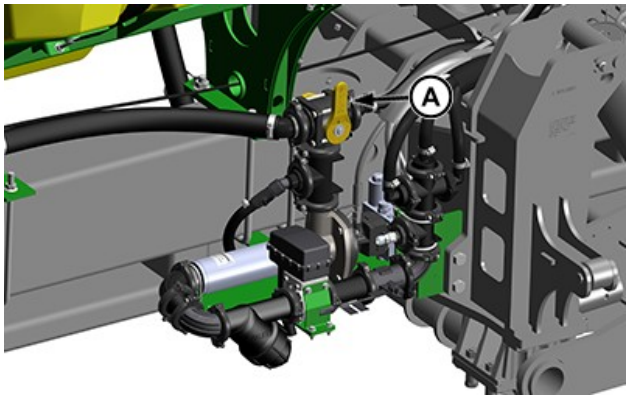
A121639—UN—03JUN24
Valves (Wing Mounted Pump)

A—Pump Valve
B—Supply Valve
C—Drain Valve

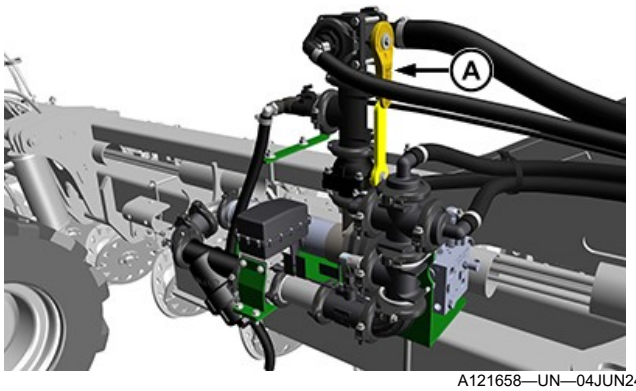
3. Adjust the pump valve (A) to flow from the main tank.
4. Open the supply (B) and drain (C) valves so that the tank drains. Close the drain valve (C) when draining is complete.
5. Use water to rinse the system before winterizing. Drain the water before adding winterizer.

NOTE: If using an offboard tank as the only supply, bypass the transfer pump during the winterization procedure.

6. Add winterization fluid to the primary tank. If using an offboard tank, transfer the winterization fluid to the primary tank and draw from the primary tank for the procedure. Stop and add fluid as needed during the procedure.



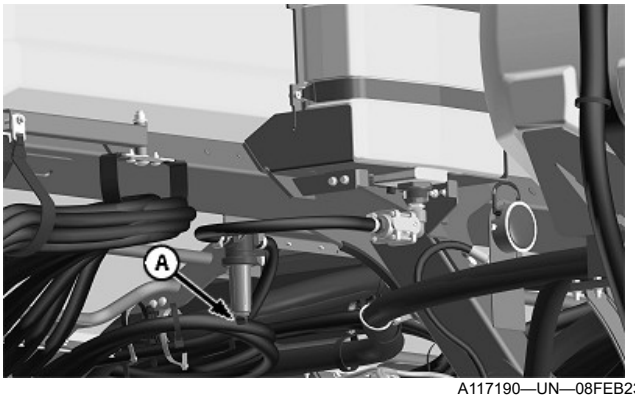
A121657—UN—07JUN24
Pump Valve (Centrally Mounted Pump)



A121658—UN—04JUN24
Pump Valve (Wing Mounted Pump)

A—Pump Valve

7. Adjust the pump valve (A) to flow from the rinse tank.

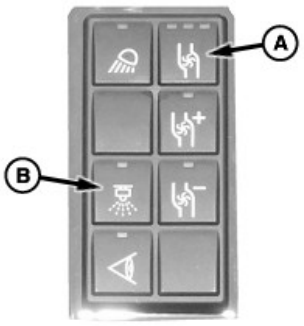


A117190—UN—08FEB23

Rinse Tank Filter

A—Plug

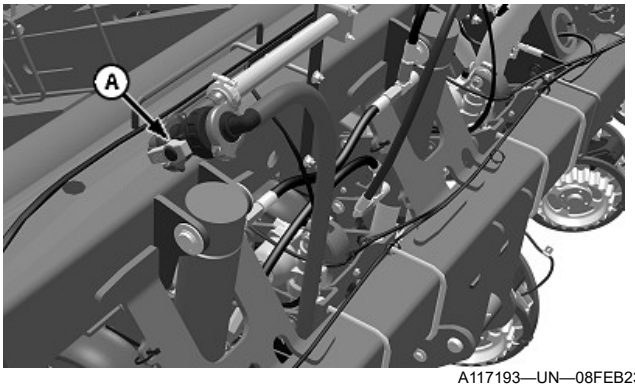
8. Remove the plug (A) and drain the rinse tank.
9. Replace the plug and add winterization fluid to the rinse tank.



A107072—UN—18JUN20

A—Fertilizer Pump
B—Master Spray

10. Activate the pump using button (A).
11. Activate the master spray function using button (B).
12. While drawing from the rinse tank, observe the fluid dispensing from the rows. When winterization fluid is steadily flowing from any row, shut the master spray (B) off.
13. Adjust the pump valve (A) to flow from the primary tank.
14. Open the primary tank supply valve.
15. Activate the master spray function using button (B).



A117193—UN—08FEB23

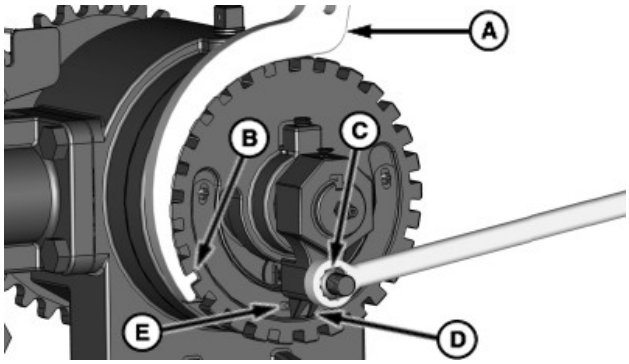
Valves and Locations Vary by Planter

A—Bleed Valve

16. One at a time, open each bleed valve (A) until there is a steady flow of winterization fluid and then close the valve.
17. After each valve has been bled, observe the flow at the rows. When winterization fluid is steadily flowing from all of the rows, deactivate the pump.

WP29706,0000E91-19-03JUN24

Adjust the John Blue (Fixed Rate) Pump Setting Number



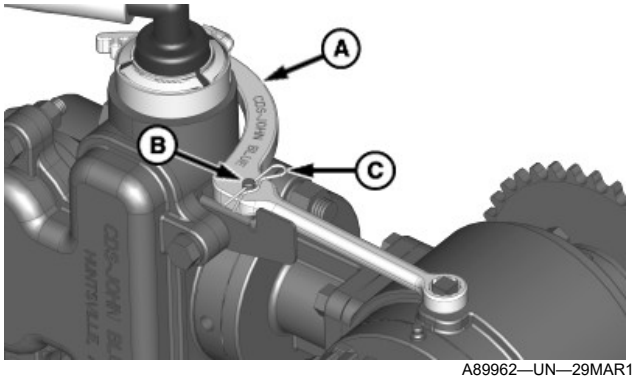
A89961—UN—29MAR16

A—Wrench
B—Scale Ring
C—Nut
D—Pointer
E—Gauge

1. Use the rate chart to determine a pump setting number for the application rate.
2. Install the wrench (A) on the scale ring (B) as shown.
3. Loosen the nut (C) and rotate the scale ring until the pointer (D) is aligned with the pump setting number on the gauge (E).

Specification	
Nut—Torque	25 N·m (18 lb·ft)

4. Tighten the nut (C) to specification.



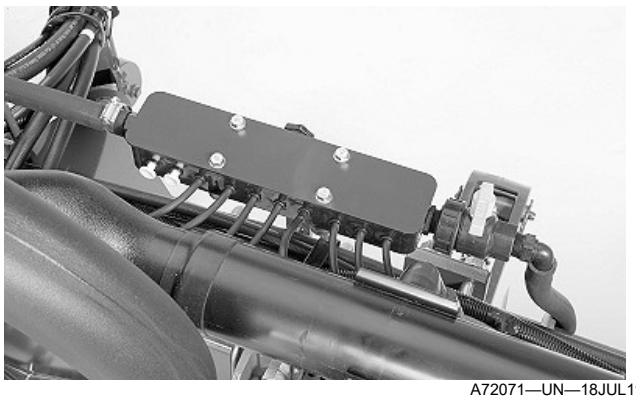
A89962—UN—29MAR16

A—Wrench
B—Pin
C—Clip

5. Store the wrench (A) on pin (B) on the pump mounting bracket. Attach the tool with the clip (C).

OUO6064,000009E-19-09OCT25

Fertilizer Distribution



A72071—UN—18JUL11

NOTE: Inserting a non-chamfered hose into the distribution manifold distorts the O-ring which causes fertilizer leaks.

The John Deere Liquid Fertilizer system uses distribution manifolds and in-line orifices of varying sizes to distribute the product at various application rates. Distribution manifolds are mounted on the frame. This distribution system is compatible with all John Deere fertilizer openers.

The fertilizer system uses in-line orifices at each row to maintain system pressure. The lower end of the pressure range, 103 kPa (1.0 bar) (15 psi), must be maintained to ensure even fertilizer distribution. Do not exceed the upper end of the range, 689 kPa (6.9 bar) (100 psi). The pump setting and the orifices are adjusted when changing the rates. To set the application rate, refer to the rate chart, then adjust the pump to a target setting and install the recommended orifices. Next, verify that the system pressure is within 103—621 kPa (1.0—6.2 bar) (15—90 psi) when traveling at the target planting speed.

NOTE: As the ground speed is increased, the fertilizer pressure increases.

The delivery hose is equipped with a check valve near each opener. A minimum pressure of 14 kPa (0.1 bar) (2 psi) must be present before the fertilizer is delivered to the opener.

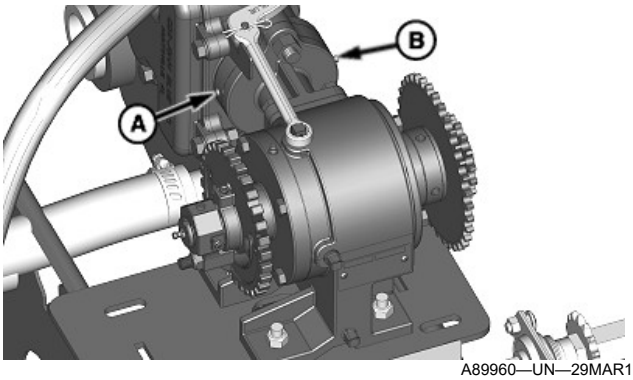
Priming the fertilizer system is critical for obtaining the best performance, especially at low flow rates (See Prime and Start the Pump). Eliminate any kinks, pinches, or sharp bends in the fertilizer hoses. Any restriction in the hoses reduces the fertilizer flow to the openers.

IMPORTANT: Monitor the system pressure by equipping all liquid fertilizer systems with a pressure sensor. SeedStar equipped planters show the fertilizer pressure on-screen. (See your SeedStar Application Help or Operator's Manual for information about the fertilizer pressure.)

Avoid pump damage. Remove the drive chain from the piston pump when the fertilizer system is not in use.

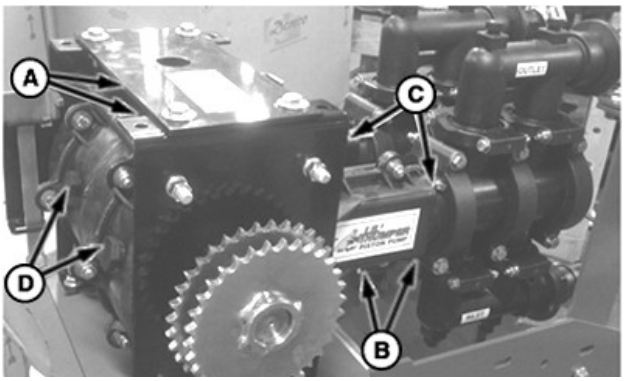
OUO6064,0000563-19-23OCT25

Prime and Start the Pump



A89960—UN—29MAR16

John Blue Pump



A89993—UN—30MAR16

Demco Pump

A—Weep Hole
B—Lubrication Fitting
C—Lubrication Fitting
D—Oil Check and Fill Plug

It is normal for a small amount of oil to leak from the weep hole (A). The weep hole must remain open. Perform an inspection at the beginning of each season. Too much grease at the lubrication fitting (B) increases the chance of plugging the weep hole or leaking grease.

Before priming, inspect the fertilizer distribution system. Verify that the filter screen is clean and that there are no leaks in the pump suction line. Verify that there are no pinched, kinked, or otherwise restricted hoses. Verify that there are no extreme high or low variations in the path of hose. Inspect all orifices for debris and blockages. Verify that all 14 kPa (0.1 bar) (2 psi) check valves are free of debris and blockage.

1. Open the shutoff valve at the tank and strainer.
2. Fill the tank with a minimum of 75 L (20 gal) and check the system for leaks

IMPORTANT: Avoid excessive system pressure. Do not exceed the maximum recommended rate for the orifice or nozzle size.

3. Refer to the rate chart and set the pump to the maximum rate for the in-line orifice or nozzle that is installed.
4. Lower the machine to the planting position and drive 90 meters (100 yards) at planting speed 9.7 km/h (6 mph).
5. Raise the machine and turn the drive wheel on the fertilizer pump by hand.
6. Check all rows for liquid exiting the opener tubes in a steady stream. Repeat the initial steps until a steady flow of liquid is apparent at all openers and all air is flushed from the distribution hoses.
7. Select a target fertilizer rate from the rate chart. Set the pump range and install in-line orifices or nozzles for the selected fertilizer rate.

NOTE: As travel speed increases, the fertilizer system pressure also increases.

8. Verify that the system pressure is within 103—621 kPa (1.0—6.2 bar) (15—90 psi) when traveling at the desired planting speed.
9. If the machine is stationary for a long period, air bubbles can develop and become trapped in the distribution hoses. Prime the system as necessary.

OUO6064,0000564-19-27APR16

How to Use Liquid Fertilizer Rate Charts

IMPORTANT: A field check must be done to verify the application rate (See Check Fertilizer Rates).

This system is NOT recommended for use with suspension fertilizers.

NOTE: 1.2 mm yellow orifices and 1.7 mm black orifices are included with this system from the factory. For customers wanting to apply higher or lower application rates, two additional orifice sizes (0.7 mm green and 2.5 mm gray) are available through Service Parts.

1. Refer to the rate chart for the fertilizer opener installed on the planter and select the approximate application rate desired for the row spacing being planted.
2. The pump ranges are given at top of the rate chart (table) for the liquid fertilizer application.

3. Set the range of the pump drive.
4. Other information contained in the chart is the pump setting, in-line orifices sizes, nozzle sizes, and estimated travel speeds during application.
5. Adjust the pump to the pump setting number.
6. Install the recommended in-line orifice or nozzle (shown on the rate chart).

OUO6064,0000610-19-25APR18

Check Fertilizer Rates

IMPORTANT: Ensure that the liquid fertilizer system is working as designed. Perform a rate check on all rows of the planter simultaneously. Checking only one row is not a good indication of fertilizer system performance.

Liters Per Hectare Conversion Chart	
Row Spacing	**Conversion Factor**
51 cm	0.081
56 cm	0.074
76 cm	0.054
91 cm	0.045
97 cm	0.043
102 cm	0.041

Gallons Per Acre Conversion Chart	
Row Spacing	**Conversion Factor**
20 in	0.255
22 in	0.232
30 in	0.170
36 in	0.142
38 in	0.134
40 in	0.128

1. Calculate size of collection container required.

   Size of container required = L/ha (gpa) expected ÷ conversion factor.

   METRIC example, 45 L/ha is expected application rate. Conversion factor for 76 cm row spacing is 0.054.

   45 ÷ 0.054 = 833 mL

   Use a container capable of easily collecting at least 833 mL.

   STANDARD example, 18 gpa is expected application rate. Conversion factor for 30 in row spacing is 0.170.

   18 ÷ 0.170 = 106 oz

   Use a container capable of easily collecting at least 106 oz

2. Tie a container to machine frame next to every fertilizer opener. Remove delivery hoses from openers and insert hoses into containers.
3. Drive forward 244 m (800 ft) at planting speed.
4. Measure number of mL (oz) in each container.
5. Calculate actual application rate for each opener.

   Measured mL (oz) x conversion factor = actual rate

   METRIC example, 789 mL were captured in container. Conversion factor for 76 cm row spacing is 0.054.

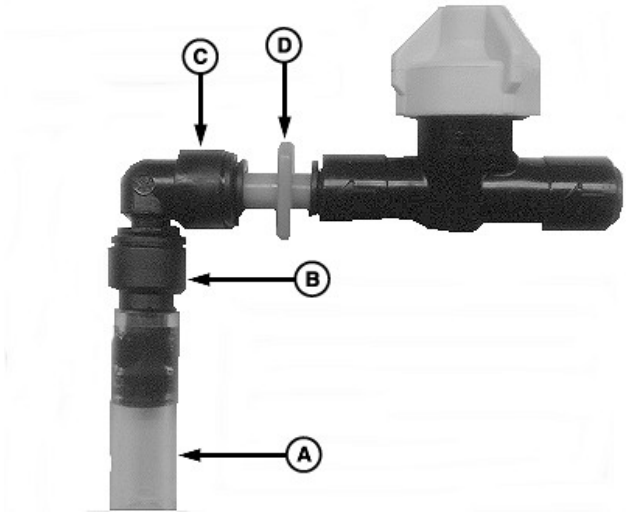
   789 x 0.054 = 42.69 L/hectare (Actual Application Rate)

   STANDARD example, 118 oz were captured in container. Conversion factor for 30 in row spacing is 0.170.

   118 x 0.170 = 20 gpa (Actual Application Rate)

OUO6064,00006DE-19-07JAN16

Liquid Fertilizer For Unit Mounted Double Disk Openers



A74057—UN—19JAN12

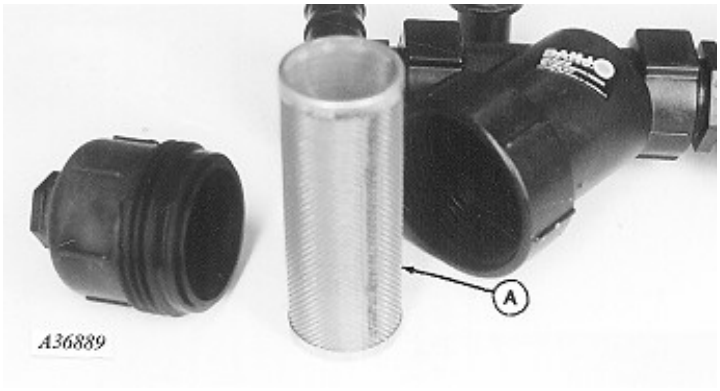
A—3/8 in. Hose
B—10 mm Stem to 8 mm Tube Fitting
C—5/16 in. Stem To 5/16 in. Tube, 90 Degree Fitting
D—Orifice

Utilize the in-line orifice for unit mounted double-disk openers. The orifice is inserted into the check valve then into the fittings described in picture. Use liquid fertilizer rate charts for non-injection openers for the desired application rate. (See RATE CHARTS in the Liquid Fertilizer Rate Charts For Non-Injection Openers section.)

Unit Mounted Double Disk Orifice Reference Chart	
Orifice	**Orifice Size**
Green	0.70
Yellow	1.2
Black	1.7
Grey	2.5

OUO6064,00006F5-19-19JAN12

Strainer Recommendations



A36889—UN—10APR95

A—Strainer

IMPORTANT: Prevent damage to piston pump. See Storage section for recommended storage procedures.

Equip all nurse tanks with strainers to prevent contamination.

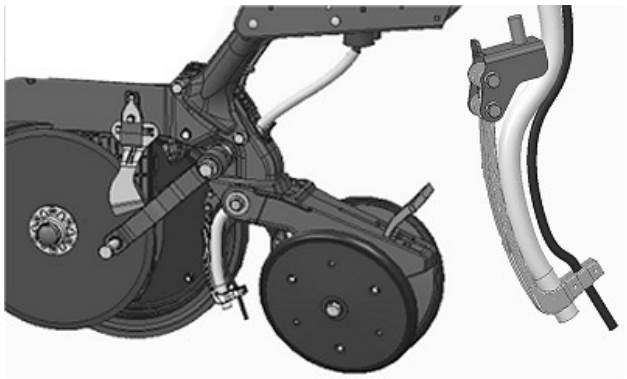
A strainer (A) prevents obstructions in manifolds, nozzles, and orifices. It also prevents damage to piston pump, manifold, and check valves. An 80 mesh main strainer is recommended. Inspect and clean strainer after initial start up, daily, and as required thereafter.

An increased pressure reading on the pressure gauge is an indication of an obstruction. Obstructions cause inconsistent delivery to openers.

If fertilizer with a high solid content is plugging the 80 mesh strainer frequently, a less restrictive 50 mesh strainer is available, but this may result in more frequent obstructions with in-line orifices. See a John Deere dealer or other service provider.

OUO6064,000076F-19-15OCT25

Liquid Fertilizer Use with the BrushBelt



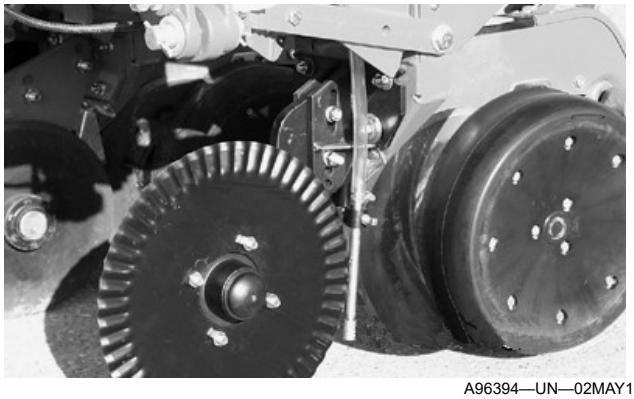
A86695—UN—09JUN15

In-Furrow Applicator



A75012—UN—04APR12

Frame Mounted Opener (beside the seed furrow)



A96394—UN—02MAY17

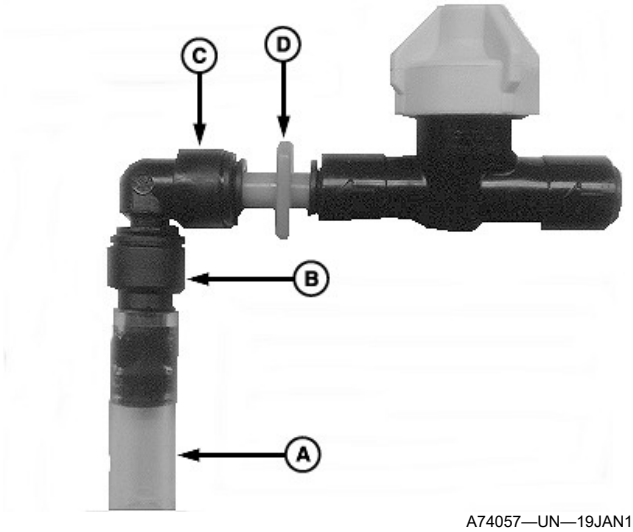
Injection Opener (beside the seed furrow)

IMPORTANT: Avoid plugging the BrushBelt. Do not apply liquid fertilizer in front of and directly in-line with the seed furrow.

Use an in-furrow applicator or a front mounted opener that applies fertilizer to the side of the seed furrow.

OUO6074,0000F9E-19-09OCT25

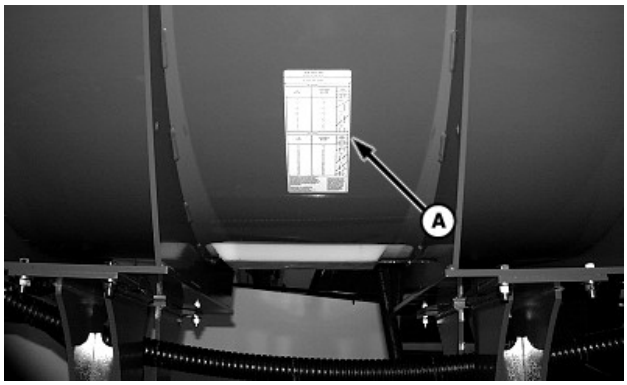
Liquid Fertilizer Rate Charts for Non-Injection Openers (Frame, Unit Mounted, and In-Furrow Placement)



A74057—UN—19JAN12

A—3/8 in Hose
B—10 mm Stem to 8 mm Tube Fitting
C—5/16 in Stem to 5/16 in Tube, 90 Degree Fitting
D—Orifice

Utilize the in-line orifice for the non-injection openers. The orifice is inserted into the check valve then into the fittings described in the graphic. To achieve the desired application rate, use the rate charts of liquid fertilizer for non-injection openers.



A50571—UN—07OCT02

A—Chart

The size recommendation chart (A) for the in-line orifice is affected by many factors including the travel speed, ambient temperature, and product used. The objective is to keep the system pressure between 103—621 kPa (1.0—6.2 bar) (15—90 psi). **Do not exceed 689 kPa (6.9 bar) (100 psi).**

The charts are optimized for ground speeds of 8—11 km/h (5—7 mph) and not recommended for speeds over 11 km/h (7 mph).

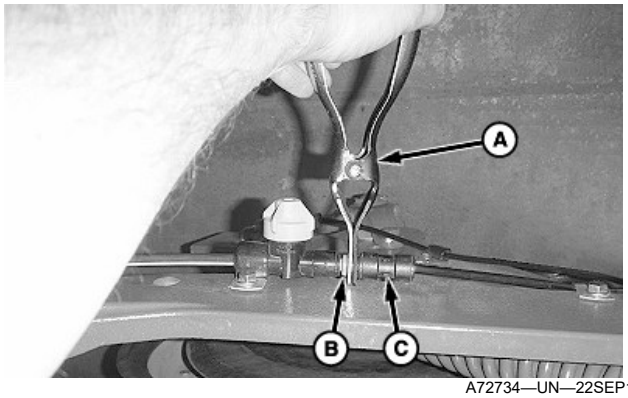
NOTE: To change application rate (GPA), change pump setting.

NOTE: To change system pressure, change in-line orifice size and/or change travel speed.

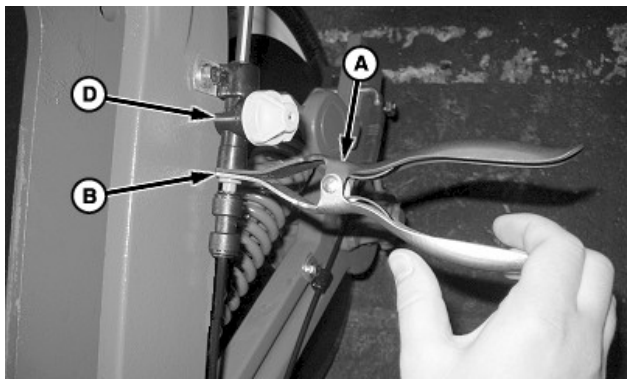
WP29706,0000359-19-24APR18

Change the In-Line Orifices for Liquid Fertilizer

Remove In-Line Orifice



A72734—UN—22SEP11



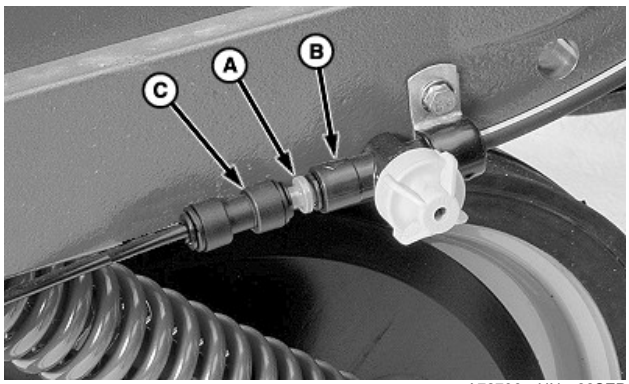
A72735—UN—22SEP11

A—Special Pliers
B—In-Line Orifice
C—Coupler
D—Check Valve

NOTE: If needed, the special pliers (Lisle 47900 Hose Remover Pliers), are purchased through the Lisle corporation.

1. Insert the special pliers (A), as far as possible, between the in-line orifice (B) and the coupler (C). Squeeze the pliers until the coupler disengages.
2. Insert the special pliers (A), as far as possible, between the in-line orifice (B) and the check valve (D). Squeeze the pliers until the in-line orifice disengages from the check valve.
3. Repeat on all fertilizer openers.

Install In-Line Orifice



A72736—UN—22SEP11

A—In-Line Orifice
B—Check Valve
C—Coupler

NOTE: Consult the fertilizer rate charts for the correct in-line orifice size at the target application rate.

1. Push the in-line orifice (A) into the check valve (B). Pull on the in-line orifice to verify that it is locked into the check valve.
2. Push the coupler (C) onto the in-line orifice (A). Pull on the coupler to verify that it is locked onto the in-line orifice.
3. Repeat on all fertilizer openers.

WP29706,000035C-19-26JUL18

Liquid Fertilizer Rate Charts-Piston Pump

DB60 24-Row 76cm (30 in) Rate Chart

LIQUID FERTILIZER APPLICATION RATE DB60 24 ROW MACHINES John Blue Pump					
76 cm (30 in) ROW SPACING					
8 km/h (5 mph)			11.3 km/h (7 mph)		
Pump Setting	Approximate Rate	In-Line Orifice	Pump Setting	Approximate Rate	In-Line Orifice
Value	L/ha (gal/acre)	Size and Color	Value	L/ha (gal/acre)	Size and Color
3.21	28.1 (3.0)	0.70 Green	3.21	28.1 (3.0)	0.70 Green
4.27	37.4 (4.0)		4.27	37.4 (4.0)	
5.34	46.8 (5.0)		5.34	46.8 (5.0)	1.2 Yellow
6.41	56.1 (6.0)	1.2 Yellow	6.41	56.1 (6.0)	
7.48	65.5 (7.0)		7.48	65.5 (7.0)	
5.7	74.8 (8.0)		5.7	74.8 (8.0)	
7.12	93.5 (10.0)		7.12	93.5 (10.0)	
7.33	112.2 (12.0)		7.33	112.2 (12.0)	1.7 Black
7.48	131.0 (14.0)		7.48	131.0 (14.0)	
Many factors affect the orifice size chart including ambient temperature, travel speed, wheel slippage, and type of fertilizer. Use this chart as a guide. (See How to Use Liquid Fertilizer Rate Charts.) The charts are optimized for ground speeds of 8-11 km/h (5-7 mph) and not recommended for speeds over 11 km/h (7 mph).					
To verify the rate, perform a field check. (See Check the Fertilizer Rates.)					

OUO6064,00006C3-19-12APR18

DB90 36-Row 76 cm (30 in) Rate Chart

LIQUID FERTILIZER APPLICATION RATE DB90 36 ROW MACHINES					
76 cm (30 in) ROW SPACING					
8 km/h (5 mph)			11.3 km/h (7 mph)		
Pump Setting	Approximate Rate	In-Line Orifice	Pump Setting	Approximate Rate	In-Line Orifice
Value	L/ha (gal/acre)	Size and Color	Value	L/ha (gal/acre)	Size and Color
3.21	28.1 (3.0)	0.70 Green	3.21	28.1 (3.0)	0.70 Green
4.27	37.4 (4.0)		4.27	37.4 (4.0)	
5.34	46.8 (5.0)		5.34	46.8 (5.0)	1.2 Yellow
5.49	56.1 (6.0)		5.49	56.1 (6.0)	
6.41	65.5 (7.0)	1.2 Yellow	6.41	65.5 (7.0)	
7.33	74.8 (8.0)		7.33	74.8 (8.0)	
Many factors affect the orifice size chart including ambient temperature, travel speed, wheel slippage, and type of fertilizer. Use this chart as a guide. (See How to Use Liquid Fertilizer Rate Charts.) The charts are optimized for ground speeds of 8-11 km/h (5-7 mph) and not recommended for speeds over 11 km/h (7 mph).					
To verify the rate, perform a field check. (See Check the Fertilizer Rates.)					

OUO6064,00006CA-19-12APR18

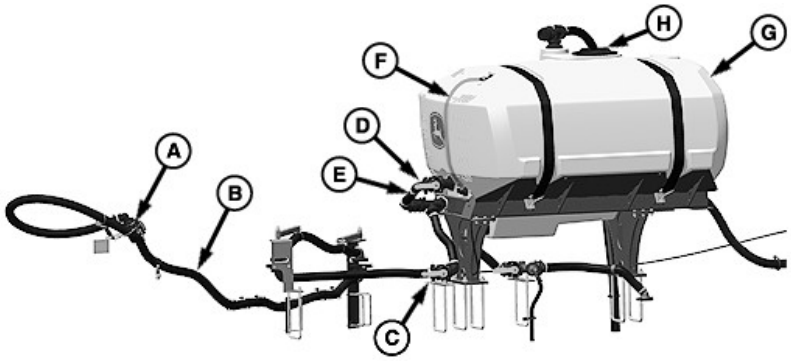
DB80 32-Row 76 cm (30 in) Rate Chart

LIQUID FERTILIZER APPLICATION RATE DB80 32 ROW MACHINES John Blue Pump					
76 cm (30 in) ROW SPACING					
8 km/h (5 mph)			11.3 km/h (7 mph)		
Pump Setting	**Approximate Rate**	**In-Line Orifice**	**Pump Setting**	**Approximate Rate**	**In-Line Orifice**
Value	**L/ha (gal/acre)**	**Size and Color**	**Value**	**L/ha (gal/acre)**	**Size and Color**
4.27	11.4 (3.0)	0.70 Green	4.27	11.4 (3.0)	0.70 Green
5.7	15.1 (4.0)		5.7	15.1 (4.0)	
7.12	18.9 (5.0)		7.12	18.9 (5.0)	1.2 Yellow
5.38	22.7 (6.0)		5.38	22.7 (6.0)	
6.2	26.5 (7.0)	1.2 Yellow	6.2	26.5 (7.0)	
7.01	30.3 (8.0)		7.01	30.3 (8.0)	
Many factors affect the orifice size chart including ambient temperature, travel speed, wheel slippage, and type of fertilizer. Use this chart as a guide. (See How to Use Liquid Fertilizer Rate Charts.) The charts are optimized for ground speeds of 8-11 km/h (5-7 mph) and not recommended for speeds over 11 km/h (7 mph).					
To verify the rate, perform a field check. (See Check the Fertilizer Rates.)					

OUO6064,00006CB-19-12APR18

Liquid Fertilizer—ExactRate Fertilizer Transfer System

Front Fill and Fertilizer Tank Overview



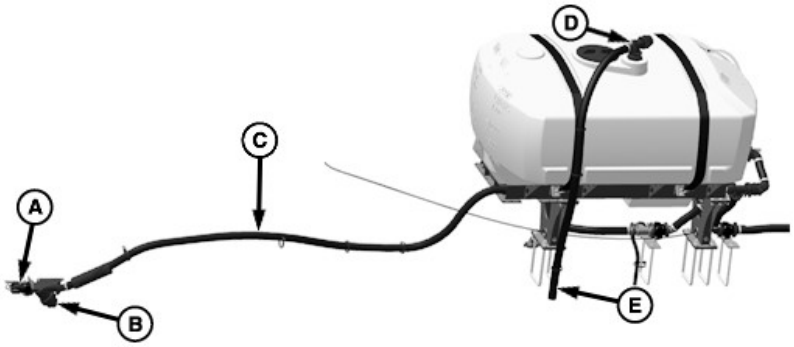
A108886—UN—15DEC20

A—Front Connection Valve
B—Front Fill Hose
C—Front Fill Valve (if equipped)
D—Tank Inlet Valve
E—Tank Inlet Check Valve
F—Tank Sight Tube
G—Fertilizer Tank
H—Fertilizer Tank Lid

This is a graphical overview of the fertilizer transfer system from the viewpoint of an operator using the front fill hose.

WP29706,0000F14-19-18DEC20

Rear Fill and Fertilizer Tank Overview



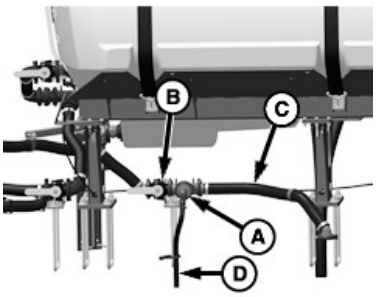
A108887—UN—15DEC20

A—Rear Fill Valve
B—Strainer
C—Rear Fill Hose
D—Anti-Siphon Valve
E—Overflow Hose

This is a graphical overview of the fertilizer transfer system from the viewpoint of an operator using the rear fill hose.

WP29706,0000F15-19-18DEC20

Tank Clean Out or Pump Hose Overview



A108888—UN—15DEC20

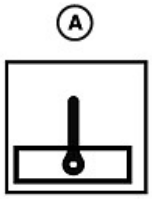
A—Tank Drain Valve
B—Fertilizer Pump Valve
C—Fertilizer Pump Hose

D—Drain Hose

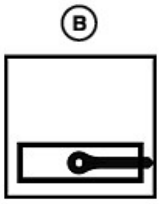
This is a graphical overview of the fertilizer transfer system from the viewpoint of an operator using the tank drain process or fertilizer application process.

WP29706,0000F1D-19-21DEC20

Valve Position Guide



A108845—UN—02DEC20



A108846—UN—02DEC20

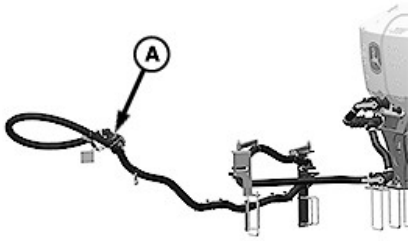
A—Closed
B—Open

This valve position guide shows valve positions for different functions of the fertilizer transfer system.

Function		Front Connection Valve	Front Fill Valve (If Equipped)	Tank Inlet Valve	Rear Fill Valve	Fertilizer Pump Valve	Tank Drain Valve
Fill	From Front	Open	Open	Open	Closed	Any	Closed
	From Rear	Closed	Closed	Open	Open	Any	Closed
Empty Tank		Closed	Closed	Closed	Closed	Open	Open
Applying Fertilizer (no tractor tank)		Closed	Closed	Closed	Closed	Open	Closed
Applying Fertilizer (with tractor tank)		Open	Open	Open	Closed	Open	Closed

WP29706,0000EE8-19-05DEC24

Connect or Disconnect the Implement or Fill Hose



A108890—UN—15DEC20

A—Front Connection Valve

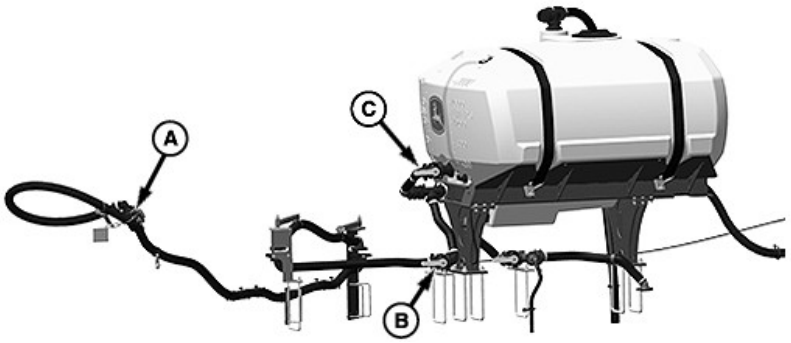
1. Ensure that the front connection valve (A) on the implement is in the closed position.
2. Remove the cover from the front connection valve.

NOTE: Ensure that the tractor quick-hitch valves are in the closed position before disconnection.

3. Connect or disconnect the front connection valve from the tractor or offboard tank hose. When disconnecting the hoses, install the previously removed covers back onto each valve for the tractor or the implement.

WP29706,0000F17-19-18DEC20

Fill Liquid Fertilizer Tanks from Tractor



A108891—UN—15DEC20

A—Front Connection Valve
B—Front Fill Valve
C—Tank Inlet Valve

NOTE: Always ensure that the tank drain valve is in the closed position.

IMPORTANT: To avoid pump damage, do not allow the solution pump to run dry. Stop the pump immediately if the tank level drops below 5% of capacity.

Function		Front Connection Valve (A)	Front Fill Valve (B) (If Equipped)	Tank Inlet Valve (C)	Rear Fill Valve	Fertilizer Pump Valve	Tank Drain Valve
Fill	From Front	Open	Open	Open	Closed	Any	Closed

After connecting the hose from the tractor to the implement, liquid fertilizer can be transferred from the tractor to the liquid fertilizer tank on the implement. A check valve within the T-fitting prevents backpressure from the liquid fertilizer tank on the implement towards the front fill hose.

1. Connect the hose from the tractor to the implement. (See Connect or Disconnect the Implement or Fill Hose.)
2. Position the valves according to the table.
3. Transfer liquid fertilizer to the implement tank by using the procedure in the tractor Operator's Manual.
4. After the liquid fertilizer tank is full on the implement, stop the transfer process and place the valves in the closed position.
5. Disconnect the hose from the tractor to the implement. (See Connect or Disconnect the Implement or Fill Hose.)

WP29706,0000F18-19-18DEC20

Fill Liquid Fertilizer Tanks from Rear of Implement



A108892—UN—15DEC20

A—Rear Fill Valve
B—Tank Inlet Valve
C—Front Fill Valve

IMPORTANT: Avoid pump damage. Do not allow the solution pump to run dry. Stop the pump immediately if the tank level drops below 5% of capacity.

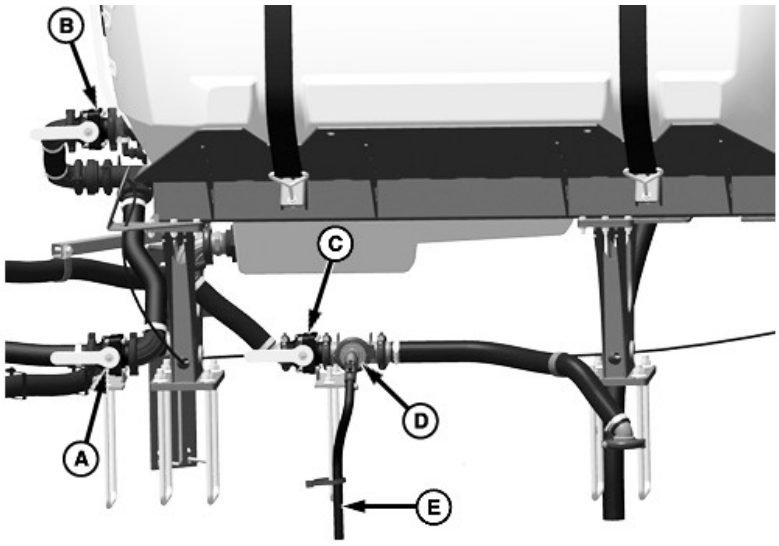
Liquid fertilizer can be transferred from an external source to the liquid fertilizer tank on the implement using the rear fill plumbing. By opening the rear fill valve and the tank inlet valve, liquid fertilizer can be pumped from the external source through the rear fill hose and the T-fitting into the liquid fertilizer tank on the implement. To prevent liquid fertilizer from bypassing the tank and going into the front fill plumbing, ensure that the front fill valve, if equipped, or the front connection valve is placed in the closed position (if the planter has both valves, place both in the closed position).

1. Connect the hose from the tractor to the implement. (See Connect or Disconnect the Implement or Fill Hose.)
2. Always ensure that the tank drain valve is in the closed position. If equipped with the front fill valve (C) on the tractor but filling from an external source through the rear of the implement, ensure that the front fill valve (C) on the tractor is in the closed position.
3. Place the rear fill valve (A) in the open position.
4. Place the tank inlet valve (B) in the open position.
5. Use proper procedure to transfer liquid fertilizer to the implement tank from the external source.
6. After the liquid fertilizer tank is full on the implement, stop the transfer process and place the valves in the closed position.
7. Disconnect the hose from the external source to the implement. (See Connect or Disconnect the Implement or Fill Hose.)

WP29706,0000F19-19-21DEC20

Drain ExactRate Fertilizer Transfer System

1.



A108893—UN—15DEC20

A—Front Fill Valve
B—Tank Inlet Valve
C—Fertilizer Pump Valve
D—Tank Drain Valve
E—Drain Hose

Remove fluid from the tank:

To catch excess fluid, place a container under the drain hose (E) of the liquid fertilizer tank.

2. Place the tank inlet valve (B) and fertilizer pump valve (C) in the closed position. If equipped with the front fill valve (A), place the valve in the closed position.
3. Place the tank drain valve (D) in the open position.
4. After tank is empty, place the tank drain valve in the closed position.
5. **Remove fluid from the front line valve, if equipped:**
   a. Place the tank inlet valve and fertilizer pump valve in the closed position. Place the front line valve in the closed position.
   b. Remove the front connection valve from the implement frame.
   c. Lower or droop the front connection valve and hose into a container for catching excess fluid.
   d. Place the front line valve in the open position.

e. Remove the cover from the front connection valve.

f. Place the front connection valve in the open position, allowing fluid to empty out of the front fill hose into the container.

g. After the front fill hose is empty, place the front connection valve and the front line valve in the closed position.

h. Install the cover onto the front connection valve.

i. Install the front connection valve on the implement frame.

6. **Remove fluid from the front fill hose without a front line valve:**

a. Place the tank inlet valve, fertilizer pump valve, and the front connection valve in the closed position.

b. Remove the front connection valve from the implement frame.

c. Lower or droop the front connection valve and hose into a container for catching excess fluid.

d. Place the tank inlet valve in the open position.

e. Remove the cover from the front connection valve.

f. Place the front connection valve in the open position, allowing fluid to empty out of the front fill hose into the container.

g. After the front fill hose is empty, place the front connection valve and the tank inlet valve in the closed position.

h. Install the cover onto the front connection valve.

i. Install the front connection valve on the implement frame.

7. **Remove fluid from the rear fill hose:**

Place the tank inlet valve, fertilizer pump valve, and the front connection valve in the closed position. If equipped with the front line valve, place the valve in the closed position.

8. To catch excess fluid, place a container under the strainer at the rear of the system.

9. To drain fluid from the rear half of the fertilizer transfer system, remove the strainer plug.

10. Install the strainer plug on the fertilizer system.

WP29706,0000F1A-19-13OCT25

Rinse ExactRate Fertilizer Transfer System

The liquid fertilizer must be rinsed out of the ExactRate fertilizer transfer system before placing the implement in storage or switching chemicals.

- To clean out the fill hoses, use plenty of water and the same steps for filling the liquid fertilizer tank. (See Fill Liquid Fertilizer Tanks from Tractor or Fill Liquid Fertilizer Tanks from Rear of Implement.)
- To clean out the pump system, fill the fertilizer tank with water and use the same steps for rinsing the ExactRate pump system on the implement. (See Rinse System.)
- Once the ExactRate fertilizer transfer system is rinsed, use the same steps when emptying the fertilizer tanks to drain the remaining water out of the ExactRate fertilizer transfer system. (See Drain ExactRate Fertilizer Transfer System.)
- Ensure that all the water is drained and the lines are empty. Leave all the valves in the open position when the implement is being stored at the end of the planting season.
- Do not completely drain the ExactRate fertilizer pump system during the draining process of the ExactRate fertilizer transfer system. The ExactRate fertilizer pump should remain primed at all times.

WP29706,0000EF2-19-09OCT25

Ready System to Apply Fertilizer



A108909—UN—15DEC20

A—Fertilizer Pump Valve

B—Tank Drain Valve

Once the planter fertilizer tank has been filled, the tank is ready to apply fertilizer. By opening the fertilizer pump valve, liquid fertilizer travels from the fertilizer tank to the fertilizer pump and distribution system on the rear of the implement.

1. Open the fertilizer pump valve (A).
2. Ensure that the tank drain valve (B) is closed.
3. Prime the fertilizer pump with liquid fertilizer from the fertilizer tank. (See Prime and Start the ExactRate Pump.)

WP29706,0000F1C-19-14OCT25

Attachments—General

General

IMPORTANT: For proper planter operation, it is important that the planter frame is fully lowered into the correct planting position. Achieving this position can be difficult with some attachment combinations, especially when planting in hard to penetrate soil conditions. If this situation is encountered, take the following action:

Reduce the attachment downforce levels. Avoid using more attachment downforce than is required.

Add frame ballast when the conditions warrant. The ballasts are important if the frame-mounted coulter is being used.

AG,OUO6074,1609-19-12APR18

SeedStar Integrated Pneumatic Downforce System

The SeedStar Integrated Pneumatic Downforce system provides “on-the-go” downforce pressure changes to the planting row units. The system air compressor supplies pressurized air to an air storage tank. The air storage tank provides extra air capacity for fast downforce changes.

With the SeedStar integrated pneumatic downforce:

- The operator can manually make “on-the-go” down force changes from the tractor cab.
- The operator can change the downforce pressure for differing soil types or for irrigated versus dry land soils.

For more information, see your SeedStar Application Help.

OUO6064,0000438-19-10FEB25

SeedStar Electric Drive System

The seed meter drive system uses electric motors to control the speed. The SeedStar monitor controls the speed of each motor.

- The operator matches the seed population to different soil types or to irrigated versus dry soils.
- Multiple population selections are programmed and applied as required.

For more information, see your SeedStar Application Help.

WP29706,00007E7-19-07OCT25

RowCommand

The RowCommand system incorporates an electrical motor in each seed meter to manage seed output, reduce yield loss, and improve harvest capability. Individual meters are grouped into RowCommand sections. RowCommand sections are operated manually or with the John Deere Section Control for automatic operation. See a John Deere dealer or other service provider.

WP29706,00007A6-19-17OCT25

Walking Gauge Wheels



A100354—UN—16APR18

A—Walking Gauge Wheel Attachment

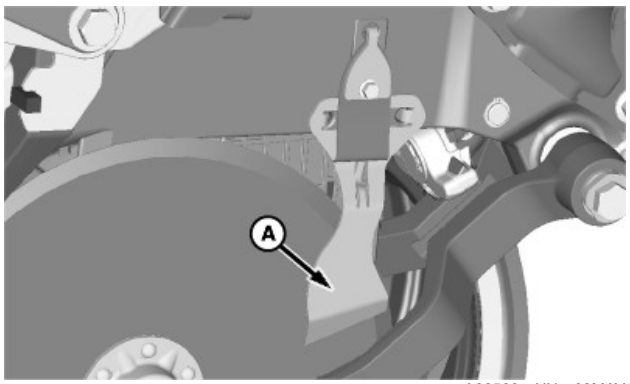
The walking gauge-wheel attachment (A) is recommended for rocky conditions or in fields with rough surface conditions. In rough conditions, the walking gauge-wheel reduces the vertical movement of the opener when one gauge wheel rolls over a solid obstacle. Reduced opener movement increases the seed depth control.

The walking action is reduced when planting deep or shallow.

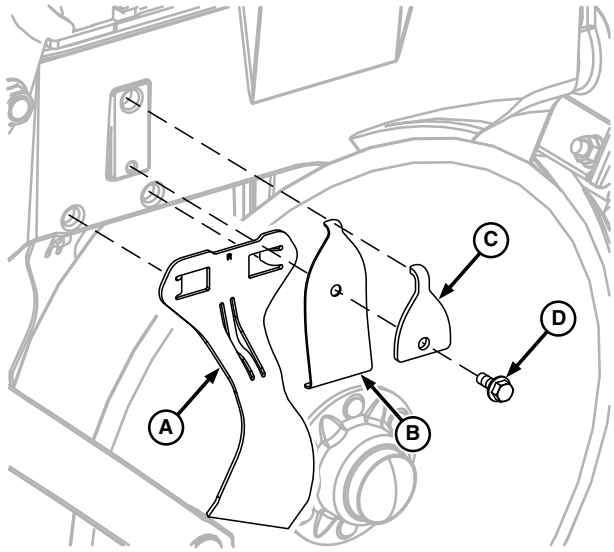
The walking gauge-wheels are not recommended for light soils or highly tilled soil conditions. In those conditions, the gauge wheels can operate at different heights relative to each other resulting in inconsistent seed-depth and poor closing of the seed furrow.

OUO6074,00009D9-19-16APR18

Rigid Scraper



A82568—UN—08MAY14



A82553—UN—08MAY14

A—Rigid Scraper
B—Leaf Spring
C—Spring Backing Plate
D—Cap Screw

IMPORTANT: Avoid disk wear by using the scraper in moist and sticky soil conditions only. Remove the scraper in all other conditions.

The rigid scraper (A) is recommended for use in moist and sticky soil conditions only.

Inspect the scraper insert for wear at the beginning of the season and periodically during the season.

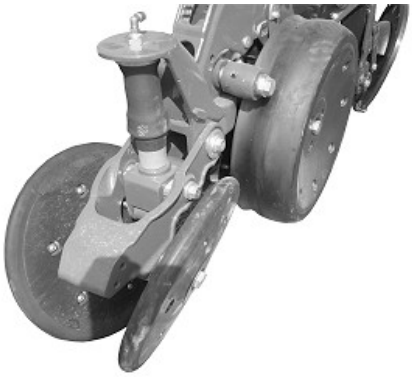
To install the rigid scraper, use the following steps: (Repeat on both sides of each row unit.)

- Install the rigid scraper (A) into the holes on the shank.
- Place the leaf spring (B) over the top of the rigid scraper. Align the upper tab with the hole in the shank.
- Place the spring backing plate (C) over the top of the leaf spring. Align the upper tab with the hole in the shank over the top of the leaf spring tab.
- Insert the cap screw (D) through the spring backing plate and the leaf spring into the shank hole as shown. Tighten the cap screw to specification.

Specification	
Cap Screw (D)—Dry Torque (dry)	16.5 N·m (146 lb·in)

WP29706,00007A7-19-01NOV18

Pneumatic Closing Wheels



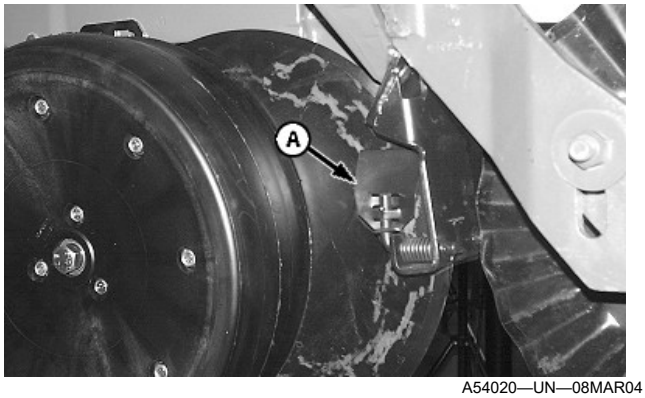
A96924—UN—14JUN17

Pneumatic Closing Wheels

Pneumatic closing wheels are compatible with MaxEmerge 5e and ExactEmerge row units. The closing wheels adjust within seconds using the CommandCenter. Two closing wheel sections are independently adjustable for the outer and center sections. There are 25 different adjustment positions possible. There is up to a 76% increase in consistent force applied at the closing wheel and an additional 32 kg (70 lb) of force available as compared to traditional closing wheels. Consistent closing force promotes consistent seed emergence.

WP29706,0000B8F-19-08OCT25

Heavy-Duty Scraper



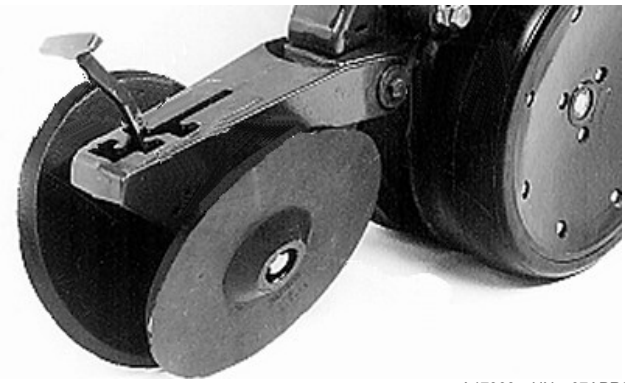
A54020—UN—08MAR04

A—Heavy-Duty Scraper

Use the heavy-duty scraper (A) to clean sticky soils from the opener blades.

OUO6074,00009DA-19-29SEP15

Heavy-Duty Closing Wheels



A47303—UN—07APR01

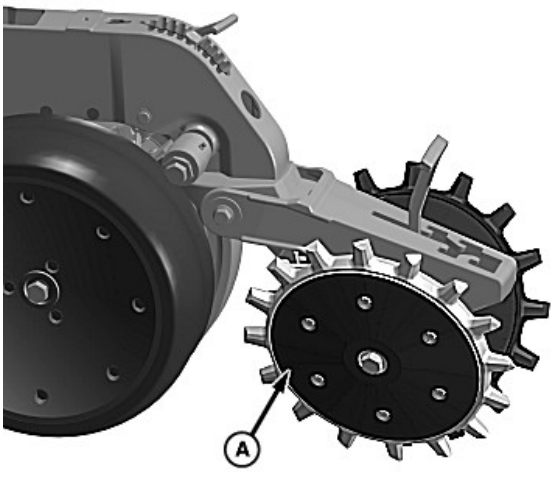
Heavy-Duty Closing Wheels

NOTE: The heavy-duty closing wheels are not recommended for conventional planting conditions.

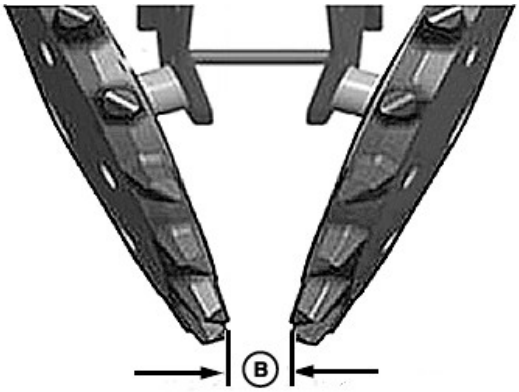
In hard to penetrate soils or seed beds with considerable residue, it is difficult to close the seed furrow completely with regular closing wheels. Heavy-duty closing wheels are made of a heavy cast material and have an aggressive edge to more effectively close the seed furrow in severe soil conditions.

AG,OUO6074,1278-19-02MAY18

Yetter Twister Closing Wheels



A115776—UN—01FEB22



A116494—UN—28MAR22

A—Yetter Twister Closing Wheel (2 used per row unit)
B—Spacing

Yetter Twister closing wheels (A) have a twisted-spike design that breaks up sidewall compaction. The wheels are effective in a wide range of soil conditions. Twister closing wheels help close the seed furrow when soil conditions are less than ideal, and they enhance seed-to-soil contact by reducing air pockets in the seed furrow.

The standard spacing (B) is recommended for most conditions with the wheels mounted in the rear holes. In fields with many contours, consider a wider wheel spacing. Moving the wheels to the front hole position also helps in contour rows. In fields with many small rocks, consider positioning one wheel in the front hole and the other wheel in the rear hole. The recommended speed range is 6—16 km/h (4—10 mph). When operating at the upper end of the range, use a wider wheel spacing and increase the wheel down-pressure.

Reasons to increase down-pressure:

- Air pockets exist at seed depth.
- The furrow openers are creating sidewall compaction.
- The seed furrow is not fully closed.

Decrease down-pressure if the soil is compacted around the seed.

Closing Wheel Spacing	
Standard mm (in)	**Contour mm (in)**
32 (1-1/4)	38 (1-1/2)

CR53390,00002E8-19-07OCT25

Unit-Mounted Coulter

The unit-mounted coulter is used to help the Tru-Vee opener penetrate tough soil conditions and to cut or displace residue commonly found in reduced tillage conditions.

Row unit downforce systems are recommended with this attachment.

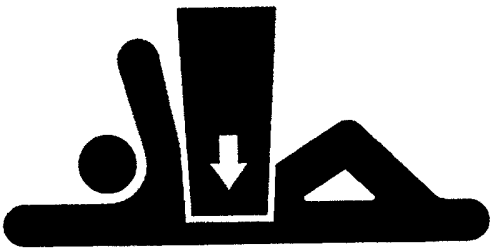
Wet soil can accumulate on the depth gauge wheels and alter the seed depth. If the coulter blade is lifting wet soil to the surface due to dry soil on top and wet soil underneath, either raise the coulter slightly, use a less aggressive coulter blade, or remove the coulter.

NOTE: The frame setup impacts the seed placement and performance of the row unit components.

1. Verify the frame height when fully engaged with the soil. Refer to the frame height adjustment procedure. Verify that the hitch is level when fully engaged with the soil. Refer to the hitch leveling procedure.
2. Either lower the openers onto a solid level surface or lower the planter until the openers touch the ground.

NOTE: The coulter can be positioned below the openers in heavy residue conditions, but monitor the seed depth closely and make adjustments as needed.

3. Inspect the position of the coulter. In normal conditions, the bottom edge of the coulter blade is approximately 6 mm (1/4 in) to 10 mm (3/8 in) higher than the bottom of the furrow openers (seed furrow).



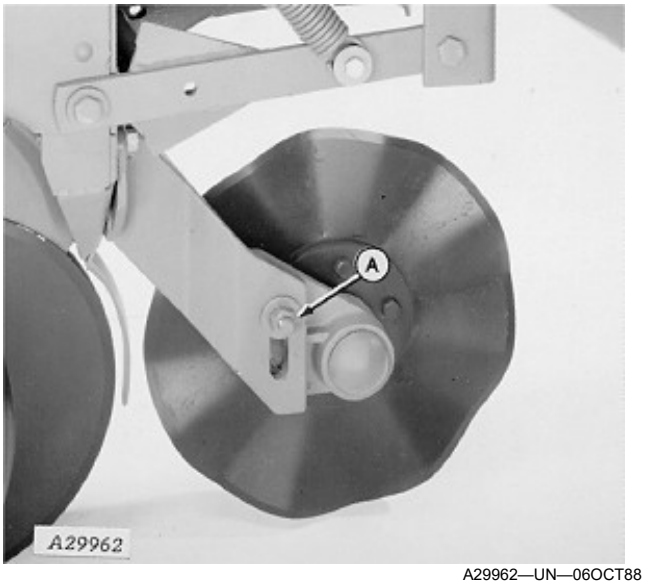
A44347—UN—16DEC97

CAUTION: Avoid a crushing injury or death from a falling implement. Install the service locks before performing any service or adjustments under a raised planter.

Shift the tractor to PARK or set the park brake, stop the engine, and remove the key.

The coulter blades are sharp. Use gloves when handling the blades.

4. Raise the planter and install the service locks.

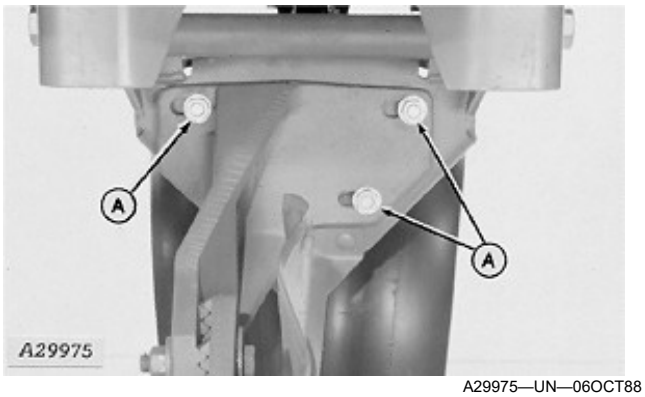


A29962—UN—06OCT88

A—Cap Screw

NOTE: As blade wear occurs, lower the arm to the next notch.

5. Loosen the cap screw (A), adjust the coulter position, and tighten the cap screw.



A29975—UN—06OCT88

A—Cap Screw (3 used)

6. Adjust the coulter blade so it is directly in front of the Tru-Vee opener and is not running at an angle to the direction of travel.

   Loosen the cap screws (A) and slide the coulter left or right. Tighten the cap screws to specification.

Specification

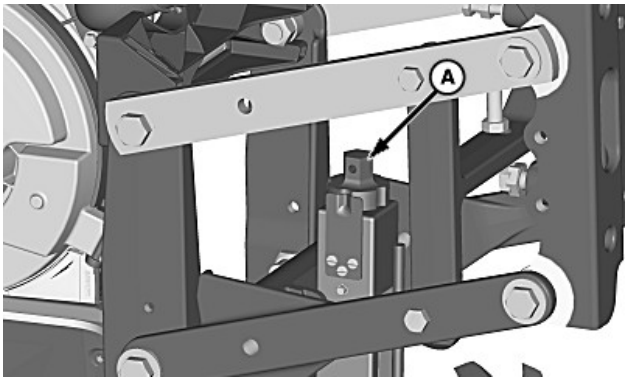
Cap Screw (A)—Dry Torque. . . . . 95 N·m (70 lb·ft)

7. If the coulter blade is at an angle to the direction of travel, do the following:
   a. Remove the cap screws (A).
   b. Add washers between the coulter casting and the front of the row unit frame.

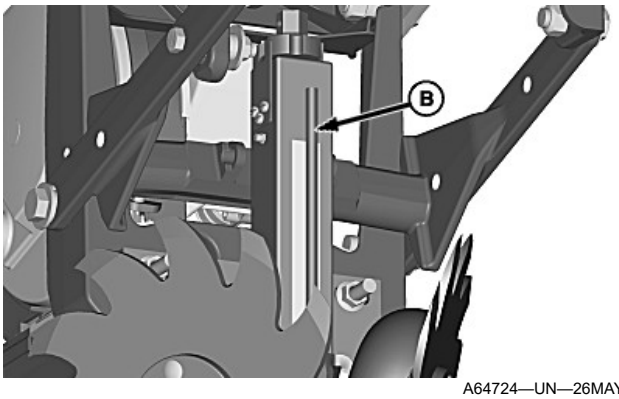
c. Install the cap screws (A) and tighten to specification.

OUO6074,00000B8-19-20APR23

Unit Mounted Row Cleaners (Manual Adjust)



A64723—UN—26MAY09



A64724—UN—26MAY09

A—Knob
B—Depth Gauge

CAUTION: Avoid injury. The row cleaner blades are sharp. Safely support the machine before service.

NOTE: Manual adjust unit-mounted row cleaners are NOT compatible with long parallel arms or double crop conditions.

The function of the row cleaner is to sweep aside residue without moving the soil.

The ground conditions, depth adjustment, and ground speed affect the width of the path cleared.

Operate at a sufficient speed 6.5—9.5 km/h (4—6 mph) to maintain good residue flow.

Do not expect 100% removal of crop residue. Complete residue removal is not necessary. Complete removal requires engagement of the soil, which is not recommended.

Expect the cleaners to stop turning occasionally when the row cleaners are properly adjusted above the soil surface.

Adjust the planter frame height and level the planter for proper row cleaner operation. (See Preparing Machine section.)

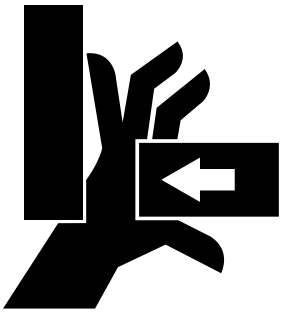
Turn knob (A) to adjust one-row cleaner to engage the residue and not the soil. Test for proper operation and continue to adjust until the height is correct. View the depth gauge (B) and set the remaining row cleaners to the same setting. Verify that all row cleaners are operating correctly.

Adjust the row unit down force to match the residue conditions and maintain the desired seed depth. Avoid operation in excessively rocky conditions. Contact with obstacles can raise the entire row unit and alter the seed depth.

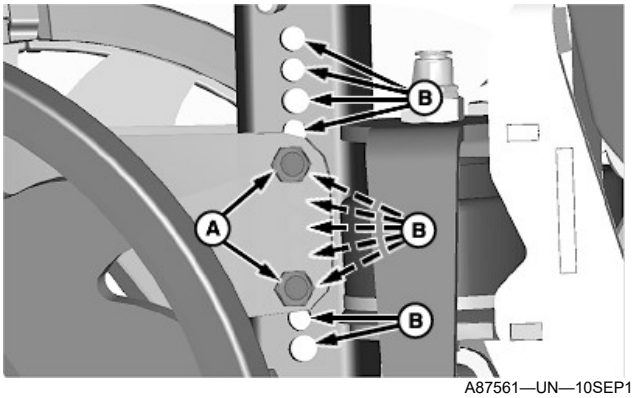
If the residue-clearing action is too aggressive, standard tine tooth wheels can be obtained via regular spare part channels.

NS43404,00001AE-19-20OCT25

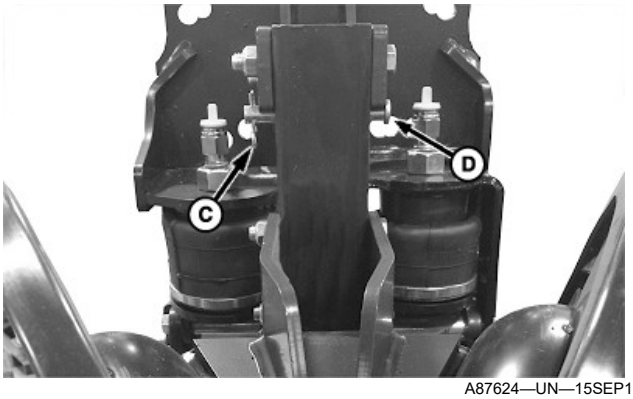
Easy Adjust Row Cleaners



A87928—UN—29SEP15



A87561—UN—10SEP15



A87624—UN—15SEP15

A—Cap Screws and Nuts
B—Height Adjustment Holes
C—Cotter Pin
D—Pin Fastener

CAUTION: Avoid injury. Row cleaner blades are sharp.

Avoid injury from unexpected component movement. Relieve the pneumatic system pressure before service or manual adjustments.

Safely support the planter before service.

IMPORTANT: To prevent damage, remove cotter pin (C) and pin fastener (D) from each row cleaner before operation. The pin can be installed for service or storage.

To lock up the row cleaners for service or storage, use pin fastener (D). Remove the pin before operation.

The function of the row cleaner is to sweep aside residue without moving the soil.

Ground conditions, depth adjustment, and ground speed affect the width of the path cleared.

Do not expect 100% removal of crop residue. Complete residue removal is not necessary. Complete removal requires engagement of soil, which is not recommended.

Expect the row cleaners to stop turning occasionally when they are properly adjusted above the soil surface.

Adjust the planter frame height and level the planter for proper row cleaner operation. (See Preparing Machine section.)

IMPORTANT: Operation with maximum downforce or when mounted in the lowest position can affect the seed depth.

NOTE: Avoid operation in excessively rocky conditions. Contact with obstacles can raise the entire row unit and alter the seed depth.

If the residue clearing action is too aggressive, standard tine tooth wheels can be obtained via regular spare part channels.

Adjust the downforce according to residue conditions and to maintain the target seed depth (See your SeedStar Application Help for on-screen operations and adjustments).

To adjust the initial height of row cleaners, do the following:

1. Adjust the pressure on row cleaners to support them at a mid-level position.
2. Establish the target planting depth.
3. Lower the frame while moving forward.
4. Remove and retain cap screws and nuts (A) from height adjustment holes (B).
5. Position the row cleaner blades above the soil surface then install and tighten cap screws and nuts (A) to specifications.

Specification

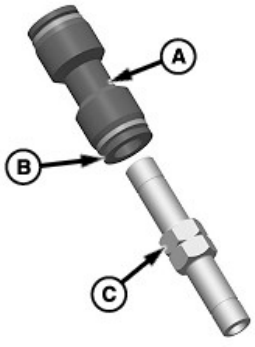
Cap Screws and Nuts
(A)—Torque (dry). . . . . 63 N·m (46 lb·ft)

6. Adjust the pressure according to residue conditions and to maintain the target seed depth (See your SeedStar Application Help for on-screen operations and adjustments).
7. Verify the correct operation of all the row cleaners.

WP29706,0000942-19-23OCT25

Install or Remove the Pneumatic Orifices

Pneumatic Orifice Reference	
Part Number	**Description**
A104616	1 mm
A104617	2 mm
A104618	3 mm
Some planters are not required to use the orifices for the easy adjust row cleaners. Some planters are not offered with specific easy adjust row cleaners or the pneumatic orifices.	



A96368—UN—02MAY17

A—Pneumatic Union
B—Release Sleeve
C—Orifice

NOTE: Each part must get installed back into the proper location. Make a note of the specific location of each orifice or place a matching mark on both the union and orifice for each location when removing.

The orifices are used to keep the pneumatic compressor from cycling too often when the planter is in operation.

Remove or install the orifice with the following:

- To remove the orifice (C) from the pneumatic union (A), hold inward on the release sleeve (B) of the union then pull out on the orifice.
- To install, push one of the orifice (C) ends into the release sleeve (B) of the pneumatic union (A) until it is in the union completely.
- To verify that the orifice is installed properly, pull on the orifice after pushing into the union. If the orifice remains in the union, it is installed properly. If the orifice slides out, repeat the orifice install or the union is damaged on the inside and must be replaced.

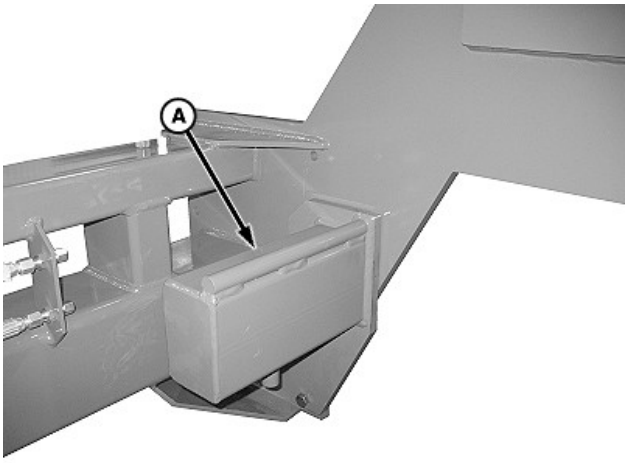
Inspect the orifices before use of the planter and easy adjust row cleaners at the beginning of the planting season for damage or cracks.

Replace any damaged orifices.

See a regular spare part channels for more information or replacement parts.

WP29706,0000B65-19-17OCT25

Ballast Attachment



A68036—UN—02JUL10

A—Bracket

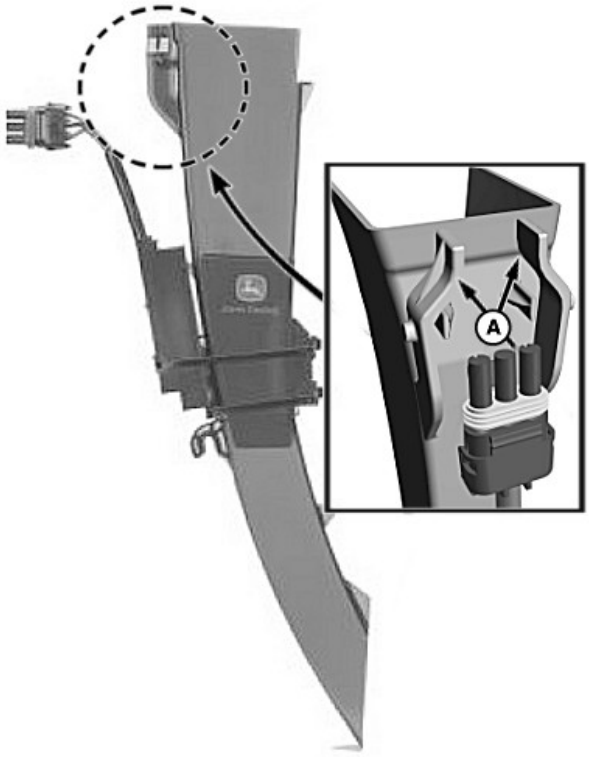
Ballast mounting bracket (A), located in place of markers, accepts tractor weights.

Place weights on bracket as required for proper row unit penetration in hard ground conditions.

NOTE: A full set of weights on ballast bracket is equal to marker weight in raised position.

WP29706,0000685-19-14APR21

Seed Tubes



A116093—UN—11FEB22

A—Tab

Large curved and regular curved seed tubes are available for the MaxEmerge 5 and MaxEmerge 5e seed metering systems.

Large curved seed tubes are recommended for planting large common edible beans, large peanuts, and other large seeds.

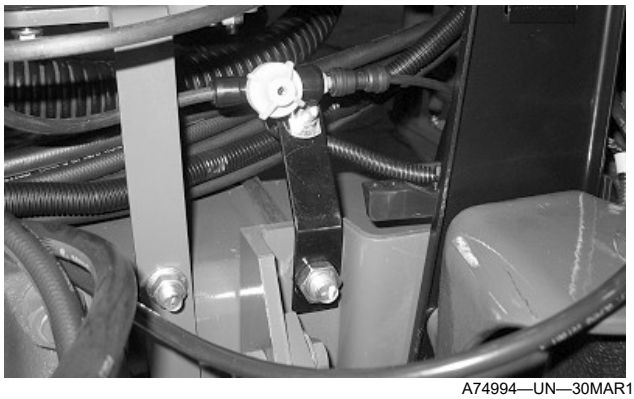
Regular curved seed tubes are recommended for planting acid-delinted cotton, corn, soybeans, sorghum, small common edible beans, sugar beets, and other small seeds.

All of the seed tubes have snap-in tabs (A) for quick seed tube placement.

Remove the seed tubes as needed. (See Install and Remove the Seed Tubes in the Service and Adjustments section for additional information.)

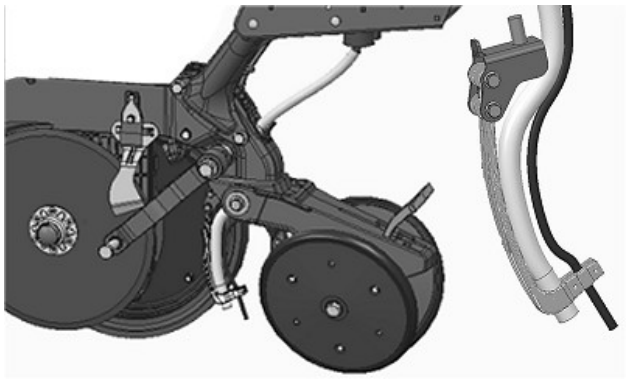
OUO6064,0000560-19-07OCT25

Liquid Fertilizer without John Deere Openers



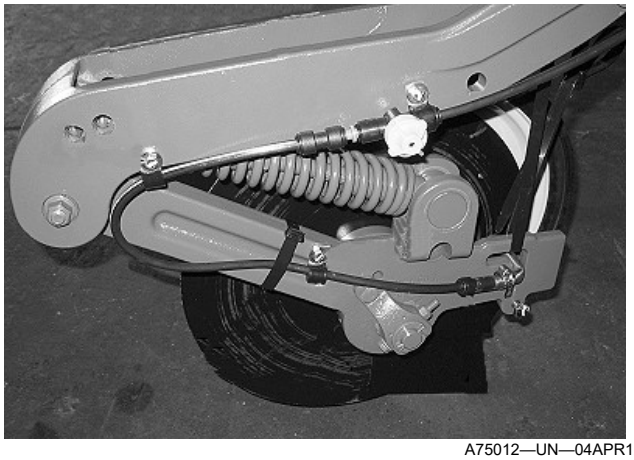
A74994—UN—30MAR12

Valve Location With Unit Mounted Openers



A86695—UN—09JUN15

John Deere In-Furrow Fertilizer



A75012—UN—04APR12

Valve Location with Frame Mounted Openers

NOTE: When using the John Deere fertilizer distribution with aftermarket openers, position the check valves as close as possible to the openers.

See a John Deere dealer or other service provider for more information.

NOTE: John Deere unit mounted and frame-mounted openers are shown for reference. John Deere in-furrow distribution can be obtained via regular spare part channels.

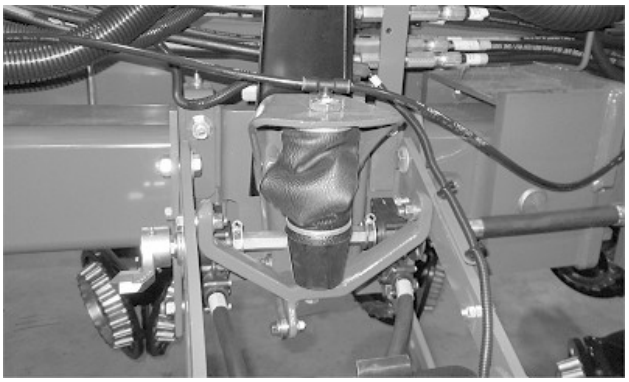
WP29706,00008B2-19-20OCT25

Pneumatic Downforce



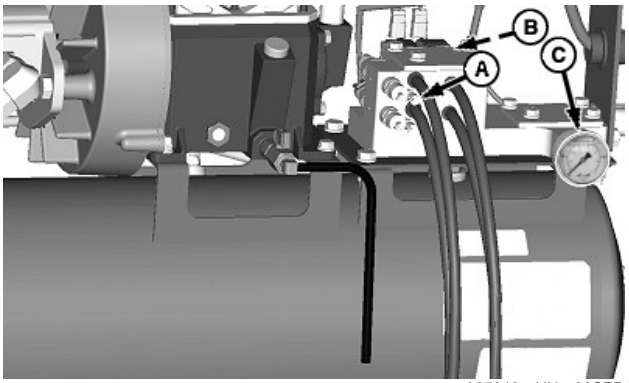
A86003—UN—02APR15

Properly Rolled Air Spring



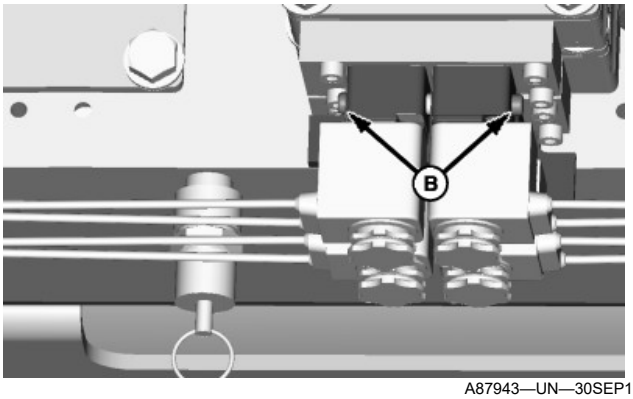
A86004—UN—02APR15

Improperly Rolled Air Spring



A87942—UN—30SEP15

Hydraulic Compressor



A87943—UN—30SEP15

Manual Override (Far Side of Valve Block)

A—Fill Valve (one per block)
B—Manual Overrides (two per block)
C—Tank Gauge

CAUTION: Avoid serious injury from exploding parts due to over-pressurization or operating the system without all of the components in place.

- **Do not inflate the system above 827 kPa (8.2 bar) (120 psi) or 1779 N (400 lb down force).**
- **Do not remove the pressure relief valve.**
- **Do not pressurize the system unless all of the row unit components are in place.**

IMPORTANT: Do not lower the machine with zero air pressure in the system. Maintain 34—55 kPa (0.3—0.5 bar) (4.3--7.8 psi) 76—120 N (17—27 lb downforce) in the system to avoid kinks in the air springs. If an air spring kinks, raise the machine and pressurize the system until the air springs straighten out.

Do not operate if a pinched or unrolled air spring occurs. Lower the system pressure. Manually roll the air spring over the lower piston. Incremental lowering of the machine helps to start the air spring rolling over the lower piston.

NOTE: It is normal for the system air pressure to drop when the frame is raised and increase when the frame is lowered.

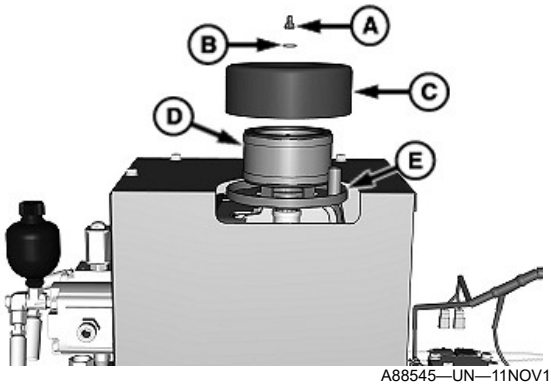
If more down force is needed on the row units that follow tractor tires, install an extra non-adjustable spring on these row units. See a John Deere dealer or other service provider.

1. If the compressor system fails, charge the air-spring circuit at fill valves (A) with shop air.
2. If the control system fails, use manual overrides (B) to increase or decrease the air-spring pressure. Check the air-spring pressure with a tire pressure gauge at fill valve (A).

3. Tank gauge (C) displays the air pressure in the tank not the pressure in the air springs. The normal operating range for tank pressure is 790—1000 kPa (7.9—10 bar) (115—145 psi)

   For more information, see your SeedStar Application Help.

Clean or Replace The Air Compressor Filter



A88545—UN—11NOV15

A—Wing Nut
B—Seal Washer
C—Weather Shield
D—Filter Element
E—Filter Base

⚠ CAUTION: Avoid injury from sudden activation of the compressor. Turn off the tractor before service.

IMPORTANT: Avoid compressor damage. Clean the air filter element every 50 operating hours. Replace the air filter element every 100 operating hours or at the beginning of each season. Filter cleanliness is critical to maintain the performance and service life of the air compressor.

1. Clean any dust from the area around the air filter.
2. Remove the wing nut (A) and the seal washer (B).
3. Remove the weather shield (C).
4. Remove the filter element (D).

IMPORTANT: Avoid filter and compressor damage. Do not damage the filter element while cleaning. To clean the filter, tap the filter lightly on a firm surface.

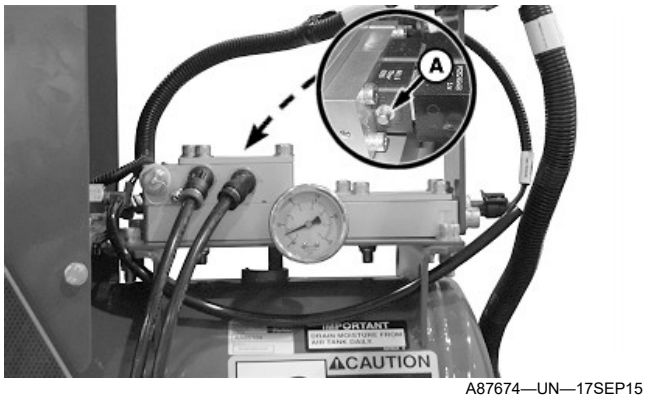
5. Clean the air filter or see a regular spare part channels to purchase a new air filter.

IMPORTANT: Avoid compressor damage. Clean all excess material from filter base (E) before installing the filter.

6. Install the cleaned or new filter.
7. Install the previously removed weather shield (C), seal washer (B), and wing nut (A).
8. Tighten wing nut (A).

OUO6074,0000EDB-19-17OCT25

Depressurize The Pneumatic Downforce System



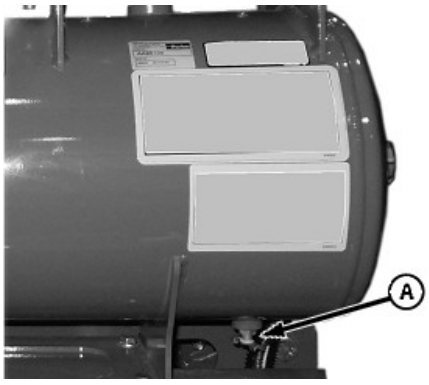
A87674—UN—17SEP15

Exhaust Manual Override

A—Manual Override Button

NOTE: The location and orientation of the air reservoir varies based on the planter model. The procedure is similar for all planter models.

1. Lower the planter to the planting position.
2. On the SeedStar monitor, reduce the down force pressure to 66 N (15 lb).
3. On the rear of the valve stack on the left-hand side, press the manual override button (A) to release the residual air pressure from the air springs.



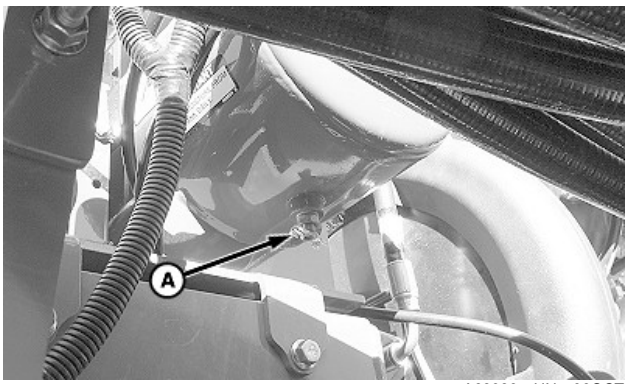
A88550—UN—20NOV15

A—Drain Valve

4. Release the reservoir air pressure by opening the drain valve (A).

OUO6074,0000EDC-19-10FEB25

Drain Air Storage Tank



A68980—UN—06OCT10

Air Tank Drain Valve

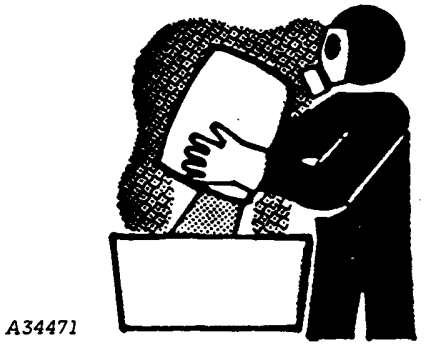
A—Water Drain Valve

Open water drain valve (A). Keep valve open until all water is drained from tank. Drain air storage tank daily and before placing planter in storage.

OUO6064,00005E6-19-08JUN15

Lubricating the Seed Meter

Use of Talc Lubricant



A34471—UN—11OCT88

CAUTION: Avoid chemical injury to eyes, skin, and lungs when accessing and handling components coated with seed treatment. If using seed treatments, use caution when handling parts coated with seed treatment. Read and follow the safety instructions on the product label.

IMPORTANT: Avoid negative effects on seed placement and population from residue on components. Only use lubricants approved for use in seed meters. (See a John Deere dealer or other service provider.)

NOTE: Wax-based lubricant typically has lower levels of inert and seed treatment dust in the vacuum blower exhaust.

Talc lubricant is compatible with MaxEmerge 5 and MaxEmerge 5e seed meters. A meter lubricant (fluency agent) is required for optimum performance of the vacuum seed meter and central commodity system (CCS). To obtain a consistent seed release from the seed disk and improve spacing accuracy, properly lubricate the seed. Seed and seed treatment must be free of clumps.

Farmer-Applied Seed Treatment:

Farmer-applied seed treatments are NOT recommended.

IMPORTANT: Avoid seed meter failure from sticky seeds and meter components due to chemical reactions between farmer-applied seed treatments and commercially applied treatments. If farmer-applied treatments are used, follow recommendations of the chemical manufacturer. Avoid treatments with high oil content. Certain temperature and humidity levels also complicate material compatibility.

If farmer-applied treatment is used, apply seed treatment first, meter lubricant second, and allow seed treatment to dry before placing seed in hoppers and CCS tanks. If seed treatment accumulates in the meter while using the following lubricant application rates, contact the treatment manufacturer for assistance.

Commercially Treated Seed:

Some treated seed is coated with commercially applied lubricant. To maintain meter performance, apply the recommended amount of lubricant in addition to the commercial application.

IMPORTANT: Avoid meter malfunction due to poor seed flow. Thoroughly incorporate the lubricant. Verify that all seeds are evenly coated.

NOTE: If the lubricant builds up in the bottom of the hopper, reduce the amount of lubricant.

When using 1.6, 2.0, 2.7, or 3.0 bushel hoppers (without CCS tanks) to deliver seed to seed meters, use the following table:

Application Rate in Row Unit Hoppers	
NOTE: Thoroughly incorporate the lubricant until all seeds are coated.	
Hopper Size	**Amount of Lubricant**
58 L (1.6 bu)	120 mL (1/2 cup)
70 L (2.0 bu)	177 mL (3/4 cup)
9.5 L (2.7 bu)	240 mL (1 cup)
106 L (3.0 bu)	
Per 80 000 Kernel Seed Unit	74 mL (5 tbsp) (2.5 oz)

When using CCS system to deliver seed to seed meters, use the following table:

Application Rate in CCS Tanks	
NOTE: Apply lubricant to seed as seed enters tank. All seeds must be coated to ensure movement through the CCS system and for proper meter performance. Mix seed and lubricant as necessary.	
CCS Tank Size	**Amount of Lubricant**
880 L (25 bu) Bulk Tank	1.9 L (8 cups)
1233 L (35 bu) Bulk Tank	2.6 L (11 cups)
1585 L (45 bu) Bulk Tank	3.3 L (14 cups)
1762 L (50 bu) Bulk Tank	3.8 L (16 cups)
1938 L (55 bu) Bulk Tank	4.3 L (18 cups)
2290 L (65 bu) Bulk Tank	4.7 L (20 cups)
Per 80 000 Kernel Seed Unit	74 mL (5 tbsp) (2.5 oz)

Adjust lubricant rates until all seeds are coated, while avoiding an accumulation of lubricant in the bottom of the hopper.

Double the lubricant recommendation when planting small seed, large seed, seeds with heavy treatment, or in humid planting conditions.

Triple the lubricant recommendation when a

combination of sticky seed treatments, large or small seed, and high humidity occurs.

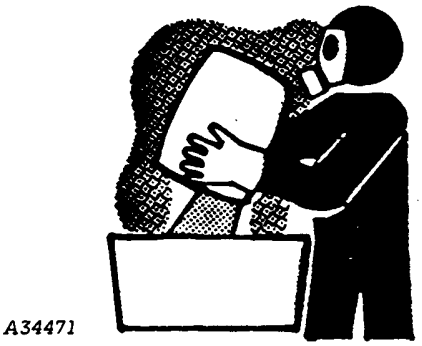
IMPORTANT: Avoid meter malfunction from the formation of lubricant clumps. Clean excess seed treatment and lubricant out of hoppers between fills.

If vacuum system requires frequent cleanout, reduce the amount of lubricant. If a coating of seed treatment is found on seed disks, increase the amount of lubricant.

When using seed treatments, clean the seed meters and seed disks with warm, soapy water. Spray a graphite coating on the vacuum seal side of the seed disks as needed.

OUO6045,00006CD-19-15OCT25

Use of Blended Talc and Graphite Lubricant



A34471—UN—11OCT88

CAUTION: Avoid chemical injury to eyes, skin, and lungs when accessing and handling components coated with seed treatment. If using seed treatments, use caution when handling parts coated with seed treatment. Read and follow the safety instructions on the product label.

IMPORTANT: Avoid negative effects on seed placement and population from residue on components. Only use lubricants approved for use in seed meters. (See a John Deere dealer or other service provider.)

NOTE: Wax-based lubricant typically has lower levels of inert and seed treatment dust in the vacuum blower exhaust.

Blended talc and graphite lubricant is compatible with ExactEmerge seed meters. A meter lubricant (fluency agent) is required for optimum performance of the vacuum seed meter and central commodity system (CCS). The blend is 80% talc and 20% graphite. To obtain a consistent seed release from the seed disk (bowl) and improve spacing accuracy, properly lubricate the seed. Seed and seed treatment must be free of clumps.

Farmer-Applied Seed Treatment

Farmer-applied seed treatments are NOT recommended.

IMPORTANT: Avoid seed meter failure from sticky seeds and meter components due to chemical reactions between farmer-applied seed treatments and commercially applied treatments. If farmer-applied treatments are used, follow recommendations of the chemical manufacturer. Avoid treatments with high oil content. Certain temperature and humidity levels also complicate material compatibility.

If farmer-applied treatment is used, apply seed treatment first, meter lubricant second, and allow seed treatment to dry before placing seed in hoppers and CCS tanks. If seed treatment accumulates in the seed meter while using the following lubricant application rates, contact the treatment manufacturer for assistance.

Commercially Treated Seed

Some treated seed is coated with commercially applied lubricant. To maintain meter performance, apply the recommended amount of lubricant in addition to the commercial application.

IMPORTANT: Avoid meter malfunction due to poor seed flow. Thoroughly incorporate the lubricant. Verify that all seeds are evenly coated.

NOTE: If the lubricant builds up in the bottom of hopper, reduce the amount of lubricant.

When using 1.6, 2.0, 2.7, or 3.0 bushel hoppers (without CCS tanks) to deliver seed to seed meters, use the following table:

Application Rate in Row Unit Hoppers	
NOTE: Thoroughly incorporate the lubricant until all seeds are coated.	
Hopper Size	**Amount of Lubricant**
58 L (1.6 bu)	120 mL (1/2 cup)
70 L (2.0 bu)	177 mL (3/4 cup)
95 L (2.7 bu)	240 mL (1 cup)
106 L (3.0 bu)	
Per 80 000 Kernel Seed Unit	74 mL (5 tbsp) (2.5 oz)

When using CCS system to deliver seed to seed meters, use the following table:

Application Rate in CCS Tanks	
NOTE: Apply lubricant to seed as seed enters tank. All seeds must be coated to ensure movement through the CCS system and for proper meter performance. Mix seed and lubricant as necessary.	
CCS Tank Size	**Amount of Lubricant**
880 L (25 bu) Bulk Tank	1.9 L (8 cups)
1233 L (35 bu) Bulk Tank	2.6 L (11 cups)
1585 L (45 bu) Bulk Tank	3.3 L (14 cups)
1762 L (50 bu) Bulk Tank	3.8 L (16 cups)
1938 L (55 bu) Bulk Tank	4.3 L (18 cups)
2290 L (65 bu) Bulk Tank	4.7 L (20 cups)
Per 80 000 Kernel Seed Unit	74 mL (5 tbsp) (2.5 oz)

Adjust lubricant rates until all seeds are coated, while avoiding an accumulation of lubricant in the bottom of hopper.

Double the lubricant recommendation when planting small seed, large seed, seeds with heavy treatment, or in humid planting conditions.

Triple the lubricant recommendation when a combination of sticky seed treatments, large or small seed, and high humidity occurs.

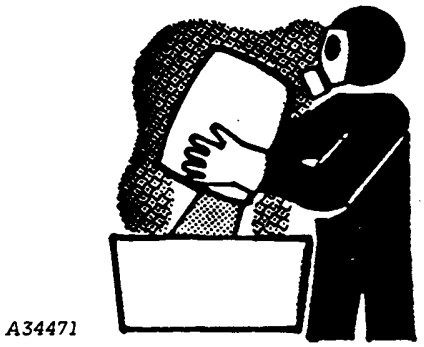
IMPORTANT: Avoid meter malfunction from the formation of lubricant clumps. Clean excess seed treatment and lubricant out of hoppers between fills.

If vacuum system requires frequent cleanout, reduce the amount of lubricant. If a coating of seed treatment is found on seed disks (bowls), increase the amount of lubricant.

When using seed treatments, clean the seed meters and seed disks (bowls) with warm, soapy water. Spray a graphite coating on the vacuum seal side of seed disks (bowls) as needed.

WP29706,00006FE-19-17OCT25

Use of Wax-Based Lubricant



A34471—UN—11OCT88

CAUTION: Avoid chemical injury to eyes, skin, and lungs when accessing and handling components coated with seed treatment. If using seed treatments, use caution when handling parts coated with seed treatment. Read and follow the safety instructions on the product label.

IMPORTANT: Avoid negative effects on seed placement and population from residue on components. Only use lubricants approved for use in seed meters. (See a John Deere dealer or other service provider.)

NOTE: Wax-based lubricant typically has lower levels of inert and seed treatment dust in the vacuum blower exhaust.

Wax-based lubricant (fluency agent) is compatible with MaxEmerge 5, MaxEmerge 5e, and ExactEmerge seed meters. A meter lubricant (fluency agent) is required for optimum performance of the vacuum seed meter and central commodity system (CCS). To obtain a consistent seed release from the seed disk and improve spacing accuracy, properly lubricate the seed. Seed and seed treatment must be free of clumps.

Farmer-Applied Seed Treatment

Farmer-applied seed treatments are NOT recommended.

IMPORTANT: Avoid seed failure from sticky seeds and meter components due to chemical reactions between farmer-applied seed treatments and commercially applied treatments. If farmer-applied treatments are used, follow recommendations of the chemical manufacturer. Avoid treatments with high oil content. Certain temperature and humidity levels also complicate material compatibility.

If farmer-applied treatment is used, apply seed treatment first, meter lubricant second, and allow seed treatment to dry before placing seed in hoppers and CCS tanks. If seed treatment accumulates in the meter while using the following lubricant application rates, contact the treatment manufacturer for assistance.

Commercially Treated Seed

Some treated seed is coated with commercially applied lubricant. To maintain meter performance, apply the recommended amount of lubricant in addition to the commercial application.

IMPORTANT: Avoid meter malfunction due to poor seed flow. Thoroughly incorporate the lubricant. Verify that all seeds are evenly coated.

NOTE: If the lubricant builds up in the bottom of hopper, reduce the amount of lubricant.

When using 1.6, 2.0, 2.7, or 3.0 bushel hoppers (without CCS tanks) to deliver seed to seed meters, use the following table:

Application Rate in Row Unit Hoppers	
NOTE: Thoroughly incorporate the lubricant until all seeds are coated.	
Hopper Size	**Amount of Lubricant**
58 L (1.6 bu)	48 mL (1/5 cup)
70 L (2.0 bu)	60 mL (1/4 cup)
95 L (2.7 bu)	90 mL (3/8 cup)
106 L (3.0 bu)	
Per 80 000 Kernel Seed Unit	30 mL (1/8 cup)

When using CCS system to deliver seed to seed meters, use the following table:

Application Rate of Approved Fluency Agents in CCS Tanks	
NOTE: Apply fluency agents to seed as seed enters tank. All seeds must be coated to ensure movement through the CCS system and for proper meter performance. Mix seed and fluency agent as necessary.	
CCS Tank Size	**Amount of Wax-Based Agent**
880 L (25 bu) Bulk Tank	0.75 L (3-1/8 cups)
1233 L (35 bu) Bulk Tank	1.05 L (4-3/8 cups)
1585 L (45 bu) Bulk Tank	1.3 L (5-5/8 cups)
1762 L (50 bu) Bulk Tank	1.5 L (6-1/4 cups)
1938 L (55 bu) Bulk Tank	1.6 L (6-7/8 cups)
2290 L (65 bu) Bulk Tank	1.9 L (8-1/8 cups)
Per 80 000 Kernel Seed Unit	30 mL (2 tbsp) (1 oz)

Adjust lubricant rates until all seeds are coated, while avoiding an accumulation of lubricant in the bottom of the hopper.

Double the lubricant recommendation when planting small seed, large seed, seeds with heavy treatment, or in humid planting conditions.

Triple the lubricant recommendation when a combination of sticky seed treatments, large or small seed, and high humidity occurs.

IMPORTANT: Avoid meter malfunction from the formation of lubricant clumps. Clean excess seed treatment and lubricant out of hoppers between fills.

If vacuum system requires frequent cleanout, reduce the amount of lubricant. If a coating of seed treatment is found on seed disks, increase the amount of lubricant.

When using seed treatments, clean the seed meters and seed disks with warm, soapy water. Spray a graphite coating on the vacuum seal side of seed disks as needed.

WP29706,00007A0-19-15OCT25

Lubricate and Maintain the Machine Safely



N40000—UN—28SEP88

CAUTION: To help prevent serious injury or death to you or others caused by unexpected movement, service the machine on a level surface. Lower the machine to the ground or sufficiently lock or block the raised machine before servicing. If the machine is connected to a tractor, engage the park brakes and place the transmission in "Park", shut off the engine and remove the key. If the machine is detached from the tractor, block the wheels and use shop stands to prevent movement.

AG,OUO6074,1354-19-29MAR18

Perform Lubrication and Maintenance Procedures

CAUTION: Do not clean, lubricate, or adjust the machine while it is in motion.

IMPORTANT: The recommended service intervals are based on normal conditions; severe or unusual conditions require more lubrication.

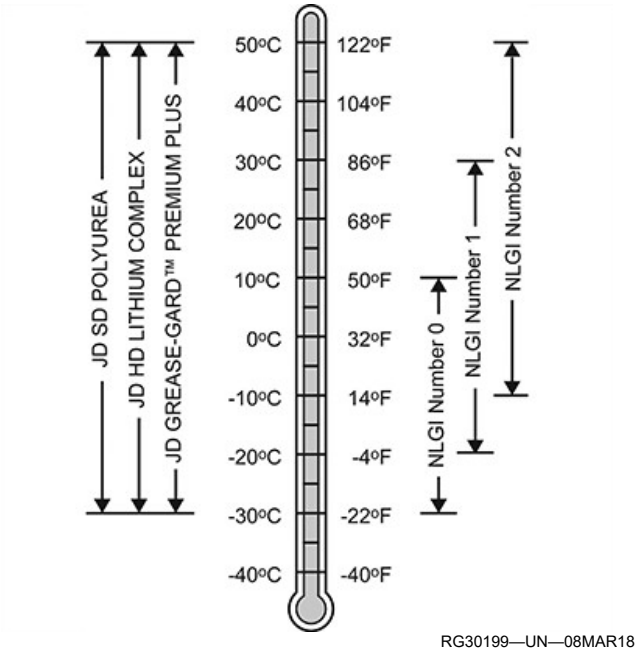
Perform each lubrication and service procedure illustrated in this section at the beginning and end of each season.

Clean the grease fittings before applying grease. Replace any lost or broken fittings immediately. If a new fitting fails to accept grease, remove it and check it for failure of the adjoining parts.

AG,OUO6074,1355-19-29MAR18

Multipurpose Extreme Pressure (EP) Grease

IMPORTANT: For automated lubrication systems, different ambient air temperatures must be considered.



RG30199—UN—08MAR18

Greases for Air Temperature Ranges

Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

John Deere SD Polyurea Grease is preferred.

The following greases are also recommended:

- John Deere HD Lithium Complex Grease
- John Deere Grease-Gard Premium Plus

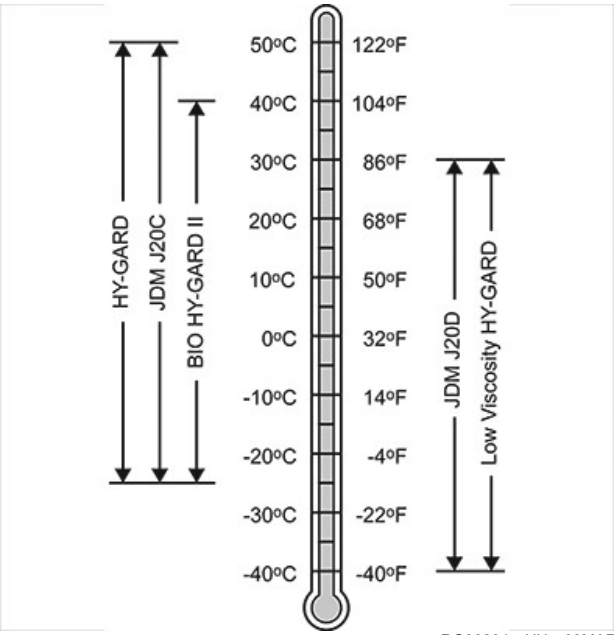
Other greases may be used if they meet the following:

- NLGI Performance Classification GC-LB
- ISO-L-X-BDHB 2 or DIN KP 2 N-10 Lithium Complex, Non-Synthetic Base Oil (100 to 220 mm2/s @ 40°C)

IMPORTANT: Some types of thickeners, base oils, and additives used in greases are not compatible with others. Mixing greases should be avoided. Consult your grease supplier before mixing different types of grease.

DX,GREA1(T)-19-06APR22

Transmission, Steering, Brake, Hydraulic, and Gear Case Oil



RG30204—UN—08MAR18

Oils for Air Temperature Ranges

Use an oil viscosity based on the expected air temperature range during the period between oil changes.

The following oils are preferred:

- John Deere Hy-Gard
- John Deere Low Viscosity Hy-Gard

Other oils may be used if they meet one of the following:

- John Deere Standard JDM J20C
- John Deere Standard JDM J20D

Use John Deere Bio Hy-Gard II oil when a biodegradable fluid is required.[1]

DX,OIL1(T)-19-06APR22

Lubrication Symbols



A54361—UN—24MAY04

Lubricate with TY6350 John Deere Multi-Purpose Spray Lubricant as required.

Lubricate with John Deere grease at an hourly interval indicated on symbol. If other greases are used, grease should contain 3—5% molybdenum disulfide.

Pack wheel bearings with axle bearing grease at hourly interval indicated on symbol.

Lubricate with SAE 10W oil at hourly interval indicated on symbol.

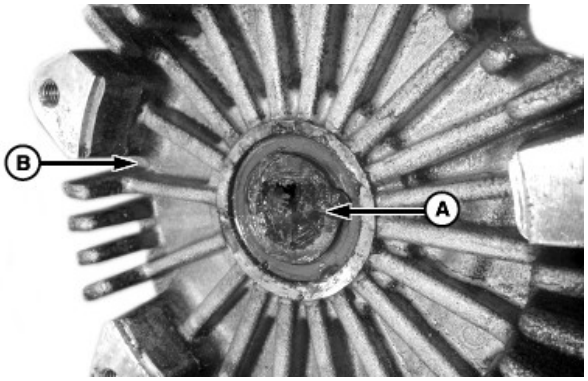
OUO6074,0000CB6-19-04DEC19

Alternative Lubricants

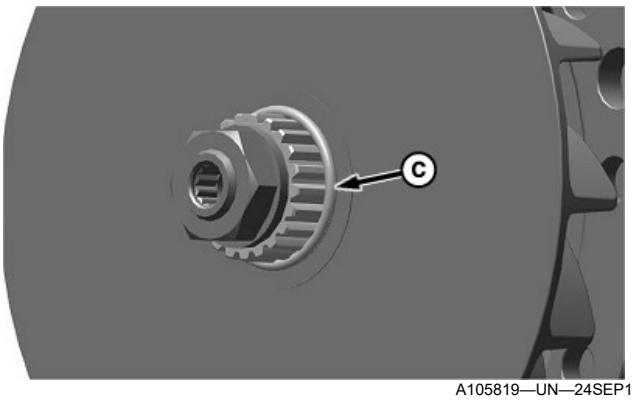
Conditions in certain geographical areas require special lubricants and lubrication practices which do not appear in this operator's manual. To obtain the latest information and recommendations, see a John Deere dealer or other service provider.

AG,OUO6074,1357-19-15OCT25

Tractor Power Generator

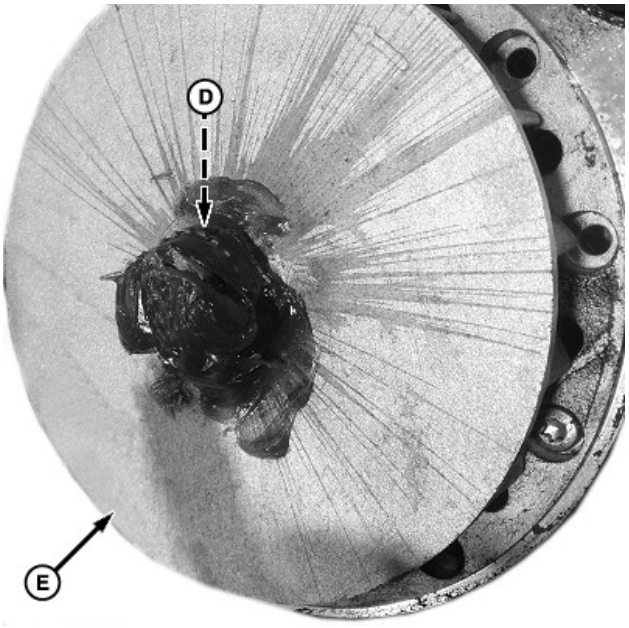


A102783—UN—29NOV18

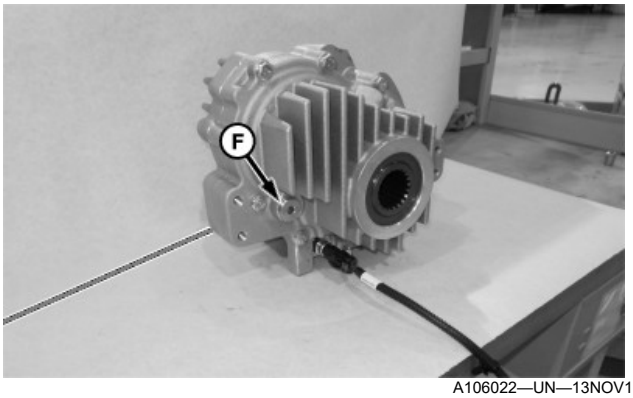


A105819—UN—24SEP19

[1] *Bio Hy-Gard II meets or exceeds the minimum biodegradability of 80% within 21 days according to CEC L-33-T-82 test method. Bio Hy-Gard II should not be mixed with mineral oils because it reduces the biodegradability and makes proper oil recycling impossible.*



A105820—UN—24SEP19



A106022—UN—13NOV19

Gear Case Oil

A—Cavity
B—Gear Case
C—O-Ring (A120963)
D—Gear
E—Alternator
F—Plug

Tractor Power Generator: See grease and oil specifications at the beginning of this section.

NOTE: John Deere HD Moly grease is preferred.

IMPORTANT: To avoid damage, protect the temperature sensor while handling the gear case.

Do not place the gear case on top of objects that damage the sensor.

IMPORTANT: Avoid damage to the gear and shaft. Lubricate the gear every time the alternator is installed and annually.

NOTE: The O-ring helps retain the grease on the gear after grease has been applied.

Using the specified lubricant, fill the cavity (A) on the gear case (B). Verify that the O-ring (C) is installed on the gear (D) of the alternator (E). Apply the same amount of lubricant to the gear (D) on the alternator (E).

Gear Lubrication — Specification

Gear Grease—Type. .. . . . . Class GC-LB with 3 to 5% Molybdenum Disulfide

Interval—Time. . . . . Each Installation and Annually

Place the gear case in the upright position as shown on a level surface. Remove plug (F). Verify that the oil is level with the hole. Add John Deere Hy-Gard oil as needed.

To replace the oil:

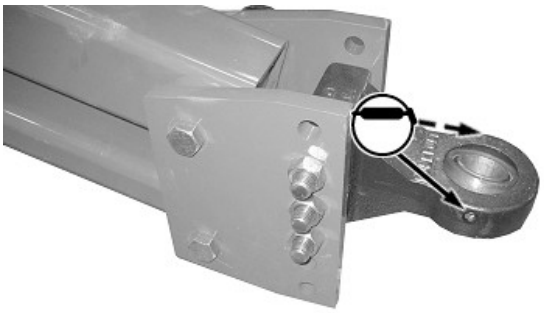
1. Remove plug (F) and tilt the gear case until all the oil drains from the plug hole.
2. After draining is complete, place the gear case in the upright position as shown on a level surface.
3. Fill with approximately 0.5 L (17 fl oz) of John Deere Hy-Gard oil or until level with the bottom of the plug hole.
4. Install the plug into the gear case.

BB83525,0000650-19-07OCT25

Lubrication Intervals

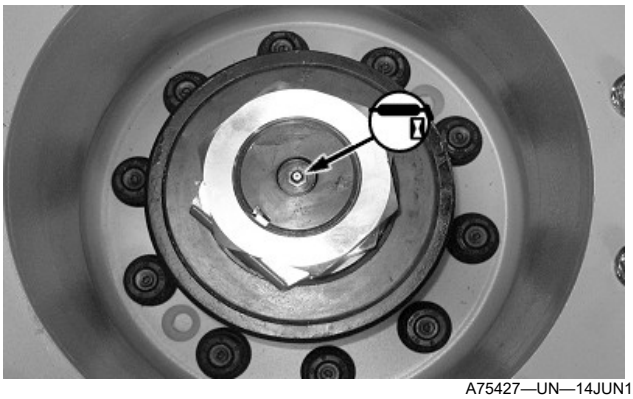
Lubrication Intervals								
Item	**Start of Season**	**As Required**	**10 Hours or Daily**	**20 Hours**	**50 Hours**	**200 Hours**	**Middle of Season**	**End of Season**
Depth Gauge Wheels			•					
Row Cleaner					•			
Unit Mounted Coulter						•		
Vacuum Seed Meters	•	•						
Fertilizer Drive Chain	•	•						•
Piston Pump Shafts			•					

Lubrication Intervals								
Item	**Start of Season**	**As Required**	**10 Hours or Daily**	**20 Hours**	**50 Hours**	**200 Hours**	**Middle of Season**	**End of Season**
Piston Pump Crankcase			•					
Front Hitch Pivots					•			
Rear Hitch Pivots					•			
Wing Wheel Pivots			•					
Wishbone Pivots					•			
Lift Cylinders					•			
Fold Cylinders					•			
Center Marker Pivots			•					
Main Frame Pivots			•					
Wing Fold Pivots			•					
Rear Center Hitch Roller								
Wing Flex Pivots			•					
Front Hitch Pivots					•			
Hitch Link				•				
Rear Center Hitch Roller					•			
Rear Steering					•			
Center Frame Wheel Hubs[a]	•						•	
Track Pivots					•			
Track Hubs[b]		•						
Tractor Power Generator: Alternator Gear and Socket	•	During each installation or annually.						
Tractor Power Generator: Gear Case	Check Oil							Replace gear case oil.
Oil level in the hydraulic air compressor.			Check					
Hydraulic compressor oil.[c]								Change
[a]10—15 pumps of grease only								
[b]Change oil on all hubs after 20,000 acres or 5 years, whichever comes first. Use Hy-Gard hydraulic oil or JDM J20C equivalent.								
[c]Change the compressor pump oil after the first 20 hours of operation, then seasonally afterward.								



A71342—UN—25APR11

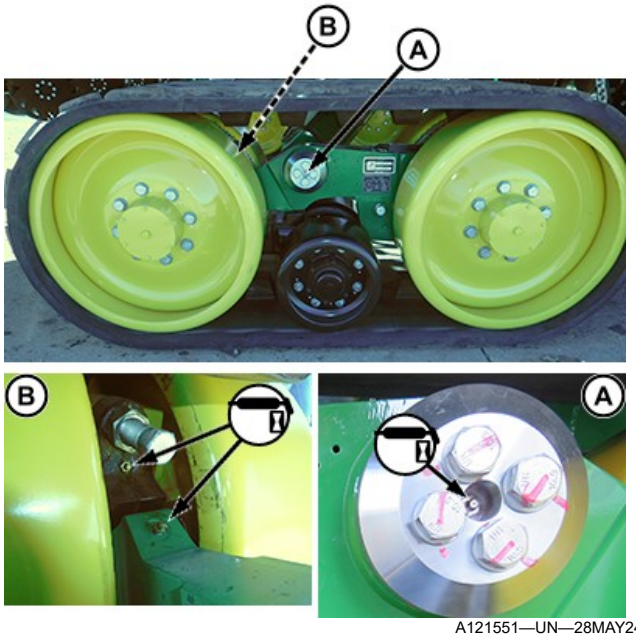
Hitch Link



A75427—UN—14JUN12

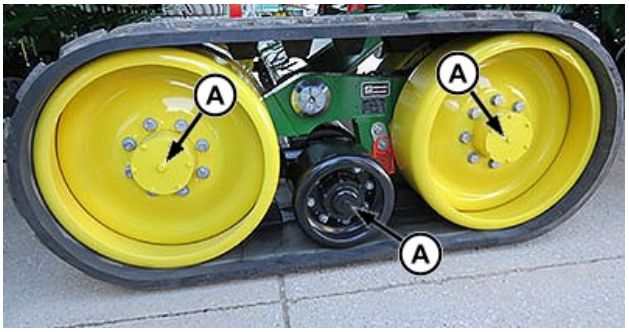
Center Frame Wheel Hub

NOTE: Lubrication point on the center frame wheel is not used on all models.



A121551—UN—28MAY24

Track Pivots

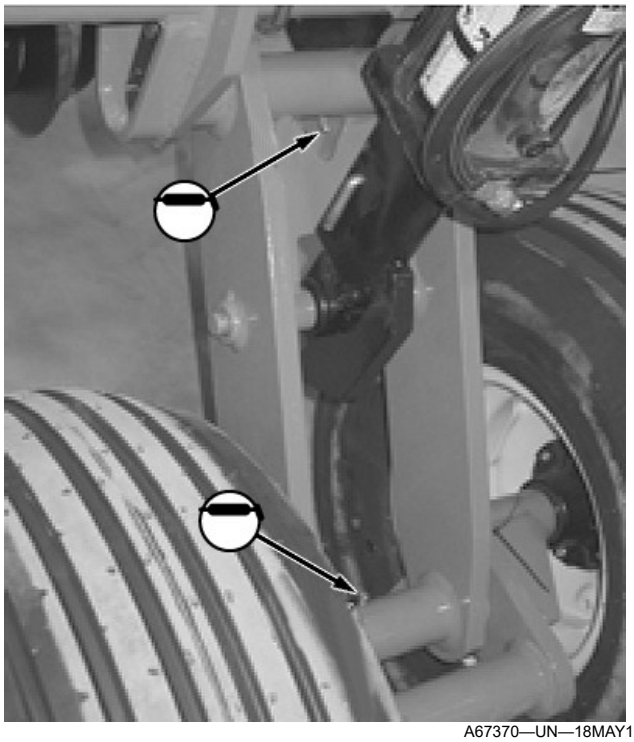


A121552—UN—23MAY24

Track Hubs

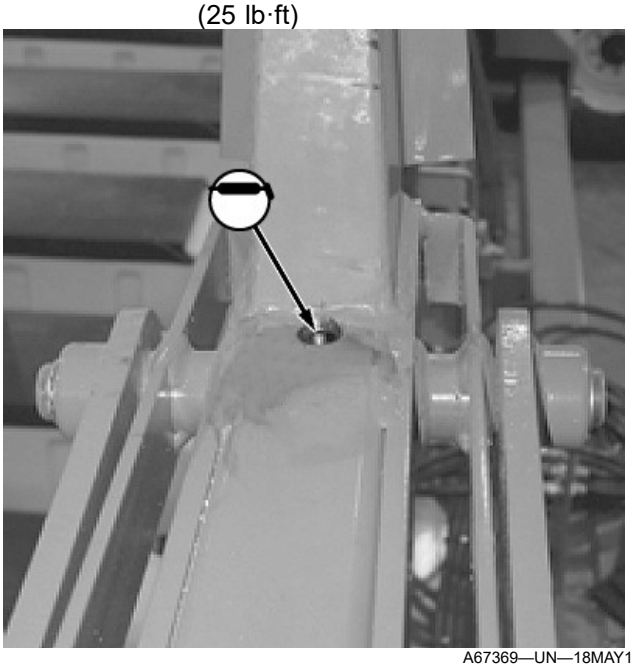
Remove plug (A), fill to bottom of the hole, and install the plug. Tighten the plug to specification.

Item	Measurement	Specification
Plug (A)	Torque	34 N·m (25 lb·ft)



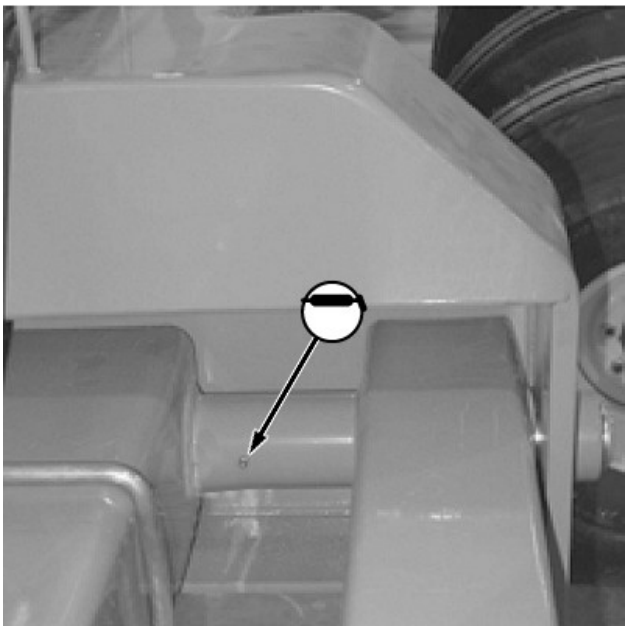
A67370—UN—18MAY10

Wing Wheel Pivots



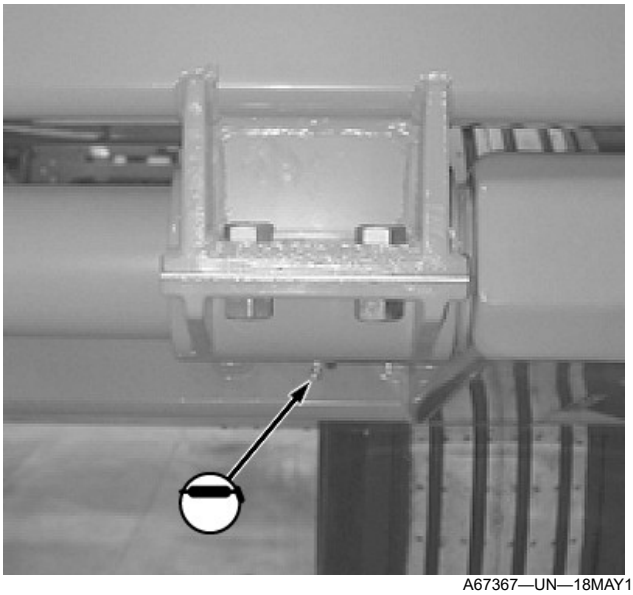
A67369—UN—18MAY10

Center Marker Pivots



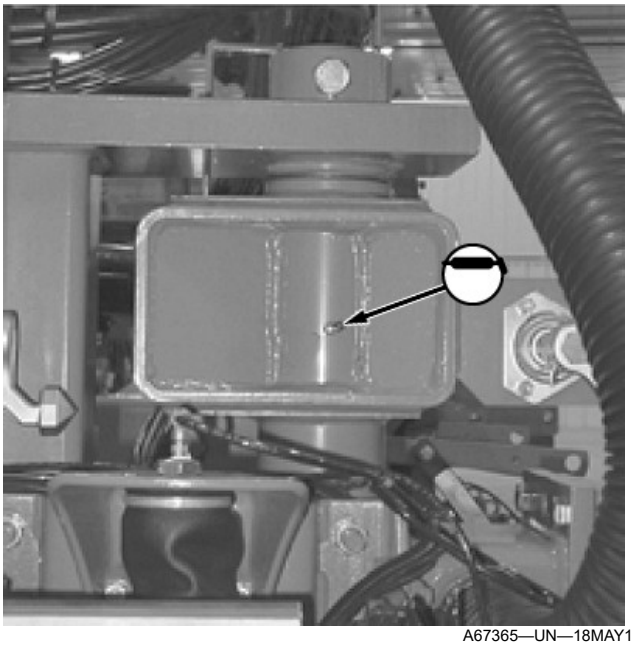
A67362—UN—18MAY10

Wing Flex Pivots



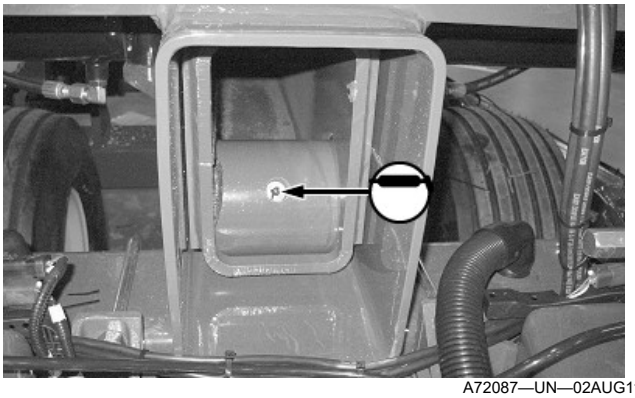
A67367—UN—18MAY10

Main Frame Pivots



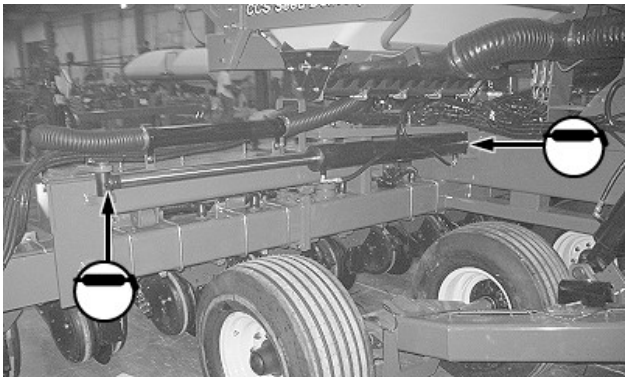
A67365—UN—18MAY10

Wing Fold Pivots



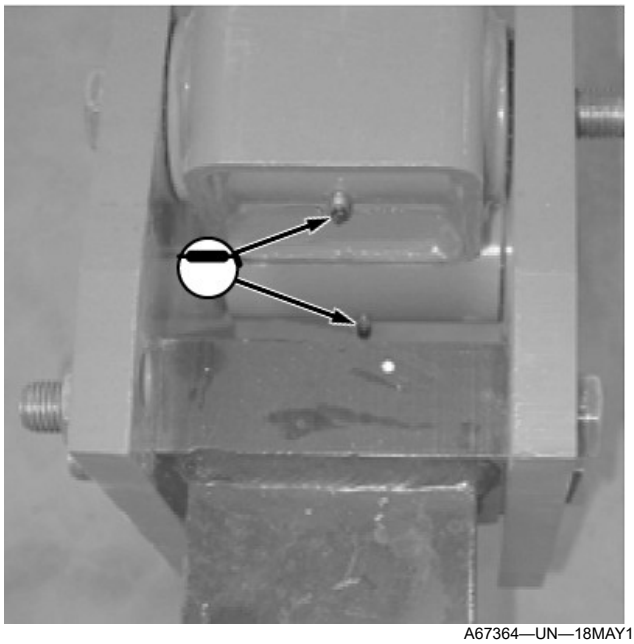
A72087—UN—02AUG11

Rear Center Hitch Roller



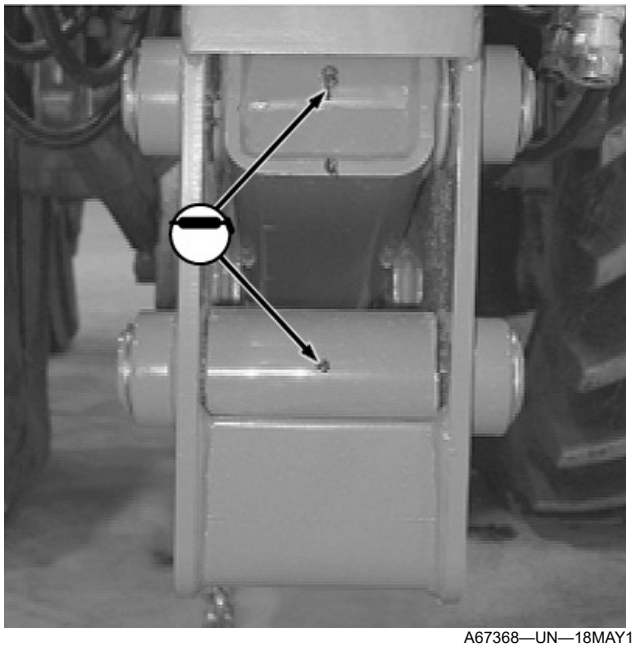
A72088—UN—02AUG11

Fold Cylinders



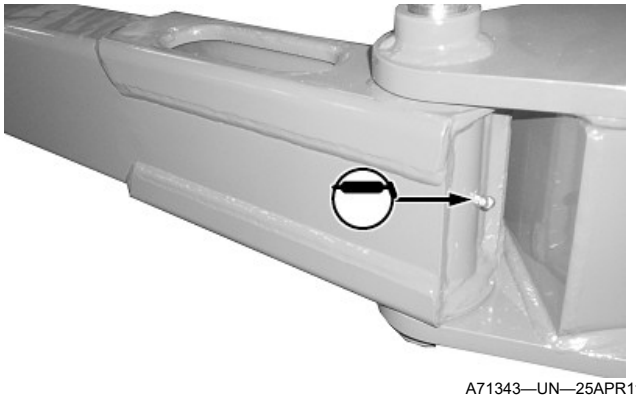
A67364—UN—18MAY10

Front Hitch Pivots



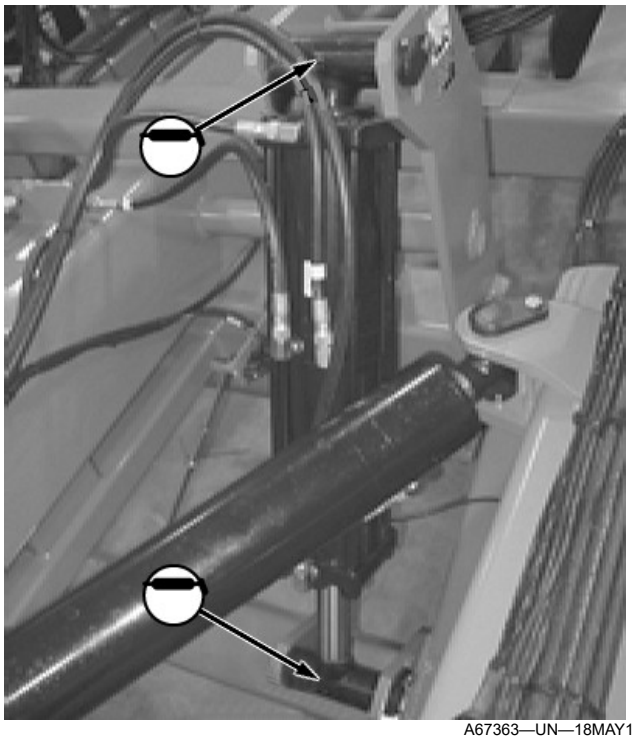
A67368—UN—18MAY10

Rear Hitch Pivots



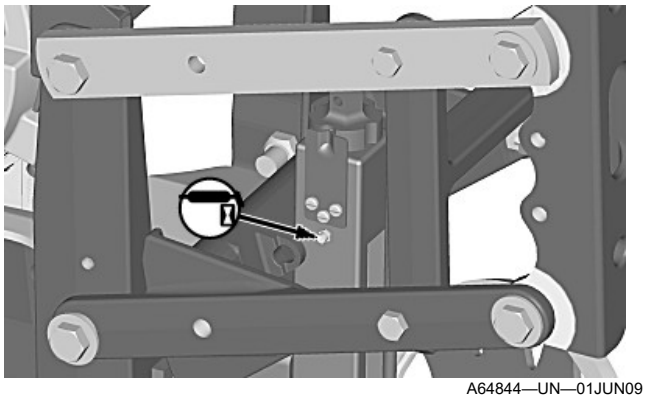
A71343—UN—25APR11

Wishbone Pivots



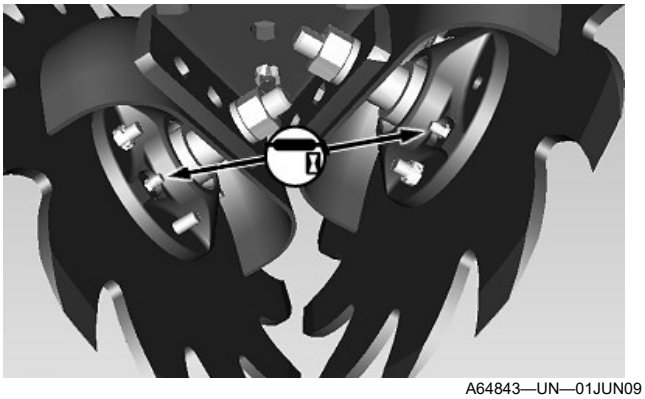
A67363—UN—18MAY10

Lift Cylinders



A64844—UN—01JUN09

Unit Mounted Row Cleaner Adjustment Arm



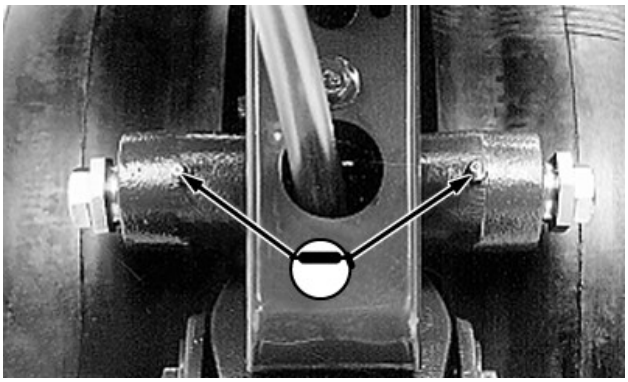
A64843—UN—01JUN09

View From Under Unit Mounted Row Cleaner

CAUTION: Avoid injury. The row cleaner blades are sharp. Safely support the implement before service.

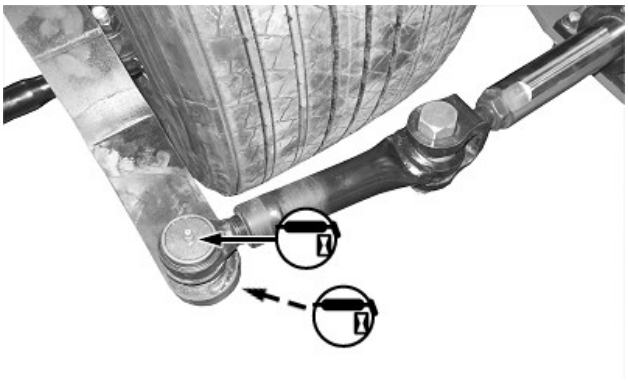
The row cleaner has sealed bearings from the factory and bearing lubrication is not required. To protect the bearing seals from dust, fill the cavity around the bearing with grease. Apply a few pumps of grease to the lube fitting every 200 operating hours until a slight resistance is felt.

If a non-sealed bearing is installed, use a 50-hour lubrication interval for the bearing.



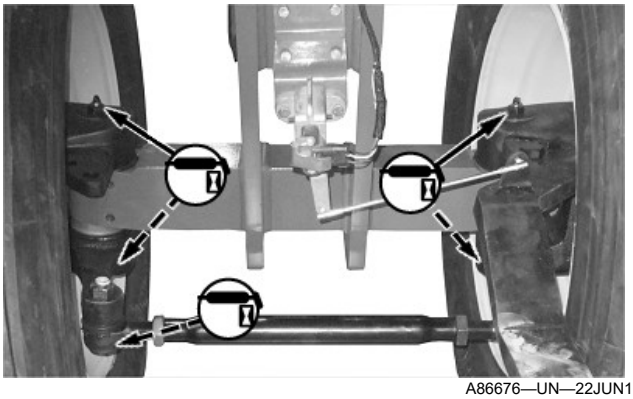
A38363—UN—16JUL08

Depth Gauge Wheels



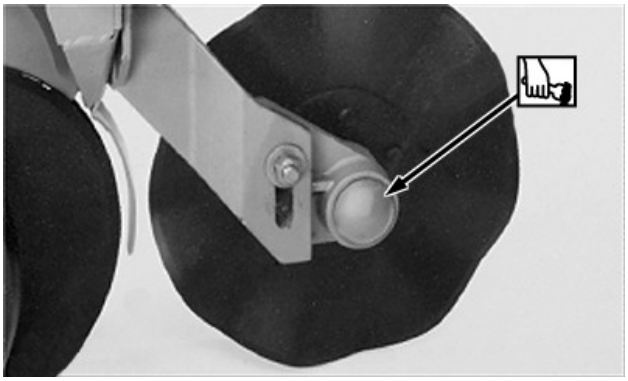
A86675—UN—22JUN15

Rear Steering Axle



A86676—UN—22JUN15

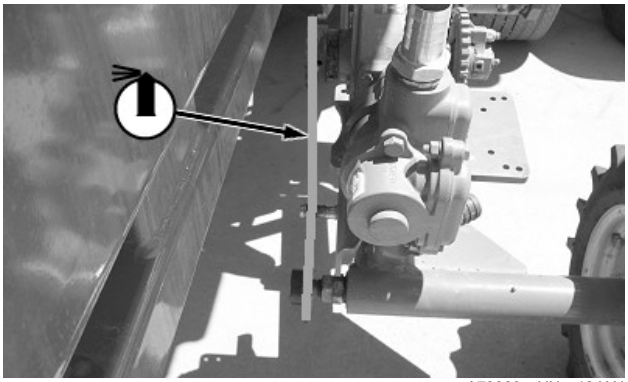
Rear Steering Wheel Brackets



A29983—UN—16JUL08

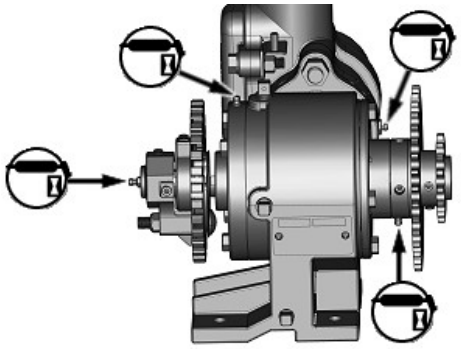
Unit Mounted Coulter

Lubricate coulter bearing with John Deere Multipurpose Lubricant or an equivalent. (See Coulter Maintenance in Service section.)



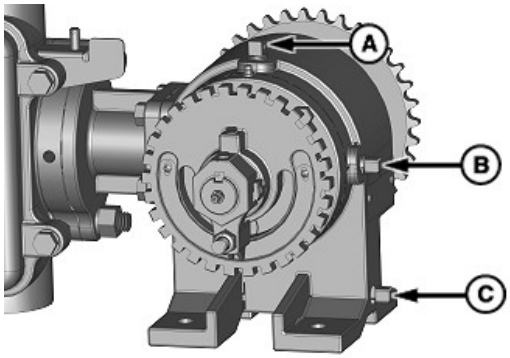
A73989—UN—12JAN12

Fertilizer Drive Chain



A89988—UN—29MAR16

John Blue Pump (If equipped)



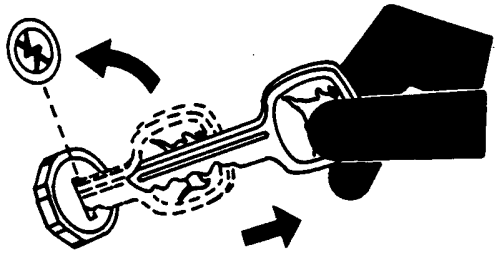
A89989—UN—29MAR16

John Blue Pump (If equipped)

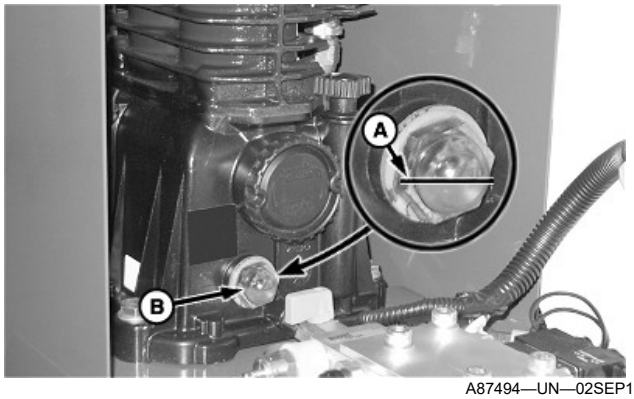
A—Fill Port
B—Check Port
C—Drain Port

Fill the crankcase of the pump with TY6296 SAE 80/90 W EP gear oil or equivalent at fill port (A). Fill crankcase level to check port (B). Check level daily thereafter. Use drain port (C) to drain oil if needed. Spray lubrication oil on the drive chain at the beginning and end of each season or as required.

Checking Oil in the Hydraulic Compressor



TS230—UN—24MAY89



A87494—UN—02SEP15

A—Middle
B—Sight Glass

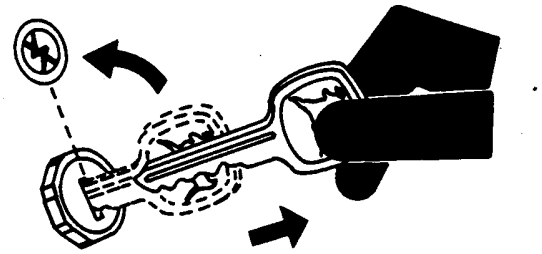
CAUTION: Avoid injury. Deactivate the selective control valves (SCVs), turn off the tractor, and place the tractor in park before servicing.

IMPORTANT: Check the oil level at the beginning of the season and daily during planter use.

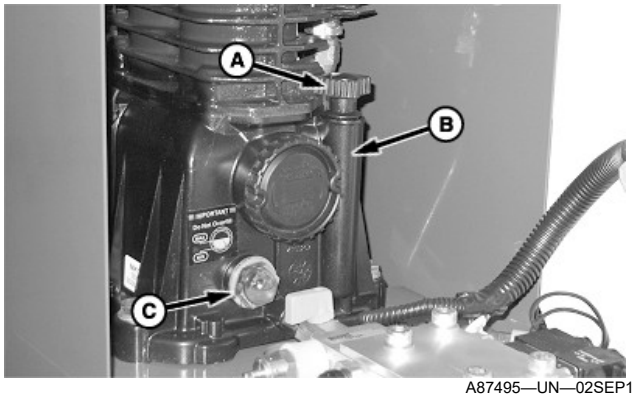
NOTE: Park the tractor and the planter on a level surface.

The proper oil level is in the middle (A) of sight glass (B). Add oil as necessary (See Fill or Change the Hydraulic Air Compressor Oil).

Change the Compressor Oil



TS230—UN—24MAY89



A87495—UN—02SEP15

A—Cap
B—Reservoir

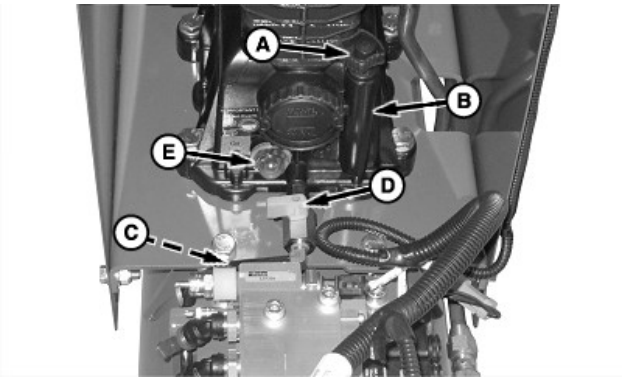
C—Sight Glass

CAUTION: Avoid injury. Deactivate the selective control valves (SCVs), turn off the tractor, and place the tractor in park before servicing.

IMPORTANT: Use non-detergent 30W synthetic air-compressor oil ISO 100 (John Deere TY27029 or equivalent).

NOTE: Park the planter and the tractor on a level surface.

To aid filling, use a funnel.



A87496—UN—02SEP15

A—Cap
B—Reservoir
C—Drain Hose
D—Drain Valve
E—Sight Glass

1. To help vent reservoir (B) while draining, remove the cap (A).
2. Place a container under drain hose (C).
3. Open drain valve (D) and collect the oil.
4. Close the drain valve.
5. Add the specified quantity of oil to reservoir (B) until the oil is visible in the middle of sight glass (E).

Specification	
Compressor	
Reservoir—Capacity	0.5 L (16.6 oz)

6. Reinstall cap (A).

Fill the Compressor with Oil

1. Remove cap (A).
2. Add oil to reservoir (B) until the oil is visible in the middle of the sight glass (C).
3. Reinstall cap (A).

WP29706,0000865-19-14OCT25

Planter Inspection

List of Inspections			
Frame and Wheels			**Inspection Detail**
Safety Chain			Verify that the chain is present. Check for excessive wear.
Jackstand			Check for cracked welds. Verify that pins are present.
Hitch Compatibility			(See Determine the Tractor Drawbar and Implement Hitch Compatibility for additional information.)
Wheel Assemblies: Tire Pressure, Wheel Bearings, Wheel Bolt Torque			Check air pressure in the tires, the bearings for wear, and the torque on wheel bolts.
Safety Signs: Slow Moving Vehicle (SMV) Sign, Decals, Reflectors			Verify that all safety signs, decals, and reflectors are present, clean, and visible.
Safety Lights and Shields			Verify that the safety lights are present and functional. Verify that all shields are present.
Service Locks			Verify that the service locks are present.
Wire Harnesses			Check for worn harnesses and broken connectors. Secure harnesses as necessary.
Switches and Sensors			Verify the functionality of any fold switches, rockshaft switches, height switches, motion sensors, and others.
Drive Chain Components: Sprockets, Idlers, Transmission, and Bearings			Check for worn or kinked chain links and sprocket, and any purging grease or looseness in bearings. (See Lubricating the Planter for additional information.)
Hydraulic Hoses: Routings and Hose Supports			Check for worn hoses and loose fittings. Replace or repair hoses and fittings as necessary. Reroute hoses as needed.
Marker Components			Check disks, bearings, and cylinders. Ensure that hardware is in place and no leaks are present.
Rockshaft Cylinder			Check for visible leaks and hose abrasion.
Rockshaft			Inspect welds and hardware.
Marker Sequence Valve			Verify that the markers properly alternate.
(See **Preparing the Planter** for additional information.)			

List of Inspections			
Row Unit Assemblies			**Inspection Detail**
Parallel Arm Bushings			Check for excessive row unit looseness.
Parallel Arm Hardware			Check for proper torque.
Hopper Locks and Disconnects			Adjust or replace as necessary. Verify that the hoppers are properly secured.
Harness Route: Row Unit to Seed Sensor			Verify that the harness is secure to minimize pinch points.
Hopper and Lid			Check if installed correctly and functioning properly.
Seed Tube			Check for wear on the seed tube.
Seed Tube Sensors			Verify that the sensor is functional through the display by performing the Seed Tube Sensor Test. (See your SeedStar Operator's Manual.)
Seed Tube Guards			Check for wear on the seed tube guards.
BrushBelt Cartridge Assembly			Clean and inspect for BrushBelt damage. Clean or replace as needed.
Double Disk Opener Shield			Check for clearance between blade and shield.
Tru-Vee Disk and Bearings			(See Inspect and Adjust the Furrow Opener Disks for additional information.)
Opener Disk and Scraper			Check scraper blade and spring for wear.
Depth Gauge Wheel Arm			Check for proper adjustment to the opener blade.
Depth Gauge Wheel Assembly			Check that depth gauge wheel tires touch blades, but still turn with minimal resistance. (See Adjust the Depth Gauge Wheels for additional information.)
Depth Gauge Wheel Tire			Replace if upper lip near blade is worn off.

List of Inspections			
Row Unit Assemblies			**Inspection Detail**
Depth Gauge Wheel: Bearing and Bushing			Check for proper bearing retention.
Closing Wheel: Handle and Bushing			Check for proper bearing retention and excessive looseness.
Closing Wheel: Bearing and Tire			Check for excessive runout of bearing. Verify that the tire and rim are secure and is free of cracks. Check for rough turning or grease purging.
Closing Wheel Spring (mechanical or pneumatic)			Check for broken springs, worn hooks on springs, and stretched springs that do not have tension in all settings. Check pneumatic springs, hoses, and hose connections for leaks.
Depth Handle Assembly			Check for wear at the pivot and spring.
Row Unit Drive Assembly			Check the sprockets and bearing for excessive wear or play.
(See **Servicing and Adjusting** for additional information.)			

List of Inspections			
Vacuum Meter			**Inspection Detail**
Vacuum Blower			Check the impeller for signs of damage. If any noticeable damage is found on the impeller, replace immediately. Check the impeller and blower housing for signs of contact damage. (See a John Deere dealer or other service provider.)
Vacuum Gauge Filter			Check for dust and verify that the gauge is responsive. Clean or replace as necessary. (See Vacuum Gauge Filter for additional information.)
Vacuum Sensor Vent and Pressure Port			Verify that the vent hose and port are not plugged or that the hose is not kinked. (See Inspect Vacuum Sensor Vent for additional information.)
Brush, Brush Holder, Baffle, and Chute Cover			Check if gaps in brush are large enough to allow seed to pass through. If so, replace brush.
Hub Seal			Verify that the seal is not weathered or cracked. Replace as necessary.
Seed Disk (Bowl)			(See Inspect and Service the Seed Meter for additional information.)
Seed Meter Hub Height			Check for proper disk (bowl) settings. Adjust as needed.
Seed Meter Vacuum Seal			Check for large cracks or wear. Replace when necessary or when replacing seed disks.
Wiper			Replace if the wiper is grooved or worn excessively.
Latch and Handle			Ensure proper retention of meter to hopper. Replace if cracked or broken.
Chamber			Check for talc and treatment buildup in the chamber.
Vacuum Meter Dust Seal			Verify that the seal is not weathered or cracked. Replace as necessary.
Flex Drive Assembly			Verify that the flex drive pivots freely.
Knockout Wheel Assembly (if equipped)			Replace the assembly if the knockout wheel points are worn.
Bearing			Replace the bearing if rough or is purging grease.
Housing			Check for visible cracks in the housing.
Vacuum Hoses			Check if cracked or show excessive wear. Replace hoses as necessary.
(See **Vacuum Meter Setup** for additional information.)			

List of Inspections			
Finger Pick-up			**Inspection Detail**
Cover			Check for excessive wear and cracks in the cover.
Belt			Verify that the belt is not twisted or has cracked paddles. Replace belt as necessary.

List of Inspections			
Finger Pick-up			**Inspection Detail**
Driver			Verify that the drive knobs are present.
Housing			Check for any visible dents in the housing.
Roller			
Bushing			
Bearing			Replace the bearing if rough or is purging grease.
Carrier Plate with Brush			Replace when case harden steel appears.
Brush			Replace if bristles are bent or missing.
Finger Assembly			Replace if the gap between the finger holder and carrier is wider than specification.
Fingers and Springs			Check for stretched or broken springs.
Deflector Housing			
Bearing			Verify that the bearing is properly seated in the housing, with no external play.
Housing			Check for visible cracks in the housing.
Bowl Height			(See a John Deere dealer or other service provider.)
Ring Brush			Check if ring brush is excessively grooved or worn. Replace as necessary.
Retaining Brush			The green retaining brush showing wear at the cleanout bump is normal and expected. The meter operates properly with the fibers worn off. Replace the brush if grooves are present.
Brush			Check the singling brush for wear. If brush thickness is less than 3 mm (1/8 in), replace the singling brush.
Retainer			Clean the retainer.
Bowl			Check fingers on the bowl for wear or damage. Replace as necessary.
Wing nut			Verify that the wing nut is tight.
Shim			
Roller			Check if fingers are worn off the roller. Replace as necessary.
Arm			Verify that the proper spring force is applied on roller.
Ejector			
Spring			Verify that proper tension is on the roller.
Cover			
Spring Locking Pin			Verify that the locking pin is present.
Screw			
Locks			
Flex Drive Assembly			
(See **Servicing and Adjusting** for additional information.)			

List of Inspections			
Row Cleaners and Coulters			**Inspection Detail**
Row Cleaners			Verify that the row cleaner is installed and functioning correctly. Check for bent teeth and loose bearings. Replace as necessary.
Coulters			Check the bearings and blade for wear. Replace as necessary. Verify that the bottom of coulter is approximately 10 mm (3/8 in) higher than bottom of the opener blades.
(See **Servicing and Adjusting** for additional information.)			

Planter List of Inspections			
Downforce			**Inspection Detail**
Downforce System			Verify if the system is installed and functioning correctly. (See a John Deere dealer or other service provider.)
Springs			Check the springs and cast components for wear and excessive slop.
Independent Row Hydraulic Downforce (IRHD) Fittings and Hoses			Check for leaks in fittings and wear on the hoses. Reroute or replace hoses as necessary.
IRHD Harnesses and Sensors			Check for pinching and any wear to harnesses. Verify that connections are fully seated.
IRHD Actuator and Mounting			Check for wear and leaks.
PDF Harnesses and Sensors			Check for pinching and any wear to harnesses. Verify that connections are fully seated.
PDF Pneumatic Leaks			Check for leaks and confirm performance. Verify that the compressor does not run excessively.
PDF Compressor			Verify that the compressor functions properly, turns on-off at the correct times, and builds the appropriate pressure.
(See **Pneumatic Downforce** for additional information.)			

List of Inspections			
RowCommand			**Inspection Detail**
RowCommand Clutch Harness Routing (if equipped)			Secure the harness as required to minimize pinch points.
RowCommand Self-Test (if equipped)			Verify that the system is functioning. (See the Operator's Manual for additional information.)
(See **RowCommand Attachment** for additional information.)			

List of Inspections			
Liquid Fertilizer System			**Inspection Detail**
Liquid Fertilizer Openers			Verified if installed and functioning correctly.
Liquid Fertilizer Tank			Verified if installed and functioning correctly.
Depth Wheels and Bearings			Inspect the shear bolts and adjust the bearings.
Opener, Bearing, Disk, and Scraper			Check for wear and excessive slop. Replace as necessary.
Hoses			Check for kinked or cracked hoses. Replace as necessary.
Transmission			Replace the sprockets that are loose or worn.
Liquid Herbicide System			Check the hoses and nozzles, clean as necessary.
Liquid Fertilizer System			Check the hoses and pump for damage and kinks. Replace as necessary.
(See **Operating the Central Commodity System** for additional information.)			

CR53390,0000266-19-15OCT25

Safety Before Service

Review the Safety Section before performing any of the Service and Adjustment operations.

WP29706,0000A6D-19-19SEP16



T81389—UN—28JUN13

Service Intervals

Service	Intervals						
	As Required	Beginning of Season	10 Hours or Daily	50 Hours	100 Hours	200 Hours	End of Season
Clean the CCS tank level sensors.	•						
Zero the CCS pressure gauge.	•						
Set the CCS row unit switch.	•						
Clean the CCS gauge filter.							•
Clean the vacuum system.	•			•			
Inspect the vacuum motor.			•				
Coulter maintenance.	•	•			•	•	
Tighten the disk closing attachment.	•						
Change the implement power generator filter.	•						
Check the gear case oil in tractor power generation.		•					
Check the batteries.		•					•
Charge the batteries.		•					•
Clean the batteries.	•						
Replace the batteries.	•						
Clean the fertilizer carrier-tank strainer.			•				
Tighten the wheel bolts.				•			
Check track alignment.			•				
Check the oil level in the hydraulic air compressor.			•				
Clean or replace hydraulic air compressor air filter.	•	Replace	Clean		Replace		
Change the hydraulic compressor Oil[a].		•					•
Inspect the pneumatic system air tank for damage or leaks.		•					
Drain the air storage tank.			•				
IRHD[b] hose cleanout.	After connecting to the tractor						
IRHD valve and accumulator flush.	After a repair	•					
IRHD Accumulator Test (Gen	•	•					

Service	Intervals						
	As Required	Beginning of Season	10 Hours or Daily	50 Hours	100 Hours	200 Hours	End of Season
1) (See the SeedStar Operator's Manual).							
IRHD manual accumulator test (Gen 2 only).	•	•					
IRHD accumulator charge (Gen 2 only).	•						
[a]Change compressor pump oil after first 20 hours of operation then seasonally afterward.							
[b]individual row hydraulic downforce							

WP29706,0000866-19-27OCT25

Use Safe Service Procedures

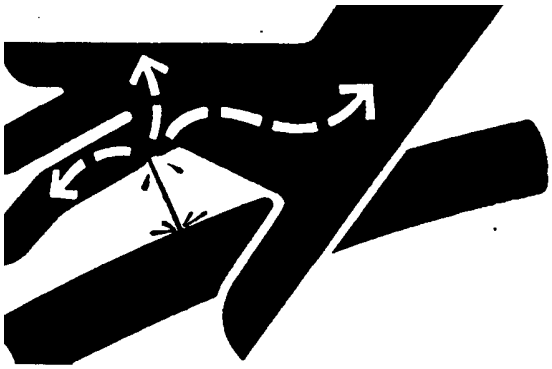


N40000—UN—28SEP88

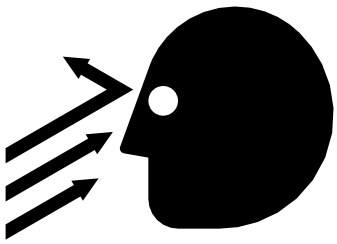
CAUTION: To help prevent serious injury or death to you or others caused by unexpected movement, service the machine on a level surface. Lower the machine to the ground or sufficiently lock or block the raised machine before servicing. If the machine is connected to a tractor, engage the park brake and place the transmission in park, shut off the engine and remove the key. If the machine is detached from the tractor, block the wheels and use shop stands to prevent movement.

AG,OUO6074,1362-19-29MAR18

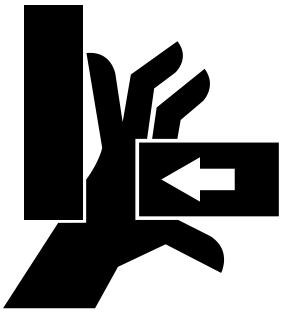
Service Pressurized Systems Safely



X9811—UN—23AUG88



A87927—UN—29SEP15



A87928—UN—29SEP15

Escaping fluid under pressure can penetrate the skin causing serious injury. Escaping air under pressure can discharge fast moving material. Avoid the hazard by relieving the pressure before disconnecting hydraulic or

pneumatic lines. Tighten all of the connections before applying pressure.

Avoid crushing injury from components that move unexpectedly. Avoid the hazard by relieving the pressure before working on the machine.

OUO6074,0000EDA-19-03MAR16

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.

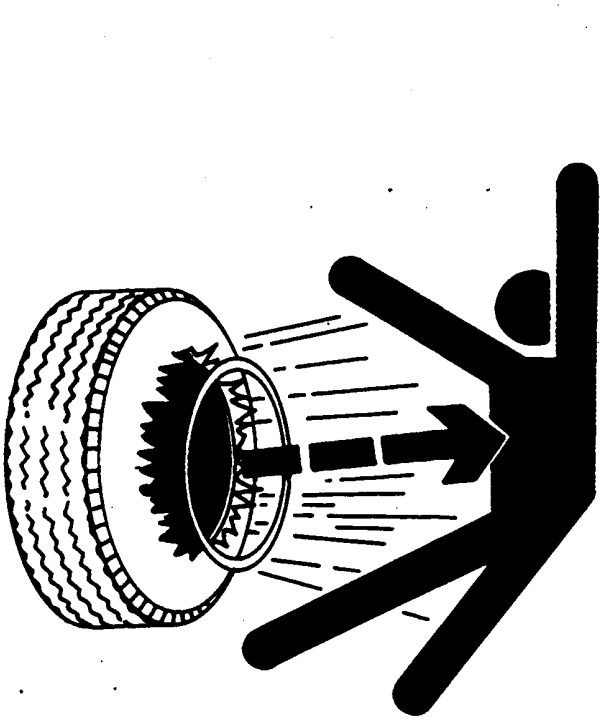
On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

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

Service Tires Safely



TS211—UN—15APR13

CAUTION: Explosive separation of a tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.

Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure.

Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly. Use a safety cage if available.

Check wheels for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.

DX,RIM1-19-27OCT08

Service and Operate Chemical Sprayers Safely



TS272—UN—23AUG88



TS220—UN—15APR13

Chemicals used in agricultural sprayers can be harmful to your health or the environment if not used carefully.

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

Reduce risk of exposure and injury:

- Wear appropriate personal protective equipment as recommended by the manufacturer. (See 'Handle agricultural chemicals safely' found in the Safety Section.)
- Fill, flush, calibrate, and decontaminate sprayer in an area where runoff will not reach ponds, lakes or streams, livestock areas, or gardens, or near other people.
- Keep children away from the chemicals, chemical solutions, and rinsates.
- If spray or chemical concentrate contacts skin, hands, or face, wash immediately with soap and water.

  If spray or chemical concentrate gets into eyes, flush immediately with water.
- If nozzle clogs or system malfunctions, stop engine and relieve spray pressure from system.
- Do not place nozzle tips or other components to the mouth to clear obstructions. Keep spare tips on hand for replacement.
- Minimize risk of spray drift.
  - Use large nozzle tips operated at lower pressures
  - Do not operate solution delivery system at pressures exceeding 345kPa (3.5 bar) (50 psi).
  - Do not spray when winds exceed 16 km/h (10 mph).
  - Do not spray when wind is blowing towards a nearby sensitive crop, garden, or populated area.
- Properly dispose of unused chemicals, flushing solution, and empty chemical containers.
- Decontaminate equipment used in mixing, transferring, and applying chemicals after use.

DX,WW,CHEM02-19-05APR04

Welding Near Electronic Control Units



TS953—UN—15MAY90

IMPORTANT: Do not jump-start engines with arc welding equipment. Currents and voltages are too high and may cause permanent damage.

1. Disconnect the negative (-) battery cable(s).
2. Disconnect the positive (+) battery cable(s).
3. Connect the positive and negative cables together. Do not attach to vehicle frame.
4. Clear or move any wiring harness sections away from welding area.
5. Connect welder ground close to welding point and away from control units.
6. After welding, reverse Steps 1—5.

DX,WW,ECU02-19-14AUG09

Keep Electronic Control Unit Connectors Clean

IMPORTANT: Do not open control unit and do not clean with a high-pressure spray. Moisture, dirt, and other contaminants may cause permanent damage.

1. Keep terminals clean and free of foreign debris. Moisture, dirt, and other contaminants may cause the terminals to erode over time and not make a good electrical connection.
2. If a connector is not in use, put on the proper dust cap or an appropriate seal to protect it from foreign debris and moisture.
3. Control units are not repairable.
4. Since control units are the components LEAST likely to fail, isolate failure before replacing by completing a diagnostic procedure.
5. The wiring harness terminals and connectors for electronic control units are repairable.

DX,WW,ECU04-19-11JUN09

Work Safely Around the Electric Drive System



A82413—UN—22APR14

Shock Hazard

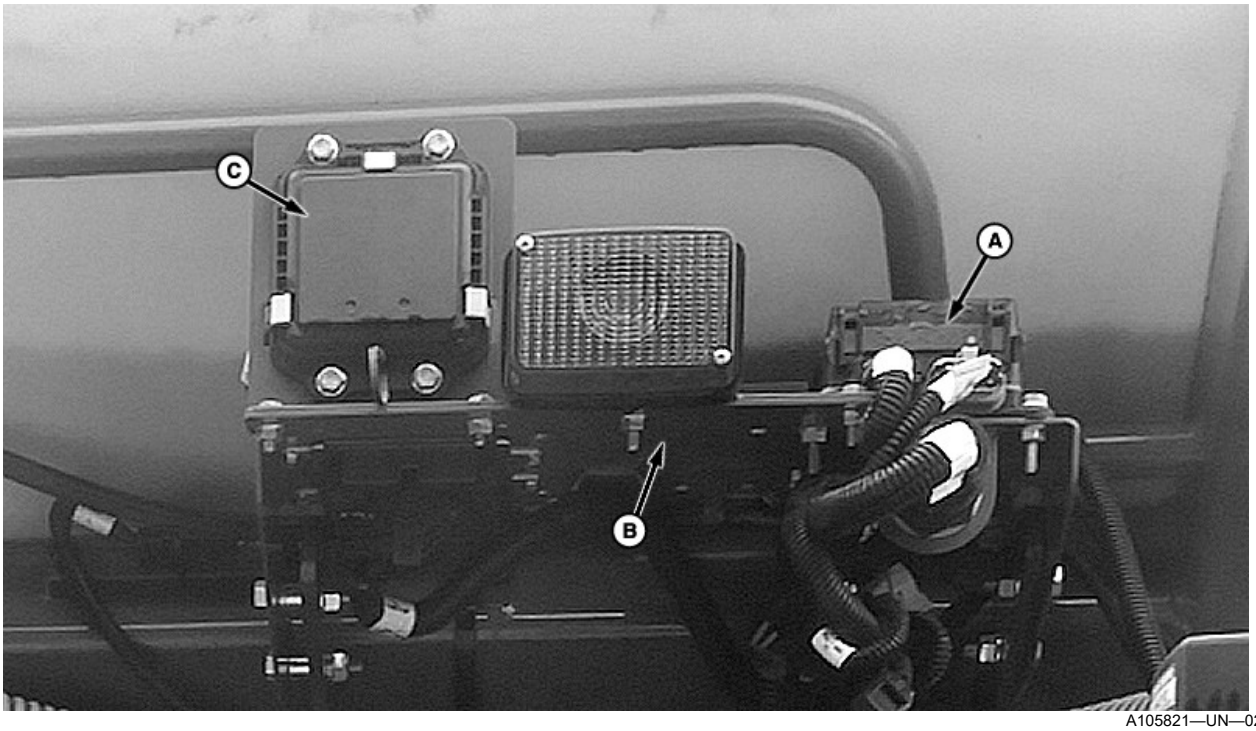
CAUTION: Avoid an electrical shock. This implement is equipped with a 56 volt electrical system. Always use caution when interacting with the electrical circuit on the implement.

Do not touch exposed electrical connections when the electric power generation (EPG) system is running.

See a John Deere dealer or other service provider for service on the electric drive system.

OUO6074,0000F26-19-17OCT25

Electric Drive Fuse Box Location



A105821—UN—02OCT19

Fuse Box Location on the Right-Hand Side CCS Tank Support

A—Electric Drive Fuse Box
B—Mounting Bracket
C—Power Distribution Center

The electric drive fuse box (A) and the power distribution center (PDC) (C) are located on the mounting bracket (B). The mounting bracket (B) is attached to the right-hand side CCS tank support.

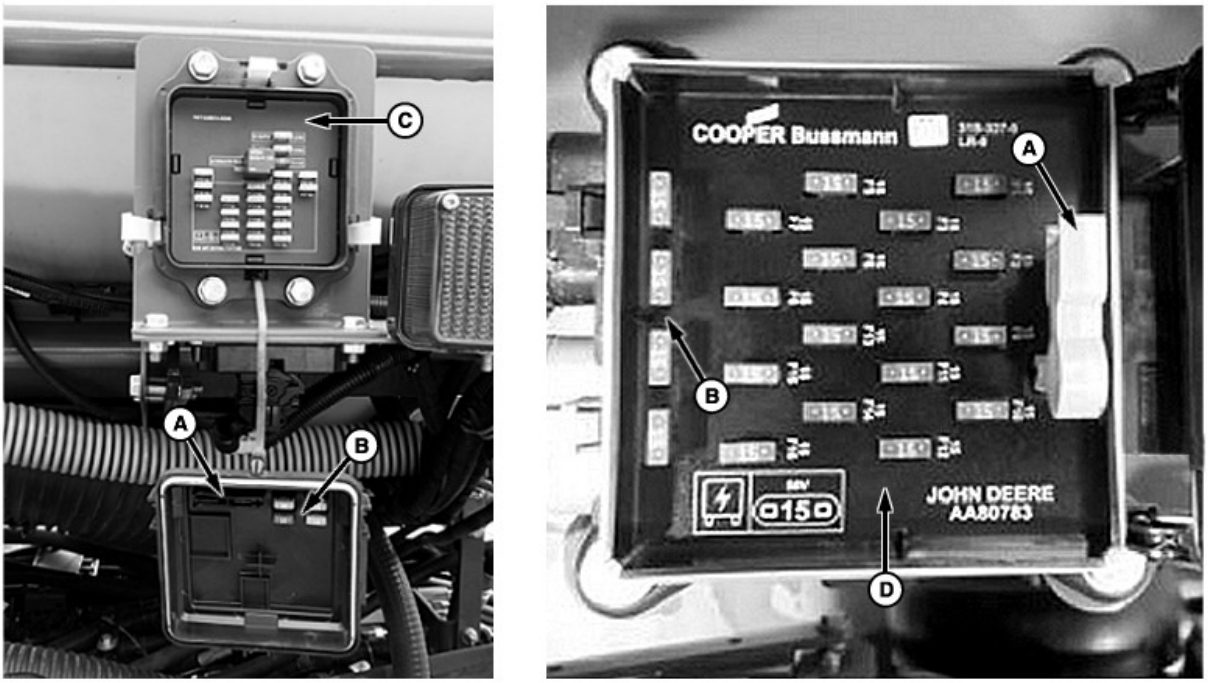
NOTE: Implements with up to 32 row units will have a fuse box (A) and a power distribution center. Implements with more than 32 row units will have two fuse boxes that are mounted side-by-side on the mounting bracket (B) (not shown) and one power distribution center.

OUO6074,000111C-19-09OCT25

Electric Drive Fuse Identification

IMPORTANT: The row unit fuses (15 A, 56 V) are not typical fuses.

Replacement fuses can be obtained via regular spare part channels.



A105575—UN—02OCT19

A—Fuse Puller
B—Spare Fuse

NOTE: A fuse puller (A) and spare fuses (B) are found inside the fuse boxes.

C—Power Distribution Center
D—Electric Drive Fuse Box

Power Distribution Center Contents		
Fuse	**Relay**	**Description**
	K01	280 4-Pin (unused)
F01—F20		Power Distribution (15 A, 56 V)

Power Distribution Center Contents		
Fuse	**Relay**	**Description**
F21		Power Generation Controller (10 A, 32 V)
F22		12 V Return (30 A, 32 V)
F23		12 V Supply (30 A, 32 V)

Electric Drive Fuse Box 1 Contents (implements with an even number of rows)	
Fuse	**Description**
F1	Row Units 1—2 Power (15 A, 56 V)
F2	Row Units 3—4 Power (15 A, 56 V)
F3	Row Units 5—6 Power (15 A, 56 V)
F4	Row Units 7—8 Power (15 A, 56 V)
F5	Row Units 9—10 Power (15 A, 56 V)
F6	Row Units 11—12 Power (15 A, 56 V)
F7	Row Units 13—14 Power (15 A, 56 V)
F8	Row Units 15—16 Power (15 A, 56 V)
F9	Row Units 17—18 Power (15 A, 56 V)
F10	Row Units 19—20 Power (15 A, 56 V)
F11	Row Units 21—22 Power (15 A, 56 V)
F12	Row Units 23—24 Power (15 A, 56 V)
F13	Row Units 25—26 Power (15 A, 56 V)

Electric Drive Fuse Box 1 Contents (implements with an even number of rows)	
F14	Row Units 27—28 Power (15 A, 56 V)
F15	Row Units 29—30 Power (15 A, 56 V)
F16	Row Units 31—32 Power (15 A, 56 V)
SP 1—4	Spare Fuses (15 A, 56 V)
Any unused fuse terminals can also hold spare fuses.	

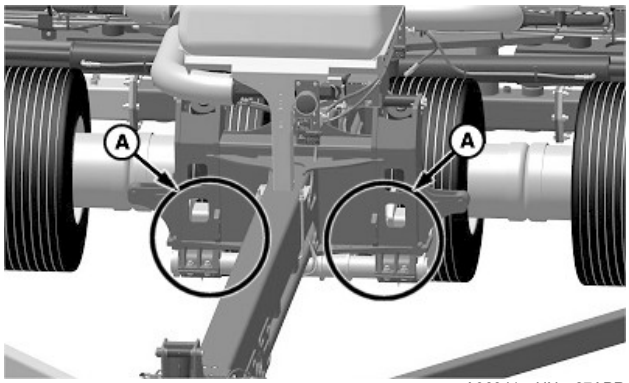
Electric Drive Fuse Box 1 Contents (implements with an odd number of rows)	
Fuse	**Description**
F1	Row Unit 1 Power (15 A, 56 V)
F2	Row Units 2—3 Power (15 A, 56 V)
F3	Row Units 4—5 Power (15 A, 56 V)
F4	Row Units 6—7 Power (15 A, 56 V)
F5	Row Units 8—9 Power (15 A, 56 V)
F6	Row Units 10—11 Power (15 A, 56 V)
F7	Row Units 12—13 Power (15 A, 56 V)
F8	Row Units 14—15 Power (15 A, 56 V)
F9	Row Units 16—17 Power (15 A, 56 V)
F10	Row Units 18—19 Power (15 A, 56 V)
F11	Row Units 20—21 Power (15 A, 56 V)
F12	Row Units 22—23 Power (15 A, 56 V)
F13	Row Units 24—25 Power (15 A, 56 V)
F14	Row Units 26—27 Power (15 A, 56 V)
F15	Row Units 28—29 Power (15 A, 56 V)
F16	Row Units 30—31 Power (15 A, 56 V)
SP 1—4	Spare Fuses (15 A, 56 V)
Any unused fuse terminals can also hold spare fuses.	

Electric Drive Fuse Box 2 Contents (implements with an even number of rows)	
Fuse	**Description**
F1	Row Units 41—42 Power (15 A, 56 V)
F2	Row Units 43—44 Power (15 A, 56 V)
F3	Row Units 45—46 Power (15 A, 56 V)
F4	Row Units 47—48 Power (15 A, 56 V)
F5	Row Units 49—50 Power (15 A, 56 V)
F6	Row Units 51—52 Power (15 A, 56 V)
F7	Row Units 53—54 Power (15 A, 56 V)
F8	Row Units 55—56 Power (15 A, 56 V)
F9	Row Units 57—58 Power (15 A, 56 V)
F10	Row Units 59—60 Power (15 A, 56 V)
F11	Row Units 61—62 Power (15 A, 56 V)
F12	Row Units 63—64 Power (15 A, 56 V)
F13	Row Units 65—66 Power (15 A, 56 V)
F14	Row Units 67—68 Power (15 A, 56 V)
F15	Row Units 69—70 Power (15 A, 56 V)
F16	Row Units 71—72 Power (15 A, 56 V)
SP 1—4	Spare Fuses (15 A, 56 V)
Any unused fuse terminals can also hold spare fuses.	

Electric Drive Fuse Box 2 Contents (implements with an odd number of rows)	
Fuse	**Description**
F1	Row Units 40—41 Power (15 A, 56 V)
F2	Row Units 42—43 Power (15 A, 56 V)
F3	Row Units 44—45 Power (15 A, 56 V)
F4	Row Units 46—47 Power (15 A, 56 V)
F5	Row Units 48—49 Power (15 A, 56 V)
F6	Row Units 50—51 Power (15 A, 56 V)
F7	Row Units 52—53 Power (15 A, 56 V)
F8	Row Units 54—55 Power (15 A, 56 V)
F9	Row Units 56—57 Power (15 A, 56 V)
F10	Row Units 58—59 Power (15 A, 56 V)
F11	Row Units 60—61 Power (15 A, 56 V)
F12	Row Units 62—63 Power (15 A, 56 V)
F13	Row Units 64—65 Power (15 A, 56 V)
F14	Row Units 66—67 Power (15 A, 56 V)
F15	Row Units 68—69 Power (15 A, 56 V)
F16	Row Units 70—71 Power (15 A, 56 V)
SP 1—4	Spare Fuses (15 A, 56 V)
Any unused fuse terminals can also hold spare fuses.	

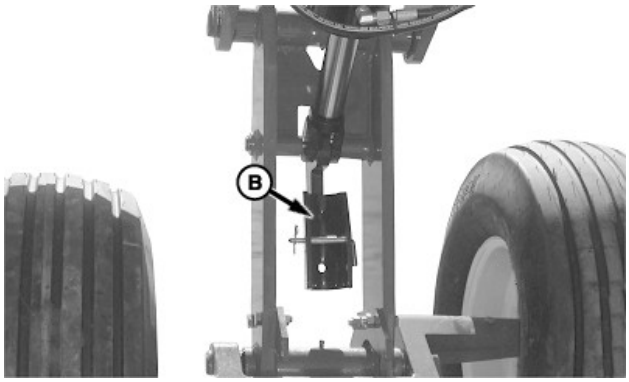
CR53390,000016F-19-23OCT25

Install Service Locks—DB Series



A96341—UN—27APR17

Center Frame Service Locks Storage Locations

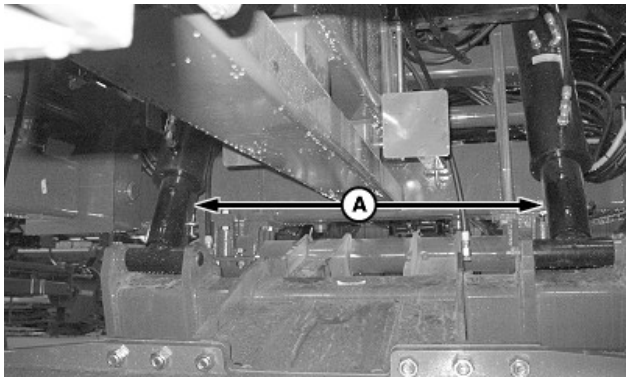


A96342—UN—27APR17

Wing Service Lock Storage Location

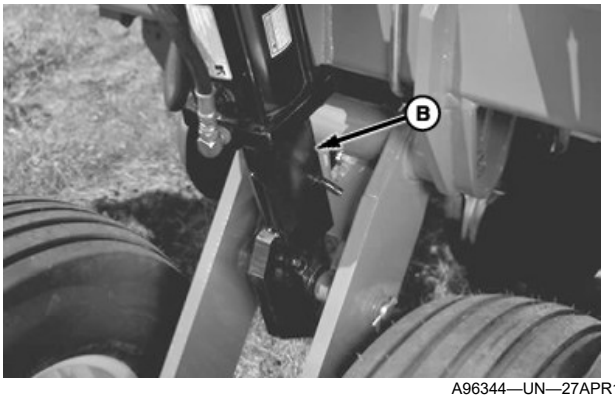
A—Storage Locations (Center Frame Service Locks)
B—Storage Locations (Wing Service Locks)

1. Locate the service locks for the center wheel cylinders in the storage locations (A) on the main frame lift.
2. Locate the service locks for the wing wheel cylinders in the storage locations (B) on the wing wheel lift.



A96343—UN—27APR17

Center Frame Service Locks



A96344—UN—27APR17

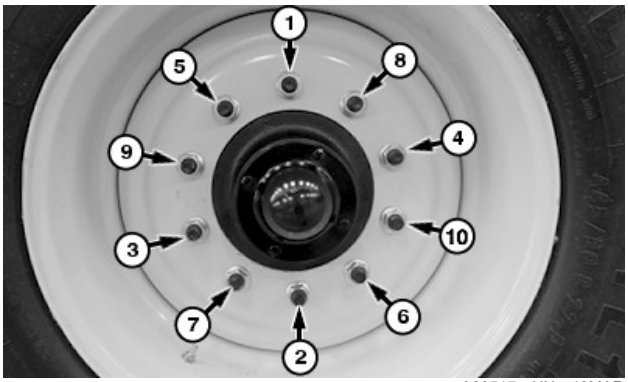
Wing Wheel Service Locks

A—Service Lock (Center Frame)
B—Service Lock (Wing Wheel)

3. To service, install center frame service locks (A) and wing service locks (B).

WP29706,0000B5E-19-27APR17

Tighten the Wheel Bolts



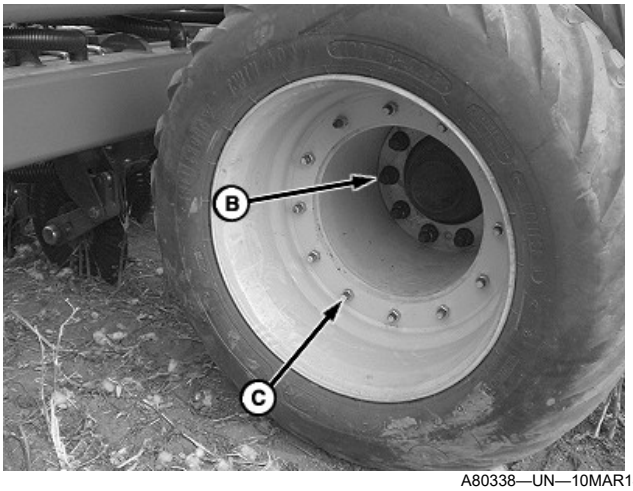
A89517—UN—10MAR16

Torque Sequence (steerable axle shown)



A80337—UN—10MAR14

Wing Wheel



A80338—UN—10MAR14

Center Frame Wheel with Rim Extension

A—Wing Wheel Bolt (6 used per wheel)
B—Center Frame Hub Nut (10 used per hub)
C—Center Frame Cap Screw and Nut (12 used per wheel)

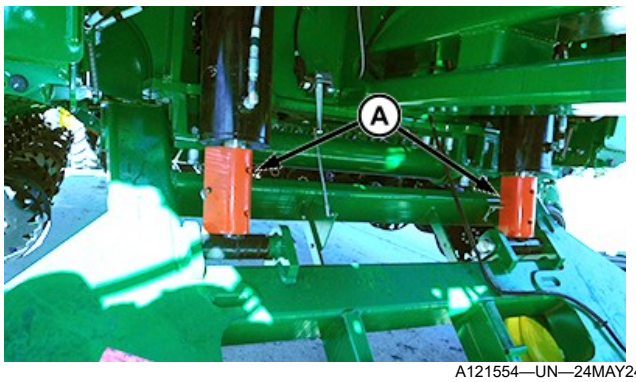
IMPORTANT: Avoid planter damage from loose hardware. Verify that the wheel hardware is tight before initial use, after the initial 10 hours, and after every 50 hours of operation.

Tighten all wheel nuts in an alternating sequence.

Wheel Fasteners				
Location	**Type**	**Fastener**	**Quantity**	**Torque (dry)**
Wing	Six-Bolt Hub	Wheel Bolt (A)	6	176 N·m (130 lb·ft)
Center Frame	Rim Extension	Hub Nut (B)	10	754 N·m (556 lb·ft)
Center Frame	Rim Extension	Cap Screw and Nut (C)	12	339 N·m (250 lb·ft)
Center Frame	Steerable Axle	Nut	10	420 N·m (310 lb·ft)
Center Frame	Eight-Bolt Hub	Nut	8	122 N·m (90 lb·ft)

WP29706,00002B1-19-16OCT19

Align Track Undercarriage



A121554—UN—24MAY24

A—Service Lock (2 used)

IMPORTANT: Avoid track damage by checking alignment very carefully before road transport.

Ensure that the planter is empty and has no additional weight added.

Ensure that the test path has enough length to safely coast to a stop.

Avoid road damage and track wear. Avoid sharp turns that cause the tracks to slide.

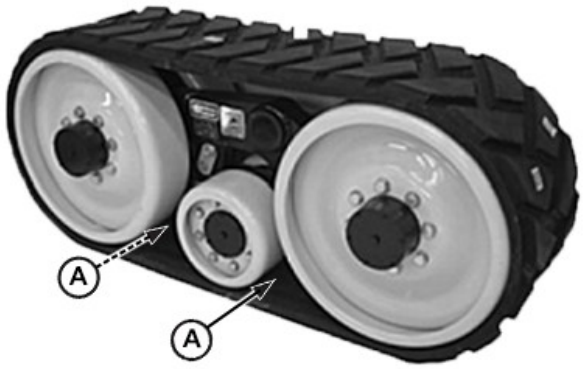
Do not travel faster than 32 km/h (20 mph) because damage can occur to the track system components.

NOTE: The course can be in a field or on the road.

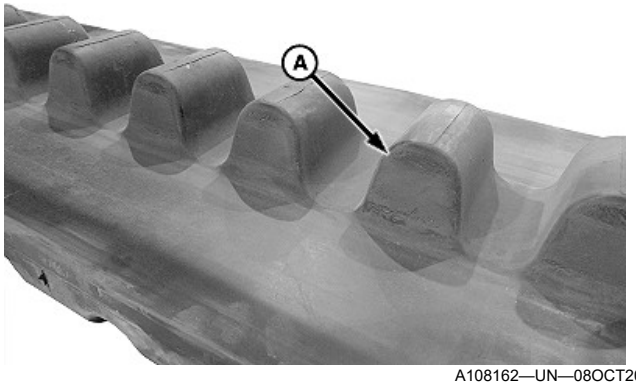
1. Pull the planter at 5—8 km/h (3—5 mph) in a straight line on a flat surface for 30—100 m (100—300 ft) without steering or braking, and coast to a stop.

2. Install service locks (A).

3. Use the following three methods to check the alignment.



A120402—UN—16JAN24



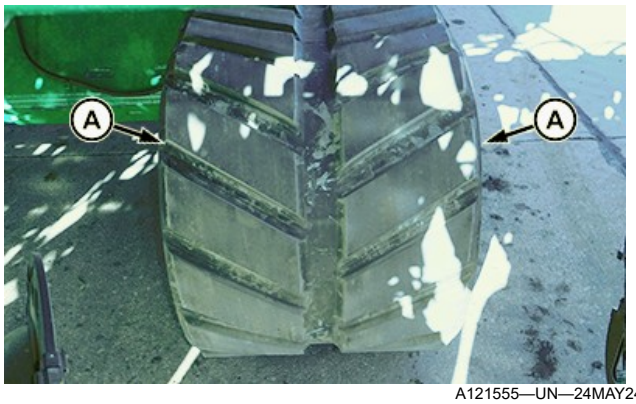
A108162—UN—08OCT20

A—Guide Lug

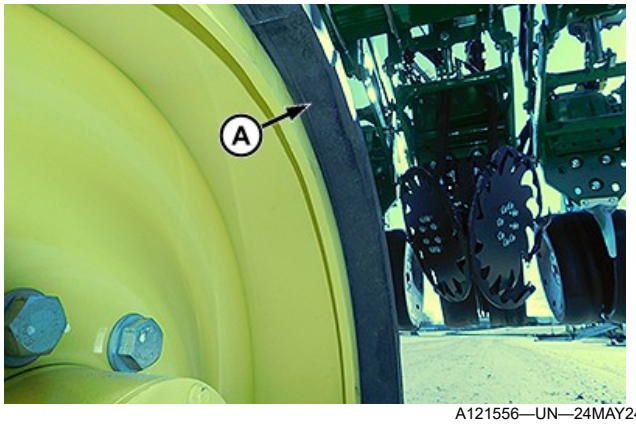
CAUTION: Avoid burns. The guide lug (A) surface may be hot. Allow the track to cool sufficiently before checking for heat variation.

NOTE: Whether the alignment is good or needs adjustment, always recheck the alignment after the first 1.5—3 km (1—2 mi) of roadway travel.

a. Check if guide lugs (A) are rubbing or show signs of rubbing the mid-rollers on either side. Also check if one side of the lugs is significantly hotter than the other side.



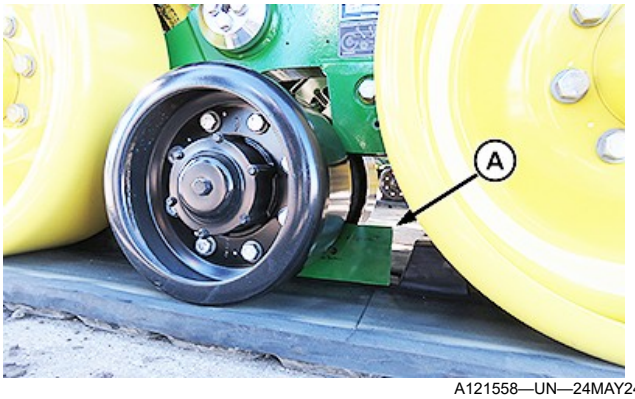
A121555—UN—24MAY24



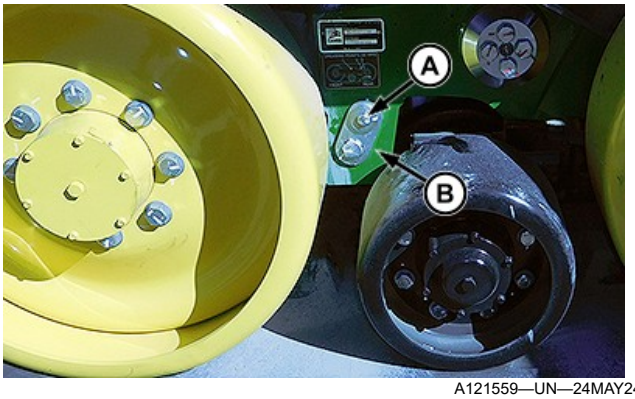
A121556—UN—24MAY24

A—Overhang (both sides)

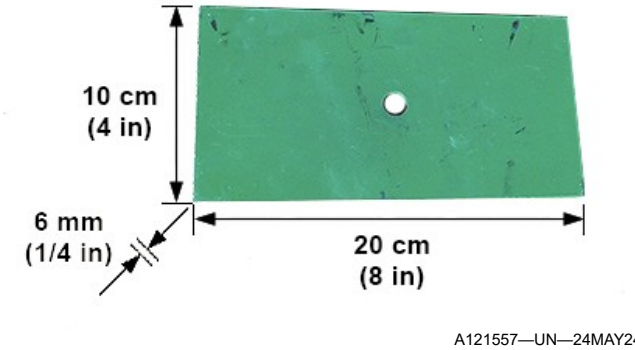
b. Measure track overhang (A) from the idler wheel on both sides. If the difference is more than 6 mm (1/4 in), alignment is necessary.



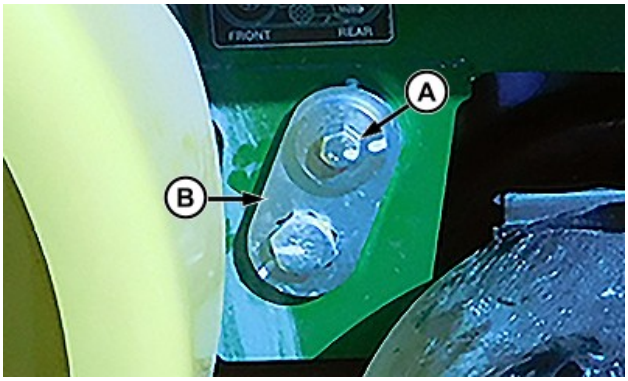
A121558—UN—24MAY24



A121559—UN—24MAY24



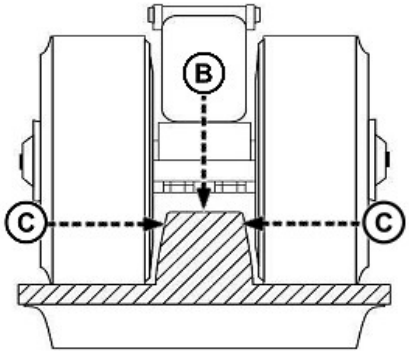
A121557—UN—24MAY24



A121560—UN—24MAY24

A—Cap Screw (2 used)
B—Locking Plate (2 used)

4. If the guide lugs are rubbing, remove cap screws (A), washers, and locking plates (B) from both sides.

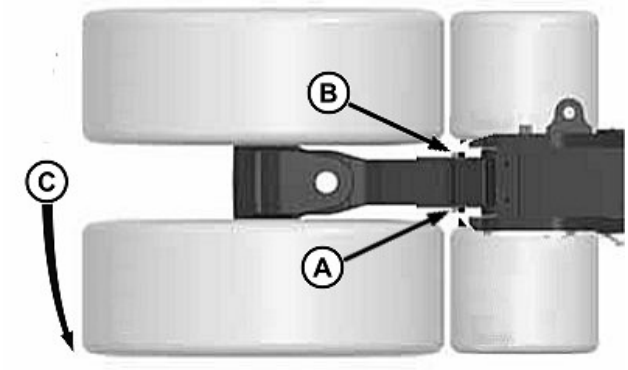


A120586—UN—26JAN24

A—Shim
B—Guide Lug
C—Gap

IMPORTANT: Shim (A) must be at least 10 x 20 cm (4 x 8 in) and 6 mm (1/4 in) thick. Shim (A) must also make contact with two guide lugs (B) to verify gap (C).

c. Slide shim (A) between the mid-roller and guide lugs (B) on both sides of the track. If shim (A) slides into gap (C) on both sides, the track is aligned. If one side is too tight, alignment is needed.

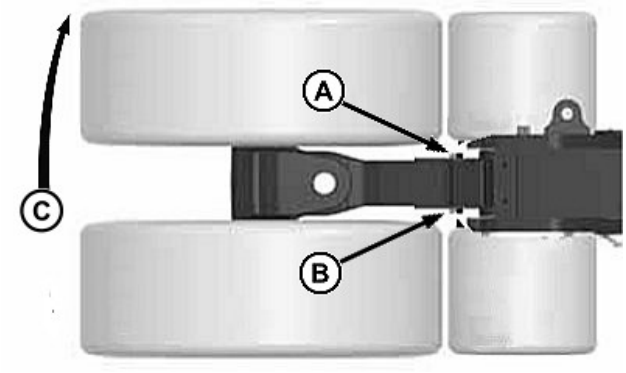


A120584—UN—23MAY24

A—Adjustment Bolt
B—Adjustment Bolt
C—Idler Movement, Left

IMPORTANT: Avoid damage to the adjustment bolts (A and B). Do not use power tools. Use manual hand tools and a ratcheting type (or equivalent) torque wrench. Do not turn the adjustment bolts (A) more than 1/4 turn before checking the alignment (driving the course again).

5. Adjust the front idlers in the opposite direction of the side that is rubbing.
   a. Loosen adjustment bolt (A) and tighten adjustment bolt (B) to move the idler left (C).



A120585—UN—28MAY24

A—Adjustment Bolt
B—Adjustment Bolt
C—Idler Movement, Right

b. Loosen adjustment bolt (A) and tighten adjustment bolt (B) to move the idler right (C).

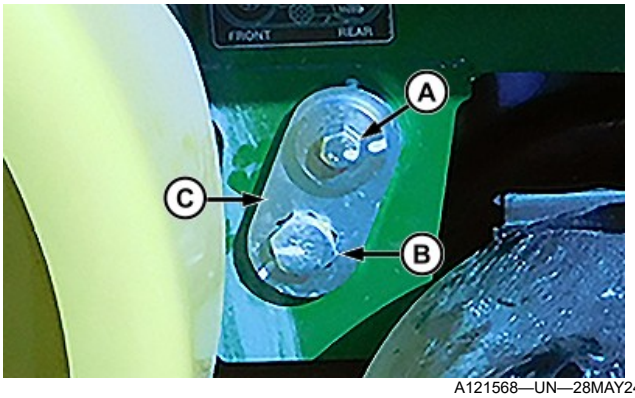
c. Lightly tighten adjustment bolt (A), drive the course, and check the alignment again. When the alignment is complete, use the following steps to tighten the adjustment bolts.

IMPORTANT: Adjustments to one track undercarriage may affect the alignment on other track undercarriages.

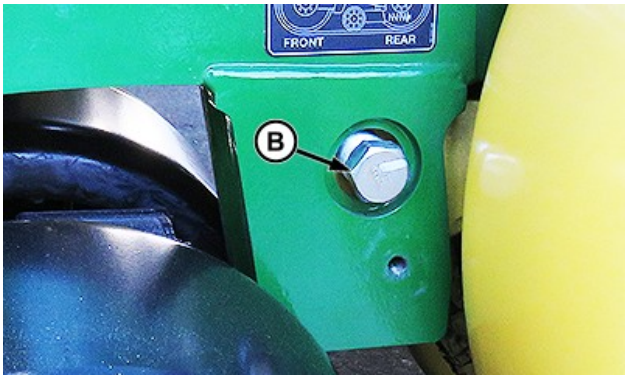
Avoid damage to cap screws (A) and adjustment bolts (B). Do not use power tools. Use manual hand tools and a ratcheting type (or equivalent) torque wrench. Do not turn cap screws (A) or adjustment bolts (B) more than one turn before checking the alignment (driving the course again).

Before driving an extended distance on the road, break in the tracks. (See Break In the Tracks.)

NOTE: Locking plate (C) is offset. If the hole for cap screw (A) does not align, flip the locking plate (C) over. If the locking plate (C) does not align in either position, tighten the adjustment bolt minimally until aligned.



A121568—UN—28MAY24



A121569—UN—28MAY24

A—Cap Screw (2 used)
B—Adjustment Bolt
C—Locking Plate (2 used)

6. When all adjustments are complete, attach locking plate (C) on adjustment bolt (B) used to move the idler. Install cap screw (A), washer, and then tighten to specification.

Specification

Cap Screw (A)—Torque. . . . . 130 N·m (95 lb·ft)

NOTE: The adjustment bolt is now snug and holding the idlers in place.

7. On the opposite side, tighten adjustment bolt (B) to specification.

Specification

Adjustment Bolt (C)—Torque. . . . . 300 N·m (221 lb·ft)

NOTE: Locking plate (C) is offset. If the hole for cap screw (A) does not align, flip the locking plate (C) over. If the locking plate (C) does not align in either position, tighten the adjustment bolt minimally until aligned.

8. Attach locking plate (C), cap screws (A), and washer.

9. Tighten cap screw (A) to specification.

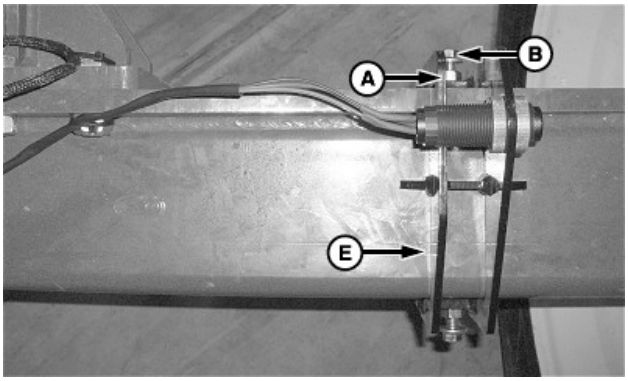
Specification

Cap Screw (A)—Torque. . . . . 130 N·m (95 lb·ft)

h5snma9,1716999842637-19-29MAY24

Remove and Install the Wheel Speed Sensor (DB Only)

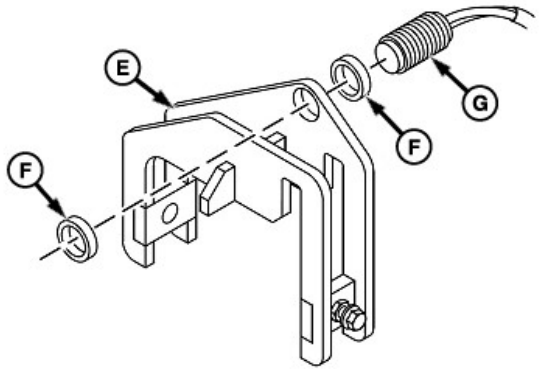
Remove the Motion Sensor



A97206—UN—12JUL17



A97207—UN—12JUL17

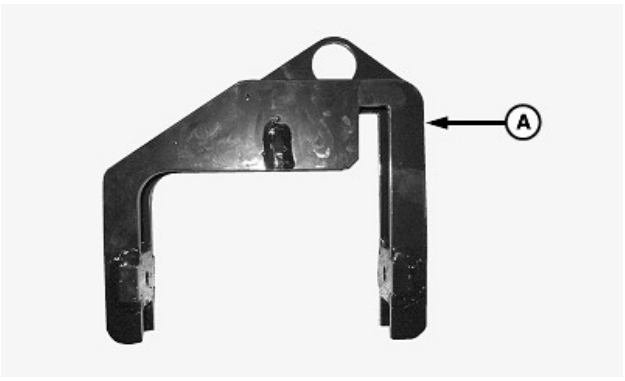


A97208—UN—12JUL17

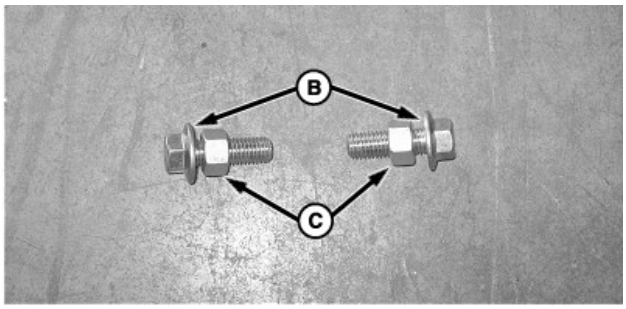
A—Nut (2 used)
B—Screw (2 used)
C—Sensor Connector
D—Backbone Connector
E—Mounting Bracket
F—Thumb Nut (2 used)
G—Motion Sensor

1. Loosen the nuts (A) and the screws (B).
2. Disconnect the motion sensor connector (C) from the backbone connector (D).
3. Slide the mounting bracket (E) away from the tone wheel and then remove the bracket.
4. Remove the thumb nuts (F) and then remove the motion sensor (G) from the mounting bracket.
5. Reinstall the motion sensor after servicing or replace if needed.

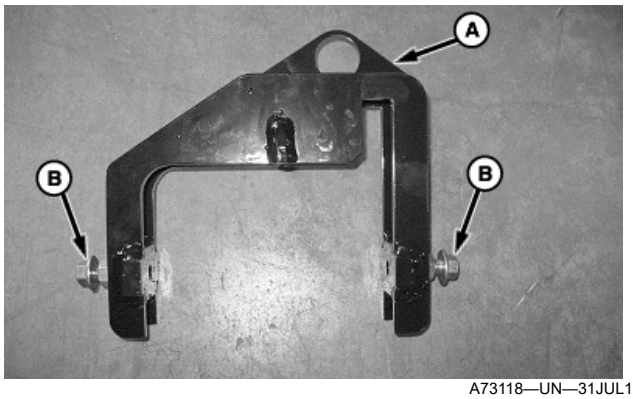
Install the Motion Sensor



A73113—UN—31JUL12



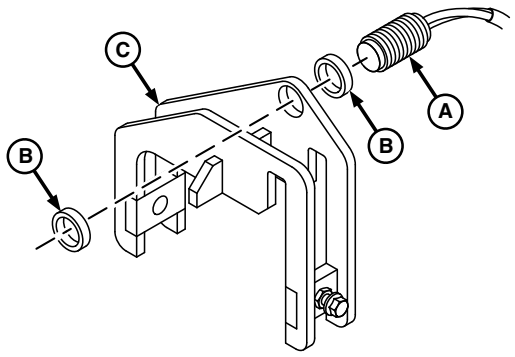
A73114—UN—01AUG12



A73118—UN—31JUL12

A—Mounting Bracket
B—Cap Screw (2 used)
C—Nut (2 used)

1. Locate the mounting bracket (A), cap screws (B), and nuts (C).
2. Thread the nuts (C) on the cap screw (B) as shown.
3. Thread the cap screws (B) with the nuts (C) into the mounting bracket (A) as shown.

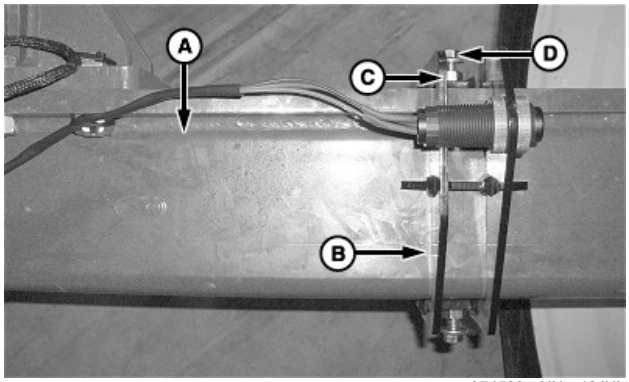


A73126—UN—27JUN13

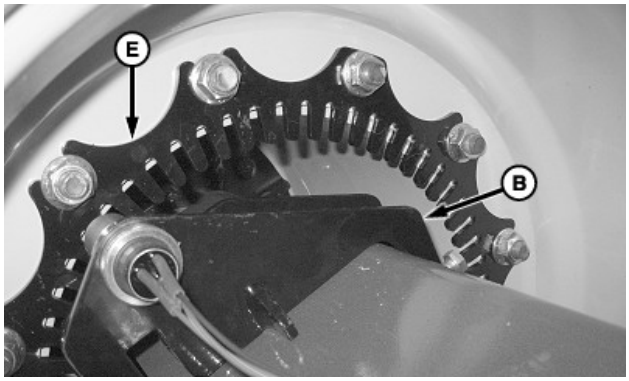
Example of Sensor Mounted in Bracket

A—Motion Sensor
B—Thumb Nuts
C—Mounting Bracket

4. Install the motion sensor (A) in the mounting bracket (C) using the thumb nuts (B).



A74583—UN—18JUL12

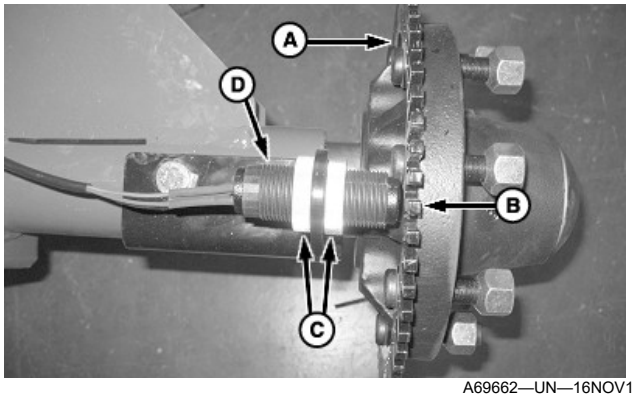


A75617—UN—18JUL12

A—Axle Tube
B—Mounting Bracket
C—Nut (2 used)
D—Cap Screw (2 used)
E—Tone Wheel

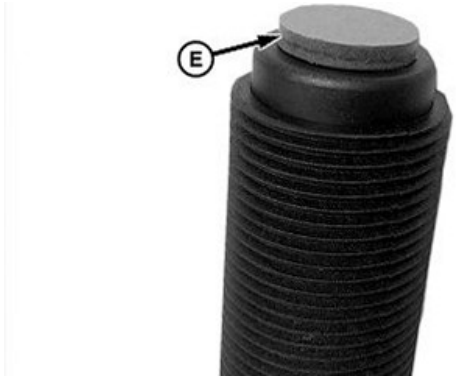
5. Position the mounting bracket (B) over the axle tube (A) as shown.
6. Position the mounting bracket (B) with the sensor near the tone wheel (E).
7. Tighten the cap screws (D).
8. Tighten the nuts (C).

NOTE: The tire that has the tone wheel mounted must be lifted off the ground for the following steps.



A69662—UN—16NOV10

Example of Sensor and Tone Wheel



A96745—UN—02JUN17

A—Hub
B—Tone Wheel
C—Thumb Nut (2 used)
D—Motion Sensor
E—Pad

9. Adjust the motion sensor (D) as follows:
   - Loosen the thumb nuts (C).
   - Rotate the motion sensor (D) until the pad (E) lightly contacts the tone wheel (B).
   - Slowly spin the hub (A) and verify only light contact with the pad (E).
   - Tighten the thumb nuts (C).
10. Reinstall the sensor to specification from the tone wheel when servicing the sensor, tone wheel, or the pad on the end of the sensor is gone.

Specification

Wheel Speed Sensor—Distance	2 — 4 mm (0.08 — 0.16 in)



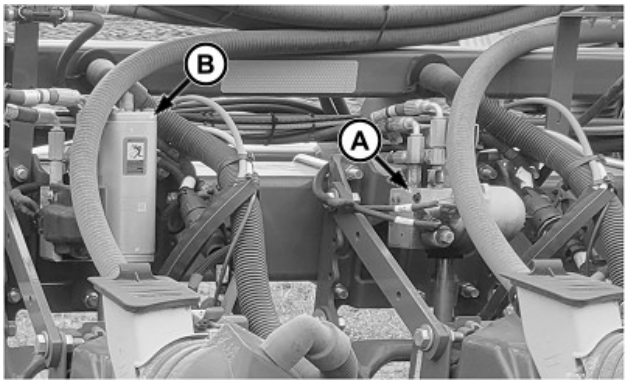
A97209—UN—12JUL17

A—Motion Sensor Connector
B—Backbone Harness Connector

11. The motion sensor connector (A) is connected to the backbone harness connector (B).

WP29706,0000BAF-19-12JUL17

Individual Row Hydraulic Downforce (IRHD) Valve Flush and Test



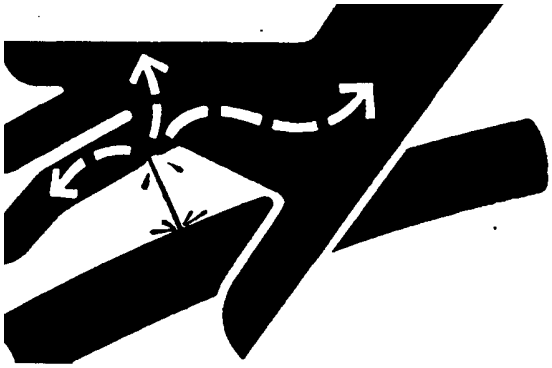
A119983—UN—17NOV23

A—Gen 1 IRHD
B—Gen 2 IRHD

NOTE: It is not necessary to warm the oil for accumulator testing.

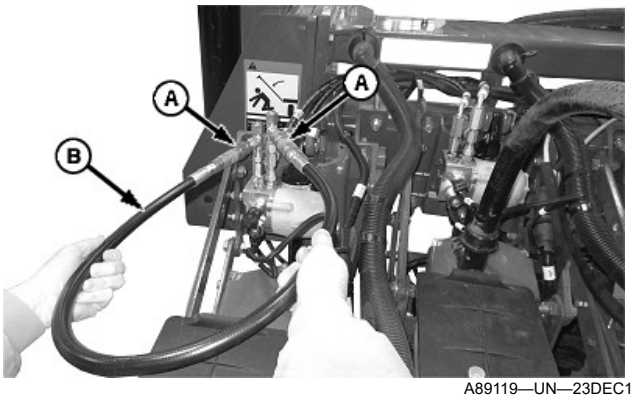
To test the accumulators:

- Gen 1 IRHD (A) (annually before planting, if replaced, or erratic behavior)—Use the on-screen procedures.
- Gen 2 IRHD (B) (annually before planting or if repaired)—Use the mobile application and manual procedure.



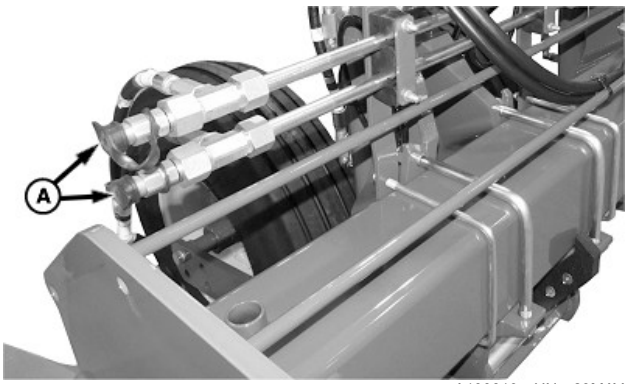
X9811—UN—23AUG88

Fluid Injection Hazard



A89119—UN—23DEC15

Bypass Hose and Row Unit with IRHD Couplers



A100619—UN—23MAY18

Steel Tube with IRHD Couplers

A—Couplers
B—Bypass Hose

To warm the hydraulic fluid and remove particulates from the hoses, use the bypass hose (B). To remove air from the system and flush particulates from the valves, use the on-screen procedures.

Perform these procedures when the IRHD system has been repaired or has erratic performance.

CAUTION: Avoid serious injury from fluid injection. Do not connect or disconnect hoses with the tractor engine running. (See Avoid High-Pressure Fluids.)

1. Turn off the tractor.

NOTE: The connection point varies depending on the reason for the test.

- *Erratic readings or performance: Connect the bypass hose to any IRHD section.*
- *After a repair: Connect the bypass hose to the repaired IRHD section.*

2. There are couplers (A) on one end of each IRHD section. Locate a set of couplers, remove the coupler caps, and attach the bypass hose (B).
3. Keep bystanders clear and start the tractor.

NOTE: See the tractor Operator's Manual for oil temperature specifics.

4. Maintain the hydraulic flow until the oil is approximately 50°C (120°F) (hoses are warm when touched).
5. Turn off the tractor.
6. Remove the bypass hose and replace the coupler caps.

NOTE: An unused selective control valve (SCV) is needed for the valve and accumulator procedures.

7. If all SCVs are in use, remove the hoses from one. (See the Recommendations for Hydraulic Connections for additional information.)
8. Start the tractor.

NOTE: Set a low idle and deactivate all SCVs for low hydraulic pressure during the air purge test.

9. Perform the Air Purge Test procedure using the SeedStar Operator's Manual and application software (see the Planter Diagnostics Procedures). Verify that all rows on the display show green bars and that the procedure is successful.

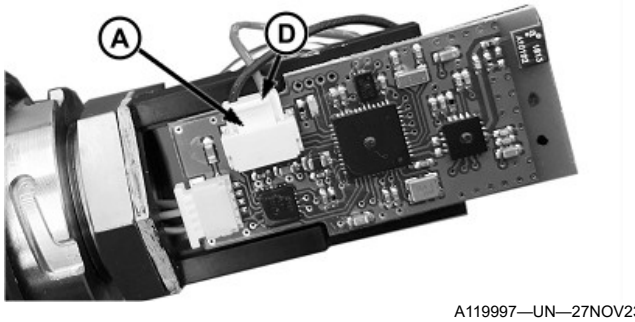
NOTE: Set a high idle and set an unused SCV to continuous detent for high hydraulic pressure during the valve tests.

10. Force the power beyond into high-pressure mode. Place an unused SCV into a continuous detent.
11. Perform the Valve Flush Test procedure using the SeedStar Operator's Manual and application software (see the Planter Diagnostics Procedures). Verify that all rows on the display show green bars and that the procedure is successful.
12. Perform the Valve Test procedure using the SeedStar Operator's Manual and application software (see the Planter Diagnostics Procedures). Verify that all rows on the display show green bars and that the procedure is successful.
13. Perform the Accumulator Test procedure in the following conditions.

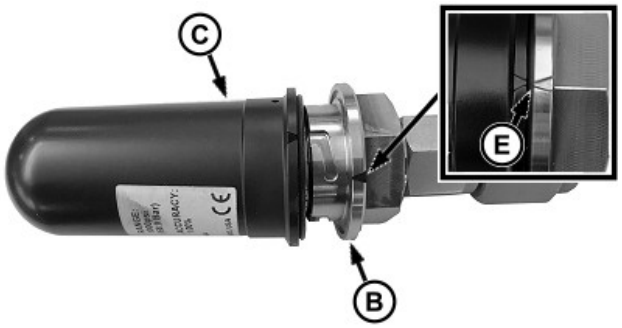
- Gen 1 IRHD (annually before planting, if replaced, or erratic behavior)—Use the SeedStar Operator's Manual and application software (see the Planter Diagnostics Procedures). Verify that all rows on the display show green bars and that the procedure is successful.
- Gen 2 IRHD (annually before planting or if repaired)—Use the mobile application and perform the manual test procedure (see Accumulator Test—Gen 2 IRHD in this section).

OUO6074,0001121-19-05DEC24

Accumulator Test—Gen 2 IRHD



A119997—UN—27NOV23



A119996—UN—27NOV23

A—Harness
B—Sensor Body
C—Sensor Housing
D—Latch
E—Indicator

NOTE: Warming the hydraulic oil is not required.

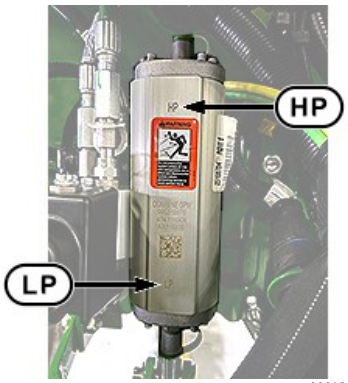
Test each accumulator annually before the planting season.

Test an accumulator if repaired.

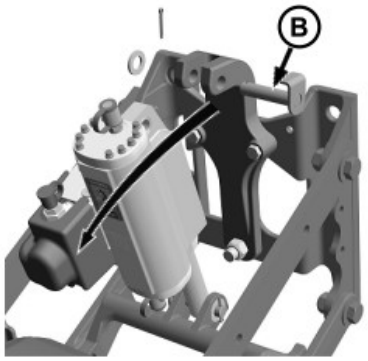
1. To use the sensor, connect battery harness (A). To extend the battery life, disconnect the battery harness.
2. Hold sensor body (B) with a wrench while turning sensor housing (C) by hand (counterclockwise=unlatch or clockwise=latch).

3. Press latch (D) before disconnecting the harness. Verify that the latch is locked when connecting the harness. Verify that indicators (E) are aligned when attaching the sensor housing to the body.

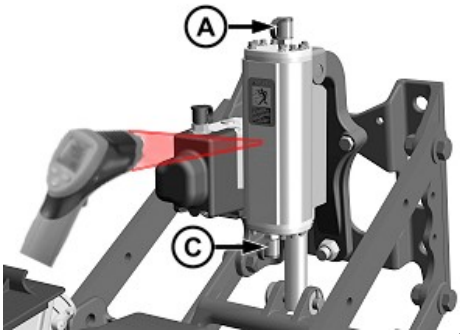
Charge Pressure Chart					
Housing Temperature		High Pressure kPa (bar) (psi) Top Port HP		Low Pressure kPa (bar) (psi) Bottom Port LP	
° C	(° F)	Acceptable Operating Range	Recharge at or Below	Acceptable Operating Range	Recharge at or Below
-7	(20)	3122—6745 (31.2—67.4) (453—978)	3122 (31.2) (453)	546—1300 (5.5—13) (79—188)	546 (5.5) (79)
-4	(25)	3154—6811 (31.5—68.1) (458—988)	3154 (31.5) (458)	552—1311 (5.5—13.1) (80—190)	552 (5.5) (80)
-1	(30)	3187—6878 (31.9—68.8) (462—998)	3187 (31.9) (462)	558—1322 (5.6—13.2) (81—192)	558 (5.6) (81)
2	(35)	3220—6945 (32.2—69.4) (467—1007)	3220 (32.2) (467)	563—1334 (5.6—13.3) (82—193)	563 (5.6) (82)
4	(40)	3252—7012 (32.5—70.1) (472—1017)	3252 (32.5) (472)	569—1345 (5.7—13.5) (83—195)	569 (5.7) (83)
7	(45)	3285—7078 (32.8—70.8) (476—1027)	3285 (32.8) (476)	575—1356 (5.7—13.6) (83—197)	575 (5.7) (83)
10	(50)	3317—7145 (33.2—71.5) (481—1036)	3317 (33.2) (481)	581—1368 (5.8—13.7) (84—198)	581 (5.8) (84)
13	(55)	3350—7212 (33.5—72.1) (486—1046)	3350 (33.5) (486)	586—1379 (5.9—13.8) (85—200)	586 (5.9) (85)
16	(60)	3382—7278 (33.8—72.8) (491—1056)	3382 (33.8) (491)	592—1391 (5.9—13.9) (86—202)	592 (5.9) (86)
18	(65)	3415—7345 (34.1—73.5) (495—1065)	3415 (34.1) (495)	598—1402 (6—14) (87—203)	598 (6) (87)
21	(70)	3447—7412 (34.5—74.1) (500—1075)	3447 (34.5) (500)	603—1413 (6—14.1) (88—205)	603 (6) (88)
24	(75)	3480—7479 (34.8—74.8) (505—1085)	3480 (34.8) (505)	609—1425 (6.1—14.2) (88—207)	609 (6.1) (88)
27	(80)	3512—7545 (35.1—75.5) (509—1094)	3512 (35.1) (509)	615—1436 (6.1—14.4) (89—208)	615 (6.1) (89)
29	(85)	3545—7612 (35.5—76.1) (514—1104)	3545 (35.5) (514)	620—1448 (6.2—14.5) (90—210)	620 (6.2) (90)
32	(90)	3578—7679 (35.8—76.8) (519—1114)	3578 (35.8) (519)	626—1459 (6.3—14.6) (91—212)	626 (6.3) (91)
35	(95)	3610—7745 (36.1—77.5) (524—1123)	3610 (36.1) (524)	632—1470 (6.3—14.7) (92—213)	632 (6.3) (92)
38	(100)	3643—7812 (36.4—78.1) (528—1133)	3643 (36.4) (528)	637—1482 (6.4—14.8) (92—215)	637 (6.4) (92)
41	(105)	3675—7879 (36.8—78.8) (533—1143)	3675 (36.8) (533)	643—1493 (6.4—14.9) (93—217)	643 (6.4) (93)



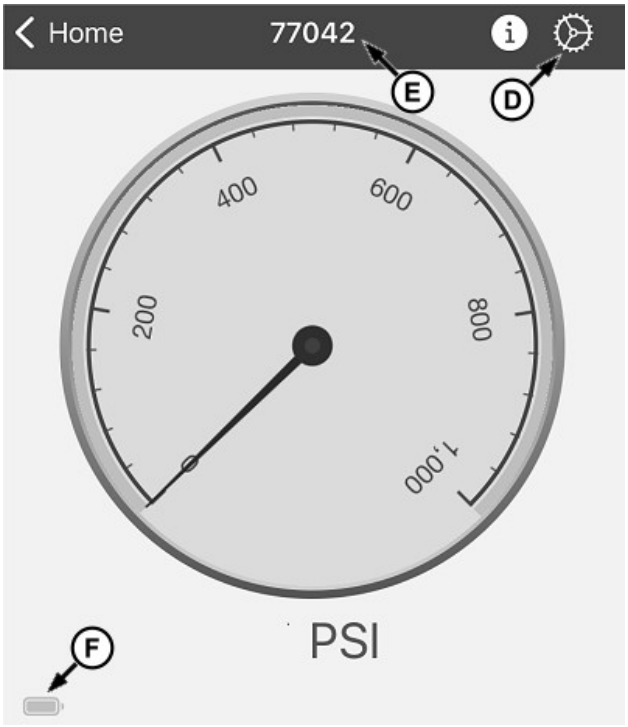
AX1396551—UN—11MAR25



A120002—UN—28NOV23



A121293—UN—22APR24



A121294—UN—22APR24

A—Top Accumulator Port (HP)
B—Pin
C—Bottom Accumulator Port (LP)
D—Settings
E—Sensor Serial Number
F—Battery Level

4. Raise the planter, engage the service locks or support the frame, and then shut off the tractor.
5. Take the temperature of the housing using an infrared tool.
6. To check the high pressure (HP) accumulator, connect the sensor to top accumulator port (A). If the port is blocked, remove top pin (B) and tilt the accumulator forward.
7. To check the low pressure (LP) accumulator, connect the sensor to bottom accumulator port (C).
8. Use the mobile application to read the pressure.
   a. Enable Bluetooth on the mobile device.
   b. From the Apple App Store or the Google Play Store, download and install the Pressure Pro CirrusSense application.
   c. For Android devices, select Connect Bluetooth Sensor.
   d. Select the serial number of the sensor used and then select Connect.

   NOTE: Adjust the units using settings (D).

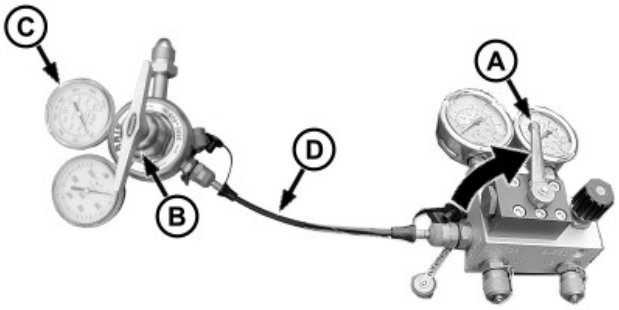
   e. Verify sensor serial number (E) and the pressure of the accumulator.
9. Refer to the chart and compare the sensor pressure to the pressure range associated to the temperature reading.

NOTE: As needed, charge all of the HP top ports (high-pressure accumulator) before the LP bottom ports (low-pressure accumulator).

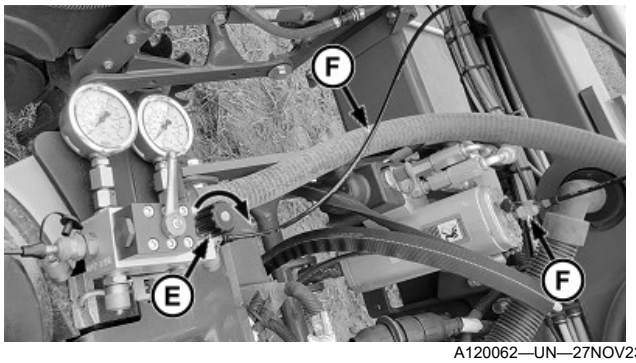
10. If the sensor pressure is below the refill limit, charge the accumulator. (See the Gen 2 IRHD—Accumulator Charging in this section or see a John Deere dealer or other service provider.)

ouo6074,1701112338388-19-17OCT25

Charge the Accumulator—Gen 2 IRHD



A120061—UN—27NOV23



A120062—UN—27NOV23

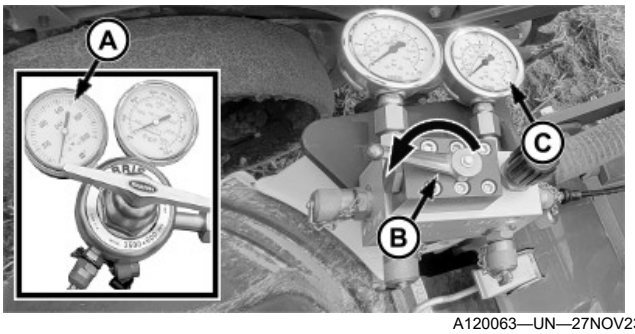
A—Charge Valve
B—Supply Valve
C—Tank Supply Gauge
D—Hose
E—Bleed Valve
F—Hose

1. Raise the planter, engage the service locks or support the frame, and then shut off the tractor.
2. Close charge valve (A) and connect supply valve (B) to a nitrogen supply tank.

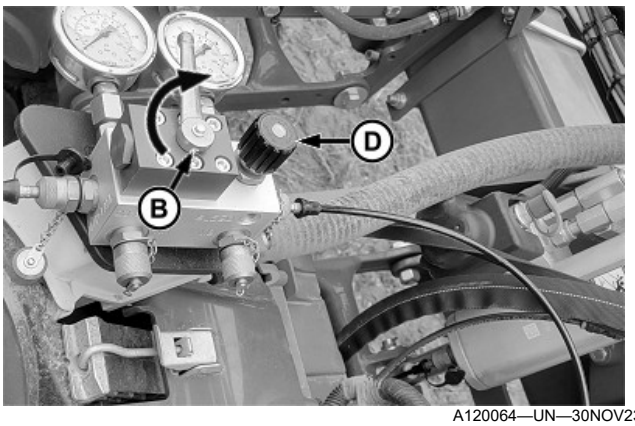
NOTE: Fill all of the top ports (high-pressure accumulators) before the bottom ports (low-pressure accumulators).

3. Verify that tank supply gauge (C) indicates at least 8275 kPa (8.28 bar) (1200 psi) for a top port or 3447 kPa (3.45 bar) (500 psi) for a bottom port.

4. Connect hose (D) between the valves.
5. Close bleed valve (E) and connect hose (F) to a top or bottom port.
6. If a long time has passed since testing the accumulator, recheck the accumulator temperature before charging.



A120063—UN—27NOV23



A120064—UN—30NOV23

A—Supply Valve
B—Charge Valve
C—Charge Gauge
D—Bleed Valve

7. Open the nitrogen supply tank and set supply valve (A) to 8275 kPa (8.28 bar) (1200 psi) for a top port or to 3447 kPa (3.45 bar) (500 psi) for a bottom port.
8. Open charge valve (B) and verify that the same pressure reading is on charge gauge (C).
9. Close charge valve (B) and use bleed valve (D) to adjust the pressure according to the chart for the current accumulator temperature.

NOTE: When the charge hoses are disconnected, expect a pressure loss of 48 kPa (0.48 bar) (7 psi) in the high-pressure (HP) accumulator and a loss of 10 kPa (0.10 bar) (1.5 psi) in the low-pressure (LP) accumulator.

10. To avoid complete loss of pressure, disconnect the charge hose from the accumulator first.

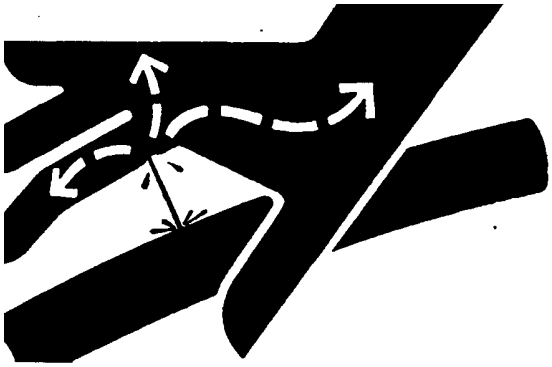
Charge Pressure Chart

Housing Temperature		High Pressure kPa (bar) (psi) Top Port HP		Low Pressure kPa (bar) (psi) Bottom Port LP	
° C	(° F)	Minimum	Maximum	Minimum	Maximum
-7	(20)	6055 (60.6) (878)	6745 (67.4) (978)	886 (8.9) (128)	1300 (13) (188)
-4	(25)	6122 (61.2) (888)	6811 (68.1) (988)	897 (9) (130)	1311 (13.1) (190)
-1	(30)	6189 (61.9) (898)	6878 (68.8) (998)	909 (9.1) (132)	1322 (13.2) (192)
2	(35)	6255 (62.6) (907)	6945 (69.4) (1007)	920 (9.2) (133)	1334 (13.3) (193)
4	(40)	6322 (63.2) (917)	7012 (70.1) (1017)	931 (9.3) (135)	1345 (13.5) (195)
7	(45)	6389 (63.9) (927)	7078 (70.8) (1027)	943 (9.4) (137)	1356 (13.6) (197)
10	(50)	6456 (64.6) (936)	7145 (71.5) (1036)	954 (9.5) (138)	1368 (13.7) (198)
13	(55)	6522 (65.2) (946)	7212 (72.1) (1046)	966 (9.7) (140)	1379 (13.8) (200)
16	(60)	6589 (65.9) (956)	7278 (72.8) (1056)	977 (9.8) (142)	1391 (13.9) (202)
18	(65)	6656 (66.6) (965)	7345 (73.5) (1065)	988 (9.9) (143)	1402 (14) (203)
21	(70)	6722 (67.2) (975)	7412 (74.1) (1075)	1000 (10) (145)	1413 (14.1) (205)
24	(75)	6789 (67.9) (985)	7479 (74.8) (1085)	1011 (10.1) (147)	1425 (14.2) (207)
27	(80)	6856 (68.6) (994)	7545 (75.5) (1094)	1023 (10.2) (148)	1436 (14.4) (208)
29	(85)	6923 (69.2) (1004)	7612 (76.1) (1104)	1034 (10.3) (150)	1448 (14.5) (210)
32	(90)	6989 (69.9) (1014)	7679 (76.8) (1114)	1045 (10.5) (152)	1459 (14.6) (212)
35	(95)	7056 (70.6) (1023)	7745 (77.5) (1123)	1057 (10.6) (153)	1470 (14.7) (213)
38	(100)	7123 (71.2) (1033)	7812 (78.1) (1133)	1068 (10.7) (155)	1482 (14.8) (215)

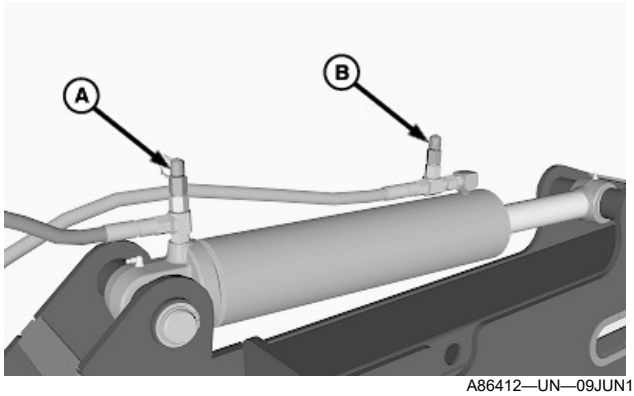
Charge Pressure Chart					
Housing Temperature		High Pressure kPa (bar) (psi) Top Port HP		Low Pressure kPa (bar) (psi) Bottom Port LP	
° C	(° F)	Minimum	Maximum	Minimum	Maximum
41	(105)	7189 (71.9) (1043)	7879 (78.8) (1143)	1079 (10.8) (157)	1493 (14.9) (217)

ouo6074,1701112488910-19-10MAR25

Bleeding Frame Weight Distribution Cylinders



X9811—UN—23AUG88



A86412—UN—09JUN15



A65291—UN—29SEP09

Bleed Hose (AA73677)

A—Bleed Port
B—Bleed Port

CAUTION: 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 the 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 can result. Doctors unfamiliar with this type of injury must reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

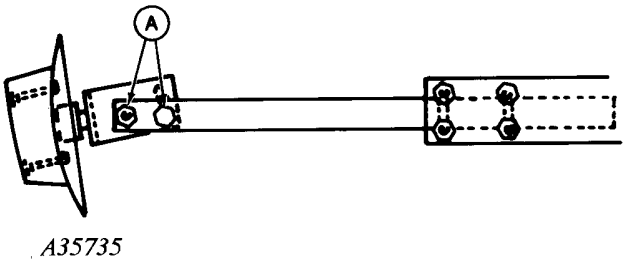
NOTE: The procedure shown is using frame weight cylinder from the right-hand side of the planter. The procedure for the cylinder on the left-hand side of the planter is similar.

1. If a hydraulic repair allows air into the FWD system, then complete the following steps to bleed the FWD hydraulics.
2. Remove the cover from the bleed port (A) on the cap end of the cylinder.
3. Attach one end of Bleed Hose (AA73677) onto the port and place the other end in a bucket.
4. Cycle the FWD system by turning the system ON and OFF until no bubbles appear from the bleed hose.
5. Turn the FWD system OFF and disconnect the bleed hose from the port.
6. Install the cover on the bleed port for the cap end of the cylinder.
7. Remove the cover from the bleed port (B) on the rod end of the cylinder.
8. Attach one end of the bleed hose onto the port and place the other end in a bucket.
9. Cycle the FWD system by turning the system ON and OFF until no bubbles appear from the bleed hose.
10. Turn the FWD system OFF and disconnect the bleed hose from the port.
11. Install the cover on the bleed port for the rod end of the cylinder.
12. To verify that the FWD system is operational, unfold

the planter until there is a noticeable engagement of the frame weight cylinders.

WP29706,0000CF0-19-10MAR22

Adjust Marker Disk



A35735—UN—06SEP94

A—Cap Screw (2 used)

The marker disk creates a furrow in the soil. This adjustment changes the size of the furrow.

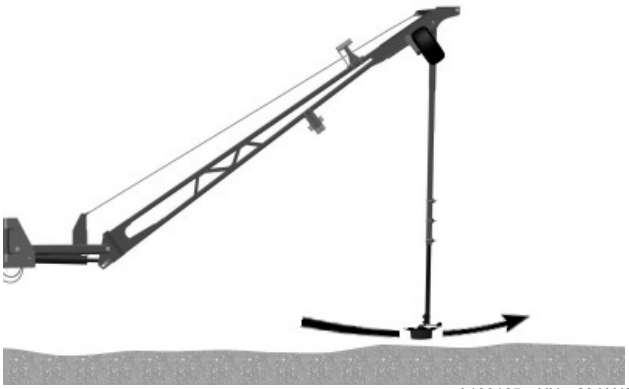
1. Loosen the nuts on cap screws (A) and adjust the disk angle.

Specification	
Cap Screw—Torque (dry).	240 N·m (175 lb·ft)

2. Tighten the cap screws to specification.

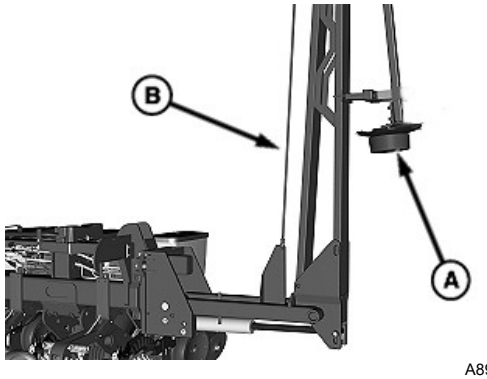
WP29706,0000DB3-19-26MAR19

Adjust the Marker Rod

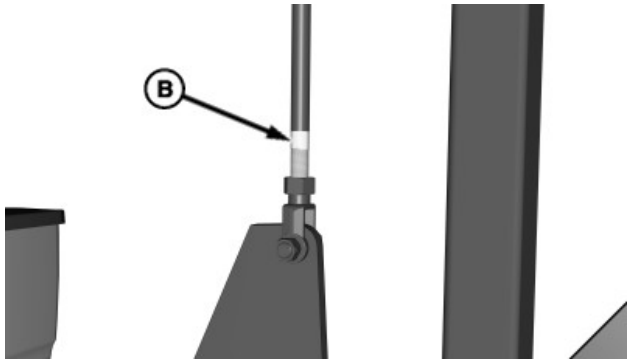


A109165—UN—29JAN21

Ground Clearance



A89582—UN—09MAY16



A89583—UN—11FEB16

A—Disk
B—Rod

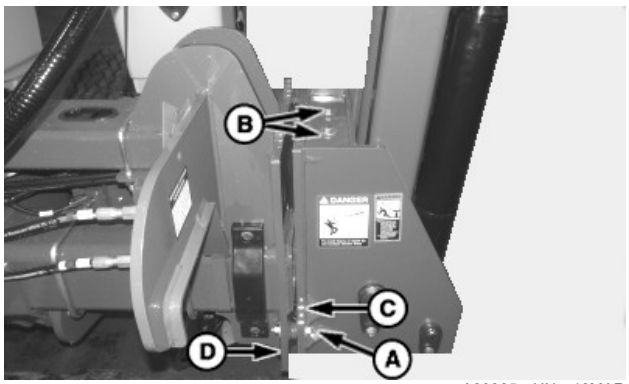
IMPORTANT: Avoid limiting the float range or disk (A) impact with the ground. Use the correct rod (B) adjustment.

NOTE: Adjust the marker length before setting rod length.

1. Lower the planter into plant position.
2. Observe the marker as it extends.
   - If the disk contacts the ground during extension, shorten the threaded rod adjustment.
   - If the disk is far above the ground during extension, lengthen the threaded rod adjustment.

LM78752,00002AB-19-02FEB21

Replace the Marker Breakaway Bolt



A89865—UN—16MAR16

A—Breakaway Bolt
B—Extra Shear Bolts
C—Bracket
D—Bracket

If the marker hits an obstacle, the marker breakaway bolt (A), provides protection from machine damage.

To replace the breakaway bolt, proceed as follows:

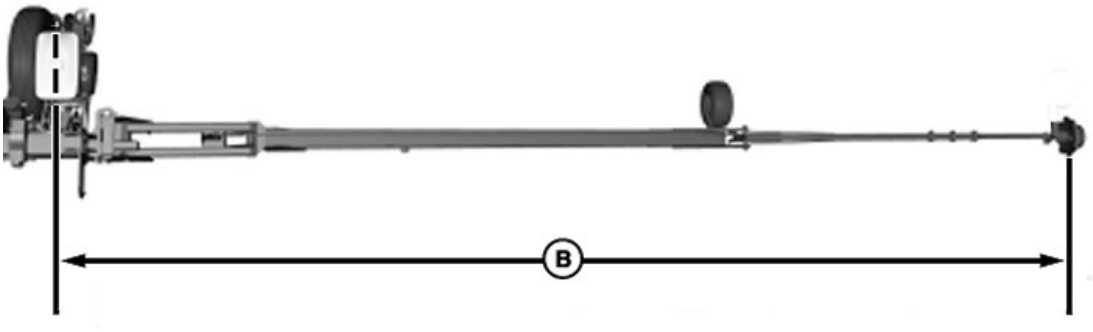
NOTE: Extra shear bolts (B) are on the marker frame.

1. Return the marker arm to operating position. Align the hole in the bracket (C) with the hole in the bracket (D) and insert the breakaway bolt (A).
2. Tighten the breakaway bolt and nut to specification. Secure with an additional lock nut.

Specification	
Breakaway Bolt and Nut—Torque	81 N·m (60 lb·ft)

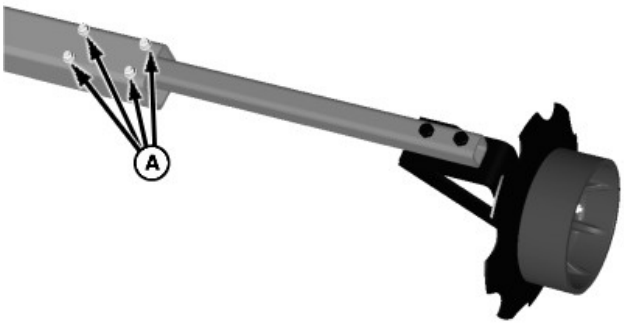
LM78752,00002AC-19-11MAY16

Adjust the Marker Length



A89581—UN—09MAY16

A—U-Bolts
B—Dimension



A51116—UN—13NOV02

1. Lower marker.
2. Loosen lock nuts on marker U-bolts (A). With the arm in the down position, adjust to length shown. Dimension (B) is measured from the center line of the planting unit to the marker disk. This is an approximate dimension and must be checked in the field.

Machine	Row Spacing	Dimension “B”
DB60 24R	76 cm (30 in)	9.1 m (29 ft 10 in)
DB60 36R	51 cm (20 in)	9.1 m (29 ft 10 in)
DB60 47R	38 cm (15 in)	8.9 m (29 ft 2 in)
DB60 48R	38 cm (15 in)	9.1 m (29 ft 10 in)
DB80 32R	76 cm (30 in)	12.2 m (40 ft)
DB88 48R	51 cm (20 in)	12.2 m (40 ft)
DB90 36R	76 cm (30 in)	13.7 m (44 ft 11 in)

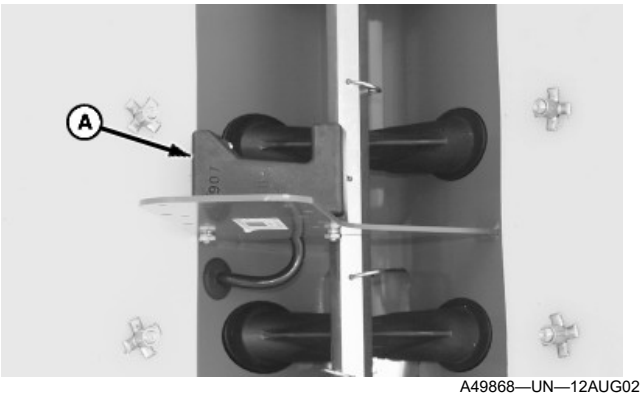
3. Tighten lock nuts (A) to specification.

Specification

Lock Nuts—Torque. . . . . 50 N·m (37 lb.-ft.)

LM78752,00002AE-19-25JUN18

Clean the CCS Tank Level Sensors



A49868—UN—12AUG02

A—Tank Level Sensor

Clean the tank level sensors (A) before filling the CCS tanks. To clean the tank sensors, use a stiff bristled 1372 mm (4.5 ft) handle 203 mm (8 in) wide broom.

OUO1074,0001427-19-09OCT25

Zero the CCS Blower Pressure Gauge



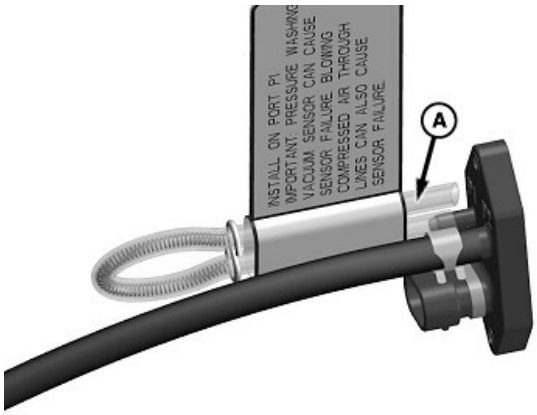
A51170—UN—18NOV02

A—Zero Adjusting Screw

1. Shut off the CCS blower.
2. With the gauge in a vertical position, disconnect the monitor hose to equalize the gauge with atmospheric pressure.
3. Use the zero adjusting screw (A) to set the gauge pointer exactly on the zero mark.
4. Connect the monitor hose.

OUO6064,00004DE-19-09OCT25

Inspect the Vacuum Sensor Vent



A109274—UN—15FEB21

Electronic Sensor

A—Clear Sensing Hose

Verify that the clear sensing hose (A) is not blocked.

CR53390,0000269-19-15FEB21

Clean the Vacuum System

Dirt or seed treatment buildup in the vacuum system causes low vacuum at planting units. Low vacuum results in a loss of seed meter accuracy.

CAUTION: Avoid chemical injury to eyes, skin, or lungs. When using seed treatments, read and follow the safety instructions on the chemical label.

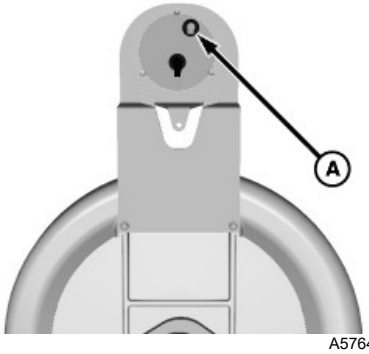
Clean the air system at least once a week during operation or more often in severe dusty conditions.

Clean as follows:

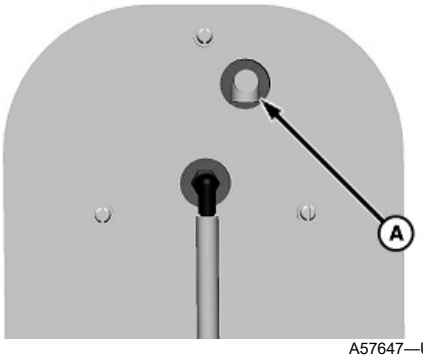
1. Turn on the vacuum blowers and set the hydraulic flow to 75 percent.
2. One at a time, remove the vacuum hoses from the meters. Inspect and clean all of the foreign material from both hose ends. Shake the hose for a few seconds and replace it on the meter.
3. Remove and install the end caps from each vacuum tube one at a time.

OUO6435,0001AEC-19-11MAY16

Vacuum Gauge Filter



A57646—UN—14MAR06



A57647—UN—15MAR06

Vacuum Gauge

A—Vacuum Gauge Filter

Annually inspect the vacuum gauge filter (A).

If the filter becomes clogged with dust, clean it.

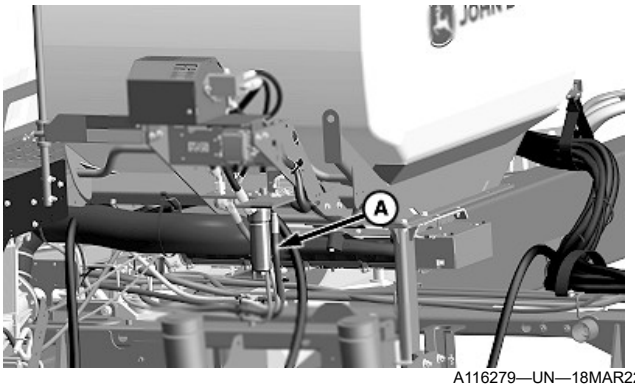
1. Remove and wash the filter with soapy water.
2. Gently dry the filter with pressurized air.

3. Install the filter on the blower gauge.

If the gauge still performs incorrectly after being cleaned, replace the filter.

CR53390,000026B-19-15FEB21

Change the Hydraulic Filter on Implement Power Generation System



A116279—UN—18MAR22

A—Filter Housing

CAUTION: Avoid injury from hydraulic oil injection. Relieve the hydraulic pressure before servicing.

1. Before starting any service work on this filter, depressurize the hydraulic system. (See Relieve the Hydraulic Pressure for additional information.)
2. Turn off the tractor and disconnect the power beyond hoses from the tractor.
3. Remove the filter housing (A).
4. Replace the filter and install the housing. (AA83699 Filter can be obtained via regular spare part channels.)

CR53390,000030F-19-23OCT25

Battery Safety

CAUTION: Help prevent serious injury from an electrical shock. This power generation system is equipped with a 56 V electrical system which has a high-voltage electrical current. Always use extreme caution when servicing the battery set in this machine.

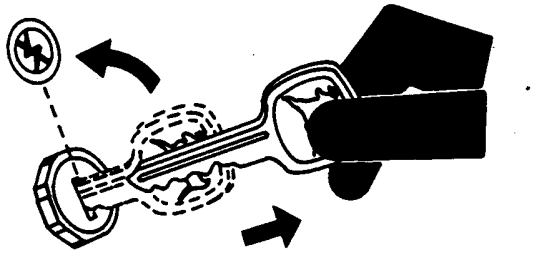
- **Explosive mixtures of hydrogen gas are present within battery cells. DO NOT service or charge vehicle batteries in an area where open flames, sparks, cigarettes, or any other source of combustion are present.**
- **Only trained technicians or owners that have knowledge and experience with electrical maintenance must repair or service this vehicle.**
- **Avoid a short circuit or spark that results in an explosion, use extreme caution when using tools, wires, or metal objects near batteries. To prevent shorting out of batteries, wrap metal tools with vinyl tape.**
- **Remove all jewelry (watches, rings, bracelets) before servicing the electrical system or batteries.**
- **If it is necessary to operate or charge the vehicle in an enclosed area, verify that the work area is ventilated well.**
- **Always wear approved eye protection while servicing the vehicle. Wear a full face shield, rubber gloves, and rubber apron when servicing the batteries.**
- **Replace worn, damaged, or broken parts immediately.**
- **DO NOT touch battery terminals, connectors, or wires that are not insulated.**
- **ALWAYS refer to the Battery Connection diagram before and during battery installation and while making the electrical connections.**
- **Battery connections are both marked and color coded. ALWAYS verify that the RED boots cover the POSITIVE (+) battery terminals and wires. ALWAYS verify that the BLACK boots cover the NEGATIVE (-) battery terminals and wires. Avoid a short circuit or sparks that result in an explosion, by connecting battery wires properly.**
- **DO NOT install the primary battery POSITIVE cable onto the initial battery positive terminal until all other battery cable connections have been completed.**
- **Battery electrolyte is poisonous and causes severe burns. Avoid contact with skin, eyes, or clothing.**

ANTIDOTES:

- **EXTERNAL: Flush with water for at least 20 minutes. Call a physician immediately.**
- **INTERNAL: Drink large quantities of milk or water. Follow with Magnesium Hydroxide Mixture "Milk of Magnesia"or vegetable oil. Call a physician immediately.**
- **EYES: Flush with water for at least 20 minutes and get prompt medical attention.**

WP29706,000074F-19-30SEP15

Access and Inspect the Batteries



TS230—UN—24MAY89



A82413—UN—22APR14

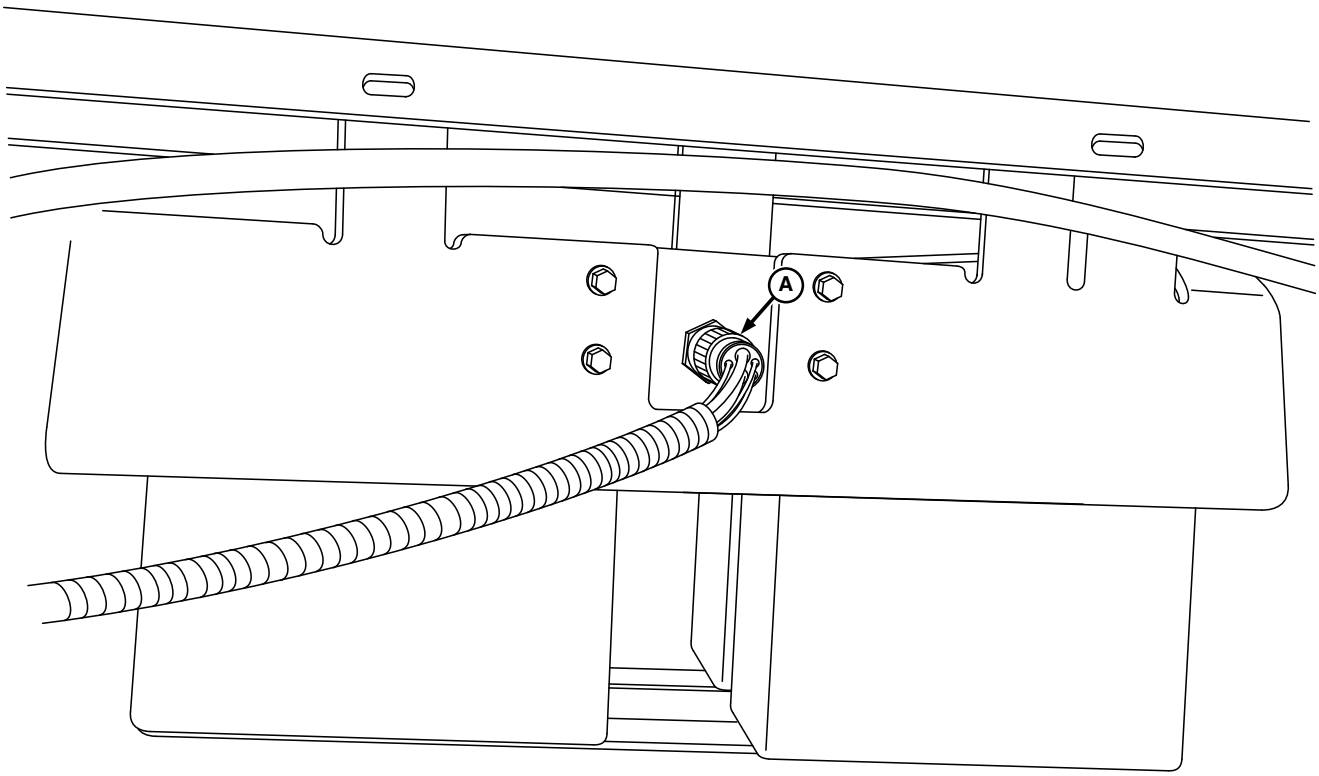
Help prevent serious injury from an electrical shock. The planter is equipped with a 56 V electrical system which has a high-voltage electrical current. Always use extreme caution when servicing this planter.

Avoid a short circuit or spark that results in an explosion. Use extreme caution when using tools, wires, or metal objects near batteries. To prevent shorting out the batteries, wrap the metal tools with vinyl tape.

Remove all jewelry (watches, rings, bracelets, and similar items) before servicing the electrical system or batteries.

A visual inspection of the planter batteries is intended to find and correct potential problems before serious safety and operational concerns occur. A battery is a perishable item that requires periodic maintenance. Life of a battery is extended with a reasonable amount of care.

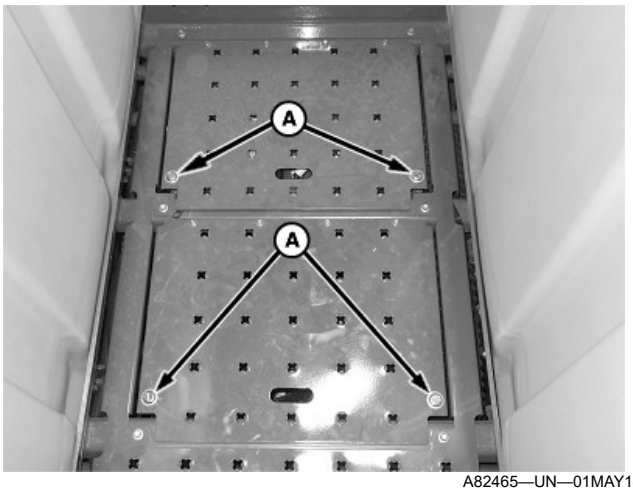
1. Park the planter safely. (See Parking Safely in the Safety section.)
2. Engage the park brake, shut off the engine and remove the key.



A83741—UN—30SEP14

A—Connector

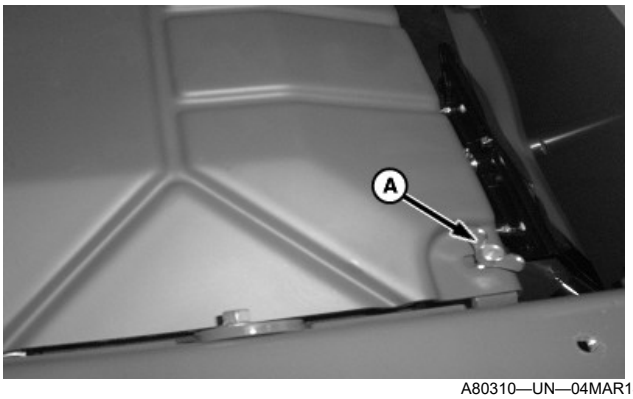
3. Remove the harness connector (A) from the outside of the battery container.



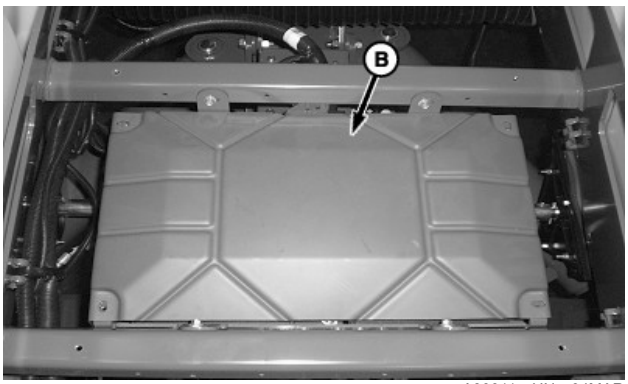
A82465—UN—01MAY14

A—Latches

4. To open the CCS platform door, turn the latches (A). To expose the battery cover, lift the door.



A80310—UN—04MAR14



A80311—UN—04MAR14

A—Wing Screws
B—Battery Cover

5. Remove and retain the wing screws (A) from the battery cover (B).
6. Remove and retain the battery cover.



A83745—UN—26SEP14

IMPORTANT: Avoid system malfunctions, planter damages, and fires. Any damage to the battery case or terminals are possible signs that the terminal connections are loose. (See Cable Installation and Terminal Torque.)

7. Visually inspect all batteries for the following:
   - Discolored or melted terminal boots
   - Burn spots
   - Dirt or corrosion on or around the battery terminals
   - Damage to the battery case or terminals
   - Leakage of the electrolyte
   - Broken or frayed cables

   To determine if the batteries need charging after a visual inspection, check the voltage levels on each battery separately. (See Check, Charge, or Replace the Batteries.)
8. After a visual inspection, charging, or repairs are complete, perform the following:
   - Install the battery cover and wing screws.
   - Close the CCS platform door and turn the latches back to the original positions on the planter.
   - Install the previously removed harness connectors on the outside of the battery container.

WP29706,0000752-19-09OCT25

Check, Charge, or Replace the Batteries



A82413—UN—22APR14

CAUTION: Help prevent serious injury from an electrical shock. The planter is equipped with a 56 V electrical system which has a high-voltage electrical current. Always use extreme caution when servicing this planter.

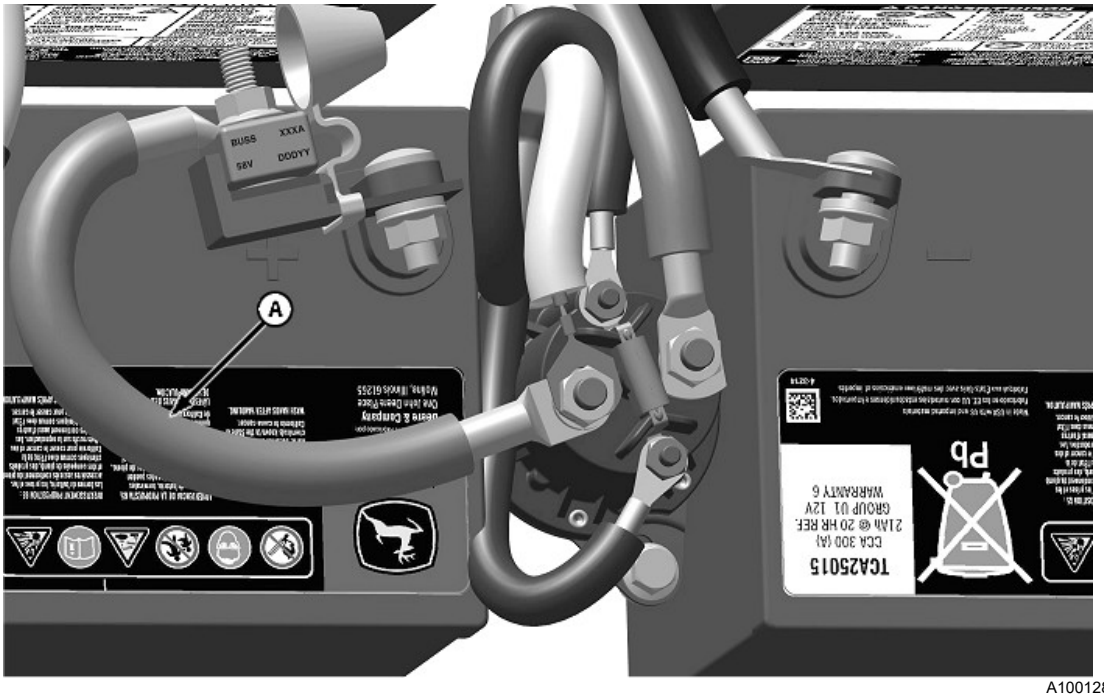
Avoid a short circuit or spark that results in an explosion. Use extreme caution when using tools, wires, or metal objects near the batteries. To prevent shorting out the batteries, wrap the metal tools with vinyl tape for protection.

Remove all jewelry (watches, rings, bracelets, and similar items) before servicing the electrical system or batteries.

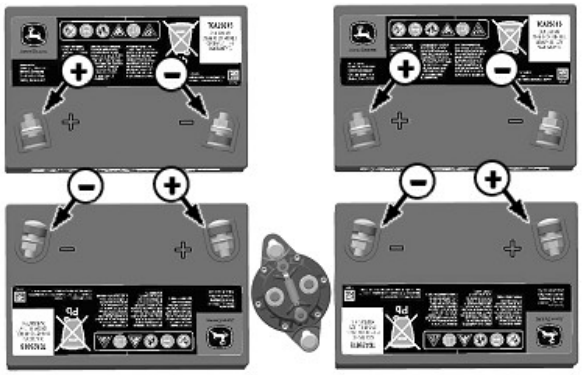
IMPORTANT: Charge the batteries when the planter is removed from storage at the beginning of the season. If the battery bank voltage is below 48 V but above 10 V, the electric power generation (EPG) is used to charge the batteries. See your SeedStar Application Help or SeedStar Operator's Manual for additional information about operating the EPG. If the battery bank voltage is below 10 V, complete the following procedure to charge the batteries individually.

Batteries also need replacement after long-term use. (See Clean or Replace the Batteries.)

1. Access the battery tray. (See Access and Inspect the Batteries.)



A100128—UN—29MAR18



A100129—UN—06APR18

Battery Arrangement

A—Battery Cable with Fuse

IMPORTANT: This battery tray is wired as a 48 V electrical system until the cables are disconnected. Cables must be removed so that each battery is separated for an individual check or charge at a 12 V level.

2. Remove the cable with the fuse (A) first.
3. Remove the remaining battery cables.
4. After each battery is separated from the system, check the voltage level on each battery.
   - If the voltage is 11 to 12 V, the charge is OK.
   - If the voltage is 0 to 10 V, charge the battery.
   - If a battery does not accept a charge, replace it.
5. Connect the charger cables to the battery terminals on one battery at a time while charging.
6. If the batteries are removed, verify the arrangement when they are replaced.

CAUTION: Avoid an electric shock from completing the circuit incorrectly. Attach the battery cable with fuse (A) last. Always use extreme caution when servicing this planter.

IMPORTANT: Avoid damage. Tighten the terminal connections correctly.

7. Install and tighten the cables. (See Cable Installation and Terminal Torque.)
8. Install the battery cover and the wing screws.
9. Close the CCS platform door and turn the latches back to the original positions on the planter.
10. Install the previously removed harness connectors on the outside of the battery container.

WP29706,000074E-19-09OCT25

Clean the Batteries



A82413—UN—22APR14

CAUTION: Help prevent serious injury from an electrical shock. The implement is equipped with a 56 V electrical system which has a high-voltage electrical current. Always use extreme caution when servicing this machine.

Avoid a short circuit or spark that results in an explosion. Use extreme caution when using tools, wires, or metal objects near batteries. To prevent shorting out the batteries, wrap the metal tools with vinyl tape.

Remove all jewelry (watches, rings, bracelets, and similar items) before servicing the electrical system or batteries. Do not touch the battery terminals, connectors, or wires that are not insulated.

Cleaning is a key element in the battery maintenance, for both safety and performance. Regular cleaning reduces the dirt and corrosion from forming. Cleaning reduces the chance of acid contact and provides efficient electrical connections. Lack of cleaning can cause the following problems:

- Reduced reliability and performance
- Shortened overall battery life
- Increased corrosion
- Possibility of a fire



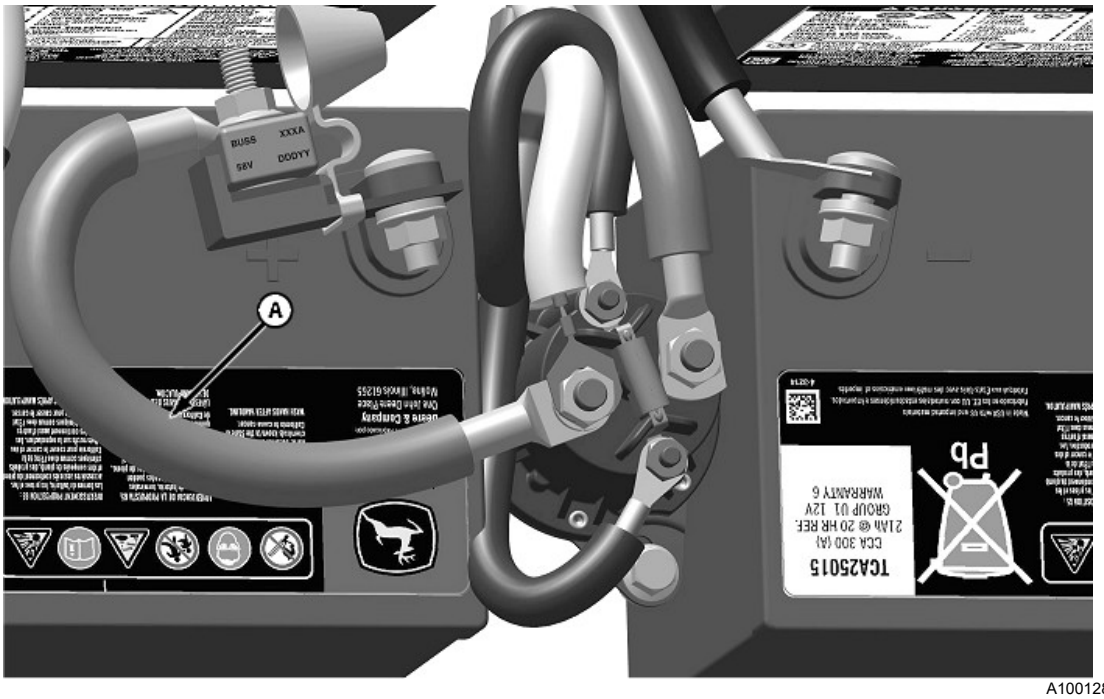
A83745—UN—26SEP14

1. Access the battery tray. (See Access and Inspect the Batteries.)

2. Clean all the moisture and corrosion in the battery compartment with a solution of one-part baking soda to five parts water. Rinse with clean water and allow to dry.

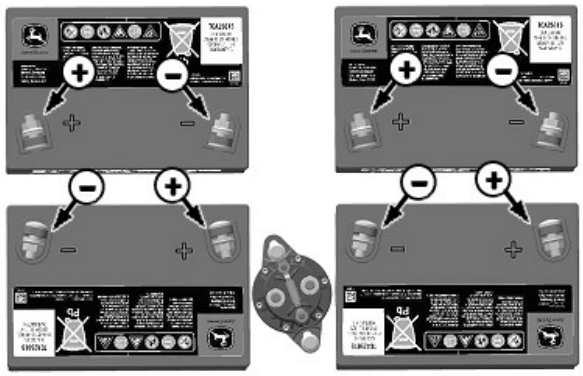
IMPORTANT: Avoid machine damage and component malfunction. Do not direct high-pressure water at the electrical components or connectors. Reduce the water pressure if pressurized spray is used to clean the batteries and surrounding areas.

3. Wash the batteries, battery terminals, and battery compartment. If the battery corrosion is excessive, continue with the following steps.



A100128—UN—29MAR18

A—Battery Cable with Fuse



A100129—UN—06APR18

Battery Arrangement

4. Remove the cable with the fuse (A) first.

5. Remove the remaining battery cables.

6. Remove the corrosion from the battery terminals and cable ends.
   - Clean the battery terminals and cable ends with a solution of one-part baking soda to five parts water. Use a wire brush if necessary.

- Rinse all the parts with clean water and allow to dry.

7. Check the battery charge and then install the cables. (See Check, Charge, or Replace the Batteries.) (See Cable Installation and Terminal Torque.)

WP29706,0000755-19-06DEC23

Cable Installation and Terminal Torque



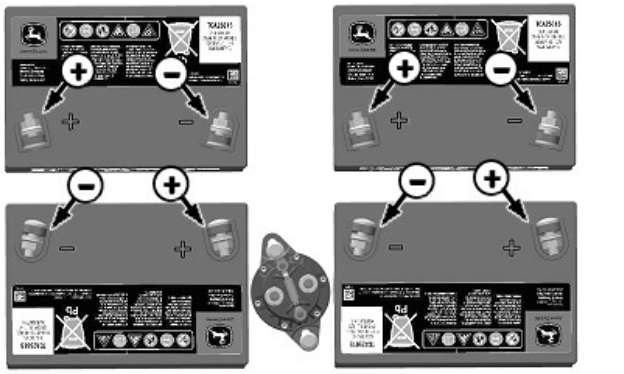
A82413—UN—22APR14

CAUTION: Help prevent serious injury from an electrical shock. This implement is equipped with a 56 V electrical system which has high-voltage electrical current. Always use extreme caution when servicing this machine.

Avoid a short circuit or spark that results in an explosion. Use extreme caution when using tools, wires, or metal objects near the batteries. To prevent shorting out the batteries, wrap the metal tools with vinyl tape.

Remove all jewelry (watches, rings, bracelets, and similar items) before servicing the electrical system or batteries.

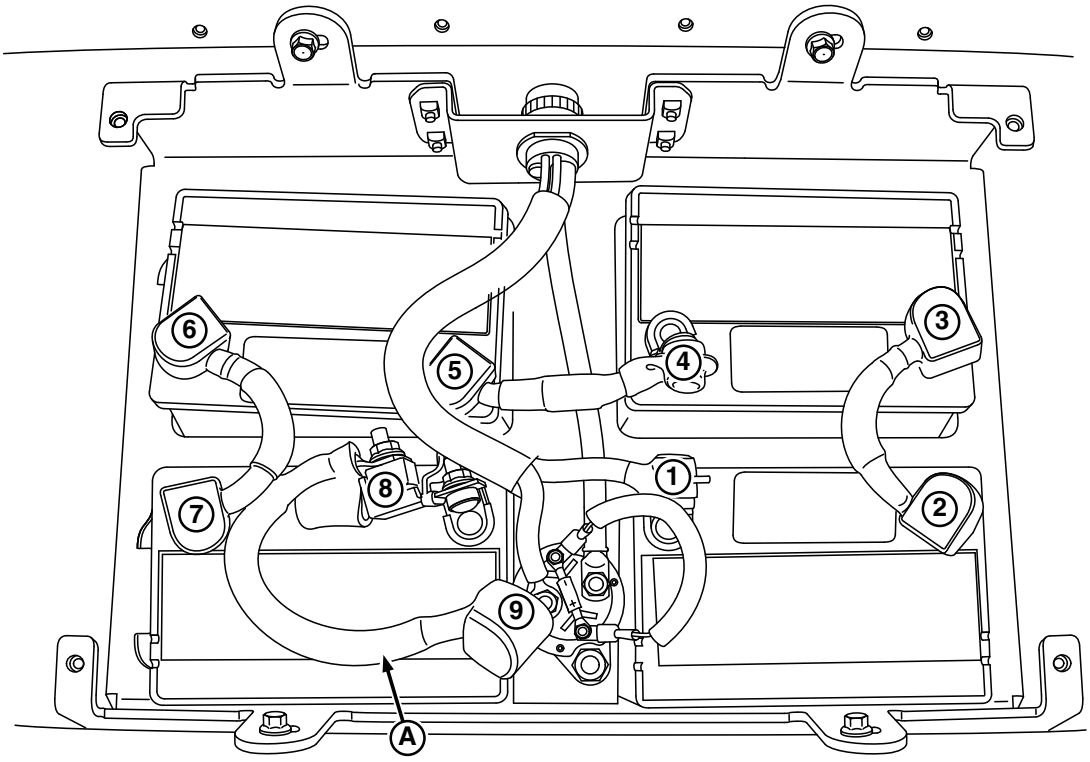
1. Clean the battery compartment, terminal connections, cable ends, and batteries (See Clean the Batteries).



A100129—UN—06APR18

Battery Arrangement

2. Verify the battery arrangement.



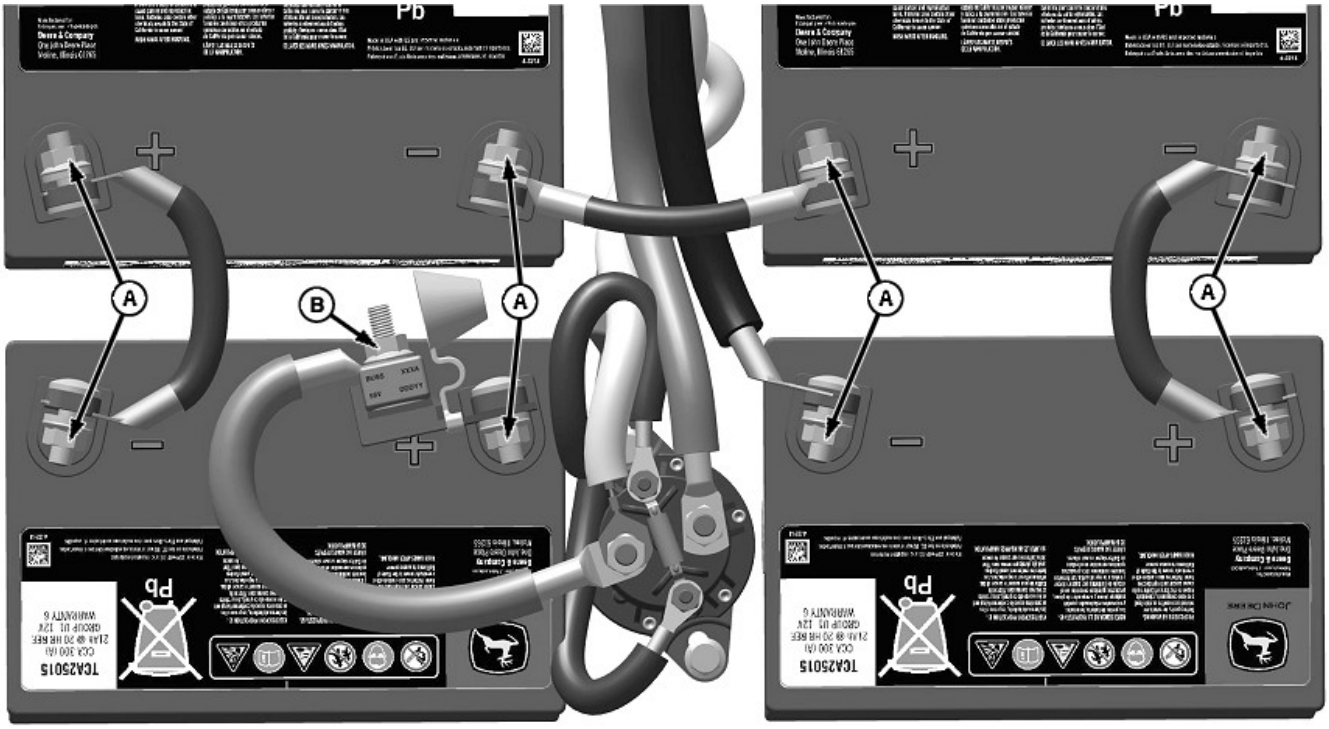
A83744—UN—30SEP14

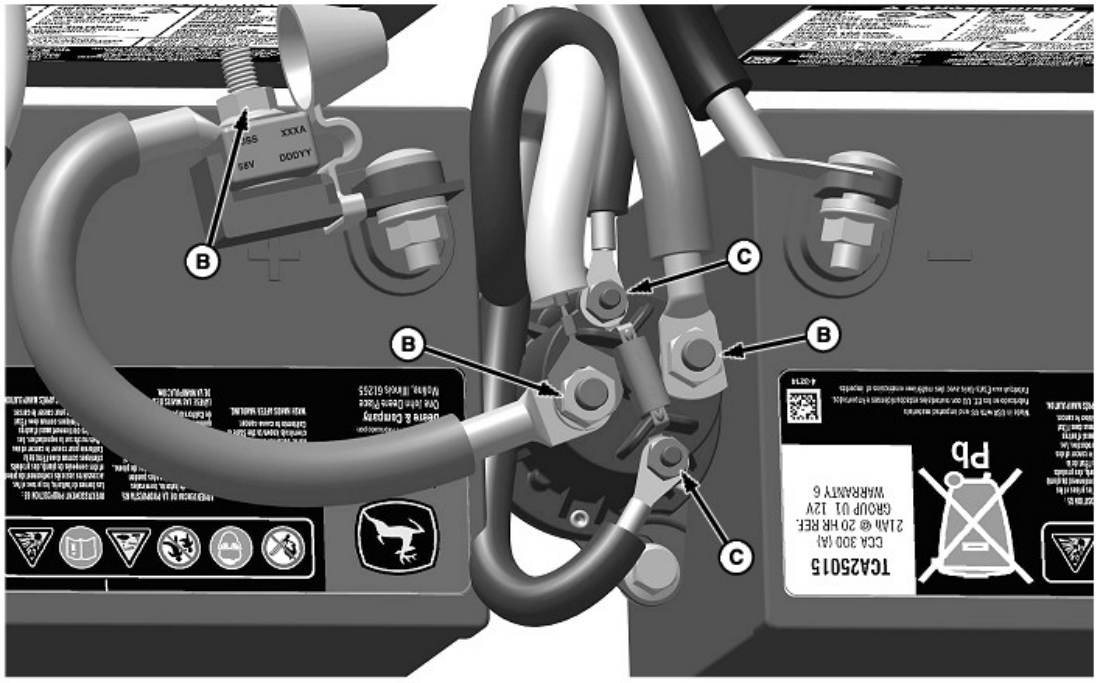
Installation Sequence

A—Cable with Fuse

CAUTION: Avoid an electric shock from completing the circuit incorrectly. Attach the battery cable with fuse (A) last. Always use extreme caution when servicing this machine.

3. Attach the cable with the fuse (A) last.
4. Follow the cable connection sequence shown. Tighten the connections to the following specifications.





A100127—UN—29MAR18

A—Battery Terminals
B—Large Fuse and Coil Terminals
C—Small Coil Terminals

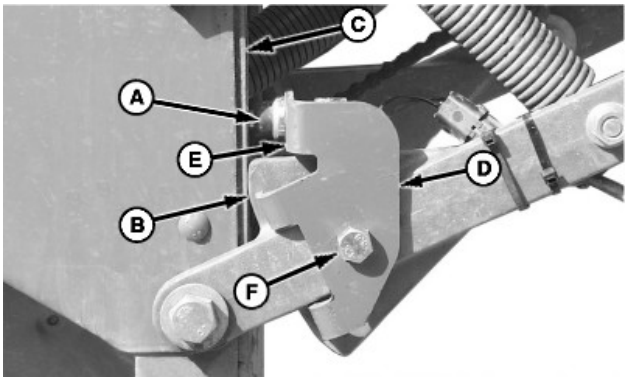
Battery Connections — Specification

Battery Terminals (A)—Dry Torque	5.6 N·m (50 lb·in)
Large Fuse and Coil Terminals (B)—Dry Torque	4 N·m (35 lb·in)
Small Coil Terminals (C)—Dry Torque	1.7 N·m (15 lb·in)

6. After tightening is complete, replace the battery enclosure and connect the external harness.

WP29706,0000753-19-06DEC23

Set the Row Unit Switch



A71634—UN—23MAY11

A—Row Unit Switch
B—Stop
C—Frame
D—Bracket
E—Flat Surface
F—Cap Screw

The row unit switch (A) senses when the machine is raised and lowered. Various systems, such as blowers and seed agitators, respond to the sensor position.

1. Completely raise the machine. Verify that the stop (B) on the lower parallel arm contacts the planting unit frame (C).
2. Rotate the sensor bracket (D) until the flat surface (E) is 20 mm (3/4 in) from the planting unit frame.
3. Tighten cap screw (F).

IMPORTANT: Avoid machine and seed damage. If the switch is mis-adjusted, seed agitators are not signaled to stop when the machine is raised.

NOTE: During adjustment, power must be supplied from the tractor.

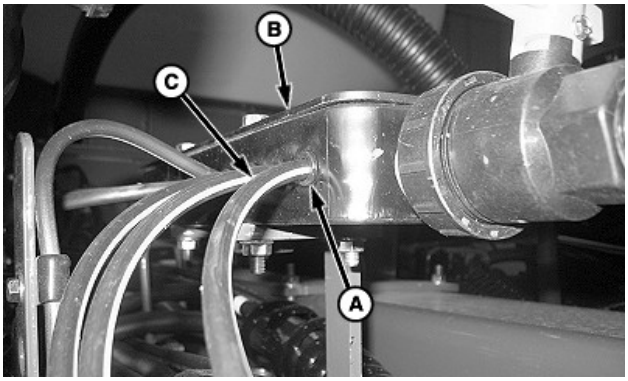
4. Observe the agitator on the CCS tank and adjust the switch so the agitator shuts off when the planter is at the full height. The switch actuating at full height ensures that the systems engage the moment the row unit contacts the ground.

OUO6064,00004DF-19-13OCT25

Fertilizer Distribution Tube

Replacing Worn or Damaged Distribution Tube

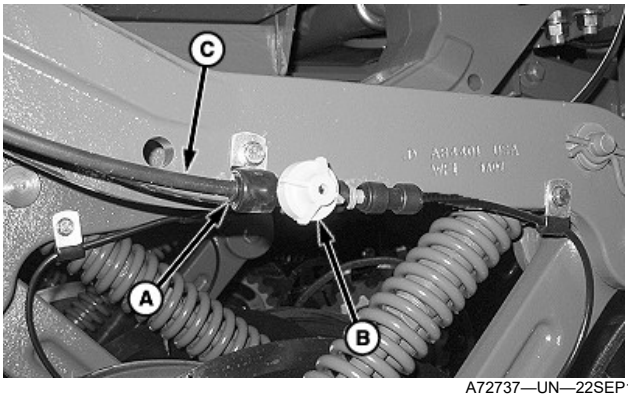
To replace the worn or damaged distribution tubes complete the following procedures:



A72199—UN—03AUG11

A—Fitting Ring
B—Manifold
C—Tube

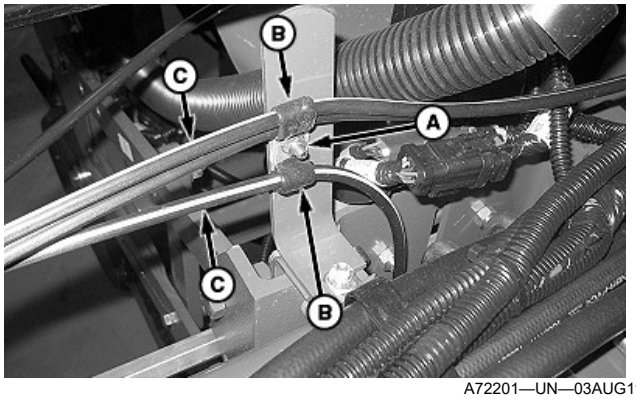
1. Push in the fitting ring (A) at the manifold (B) and remove the tube (C).



A72737—UN—22SEP11

A—Fitting Ring
B—Check Valve
C—Tube

2. Push in the fitting ring (A) at the check valve (B) and remove the tube (C).



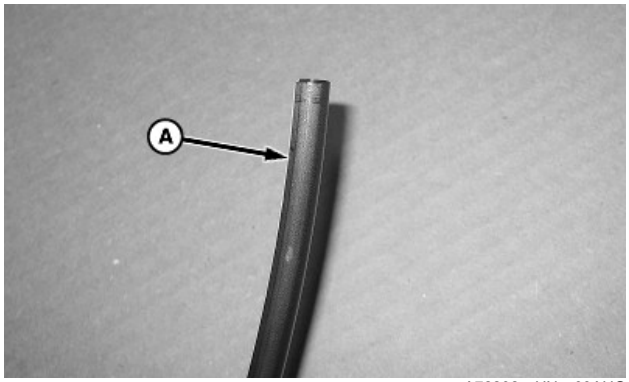
A72201—UN—03AUG11

A—Nut
B—Hose Clamp
C—Tube

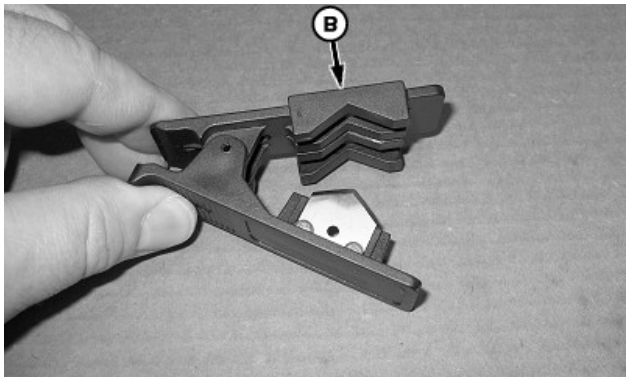
3. Loosen the nuts (A) on all the hose clamps (B) at all the locations for the tubes being replaced.
4. Remove the tube (C) from the hose clamps (B).
5. Measure the tube length before discarding.

NOTE: Add 25.4 mm (1 in) to the overall tube length for trimming and chamfering.

6. Cut the new tube to length.



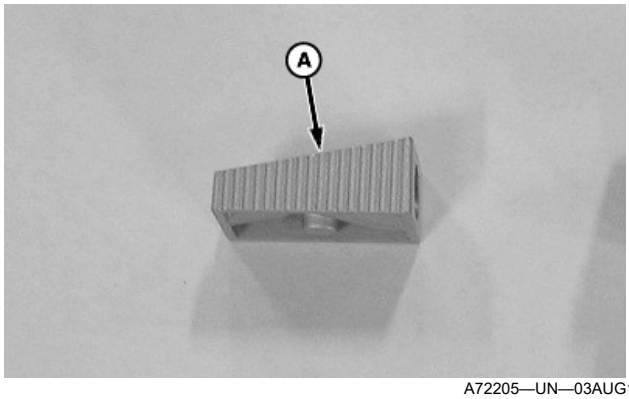
A72202—UN—03AUG11



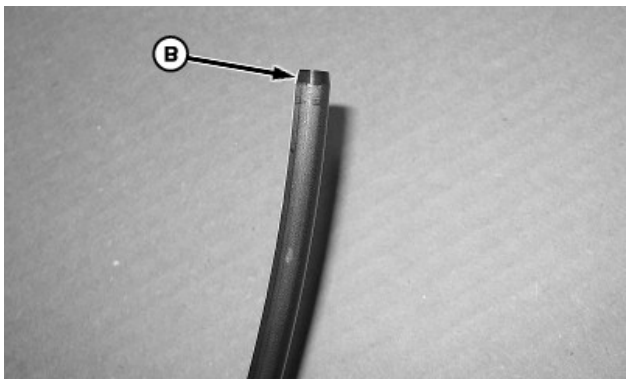
A72204—UN—03AUG11

A—Tube
B—Tube Cutter

7. Trim each end of the tube (A) square with the tube cutter (B) or a similar device. Ensure that the end of the tubing is not crushed.



A72205—UN—03AUG11

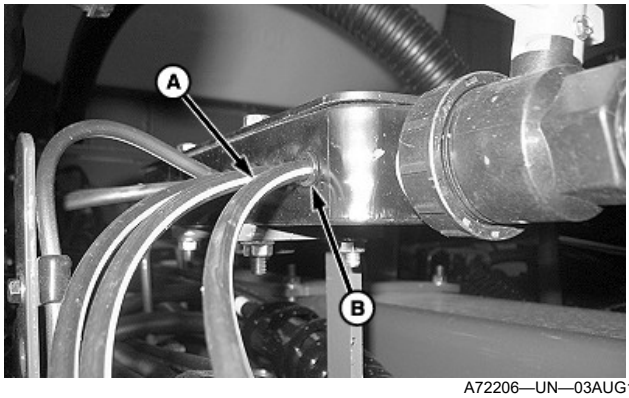


A72203—UN—03AUG11

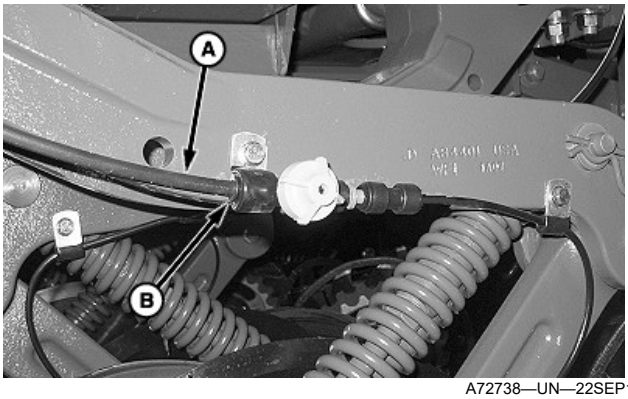
A—Chamfer Tool
B—Tube

NOTE: Inserting a non-chamfered tube into the distribution manifold distorts the O-ring which causes fertilizer leaks.

8. Using a chamfer tool (A) (a pencil sharpener works well), chamfer each end of the tube (B).
9. Route the tube from the manifold to the opener, inserting the tube in the appropriate hose clamps.



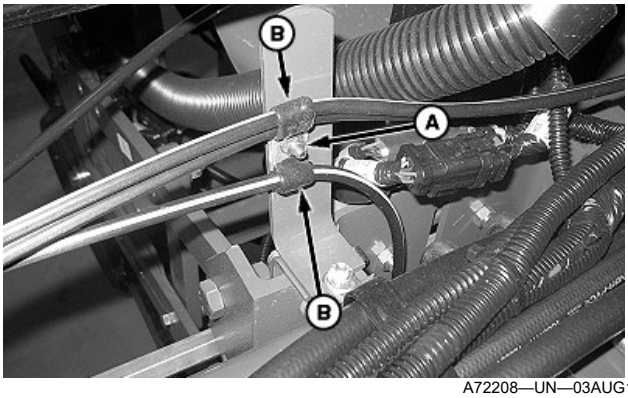
A72206—UN—03AUG11



A72738—UN—22SEP11

A—Tube
B—Fitting

10. Push each end of the tube (A) fully into the fittings (B). Pull the tube to verify that the tube is locked into the fitting.



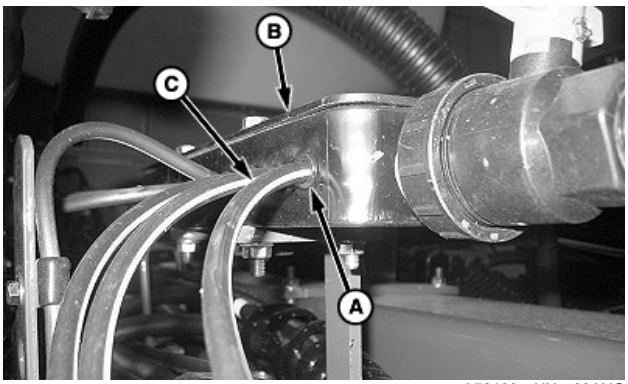
A72208—UN—03AUG11

A—Nut
B—Hose Clamp

11. Tighten the nut (A) on the hose clamps (B).
12. Prime the system and check for leaks (See Prime and Start the Pump).

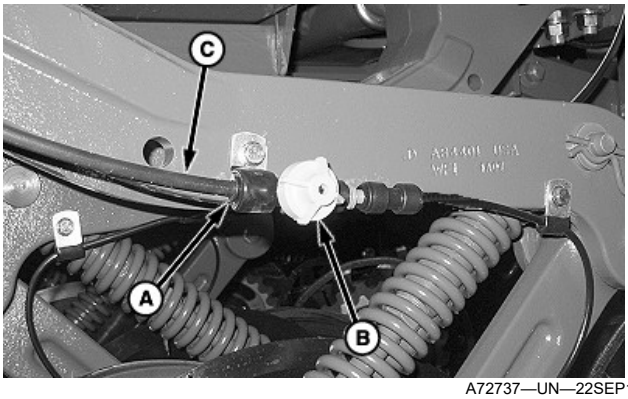
Fix Distribution Tube Connection Leak

To fix a leak in the distribution tube connections, complete the following procedures:



A72199—UN—03AUG11

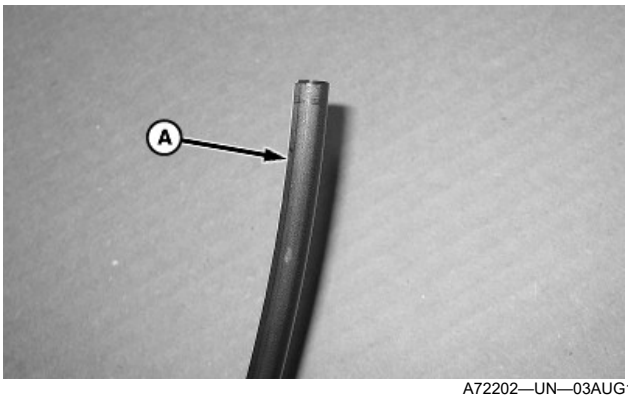
Distribution Manifold



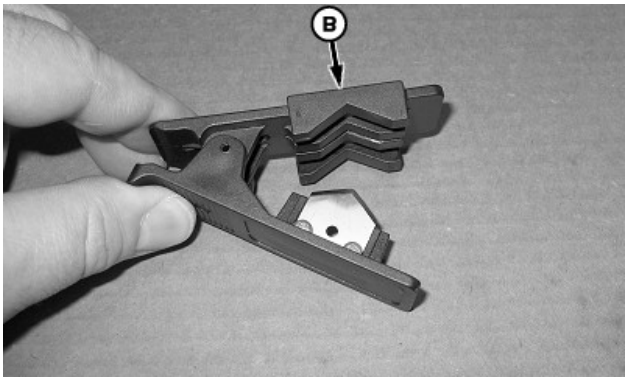
A72737—UN—22SEP11

A—Fitting Ring
B—Distribution Manifold
C—Tube

1. Push in the fitting ring (A) at the distribution manifold (B) and pull out the tube (C).



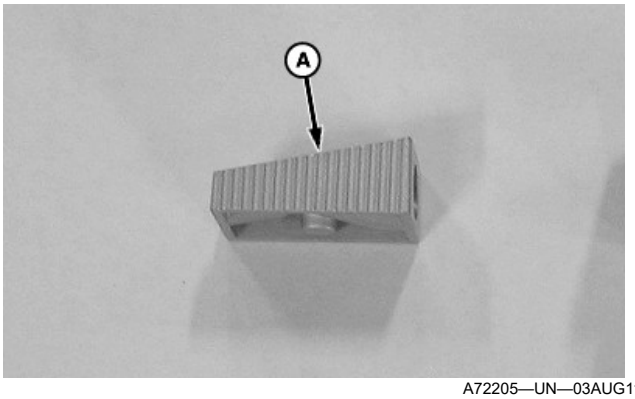
A72202—UN—03AUG11



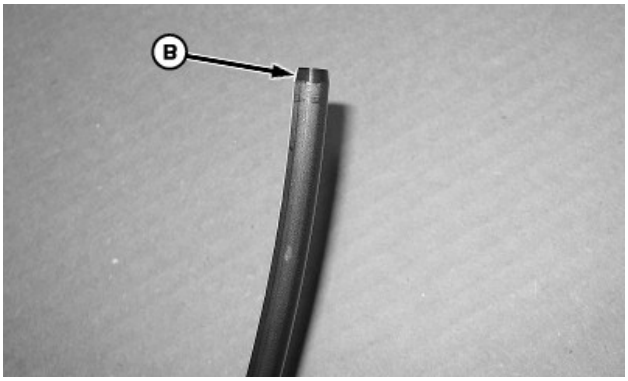
A72204—UN—03AUG11

A—Tube
B—Tube Cutter

2. Trim the end of the tube (A) square with the tube cutter (B) or a similar device. Verify that the end of the tubing is not crushed.



A72205—UN—03AUG11

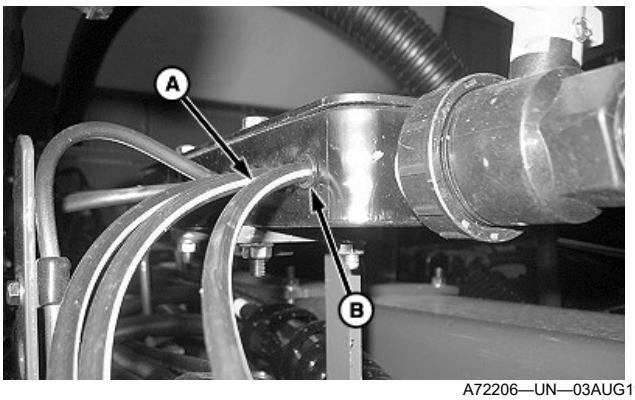


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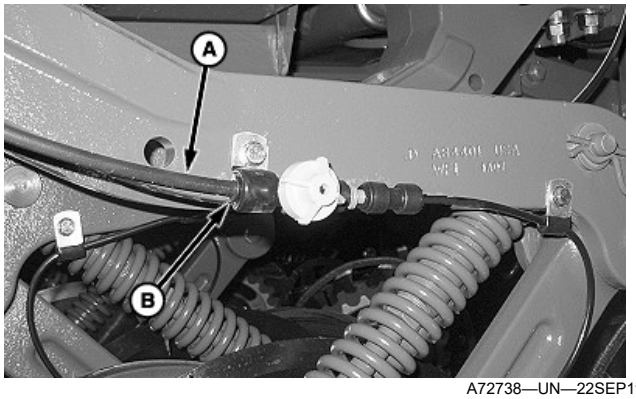
A—Chamfer Tool
B—Tube

NOTE: Inserting a non-chamfered tube into the distribution manifold distorts the O-ring which causes fertilizer leaks.

3. Using a chamfer tool (A) (a pencil sharpener works well), chamfer the end of the tube (B).



A72206—UN—03AUG11



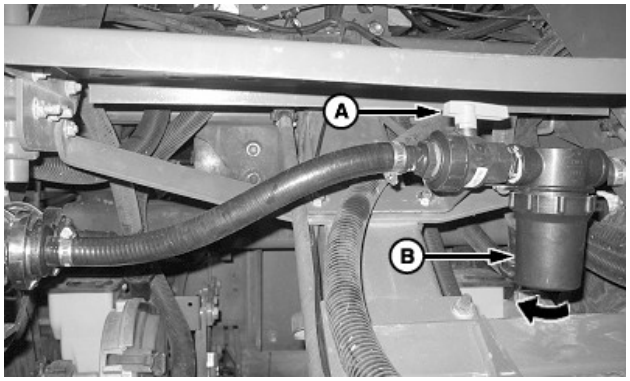
A72738—UN—22SEP11

A—Tube
B—Fitting

4. Push the end of the tube (A) into the fittings (B) completely. Pull the tube to verify that the tube is locked into the fitting.
5. Prime the system and check for leak (See Prime and Start the Pump).

OUO6064,0000772-19-11JUL18

Clean Carrier Tank Strainer



A58826—UN—21SEP06

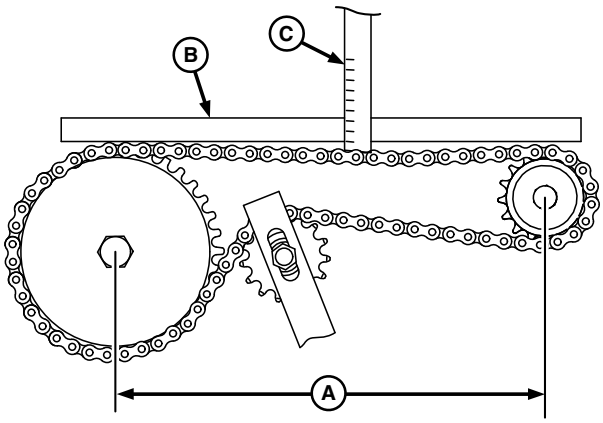
Valve Shown in Open Position

A—Handle
B—Strainer Cap

1. Rotate valve handle (A) horizontally to shut off water supply to carrier pump.
2. Remove strainer cap (B).
3. Remove strainer and clean it in fresh clean water.
4. Reinstall strainer and strainer cap (B).
5. Rotate valve handle (A) to open water supply to carrier pump.
6. Prime carrier pump. See Central Insecticide System Operator's Manual for PRIME CARRIER PUMP procedure.

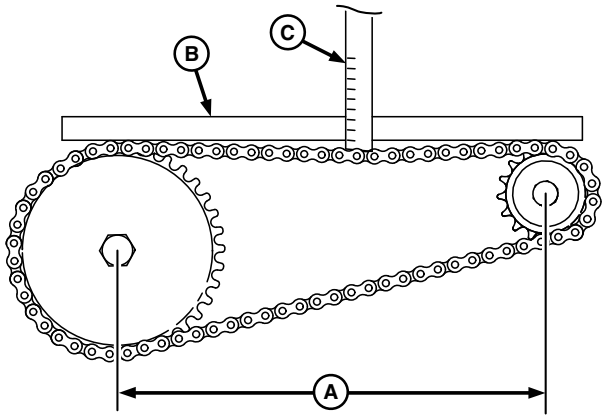
OUO6435,0000433-19-04APR13

Tighten the Drive Chains



A70496—UN—31JAN11

Drive Chain with Tension Idler



A70495—UN—31JAN11

Drive Chain without Tension Idler

A—Shaft Distance
B—Straight Edge
C—Ruler

To determine the chain deflection, perform the following procedures:

1. To tighten the chain, rotate the drive.
2. Place a straight edge (B) over the slack span of the chain.

NOTE: Make sure that one side of the chain is taut during measurement.

3. At the center of the shaft distance (A), use a ruler (C) to measure the deflection from the top of the chain to the underside of the straight edge.

IMPORTANT: Do not over tighten the chains or rapid chain wear, shaft, and bearing damage can result.

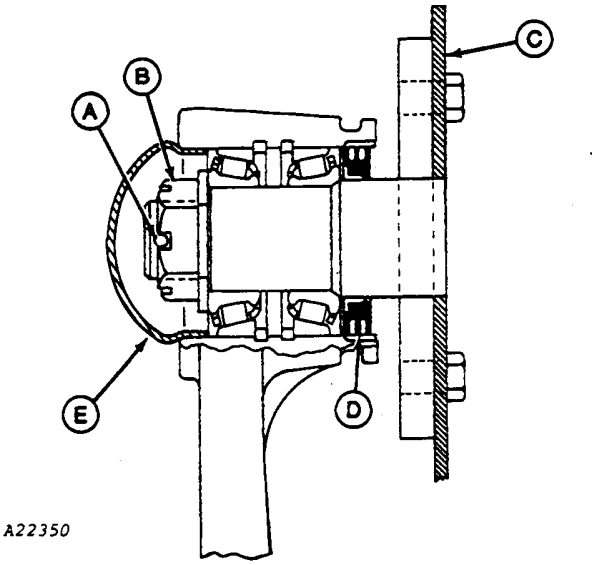
4. Adjust the shaft centers or chain tighteners to specification.

Specification

Chain—Deflection. . . . . 6.4 mm (1/4 in) of chain deflection per 31 cm (12 in)

OUO6064,0000377-19-07JUL20

Coulter Maintenance



A22350—UN—13OCT88

A—Cotter Pin
B—Slotted Nut
C—Coulter Disk
D—Face Seal
E—Hub Cap

The bearing has a face-type seal (D). Contact between the seal and a machined surface retains the grease and excludes the dirt. If there is any play in the bearing, do the following:

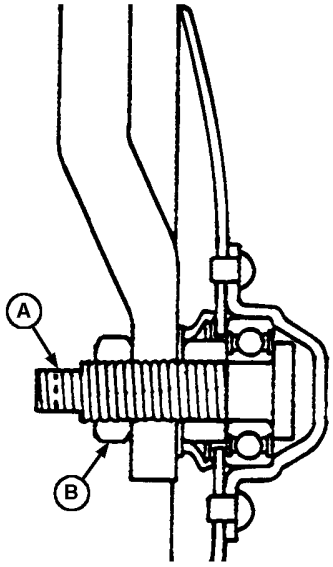
- Clamp the coulter disk(C) in a vise.
- Disassemble and clean the coulter components.
- Repack with the John Deere TY6341 SD Polyurea grease or an equivalent SAE multipurpose type grease.
- Tighten the nut (B) until there is a drag on the bearing.

NOTE: Apply 1.3—2.8 N·m (10—25 lb·in) of drag on the bearing. This drag assures a positive sealing. To lock the slotted nut into position, replace the cotter pin (A) into the nut.

The bearings are packed with grease at the factory. Every 100 hours, inspect the bearing and adjust if necessary. Every 200 hours or before each planting season, disassemble the bearing then clean and repack as previously outlined. Do not use a chassis lubricant in the bearings.

AG,OUO6074,1381-19-17APR18

Disk Closing Attachment



A47137—UN—01MAR01

A—Disk Bearing Bolt
B—Lock Nut

1. Loosen the lock nut (B).
2. Place the wrench on the flat surfaces of the disk bearing bolt (A) and tighten the bolt to specification.

Specification

Bearing Bolt—Torque. . . . . 203 N·m (150 lb·ft)

3. To maintain the proper torque adjustment of the disk bearing bolt, place the wrench on the flat surfaces of the bolt. Place another wrench on the flat surfaces of the lock nut (B) and tighten the lock nut to specification.

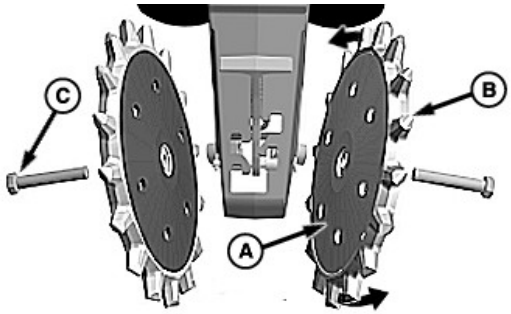
Specification

Lock Nut—Torque. . . . . 203 N·m (150 lb·ft)

OUO1074,00000BB-19-17APR18

Adjust the Twister Closing Wheels for Wear

IMPORTANT: The spikes (B) are directional. Do not swap the closing wheels (A) left-to-right. When the leading edges of the spikes (B) become worn, flip the closing wheels (A) around.



A116499—UN—28MAR22

A—Closing Wheel (2 used)
B—Spike
C—Cap Screw (2 used)

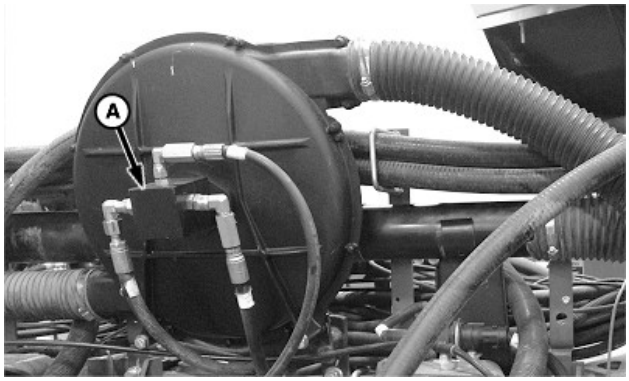
When the closing wheels (A) become worn on one side of the spikes (B), remove, rotate, and reinstall them in the same position. Tighten cap screws (C) to specification. Replace the closing wheels (A) when both sides of the spikes (B) are worn and the performance is reduced.

Torque — Specification

Cap Screw (C)—Torque. . . . . 115 N·m (85 lb·ft)

CR53390,0000310-19-01APR22

Inspect and Replace the Vacuum Motor



A85116—UN—29JAN15

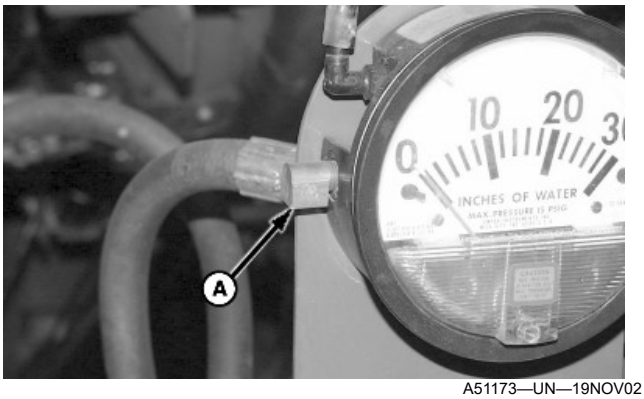
A—Motor

Check the vacuum motor (A) for oil leaks.

A small amount of oil leakage is acceptable. If leakage occurs on the motor housing, check for loose hardware on the motor or loose fittings. If oil leakage is excessive or if vacuum levels cannot be maintained, replace the vacuum motor.

OUO6435,0001FE2-19-11MAY16

CCS Blower Gauge Filter



A51173—UN—19NOV02

CCS Blower Gauge

A—CCS Blower Gauge Filter

Annually inspect the CCS blower gauge filter (A).

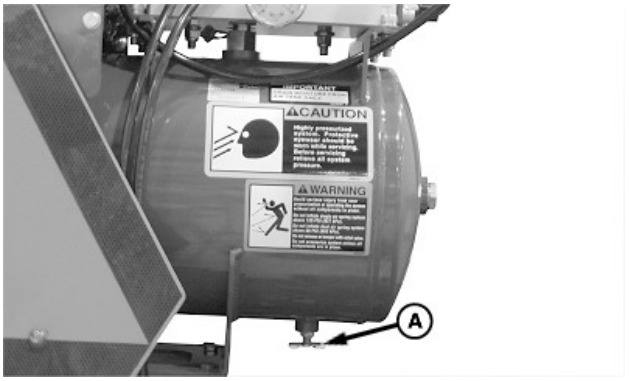
If the filter becomes clogged with dust, clean it.

1. Remove and wash the filter with soapy water.
2. Gently dry the filter with pressurized air.
3. Install the filter on the blower gauge.

If the gauge still performs incorrectly after being cleaned, replace the filter.

OUO6074,0000BD7-19-07OCT25

Drain Air Storage Tank



A87767—UN—23SEP15

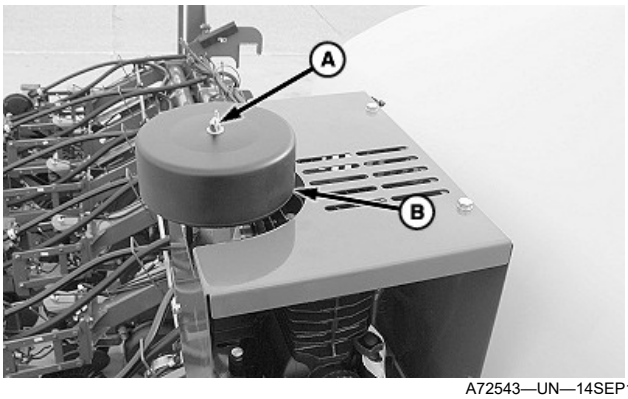
Down Force Air Tank Drain Valve

A—Water Drain Valve

Open water drain valve (A). Keep valve open until all water is drained from tank. Drain air storage tank daily and before placing planter in storage.

WP29706,0000784-19-23SEP15

Clean or Replace Pneumatic-Compressor Air Filter



A72543—UN—14SEP11

Compressor Mounted Air Filter (Hydraulic Compressor)

A—Wing Nut and Seal Washer
B—Weather Shield

CAUTION: Avoid injury from sudden activation of hydraulic compressor. Before service, deactivate selective control valve (SCV) that operates hydraulic compressor and turn off tractor.

IMPORTANT: Avoid damage to compressor. Filter cleanliness is critical to maintain the performance and service life of the air compressor. Clean filter more frequently in dusty conditions.

1. Clean dust from area around the compressor air filter.
2. Remove and retain wing nut and seal washer (A).
3. Remove weather shield (B) and filter element.

IMPORTANT: Avoid compressor damage. Ensure that no dust enters air compressor inlet.

4. Wipe dust from filter base.

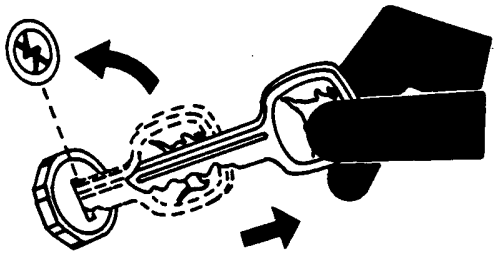
IMPORTANT: Avoid filter and compressor damage. Do not damage filter element while cleaning. To clean filter, tap filter lightly on a firm surface.

5. Clean the air filter or purchase a new air filter from regular spare part channels.
6. Install filter and weather shield.
7. Install seal washer and tighten wing nut.

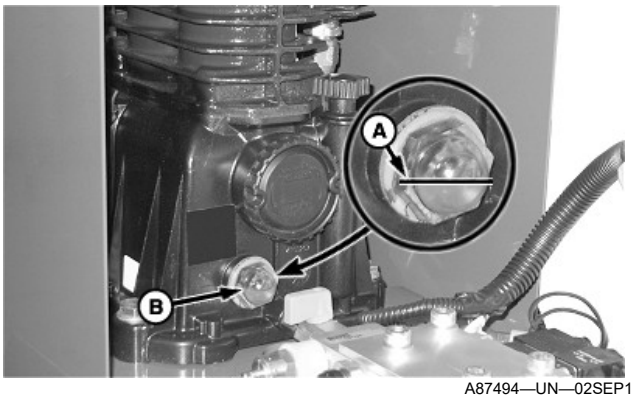
Air Compressor Filter				
	50 Hours	100 Hours	200 Hours	Yearly
Hydraulic Compressor	Clean	Replace		Replace

WP29706,0000880-19-22OCT25

Check the Hydraulic Air-Compressor Oil



TS230—UN—24MAY89



A87494—UN—02SEP15

A—Middle
B—Sight Glass

CAUTION: Avoid injury. Deactivate the selective control valves (SCVs), turn off the tractor, and place the tractor in park before servicing.

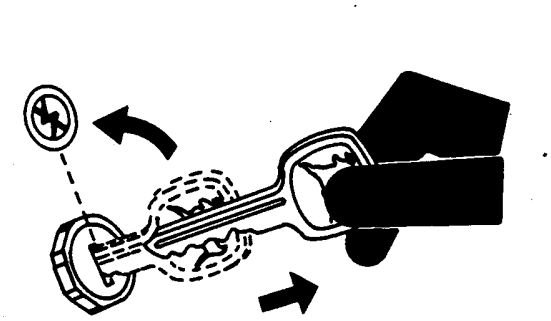
IMPORTANT: Check the oil level at the beginning of the season and daily during machine use.

NOTE: Park the tractor and the machine on a level surface.

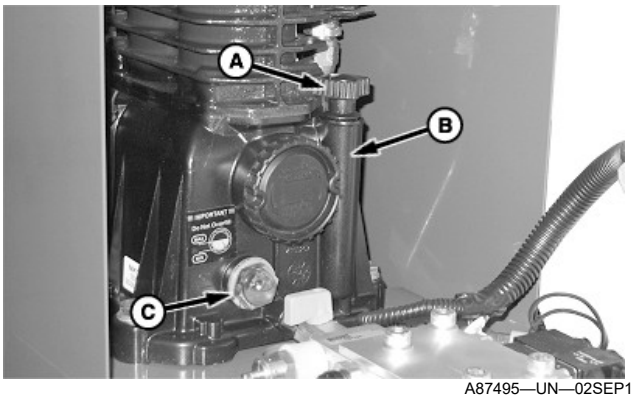
The proper oil level is in the middle (A) of the sight glass (B). Add oil as necessary. (See Fill or Change the Hydraulic Air Compressor Oil in this section.)

WP29706,00002F1-19-14JUN18

Fill or Change the Hydraulic Air-Compressor Oil



TS230—UN—24MAY89



A87495—UN—02SEP15

A—Cap
B—Reservoir
C—Sight Glass

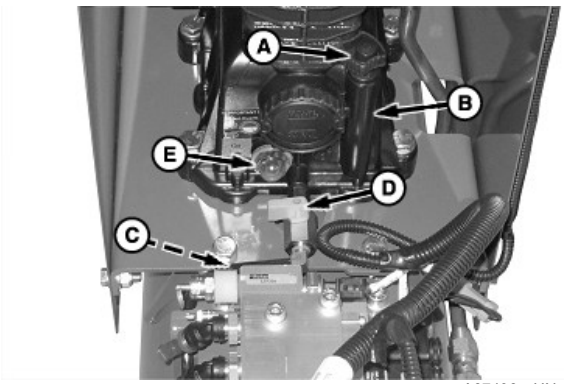
CAUTION: Avoid injury. Deactivate the selective control valves (SCVs), turn off the tractor, and place the tractor in park before servicing.

IMPORTANT: Use non-detergent 30W synthetic air-compressor oil ISO 100 (John Deere TY27029 or equivalent).

NOTE: Park the machine and the tractor on a level surface.

To aid filling, use a funnel.

Change the Compressor Oil



A87496—UN—02SEP15

A—Cap
B—Reservoir
C—Drain Hose
D—Drain Valve
E—Sight Glass

1. To help vent the reservoir (B) while draining, remove the cap (A).
2. Place a container under the drain hose (C).
3. Open the drain valve (D) and collect the oil.
4. Close the drain valve.
5. Add specified quantity of oil to the reservoir (B) until the oil is visible in the middle of the sight glass (E).

Specification	
Compressor	
Reservoir—Capacity	0.5 L (16.6 oz)

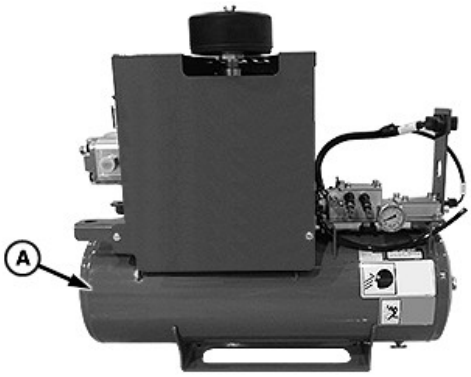
6. Reinstall the cap (A).

Fill the Compressor with Oil

1. Remove the cap (A).
2. Add oil to the reservoir (B) until the oil is visible in the middle of the sight glass (C).
3. Reinstall the cap (A).

WP29706,00002F2-19-07OCT25

Inspect the Pneumatic System Air Tank



A90704—UN—26MAY16

A—Air Tank

Inspect the air tank (A) for damage, corrosion, and air leaks at the beginning of the season.

OUO6074,0000F68-19-26MAY16

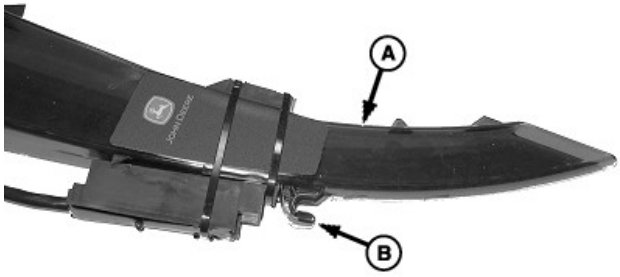
Servicing and Adjusting—MaxEmerge 5e Seed Meter

Service Intervals

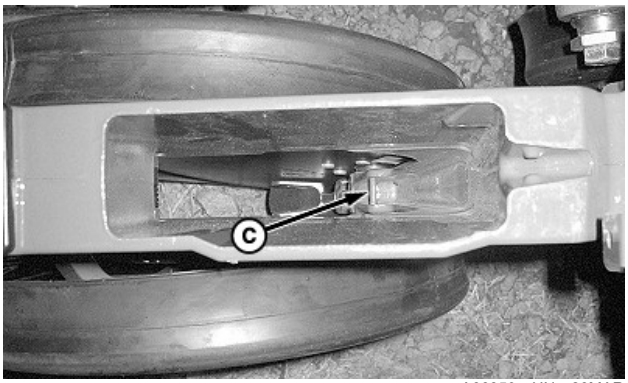
Service	Intervals						
	As Required	Beginning of Season	10 Hours or Daily	50 Hours	100 Hours	200 Hours	End of Season
Install or Remove Seed Tube	•						
Clean the Seed Sensor	•						
Replace Meter Handle	•						
Clean the Row Unit Hopper Screen	•						
Install a New Vacuum Seal	•						
Inspect and Adjust the Furrow Opener Blades	•						
Replace the Furrow Opener Blades and Seed Tube Guard	•						
Adjust the Gauge Wheels	•						
Inspect and Service the Seed Meter		•					•
Clean the Meter Drive and Drive Coupler		•					

LM78752,00001D1-19-18MAY17

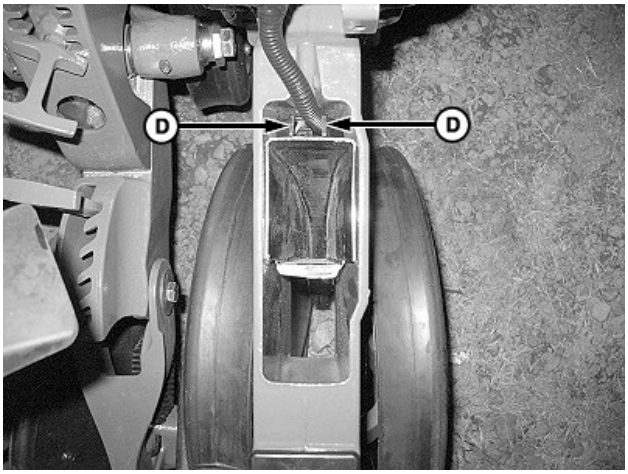
Install and Remove the Seed Tube



A59900—UN—02APR07



A66859—UN—26MAR10



A66860—UN—26MAR10

A—Seed Tube
B—Hook
C—Pin
D—Tabs

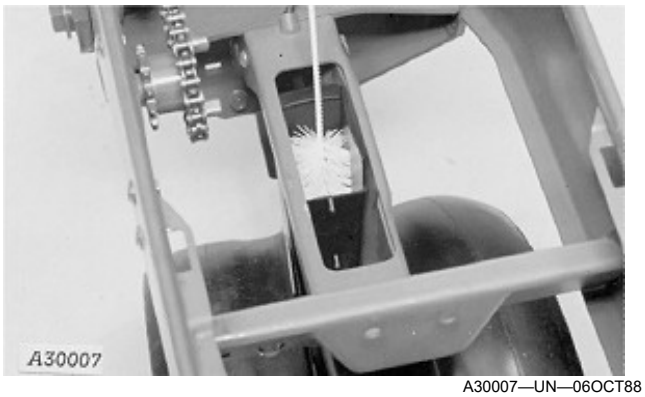
1. Connect the monitor harness to the sensor harness.

NOTE: Place the harness connector inside the planting unit at the same time as the seed tube.

2. Insert the seed tube (A) into the planting unit so hook (B) locks onto the alignment pin (C).
3. Position the seed tube so the tabs (D) lock into the holes.
4. To remove the seed tube, squeeze the tabs with your fingers until they release from the casting. Pull the tube upward.

OUO6064,000004B-19-11MAY16

Clean the Seed Tube Sensor



A30007—UN—06OCT88

In dusty conditions or with heavily treated seed, an excessive buildup of dust and seed treatment are deposited inside the seed tube which blocks the seed sensor light. When the sensor light becomes blocked, false low-population counts or false low-limit warnings appear.

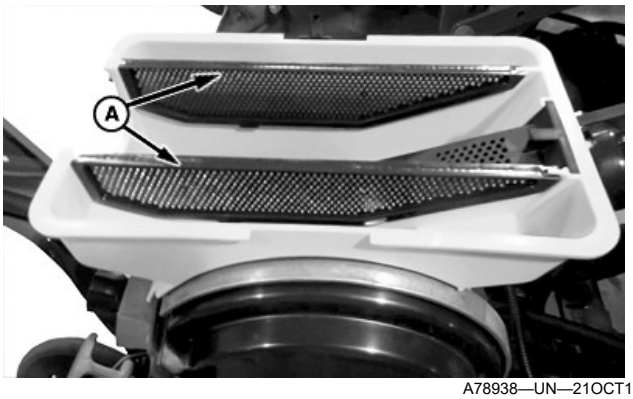
Periodically clean the seed sensor area inside the seed tube with the dry brush provided.

IMPORTANT: Do not plant again until all of the seed tube surfaces are dry.

If moisture enters the seed tube during a rain or when the planter is washed, dust in the seed tube turns to mud. If moisture is present or dry residue is difficult to remove with a dry brush, use a mild detergent and water with the brush. Allow the interior of the seed tube surface to dry.

AG,OUO1074,849-19-16APR18

Clean the Row Unit Hopper Screen



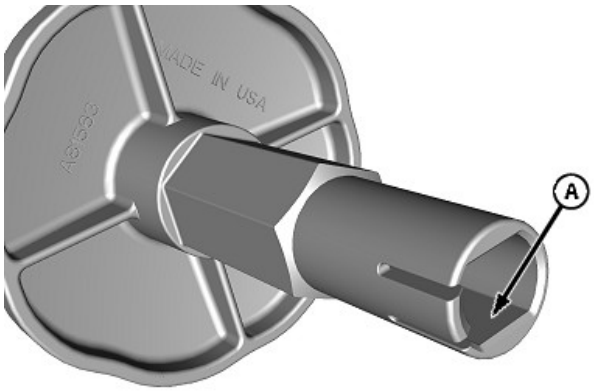
A78938—UN—21OCT13

A—Hopper Screens

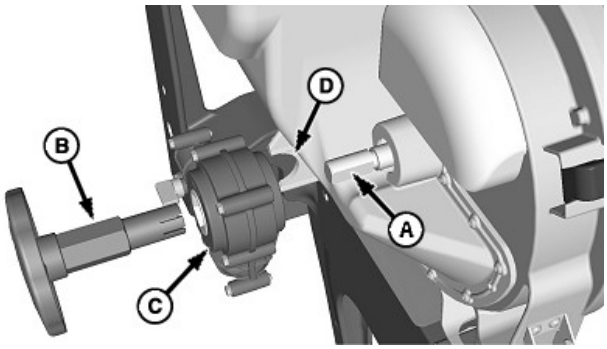
Remove the hopper screen (A), tap until clear and reinstall.

OUO6023,00014A9-19-11MAY16

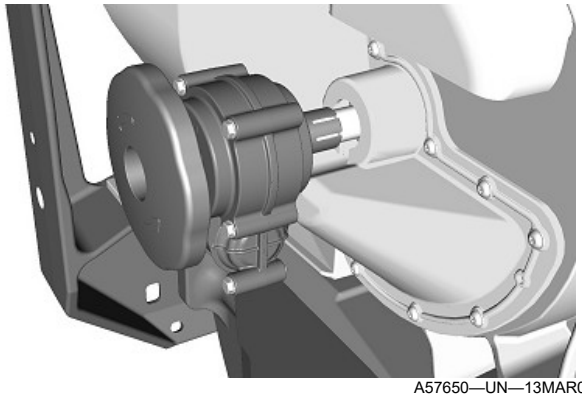
Replace Meter Handle



A57648—UN—13MAR06



A57649—UN—13MAR06



A57650—UN—13MAR06

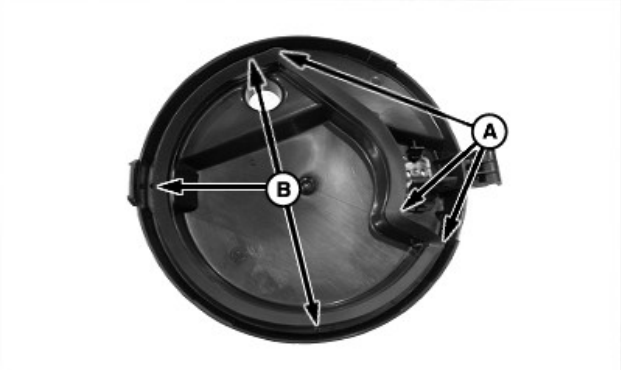
Assembled

A—Flat Surfaces, Aligned
B—New Handle
C—Gear Case
D—Cutout

If the meter handle breaks, remove the broken pieces. Then align the flat surfaces (A) and insert the new handle (B) through the gear case (C) until the handle snaps into the groove on the shaft. Gear case must seat into cutout (D).

WP29706,0000A36-19-07JUL16

Install a New Vacuum Meter Seal



A78799—UN—07APR14

A—Corners
B—Dimple Location

NOTE: It is not required to empty the seed out of the hopper.

1. Remove the seed hopper from the row unit and place the hopper on its side.
2. Unlatch the meter handle and open the seed meter dome.
3. Remove and discard the old vacuum seal.

NOTE: This procedure prevents excessive slack in the vacuum seal.

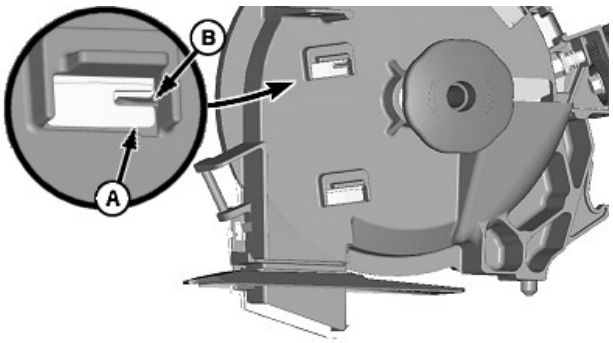
4. Install the new vacuum seal. Insert the corners (A) of the vacuum seal then insert the vacuum seal at the three locations (B). The dimples on the vacuum seal align with the dimples on the seed meter dome. Finally, insert the remaining portions of the vacuum seal.
   a. Insert the corners (A) of the vacuum seal.
   b. Insert the vacuum seal at the three locations (B). The dimples on the vacuum seal align with the dimples on the seed meter dome.
   c. Insert the remaining portions of the vacuum seal.

IMPORTANT: Allow the lubricant to dry before installation.

5. If the seed disk has been used, apply the spray-on graphite lubricant TY25797 to the vacuum side of the seed disk.
6. Close the seed meter dome and latch the meter handle. Install the seed hopper on the row unit.

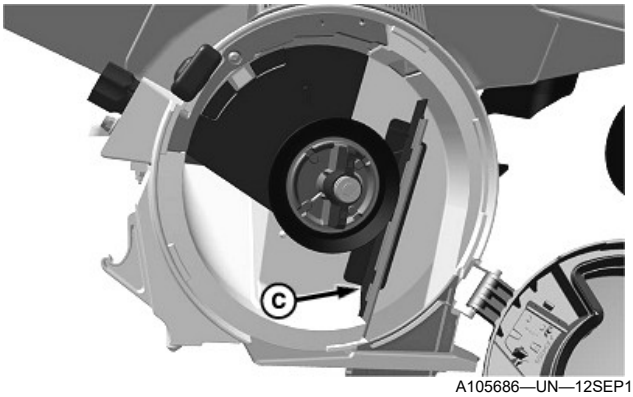
AG,OUO6074,1367-19-02MAY18

Change the Vacuum Seed Meter Brush



A77792—UN—01MAY13

Rear of Seed Meter

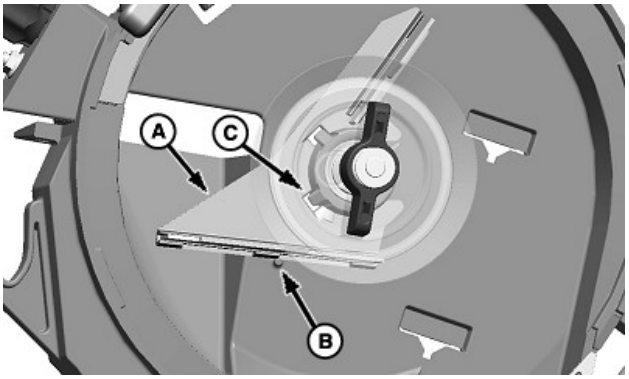


A105686—UN—12SEP19

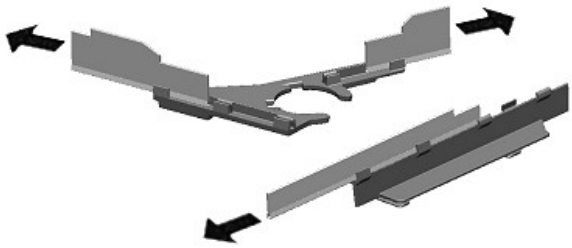
A—Front-Brush Tab
B—Lock
C—Front-Brush Holder

1. Open the seed meter and empty any seed contained within it. (See Clean Out the Vacuum Seed Meter for additional information.)
2. Inspect the brushes for wear and replace them as needed. (See Seed Meter Settings for additional information.)
3. Pry the front-brush tab (A) over the lock (B) and remove the front-brush holder (C) from the meter.

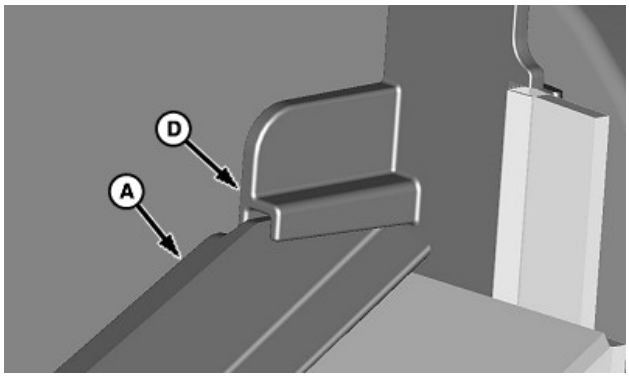
NOTE: The rear brush is only used with mini seed hoppers except when planting canola.



A105687—UN—18SEP19



A77794—UN—01MAY13



A105688—UN—09OCT19

Brushes Seated

A—Rear-Brush Holder
B—Pin
C—Grooves and Tabs
D—Front-Brush Holder

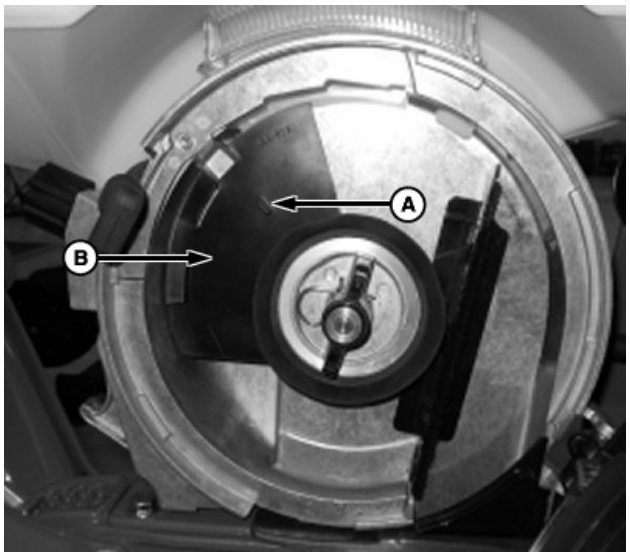
4. Rotate the rear-brush holder (A) until it contacts the pin (B) and the grooves and tabs (C) align. Lift and remove the rear-brush holder.
5. To replace the brushes, slide them in and out of the brush holders.

NOTE: Install the rear brush first.

6. Insert the brush holders into the meter and verify that the holders are locked into position.
7. Verify that the rear-brush holder (A) is seated under the front-brush holder (D).

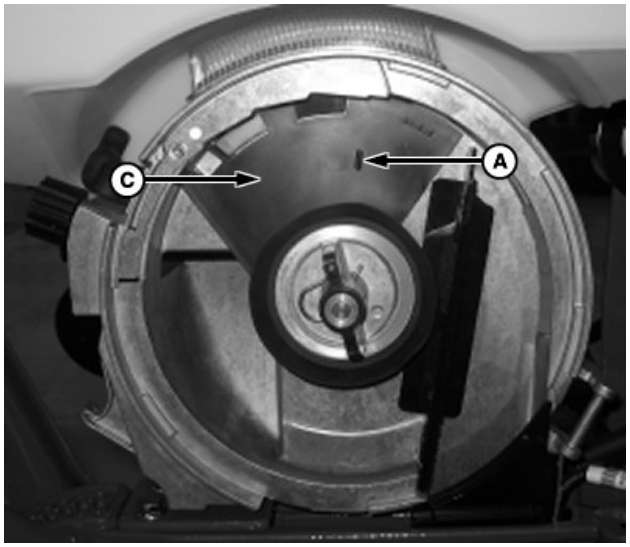
WP29706,00008CF-19-16FEB21

Adjust the Baffle in the Vacuum Seed Meter



A78486—UN—31JUL13

Lower Baffle Position



A78487—UN—31JUL13

Upper Baffle Position

A—Tab
B—Lower Position
C—Upper Position

The baffle is used to avoid over-population due to the seed meter over-filling.

NOTE: The baffle is not used on meters with mini hoppers except when planting canola.

1. Open the seed meter and remove the seed disk.

NOTE: The lower position (B) is recommended for smaller seeds such as: sugar beet, sorghum, oil sunflower, and popcorn.

The upper position (C) is recommended for larger seeds such as: corn, soybean, cotton, common edible bean, peanut, sweet corn, and confectionary sunflower.

2. Move the tab (A) to the position recommended in the Seed Meter Settings.

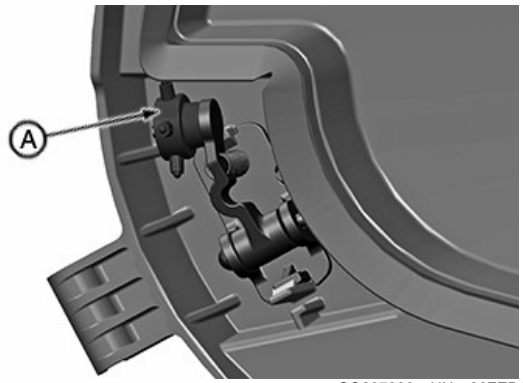
If seed bridges at the baffle, adjust the baffle to the upper position (C) and increase the amount of meter lubricant.

Lowering the baffle does not eliminate an over-filled seed meter caused by rough field conditions. To reduce the effects of a rough field, increase downforce on the row units and reduce ground speed.

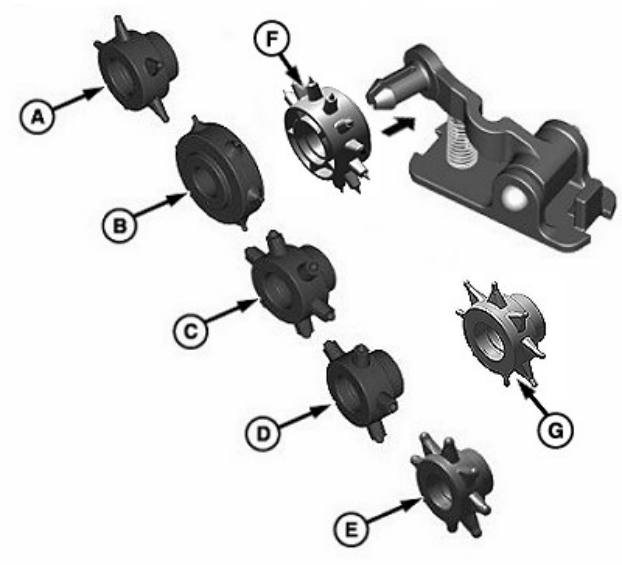
If over-population occurs when planting sideways on a hill: reduce ground speed, use round seeds, or install flat style seed disks. Over-population occurs on hillsides when the agitator tabs on some seed disks hold and carry additional seeds past the meter brush and into the seed tube. Round seeds and flat seed disks improve performance on hillsides.

OUO6074,0000CF4-19-07FEB22

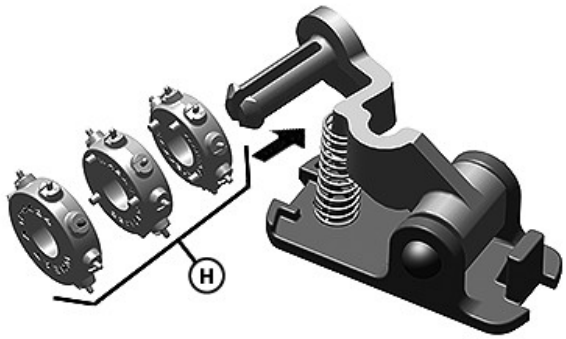
Install the Knockout Wheel Assembly



CQ297999—UN—26FEB14



A109233—UN—29MAR21



A116099—UN—17FEB22

A—Knockout Wheel (type A)
B—Knockout Wheel (type B)
C—Knockout Wheel (type C)
D—Knockout Wheel (type D)
E—Knockout Wheel (type E)
F—Knockout Wheel (type F)
G—Knockout Wheel (type G)
H—Knockout Wheel (type H)

NOTE: The knockout wheel is used to ensure that irregularly shaped seeds are fully released from the seed cell hole. Wheel projections engage the seed cell holes to eject all the seeds and foreign material.

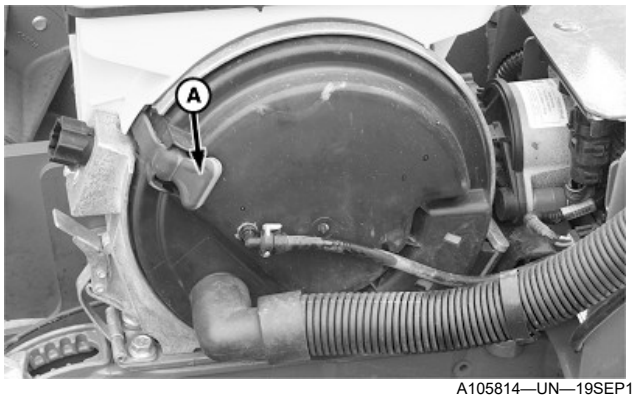
There are eight knockout wheels available for use with different seed disks and seed types. (See Seed Meter Settings in this section for additional information.)

To remove a knockout wheel, squeeze the hub and pull off the wheel.

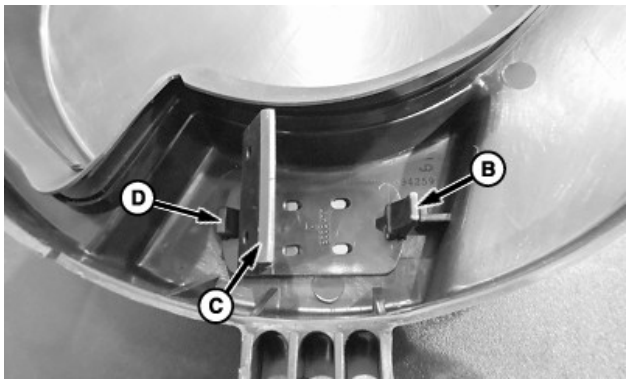
NOTE: Orient the knockout wheel as shown. The shoulder of the selected knockout wheel (type A—G) faces the knockout arm. The smallest wheel for type H is next to the arm.

To install a knockout wheel, press the wheel onto the hub.

Knockout Wheel Identification		
Knockout Wheel	**Wheel Part Number**	**Assembly Part Number**
Type A	A102718	AA85899
Type B	H136448	AA79986
Type C	A52389	AA81736
Type D	A53272	AA85089
Type E	A106147	AA89145
Type F	A119983	AA103137
Type G	A123990	AA103153
Type H	A124484, A124483, and A124473	AA103597



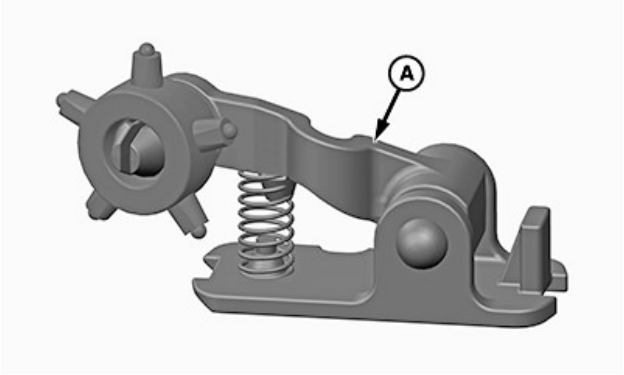
A105814—UN—19SEP19



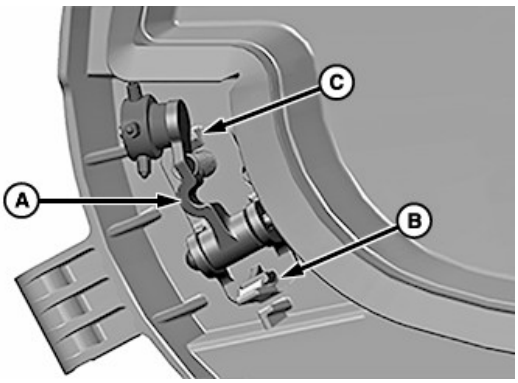
A77663—UN—27AUG13

A—Handle
B—Retaining Clip
C—Wiper Assembly
D—Fastener Clip

1. Disengage handle (A) and open the meter dome.
2. To remove wiper assembly (C), push the retaining clip (B) and pull the wiper assembly away from the fastener clip (D).



A100237—UN—03APR18



A100238—UN—03APR18

A—Knockout Wheel Assembly
B—Retaining Clip
C—Fastener Clip

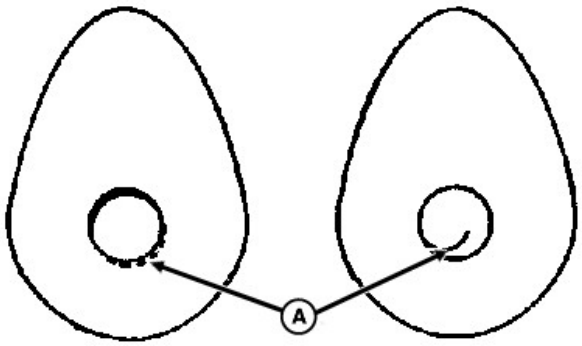
3. Install knockout wheel assembly (A) between the retaining clip (B) and the fastener clip (C).

NOTE: When closing the dome, verify that the wheel and the row of seed cells, on the seed disk, are aligned.

4. Close and latch the meter dome.

WP29706,0000520-19-24FEB22

Inspect the Seed Disk Cell



A46242—UN—27JUL00

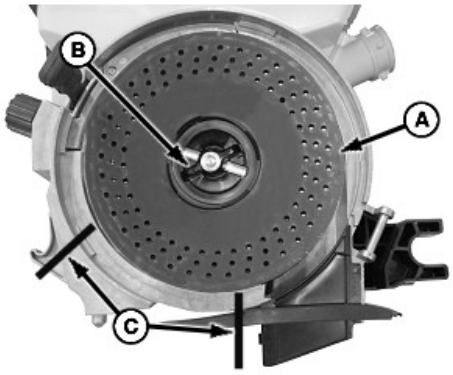
A—Flash

NOTE: To determine seed meter accuracy, perform a field check. If metering performance is satisfactory, it is not necessary to replace any seed disk.

Check seed cell and hole for flash (A) (particles of material left behind in molding process). Remove any flash before installing seed disk. If flash cannot be easily removed, replaced the disk.

WP29706,00005B9-19-13JUL15

Install Seed Disk



A77666—UN—15OCT13

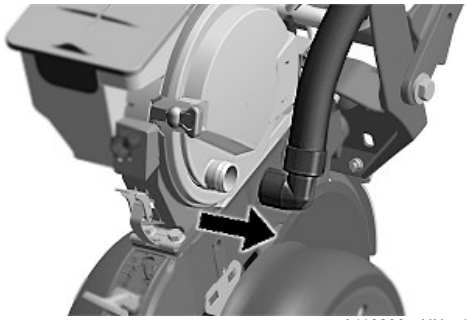
A—Seed Disk
B—Hub Handle
C—Section

1. Open the seed meter dome.
2. Fit seed disk (A) into housing. Hold the seed disk stationary and rotate hub handle (B) into locked position.
3. Inspect the hub adjustment. If the following conditions are not met, adjust the hub. (See Adjust Seed Meter Hub for additional information.)
   - Verify that seed disk (A) continues to rotate approximately 1/4 revolution after the hub is spun rapidly by hand and quickly released.
   - Verify that there is light contact between the seed disk and the double eliminator as the seed disk is rotated.
   - Verify that no seed loss occurs through any gap in section (C) as the seed disk is rotated.

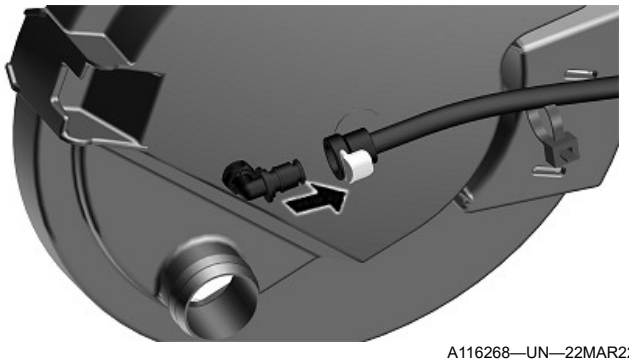
WP29706,0000521-19-05APR19

Adjust Seed Meter Hub

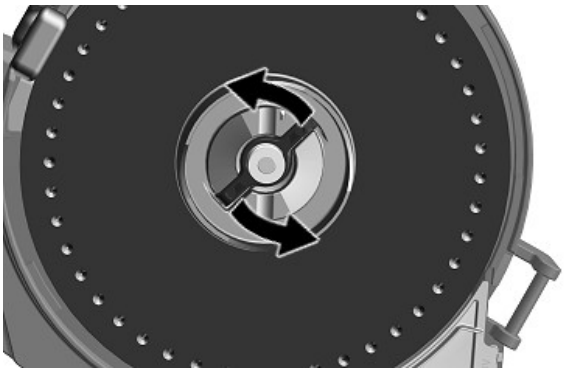
Improve meter accuracy and minimize seed damage with a properly adjusted meter hub. Check this adjustment whenever the seed disks are changed. If a gap between the seed disk and double eliminator exists or seed disk is difficult to turn, adjust the meter hub.



A116266—UN—18MAR22

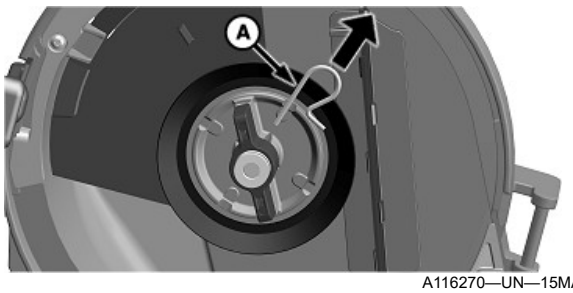


A116268—UN—22MAR22



A116267—UN—15MAR22

1. Access the seed meter.

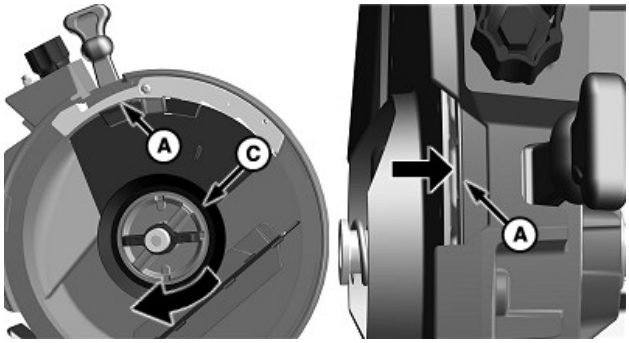


A116270—UN—15MAR22

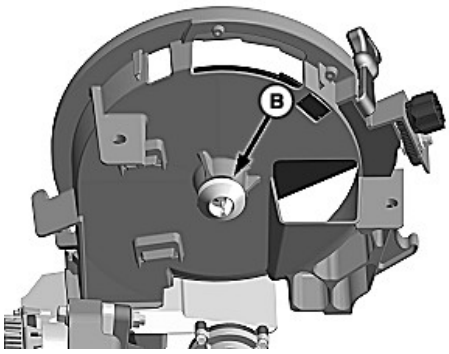
A—Spring Clip

2. Remove the spring clip (A).

NOTE: The seed disk lightly contacts the double eliminator (A) when properly adjusted.



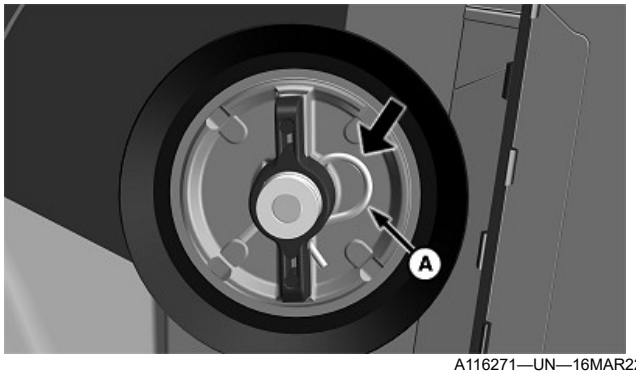
A116274—UN—17MAR22



A116269—UN—22MAR22

A—Double Eliminator
B—Meter Drive
C—Meter Hub

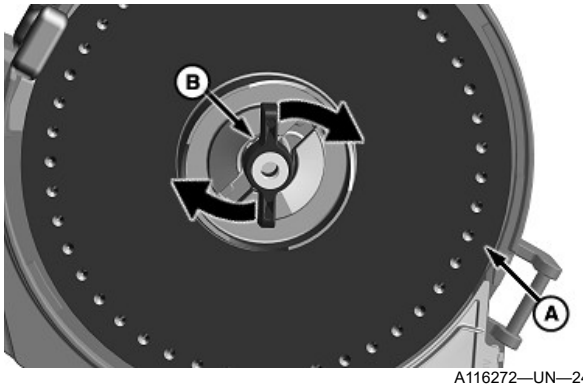
3. Adjust the meter hub (C).
   - Make small adjustments.
   - Hold the meter drive (B).
   - Thread hub (C) clockwise to move the seed disk closer to the double eliminator (A).
   - Thread meter hub (C) counterclockwise to move the seed disk away from the double eliminator (A).



A116271—UN—16MAR22

A—Spring Clip

4. Align the slot with the hole in the shaft and attach the spring clip (A).



A116272—UN—24MAR22

Storage

A—Seed Disk
B—Hub Handle

5. Attach seed disk (A) and lock the hub handle (B).
6. Inspect the adjustment.
   - Spin and release the seed disk rapidly by hand.
   - Observe the distance that the seed disk rotates. If seed disk rotates approximately 1/4 revolution and stops, the hub is adjusted properly.
   - Repeat the hub adjustment until correct.

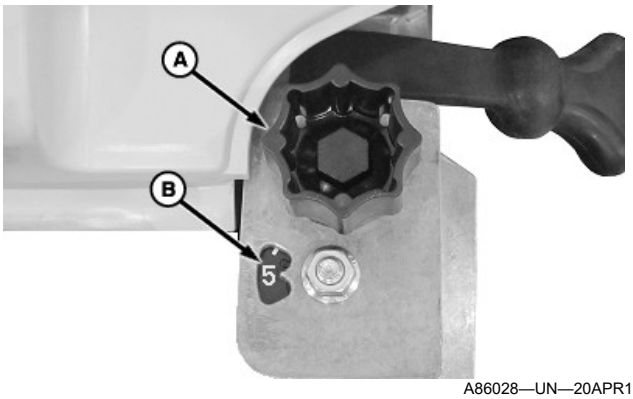
IMPORTANT: Avoid warped seed disks. Do not store seed disks in the seed meters. Store seed disks horizontally on the hub or hang on the wall from the hub. Do not store under heavy items or hang from the seed hole. Store away from high heat and sunlight.

NOTE: The seed disk lightly contacts the double eliminator when properly adjusted.

7. Rotate seed disk slowly by hand and observe that the seed disk contacts the double eliminator. If a gap appears that is large enough for seed to wedge between the seed disk and the housing, repeat the hub adjustment. If seed disk is warped, replace the seed disk.
8. When hub adjustment is complete, install the meter assembly on the row unit shank and engage the meter latch.
9. Connect seed delivery hose, vacuum hose, and the vacuum sense hose (if equipped).

WP29706,0000B19-19-25MAR22

Calibrate the Double Eliminator



A86028—UN—20APR15

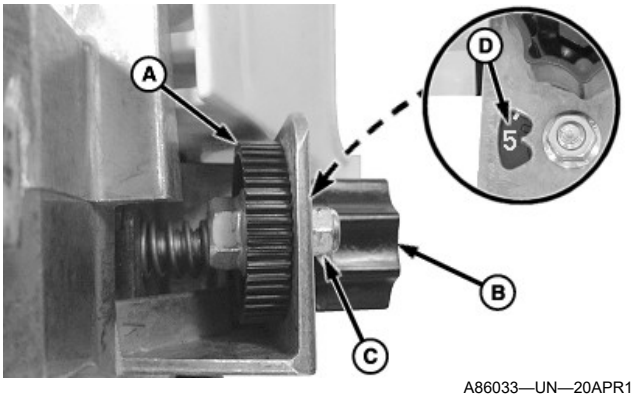
Setting 5

A—Adjustment Knob
B—Setting, 5

Calibrate double eliminator setting 5 (B) for 50% hole coverage on the seed disk.

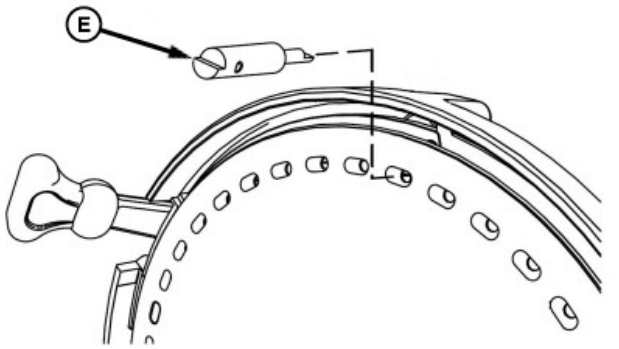
NOTE: To provide more clearance, the calibration procedure requires removal of the hopper.

1. Turn adjustment knob (A) until double eliminator setting 5 (B) is visible.
2. Install the ProMax 40 seed disk in the meter.



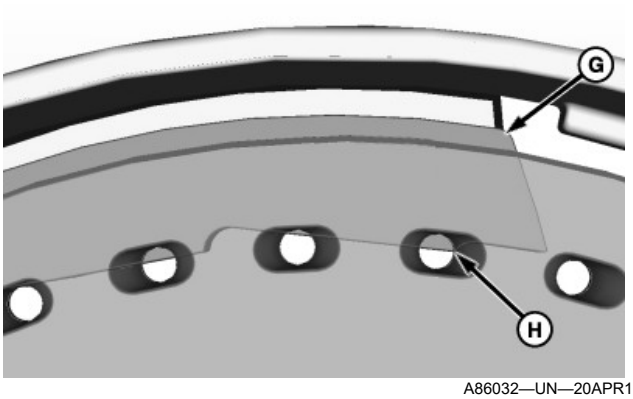
A86033—UN—20APR15

Double Eliminator Knob



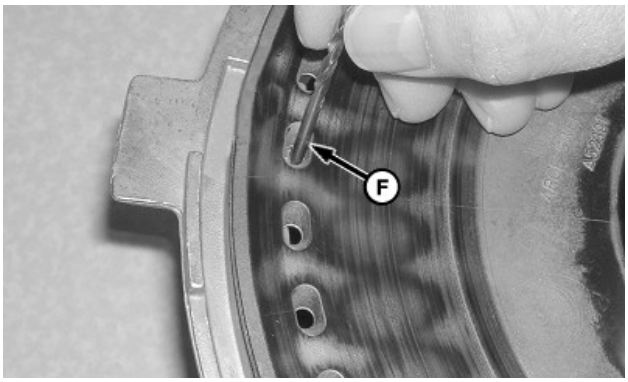
A86030—UN—20APR15

Adjustment Tool Method



A86032—UN—20APR15

50% Coverage



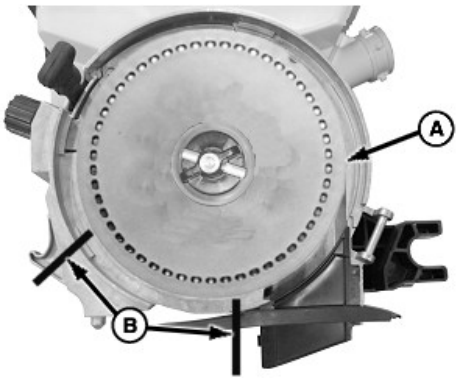
A86031—UN—20APR15

Drill Bit Method

A—Dial
B—Adjustment Knob
C—Nut
D—Window
E—Double Eliminator Tool
F—Drill Bit
G—Double Eliminator Plate
H—High Point

NOTE: JDG10965 Adjustment Tool can be obtained via regular special tool order channels.

3. Insert double eliminator tool (E) or the shank of a 2.5 mm (3/32 in) drill bit (F) into the seed disk hole.
4. Position the tool or drill bit in-line with high point (H) of double eliminator plate (G).
5. Turn adjustment knob (B) until the high point of the double eliminator lightly contacts the tool or drill bit.
6. If the setting is between 4.5 and 5.5 in the center of window (D), no adjustment is needed.
7. If the setting is less than 4.5 or greater than 5.5, loosen nut (C) enough to move dial (A).
8. Position the dial with number 5 showing in the center of window (D).
9. Tighten nut (C).
10. Remove the tool or drill bit from the seed disk.



A86177—UN—22APR15

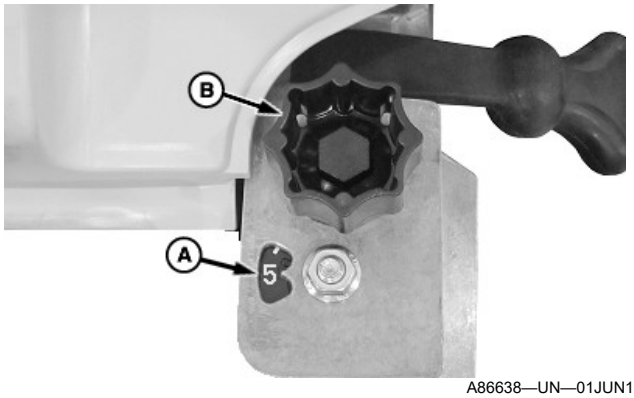
A—Disk
B—Inspection Area

NOTE: The seed disk must turn smoothly and have light contact with the double eliminator. A small gap between the seed disk and the housing is acceptable. Seed must not pass between the disk and the housing. To improve inspection process, place a small amount of seed in the meter.

11. Turn seed disk (A) by hand and inspect the gap between the disk and the meter in inspection area (B). If the disk turns too hard or if the seed passes through the gap, adjust the hub position, adjust the seed meter hub. (See Adjust Seed Meter Hub for additional information.
12. Close the meter dome and if previously removed, attach the meter to the hopper.
13. Set all the rows the same.
14. To evaluate seed delivery and meter performance, plant a short distance and perform a field check. Adjust the individual seed meters as necessary.

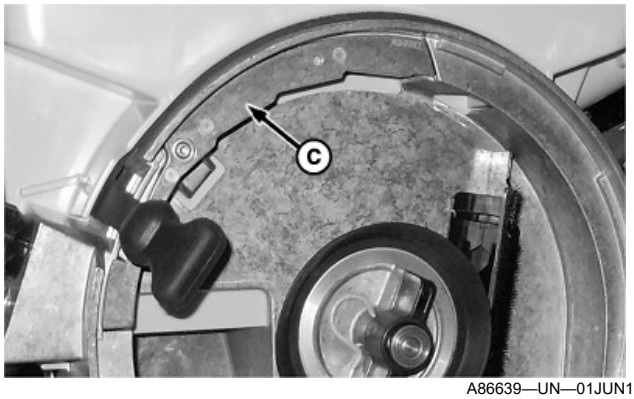
WP29706,0000A09-19-23OCT25

Operate Double Eliminator



A86638—UN—01JUN15

Indicator and Adjustment Knob



A86639—UN—01JUN15

Eliminator Plate

A—Indicator
B—Adjustment Knob
C—Eliminator Plate

NOTE: Set a vacuum level using the vacuum chart for the disk and seed that is used. The number indicator on the meter has a range of 0—10.

There is a number indicator (A) next to the knob for consistent adjustment. (See Calibrate the Double Eliminator in the MaxEmerge service section.)

Smaller numbers on the indicator = less hole coverage and increase vacuum at the hole.

Middle numbers on the indicator = 1/2 of the hole covered (detent position).

Larger numbers on the indicator = more hole coverage and reduce vacuum at the hole.

Double Eliminator Operating Tips:

- To position the eliminator plate (C) for more or less hole coverage on the seed disks, turn the adjustment knob (B).

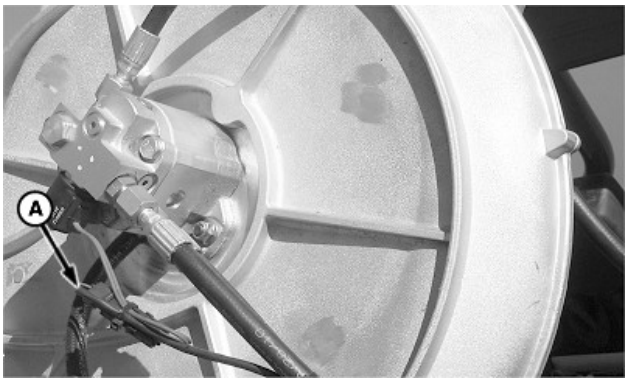
  For the seed disk used with flat corn seed, the normal operating position is number 5 on the indicator.

  When in position number 5, the double eliminator plate covers 1/2 of the seed disk hole and provides good seed singulation for a wide variety of seed sizes and shapes.

  If seed singulation performance is inconsistent and cannot be corrected by varying the vacuum level, adjust the double eliminator. If skips are occurring, adjust the double eliminator to a lower setting. If doubles are occurring, adjust the double eliminator to a higher setting.
- Disk hub height is critical for proper performance. Adjust the seed-disk hub, so the seed disk is in light contact with the meter housing. Proper adjustment is achieved when the seed disk turns approximately 1/4 to 1/2 turn when the hub is spun rapidly by hand. (See Adjust the Seed Meter Hub for additional information.)

WP29706,0000523-19-17FEB25

Install The Hopper Extension (Mini-Hopper Only)



A86748—UN—17JUN15

A—CCS Solenoid Harness

IMPORTANT: Avoid interference with the frame tube. Do not use the mini-hopper extension on the 1795 rockshaft near the mainframe.

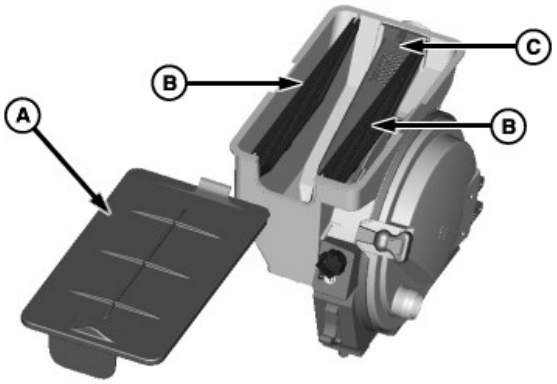
NOTE: When sugar beets are used or when using seed not approved for CCS seed tank delivery, the seed must be added to the hoppers, not the CCS tank. The extensions allow for more seeds to be planted. The extensions are useful when planting seed plots.

Disable the CCS blower when using the mini-hopper extension.

Do not install more than one extension on a mini-hopper.

When filling the mini-hopper extension, do not fill the seed over the screen vent holes.

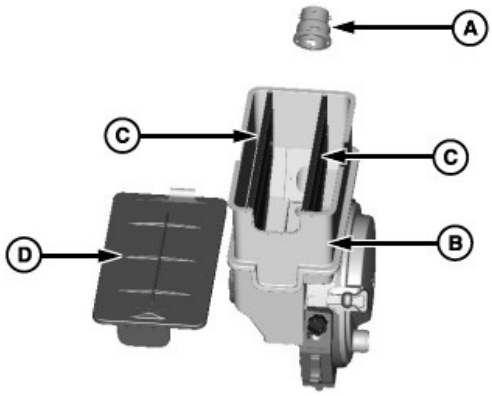
1. Disconnect harness (A) to disable the CCS blower.



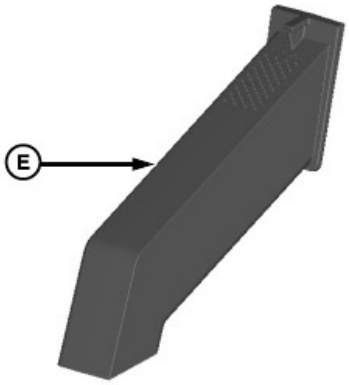
A78492—UN—31JUL13

A—Lid
B—Screened Dividers
C—Discharge Tube

2. Remove the lid (A), the screened dividers (B), and the discharge tube (C).



A78493—UN—31JUL13



A78494—UN—31JUL13

A—Cap
B—Mini-Hopper Extension
C—Non-Screened Dividers
D—Lid
E—Discharge Tube

3. Install cap (A) between the CCS tube and the hose.

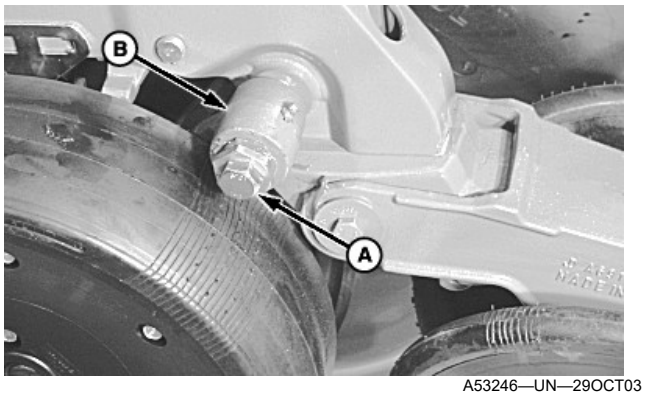
NOTE: Mini-hopper extensions are compatible with the CCS delivery system. To return to CCS system use, install the discharge tube (E) removed in step 2, reconnect the CCS blower harness, and remove the cap (A) (if used).

NOTE: Do not fill the mini hopper higher than the bottom of the screens. If seeds restrict the airflow through the screens, meter performance suffers.

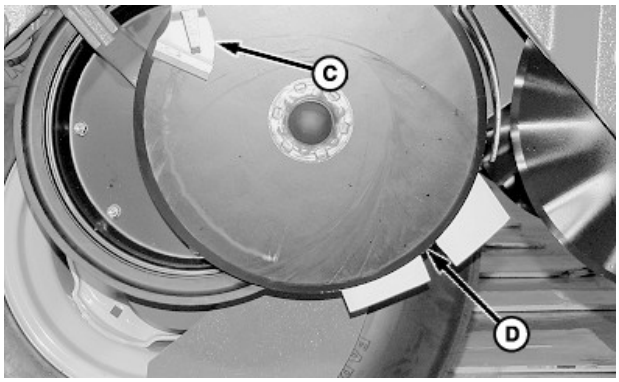
4. Install extension (B) onto the mini-hopper.
5. Install the dividers (C) into the mini-hopper and the extension (B).
6. Reinstall the lid (D).

MH69740,000054F-19-07OCT25

Inspect and Adjust the Furrow Opener Disks



A53246—UN—29OCT03



A53250—UN—29OCT03

A—Cap Screw
B—Pivot Arm
C—Scraper
D—Contact Area

CAUTION: Avoid injury from sharp edges on the disks. Wear protective gloves and handle the disks carefully.

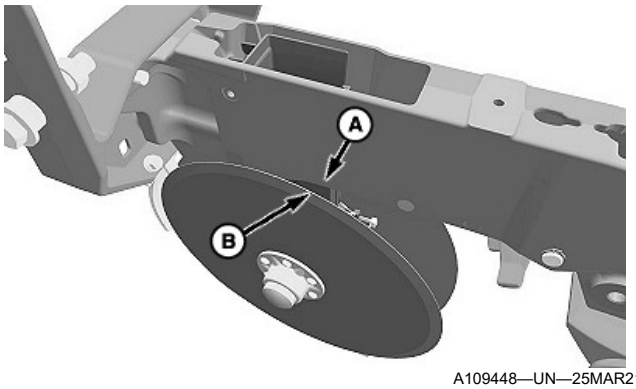
Inspect the disk contact area, the disk diameter, and the disk centering.

1. Inspect the contact area (D) where the disks touch.
   a. Insert two business cards (or similar items) between the disk opening and gently slide the cards together until the disk contact area is reached.
   b. Measure the distance between the business cards and compare the measurement to the specification.

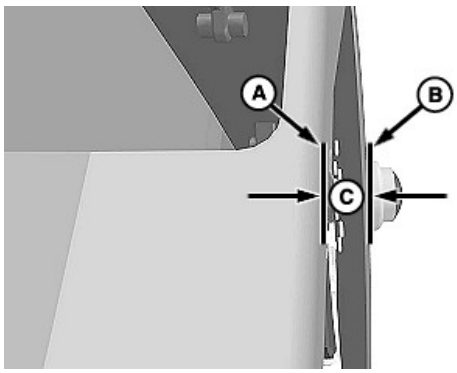
Specification

Disk Edge—Contact Area. . . . . 38—64 mm (1-1/2—2-1/2 in)

   c. If the contact area does not fall within the specifications, adjustment is required.
2. Remove cap screw (A), pivot arm (B), scrapers (C), and the depth gauge wheel.
3. Inspect the scrapers for excessive wear and replace as necessary.



A109448—UN—25MAR21



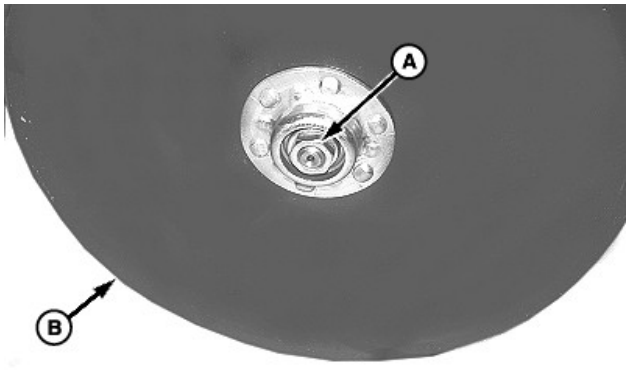
A109449—UN—25MAR21

Viewed from Above

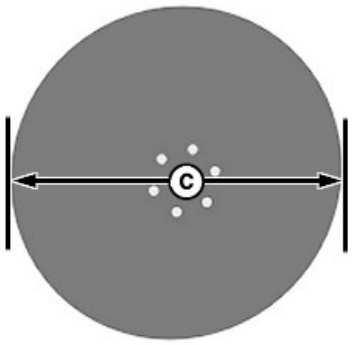
A—Shank Surface
B—Disk Edge
C—Dimension

NOTE: For consistency, measure from the top center of both disks.

4. Measure from the shank surface (A) to the disk edge (B) for both disks. If dimension (C) is not close to equal for both disks, adjustment is required.



A51112—UN—20NOV02



A109447—UN—26MAR21

Rear of Disk

A—Nut
B—Disk
C—Diameter

⚠ CAUTION: Avoid injury from sharp edges on the disks. Wear protective gloves and handle the disks carefully.

IMPORTANT: Avoid spindle damage. The nut on the left side of the row unit has left-hand threads.

NOTE: While the disk is removed, inspect all of the components between the disk for wear and damage.

Do not discard the shims.

5. Determine if the disks need adjusted closer or further from the shank based on the contact area. If one disk is closer to the shank, decide which disk needs more shims on the inside or outside based on the contact area adjustment.

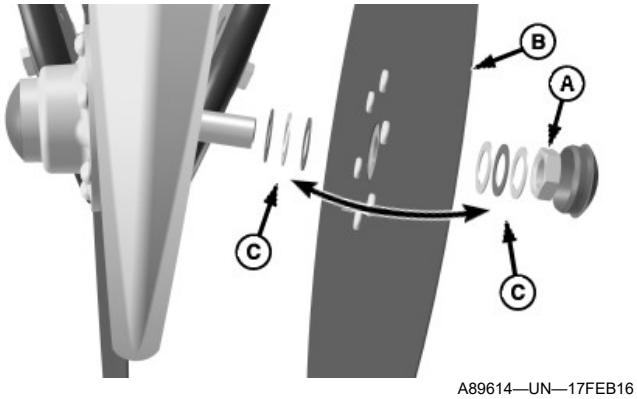
   Remove the nut (A) and disk (B).

6. Measure the diameter (C) and compare that to the specification.

Specification

Disk Diameter (C)—Minimum Diameter. . . . . 35.5 cm (14 in)

7. If the diameter is below the specification, the beveled edge is worn away, or significant damage is apparent, replace the disks. Replace the disks in pairs. Do not pair used and new disks.



A89614—UN—17FEB16

A—Nut
B—Disk
C—Shim

NOTE: Reposition shims on one or both disks as needed while adjusting the contact area and disk centering.

8. Reposition one or more of the shims (C) from one side of a disk (B) to the other. Install the disk and inspect the contact point and disk centering. Repeat the shim placement as needed.
9. Tighten the disk nut (A) to specification.

Specification

Disk Nut (A)—Torque (dry). . . . . 122 N·m (90 lb·ft)

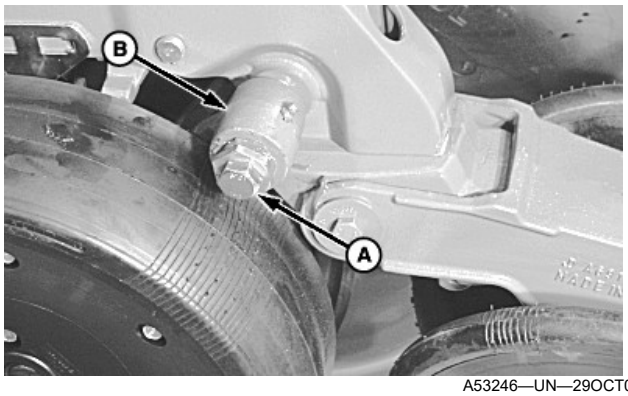
10. Adjust the depth gauge wheels. (See Adjust The Depth Gauge Wheels for additional information.) Tighten the cap screws for the pivot arms to specification.

Specification

Pivot Arm Cap Screw—Torque (dry). . . . . 271 N·m (200 lb·ft)

WP29706,00007A2-19-26MAR21

Replace the Furrow Opener Disks

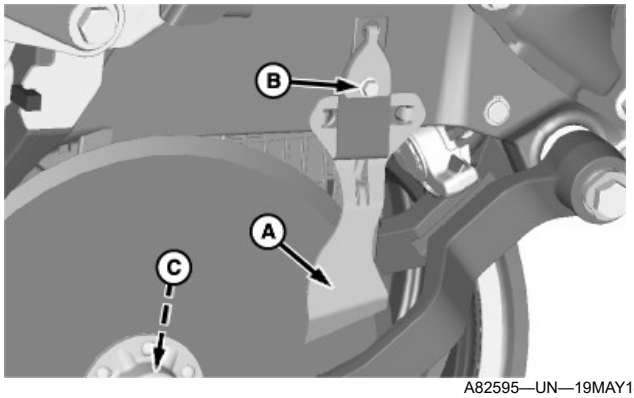


A53246—UN—29OCT03

A—Cap Screw
B—Pivot Arm

IMPORTANT: Avoid premature wear. Do not use a new disk with a used disk. Install new disks in pairs.

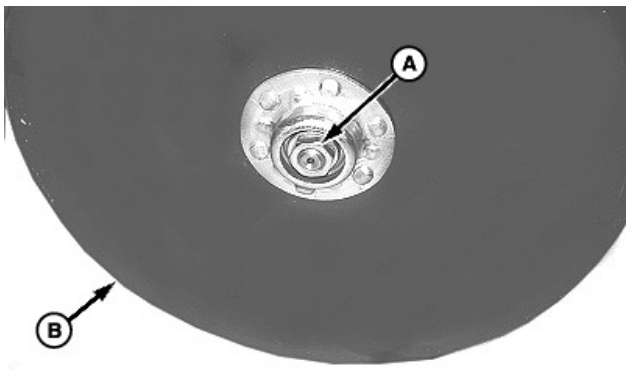
1. Remove the cap screw (A), pivot arm (B), and the depth gauge wheel.



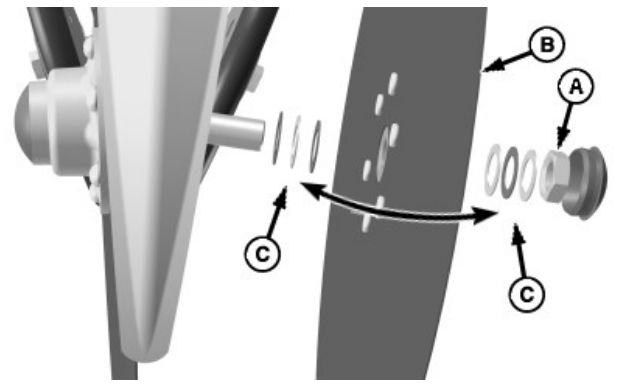
A82595—UN—19MAY14

A—Scraper
B—Cap Screw
C—Hub Cap

2. Remove the cap screw (B) and disengage the scraper (A) assembly from the row unit.
3. Remove the hub cap (C).



A51112—UN—20NOV02



A89614—UN—17FEB16

A—Nut
B—Disk
C—Shims

CAUTION: Avoid injury from sharp edges on the disks. Wear protective gloves and handle the disks carefully.

IMPORTANT: Avoid spindle damage. The nut on the left side of the row unit has left-hand threads.

NOTE: While the disk is removed, inspect all of the components between the disks for wear and damage.

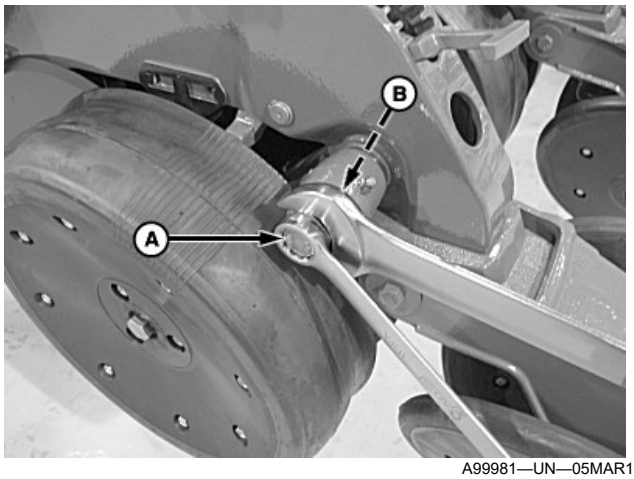
Do not discard the shims (C).

4. Remove the hub cap, nut (A), and disk (B).
5. Remove the shims.
6. Adjust the disk contact point during reassembly. (See Inspect and Adjust The Furrow Opener Disks.)
7. During the final reassembly, tighten the disk nut to specification.

Specification	
Disk Nut—Torque (dry)	122 N·m (90 lb·ft)

WP29706,0000422-19-01NOV18

Adjust the Depth Gauge Wheels



A99981—UN—05MAR18

A—Cap Screw
B—Nut

IMPORTANT: Avoid the buildup of field residue between the depth gauge wheel and Tru-Vee disk. Avoid premature wear of the depth gauge wheel. Maintain the proper depth gauge wheel adjustment.

NOTE: Properly adjusted depth gauge wheels contribute to quality seed trenches.

Check for proper adjustment:

1. Raise the row units above the ground.

2. Spin and release a depth gauge wheel.
3. Observe how far the depth gauge wheel rotates before stopping due to contact with the disk.
   - If the wheel spins more than half a rotation, but less than a full rotation, it is properly adjusted.
   - If the wheel spins less than half a rotation, it is adjusted too close to the disk.
   - If the wheel spins more than a full rotation, the gap between the wheel and the disk (at the closest point) must be less than 1.5 mm (1/16 in).

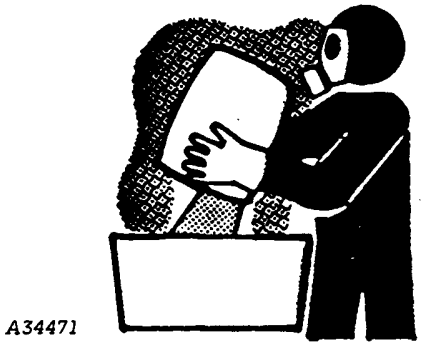
Adjust the depth gauge wheel as follows:

1. Hold the cap screw (A) with one wrench and turn the adjustment nut (B) with another wrench (A).
   - To move the wheel closer to the disk, turn the nut counterclockwise.
   - To move the wheel away from the disk, turn the nut clockwise.
2. Tighten the cap screw to specification and recheck the wheel adjustment.

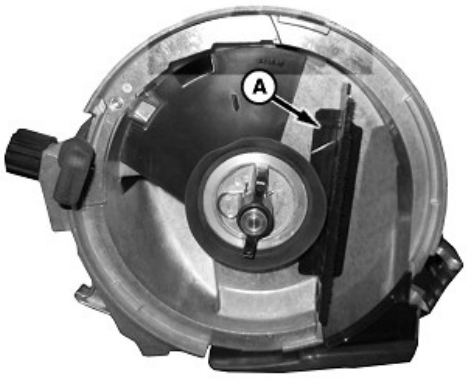
Specification	
Cap Screw—Torque (dry)	271 N·m (200 lb·ft)

AG,OUO6074,1369-19-07OCT25

Inspect and Service the Seed Meter



A34471—UN—11OCT88



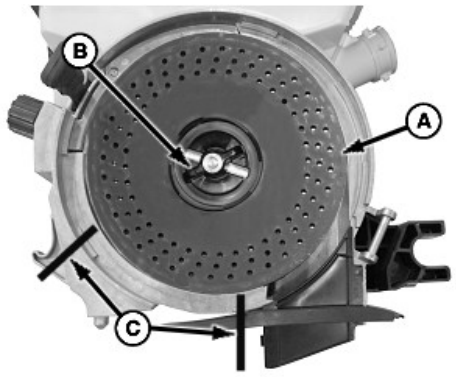
A78513—UN—02AUG13

A—Plastic

CAUTION: Avoid eye, skin, or breathing problems from exposure to seed treatments. If seed treatments are used, use caution when opening the seed meter domes. Read and follow safety instructions on the chemical product label.

Annually inspect the seed meter for wear and seed treatment buildup.

1. Annual cleaning of the seed meter and the seed disk is recommended. To remove seed treatment buildup, use a mild detergent and a soft brush. Clean behind the plastic (A) in the seed meter housing.

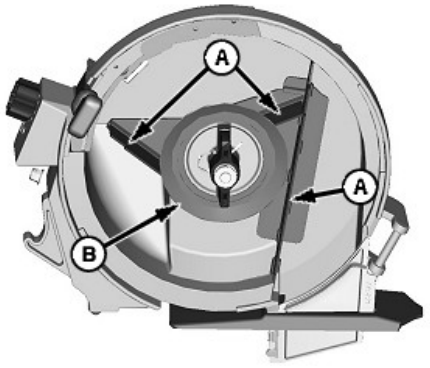


A77666—UN—15OCT13

A—Seed Disk
B—Hub
C—Inspection Area

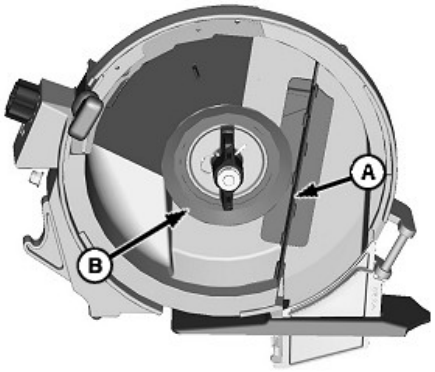
2. Install the seed disk (A). Spin the hub (B) rapidly by hand and quickly release the hub. If the disk rotates approximately 1/4 revolution after it is released, the hub is properly adjusted. (See Adjust Meter Hub).
3. With the hub properly adjusted, view the edge of the seed disk in the inspection area. Rotate the hub slowly by hand. If gaps intermittently appear as the seed disk is rotated (indication of a warped disk), replace the disk.

4. With the hub properly adjusted, hold the meter upright with seed in the meter. Verify that no seed loss occurs in the inspection area (C) by rotating the seed meter. If seed loss occurs, replace the disk.
5. Remove the seed disk.



A80236—UN—01MAY14

1795 Only



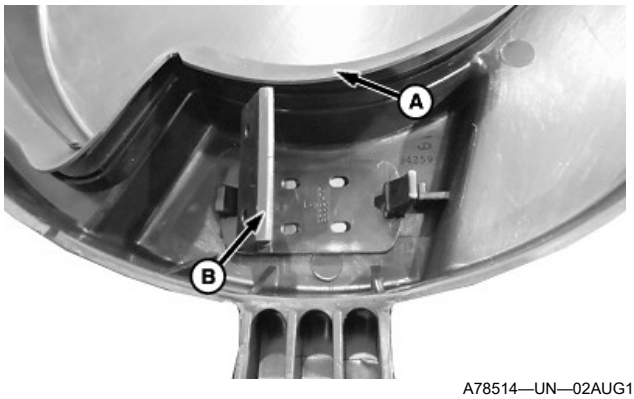
A80237—UN—01MAY14

All Other Planters

A—Brush
B—Hub Seal

6. Check the brush (A) bristles for separations and gaps. If the brush is worn enough to allow seed to pass through, replace the brush (See Change the Vacuum Seed Meter Brush).
7. Replace the hub seal (B) if it is cracked or weathered.

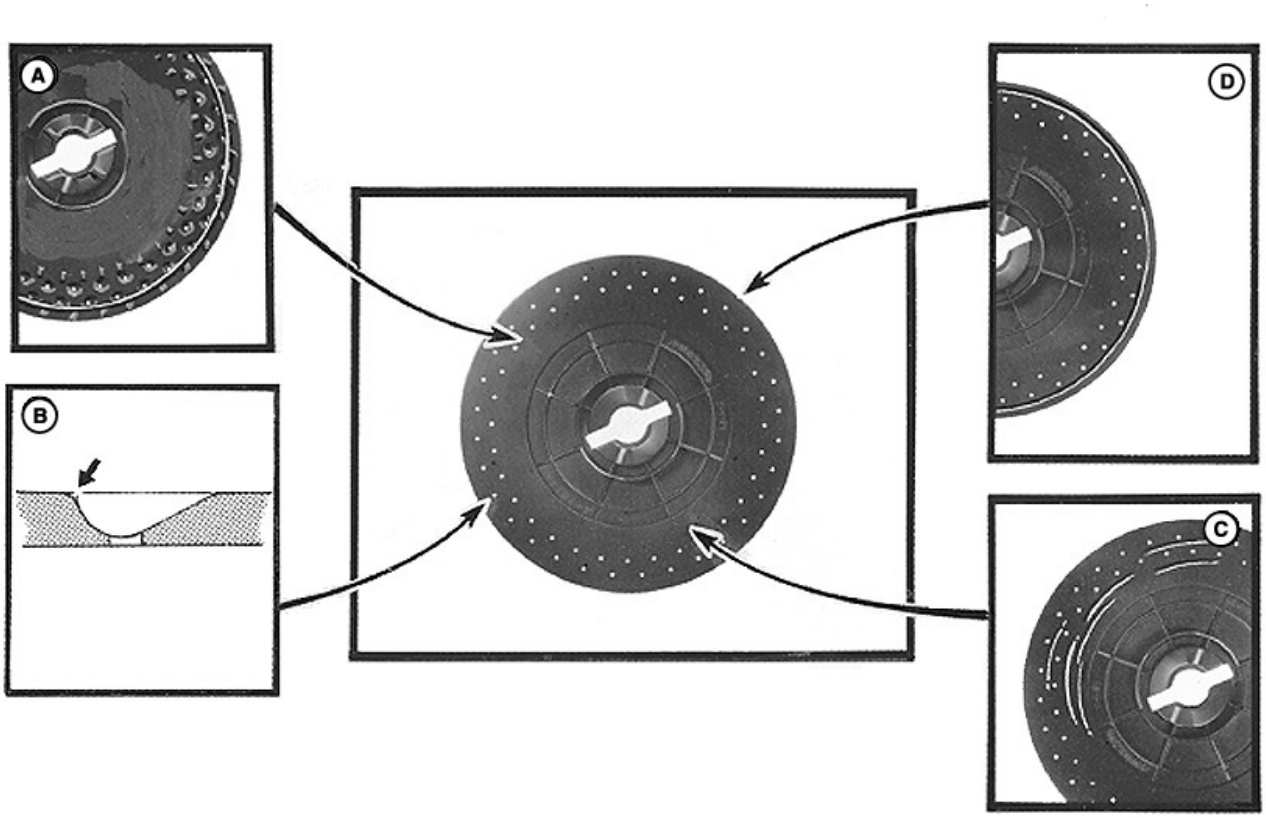
NOTE: If the vacuum seals are replaced, apply Graphite Spray TY25797 on the vacuum side of the used seed disks. The new seed disks are factory lubricated.



A78514—UN—02AUG13

A—Seals
B—Wiper

8. Replace the vacuum seals (A) if the seed disks are replaced or when large cracks or wear areas are visible in the seal.
9. Replace the disk wiper (B) if the edge of the wiper is grooved or excessively worn.

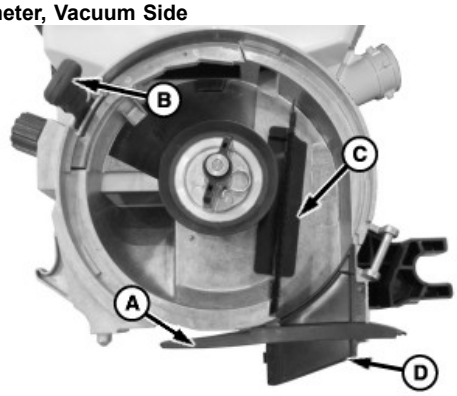


A55426—UN—22NOV04

A—Perimeter, Seed Side
B—Worn Edge (Seed Cell Side View)
C—Grooves on Vacuum Side
D—Perimeter, Vacuum Side

NOTE: To verify meter performance before purchasing new disks, perform a field check (See Check Seed Population).

10. Inspect the seed disks for wear in the following areas and replace the disks as needed.
    - Perimeter on the Seed Side (A): A small amount of wear is acceptable. Check for seed loss through the gap between the disk and the housing.
    - Worn Edge (B) of the Seed Cell: Seed abrasion removes the edges on the seed cells and increases the cell size. Increased cell size causes overpopulation when planting smaller seeds and causes under-population when planting larger seeds.
    - Grooves (C) on the Vacuum Side: Small grooves or scratches are acceptable. Large grooves affect the seed disk performance.
    - Perimeter on Vacuum Side (D): A wear depth less than 1 mm (3/64 in) is acceptable.



A78515—UN—15OCT13

A—Dust Cover
B—Handle
C—Brush Holder
D—Chute Cover

11. Replace the dust cover (A) for the seed meter when it does not fit properly, is cracked, or is weathered.
12. Replace the rubber handle (B), if it is cracked or broken.
13. Replace the brush holders (C), if worn.
14. Replace the chute cover (D), if worn.

WP29706,0000BA5-19-28JUN17

Service Intervals

Service/Inspection	Intervals						
	As Required	Beginning of Season	10 Hours or Daily	50 Hours	100 Hours	200 Hours	End of Season
Install and Remove the BrushBelt cartridge	•						
Clean the Seed Sensor	•						
Change the Meter Agitation Strip	•						
Clean or Replace the Segue	•						
Tighten the Meter Latch	•						
Install a New Vacuum Seal	•						
Inspect and Adjust the Furrow Opener Blades	•						
Replace the Furrow Opener Blades and BrushBelt Guard	•						
Inspect and Service ExactEmerge Meters							•
Adjust the Gauge Wheels	•						
Inspect and Service the Seed Meter		•					•

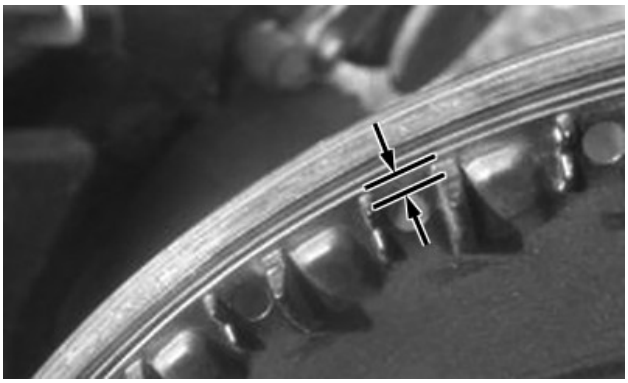
LM78752,00001D0-19-07OCT25

Component Wear Guidelines

NOTE: See the procedures in this section for component access and detailed service.

Service and Inspection	Intervals			
	As Required	50 Hours	100 Hours	End of Season
Inspect and Service the Seed Disk (Bowl)			•	
Inspect and Service the Meter Housing				•
Inspect and Service the Metal Meter Wear Pads		•		
Inspect and Service the Ceramic Meter Wear Pads		•		
Inspect and Service the Seed Segue (Guide)				•
Inspect and Service the Corn Agitation or Smooth Strip			•	
Inspect and Service the Meter Hub Bearing	•			
Inspect and Service the Double Eliminator				•
Inspect and Service the Knockout Wheel			•	
Inspect and Service the Dome Seal	•			•
Inspect and Service the BrushBelt Conditioner			•	
Inspect and Service the BrushBelt Gear Case			•	•
Inspect and Service the BrushBelt	•			•
Inspect and Service the Seed Sensor	•			•

Seed Disk (Bowl)



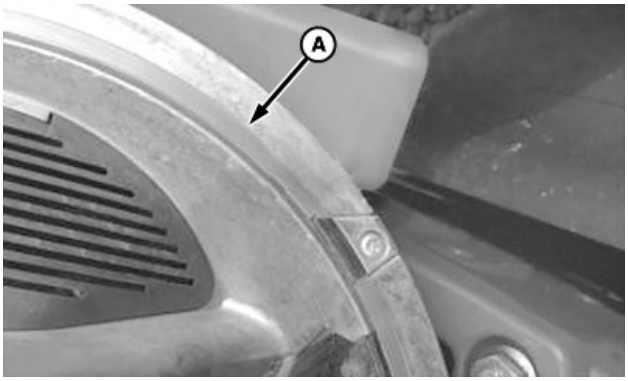
A100131—UN—20MAR18

Partially Worn Seed Disk (Bowl)

NOTE: Small grooves along the edge of the seed disk (bowl) do not cause meter performance issues.

Inspect the seed disks for wear due to the meter housing and wear pad contact.

Meter Housing



A100132—UN—22MAR18

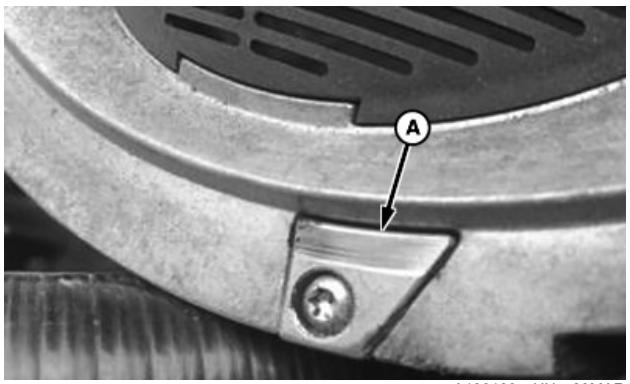
Partially Worn Meter Housing

A—Meter Housing Surface

NOTE: Small grooves in the meter housing do not cause performance or durability issues.

Inspect the meter housing surface (A) for excessive wear. Timely replacement of the meter wear pads helps avoid housing wear.

Metallic Meter Wear Pads



A100133—UN—20MAR18

Partially Worn Pad

A—Wear Pad

NOTE: The metallic wear pads are subject to wear under normal conditions.

Proper replacement of the wear pads helps prevent wear to the meter housing.

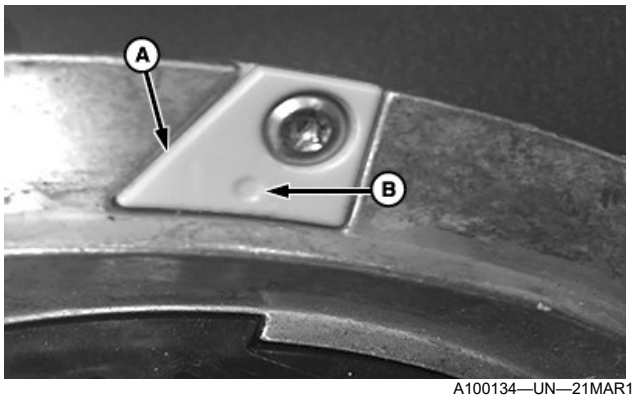
Inspect the wear pad (A). To prevent meter housing wear, replace the wear pad when it is flush with the housing.

If some pads wear faster than others, swap the pad positions to extend the overall life before replacement.

Specification

Wear Pad Screw—Torque (dry). . . . . 3 N·m (25 lb·in)

Ceramic Meter Wear Pads



A100134—UN—21MAR18

Ceramic Meter Wear Pad

A—Wear Pad
B—Wear Indicator

NOTE: The ceramic wear pads are subject to wear under normal conditions.

Proper replacement of the wear pads helps prevent wear to the meter housing.

Inspect the wear pad (A). To prevent meter housing wear, replace the wear pads when the wear indicator (B) is no longer visible.

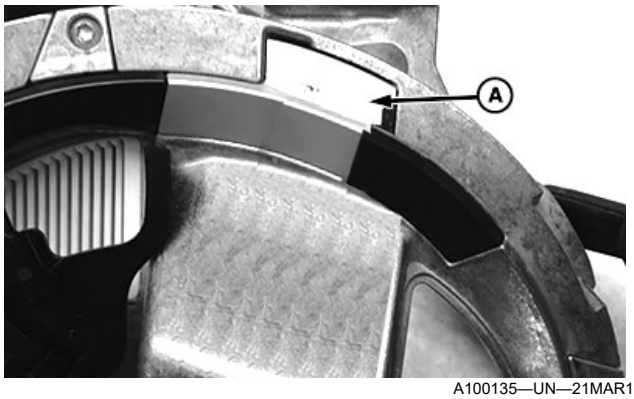
If some pads wear faster than others, swap the pad positions to extend the overall life before replacement.

IMPORTANT: Avoid breaking the ceramic. Tighten the screws to specification.

Specification

Wear Pad Screw—Torque (dry). . . . . 3 N·m (25 lb·in)

Seed Segue (Guide)



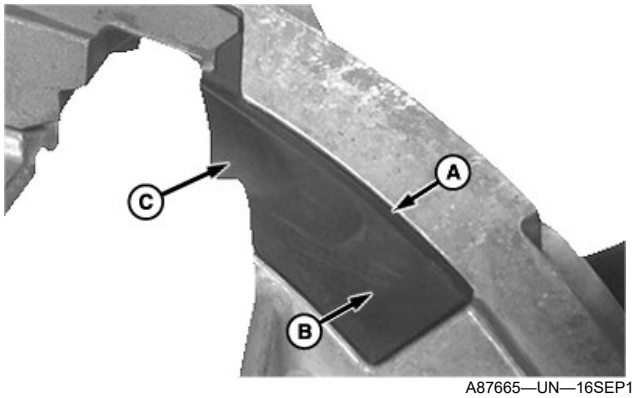
A100135—UN—21MAR18

Seed Segue (Guide)

A—Seed Segue (Guide)

NOTE: Wear from contact with the seed bowl does not cause performance issues.

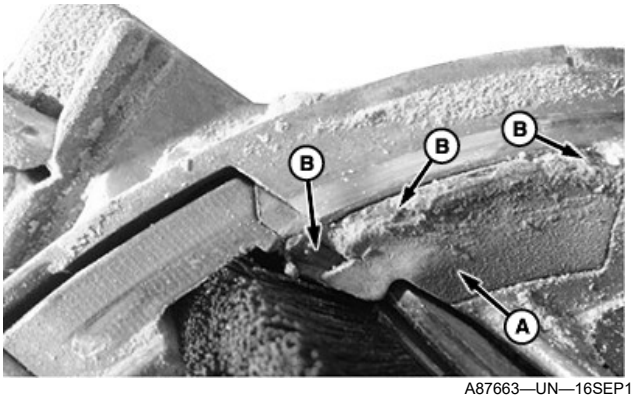
Inspect the seed segue (guide) (A) surface for chipped or damaged areas where the seed transitions to the BrushBelt. Verify that the rubber boot is not excessively damaged or worn.



A87665—UN—16SEP15

A—Edge
B—Flat Surface
C—Recessed Area

If the rubber boot is in good condition, the edges (A) and flat surface (B) are flush with the meter housing and the recessed area (C) is lower than the edges.

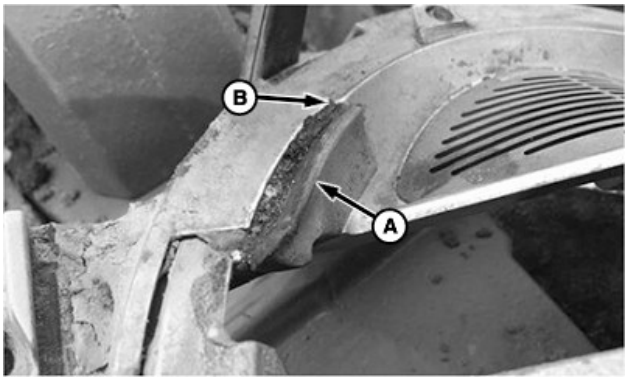


A87663—UN—16SEP15

Deteriorated Rubber Boot

A—Rubber Boot
B—Deterioration

If the rubber boot (A) has excessive deterioration (B), replace the rubber boot.



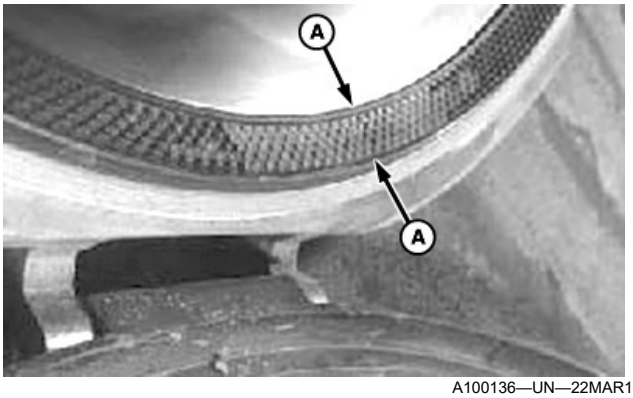
A87664—UN—16SEP15

Worn Rubber Boot

A—Rubber Boot
B—Edge

If the rubber boot (A) has worn enough to expose an edge (B) of the meter housing, replace the rubber boot.

Corn Agitation or Smooth Strip



A100136—UN—22MAR18

Partially Worn Corn Agitation Strip

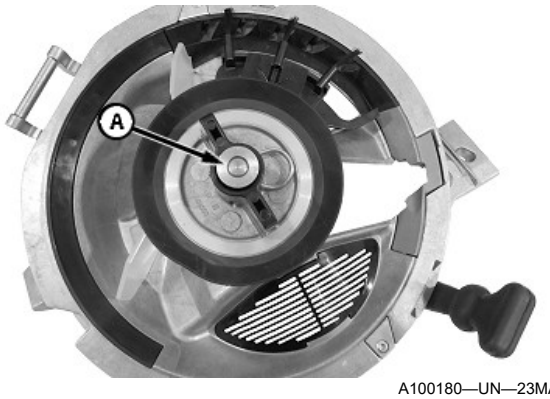
A—Corn Agitation Strip

NOTE: Individual missing tines do not affect performance.

If there are consecutive tines missing or if any extremities are peeled back, replace the corn agitation strip (A).

If the attached clips on the back side of the meter are broken or damaged, replace the strip.

Meter Hub Bearing



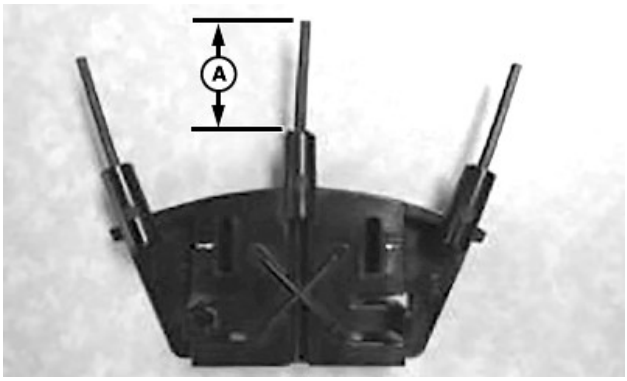
A100180—UN—23MAR18

A—Hub

NOTE: Shaft movement in relationship to the housing can affect performance.

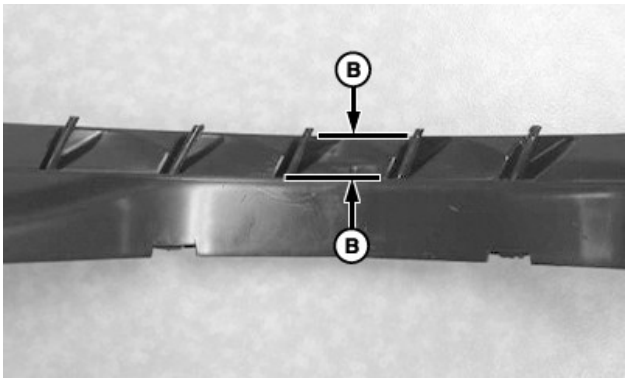
If there is measurable movement of the hub (A) bearing within the housing, replace the hub bearing. Bearing replacement can be obtained via regular special tool order channels.

Double Eliminator



A100137—UN—21MAR18

Inner Double Eliminator



A100138—UN—21MAR18

Outer Double Eliminator

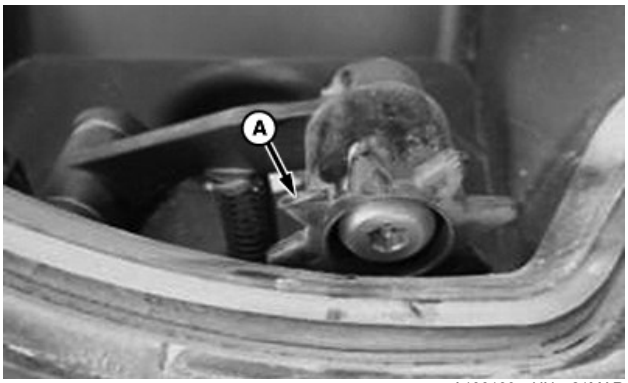
A—Inner Tine Length
B—Outer Tine Length

Inspect the tine length. If the tines are below the minimum length, replace the double eliminator.

Minimum Tine Length — Specification

Inner Tine—Length (A)	18 mm (19/64 in)
Outer Tine—Length (B)	8 mm (5/16 in)

Knockout Wheel



A100139—UN—21MAR18

Knockout Wheel

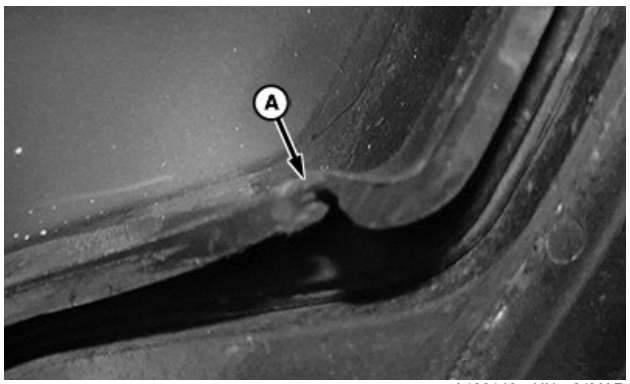
A—Knockout Wheel Tines

IMPORTANT: To avoid damage to the seed knockout wheel, never operate the meter drives without the seed disks (bowls) installed. The seed bowl protects the knockout wheel from the rotating BrushBelt.

NOTE: The knockout wheel tines are designed to engage the seed cell holes completely.

If the knockout wheel tines (A) are worn, missing, or do not engage the holes adequately, replace the wheel. Verify that the wheel bearing surface is clean and that the wheel spins freely.

Dome Seal



A100140—UN—21MAR18

Dome Seal

NOTE: Verify that the graphite coating is maintained on the seal side of the seed disk (bowl). Store the disk (bowl) properly. See the Storage section for more information.

Inspect the dome seal for torn areas and deformed edges that prevent an adequate seal. Replace the seal when it no longer maintains an adequate vacuum seal with the disk (bowl).

BrushBelt Conditioner



A100141—UN—21MAR18

BrushBelt Conditioner

Replace the BrushBelt conditioner when it no longer contacts the belt bristles.

BrushBelt Gear Case

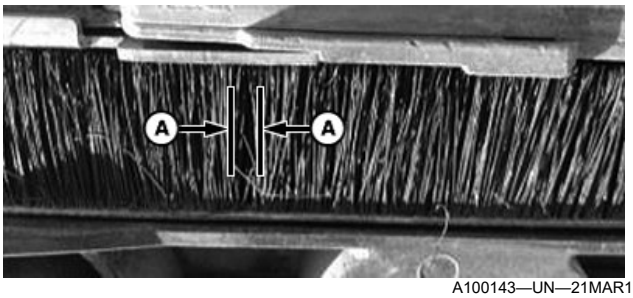


A100142—UN—21MAR18

BrushBelt Gear Case

Remove the BrushBelt gear case from the cartridge. Rotate the gear case by hand. Check for smooth operation. Rough movement suggests a dry bearing. If the rotation is not smooth, replace the gear case.

BrushBelt



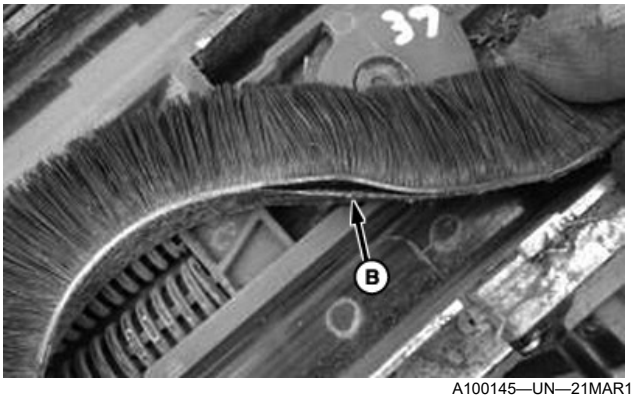
A100143—UN—21MAR18

Bristle Loss



A100144—UN—21MAR18

Uneven Side-to-Side Wear



A100145—UN—21MAR18

Belt Separation

A—Bristle Loss
B—Belt Separation

NOTE: Bent over bristles do not indicate that the belt needs replacement. When the BrushBelt is in operation the conditioner restores the bristles to a proper position.

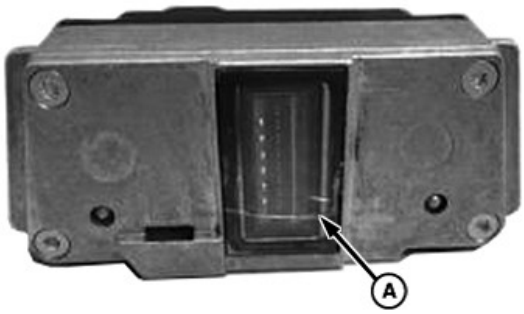
If a continuous area of bristle loss (A) exceeds 10 mm (3/8 in), replace the belt.

If one side is excessively worn, replace the belt.

If the length of belt separation (B) reaches 2.5 cm (1 in) and performance is affected, replace the belt.

If the backing breaks, replace the belt.

Seed Sensor



A100148—UN—21MAR18

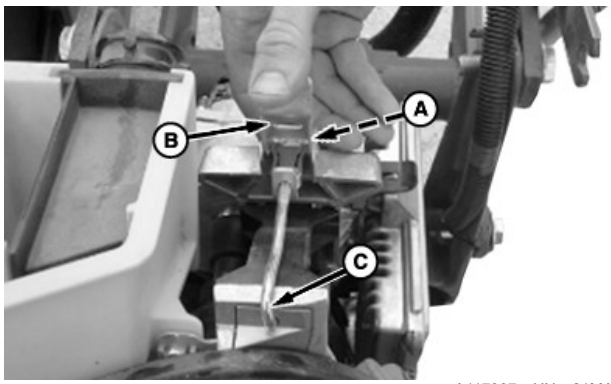
Seed Sensor

A—Glass Face

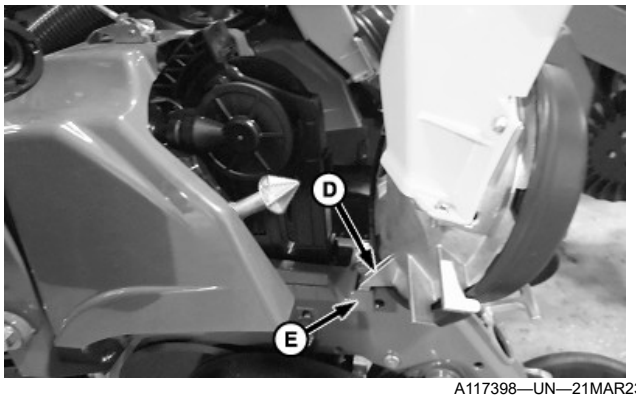
If the glass face (A) is cracked or broken, replace the seed sensor.

OUO6074,0001030-19-21OCT25

Remove the ExactEmerge Seed Meter



A117397—UN—21MAR23



A117398—UN—21MAR23

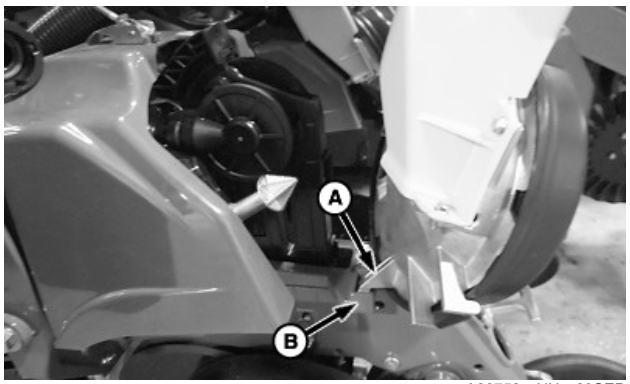
A—Clip
B—Latch
C—Hook
D—Housing Tab
E—Bracket Base

IMPORTANT: Avoid breaking housing tab (D). Carefully remove the seed meter from the drive motor.

1. Access the vacuum meter. (See the procedure in this section.)
2. Push down on clip (A) while lifting on latch (B) to unlock the seed meter from the top area of the BrushBelt cartridge.
3. Remove the hook (C) from the slot in the meter tab.
4. Slowly remove the seed meter coupler from the drive motor shaft.
5. Remove the housing tab (D) from the bracket base (E).

WP29706,0000CE8-19-24MAR23

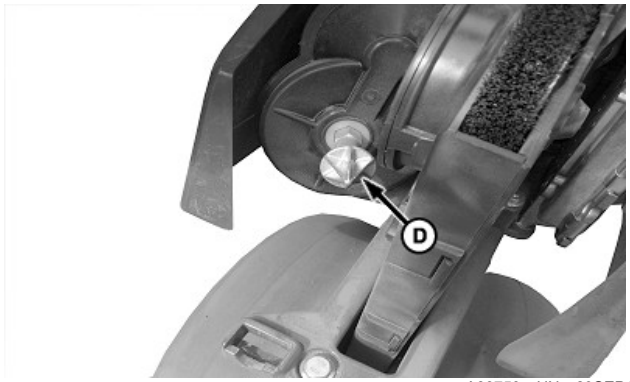
Install the ExactEmerge Seed Meter



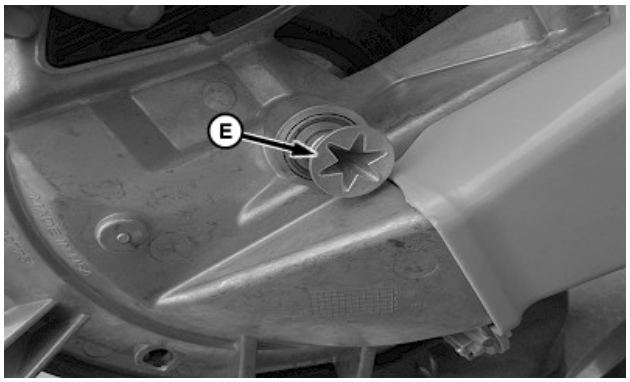
A83752—UN—29SEP14



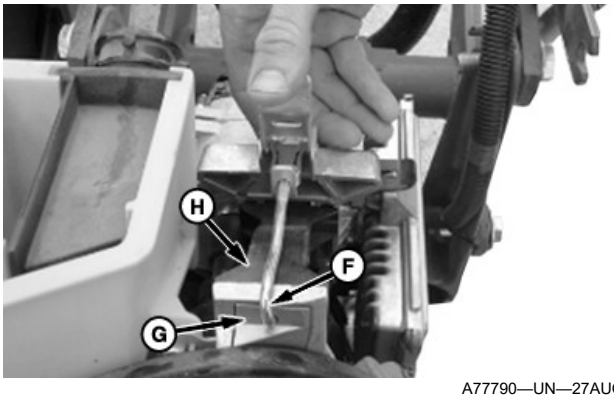
A77995—UN—27AUG13



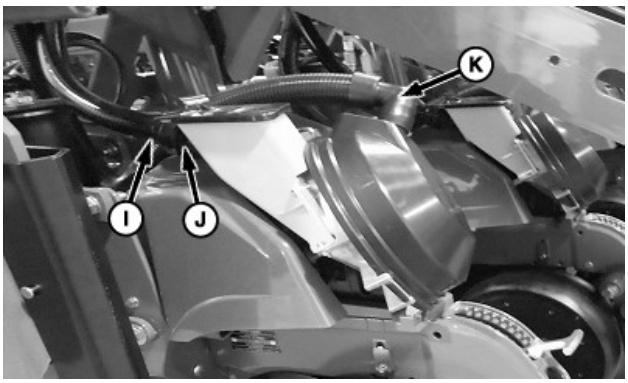
A83750—UN—29SEP14



A83751—UN—29SEP14



A77790—UN—27AUG13



A77791—UN—27AUG13

A—Housing Tab
B—Bracket
C—Seed Meter Assembly
D—Motor Shaft
E—Seed Meter Coupler
F—Hook
G—Tab
H—Top Area
I—Delivery Hose
J—Fill Neck
K—Vacuum Hose

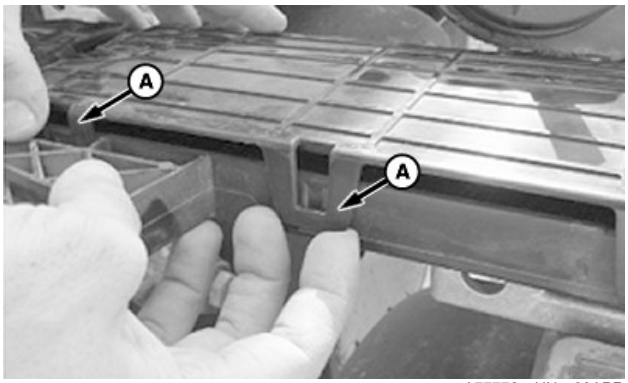
1. Position the housing tab (A) into the bracket (B) of the seed meter assembly (C).

NOTE: Turn the driveshaft to align it with the coupler as needed.

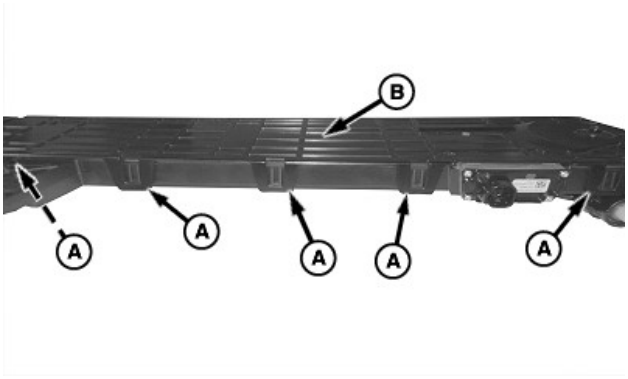
2. Align the motor shaft (D) and the seed meter coupler (E), being careful to align the meter housing to the BrushBelt cartridge.
3. Position the hook (F) through tab (G) on the meter and the top area (H) of the BrushBelt cartridge.
4. Fasten the latch until the clip snaps. If the latch is out of adjustment, meter is loose, or has side-to-side motion, proceed as follows:
   a. Release the latch and hook.
   b. Rotate the hook one full revolution. Clockwise rotation moves the hook inward. Counterclockwise rotation moves the hook outward.
   c. Install the meter and position the hook into the meter tab and the BrushBelt cartridge.
   d. Close the latch until the clip snaps, then check the latch for proper adjustment and no side-to-side movement. Repeat these steps as necessary for other meter latches.

WP29706,0000CE9-19-24MAR23

Replace or Clean the BrushBelt Cartridge Components



A77772—UN—30APR13

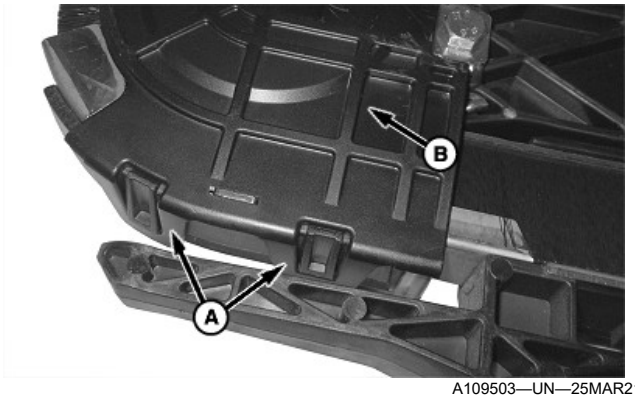


A79835—UN—22JAN14

A—Tabs
B—Upper Cartridge Cover

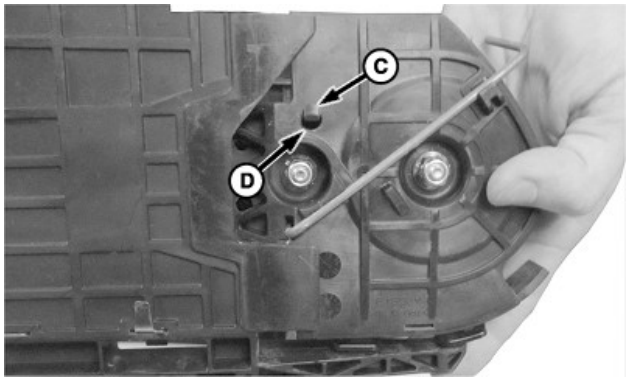
*NOTE: **Periodically clean the seed sensor area inside the BrushBelt cartridge.** If dusty conditions or heavily treated seed causes an excessive buildup on the seed sensor, false warnings appear for low population or low limits.*

1. Remove the BrushBelt cartridge (see Remove and Install the BrushBelt Cartridge).
2. To release the upper cartridge cover (B), pull back on the tabs (A).



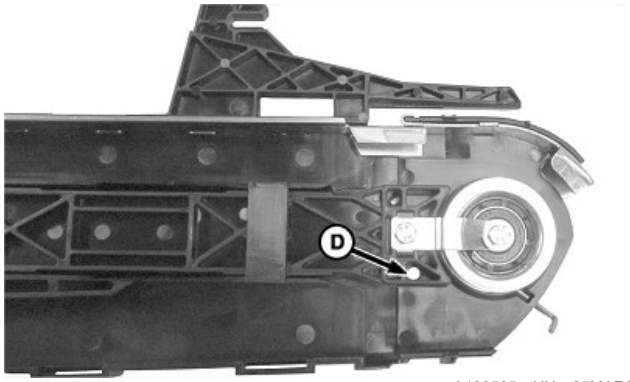
A109503—UN—25MAR21

Lower Cartridge Cover



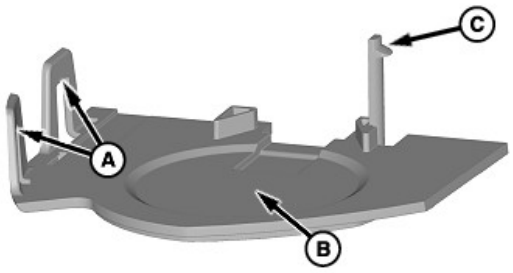
A109504—UN—25MAR21

Outside of Cartridge



A109505—UN—25MAR21

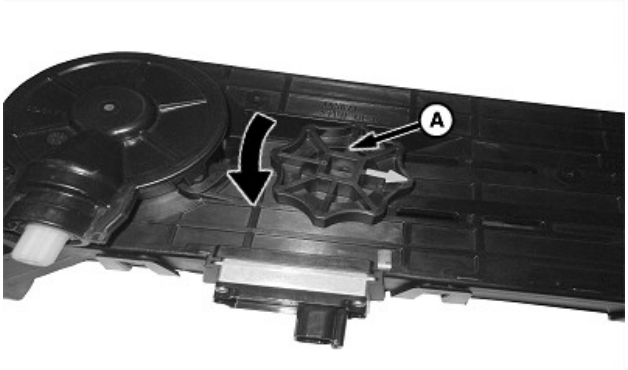
Inside of Cartridge



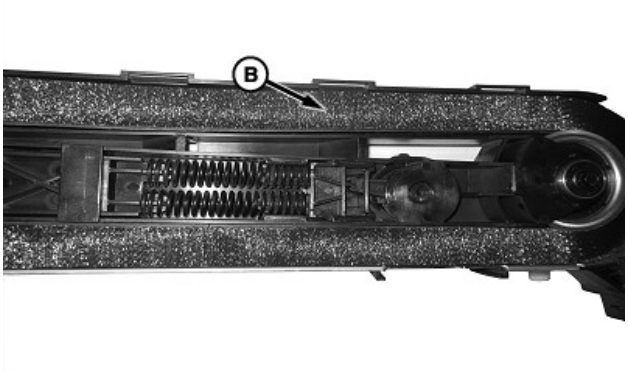
A109506—UN—25MAR21

A—Tabs
B—Lower Cartridge Cover
C—Retaining Clip
D—Hole

3. Release the tabs (A) on the lower cartridge cover (B) and push the retaining clip (C) through hole (D).



A79872—UN—22JAN14



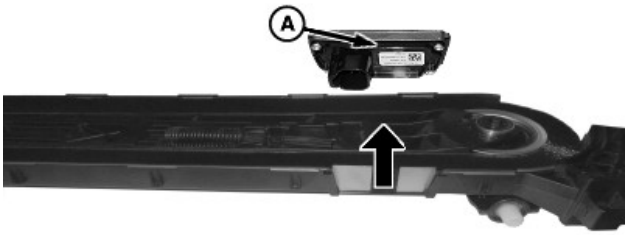
A79896—UN—22JAN14



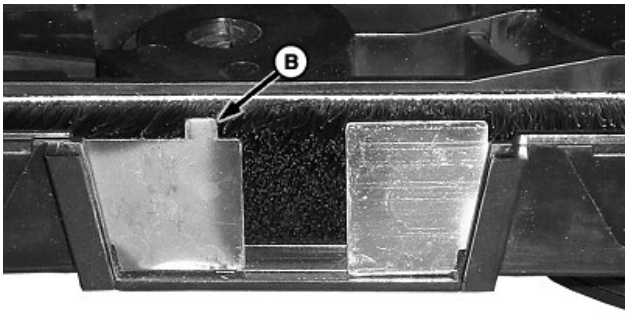
A82226—UN—09APR14

A—Belt Tensioner
B—BrushBelt

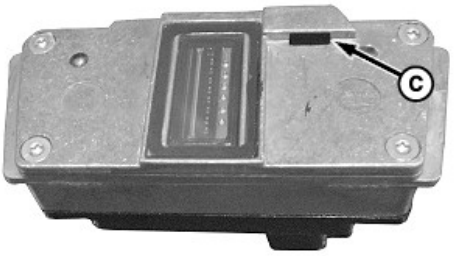
4. To remove the spring tension, turn the belt tensioner (A) counterclockwise. Remove the BrushBelt (B) from the cartridge.



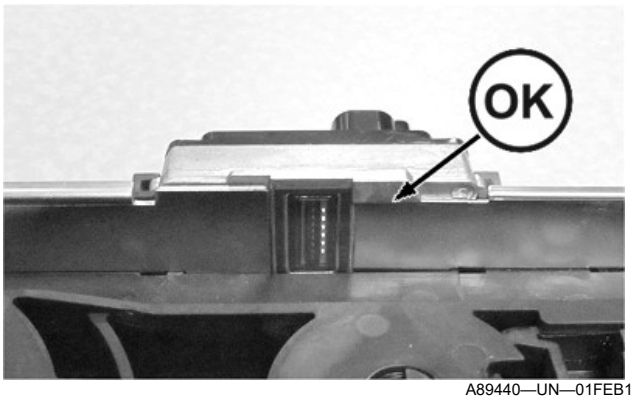
A79897—UN—22JAN14



A109508—UN—25MAR21

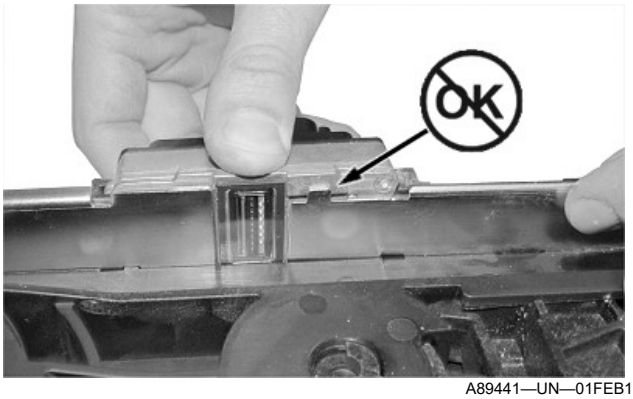


A109509—UN—25MAR21



A89440—UN—01FEB16

Tab Seated Correctly



A89441—UN—01FEB16

Tab Exposed

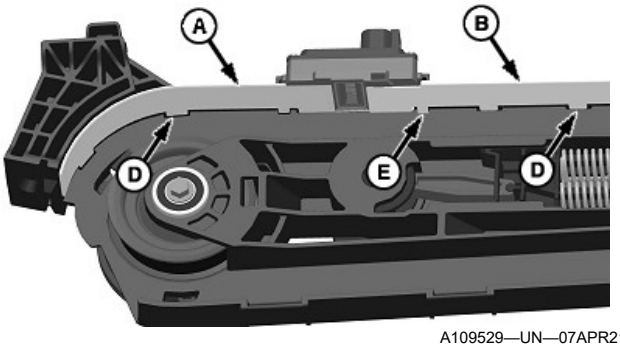
A—Seed Sensor
B—Wear Liner Tab
C—Sensor Slot

IMPORTANT: Do not plant again until the belt and interior surfaces are dry. To dry the components, perform a meter runoff for several minutes.

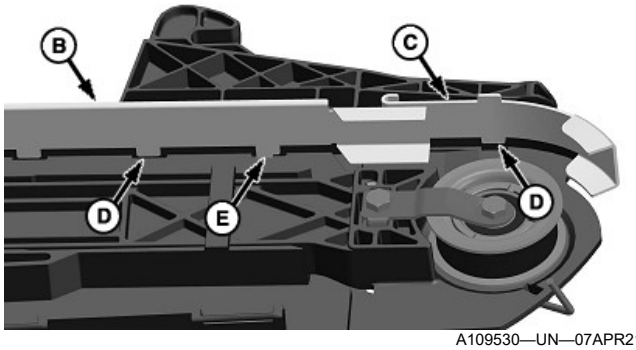
To avoid false readings from the seed sensor (A), insert the wear liner tab (B) into sensor slot (C).

NOTE: If moisture enters the cartridge or belt during rain or when the planter is washed, accumulated dust becomes mud.

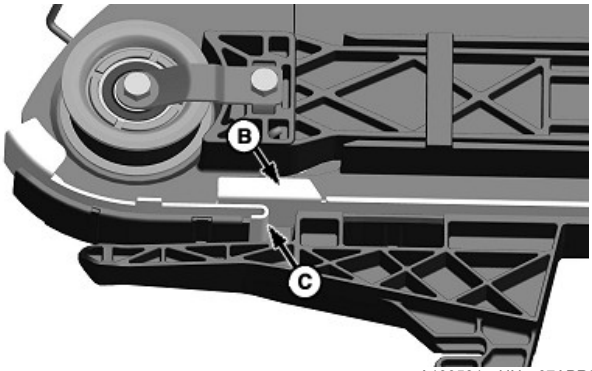
5. Clean the seed sensor (A) and surrounding area. If residue is difficult to remove with a dry brush, use a mild detergent and water with a brush. The surfaces must be dry before use.
6. When installing the sensor, verify that the tab (B) is in the slot (C).



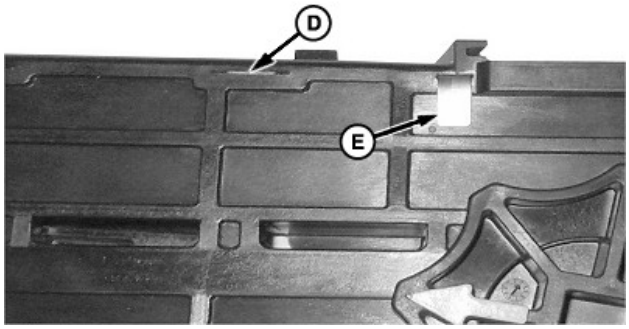
A109529—UN—07APR21



A109530—UN—07APR21



A109531—UN—07APR21



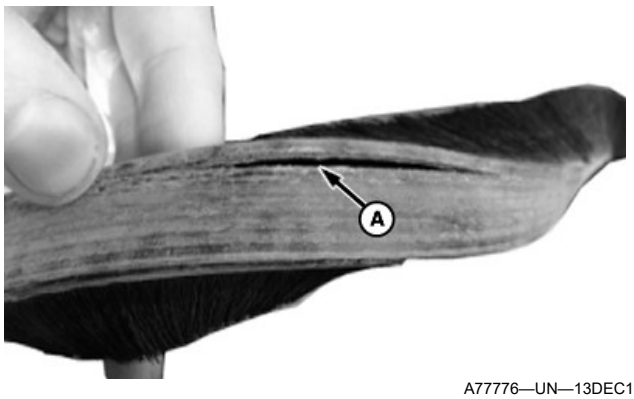
A79907—UN—04FEB14



A79906—UN—04FEB14

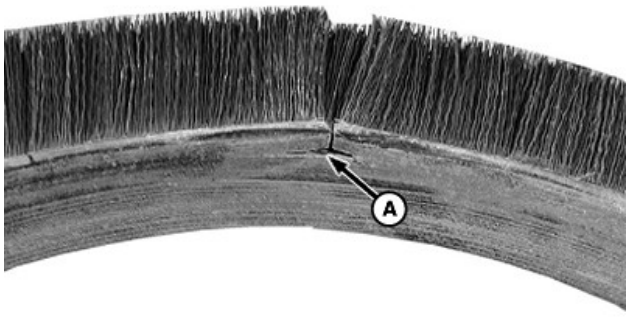
A—Upper Wear Liner
B—Middle Wear Liner
C—Lower Wear Liner
D—Alignment Tabs
E—Retaining Tabs

7. Inspect the upper wear liner (A), the middle wear liner (B), and the lower wear liner (C) for excessive wear or damage and replace as needed.
8. When installing the liners, verify that the lower liner (C) is behind the middle liner (B) and that all tabs are in the cartridge slots before bending the retaining tabs (E).



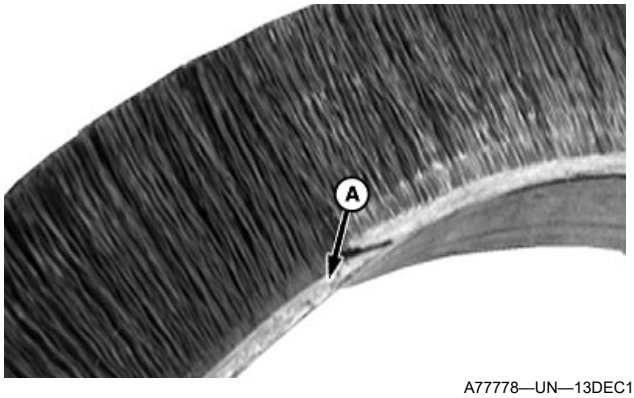
A77776—UN—13DEC13

Split Damage



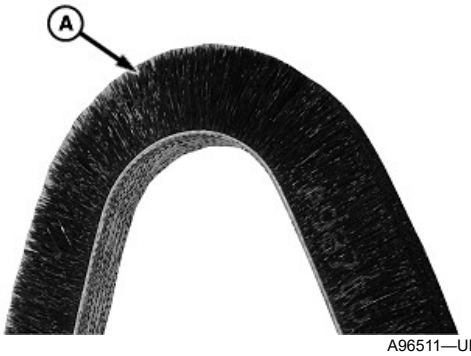
A77777—UN—13DEC13

Crack Damage



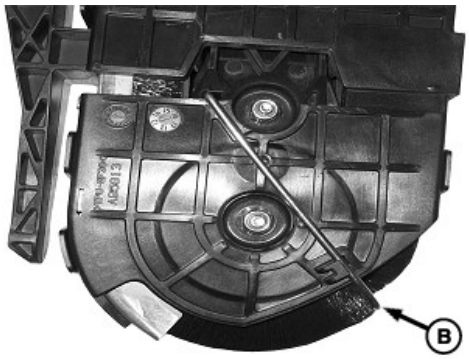
A77778—UN—13DEC13

Edge Slice Damage



A96511—UN—10MAY17

Uneven Bristle Damage



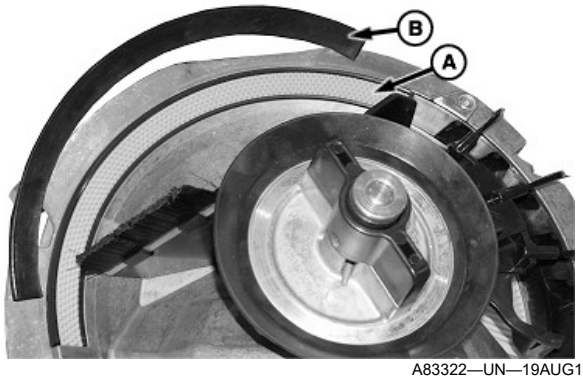
A79908—UN—04FEB14

A—Wear or Damage
B—Brush Conditioner

9. Check the BrushBelt for wear or damage (A). Replace the belt as needed.
10. Inspect the brush conditioner (B) for damage and replace as needed.
11. Install the belt into the cartridge.
12. Install the upper and lower cartridge covers.
13. Install the belt cartridge (see Remove and Install the BrushBelt Cartridge).

WP29706,0000407-19-07OCT25

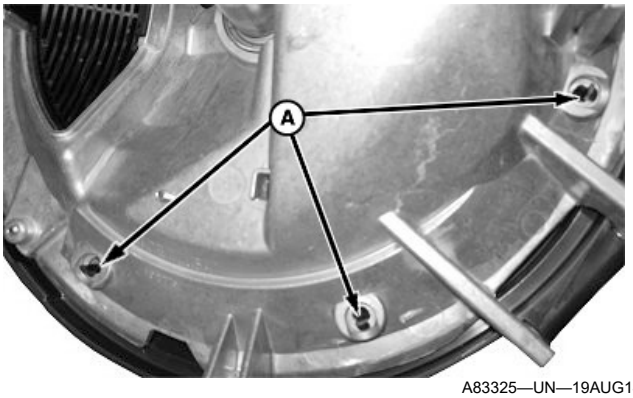
Change the Meter Strip (Agitation or Smooth)



A83322—UN—19AUG14

A—Agitator Strip
B—Smooth Strip

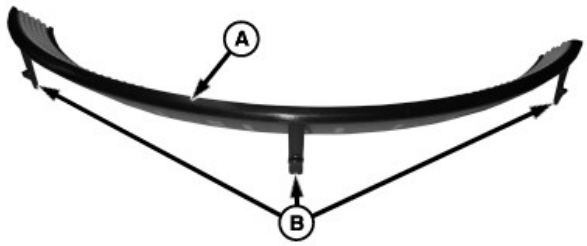
1. Determine which agitator strip is need for the crop being planted. The agitator strip (A) has a rough surface. The smooth strip (B) has a smooth surface. (See ExactEmerge Meter Settings for the recommended agitator strip by crop.)
2. Remove the meter from the row unit (See Remove and Install the ExactEmerge Seed Meter).
3. Open the seed meter dome (See Clean Out the ExactEmerge Meter).
4. Remove the seed disk (bowl) (See Clean Out the ExactEmerge Meter).



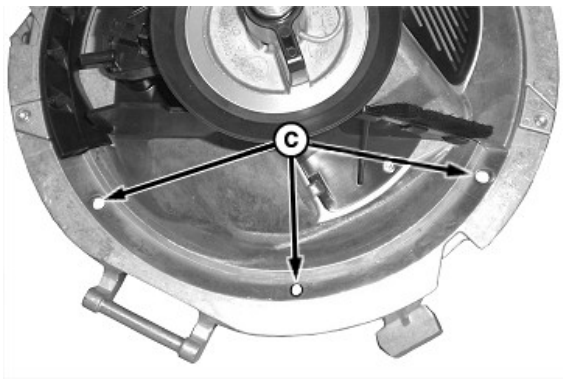
A83325—UN—19AUG14

A—Tabs

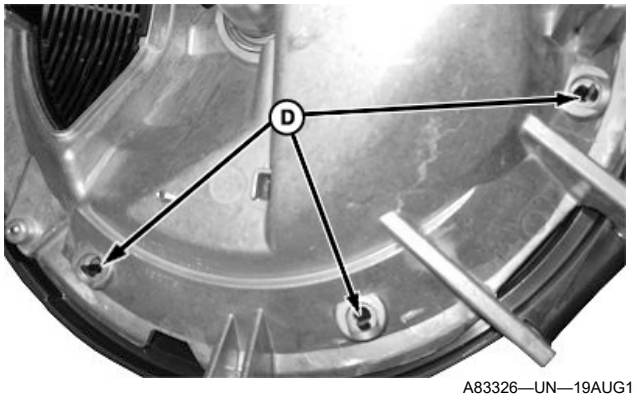
5. To release the agitator strip, squeeze the tabs (A) on the back of the meter then pull out on the strip.



A83323—UN—19AUG14



A83324—UN—19AUG14



A83326—UN—19AUG14

A—Agitator Strip
B—Tabs
C—Holes
D—Tabs

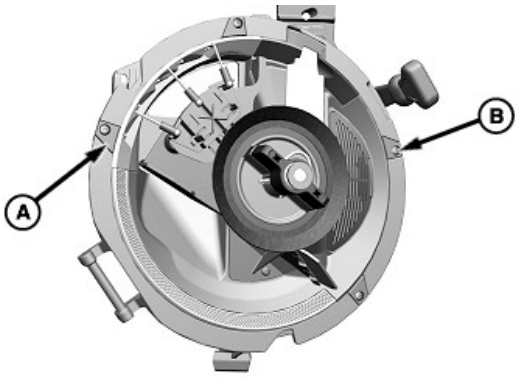
6. To install the correct agitator strip (A) in the meter, align the tabs (B) with the holes (C). Push the strip into position until the tabs (D) latch into the holes.
7. Install the correct seed disk (bowl) (See Install the Seed Disk).

NOTE: The meter hub height must be checked when the seed disk (bowl) is changed.

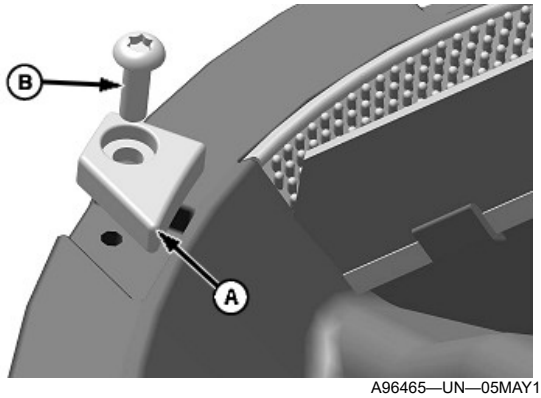
8. Adjust the meter hub height (See Adjust the Meter Hub Height).
9. Close the seed meter dome.
10. Install the meter on the row unit (See Remove and Install the ExactEmerge Seed Meter).

WP29706,00007E0-19-07OCT25

Replace the Wear Pads



A95412—UN—05MAY17



A96465—UN—05MAY17

A—Wear Pad (4 used)
B—TORX Screw (4 used)

CAUTION: Avoid chemical injury to eyes, skin, and lungs when accessing and handling components coated with seed treatment. Wear the appropriate personal protective equipment. Read and follow the safety instructions on the product label.

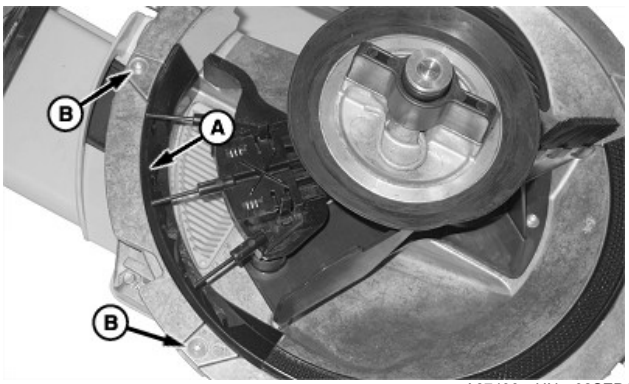
1. Access the meter and remove the seed disk (bowl).
2. Inspect the wear pads (A). Replace the pads before the amount of wear allows the seed disk (bowl) to contact the meter housing.
3. Remove the TORX screws (B) and wear pads.
4. Install new wear pads.
5. Install the TORX screws and tighten to specification.

Specification

TORX Screws—Torque (dry)	2.9 N·m 25-1/2 lb·in

OUO6074,0000F9F-19-09OCT25

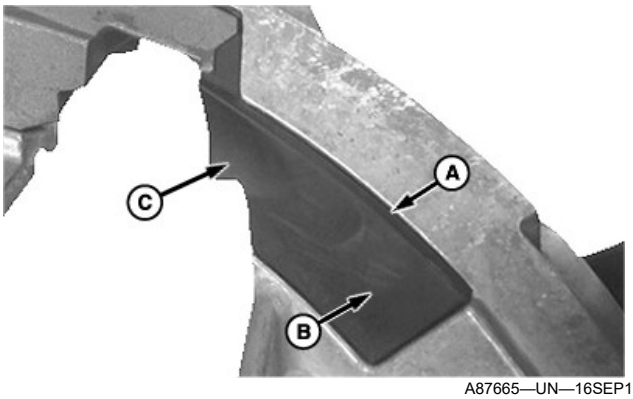
Replace or Clean the Segue



A87490—UN—02SEP15

A—Outer Double Eliminator Assembly
B—Torx Screws (2 used)

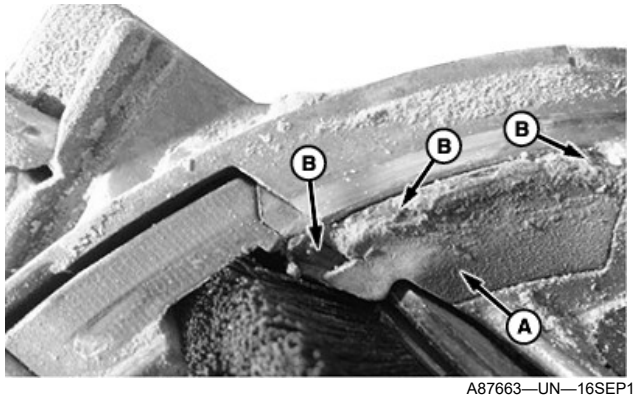
1. Remove the seed meter from the row unit. (See Remove the ExactEmerge Seed Meter or Install the ExactEmerge Seed Meter.)
2. Open the seed meter dome (See Clean Out the ExactEmerge Meter.)
3. Remove the seed disk (bowl). (See Remove the Seed Disk.)
4. Remove and retain the TORX screws (B) and the plates.
5. To remove, pull up on the outer double eliminator assembly (A).



A87665—UN—16SEP15

A—Edge
B—Flat Surface
C—Recessed Area

6. If the rubber boot of the segue is in good condition, the edges (A) and flat surface (B) are flush with the meter housing. The recessed area (C) is lower than the edges.

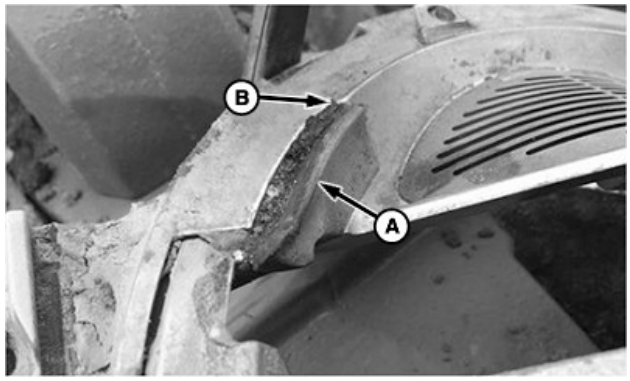


A87663—UN—16SEP15

Deteriorated Rubber Boot

A—Rubber Boot
B—Deterioration

7. If the rubber boot (A) of the segue has excessive deterioration (B), replace the rubber boot.

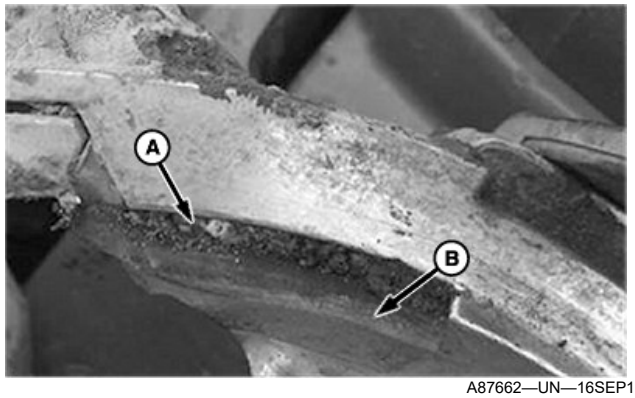


A87664—UN—16SEP15

Worn Rubber Boot

A—Rubber Boot
B—Edge

8. If the rubber boot (A) of the segue has worn enough to expose an edge (B) of the meter housing, replace the rubber boot.



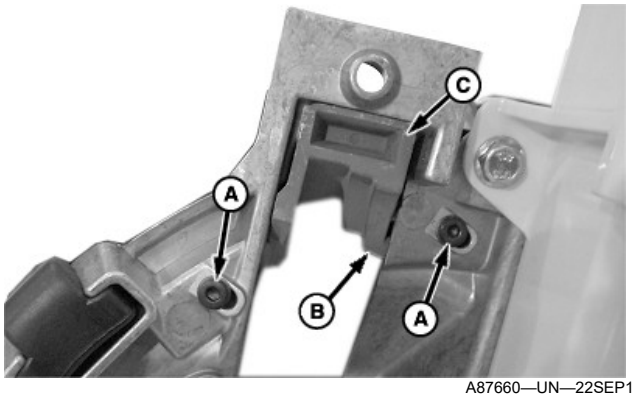
A87662—UN—16SEP15

Debris Buildup

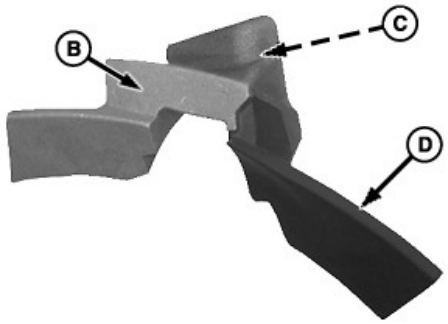
A—Debris
B—Rubber Boot

IMPORTANT: Prevent debris from pushing the rubber boot out of position.

9. Remove all debris (A) from the rubber boot (B) of the segue and from the boot seat in the meter housing.



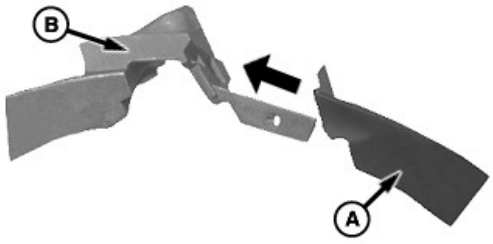
A87660—UN—22SEP15



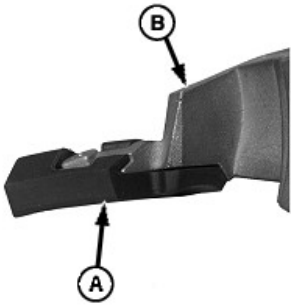
A87661—UN—22SEP15

A—Torx Screws (2 used)
B—Segue Assembly
C—Segue Pocket
D—Rubber Boot

10. Remove and retain the two Torx screws (A).
11. To remove the segue assembly (B) and rubber boot (D), lightly tap in the segue pocket (C) from the rear of the meter.

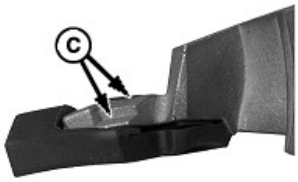


A87666—UN—16SEP15



A87763—UN—22SEP15

Correctly Installed



A87764—UN—22SEP15

Incorrectly Installed

A—Rubber Boot
B—Segue
C—Tabs

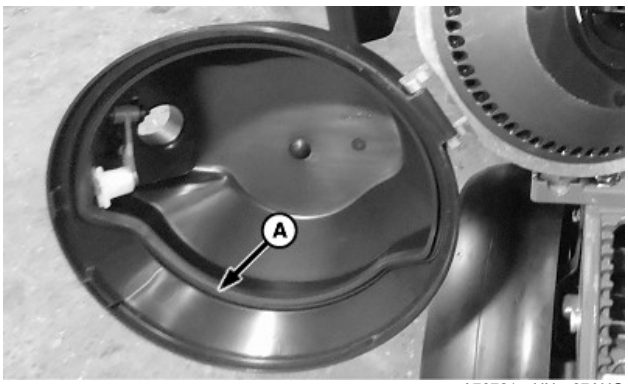
IMPORTANT: Verify that the tabs (C) on the rubber boot are seated in the notches of segue.

12. When replacing the rubber boot, install the rubber boot (A) on the segue (B) as shown.
13. Install the segue assembly into the meter housing.
14. Install and tighten the previously removed Torx screws.
15. Install the outer double eliminator assembly.
16. Install the previously removed plates and the Torx screws for the outer double eliminator. Tighten the screws to specification.

Specification	
Torx Screws—Torque (dry)	2.9 N·m 25-1/2 lb·in

WP29706,0000949-19-07OCT25

Install A New Vacuum Seal



A78721—UN—27AUG13

A—Corners

1. Unlatch the meter handle and open the seed meter dome.
2. Remove and discard the old vacuum seal.

NOTE: This procedure prevents excessive slack in the vacuum seal.

3. Install the new vacuum seal. Insert the corners of the seal (A) then insert the seal at the three locations with the dimples on the seal aligned with the dimples on the seed meter dome. Finally, insert the remaining portions of the seal.
4. If a seed disk (bowl) is being used, apply Graphite Lubricant TY25797 on the vacuum seal side.
5. Close the seed meter dome and latch the meter handle.

WP29706,000040F-19-11MAY17

Install the Cartridge Seal



A89526—UN—08FEB16

A—Cartridge Seal

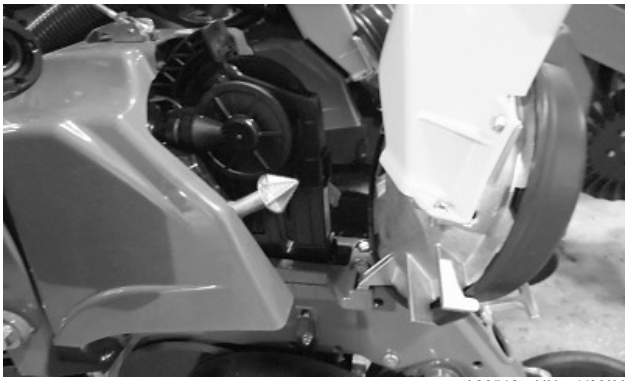
NOTE: Refer to the Meter Settings charts for the seal part number.

*When planting Sugar Beet, Sorghum, Small Popcorn, or Small Cotton seeds, the cartridge seal **must** be used. The cartridge seal does not interfere when planting other seeds.*

Install the cartridge seal (A) on the edge of the BrushBelt cartridge as shown. If the seal is damaged during operation, replace the seal.

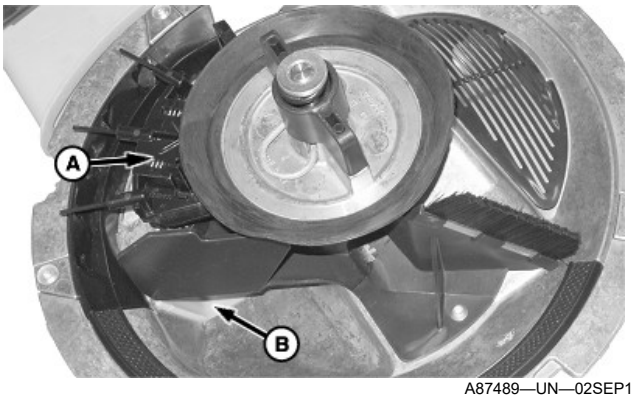
WP29706,000099E-19-07OCT25

Replace the Inner and Outer Double Eliminator and the Baffle Brush

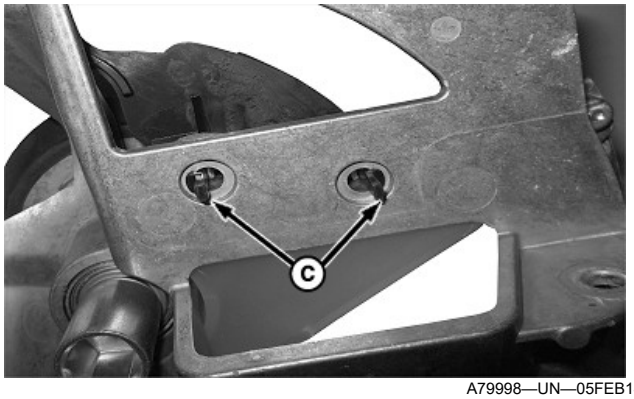


A96512—UN—11MAY17

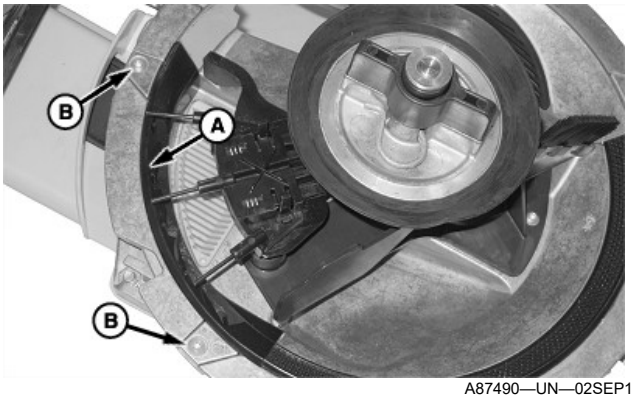
1. Remove the seed meter from the row unit. (See Remove and Install the ExactEmerge Seed Meter.)
2. Open the seed meter dome. (See Access the Vacuum Meter.)
3. Remove the seed disk (bowl). (See Clean Out the ExactEmerge Meter.)



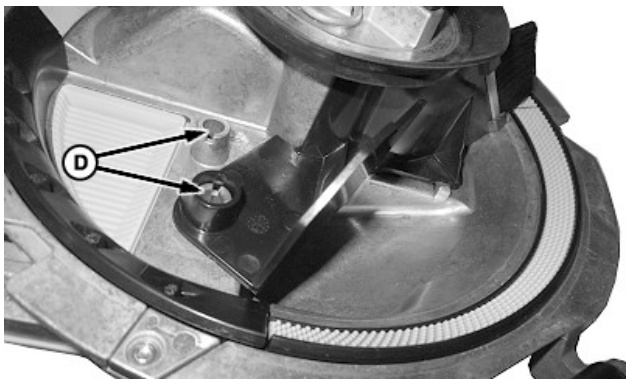
A87489—UN—02SEP15



A79998—UN—05FEB14



A87490—UN—02SEP15



A82359—UN—16APR14



A87491—UN—02SEP15

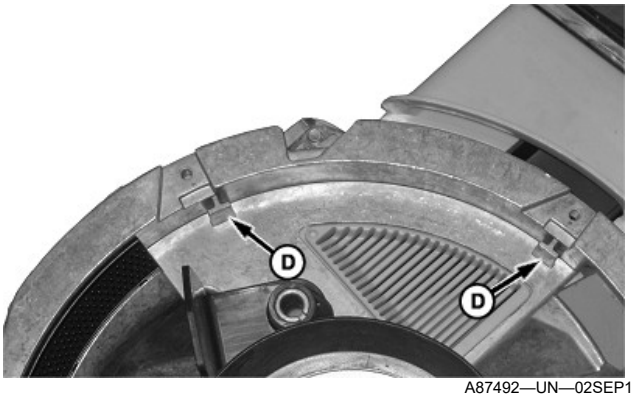
A—Inner Double Eliminator
B—Hopper Opening
C—Tab (2 used)
D—Hole (2 used)

NOTE: Verify uniform length and diameter of each tine for the outer double eliminator.

4. Inspect inner double eliminator (A) for wear and replace as needed.

NOTE: The Mini-Hopper has been removed from the back of the meter housing to access the inner double eliminator tabs.

5. To remove and replace inner double eliminator (A):
   - Reach with fingers inside hopper opening (B).
   - Squeeze tabs (C) to the unlock position.
   - Pull out the double eliminator assembly.
   - Install assembly by installing the tabs into holes (D).



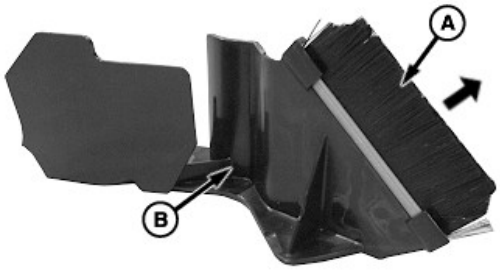
A87492—UN—02SEP15

A—Outer Double Eliminator
B—TORX Screw (2 used)
C—Slot (2 used)
D—Housing Post

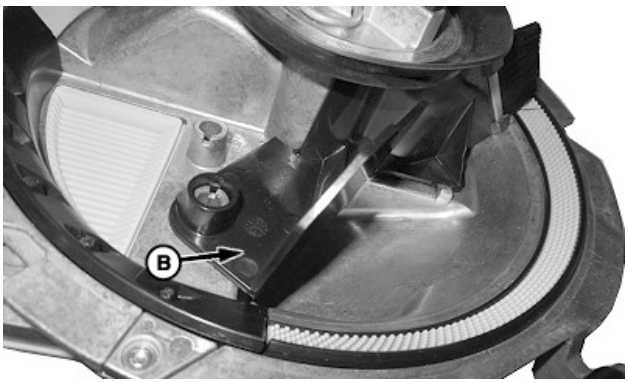
6. To remove and replace outer double eliminator (A):
   - Remove TORX screws (B) and the wear pads.
   - Pull out the double eliminator.
   - Align slots (C) with housing posts (D). To install, push the replacement assembly into the meter housing.
   - Install the wear pads and tighten TORX screws (B) to specification.

Specification

TORX Screws—Torque (dry)	3 N·m (25 lb·in)



A82357—UN—09SEP14



A82356—UN—16APR14

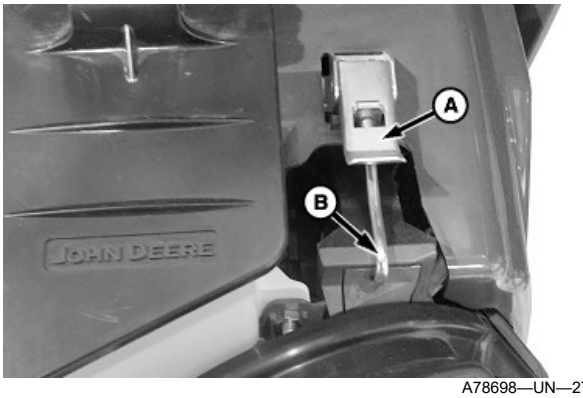
A—Baffle Brush
B—Baffle

To remove and replace baffle brush (A):

- Gently pull baffle brush (A) from baffle (B).
- Press the replacement brush into the baffle.

WP29706,0000688-19-07FEB25

Tighten the Meter Latch



A78698—UN—27AUG13

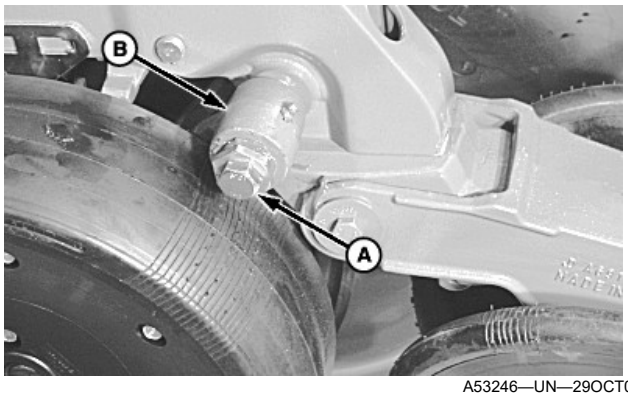
A—Latch
B—Hook

The meter latch (A) must close firmly into the locked position when the hook (B) is seated through the meter tab and the BrushBelt cartridge. If the latch or the meter is out of adjustment, proceed as follows:

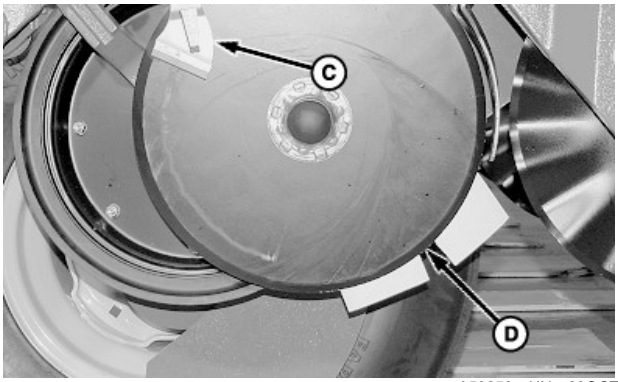
1. Release the latch and hook.
2. Rotate the hook one full revolution.
3. Install the meter and position the hook into the meter tab and the BrushBelt cartridge.
4. Close the latch until the clip snaps, then check the latch for proper adjustment and no side to side movement. Repeat these steps as necessary for other meter latches.

WP29706,0000401-19-07OCT25

Inspect and Adjust the Furrow Opener Disks



A53246—UN—29OCT03



A53250—UN—29OCT03

A—Cap Screw
B—Pivot Arm
C—Scraper
D—Contact Area

CAUTION: Avoid injury from sharp edges on the disks. Wear protective gloves and handle the disks carefully.

Inspect the disk contact area, the disk diameter, and the disk centering.

1. Inspect the contact area (D) where the disks touch.
   a. Insert two business cards (or similar items) between the disk opening and gently slide the cards together until the disk contact area is reached.
   b. Measure the distance between the business

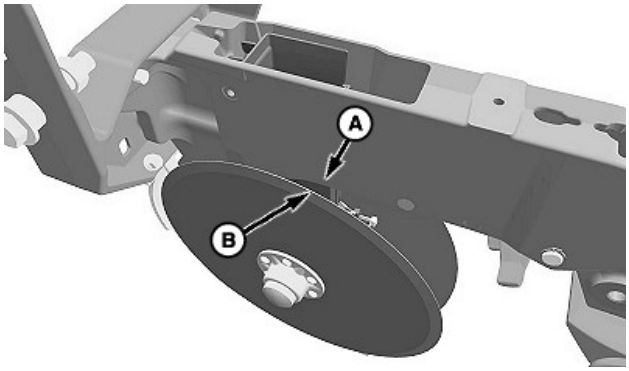
cards and compare the measurement to the specification.

Specification

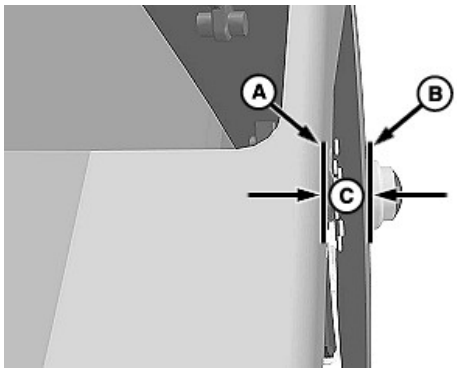
Disk Edge—Contact Area. . . . . 38—64 mm (1-1/2—2-1/2 in)

c. If the contact area does not fall within the specifications, adjustment is required.

2. Remove cap screw (A), pivot arm (B), scrapers (C), and the depth gauge wheel.
3. Inspect the scrapers for excessive wear and replace as necessary.



A109448—UN—25MAR21



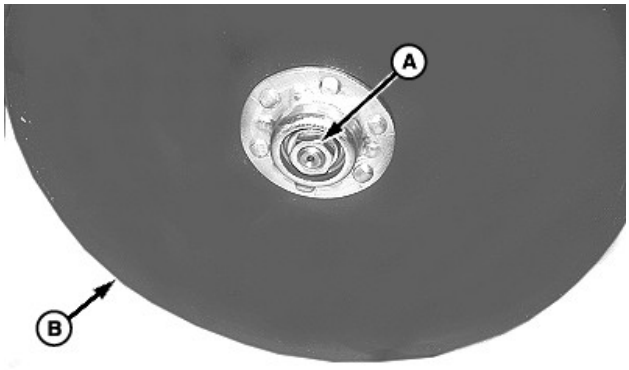
A109449—UN—25MAR21

Viewed from Above

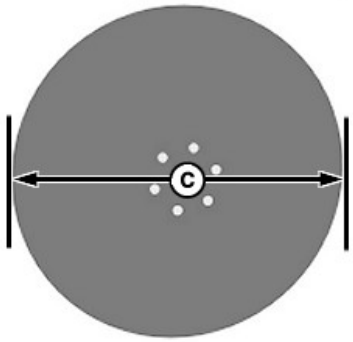
A—Shank Surface
B—Disk Edge
C—Dimension

NOTE: For consistency, measure from the top center of both disks.

4. Measure from the shank surface (A) to the disk edge (B) for both disks. If dimension (C) is not close to equal for both disks, adjustment is required.



A51112—UN—20NOV02



A109447—UN—26MAR21

Rear of Disk

A—Nut
B—Disk
C—Diameter

CAUTION: Avoid injury from sharp edges on the disks. Wear protective gloves and handle the disks carefully.

IMPORTANT: Avoid spindle damage. The nut on the left side of the row unit has left-hand threads.

NOTE: While the disk is removed, inspect all of the components between the disk for wear and damage.

Do not discard the shims.

5. Determine if the disks need adjusted closer or further from the shank based on the contact area. If one disk is closer to the shank, decide which disk needs more shims on the inside or outside based on the contact area adjustment.

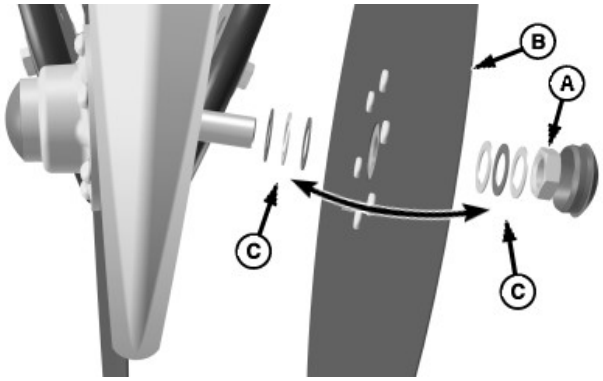
   Remove the nut (A) and disk (B).

6. Measure the diameter (C) and compare that to the specification.

Specification

Disk Diameter (C)—Minimum Diameter. . . . . 35.5 cm (14 in)

7. If the diameter is below the specification, the beveled edge is worn away, or significant damage is apparent, replace the disks. Replace the disks in pairs. Do not pair used and new disks.



A89614—UN—17FEB16

A—Nut
B—Disk
C—Shim

NOTE: Reposition shims on one or both disks as needed while adjusting the contact area and disk centering.

8. Reposition one or more of the shims (C) from one side of a disk (B) to the other. Install the disk and inspect the contact point and disk centering. Repeat the shim placement as needed.
9. Tighten the disk nut (A) to specification.

Specification

Disk Nut (A)—Torque (dry). . . . . 122 N·m (90 lb·ft)

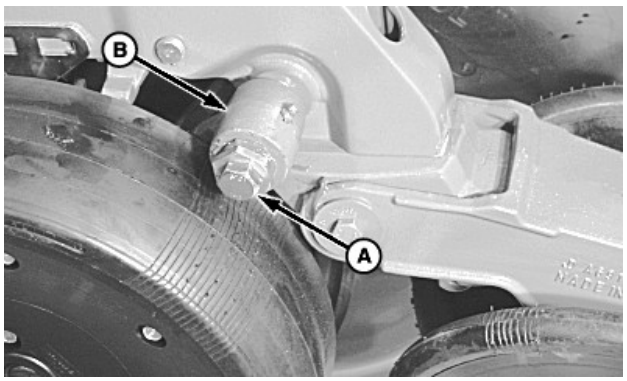
10. Adjust the depth gauge wheels. (See Adjust The Depth Gauge Wheels for additional information.) Tighten the cap screws for the pivot arms to specification.

Specification

Pivot Arm Cap Screw—Torque (dry). . . . . 271 N·m (200 lb·ft)

WP29706,00007A2-19-26MAR21

Replace the Furrow Opener Disks

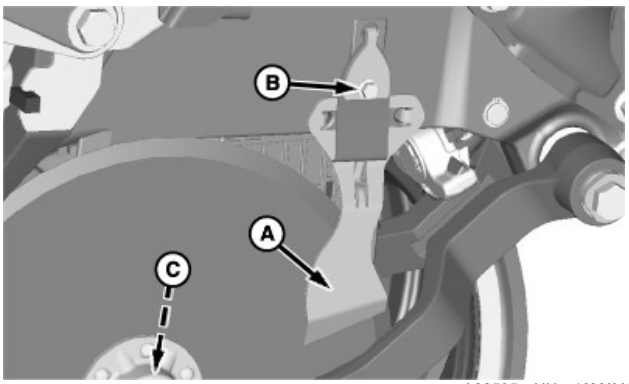


A53246—UN—29OCT03

A—Cap Screw
B—Pivot Arm

IMPORTANT: Avoid premature wear. Do not use a new disk with a used disk. Install new disks in pairs.

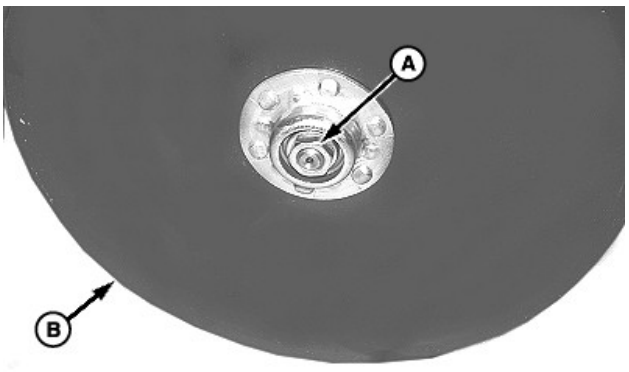
1. Remove the cap screw (A), pivot arm (B), and the depth gauge wheel.



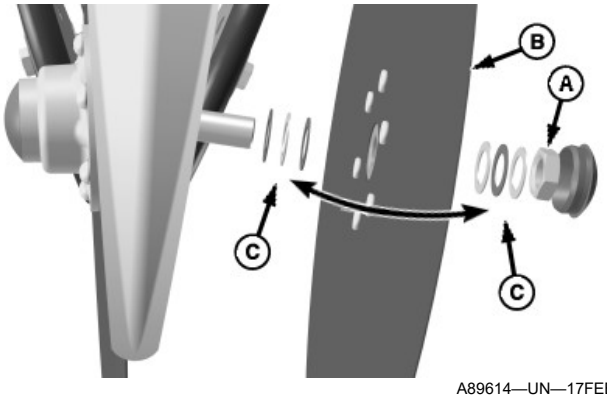
A82595—UN—19MAY14

A—Scraper
B—Cap Screw
C—Hub Cap

2. Remove the cap screw (B) and disengage the scraper (A) assembly from the row unit.
3. Remove the hub cap (C).



A51112—UN—20NOV02



A89614—UN—17FEB16

A—Nut
B—Disk
C—Shims

CAUTION: Avoid injury from sharp edges on the disks. Wear protective gloves and handle the disks carefully.

IMPORTANT: Avoid spindle damage. The nut on the left side of the row unit has left-hand threads.

NOTE: While the disk is removed, inspect all of the components between the disks for wear and damage.

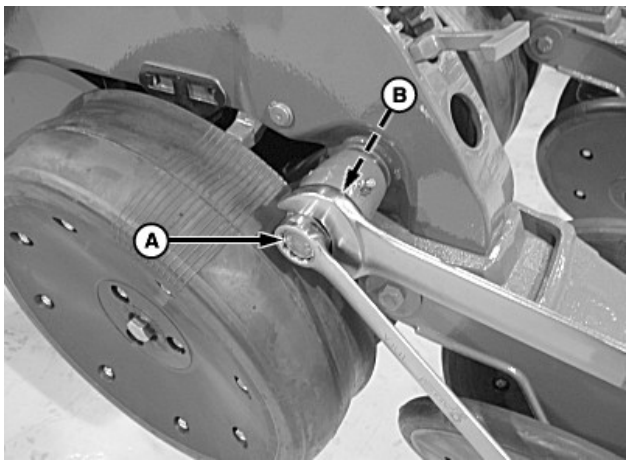
Do not discard the shims (C).

4. Remove the hub cap, nut (A), and disk (B).
5. Remove the shims.
6. Adjust the disk contact point during reassembly. (See Inspect and Adjust The Furrow Opener Disks.)
7. During the final reassembly, tighten the disk nut to specification.

Specification	
Disk Nut—Torque (dry)	122 N·m (90 lb·ft)

WP29706,0000422-19-01NOV18

Adjust the Depth Gauge Wheels



A99981—UN—05MAR18

A—Cap Screw
B—Nut

IMPORTANT: Avoid the buildup of field residue between the depth gauge wheel and Tru-Vee disk. Avoid premature wear of the depth gauge wheel. Maintain the proper depth gauge wheel adjustment.

NOTE: Properly adjusted depth gauge wheels contribute to quality seed trenches.

Check for proper adjustment:

1. Raise the row units above the ground.
2. Spin and release a depth gauge wheel.
3. Observe how far the depth gauge wheel rotates before stopping due to contact with the disk.
   - If the wheel spins more than half a rotation, but less than a full rotation, it is properly adjusted.
   - If the wheel spins less than half a rotation, it is adjusted too close to the disk.
   - If the wheel spins more than a full rotation, the gap between the wheel and the disk (at the closest point) must be less than 1.5 mm (1/16 in).

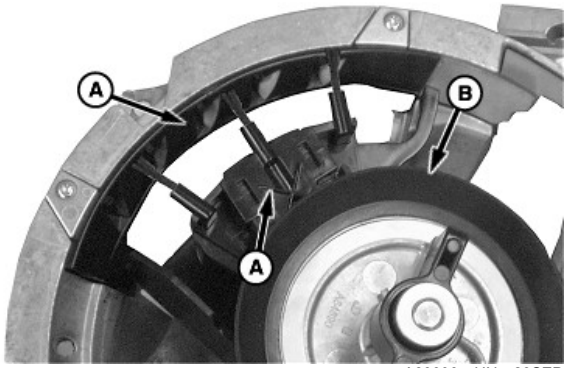
Adjust the depth gauge wheel as follows:

1. Hold the cap screw (A) with one wrench and turn the adjustment nut (B) with another wrench (A).
   - To move the wheel closer to the disk, turn the nut counterclockwise.
   - To move the wheel away from the disk, turn the nut clockwise.
2. Tighten the cap screw to specification and recheck the wheel adjustment.

Specification	
Cap Screw—Torque (dry).	271 N·m (200 lb·ft)

AG,OUO6074,1369-19-07OCT25

Inspect and Service the Meter



A80090—UN—23SEP14

A—Inner and Outer Double Eliminators
B—Hub Seal

CAUTION: Follow the chemical manufacturers precautions when handling parts coated with seed treatments. Use proper skin, eye, and respiratory protection.

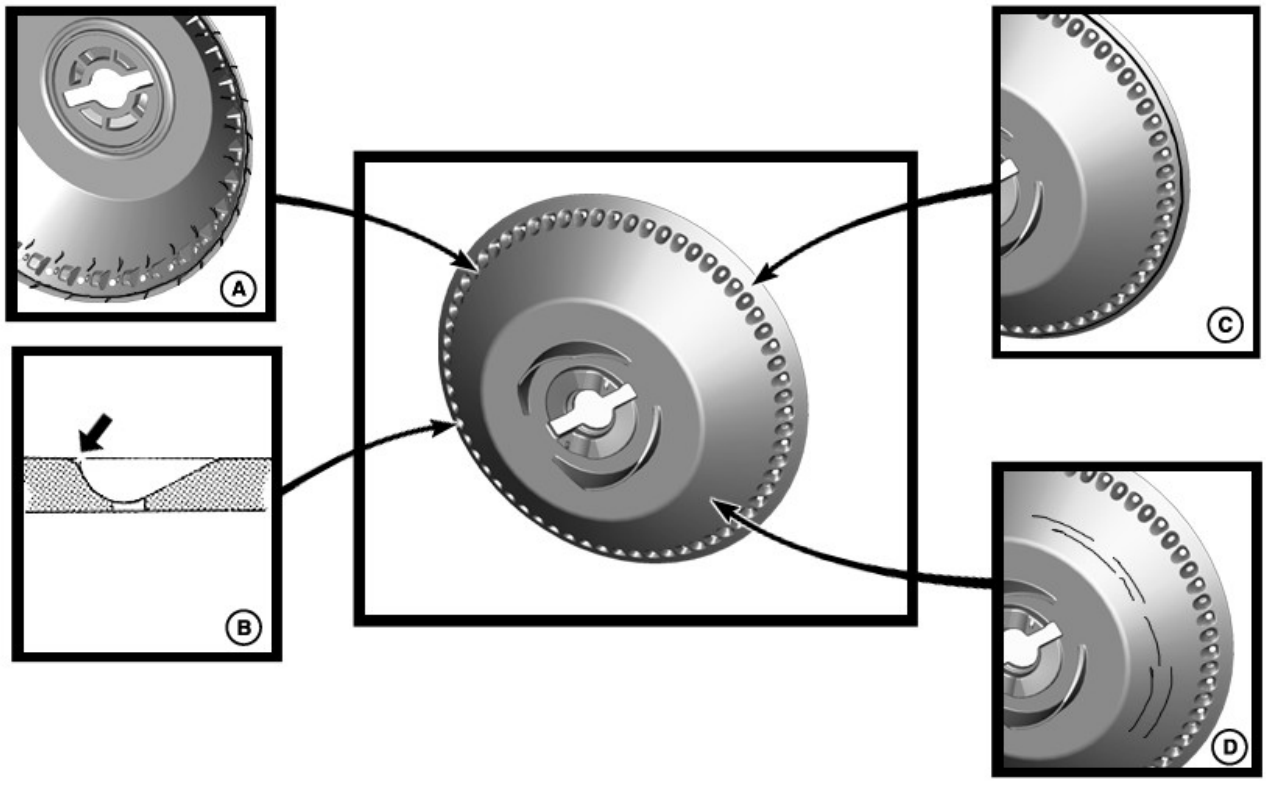
Annually inspect the ExactEmerge seed meter for wear and chemical or seed treatment buildup.

IMPORTANT: Degraded meter performance, like multiple seed placement, is an indicator of possible inner or outer double eliminator wear.

1. Check the inner and outer double eliminators (A) for wear. Check the inner and outer tines for uniform length and diameter. If the length of the outer double eliminator measures less than 8 mm from the base Tine or Brush to the tip and the meter performance is degraded, replace it. If the diameters of inner adjustable double eliminator Tines are worn to less than 1/2 the original diameter and the meter performance is degraded, replace it.
2. Replace the hub seal (B) if it is cracked or weathered.

NOTE: Before replacing the seed disk (bowl), properly set the meters and the vacuum.

If the metering performance is satisfactory, it is not necessary to replace the seed disk (bowl).



A76558—UN—31OCT12

A—Wear Example
B—Worn Edge (Seed Cell Side View)
C—Wear Example
D—Wear Example

3. Check the seed disk (bowl) for wear in the following areas and replace as needed.

   A small amount of wear (A) around the perimeter of the seed disk (bowl) is acceptable. If worn, check for seed loss through the gap between the seed disk (bowl) and the housing.

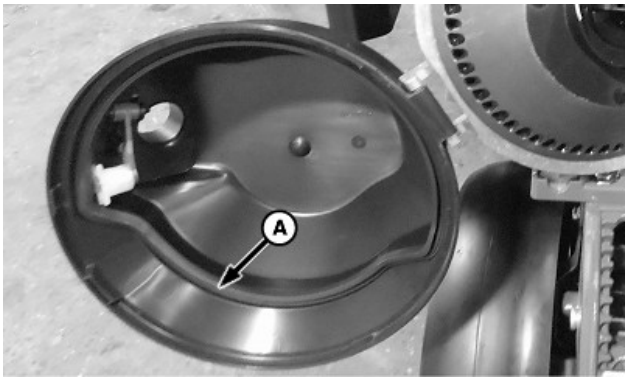
   Seed loss is eliminated with hub adjustments (See Adjust the Meter Hub Height).

   Inspect the individual seed cells. Seed abrasion wears sharp edges on the seed cells (B) and increases the cell size. (Increased cell size causes overpopulation when planting small seed or causes under-population when planting large seed). Replace the seed disk (bowl) if the cell size is increased and field checks determine a reduction in accuracy.

   Small grooves or scratches (C) are acceptable on the vacuum side of the seed disk (bowl).

   Wear around the perimeter (D) of the seed disk (bowl) is acceptable up to an approximate depth of 1.0 mm (3/64 in).

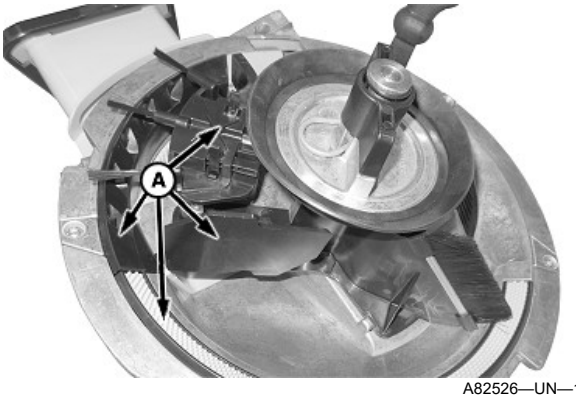
NOTE: If the vacuum seals are replaced, apply Graphite Spray TY25797 on the vacuum side of the used seed disks (bowls). See the Lubrication section. New seed disks (bowls) are lubricated from the factory.



A78721—UN—27AUG13

A—Vacuum Seals

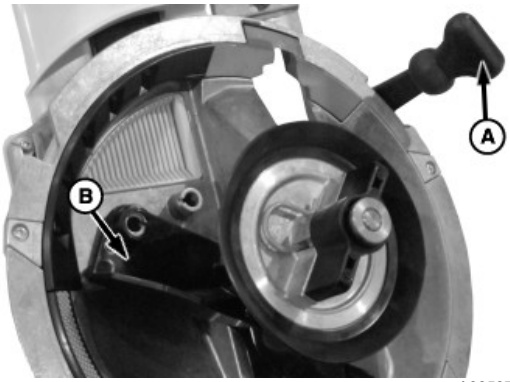
4. Replace the vacuum seal (A) if the seed disk (bowl) is replaced or when large cracks or wear areas are visible.



A82526—UN—14MAY14

A—Components

5. Annual cleaning of the seed meters and the seed disk (bowl) is recommended. To remove any seed treatment buildup, use a mild detergent and a soft brush behind the components (A) in the seed meter housing.



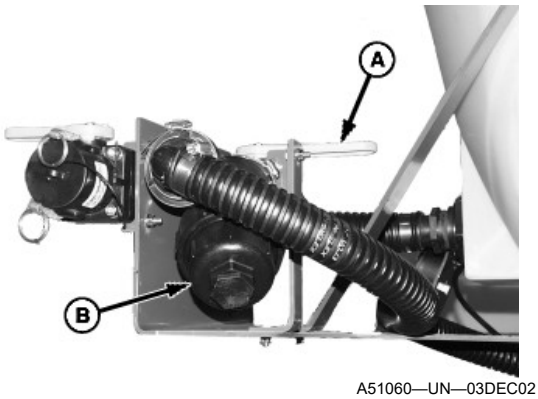
A82527—UN—14MAY14

A—Rubber Handle
B—Baffle

6. Replace the rubber handle (A) if it is cracked or broken.
7. Replace the baffle (B) if it is damaged or worn.

WP29706,0000405-19-07OCT25

Clean Strainer Screen



A51060—UN—03DEC02

A—Shut-Off Valve
B—Cap

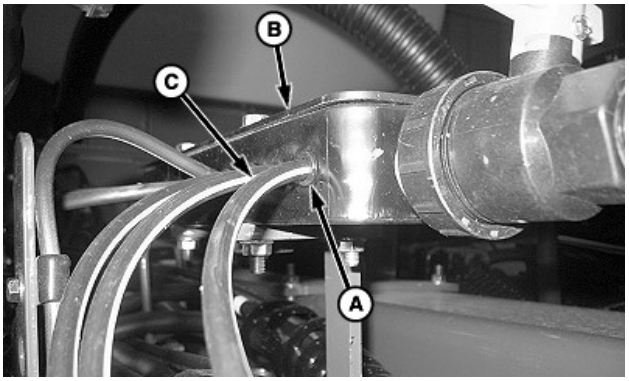
Check fertilizer strainer screen after initial start-up of pump and daily thereafter. Clean when necessary. Close shutoff valve (A) and remove strainer cap (B) to check screen.

AG,OUO6074,1377-19-23FEB16

Fertilizer Distribution Tube

Replacing Worn or Damaged Distribution Tube

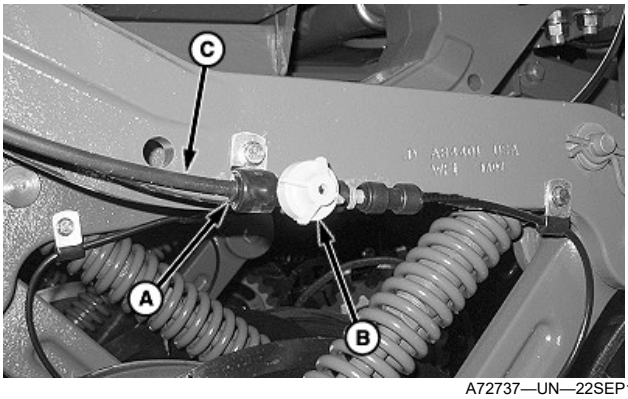
To replace the worn or damaged distribution tubes complete the following procedures:



A72199—UN—03AUG11

A—Fitting Ring
B—Manifold
C—Tube

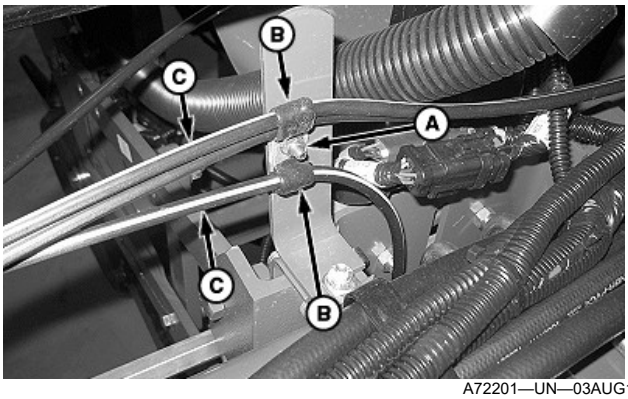
1. Push in the fitting ring (A) at the manifold (B) and remove the tube (C).



A72737—UN—22SEP11

A—Fitting Ring
B—Check Valve
C—Tube

2. Push in the fitting ring (A) at the check valve (B) and remove the tube (C).



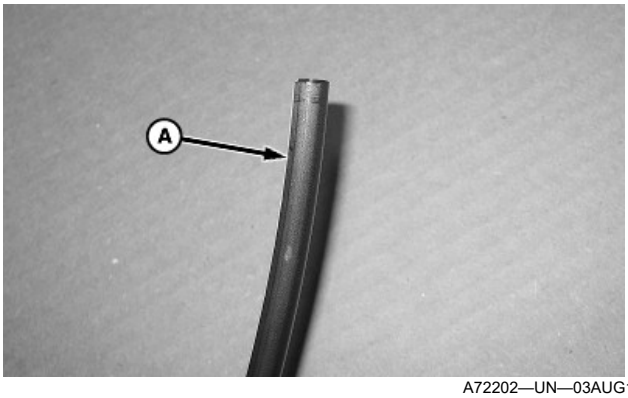
A72201—UN—03AUG11

A—Nut
B—Hose Clamp
C—Tube

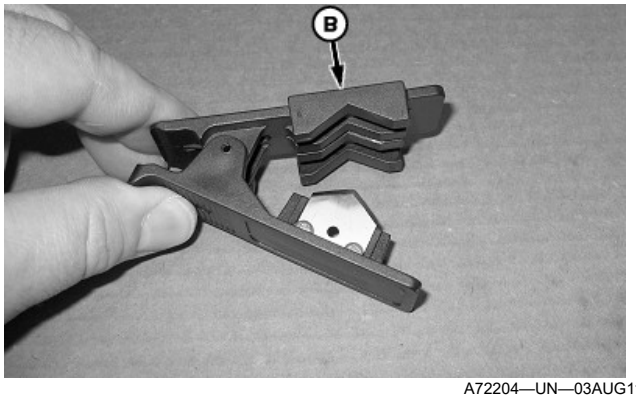
3. Loosen the nuts (A) on all the hose clamps (B) at all the locations for the tubes being replaced.
4. Remove the tube (C) from the hose clamps (B).
5. Measure the tube length before discarding.

NOTE: Add 25.4 mm (1 in) to the overall tube length for trimming and chamfering.

6. Cut the new tube to length.



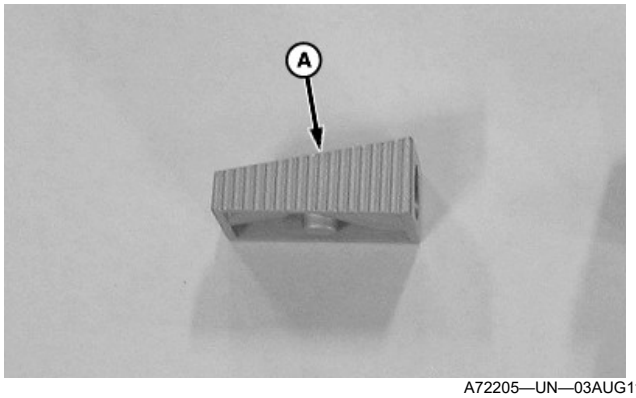
A72202—UN—03AUG11



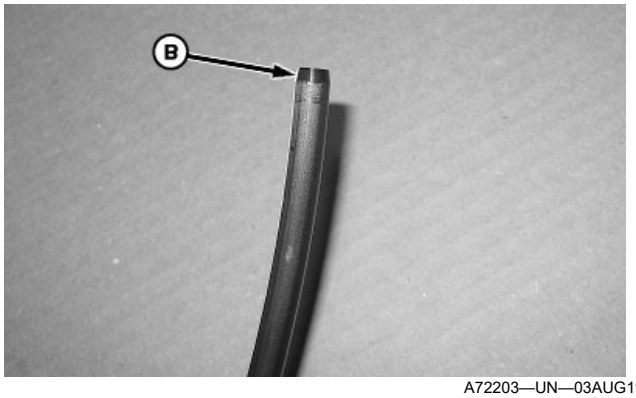
A72204—UN—03AUG11

A—Tube
B—Tube Cutter

7. Trim each end of the tube (A) square with the tube cutter (B) or a similar device. Ensure that the end of the tubing is not crushed.



A72205—UN—03AUG11

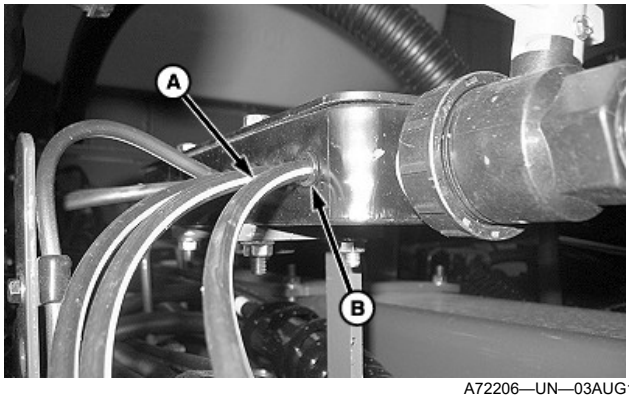


A72203—UN—03AUG11

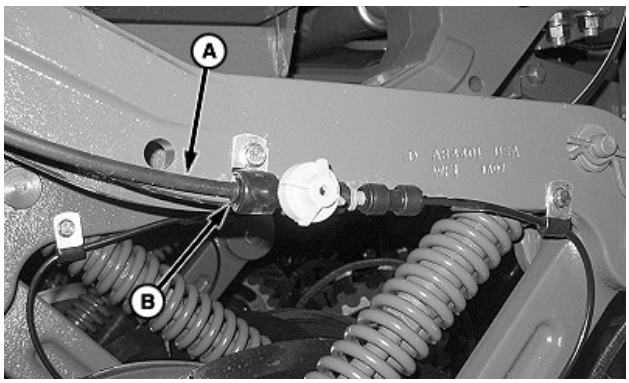
A—Chamfer Tool
B—Tube

NOTE: Inserting a non-chamfered tube into the distribution manifold distorts the O-ring which causes fertilizer leaks.

8. Using a chamfer tool (A) (a pencil sharpener works well), chamfer each end of the tube (B).
9. Route the tube from the manifold to the opener, inserting the tube in the appropriate hose clamps.



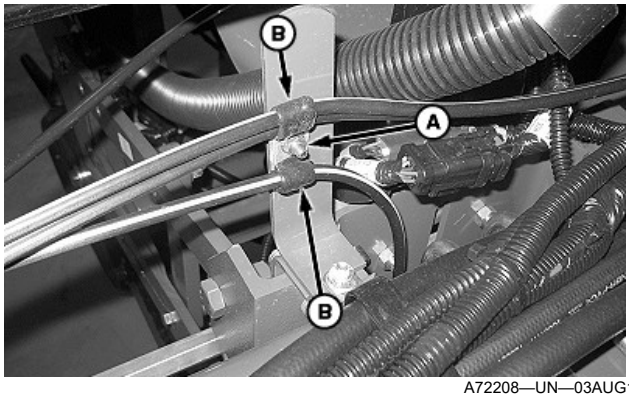
A72206—UN—03AUG11



A72738—UN—22SEP11

A—Tube
B—Fitting

10. Push each end of the tube (A) fully into the fittings (B). Pull the tube to verify that the tube is locked into the fitting.



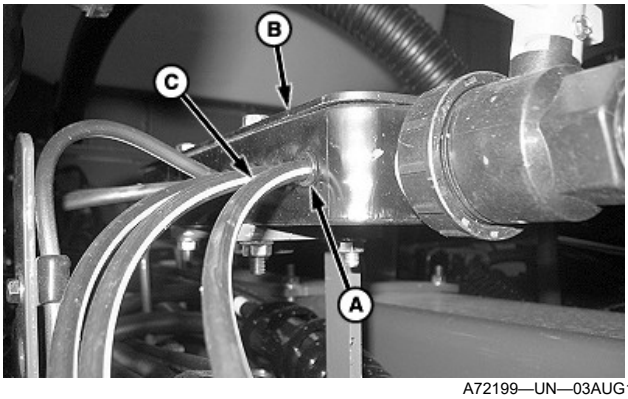
A72208—UN—03AUG11

A—Nut
B—Hose Clamp

11. Tighten the nut (A) on the hose clamps (B).
12. Prime the system and check for leaks (See Prime and Start the Pump).

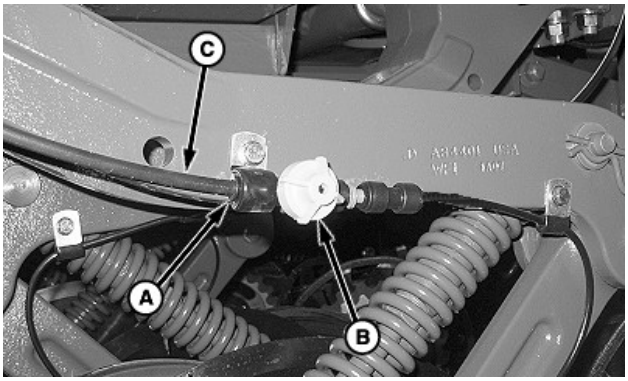
Fix Distribution Tube Connection Leak

To fix a leak in the distribution tube connections, complete the following procedures:



A72199—UN—03AUG11

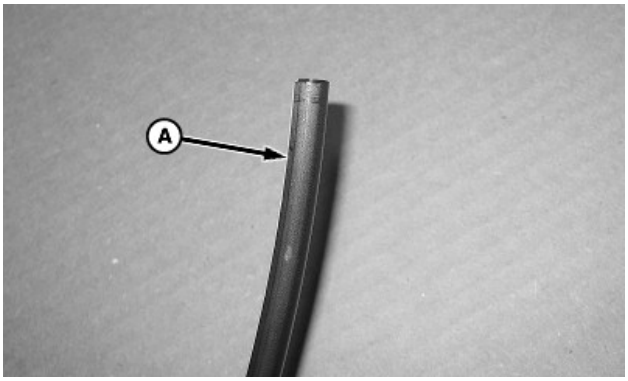
Distribution Manifold



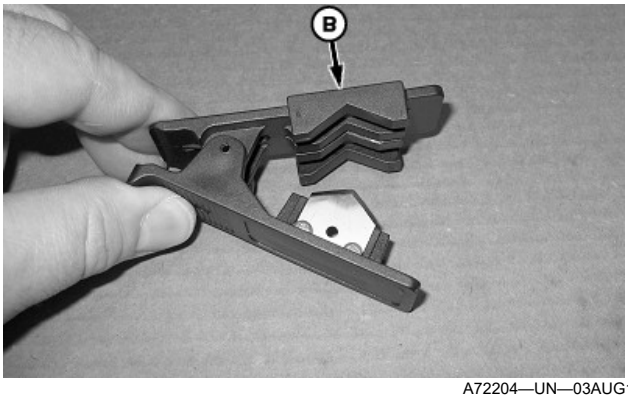
A72737—UN—22SEP11

A—Fitting Ring
B—Distribution Manifold
C—Tube

1. Push in the fitting ring (A) at the distribution manifold (B) and pull out the tube (C).



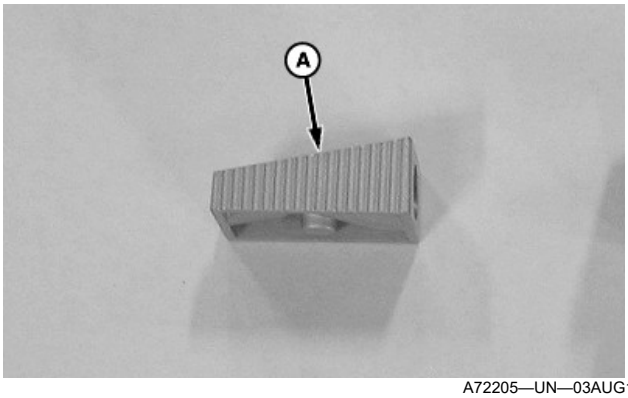
A72202—UN—03AUG11



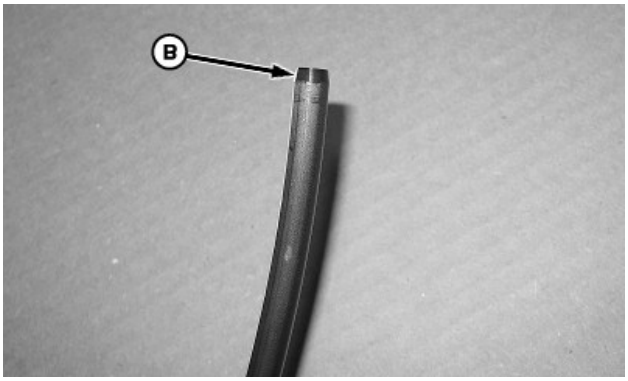
A72204—UN—03AUG11

A—Tube
B—Tube Cutter

2. Trim the end of the tube (A) square with the tube cutter (B) or a similar device. Verify that the end of the tubing is not crushed.



A72205—UN—03AUG11

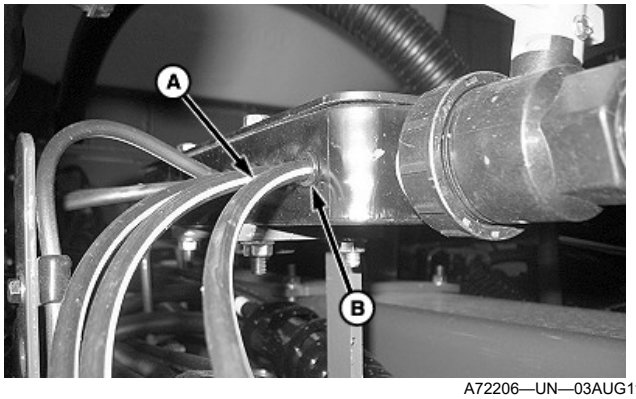


A72203—UN—03AUG11

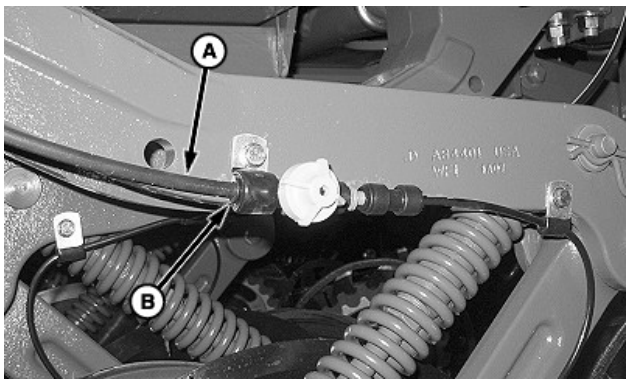
A—Chamfer Tool
B—Tube

NOTE: Inserting a non-chamfered tube into the distribution manifold distorts the O-ring which causes fertilizer leaks.

3. Using a chamfer tool (A) (a pencil sharpener works well), chamfer the end of the tube (B).



A72206—UN—03AUG11



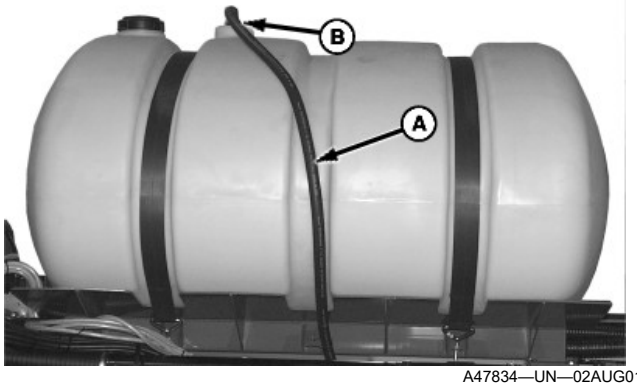
A72738—UN—22SEP11

A—Tube
B—Fitting

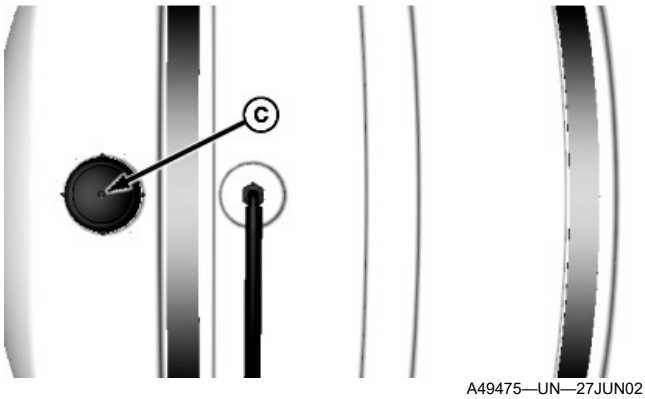
4. Push the end of the tube (A) into the fittings (B) completely. Pull the tube to verify that the tube is locked into the fitting.
5. Prime the system and check for leak (See Prime and Start the Pump).

OUO6064,0000772-19-11JUL18

Clean the Liquid Fertilizer Tank Lid Fitting and Drip Line Hose



A47834—UN—02AUG01



A49475—UN—27JUN02

Top View of Fertilizer Tank

A—Drip Line Hose
B—Fitting
C—Spring Loaded Check Valve

CAUTION: Avoid personal injury. Never service the system under pressure. Empty the tank completely or relieve system pressure by pressing the spring loaded check valve (C).

IMPORTANT: Avoid system malfunction. Drip line hose and fitting becoming plugged with dirt and liquid fertilizer causes an air lock condition.

1. Relieve pressure from the system.
2. Remove the drip line hose (A) and fitting (B).
3. Flush the drip line hose and fitting.
4. Install the flushed drip line hose and fitting.

OUO6074,00003DF-19-15APR19

Safety Before Service

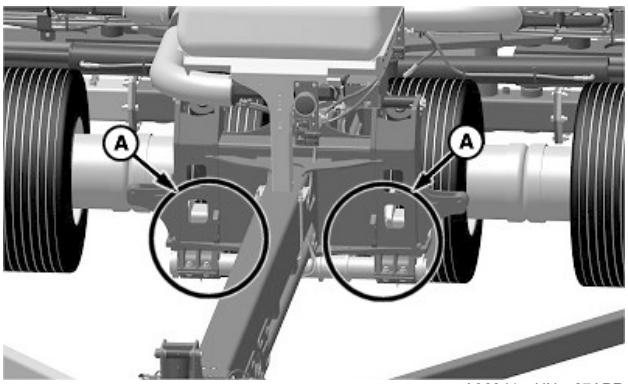


T81389—UN—28JUN13

Review the Safety Section before performing any of the Service and Adjustment operations.

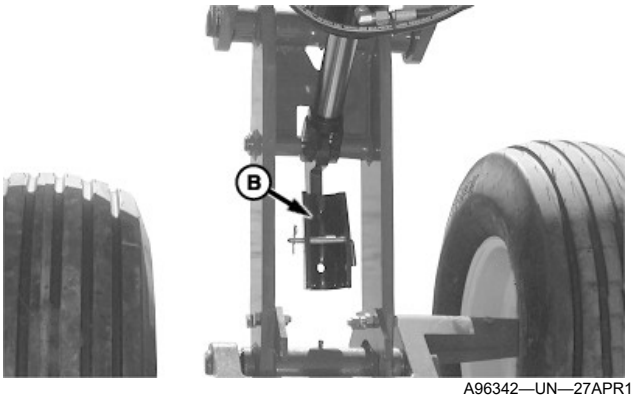
WP29706,0000A6D-19-19SEP16

Install Service Locks—DB Series



A96341—UN—27APR17

Center Frame Service Locks Storage Locations

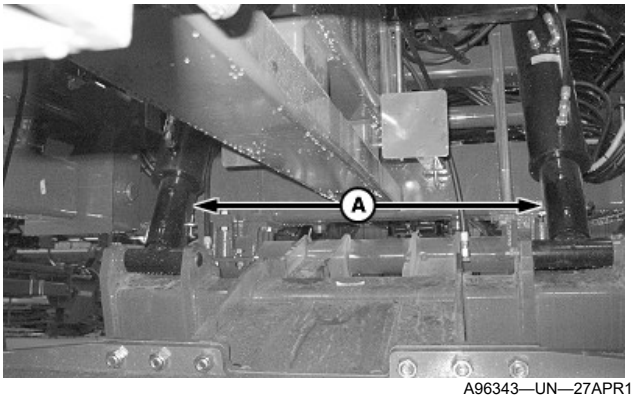


A96342—UN—27APR17

Wing Service Lock Storage Location

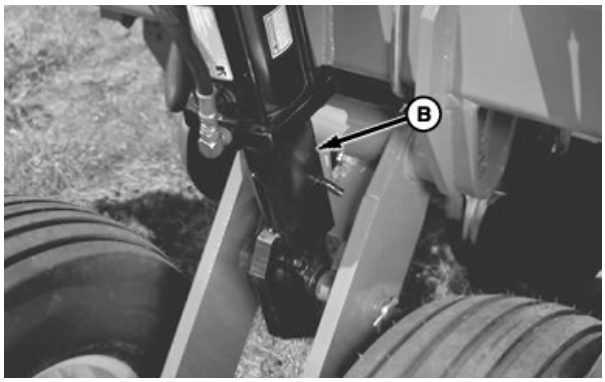
A—Storage Locations (Center Frame Service Locks)
B—Storage Locations (Wing Service Locks)

1. Locate the service locks for the center wheel cylinders in the storage locations (A) on the main frame lift.
2. Locate the service locks for the wing wheel cylinders in the storage locations (B) on the wing wheel lift.



A96343—UN—27APR17

Center Frame Service Locks



A96344—UN—27APR17

Wing Wheel Service Locks

A—Service Lock (Center Frame)
B—Service Lock (Wing Wheel)

3. To service, install center frame service locks (A) and wing service locks (B).

WP29706,0000B5E-19-27APR17

Piston Pump Fertilizer Service Intervals

Service	Intervals						
	As Required	Beginning of Season	10 Hours or Daily	50 Hours	100 Hours	200 Hours	End of Season
Clean the liquid fertilizer hoses and tank lid.	•						
Clean the lid fitting in the liquid fertilizer tank and the drip line hose.	•						
Clean the liquid fertilizer tank.	•						•
Tighten the liquid-fertilizer hose clamps.		•					
Change the oil in the liquid fertilizer pump.		•					
Clean the fertilizer strainer screen.			•				

WP29706,0000D09-19-22MAY18

Clean Liquid Fertilizer Tank

Although the tank is made of a highly durable and corrosion resistant plastic, proper maintenance is required.

Rinse the tank with water when changing from one solution to another.

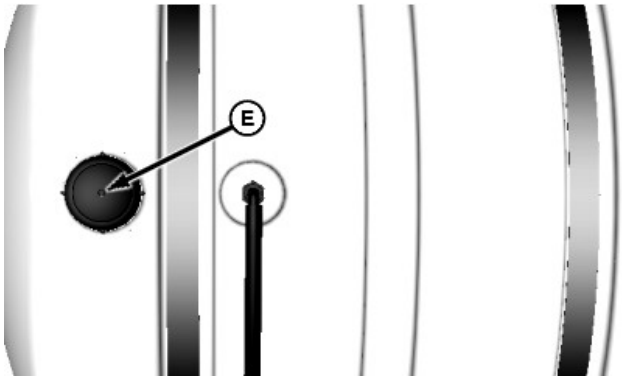
Rinse tank thoroughly with water after each season or before any shutdown lasting over one week.

Do not allow sludge to accumulate in the bottom of the tank.

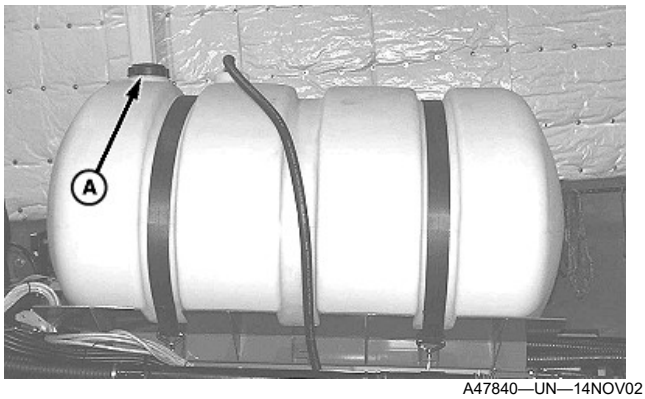
Do not leave fertilizer in the tank if the temperature is expected to drop below 40 degrees as some types of liquid fertilizers will begin to crystallize at this temperature.

To clean the tank, proceed as follows:

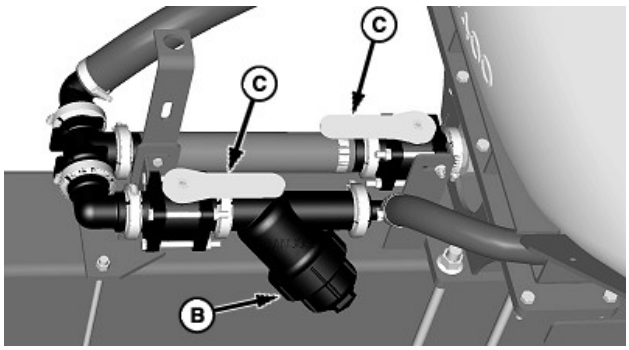
CAUTION: Do not service if system is under pressure. Never remove tank lid to relieve pressure. Empty tank completely to relieve pressure by reversing flow through nurse tank pump or press the spring loaded check valve (E) on the center of the tank lid.



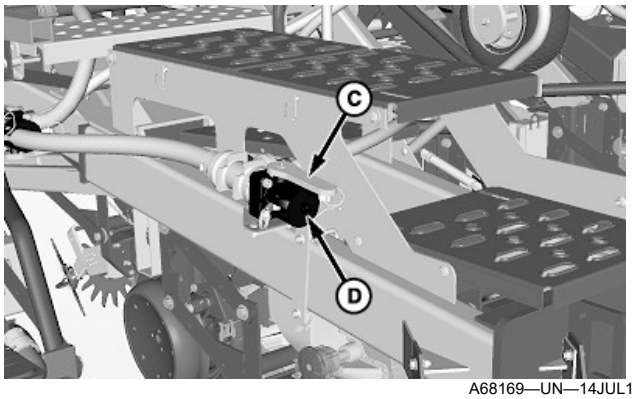
A49476—UN—27JUN02



A47840—UN—14NOV02



A53425—UN—02DEC03



A68169—UN—14JUL10

A—Lid
B—Strainer Cap
C—Valves
D—Quik-Fill Cap
E—Spring Loaded Check Valve

1. Relieve pressure from tank.
2. Remove lid (A).
3. Remove strainer cap (B) and screen.
4. Open shutoff valves (C) going to pump, tank and Quik-Fill port.
5. Remove Quik-Fill cap (D).
6. Flush tank and hoses with water.
7. After cleaning tank, close shutoff valves, replace strainer cap, Quik-Fill cap and replace lid on tank.
8. To clean pump and distribution lines, see LIQUID FERTILIZER SYSTEM WITH PISTON PUMP in Storage section.

WP29706,0000D0A-19-22OCT25

Servicing and Adjusting—Liquid Fertilizer, ExactRate

Safety Before Service

Review the Safety Section before performing any of the Service and Adjustment operations.

WP29706,0000A6D-19-19SEP16



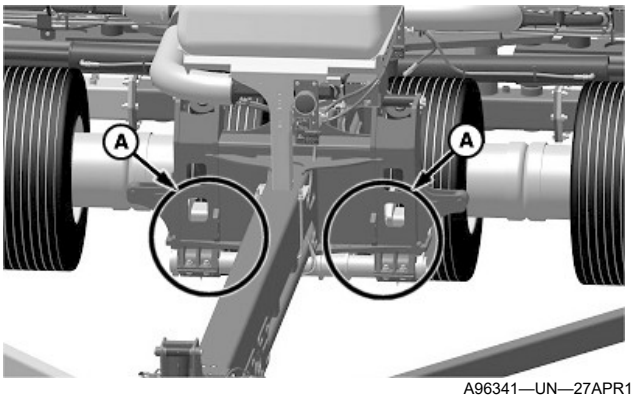
T81389—UN—28JUN13

ExactRate Service Intervals

Service	Intervals						
	As Required	Beginning of Season	10 Hours or Daily	50 Hours	100 Hours	200 Hours	End of Season
Repair valve body components.	•						
Repair valve body solenoids.	•						
Repair half clamp.	•						
Tighten the clamps on the liquid fertilizer hoses.		•					
Clean the ExactRate fertilizer strainer screen.	•						

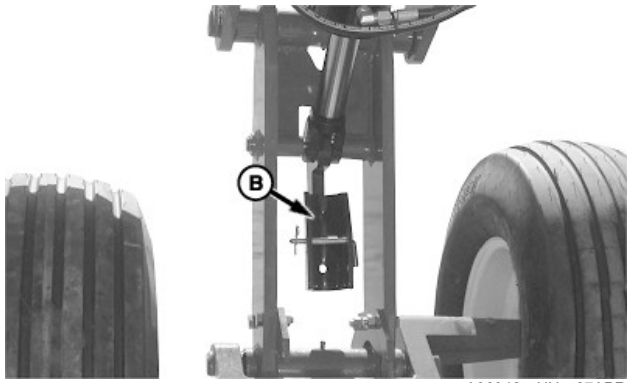
SH27916,000047C-19-08OCT25

Install Service Locks—DB Series



A96341—UN—27APR17

Center Frame Service Locks Storage Locations

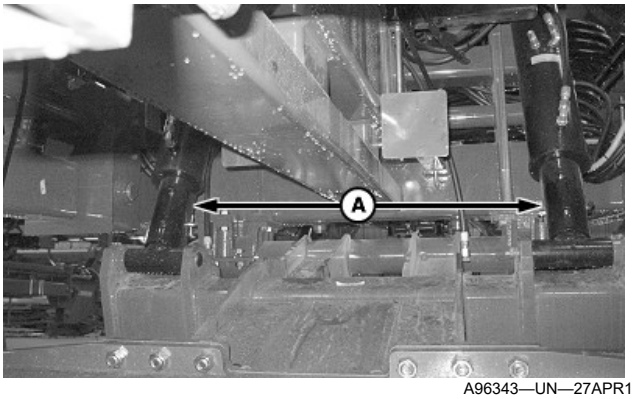


A96342—UN—27APR17

Wing Service Lock Storage Location

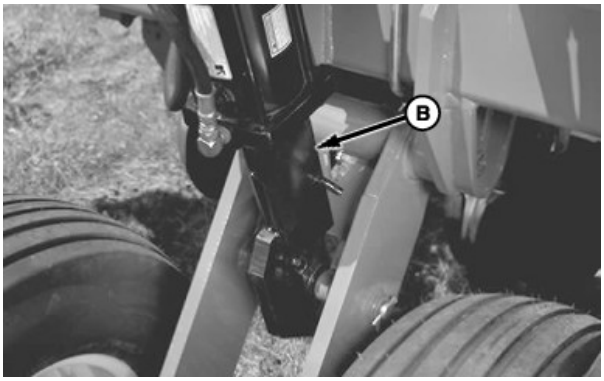
A—Storage Locations (Center Frame Service Locks)
B—Storage Locations (Wing Service Locks)

1. Locate the service locks for the center wheel cylinders in the storage locations (A) on the main frame lift.
2. Locate the service locks for the wing wheel cylinders in the storage locations (B) on the wing wheel lift.



A96343—UN—27APR17

Center Frame Service Locks



A96344—UN—27APR17

Wing Wheel Service Locks

A—Service Lock (Center Frame)
B—Service Lock (Wing Wheel)

3. To service, install center frame service locks (A) and wing service locks (B).

WP29706,0000B5E-19-27APR17

Remove Valve Body

Do not remove the valve body unless absolutely necessary.

CAUTION: Avoid serious injury. Turn OFF the fertilizer system. Do not perform any maintenance on the components while fertilizer system is turn ON.

Avoid injury from pressurized fertilizer solution.

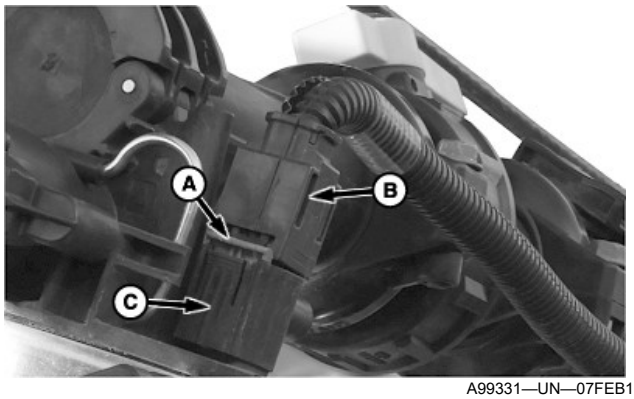
Wear protective clothing, eyewear, and gloves when performing service.

Do not drain the fertilizer solution onto the ground. Drain into a container or bucket.

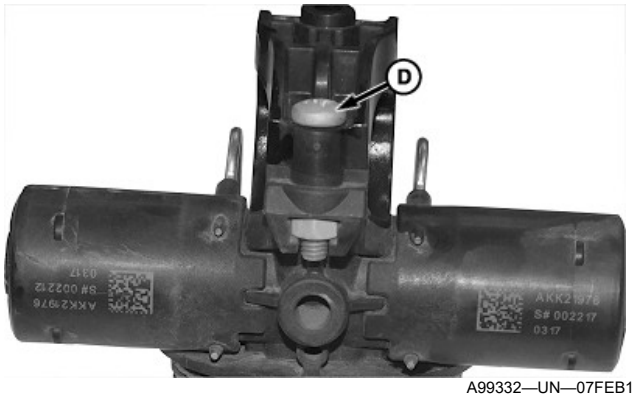
Pressure is trapped in the distribution pipes. Relieve the pressure from the liquid fertilizer system before servicing the valve body.

Do not activate the fertilizer pump while servicing any of the valve bodies.

1. Turn ON the electric power generation system.



A99331—UN—07FEB18



A99332—UN—07FEB18

A—Connector Lock
B—Harness Connector
C—Valve Body Connector
D—Screw

2. Relieve the pressure from the distribution pipes and valve bodies by using the pressure relief button on the display in the tractor. The pressure relief button enables the valve bodies for 6 seconds. Before performing any service on the fertilizer system, cycle the pressure relief several times.
3. Clean contamination from the exterior of the valve body.
4. Clean the electrical connector with TY26632 Electronic Contact Cleaner.
5. Unlock the connector. Retract the connector lock (A).

IMPORTANT: Avoid harness damage. Do not pull on the harness when disconnecting the harness connector.

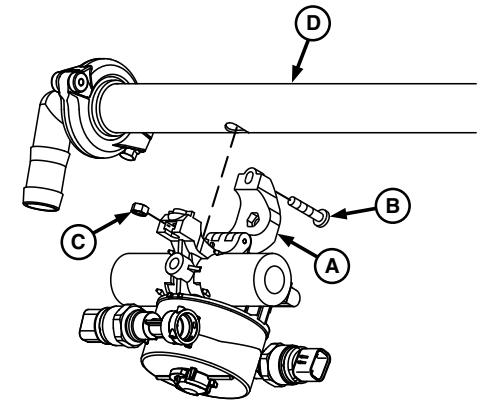
6. Disconnect the harness connector (B) from the valve body connector (C).
7. Remove the screw (D) and open the half clamp.

NOTE: Use a suitable container or bucket to catch any leaked fertilizer solution.

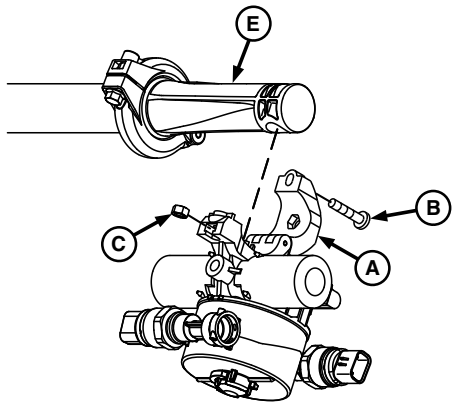
8. Remove the valve body.

WP29706,0000C79-19-09JUL20

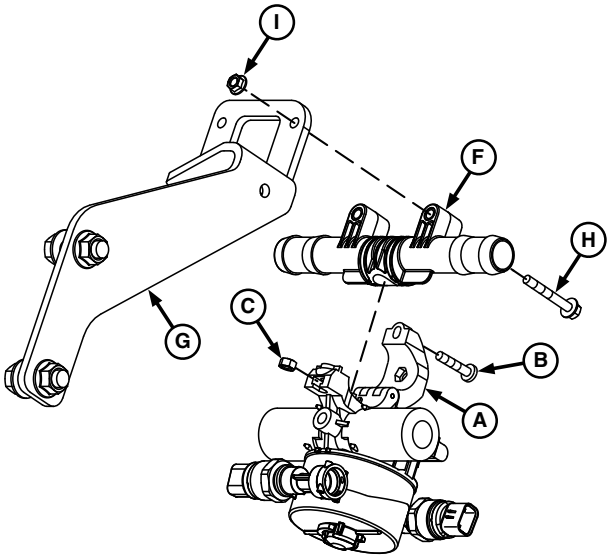
Install Valve Body



A99271—UN—02FEB18



A99272—UN—02FEB18



A99273—UN—02FEB18

A—Half Clamp
B—Screw
C—Nut
D—Fertilizer Pipe
E—Aspirator Fitting
F—Support Fitting
G—Support Bracket
H—Cap Screw
I—Nut

NOTE: Apply an anti-seize compound to the mounting screw of the valve body and use low speed setting when installing with power tools.

Lubricate the connector seal with T242210 NyoGel or equivalent before installation.

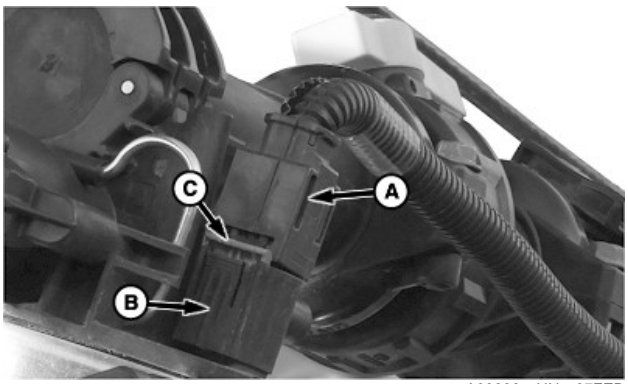
1. Verify that the half clamp (A) is open before installing the valve body.
2. Position the valve body against the fertilizer pipe (D), the aspirator fitting (E), or the support fitting (F). Align the O-ring and valve intake with the distribution hole.
3. Close the half clamp around the fertilizer pipe, aspirator fitting, or support fitting.
4. Install the screw (B) in the half clamp, then through the nut (C) in the valve body. After installing the valve body onto a support fitting, install them onto a support bracket (G) using a cap screw (H) and nut (I). Tighten to specification.

Specification

Screw (B)—Torque. . . . . 2 N·m (17-3/4 lb·in)

Specification

Cap Screw and Nut (H and I)—Torque. . . . . 10.8 N·m 95.6 lb·in



A99330—UN—07FEB18

A—Harness Connector
B—Connector
C—Connector Lock

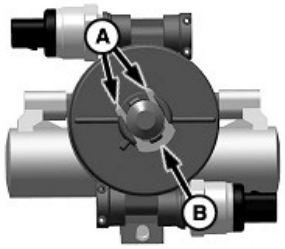
NOTE: Verify that the connector lock is fully raised before installing the connector onto the valve body.

5. Insert the harness connector (A) into the connector (B) on the valve body.

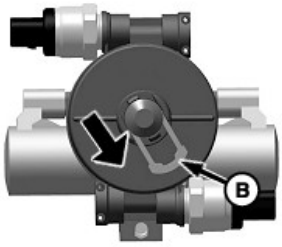
6. Lock the connector into position by pushing the connector lock (C) downward.

WP29706,0000C81-19-08OCT25

Repair Valve Body Components



A99335—UN—12FEB18



A99533—UN—12FEB18



A99534—UN—12FEB18

A—Tab
B—Clip
C—Valve Body
D—Turret

CAUTION: Avoid injury from pressurized fertilizer solution. Relieve the trapped pressure in the fertilizer pipes before servicing the valve body.

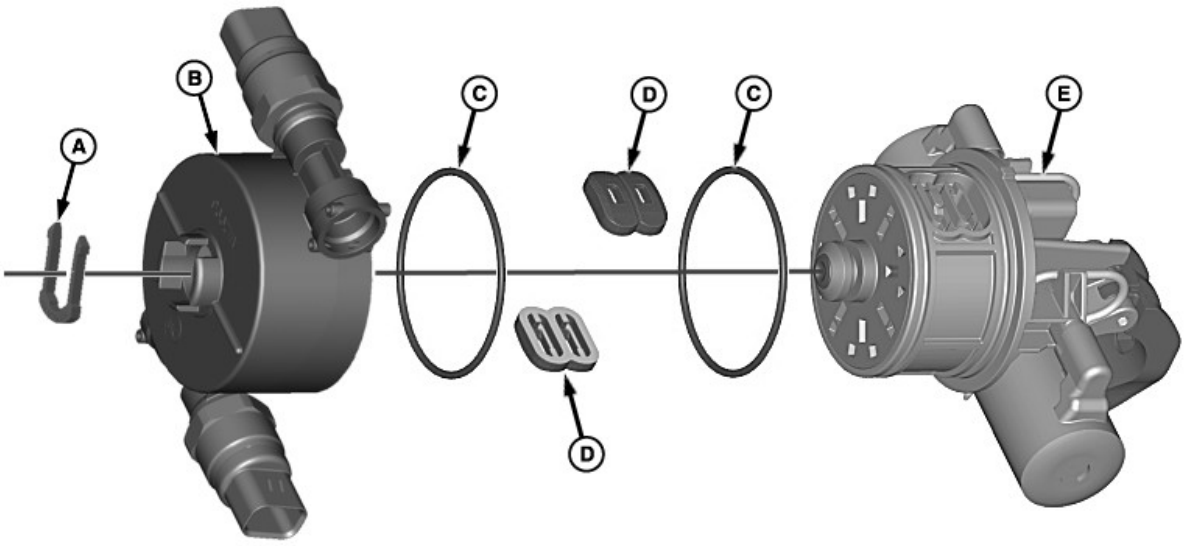
Do not activate the fertilizer pump while servicing any of the valve bodies.

IMPORTANT: Do not allow solvent or diesel fuel to contact the rubber parts, as it causes deterioration.

1. Turn ON tractor power generation and turn OFF fertilizer pump before relieving pressure in the fertilizer system.
2. Relieve the pressure from the distribution pipes and valve bodies by using the pressure relief button on the display in the tractor. The pressure relief button enables the valve bodies for 6 seconds.

NOTE: It is only necessary to remove the valve body when replacing entire valve body. Otherwise, replace the valve body solenoids, seals, poppets, sensors, and distribution tubes without removing the entire valve body.

3. Remove the valve body from the fertilizer pipes, if desired. (See Remove Valve Body.)
4. Squeeze the lock tabs (A) and push inward on the clip (B).
5. Remove the clip (B) from the turret.
6. Retain the valve body (C) and remove the turret (D).



A99333—UN—09FEB18

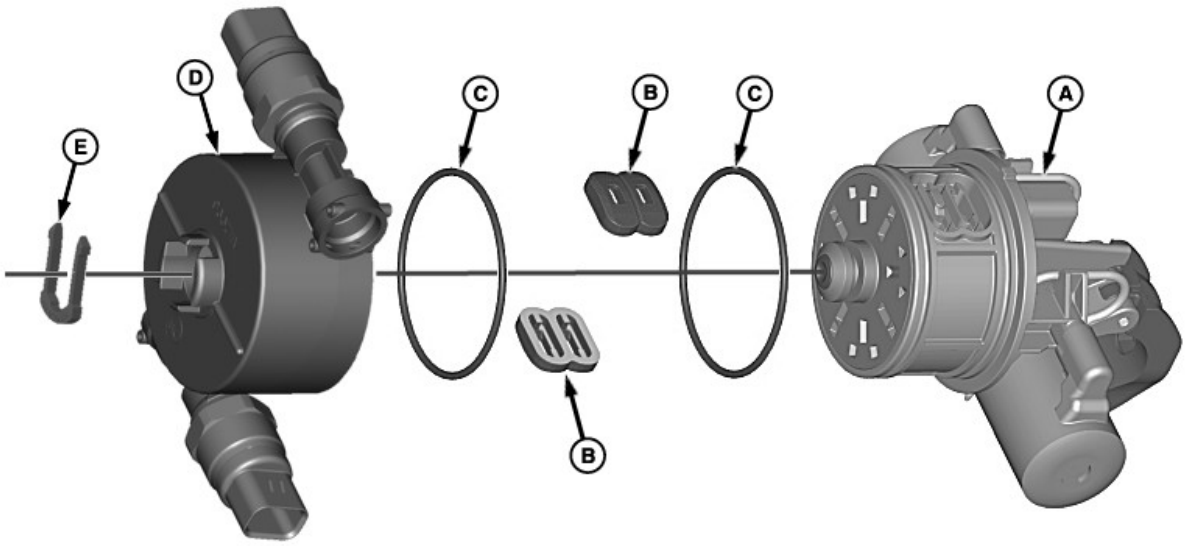
A—Clip
B—Turret
C—O-Ring (2 used)
D—Seal (2 used)
E—Valve Body

IMPORTANT: Always use new O-rings. Damaged or used O-rings leak.

7. Disassemble the remaining components (C—E) using the graphic as a guide.
8. Inspect the internal components of the valve body for wear or damage. Replace any components as needed.
9. After repairs are completed, reassemble the valve body components. (See Assemble Valve Body Components.)

WP29706,0000C7A-19-26JUN20

Assemble Valve Body Components



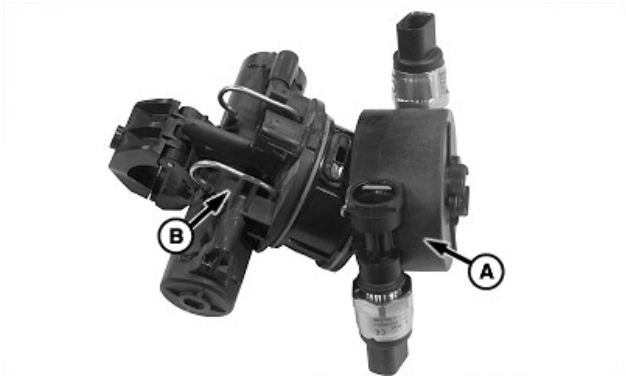
A99334—UN—09FEB18

A—Valve Body
B—Seals (2 used)
C—O-Rings (2 used)
D—Turret
E—Clip

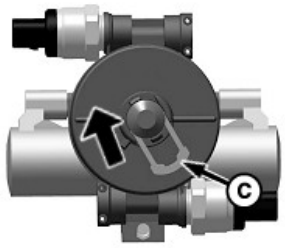
IMPORTANT: Always use new O-rings. Damaged or used O-rings leak.

NOTE: Lubricate turret O-rings and seals with PMH3503 Parker Super O-Lube or equivalent lubricant during assembly.

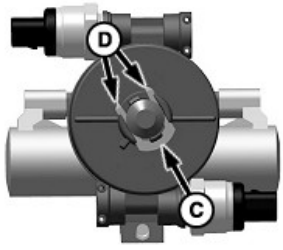
1. Assemble the internal components (B and C) with the valve body (A) using the graphic as a guide.



A99535—UN—12FEB18



A99536—UN—12FEB18



A99537—UN—12FEB18

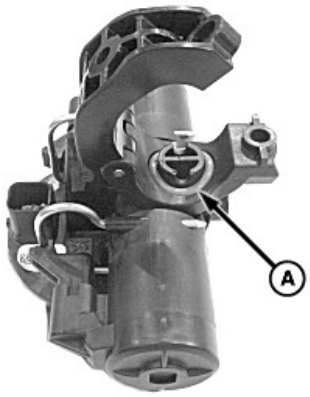
A—Turret
B—Valve Body
C—Clip
D—Tabs

Install the turret (A) onto the valve body (B).

3. Push the clip (C) onto the base of the turret until the lock tabs (D) engage.
4. Install the valve body on the planter. (See Install Valve Body.)

WP29706,0000C82-19-16AUG19

Repair Valve Body Solenoid



A99538—UN—12FEB18

A—O-Ring

CAUTION: Avoid injury from pressurized fertilizer solution. Relieve the pressure in the fertilizer pipes before servicing the valve body.

Do not activate the fertilizer pump while servicing any of the valve bodies.

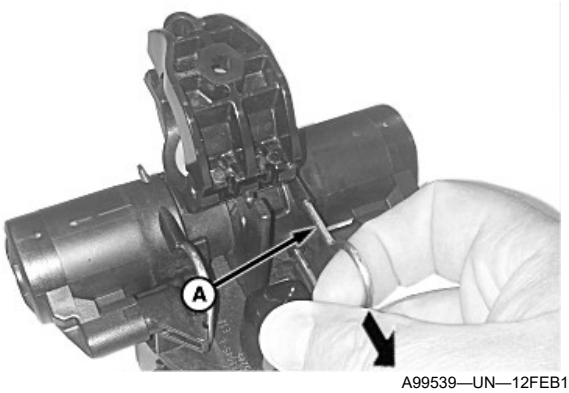
IMPORTANT: Do not allow solvent or diesel fuel to contact the rubber parts of the valve body, as it causes deterioration.

NOTE: Service tools are shipped with the planter.

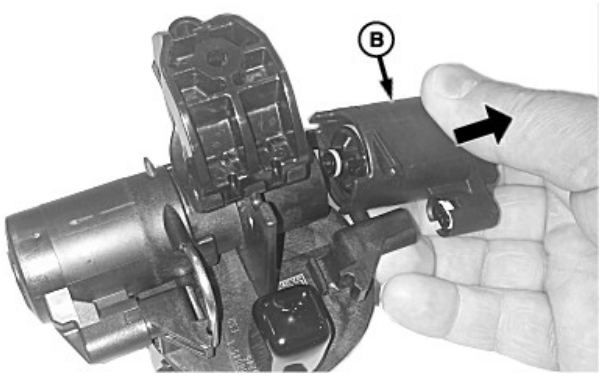
1. Relieve the pressure from the distribution pipes and valve bodies by using the pressure relief button on the display in the tractor. The pressure relief button enables the valve bodies for 6 seconds.

NOTE: It is not necessary to remove the valve body when removing the valve solenoid.

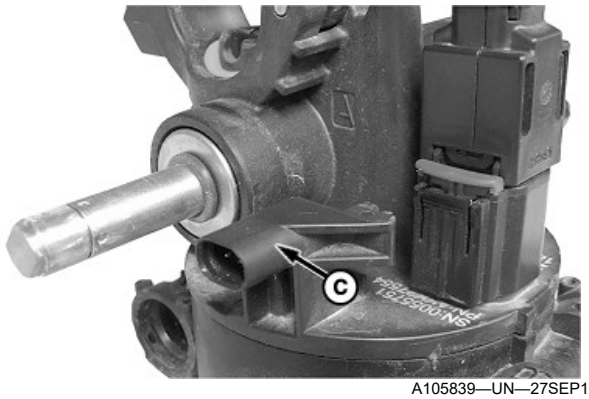
2. Remove the valve body from the fertilizer pipes, if desired. (See Remove Valve Body.)
3. Remove the O-ring (A).
4. Clean around the electrical connection and the solenoid using TY26632 Electronic Contact Cleaner.



A99539—UN—12FEB18



A99540—UN—12FEB18

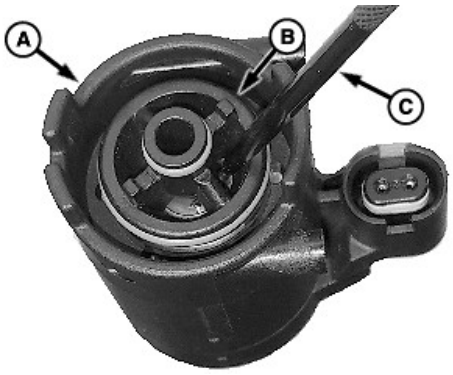


A105839—UN—27SEP19

A—Clip
B—Solenoid
C—2-Pin Connector

IMPORTANT: The solenoid cartridge sometimes gets stuck in position when removing the solenoid from the valve body. Do not use a channel lock or pliers to pull on the cartridge to release it from the valve body.

5. Remove the clip (A), then the solenoid (B) from the valve body.
6. Lightly spray TY26632 Electronic Contact Cleaner inside the 2-pin connector (C) on the valve body after the solenoid is removed to clean off any fertilizer residue that may have come in contact with the pins. After cleaning the connector with spray, apply T242210 NyoGel or equivalent inside the 2-pin connector before installation.

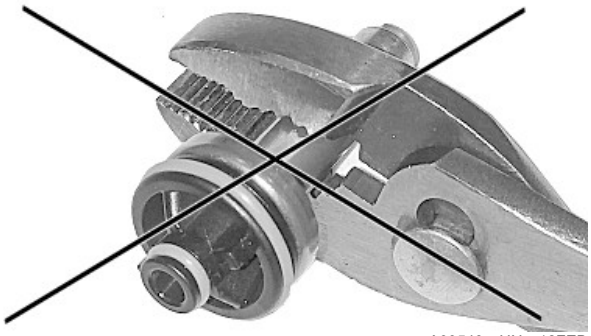


A99541—UN—12FEB18



A99542—UN—12FEB18

PT21225 Offset Hook



A99543—UN—12FEB18

Incorrect



A99544—UN—12FEB18



A99545—UN—12FEB18

A—Solenoid
B—Cartridge Assembly
C—Offset Hook (PT21225)
D—Torque Wrench
E—Cartridge Wrench

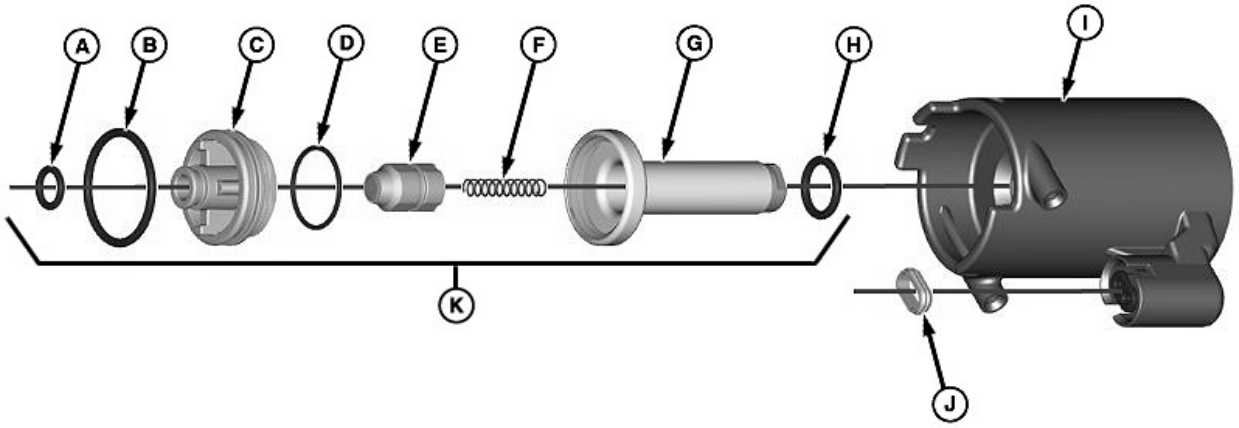
F—Hole

IMPORTANT: Do not use a channel lock or pliers on the tube of the cartridge.

Do not damage the components when using an offset hook tool to remove a stuck cartridge. Use caution to maintain grip when using the tool to remove the components.

7. Remove the cartridge assembly (B) from the solenoid (A). If the cartridge does not pull out by hand, insert the offset hook (C) tool into a quadrant in the valve seat. Pull out the cartridge gently with the offset hook tool without damaging it.
8. Install the cartridge into the cartridge wrench (E) and align the flats.
9. Install the torque wrench (D) onto the valve seat.
10. To remove from the cartridge assembly, turn the valve seat counterclockwise.
11. Remove the plunger and the spring by inserting the offset hook tool into a hole (F) in the plunger.

IMPORTANT: Do not soak the solenoid in any cleaner solution.



A99546—UN—22FEB18

A—O-Ring
B—O-Ring
C—Valve Seat
D—O-Ring
E—Plunger
F—Spring
G—Tube Assembly
H—O-Ring
I—Solenoid
J—Harness Connector Seal
K—Cartridge Assembly

12. After the valve seat (C) is removed from the cartridge assembly (K), the remaining parts can be soaked in Erase or an equivalent cleaner, diluted per label instructions, to aide in disassembly. Do not soak the solenoid (I) in any cleaner solution.
13. Disassemble the remaining components (A—J).

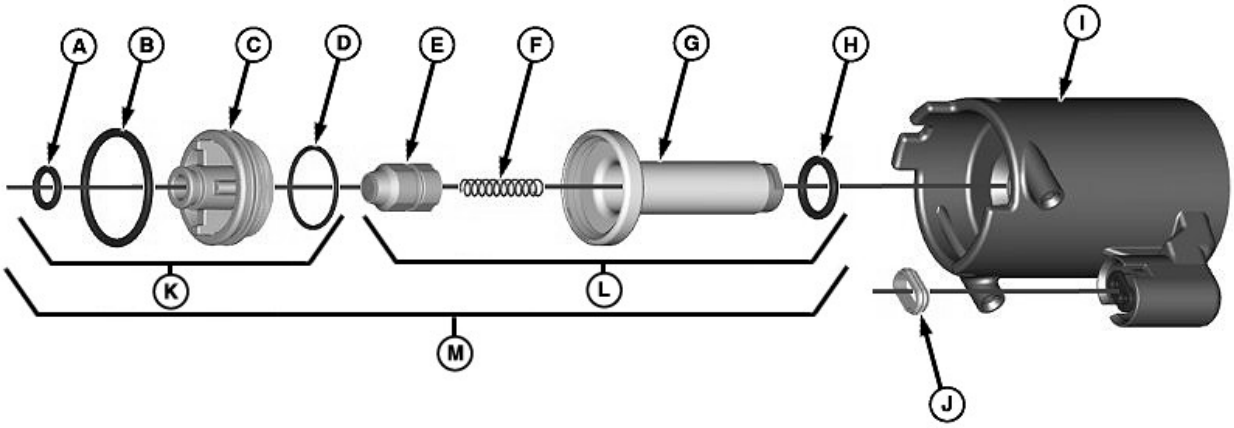
IMPORTANT: Always use new O-rings. Damaged or used O-rings leak.

NOTE: Do not apply any lubricant to the cartridge O-rings when reassembling.

14. Inspect the components for wear or damage. Replace any components as needed.
15. Repeat steps for the remaining solenoid.

WP29706,0000C7B-19-08OCT25

Assemble Valve Body Solenoid



A99547—UN—22FEB18

A—O-Ring
B—O-Ring
C—Valve Seat
D—O-Ring
E—Plunger
F—Spring
G—Tube
H—O-Ring
I—Solenoid
J—Harness Connector Seal
K—Valve Seat
L—Tube Assembly
M—Cartridge Assembly



A99548—UN—22FEB18

IMPORTANT: Always use new O-rings. Damaged or used O-rings leak.

NOTE: Service tools are shipped with the planter.

Do not apply any lubricant to the cartridge O-rings when reassembling.

1. Assemble the valve seat components (A—D).
2. Assemble the tube assembly components (E—H).

NOTE: Lubricate harness connector seal with T242210 NyoGel or equivalent before installation.

3. If cleaned or replaced, install the harness connector seal (J) in the solenoid (I).

IMPORTANT: To prevent damage, the valve seat wrench and the provided torque wrench must be used when tightening the valve seat.

NOTE: Cartridge assembly must easily install by hand into the solenoid. If tapping or excessive force is required, inspect the cartridge and electrical connector for contamination or misalignment.

4. Reassemble the cartridge assembly (M) by installing the valve seat (K) into the tube assembly (L). Do this step carefully so the threads are not torn up on the valve seat.



A99876—UN—22FEB18

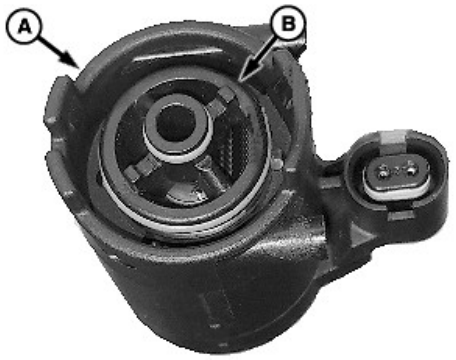
A—Torque Wrench
B—Cartridge Wrench

NOTE: The provided torque wrench has a preset value of 5 lb·in.

5. Install the tube assembly into the cartridge wrench (B) and align the flats.
6. Install the torque wrench (A) onto the valve seat. Turn the torque wrench clockwise and tighten to the preset torque specification.

Specification

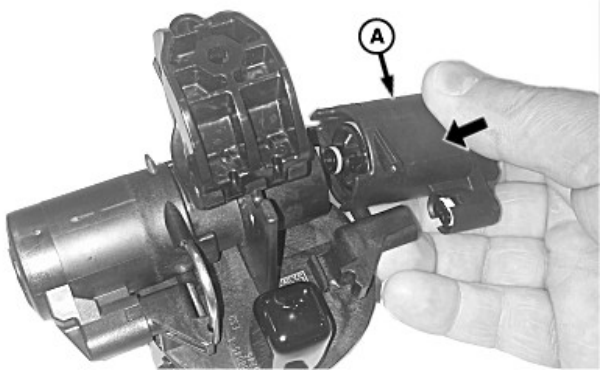
Valve Seat—Torque	0.5 N·m (5 lb·in)



A99877—UN—22FEB18

A—Solenoid
B—Cartridge Assembly

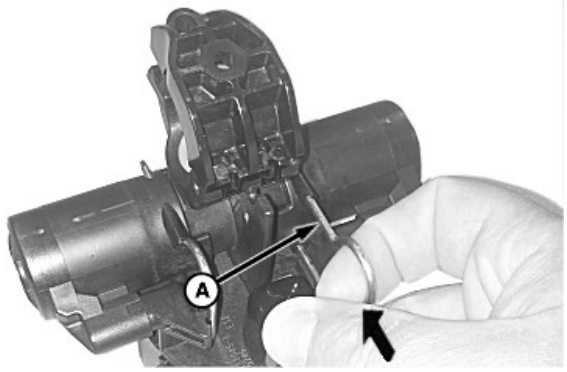
7. Install the cartridge assembly (B) into the solenoid (A).



A99878—UN—22FEB18

A—Solenoid

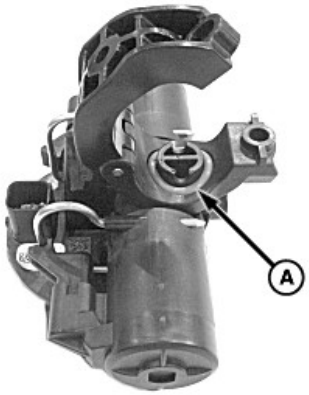
8. Install the solenoid (A) on the valve body.



A99879—UN—22FEB18

A—Clip

9. Install the clip (A) through the solenoid and valve body.



A99538—UN—12FEB18

A—O-Ring

10. Install the O-ring (A).
11. Repeat steps for the remaining solenoid on the valve body.
12. Install the valve body. (See Install Valve Body.)

WP29706,0000C83-19-08OCT25

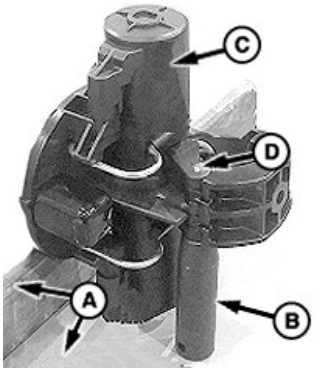
Repair the Half Clamp

CAUTION: Avoid serious injury. Do not clean turret fittings by placing near mouth and blowing. You could swallow or inhale hazardous chemicals that are poisonous, which can cause serious injury or death.

Avoid injury from pressurized fertilizer solution. Relieve the pressure from the fertilizer pipes before servicing the valve body.

Do not activate the fertilizer pump while servicing any of the valve bodies.

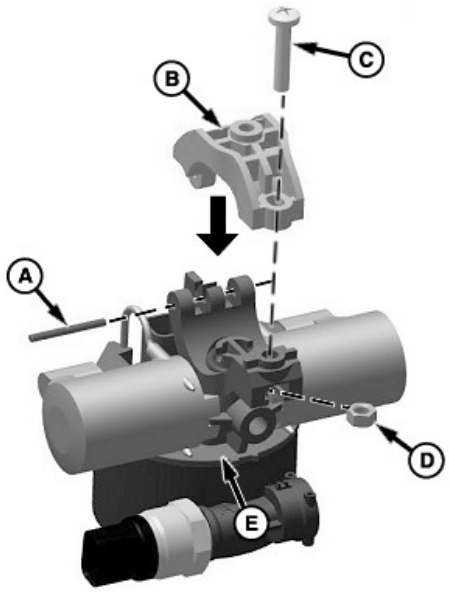
1. Relieve the pressure from the distribution pipes and valve bodies by using a pressure relief button on the display in the tractor. The pressure relief button enables the valve bodies for 6 seconds.
2. Remove the valve body. (See Remove Valve Body.)



A99880—UN—23FEB18

A—Blocking
B—Deep Socket (3/8 in x 8 mm)
C—Solenoid
D—Pin

3. Support the lower valve body with some type of blocking (A) so the upper valve body is positioned on the side. Support the pin area of the half clamp with a deep socket (B). Align the pin with the opening on the socket. Make certain the solenoids (C) are not resting on the blocking.
4. Using a small pin punch, tap the pin (D) into the socket.



A99881—UN—23FEB18

A—Pin
B—Half Clamp
C—Screw
D—Nut
E—Valve Body

5. Inspect the components for wear or damage. Replace them as needed.
6. Install the half clamp (B) into position on the valve body (E).
7. Insert the pin (A) using a C-clamp or channel-lock pliers through the hinge points of the half clamp and valve body. Use the graphic as a guide.
8. Install the nut (D), then insert the screw (C) through the half clamp. **Do not** tighten the screw into the nut until installing the valve body on the fertilizer pipe.
9. Install the valve body. (See Install Valve Body.)

WP29706,0000C7C-19-23SEP19

Clean Liquid Fertilizer Tank

Although the tank is made of a highly durable and corrosion resistant plastic, proper maintenance is required.

Rinse the tank with water when changing from one solution to another.

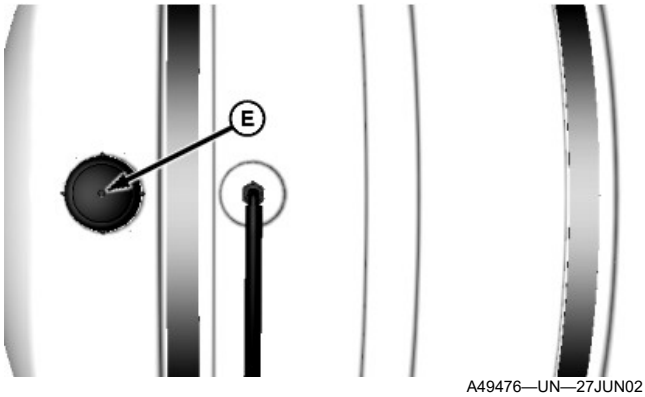
Rinse tank thoroughly with water after each season or before any shutdown lasting over one week.

Do not allow sludge to accumulate in the bottom of the tank.

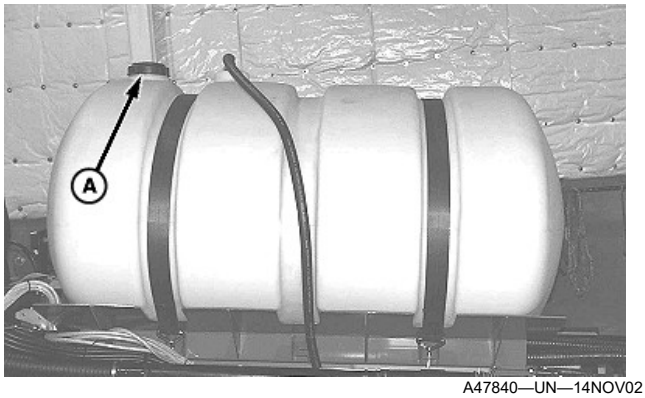
Do not leave fertilizer in the tank if the temperature is expected to drop below 4.4°C (40°F) as some types of liquid fertilizers begin to crystallize at this temperature.

To clean the tank, proceed as follows:

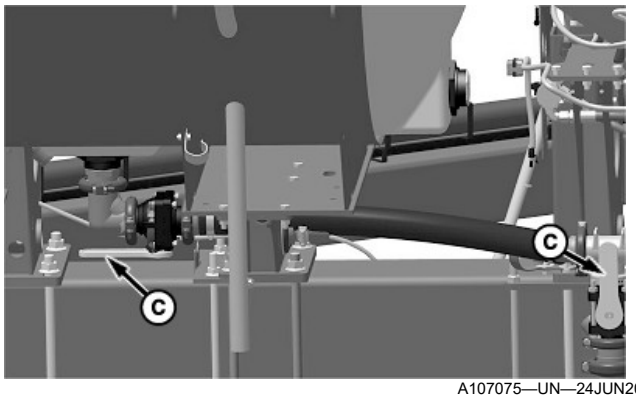
CAUTION: Do not service if system is under pressure. Never remove tank lid to relieve pressure. Empty tank completely to relieve pressure by reversing flow through the nurse tank pump or press the spring loaded check valve (E) on the center of the tank lid.



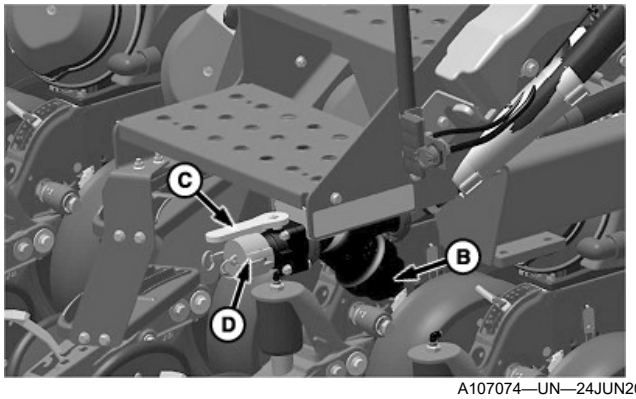
A49476—UN—27JUN02



A47840—UN—14NOV02



A107075—UN—24JUN20



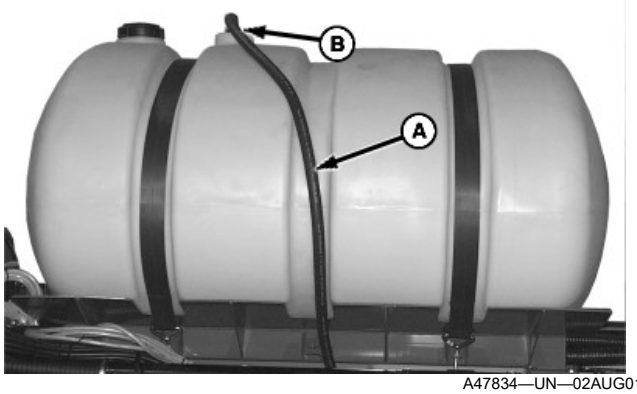
A107074—UN—24JUN20

A—Lid
B—Strainer Cap
C—Valves
D—Quik-Fill Cap
E—Spring Loaded Check Valve

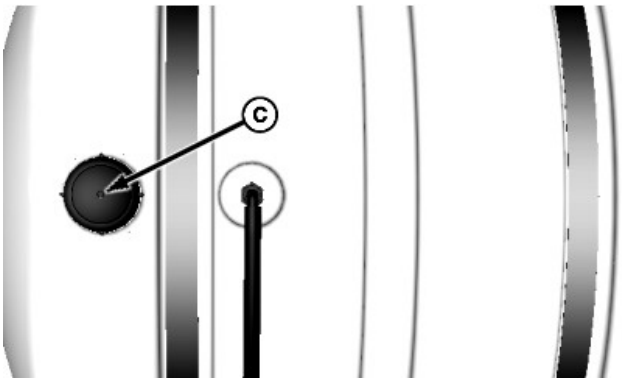
1. Relieve pressure from the tank.
2. Remove lid (A).
3. Remove strainer cap (B) and screen.
4. Open shutoff valves (C) going to the pump, tank, and Quik-Fill port.
5. Remove Quik-Fill cap (D).
6. Flush tank and hoses with water.
7. After cleaning tank, close shutoff valves, replace the strainer cap and Quik-Fill cap, and replace lid on tank.
8. To clean pump and distribution lines, see cleaning processes in the Servicing and Adjusting—Liquid Fertilizer, Piston Pump section.

WP29706,0000EA0-19-14OCT25

Clean the Liquid Fertilizer Tank Lid Fitting and Drip Line Hose



A47834—UN—02AUG01



A49475—UN—27JUN02

Top View of Fertilizer Tank

A—Drip Line Hose
B—Fitting
C—Spring-Loaded Check Valve

CAUTION: Avoid personal injury. Never service the system under pressure. Empty the tank completely or relieve system pressure by pressing the spring-loaded check valve (C).

IMPORTANT: Avoid system malfunction. Verify that dirt and liquid fertilizer do not plug the drip line hose (A) and fitting (B), causing an air lock condition.

1. Relieve pressure from the system.
2. Remove drip line hose (A) and the fitting (B).
3. Flush drip line hose (A) and the fitting (B).
4. Install flushed drip line hose (A) and the fitting (B).

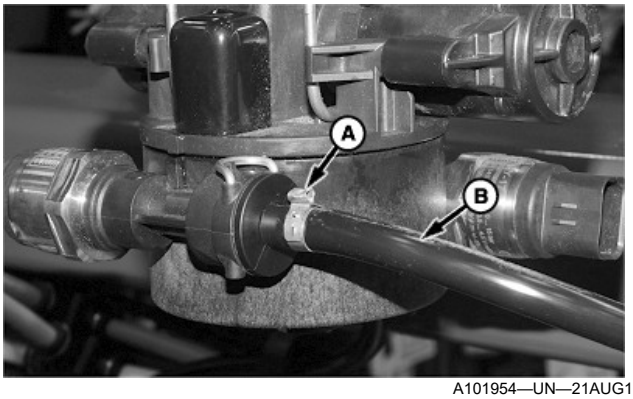
CR53390,0000168-19-01AUG19

Fertilizer Distribution Tube

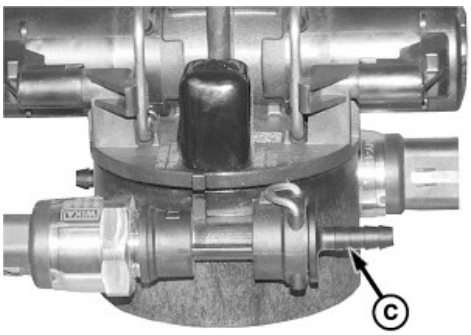
Replacing Worn or Damaged Distribution Tube



A101953—UN—21AUG18



A101954—UN—21AUG18



A101957—UN—21AUG18

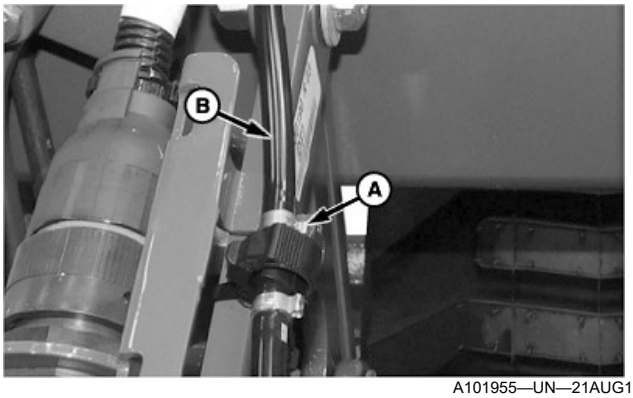
A—Clamp
B—Tube
C—Valve Fitting

To replace the worn or damaged distribution tubes complete the following procedures:

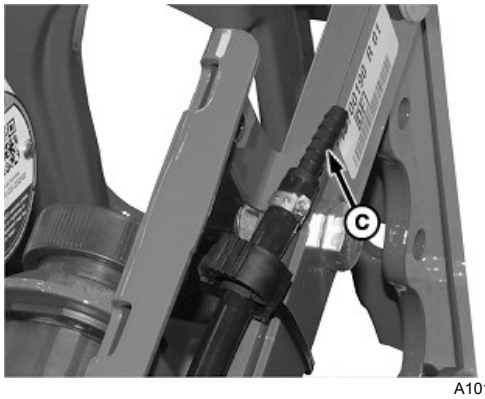
1. **Replace the upper section of the distribution tube from frame-mounted opener spout or in-furrow spout:**

   Cut and remove the clamp (A) on the worn or damaged distribution tube (B) for the valve fitting (C) of the turret.

2. Remove the worn or damaged tube (B) from the end of the valve fitting (C).



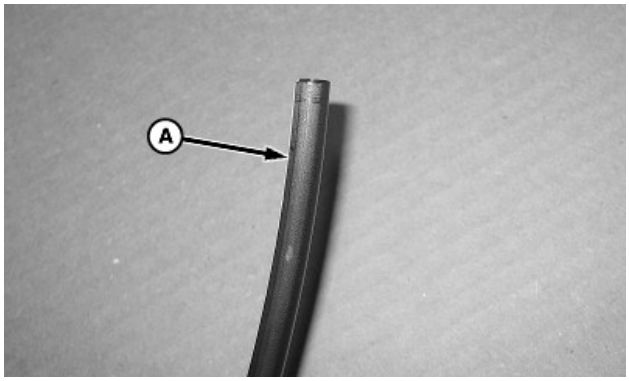
A101955—UN—21AUG18



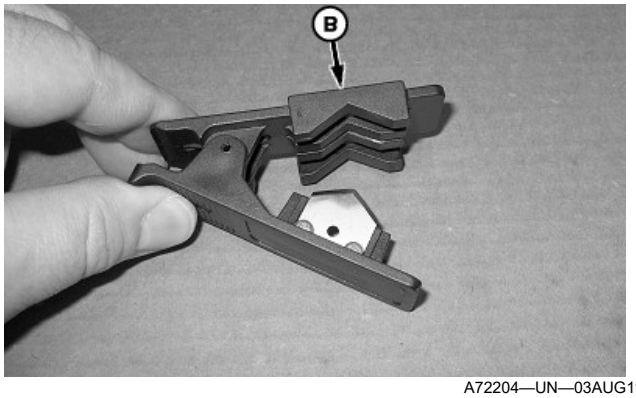
A101956—UN—21AUG18

A—Clamp
B—Tube
C—In-Line Orifice

3. Cut and remove the clamp (A) on the opposite end of the worn or damaged tube (B). Retain the in-line orifice (C).
4. Remove the worn or damaged tube from the end of the in-line orifice.
5. Measure the worn or damaged tube length before discarding.
6. Cut a new piece of the distribution tube to the length of the worn or damaged tube.



A72202—UN—03AUG11



A72204—UN—03AUG11

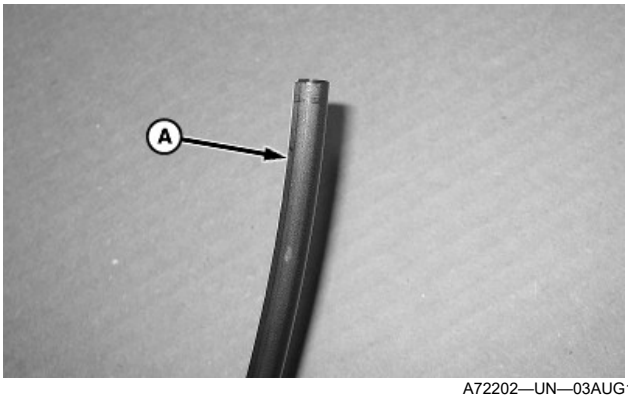
A—Tube
B—Tube Cutter

7. Trim each end of the new tube (A) square with the tube cutter (B) or a similar device. Verify that the end of the tube is not crushed.
8. Route the new tube from the valve fitting to the in-line orifice on the opener, inserting the tube through the appropriate hose clamps or tie bands.
9. Route the new tube from the valve fitting to the in-line orifice on the parallel arms of the row unit, inserting the tube through the appropriate hose clamps or tie bands.
10. Install a clamp on both ends of the new tube. Do not tighten the clamp at this time.
11. Push each end of the tube fully onto the fittings. Pull the tube to verify that the tube is locked onto the fitting.
12. Align the clamps on the area of the fitting.
13. Using the proper tool, tighten the clamps by squeezing them at the pinch points on the clamps.
14. **Replace the lower section of the distribution tube from the frame-mounted opener spout or in-furrow spout:**

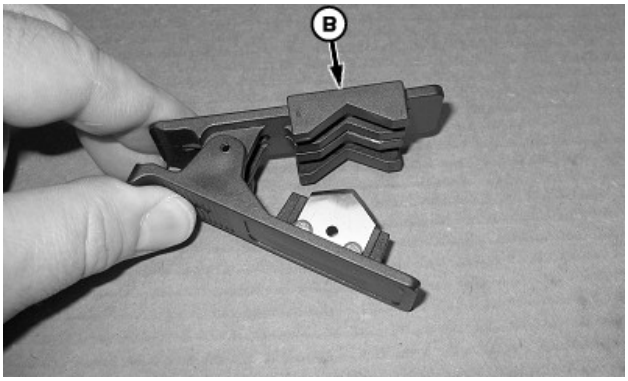
    On the opener only, push in the fitting ring on the coupler near the bend of the opener and remove the distribution tube from the coupler.
15. On the opener only, push in the fitting ring on the spout coupler of the opener and remove the other end of the distribution tube from the coupler.
16. For the in-furrow only, unlatch and remove the vacuum seed meter.
17. Remove the drive assembly cover.
18. Cut and remove the clamp on the tube connected to the lower half of the barbed fitting.
19. Remove the tube from the barbed fitting.
20. Cut and remove the clamp on the tube near the reducer fitting for the in-furrow hose.

NOTE: During removal of the lower distribution tube, take note of the routing for the original tube to aid in the installation of the new tube.

21. Remove the tube from the end of the reducer fitting.
22. Measure the tube length before discarding.
23. Cut the new tube to length.



A72202—UN—03AUG11



A72204—UN—03AUG11

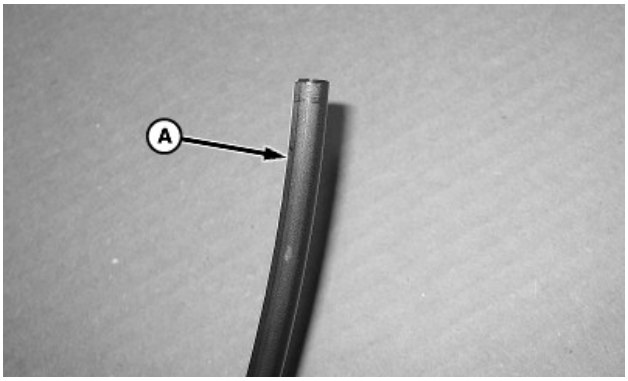
A—Tube
B—Tube Cutter

24. Trim each end of the tube (A) square with the tube cutter (B) or a similar device. Ensure that the end of the tubing is not crushed.
25. On the opener only, push one end of the new tube into the spout coupler and the other end of the new tube into the coupler near the bend of the opener. Pull the tube to verify that the tube is locked into the coupler.
26. For the in-furrow only, route the tube through the same area of the drive assembly from the tie band on the parallel arm to the reducer fitting on the lower part of the row unit.
27. Install a clamp on both ends of the new tube. Do not tighten the clamp at this time.
28. Push each end of the tube fully onto the fittings. Pull the tube to verify that the tube is locked onto the fitting.
29. Align the clamps on the area of the fitting.
30. Using the proper tool, tighten the clamps by squeezing them at the pinch points on the clamp.
31. **Replace the distribution tube of the in-furrow spout:**

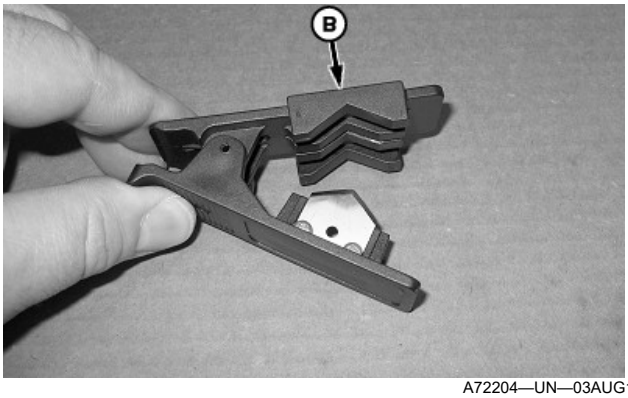
    Push in the fitting ring of the reducer fitting and remove the distribution tube from the fitting.
32. Loosen the nuts on the bottom of the in-furrow bracket near the closing wheels of the row unit.
33. Cut and remove the tie band retaining the tube to the in-furrow bracket.

NOTE: During removal of the in-furrow tube, take note of the routing for the original tube to aid in the installation of the new tube.

34. Remove the tube from the in-furrow bracket and the row unit.
35. Measure the tube length before discarding.
36. Cut the new tube to length.



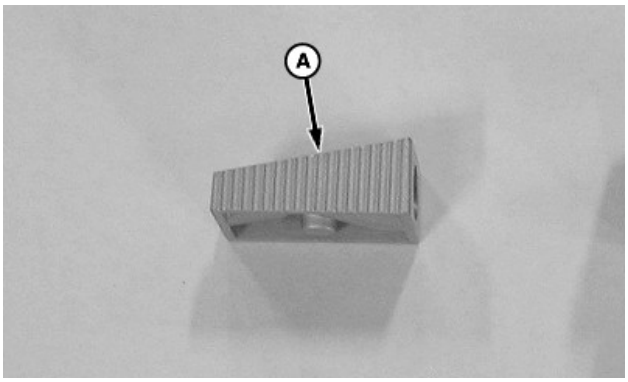
A72202—UN—03AUG11



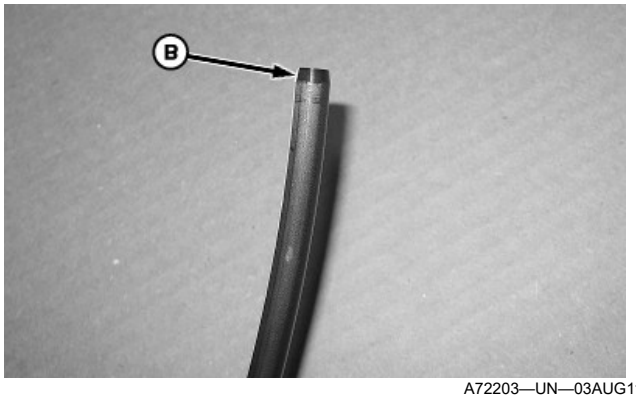
A72204—UN—03AUG11

A—Tube
B—Tube Cutter

37. Trim each end of the new tube (A) square with the tube cutter (B) or a similar device. Ensure that the end of the new tubing is not crushed.



A72205—UN—03AUG11



A72203—UN—03AUG11

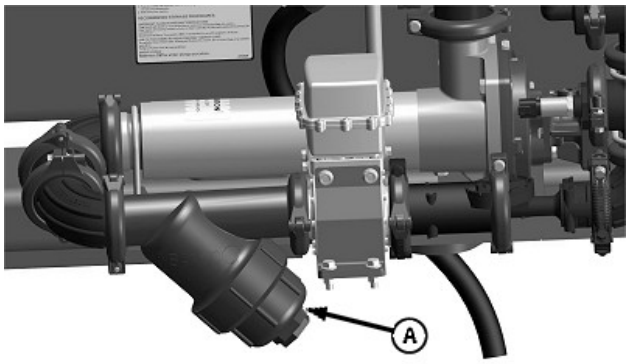
A—Chamfer Tool
B—Tube

NOTE: Inserting a non-chamfered tube into the reducer fitting distorts the ability of the fitting to seal properly, which causes fertilizer leaks.

38. Using a chamfer tool (A) (a pencil sharpener works well), chamfer end of the new tube (B).
39. Route the new tube through the same area of the row unit from the reducer fitting to the opening on the in-furrow bracket.
40. Push the chamfered end of the tube fully onto the reducer fitting. Pull the tube to verify that the tube is locked into the fitting.
41. Align the other end of the tube to the position in the in-furrow opening that it was in previously.
42. Retain the tube position by installing a tie band around the tube and through the loop on the in-furrow bracket.
43. Tighten the nuts on the bottom of the in-furrow bracket.
44. Prime the system and check for leaks. (See Prime and Start the Pump.)

WP29706,0000CD3-19-22AUG19

Clean the Strainer Screen



A117307—UN—09MAR23

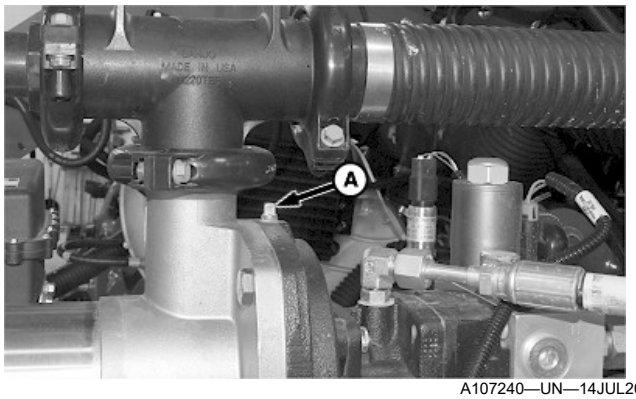
Strainer

A—Cap

Check the fertilizer strainer screen after the initial start-up of the pump and clean the strainer screen when necessary thereafter. To check the strainer screen, close the primary tank shutoff valve and remove the strainer cap (A).

WP29706,0000E97-19-09MAR23

Chamber Fluid Maintenance



A107240—UN—14JUL20

A—Plug

1. Replace the chamber fluid every 1000 hours of usage. The color of the fluid in the chamber is purple. Use only the Hypro chamber fluid for replacement.

   To replace the chamber fluid, remove the pump from the mounting platform.
2. Remove the plug (A) from the port on the wet seal chamber and drain all the fluid from the chamber.
3. Replace the chamber fluid with new Hypro 93HPS Wet Seal Fluid.
4. Pour the entire contents of a (12.5 fl oz) bottle into the wet seal chamber. Do not fill the chamber to the top with fluid.
5. Reinstall the plug (A) in the port.

WP29706,0000EA2-19-08OCT25

Servicing and Adjusting—Liquid Fertilizer, ExactShot

Safety Before Service

Review the Safety Section before performing any of the Service and Adjustment operations.

WP29706,0000A6D-19-19SEP16



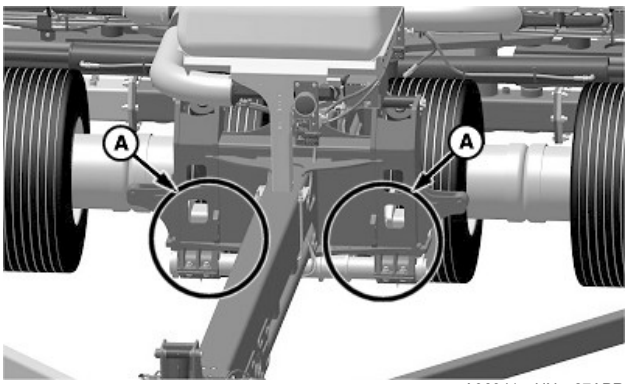
T81389—UN—28JUN13

ExactShot Service Intervals

Service	Intervals						
	As Required	Beginning of Season	10 Hours or Daily	50 Hours	100 Hours	200 Hours	End of Season
Repair the dosing valve components.	•						
Repair the dosing valve solenoid.	•						
Repair half clamp.	•						
Clean the liquid fertilizer hoses and tank lid.	•						
Clean the lid fitting in the liquid fertilizer tank and the drip line hose.	•						
Clean the liquid fertilizer tank.	•						•
Replace the fertilizer tubes.	•						
Replace the fertilizer opener scrapers.	•						
Service single-disk fertilizer opener.	•						
Tighten the clamps on the liquid fertilizer hoses.		•					
Clean the fertilizer strainer screen.	•						

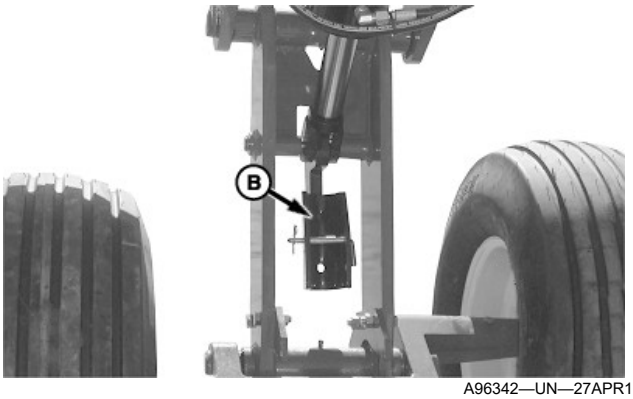
ouo6074,1679597697939-19-23MAR23

Install Service Locks—DB Series



A96341—UN—27APR17

Center Frame Service Locks Storage Locations

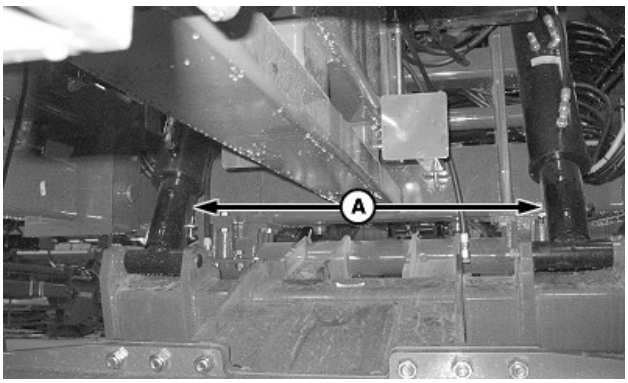


A96342—UN—27APR17

Wing Service Lock Storage Location

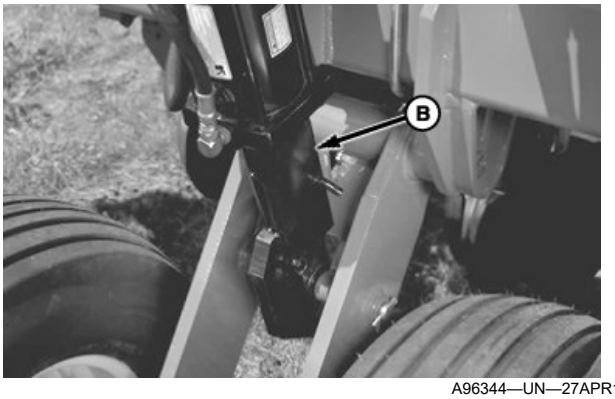
A—Storage Locations (Center Frame Service Locks)
B—Storage Locations (Wing Service Locks)

1. Locate the service locks for the center wheel cylinders in the storage locations (A) on the main frame lift.
2. Locate the service locks for the wing wheel cylinders in the storage locations (B) on the wing wheel lift.



A96343—UN—27APR17

Center Frame Service Locks



A96344—UN—27APR17

Wing Wheel Service Locks

A—Service Lock (Center Frame)
B—Service Lock (Wing Wheel)

3. To service, install center frame service locks (A) and wing service locks (B).

WP29706,0000B5E-19-27APR17

Remove Fertilizer Dosing Valve



TS281—UN—15APR13

CAUTION: Avoid serious injury. Turn off the fertilizer system. Do not perform any maintenance on the components while fertilizer system is on.

Avoid injury from pressurized fertilizer solution.

Wear protective clothing, eyewear, and gloves when performing service.

Pressure is trapped in the distribution hoses and valve bodies. Relieve the pressure from the liquid fertilizer system before servicing the valve body.

Do not activate the fertilizer pump while servicing any of the valve bodies.

NOTE: Do not drain the fertilizer solution onto the ground. Use a suitable container or bucket to catch any leaked fertilizer solution.

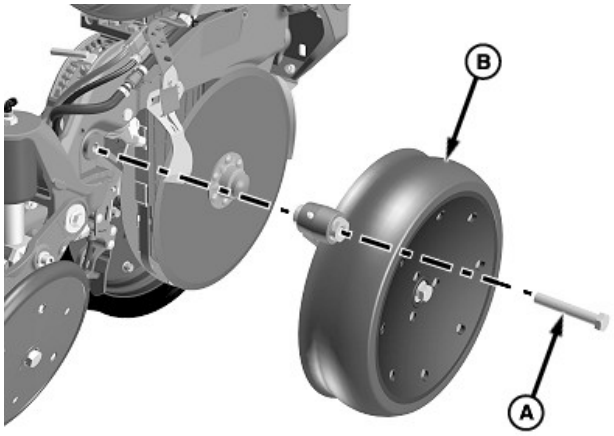
1. Turn on the electric power generation system.

2. Relieve the pressure from the distribution hoses and valve bodies by using the pressure relief button on the display in the tractor. The pressure relief button enables the valve bodies for 6 seconds. Before performing any service on the fertilizer system, cycle the pressure relief several times.
3. Clean contamination from the exterior of the valve body assembly.
4. Clean the electrical connectors with TY26632 Electronic Contact Cleaner.



TS268—UN—23AUG88

CAUTION: Avoid contact with the furrow opener disks. Edges are sharp and can cause serious injury. Always wear gloves when working near disks.



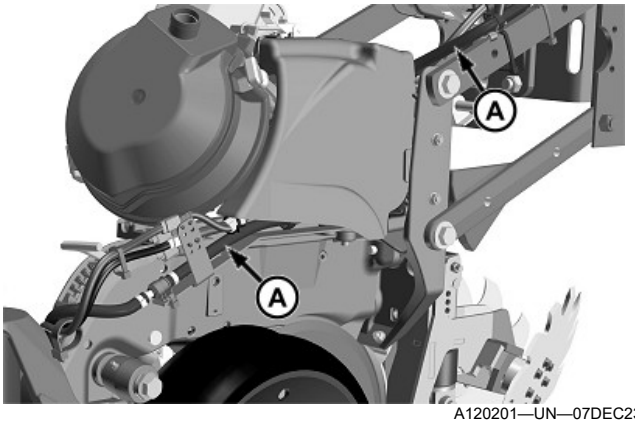
A117285—UN—21APR23

Right-Hand Side Shown

A—Cap Screw
B—Gauge Wheel

NOTE: Approximate weight of the offset gauge wheel arm assembly is 9 kg (20 lb).

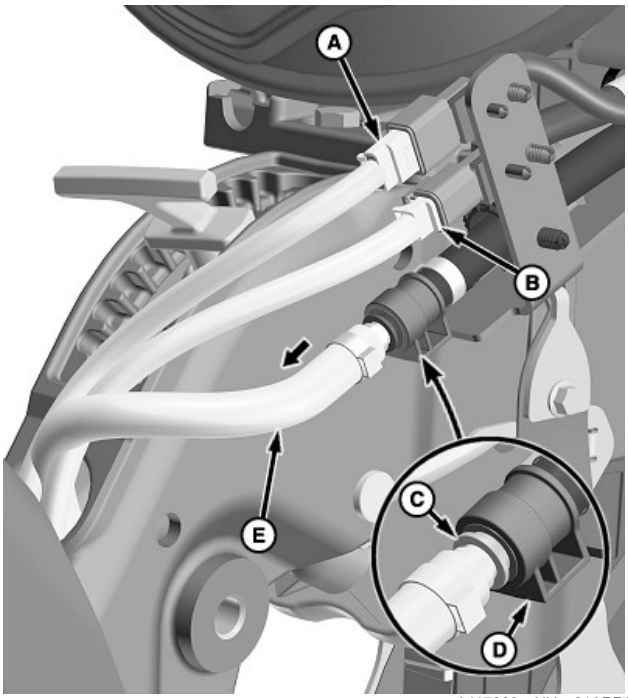
5. Remove the cap screw (A) and gauge wheel (B).
6. Repeat procedure on left-hand side.



A120201—UN—07DEC23

A—Upper Hose

7. To minimize fluid loss, clamp the upper hose (A).



A117286—UN—21APR23

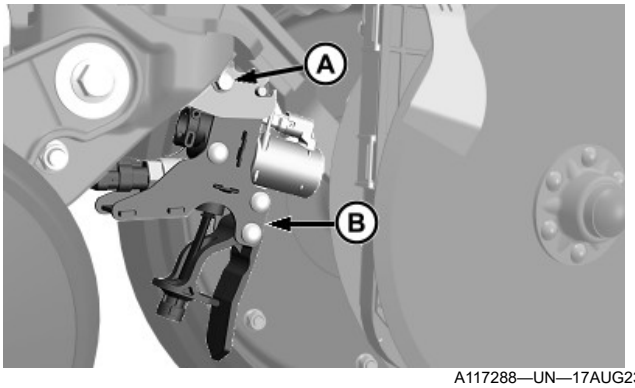
A—Pressure Sensor Harness Connector, 3-Pin
B—Solenoid Harness Connector, 2-Pin
C—Lock Fitting
D—Coupler
E—Distribution Hose

IMPORTANT: Thoroughly clean around the nozzle assembly and around the hose and harness routing path.

Avoid getting fertilizer on electrical connectors (A and B).

After disconnection, orient the hose (E) down until drained of fluid.

8. Push in lock fitting (C) on coupler (D) and at the same time, pull out distribution hose (E).
9. Unplug harness connectors (A and B).



A117288—UN—17AUG23

Right-Hand Side

A—Cap Screw
B—Valve Assembly

IMPORTANT: Be careful when routing the harness connectors and delivery hose through openings in the frames. Clean the frame components where the hose and harness route for easy and clean removal and replacement.

10. Remove the cap screw (A) and valve assembly (B).
11. Disassemble and inspect parts as necessary. (See procedures in this section.)

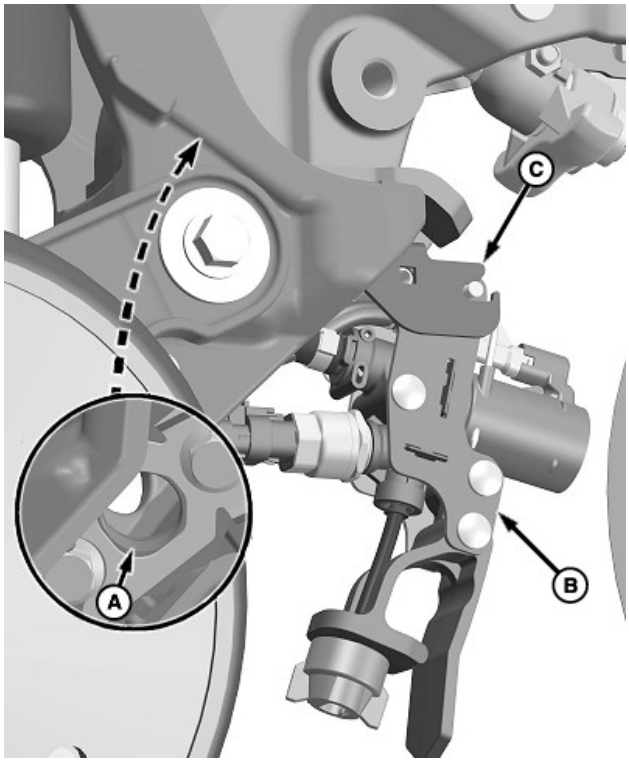
gc7gsd7,1678227237847-19-07DEC23

Install the Fertilizer Dosing Valve



TS268—UN—23AUG88

CAUTION: Aoid contact with the furrow opener disks. Edges are sharp and can cause serious injury. Always wear gloves when working near disks.

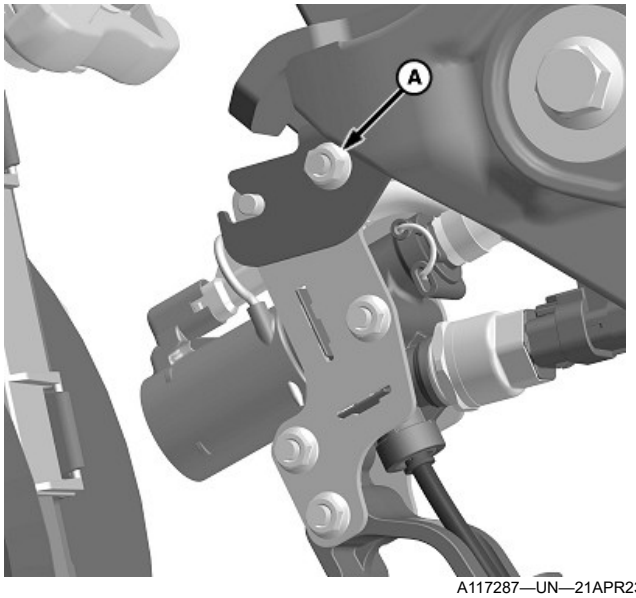


A117290—UN—21APR23

A—Openings
B—Dosing Valve
C—Hook (2 used)

IMPORTANT: Be careful when routing harness connectors and distribution hose through openings in the frames.

1. Route the harness connectors and distribution hose, one at a time, up through frame openings (A).
2. Lift the dosing valve (B) up and set into bracket hooks (C).

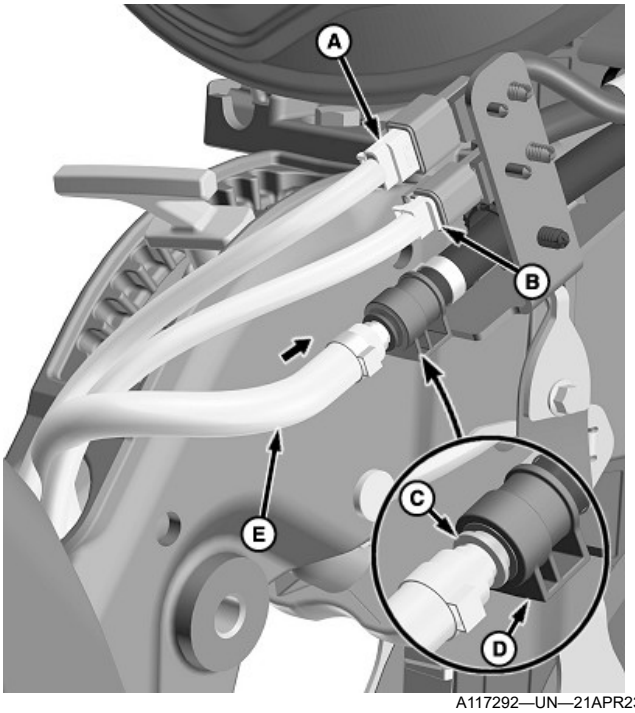


A117287—UN—21APR23

Left-Hand Side

A—Flange Lock Nut

3. Pivot the dosing valve rearward and attach with cap screw and flang lock nut (A).
4. Install flange lock nut (A).



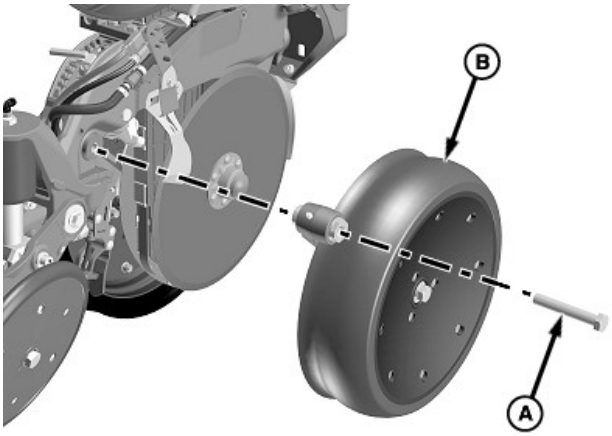
A117292—UN—21APR23

A—Pressure Sensor Harness Connector, 3-Pin
B—Solenoid Harness Connector, 2-Pin
C—Lock Fitting
D—Coupler
E—Distribution Hose

5. Push in the lock fitting (C) on the coupler (D) and at the same time, push in the distribution hose (E).

NOTE: Lubricate the connector seals with T242210 NyoGel or equivalent before connecting.

6. Plug in the harness connectors (A and B).



A117285—UN—21APR23
Right-Hand Side Shown

A—Cap Screw
B—Gage Wheel

7. Attach the gauge wheel (B) and cap screw (A).
8. Tighten the cap screw to specification.

Specification

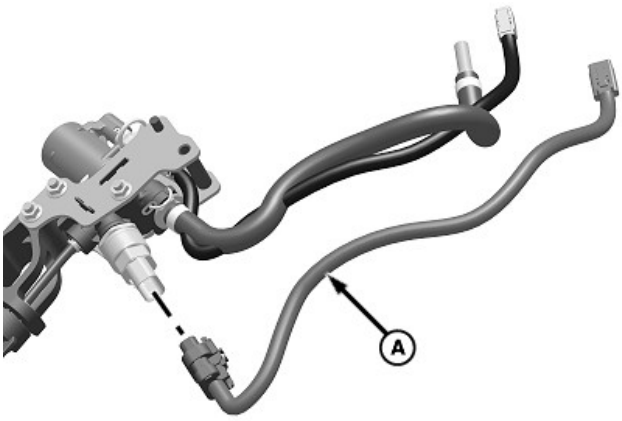
Cap Screw (A)—Torque. . . . . 271 N·m (200 lb·ft)

9. Apply John Deere SD polyurea grease to the lubrication fitting until grease appears at the end of the gauge wheel arm.

gc7gsd7,1678227316608-19-17AUG23

Disassemble and Inspect Fertilizer Dosing Valve

IMPORTANT: Do not allow solvent or diesel fuel to contact the rubber parts, as it causes deterioration.

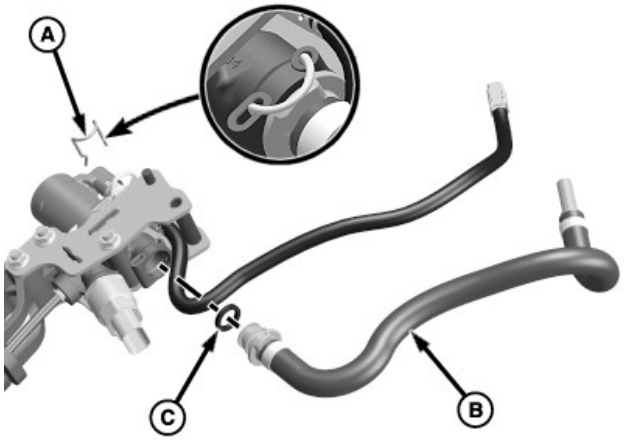


A117295—UN—09MAR23

A—Pressure Sensor Extension Harness

1. Disconnect pressure sensor extension harness (A).

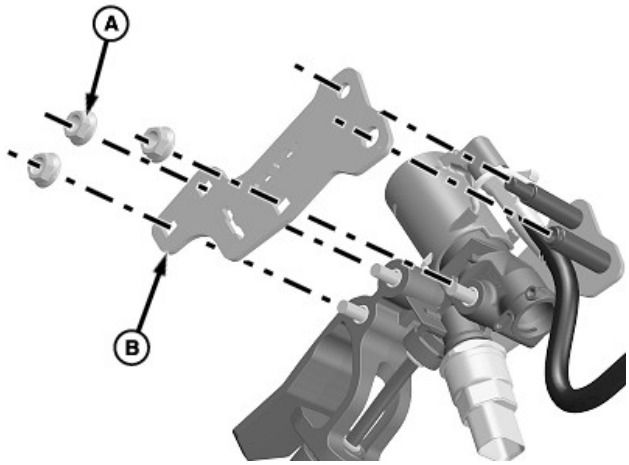
2. Inspect harness for wear or damage. Replace if necessary.



A117296—UN—09MAR23

A—Fork Pin
B—Distribution Hose
C—O-Ring

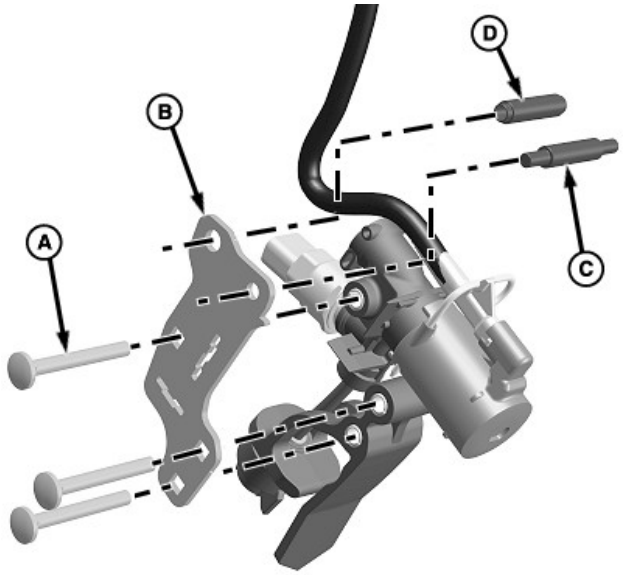
3. Pry out and remove fork pin (A).
4. Pull out distribution hose (B) and O-ring (C).
5. Inspect hose for wear or damage. Replace if necessary. (See Inspect and Replace Fertilizer Distribution Hoses and Manifold/Tubes in this section.)



A117297—UN—09MAR23

A—Flange Lock Nut (3 used)
B—Mount Plate

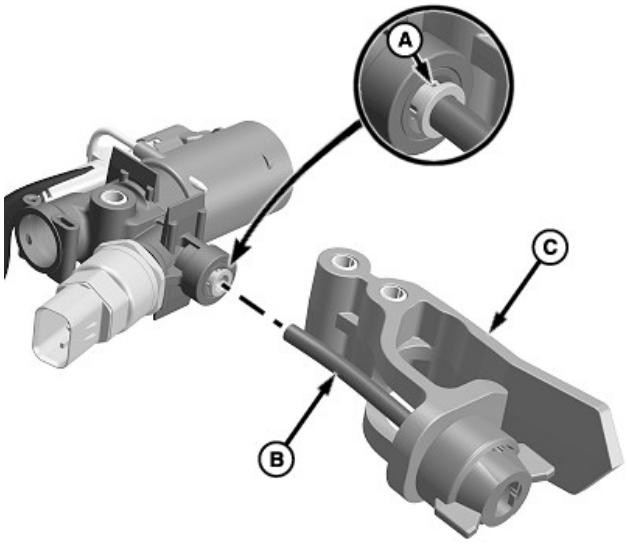
6. Remove flange lock nuts (A) and mount plate (B).



A117298—UN—09MAR23

A—Carriage Bolt (3 used)
B—Mount Plate
C—Pin
D—Bushing

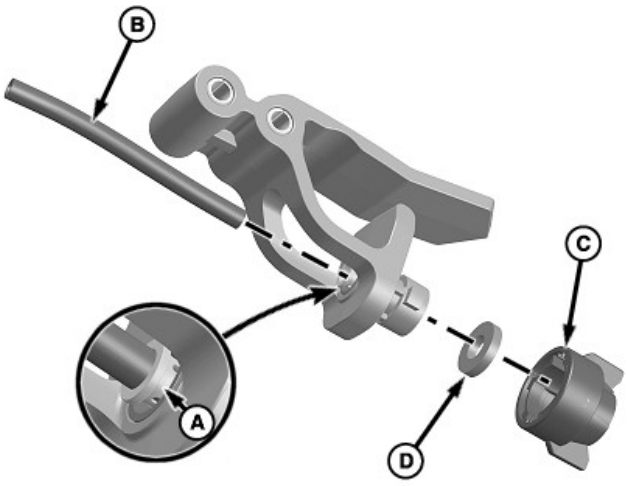
7. Remove carriage bolts (A), mount plate (B), pin (C), and bushing (D).



A117299—UN—09MAR23

A—Lock Fitting
B—Fertilizer Hose
C—Nozzle Assembly

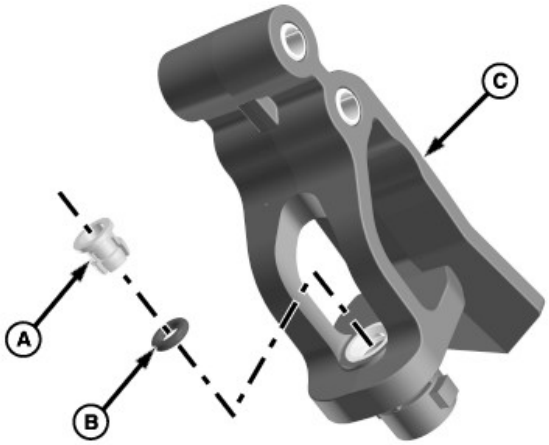
8. Push in lock fitting (A) and at the same time, pull out fertilizer hose (B) to remove nozzle assembly (C).



A117300—UN—09MAR23

A—Lock Fitting
B—Fertilizer Hose
C—Quick-Connect Cap
D—Sealing Washer

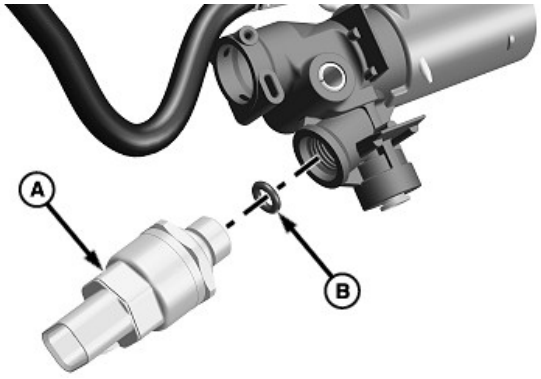
9. Push in lock fitting (A) and at the same time, pull out fertilizer hose (B).
10. Remove quick-connect cap (C) and sealing washer (D).



A117301—UN—13APR23

A—Lock Fitting
B—O-Ring
C—Nozzle Holder Guide

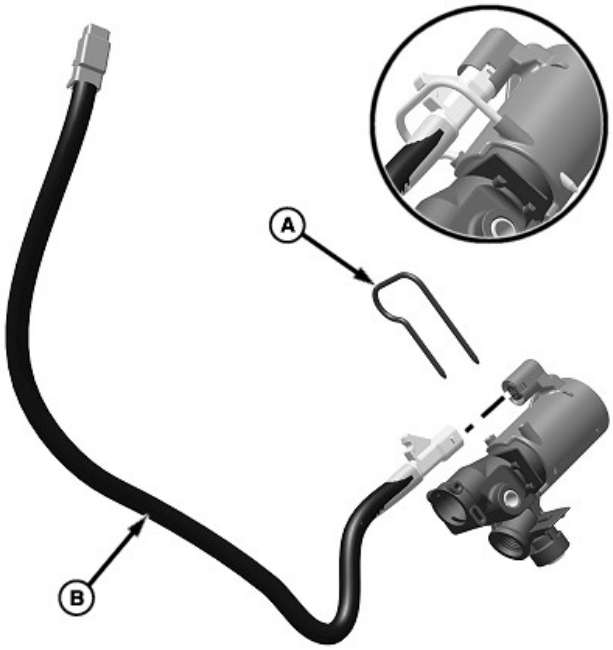
11. Pry out lock fitting (A) and O-ring (B) from nozzle holder guide (C).
12. Inspect nozzle holder guide, quick-connect cap, and parts for cracks, wear, or damage. Replace if necessary.



A117302—UN—09MAR23

A—Pressure Sensor
B—O-Ring

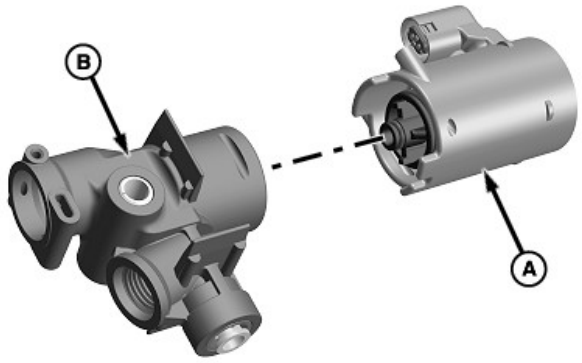
13. Remove pressure sensor (A) and O-ring (B).



A117303—UN—09MAR23

A—Pin
B—Solenoid Extension Harness

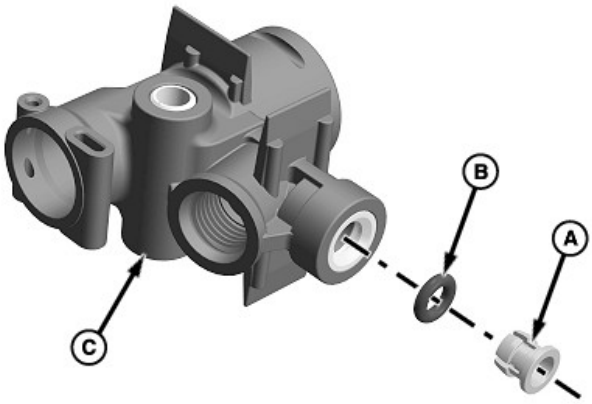
14. Pry out and remove pin (A).
15. Pull out solenoid extension harness (B).
16. Inspect harness for wear or damage. Replace if necessary.



A117304—UN—09MAR23

A—Dosing Solenoid
B—Valve Body

17. Separate dosing solenoid (A) from valve body (B).
18. Inspect dosing solenoid for wear or damage. (See Disassemble and Inspect Fertilizer Dosing Solenoid in this section.)



A117305—UN—13APR23

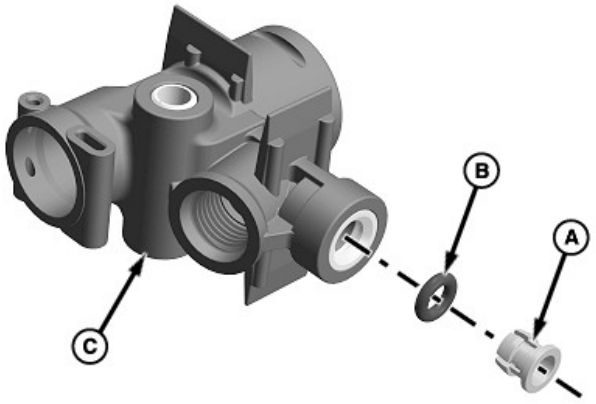
A—Lock Fitting
B—O-Ring
C—Valve Body

19. Pry out lock fitting (A) and O-ring (B).
20. Inspect valve body (C) for cracks, wear, or damage. Replace if necessary.

gc7gsd7,1678316930660-19-13APR23

Assemble Fertilizer Dosing Valve

IMPORTANT: Always use new O-rings. Damaged or used O-rings leak.

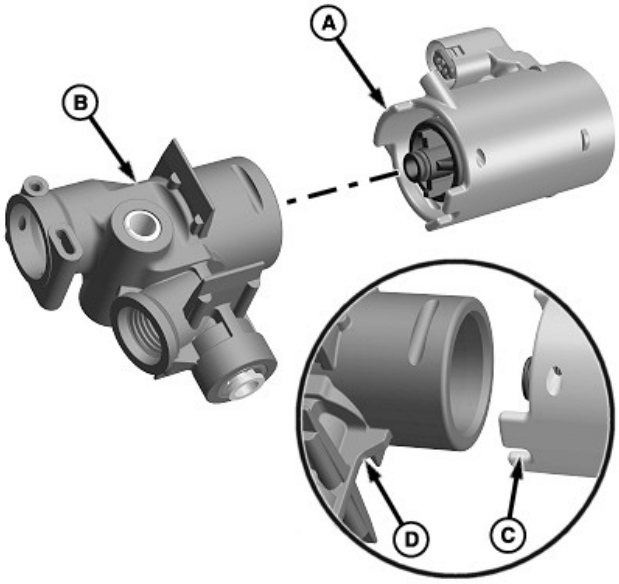


A117305—UN—13APR23

A—Lock Fitting
B—O-Ring
C—Valve Body

NOTE: Lubricate O-ring with PMH3503 Parker Super O-Lube or equivalent lubricant.

1. Install O-ring (B) and lock fitting (A).



A117309—UN—10MAR23

A—Dosing Solenoid
B—Valve Body
C—Notch
D—Tab

2. Align notch (C) with tab (D) and assemble dosing solenoid (A) to valve body (B).

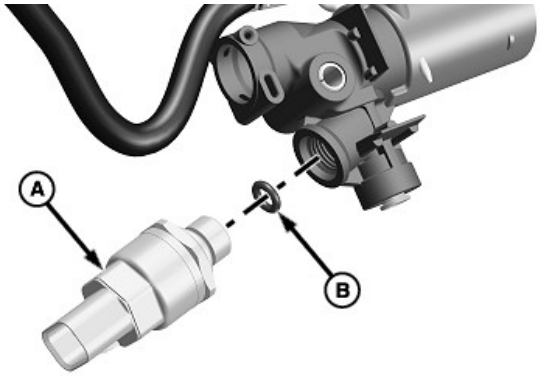


A117303—UN—09MAR23

A—Pin
B—Solenoid Extension Harness

NOTE: Lubricate the connector seal with T242210 NyoGel or equivalent.

3. Push in solenoid extension harness (B).
4. Install pin (A).



A117302—UN—09MAR23

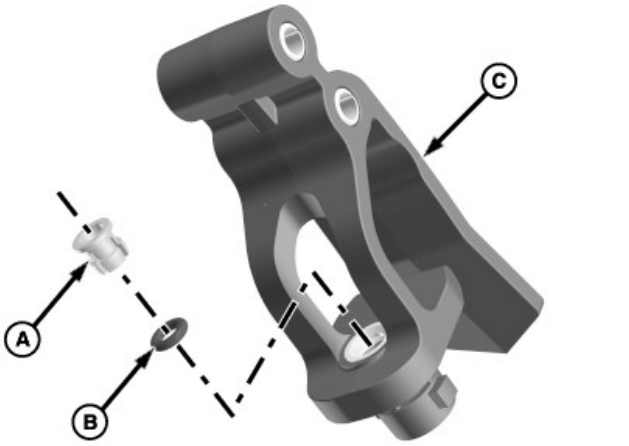
A—Pressure Sensor
B—O-Ring

NOTE: Lubricate O-ring with PMH3503 Parker Super O-Lube or equivalent lubricant.

5. Install O-ring (B) and pressure sensor (A).
6. Tighten to specification.

Specification

Pressure Sensor—Torque	7.5 N·m (66 lb·in)

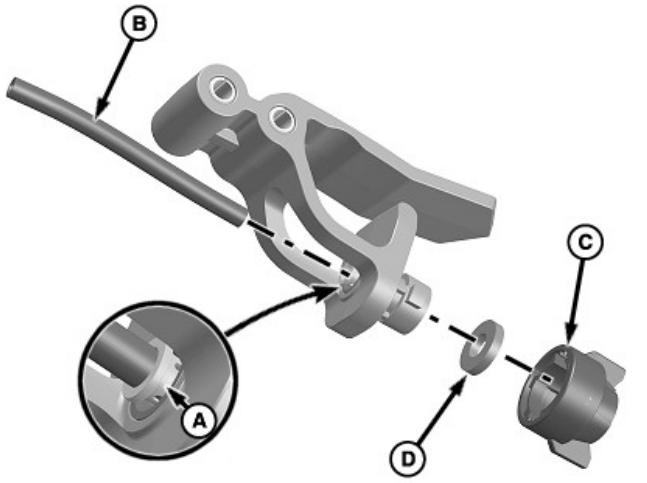


A117301—UN—13APR23

A—Lock Fitting
B—O-Ring
C—Nozzle Guide

NOTE: Lubricate O-ring with PMH3503 Parker Super O-Lube or equivalent lubricant.

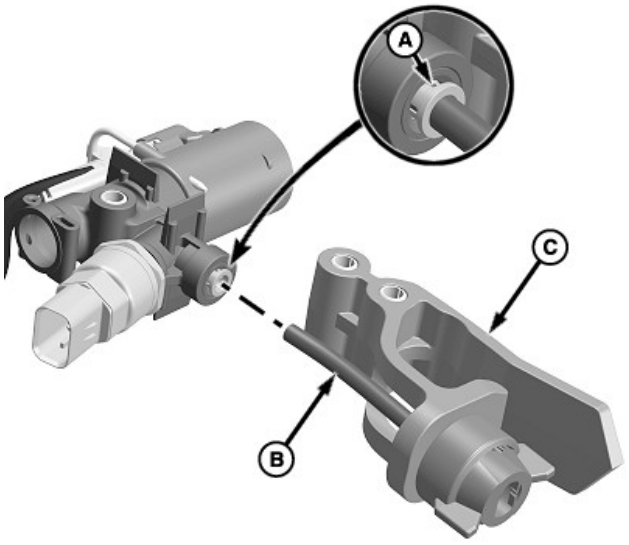
7. Install O-ring (B) and lock fitting (A).



A117300—UN—09MAR23

A—Lock Fitting
B—Fertilizer Hose
C—Quick-Connect Cap
D—Sealing Washer

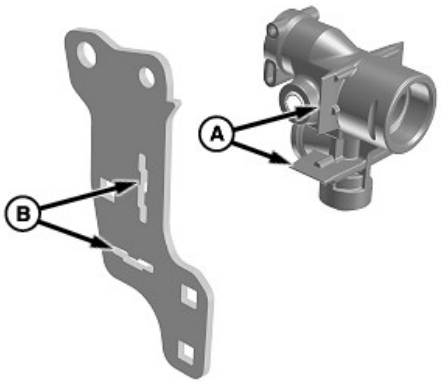
8. Install sealing washer (D) and quick-connect cap (C).
9. Push in lock fitting (A) and at the same time, push in fertilizer hose (B).



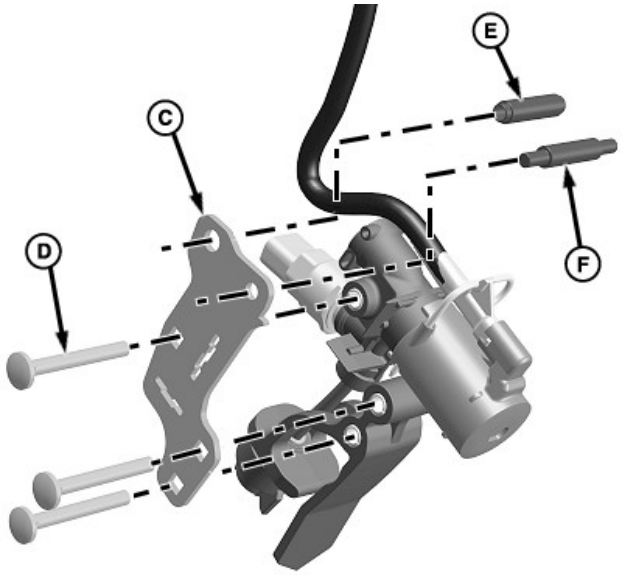
A117299—UN—09MAR23

A—Lock Fitting
B—Fertilizer Hose
C—Nozzle Assembly

10. Attach nozzle assembly (C) to valve body. Push in lock fitting (A) and at the same time, push in fertilizer hose (B).



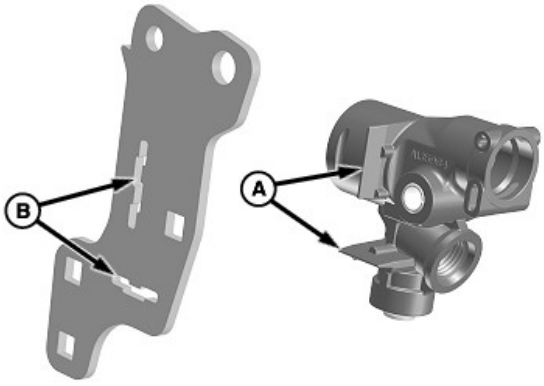
A117311—UN—10MAR23



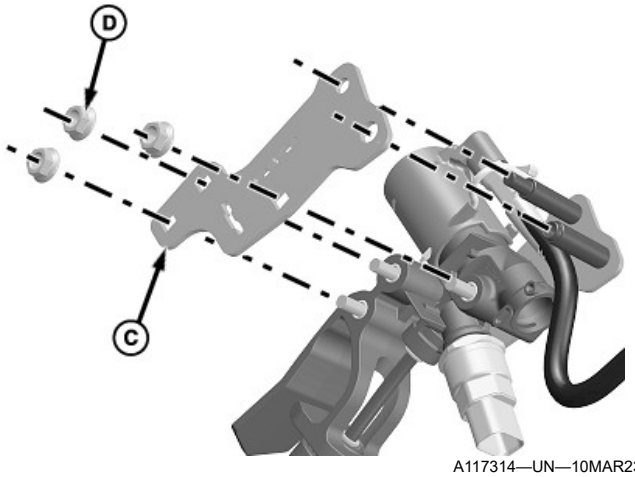
A117312—UN—10MAR23

A—Fin (2 used)
B—Slot (2 used)
C—Mount Plate
D—Carriage Bolt (3 used)
E—Bushing
F—Pin

11. Align fins (A) on valve body with slots (B) in mount plate and install mount plate (C) on valve body.
12. Install carriage bolts (D), bushing (E), and pin (F).



A117313—UN—10MAR23

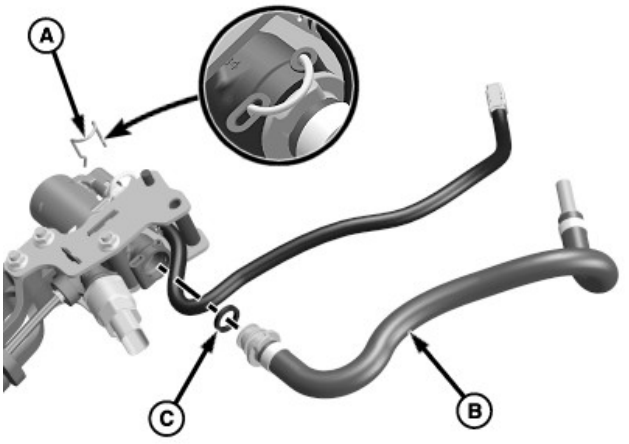


A117314—UN—10MAR23

A—Fin (2 used)
B—Slot (2 used)
C—Mount Plate
D—Flange Lock Nut (3 used)

13. Align fins (A) on valve body with slots (B) in mount plate (C) and install mount plate on valve body.
14. Install flange lock nuts (D).
15. Tighten to specification.

Specification	
Flange Lock Nut—Torque	9 N·m (80 lb·in)

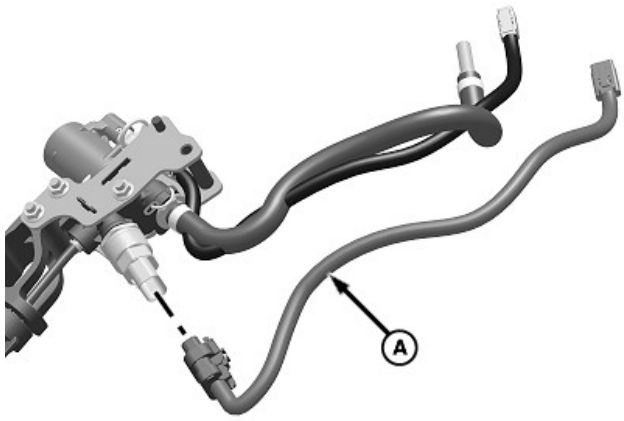


A117296—UN—09MAR23

A—Fork Pin
B—Distribution Hose
C—O-Ring

NOTE: Lubricate O-ring with PMH3503 Parker Super O-Lube or equivalent lubricant.

16. Install O-ring (C) and distribution hose (B).
17. Install fork pin (A).



A117295—UN—09MAR23

A—Pressure Sensor Extension Harness

NOTE: Lubricate the connector seal with T242210 NyoGel or equivalent.

18. Connect pressure sensor extension harness (A).

gc7gsd7,1678316935893-19-13APR23

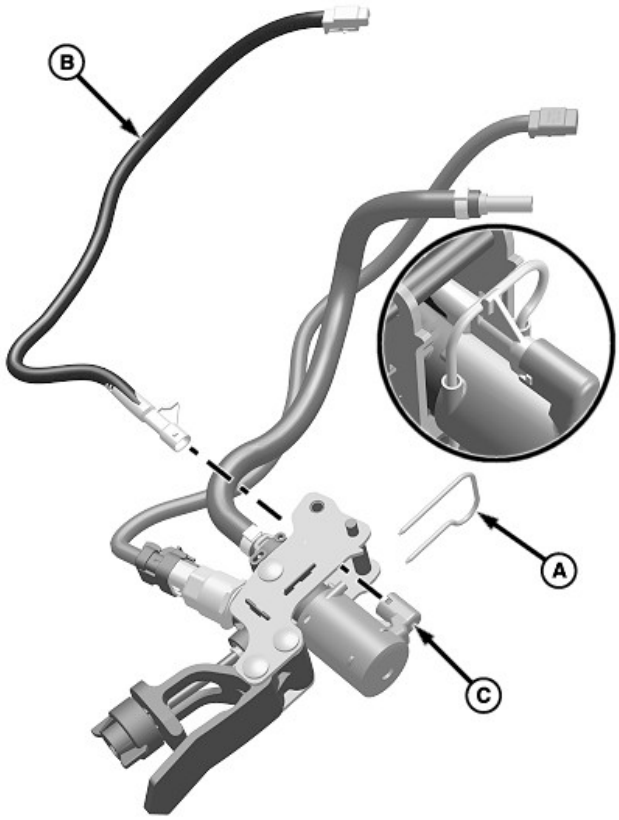
Disassemble and Inspect Fertilizer Dosing Solenoid

1. Remove fertilizer dosing valve. (See procedure in this section.)

IMPORTANT: Do not allow solvent or diesel fuel to contact the rubber parts of the dosing solenoid, as it causes deterioration.

NOTE: AA110714 Service Kit is shipped with the planter.

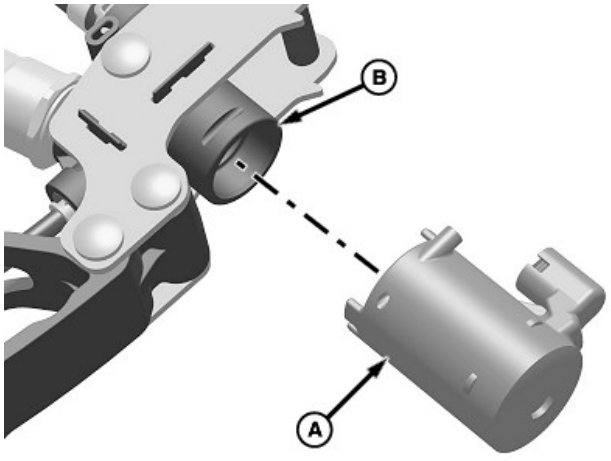
2. Clean around the extension harness connection and dosing solenoid using TY26632 Electronic Contact Cleaner.



A117315—UN—13MAR23

A—Pin
B—Solenoid Extension Harness
C—Connector Housing

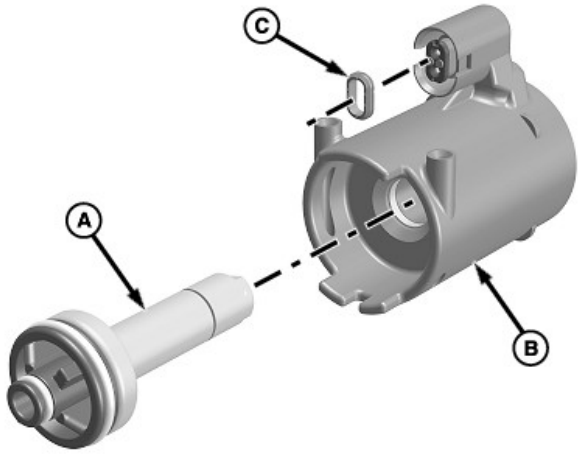
3. Pry out and remove pin (A).
4. Pull out solenoid extension harness (B).
5. Lightly spray TY26632 Electronic Contact Cleaner on the harness connector end and inside the 2-pin connector housing (C) to clean off any fertilizer residue.



A117316—UN—13MAR23

A—Dosing Solenoid
B—Valve Body

6. Separate dosing solenoid (A) from valve body (B).

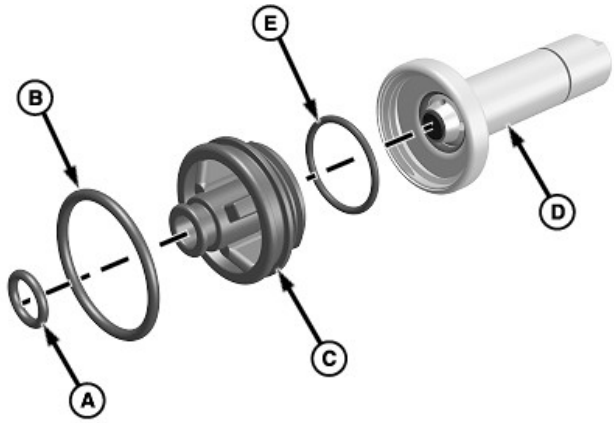


A117317—UN—13MAR23

A—Cartridge Assembly
B—Dosing Solenoid
C—Harness Connector Seal

IMPORTANT: Do not use a channel lock or pliers on the cartridge assembly.

7. Remove cartridge assembly (A) from dosing solenoid (B).
8. Remove harness connector seal (C).

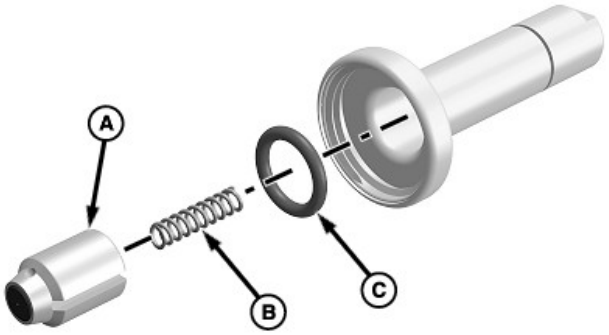


A117318—UN—13MAR23

A—O-Ring
B—O-Ring
C—Valve Seat
D—Tube Assembly
E—O-Ring

IMPORTANT: Do not use a channel lock or pliers on the tube assembly or valve seat.

9. Remove O-rings (A and B).
10. Separate valve seat (C) from tube assembly (D) by turning valve seat counterclockwise.
11. Remove O-ring (E).



A117319—UN—13MAR23

A—Plunger
B—Spring
C—O-Ring

12. Remove plunger (A), spring (B), and O-ring (C).

IMPORTANT: Do not soak the valve seat or dosing solenoid in any cleaner solution. Wipe off parts using a lint-free cloth.

13. Clean all parts except the valve seat and dosing solenoid using Erase or equivalent cleaner, diluted according to the instructions on the product label.
14. Inspect all parts for wear or damage. Replace if necessary.

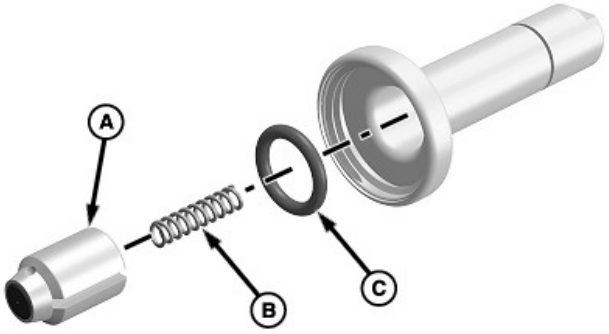
gc7gsd7,1678733325363-19-13APR23

Assemble Fertilizer Dosing Solenoid

IMPORTANT: Always use new O-rings. Damaged or used O-rings leak.

Do not apply any lubricant on the O-rings.

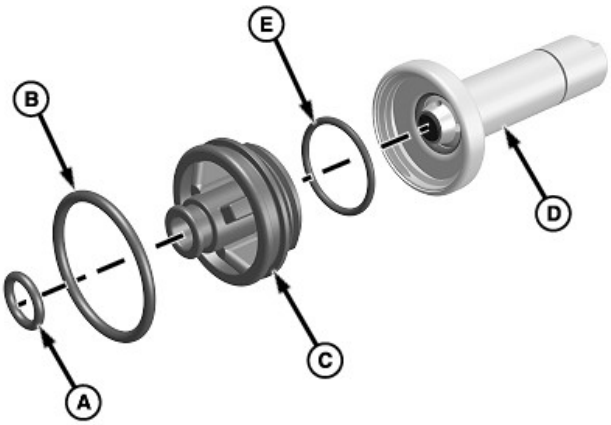
NOTE: AA110714 Service Kit is shipped with the planter.



A117319—UN—13MAR23

A—Plunger
B—Spring
C—O-Ring

1. Install O-ring (C), spring (B), and plunger (A) into the tube assembly.



A117318—UN—13MAR23

A—O-Ring
B—O-Ring
C—Valve Seat
D—Tube Assembly
E—O-Ring

2. Install O-ring (E).

IMPORTANT: Do not use a channel lock or pliers on the tube assembly or the valve seat.

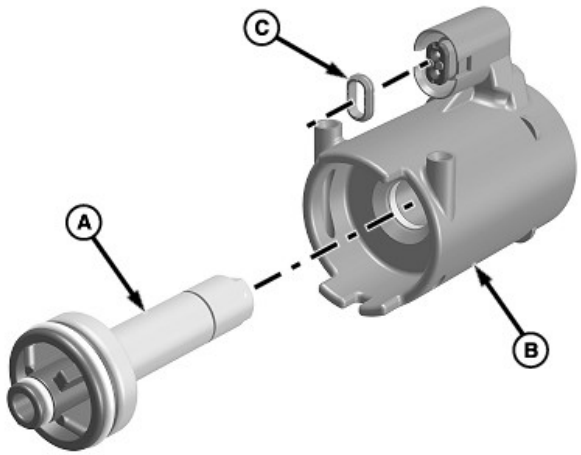
3. Align valve seat (C) with tube assembly (D) and turn valve seat clockwise.

IMPORTANT: To prevent damage, the valve seat wrench and the provided torque wrench must be used when tightening the valve seat.

4. Install the supplied torque wrench from AA110714 Service Kit onto the valve seat. Turn the torque wrench clockwise and tighten to the preset torque specification.

Specification	
Valve Seat—Torque	0.5 N·m (5 lb·in)

5. Install O-rings (A and B).



A117317—UN—13MAR23

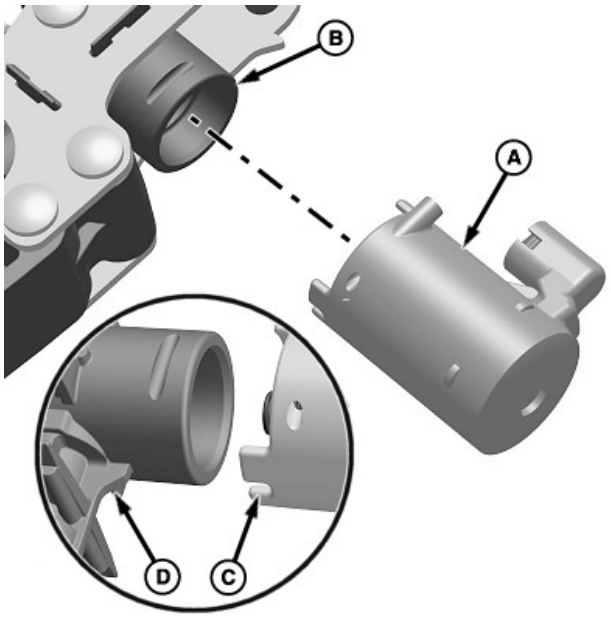
A—Cartridge Assembly

B—Dosing Solenoid
C—Harness Connector Seal

6. Install harness connector seal (C).

IMPORTANT: Cartridge assembly must easily install by hand into the dosing solenoid. If tapping or excessive force is required, inspect the cartridge assembly and dosing solenoid for contamination or misalignment.

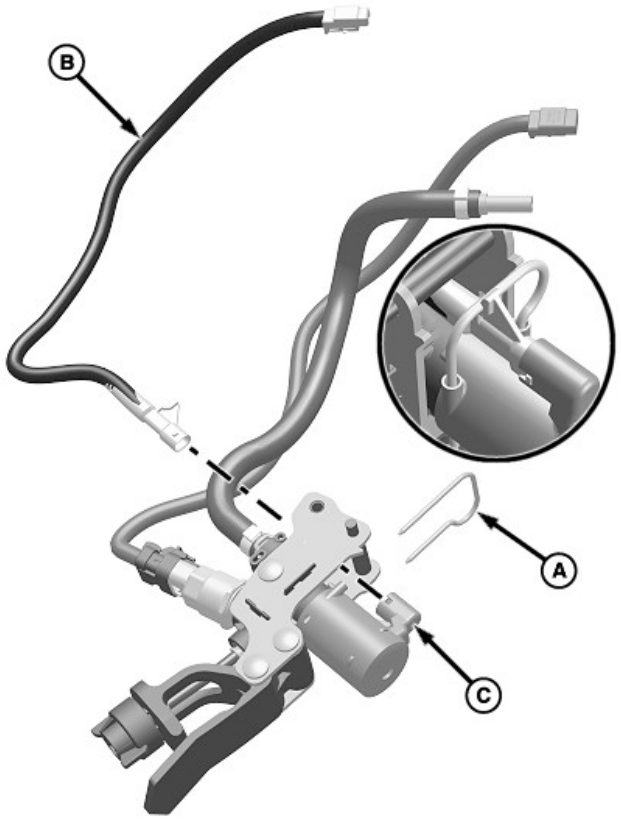
7. Install cartridge assembly (A) into dosing solenoid (B).



A117320—UN—14MAR23

A—Dosing Solenoid
B—Valve Body
C—Notch
D—Tab

8. Align notch (C) with tab (D) and assemble dosing solenoid (A) to valve body (B).



A117315—UN—13MAR23

A—Pin
B—Solenoid Extension Harness
C—Connector Housing

NOTE: Lubricate extension harness seal and pins inside connector housing (C) with T242210 NyoGel or equivalent.

9. Push in solenoid extension harness (B).
10. Install pin (A).
11. Install fertilizer dosing valve. (See procedure in this section.)

gc7gsd7,1678744016707-19-13APR23

Inspect and Replace Fertilizer Manifold T-Fittings



TS281—UN—15APR13

CAUTION: Avoid serious injury. Turn off the fertilizer system. Do not perform any maintenance on the components while fertilizer system is on.

Avoid injury from pressurized fertilizer solution.

Wear protective clothing, eyewear, and gloves when performing service.

Pressure is trapped in the manifold/tube and distribution hoses. Relieve the pressure from the liquid fertilizer system before servicing the manifold T-fittings.

Do not activate the fertilizer pump while servicing any of the components.

NOTE: Do not drain the fertilizer solution onto the ground. Use a suitable container or bucket to catch any leaked fertilizer solution.

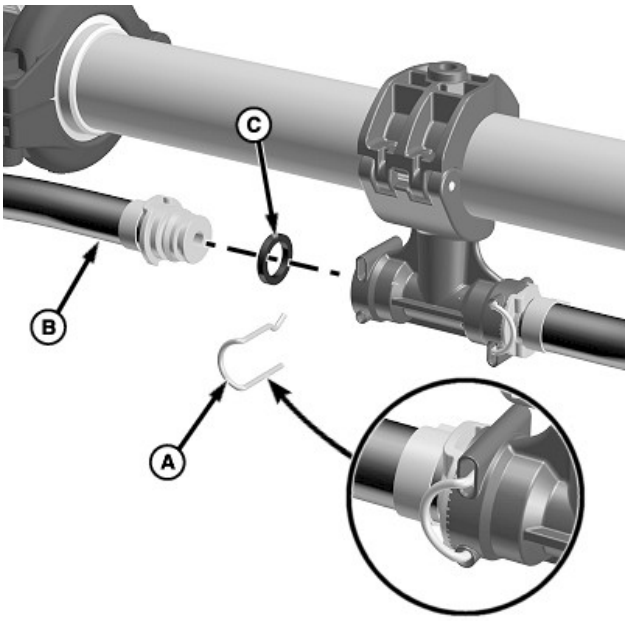
1. Turn on the electric power generation system.
2. Relieve the pressure from the manifold tube, distribution hoses, and manifold T-fittings by using the pressure relief button on the display in the tractor. The pressure relief button enables the components for 6 seconds. Before performing any service on the fertilizer system, cycle the pressure relief several times.



TS220—UN—15APR13

CAUTION: Avoid serious injury. Do not clean manifold tube, distribution hoses,or manifold T-fittings by placing near mouth and blowing. You could swallow or inhale hazardous chemicals that are poisonous, which can cause serious injury or death.

3. Clean contamination from the exterior of the manifold tube, distribution hoses, and manifold T-fittings.

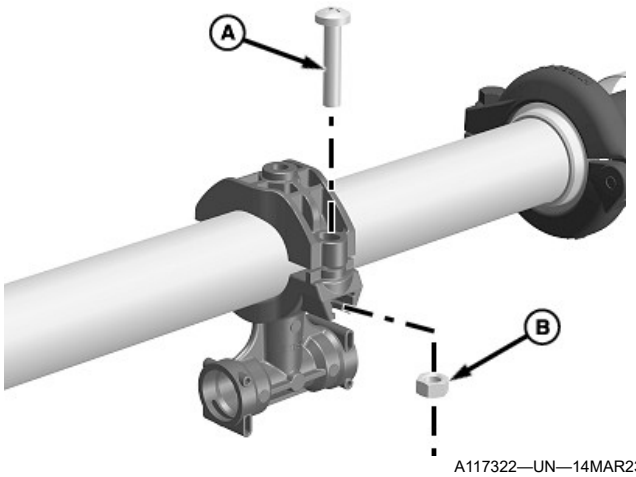


A117321—UN—14MAR23

A—Fork Pin
B—Distribution Hose
C—O-Ring

NOTE: Make sure to inspect and clean all manifold T-fittings. Service procedure is the same for all T-fittings.

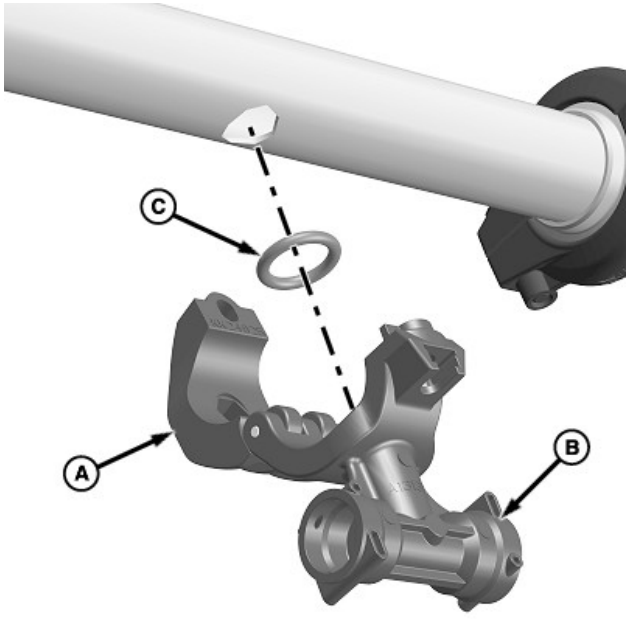
4. Pry out and remove fork pin (A).
5. Pull out distribution hose (B) and O-ring (C).
6. Repeat the procedure on the other end of the maniflod T-fitting.



A117322—UN—14MAR23

A—Screw
B—Nut

7. Remove screw (A) and nut (B).



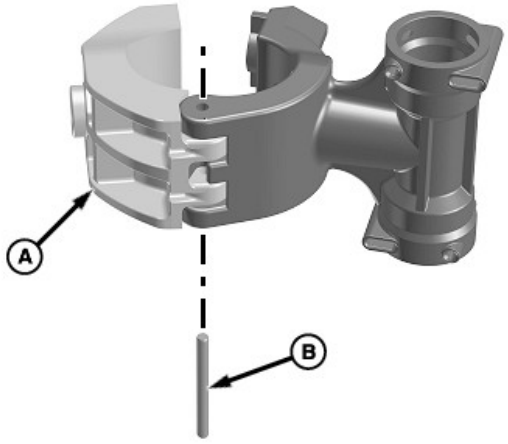
A117323—UN—17MAR23

A—Half Clamp
B—Manifold T-Fitting
C—O-Ring

8. Raise/rotate half clamp (A) and remove manifold T-fitting (B) and O-ring (C).

CAUTION: Avoid serious injury. Do not clean manifold tube, distribution hoses, or manifold T-fittings by placing near mouth and blowing. You could swallow or inhale hazardous chemicals that are poisonous, which can cause serious injury or death.

9. Clean out manifold T-fitting using compressed air.
10. Clean all parts using Erase or equivalent cleaner, diluted according to the instructions on the product label.
11. Inspect all parts for cracks, wear, or damage. Replace as necessary.



A117324—UN—17MAR23

A—Half Clamp
B—Pin

12. If necessary to replace half clamp (A):
    a. Remove pin (B) using a punch and 3/8 in drive deep-well socket.
    b. Install new half clamp and pin using a C-clamp or channel-lock pliers.

IMPORTANT: Always use new O-rings. Damaged or used O-rings leak.

13. Install manifold T-fitting in reverse order of removal.
    - Lubricate all O-rings with PMH3503 Parker Super O-Lube or equivalent lubrucant.
    - Tighten screw to specification.

Specification	
Screw—Torque	2 N·m (18 lb·in)

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Clean Liquid Fertilizer Tank

CAUTION: Do not service when the system is under pressure. Never remove the fertilizer tank lid to relieve the pressure. Empty the liquid fertilizer tank completely to relieve pressure by reversing flow through a nurse tank pump or press the spring-loaded check valve (E) on the center of the fertilizer tank lid.

Although the liquid fertilizer tank is made of a highly durable and corrosion-resistant plastic, proper maintenance is required.

Rinse the liquid fertilizer tank with water when changing from one solution to another.

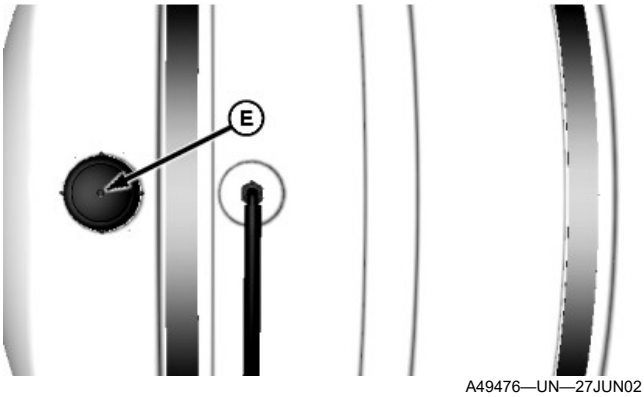
To avoid plugged hoses if the fertilizer is not rinsed immediately after use, remove the hose from the tank ball valve before rinsing the fertilizer tank.

Rinse the liquid fertilizer tank thoroughly with water after each season or before any shutdown lasting over one week.

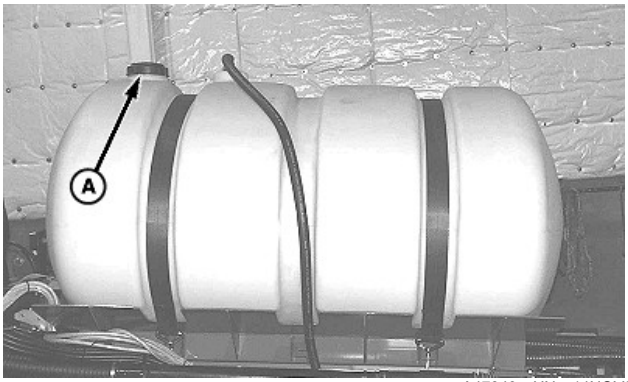
Do not allow sludge to accumulate in the bottom of the liquid fertilizer tank.

Do not leave liquid fertilizer in the liquid fertilizer tank if the temperature is expected to drop below 4.4°C (40°F), as some types of liquid fertilizers begin to crystallize at this temperature.

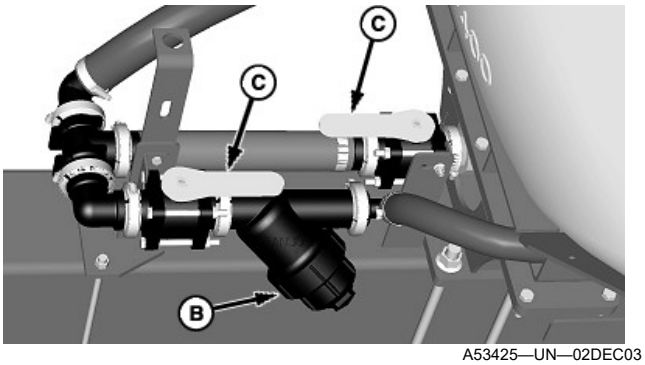
To clean the liquid fertilizer tank, proceed as follows:



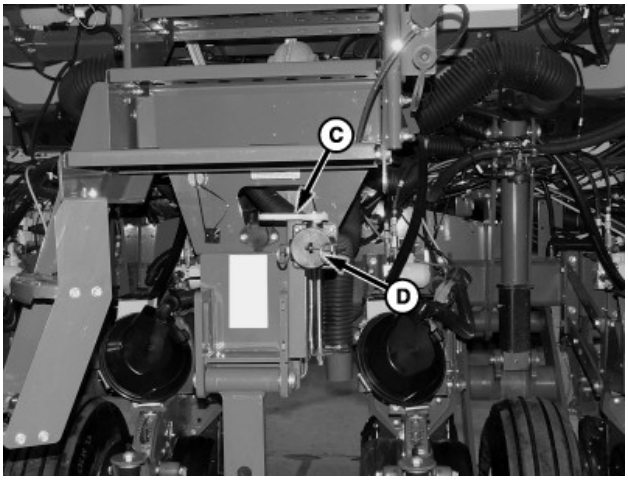
A49476—UN—27JUN02



A47840—UN—14NOV02



A53425—UN—02DEC03



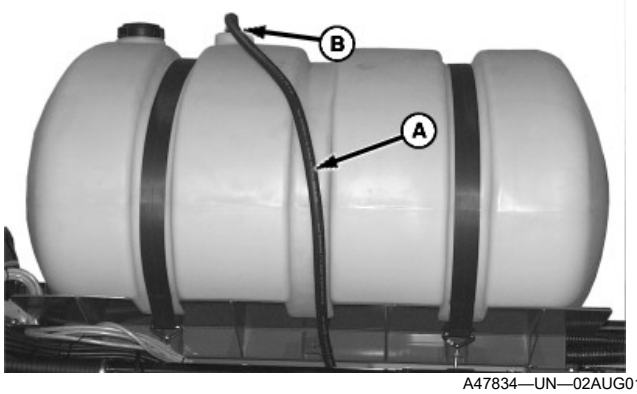
A107068—UN—17JUN20

A—Lid
B—Strainer Cap
C—Shutoff Valve
D—Quik-Fill Cap
E—Spring-Loaded Check Valve

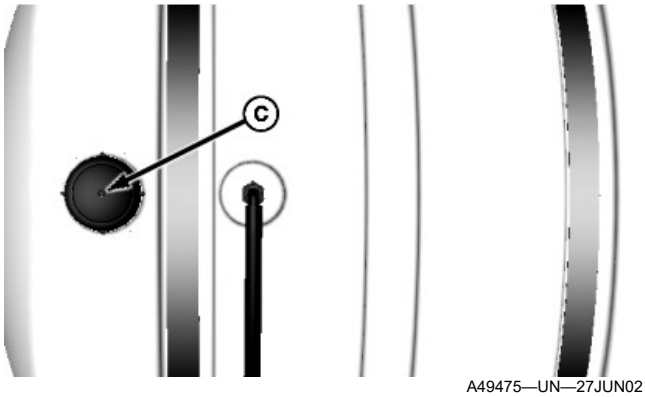
1. Relieve the pressure from the liquid fertilizer tank.
2. Remove the lid (A).
3. Remove the strainer cap (B) and screen.
4. Open the shutoff valves (C) going to the pump, tank, and Quik-Fill port.
5. Remove Quik-Fill cap (D).
6. Flush tank and hoses with water.
7. After cleaning the tank, close the shutoff valves, reinstall the strainer cap and Quik-Fill cap, and lid on the tank.
8. To clean any remaining material from the tank, remove the fitting from the bottom of the tank and flush the tank with water.
9. Clean the pump and distribution lines for storage after cleaning the liquid fertilizer tank. (See Liquid Fertilizer System Storage Procedures in the Storage section.)

WP29706,0000E9B-19-09OCT25

Clean the Liquid Fertilizer Tank Lid Fitting and Drip Line Hose



A47834—UN—02AUG01



A49475—UN—27JUN02

Top View of Fertilizer Tank

A—Drip Line Hose
B—Fitting
C—Spring-Loaded Check Valve

CAUTION: Avoid personal injury. Never service the system under pressure. Empty the tank completely or relieve system pressure by pressing the spring-loaded check valve (C).

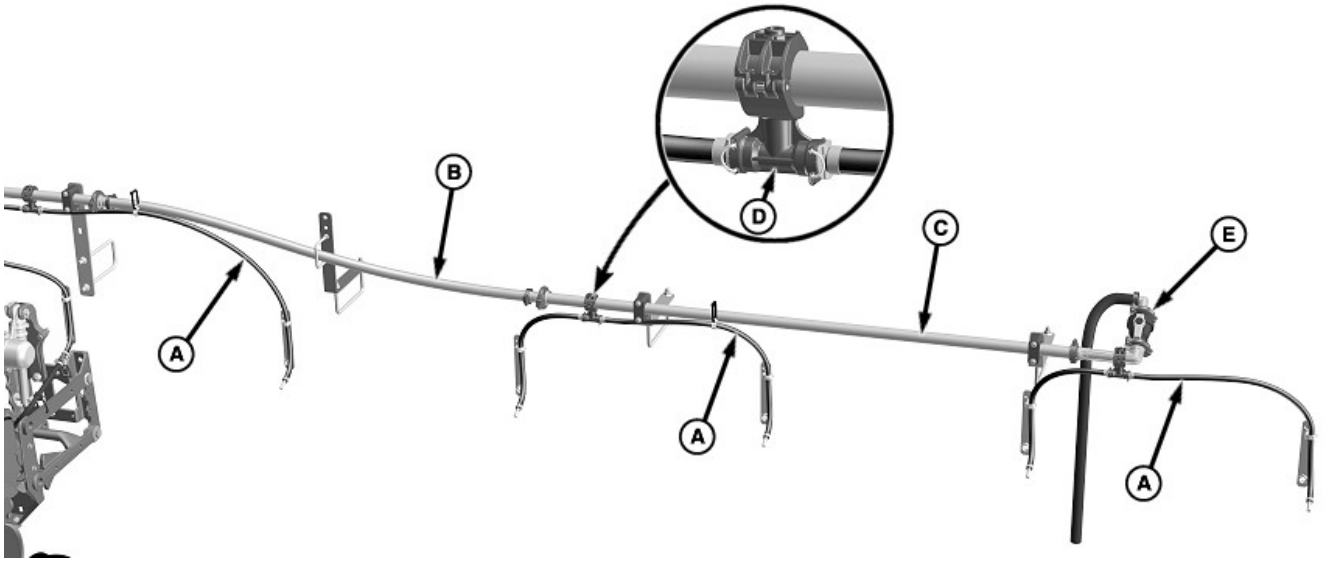
IMPORTANT: Avoid system malfunction. Verify that dirt and liquid fertilizer do not plug the drip line hose (A) and fitting (B), causing an air lock condition.

1. Relieve pressure from the system.
2. Remove drip line hose (A) and the fitting (B).
3. Flush drip line hose (A) and the fitting (B).
4. Install flushed drip line hose (A) and the fitting (B).

CR53390,0000168-19-01AUG19

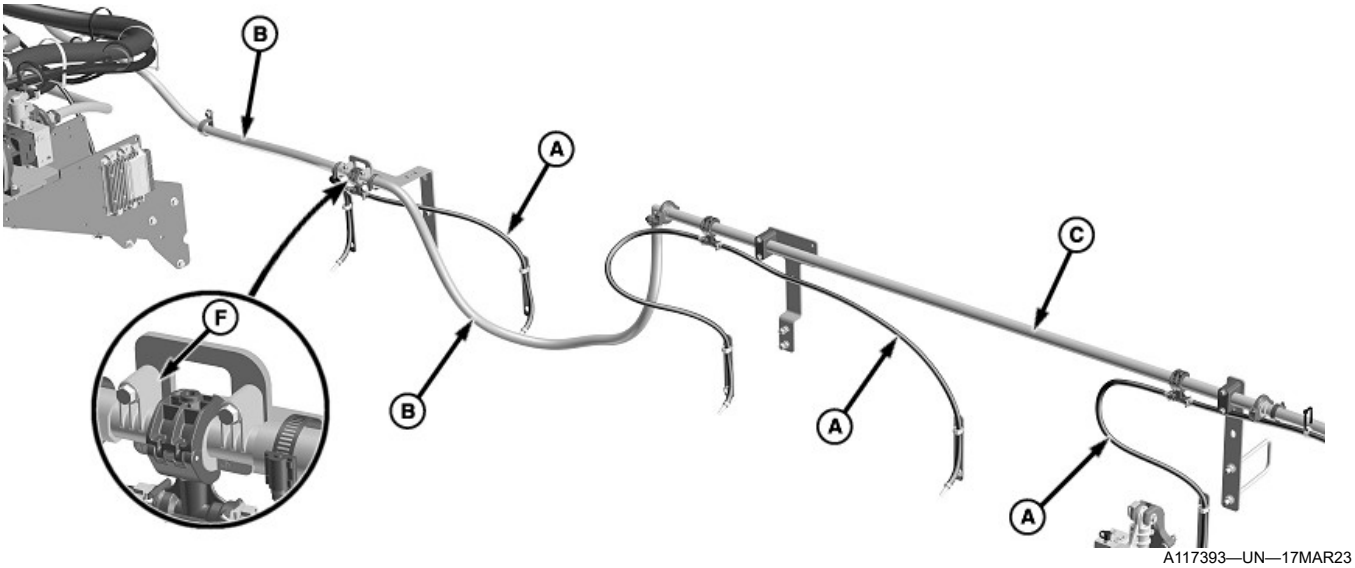
Inspect and Replace Fertilizer Distribution Hoses and Manifold Tubes

Fertilizer Distribution System Identification



A117366—UN—17MAR23

Location Diagram—Example 1



A117393—UN—17MAR23

Location Diagram—Example 2

A—Distribution Hose
B—Delivery Hose
C—Manifold Tube
D—Manifold T-Fitting
E—Shutoff Valve
F—Straight Fitting/Support

NOTE: Replacement procedures are the same for both sides of the machine. Right-hand side is shown.



TS281—UN—15APR13

CAUTION: Avoid serious injury. Turn off the fertilizer system. Do not perform any maintenance on the components while fertilizer system is on.

Avoid injury from pressurized fertilizer solution.

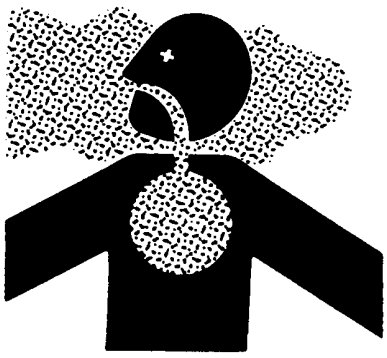
Wear protective clothing, eyewear, and gloves when performing service.

Pressure is trapped in the distribution system. Relieve the pressure from the liquid fertilizer system before servicing the components.

Do not activate the fertilizer pump while servicing any of the components.

NOTE: Do not drain the fertilizer solution onto the ground. Use a suitable container or bucket to catch any leaked fertilizer solution.

1. Turn on the electric power generation system.
2. Relieve the pressure from the distribution system by using the pressure relief button on the display in the tractor. The pressure relief button enables the components for 6 seconds. Before performing any service on the fertilizer system, cycle the pressure relief several times.



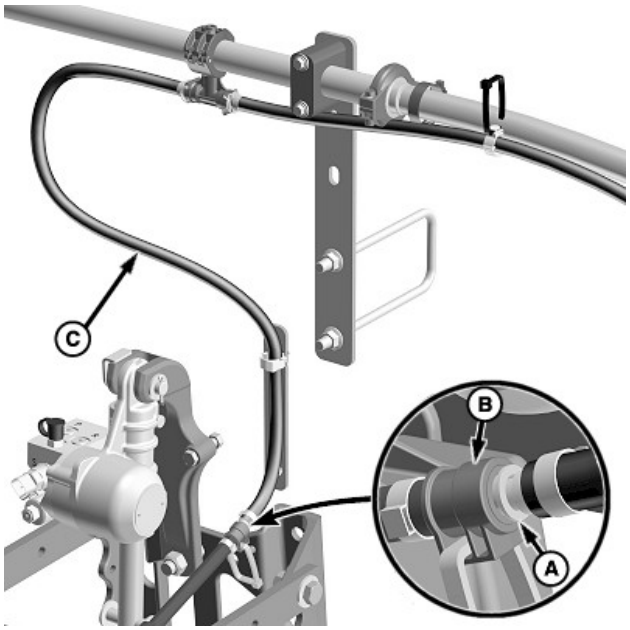
TS220—UN—15APR13

CAUTION: Avoid serious injury. Do not clean any components by placing near mouth and blowing. You could swallow or inhale hazardous chemicals that are poisonous, which can cause serious injury or death.

3. Clean contamination from the exterior of all components.

4. Clean out all components using compressed air.
5. Clean all parts using Erase or equivalent cleaner, diluted according to the instructions on the product label.

Distribution Hoses

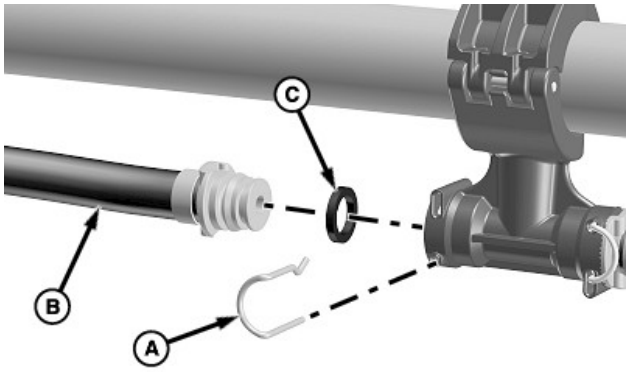


A117367—UN—17MAR23

Row Unit End

A—Lock Fitting
B—Coupler
C—Distribution Hose

1. Push in lock fitting (A) on coupler (B) and at the same time, pull out distribution hose (C).



A117368—UN—17MAR23

Manifold T-Fitting End

A—Fork Pin
B—Distribution Hose
C—O-Ring

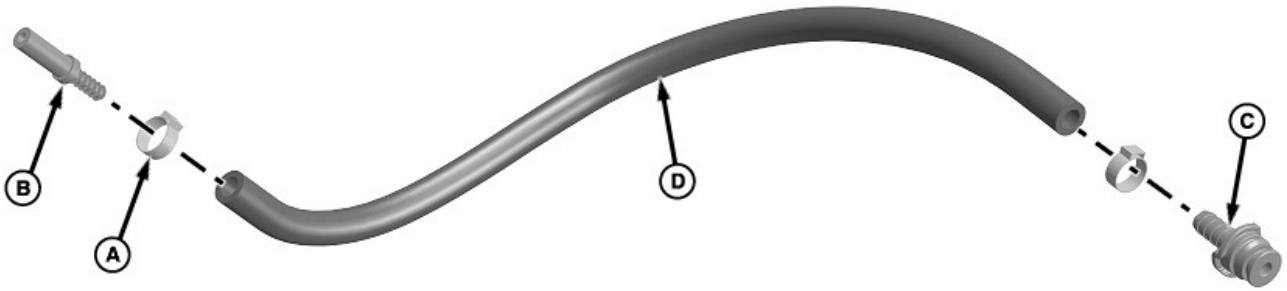
2. Pry out and remove fork pin (A).
3. Pull out distribution hose (B) and O-ring (C).



A117369—UN—20MAR23

A—Clip (as required)

4. Remove distribution hose from clips (A).



A117370—UN—20MAR23

A—Clamp (2 used)
B—Stem
C—Barb Fitting
D—Distribution Hose

5. Inspect distribution hose for wear or damage. If necessary, replace hose as follows:
   a. Cut and remove clamps (A) from both ends of distribution hose (D).
   b. Remove stem (B) and barb fitting (C).
   c. Measure the length of the worn or damaged hose before discarding.
   d. Cut a new piece of hose to the previously recorded length.

e. Trim each end of the new hose square with a tube cutter or a similar device.

f. Push one end of of the new hose onto the barb-end of stem (B).

g. Install clamps (A) on the delivery hose. Leave loose.

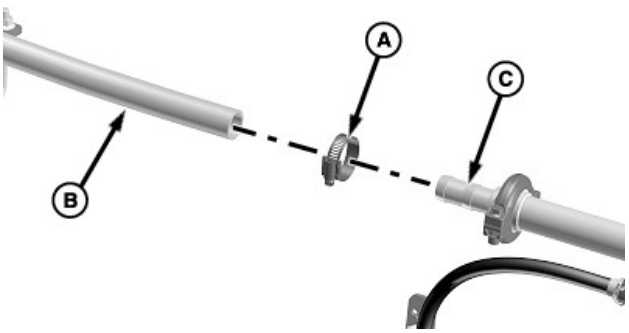
h. Push the opposite end of of the hose onto the end of barb fitting (C).

i. Position each clamp over the barb ends and, using the proper tool, tighten the clamps by squeezing them at the pinch points on the clamps.

IMPORTANT: Always use new O-rings. Damaged or used O-rings leak.

6. Install distribution hose in reverse order of removal.
   - Lubricate all O-rings with PMH3503 Parker Super O-Lube or equivalent lubricant.
   - Secure distribution hose to the machine with existing clips.

Delivery Hoses

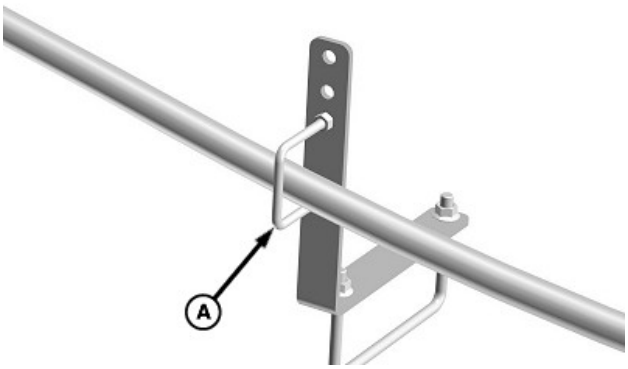


A117371—UN—20MAR23

A—Hose Clamp
B—Delivery Hose
C—Barb Fitting

NOTE: Make note of the hose routing before removing the hose to aid in the installation of the new hose.

1. Remove hose clamp (A) from both ends of delivery hose (B).
2. Cut off tie bands where necessary.
3. Remove cap screw and P-clamp, if equipped.
4. Twist and pull delivery hose from barb fitting (C) at both ends.

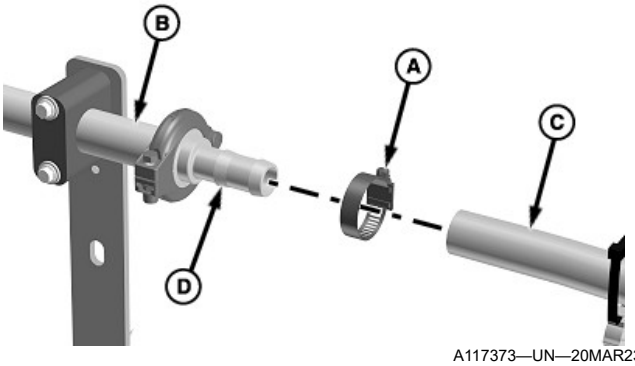


A117372—UN—20MAR23

A—Guide

5. Route delivery hose through guides (A) where necessary.
6. Inspect delivery hose for wear or damage. If necessary, replace hose as follows:
   a. Measure the length of the worn or damaged hose before discarding.
   b. Cut a new piece of hose to the previously recorded length.
   c. Trim each end of the new hose square with a tube cutter or a similar device.
7. Install delivery hose in reverse order of removal. Install new tie bands, where necessary.

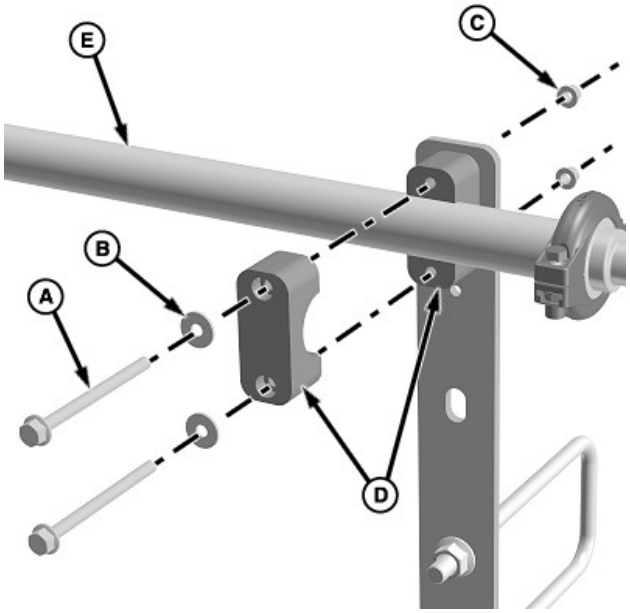
Manifold Tubes



A117373—UN—20MAR23

A—Hose Clamp (2 used)
B—Manifold Tube
C—Delivery Hose (2 used)
D—Adapter Fitting (2 locations)

1. Remove manifold T-fittings. (See Inspect and Replace Fertilizer Manifold T-Fittings in this section.)
2. Remove hose clamps (A) from both ends of manifold tube (B).
3. Twist and pull delivery hoses (C) from adapter fitting (D) at both ends of the manifold tube.

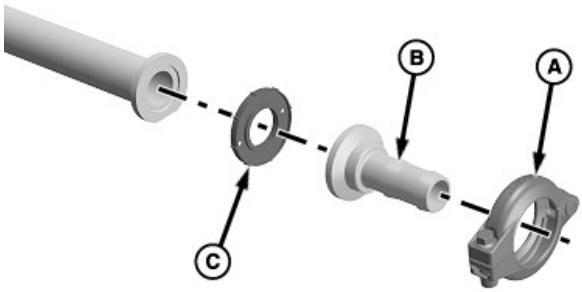


A117374—UN—20MAR23

A—Cap Screw (2 used)
B—Washer (2 used)
C—Flange Lock Nut (2 used)
D—Clamp Half (2 used)
E—Manifold Tube

NOTE: Approximate weight of manifold tube is 4 kg (9 lb).

4. Remove cap screws (A), washers (B), flange lock nuts (C), clamp halves (D), and manifold tube (E) from support brackets.
5. Repeat step 4 on the opposite end.



A117375—UN—20MAR23

Straight Adapter Shown

A—Flange Clamp (as needed)
B—Adapter (straight or elbow)
C—Gasket

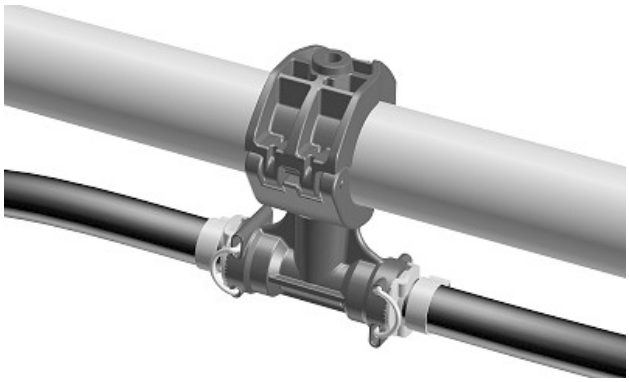
6. Remove flange clamps (A), adapter (B), and gasket (C) from both ends of the manifold tube.
7. Inspect all parts for cracks, wear, or damage. Replace as necessary.
8. Install manifold tube in reverse order of removal.
   - Tighten flange clamps to specification.

Specification

Flange Clamp—Torque. . . . . 4.5 N·m (40 lb·in)

   - Install manifold tube with holes DOWN.

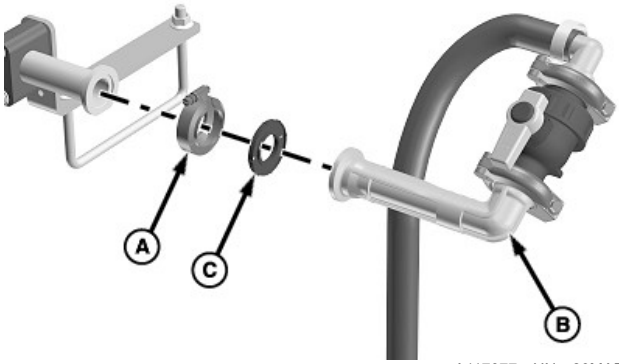
Manifold T-Fittings



A117376—UN—20MAR23

Remove manifold T-fittings. (See Inspect and Replace Fertilizer Manifold T-Fittings in this section.)

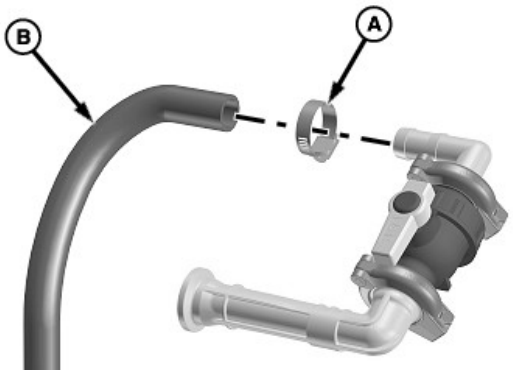
Shutoff Valve and Fittings



A117377—UN—20MAR23

A—Flange Clamp
B—Shutoff Valve Assembly
C—Gasket

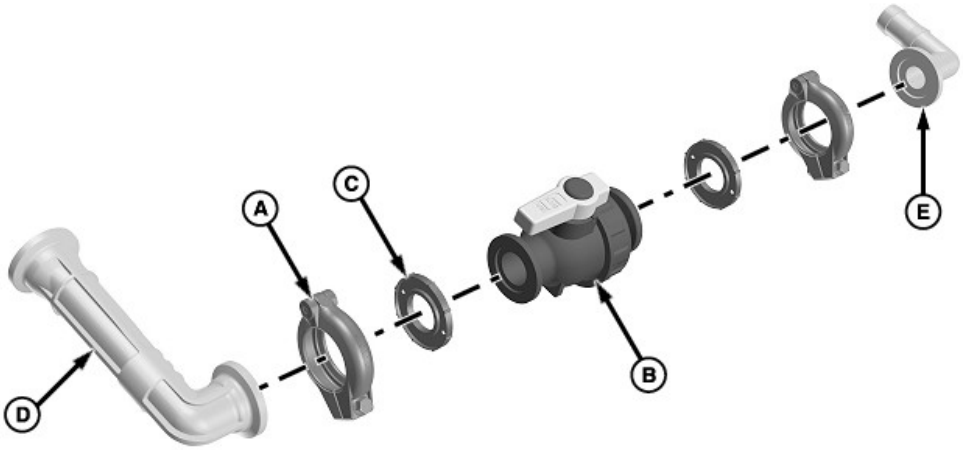
1. Remove manifold T-fittings. (See Inspect and Replace Fertilizer Manifold T-Fittings in this section.)
2. Remove flange clamp (A).
3. Remove shutoff valve assembly (B) and gasket (C).



A117392—UN—20MAR23

A—Hose Clamp
B—Drain Hose

4. Remove hose clamp (A) and drain hose (B).
5. Inspect drain hose for wear or damage. If necessary, replace hose as follows:
   a. Measure the length of the worn or damaged hose before discarding.
   b. Cut a new piece of hose to the previously recorded length.
   c. Trim each end of the new hose square with a tube cutter or a similar device.



A117378—UN—20MAR23

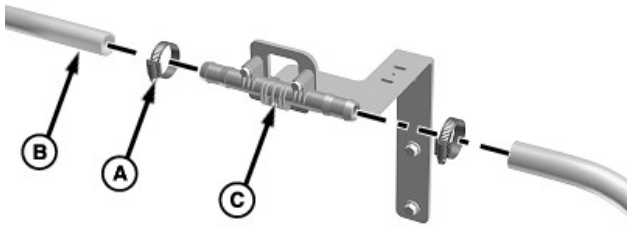
A—Flange Clamp (2 used)
B—Shutoff Valve
C—Gasket (2 used)
D—Elbow Fitting
E—Elbow Fitting with Barb End

6. Disassemble parts (A—E).
7. Inspect all parts for cracks, wear, or damage. Replace as necessary.
8. Install shutoff valve, fittings, and drain hose in reverse order of removal. Tighten flange clamps to specification.

Specification

Flange Clamp—Torque	4.5 N·m (40 lb·in)

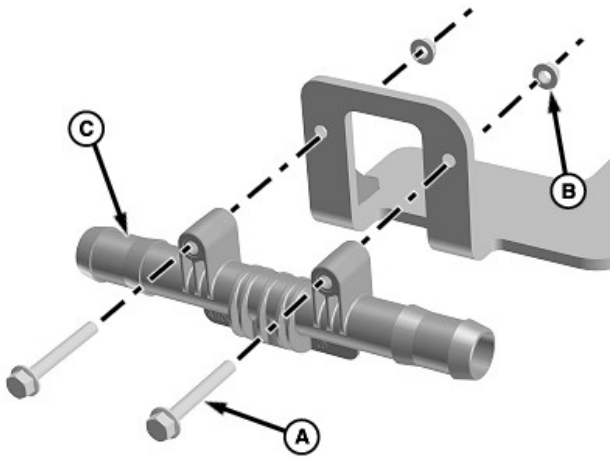
Straight Fitting/Support



A117379—UN—20MAR23

A—Hose Clamp (2 used)
B—Delivery Hose (2 used)
C—Straight Fitting/Support

1. Remove manifold T-fittings. (See Inspect and Replace Fertilizer Manifold T-Fittings in this section.)
2. Remove hose clamps (A).
3. Twist and pull delivery hoses (B) from ends of straight fitting/support (C).



A117380—UN—20MAR23

A—Cap Screw (2 used)
B—Flange Nut (2 used)
C—Straight Fitting/Support

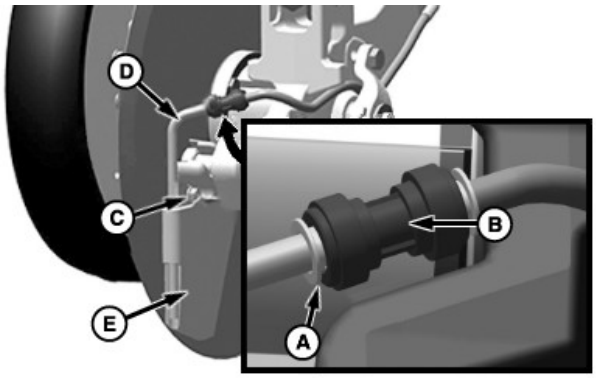
4. Remove cap screws (A), flange nuts (B), and straight fitting/support (C).
5. Inspect straight fitting/support for cracks, wear, or damage. Replace as necessary.
6. Install straight fitting/support in reverse order of removal. Tighten cap screws to specification.

Specification

Cap Screw—Torque. . . . . 14 N·m (124 lb·in)

gc7gsd7,1678897045078-19-24MAR23

Replace Fertilizer Tubes



A103473—UN—04FEB19

A—Sleeve
B—Coupler
C—Flange Cap Screw
D—Fertilizer Tube
E—Scraper

1. Support the planter safely (see the procedures at the beginning of this section).

⚠ CAUTION: Opener disks are sharp. Wear protective gloves and handle the opener disks carefully.

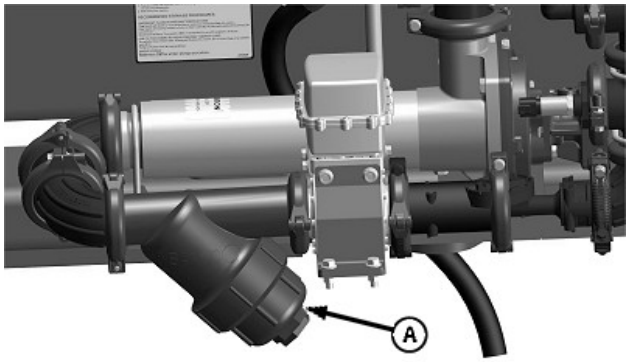
2. Push the release sleeve (A) on the liquid coupler (B) and at the same time pull the coupler off the fertilizer tube (D).
3. Remove the flange cap screw (C).
4. Pull the fertilizer tube up and out of the scraper (E).
5. Install a replacement fertilizer tube in the reverse order and tighten flange cap screw to specification.

Specification

Flange Cap Screw—Torque (dry). . . . . 16.5 N·m (146 lb·in)

WP29706,0000D0B-19-14FEB19

Clean the Strainer Screen



A117307—UN—09MAR23

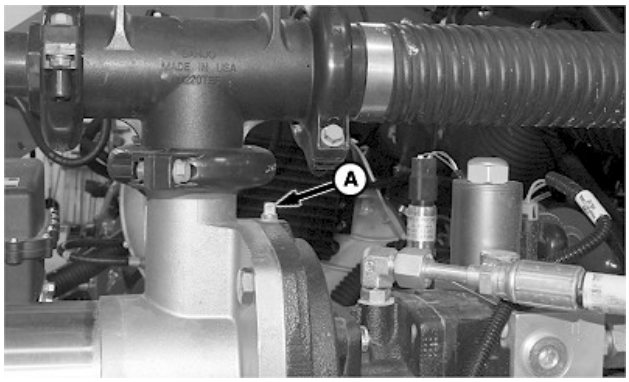
Strainer

A—Cap

Check the fertilizer strainer screen after the initial start-up of the pump and clean the strainer screen when necessary thereafter. To check the strainer screen, close the primary tank shutoff valve and remove the strainer cap (A).

WP29706,0000E97-19-09MAR23

Chamber Fluid Maintenance



A107240—UN—14JUL20

A—Plug

1. Replace the chamber fluid every 1000 hours of usage. The color of the fluid in the chamber is purple. Use only the Hypro chamber fluid for replacement.

   To replace the chamber fluid, remove the pump from the mounting platform.

2. Remove the plug (A) from the port on the wet seal chamber and drain all the fluid from the chamber.
3. Replace the chamber fluid with new Hypro 93HPS Wet Seal Fluid.
4. Pour the entire contents of a (12.5 fl oz) bottle into the wet seal chamber. Do not fill the chamber to the top with fluid.
5. Reinstall the plug (A) in the port.

WP29706,0000EA2-19-08OCT25

Electric Drive System

Symptom	Problem	Solution
Meters stop running on the entire planter	Meter binding	Remove object that is binding meter. Adjust meter if binding on inner components. Check meter is working correctly by performing meter or planter runoff.
	Seed Jamming in meter	Remove seed jammed from meter. Check meter is working correctly by performing meter or planter runoff.
	Debris in meter	Remove debris from meter. Check meter is working correctly by performing meter or planter runoff.
	Hub height adjustment too tight	Adjust hub height. Check meter is working correctly by performing meter or planter runoff.
	Torque is too high on-screen	Check for possible obstruction inside meter. Remove objects. Possibly adjust meter hub. Check meter is working correctly by performing meter or planter runoff.

WP29706,0000879-19-03DEC14

Row Units

Symptom	Problem	Solution
The closing wheels plug with crop residue.	The closing wheels have insufficient clearance for residue flow.	Stagger the closing wheels (See Stagger the Closing Wheels).
The closing wheels leave a severe imprint in the soil.	The closing wheels are applying too much downforce.	Decrease the closing wheel downforce.
The closing wheels are not firming the soil around the seed.	The closing wheels are applying insufficient downforce.	Increase the closing wheel downforce.
The closing wheel is running on top of the seed furrow.	The closing wheel is improperly centered.	Properly align the closing wheels until centered on the row unit (See Center the Closing Wheels).
	The closing wheel casting or pivot bushings are worn.	Replace the bushings on the closing wheel casting or pivot.
Monitor does not count seeds.	Dirt or debris has collected on the seed sensor.	Clean seed sensor with cleaning brush.
The Individual Row Hydraulic Downforce (IRHD) is not performing to requirements.	Performance bars are showing red instead of black on-screen.	Perform the IRHD valve test (See your SeedStar Application Help or the SeedStar Operator's Manual for additional information on the valve test).

Symptom	Problem	Solution
		Perform the IRHD valve flush test (See your SeedStar Application Help or the SeedStar Operator's Manual for additional information on the valve flush test).
	Valves are not meeting performance requirements.	Perform the IRHD valve test (See your SeedStar Application Help or the SeedStar Operator's Manual for additional information on the valve test).
		Perform the IRHD valve flush test (See your SeedStar Application Help or the SeedStar Operator's Manual for additional information on the valve flush test).
	After three valve flush tests, the IRHD is still not performing as needed.	See a John Deere dealer or other service provider for removal and cleaning of the valve cartridge assembly.
	The IRHD is still not performing correctly after cleaning the valve cartridge parts.	See a John Deere dealer or other service provider to replace each valve cartridge assembly which is not performing to needs.
	Air in the hydraulic circuit for the IRHD due to switching tractors or disconnecting hydraulic hoses.	Perform the IRHD air purge test (See your SeedStar Application Help or the SeedStar Operator's Manual for additional information on the air purge test).
	The on-screen downforce is showing erratic peak highs.	Gen 1 IRHD: Perform the accumulator test (See your SeedStar Application Help or the SeedStar Operator's Manual for additional information on the accumulator test). Gen 2 IRHD: Perform the manual accumulator test (See the Service and Adjusting—General section).
	On-screen ride quality is degrading.	Gen 1 IRHD: Perform the accumulator test (See your SeedStar Application Help or the SeedStar Operator's Manual for additional information on the accumulator test). Gen 2 IRHD: Perform the manual accumulator test (See the Service and Adjusting—General section).

Symptom	Problem	Solution
	The IRHD accumulator is suspected of having a leak.	Gen 1 IRHD: Perform the accumulator test (See your SeedStar Application Help or the SeedStar Operator's Manual for additional information on the accumulator test). Gen 2 IRHD: Perform the manual accumulator test (See the Service and Adjusting—General section).
	One or more row units fail the accumulator test.	Verify the results by retesting. Gen 1 IRHD: See a John Deere dealer or other service provider to replace the accumulator within the IRHD actuator. Gen 2 IRHD: Charge the accumulator (See Accumulator Charging in the Service and Adjusting—General section). If the accumulator continues to fail, order a piston repair kit and service the accumulator or replace the accumulator.

WP29706,00003FB-19-22OCT25

ExactEmerge Seed Meter

Symptom	Problem	Solution
The monitor is showing false readings.	The seed sensors are dirty.	Clean the sensors. (See Replace or Clean the BrushBelt Cartridge Components for additional information.)
	The seed sensors are not installed correctly.	Verify that the seed sensor is installed against the wear guide tab.
No seeds are planted.	The row unit hopper is empty.	Fill the hoppers. If equipped with CCS, verify the settings and inspect the delivery system.
	There is no vacuum reading.	See the solutions for the planter has low vacuum.
	The BrushBelt cartridge is plugged or damaged.	Inspect the BrushBelt. Verify that the cartridges are hooked properly in the row unit. Replace damaged components. Clean mud and additive buildup from the brush.
	The seed meter drive is not engaged.	Engage the electric power generation and the seed meter drive.

Symptom	Problem	Solution
	The BrushBelt has no tension applied.	Apply tension to the BrushBelt by turning the knob on the BrushBelt cartridge.
The monitor is showing poor seed spacing.	The seed disk (bowl) holes are plugged.	Clean the seed disk (bowl).
		Inspect the knockout wheel assembly. Clean or replace seed meter components as needed.
	The farmer-applied seed treatment is causing buildup and the seeds stick inside the seed meter or BrushBelt.	Follow the recommended seed meter lubricant usage and application procedure. (See Meter Lubrication section for additional information.)
		Clean the seed meter and seed disk (bowl).
	The seed meter has worn brushes.	Replace the brushes.
	The planter has low vacuum.	See the solutions for the planter has low vacuum.
	The seed meter has worn seals.	Replace the seals.
	The seed disk (bowl) hub is misadjusted.	Adjust the hub.
	The planter is using the incorrect vacuum for the seed being planted.	Adjust the vacuum level to the recommended levels. See the vacuum level charts.
	A seed meter has a faulty vacuum sensor.	Inspect the sensor hose. If the hose is plugged, remove the hose and clean it. If the hose is damaged, replace it.
	The seed meter has a worn seed disk (bowl).	Replace the seed disk (bowl).
	The BrushBelt Cartridge is improperly installed or worn.	Position or replace the BrushBelt cartridge. Verify that the cartridge hook is properly positioned in the unit shank.
	There is mud inside the BrushBelt cartridge.	Remove the BrushBelt, clean it, and install it.
	The seed sensor is installed improperly.	Verify that the tab in the wear liner is properly positioned in the seed sensor slot. (See Install and Remove BrushBelt Cartridge for additional information.)

Symptom	Problem	Solution
	The BrushBelt has a worn cartridge guard.	Replace the guard.
	The seed disk (bowl) has treated seed sticking in the cell.	Clean the seed disk (bowl).
		Increase the application rate of the seed meter lubricant. (See Meter Lubrication section for additional information.)
	The seed disks (bowls) have not been sprayed with the graphite lubricant.	Spray the seed disks (bowls) with Graphite Lubricant TY25797.
The monitor shows a low seed population.	If low population displays on the monitor and the field counts are accurate, the sensors are dirty.	Clean the seed sensors.
	The seed disk (bowl) holes are plugged.	Clean the seed disk (bowl).
		Install the knockout wheel assembly or replace the worn knockout wheel assembly.
	The vacuum holes are plugged with dirty seed.	Use clean seed.
		Install the knockout wheel assembly or replace the worn knockout wheel assembly.
	The seed disk (bowl) hub is loose.	Adjust the seed disk (bowl) hub. (See Adjust the Meter Hub Height for additional information.)
	The seed meter has treated seed sticking in the cells.	Inspect the seed disks (bowls). If there is buildup, clean the seed disks (bowls).
	The farmer-applied seed treatment is causing buildup and seed is stick in the seed meter.	Discontinue use of the treatments or increase use of the seed meter lubricant.
	The planter has low vacuum.	Increase the vacuum level. (See Set the Vacuum Level for additional information.)
		See the solutions for the planter has low vacuum.
	There is foreign material (chaff) built up in the vacuum dome.	Inspect and clean the dome.
	The seed meter has worn seals.	Replace the seals.

Symptom	Problem	Solution
	The seed meter has a worn seed disk (bowl).	Replace the seed disk (bowl).
	The seed is bridging in the hopper or seed meter.	Increase the rate of the seed meter lubricant used. Clean the seed meter and hopper.
	The seed meter has a plugged inlet or discharge elbows.	Clean the elbows.
	The vacuum level is too low.	Increase the vacuum level.
	The seed meter brush is improperly installed or worn.	Install the brush properly or replace.
	The double eliminator is set incorrectly.	Set the inner double eliminator brush at the correct position for the seed being planted. Lower the setting by one notch if seed skips occur.
	The seed sensor is installed improperly.	Verify that the tab in the wear liner is properly positioned in the seed sensor slot. (See Install and Remove BrushBelt Cartridge for additional information.)
The monitor shows a high seed population.	The planter has high vacuum.	Adjust the vacuum level. (See Set the Vacuum Level for additional information.)
	The seed meter has a faulty vacuum sensor.	Inspect the sensor hose. If the hose is plugged, remove the hose and clean it. If the hose is damaged, replace it.
	The seed meter has a worn seed disk (bowl).	Replace the seed disk (bowl).
	The seed size is not compatible with the seed disk (bowl).	Use the correct seed disk (bowl).
	The double eliminator or baffle brushes are improperly installed.	Install the double eliminator or baffle brushes properly. (See Change The Double Eliminator and The Baffle Brush for additional information.)
	The seed disk (bowl) hub is loose.	Adjust the seed meter hub. (See Adjust the Meter Hub Height for additional information.)
	The mini hopper screens are plugged and the seed meter has overfilled.	Clean the mini hopper screens.
	The discharge elbow holes are plugged.	Clean the elbows.

Symptom	Problem	Solution
	The double eliminator is set incorrectly.	Set the double eliminator. (See Double Eliminator Adjustment.)
	The inner or outer double eliminator has worn down.	Replace the inner or outer double eliminator. (See Inspect and Service the Meter for additional information.)
	The seed sensor is installed improperly.	Verify that the tab in the wear liner is properly positioned in the seed sensor slot. (See Remove and Install the BrushBelt Cartridge for additional information.)
The Brushbelt cartridge is plugging.	The planter is rolling backward when lowering.	Lower the planter only while moving forward.
	Field debris accumulates inside the cartridge.	Enable the brush reversal feature and set a time interval for operation. See a John Deere dealer or other service provider.
	There is mud inside the BrushBelt cartridge.	Remove the BrushBelt, clean it, and reinstall the cartridge.
	The operator is turning the tractor steering wheel when the planter is down and stationary (four-wheel drive or track tractors only).	Avoid turning the tractor steering when the planter is down and stationary.
The planter is planting at an inconsistent seed depth.	The planter is planting in a rough seed bed.	Increase the downforce pressure being applied to the row unit.
		Reduce ground speed.
	Mud is building up on the depth gauge wheels.	Remove the mud from the depth gauge wheels. Avoid operating the planter in muddy planting conditions.
	The planter is showing excessive row unit bounce.	Reduce the ground speed.
		Increase the downforce pressure being applied to the row unit.
The monitor is showing too many skips while planting.	The planter has a low vacuum setting.	Increase the vacuum level. (See Set the Vacuum Level for additional information.)
	The holes in the seed disk (bowl) are plugged with debris.	Remove the debris from the seed disk (bowl). Install the correct knockout wheel.
	The planter has low seed level in the hopper.	Fill the hoppers.

Symptom	Problem	Solution
	The double eliminator setting is too aggressive.	Adjust the double eliminator one notch lower and check the results. Repeat lowering the double eliminator setting until the results remove the skips.
	The knockout wheel is worn or damaged.	Verify that the knockout wheel is engaging the holes in the seed disk (bowl) by viewing through the back of the seed meter. Replace the knockout wheel as necessary.
The planter has premature failure of the vacuum motor seal.	The vacuum motor has incorrect hydraulic connections.	Verify the hose connections.
	The vacuum motor is turned off incorrectly.	To turn off the motor, place the selective control valve (SCV) lever into the float position.
	The vacuum motor has high case drain pressure.	Check for 172 kPa (1.7 bar) (25 psi) or less back pressure at the vacuum motor.
		Verify that the case drain line is connected and the hose not kinked.
	The vacuum motor has excessive oil leakage near the motor or seal.	Check for loose hardware on the motor or loose fittings for the hydraulic hoses. (See Inspect and Replace the Vacuum Motor for additional information.)
The planter has low vacuum.	Vacuum system seals are not aligned.	Inspect the seals where the vacuum system connects on a folding frame implement.
	The planter has incorrect hydraulic connections.	Verify the hose connections.
	The vacuum hoses are not connected to the seed meter.	Connect the vacuum hoses to the seed meter.
	The vacuum system is clogged with dust.	Clean the vacuum system. (See Clean Vacuum System for additional information.)
	The vacuum hoses are kinked or pinched.	To remove kinks or pinches, reposition the hoses.
	The blower guard is clogged with dust or seed treatments.	Clean the blower guard.
	The seed meter strap is not engaged on the dome.	Attach the seed meter strap to the seed meter dome. (See Access the Vacuum Meter for additional information.)

Symptom	Problem	Solution
	The seed meter seals are worn or flipped.	Inspect the seals for damage or wear. Reposition or replace the seals. (See Install a New Vacuum Seal for additional information.)
	The vacuum system is assembled without the O-rings.	Disassemble vacuum system and add the O-rings were needed.
	The seed meter dome is not closed properly.	Verify that the seed meter dome closes properly. (See Access the Vacuum Meter for additional information.)
	The seed meter has foreign material (chaff) built up in the vacuum dome.	Inspect and clean the seed meter dome. (See Inspect and Service the Meter for additional information.)
The planter has erratic vacuum levels.	Vacuum system seals are not aligned.	Inspect the seals where the vacuum system connects on a folding frame implement.
	The vacuum system is clogged with dust.	Clean the vacuum system. (See Clean the Vacuum System for additional information.)
	The flow control valve has failed.	Replace the flow control valve.
	The tractor oil level is low.	Add oil to the tractor oil reservoir.
	The tractor is not stabilizing the flow (when controlled with the tractor SCV).	See a John Deere dealer or other service provider.
	The vacuum seal in the frame tube is missing or not installed correctly.	Install the vacuum manifold seal in the frame tube or straighten the existing seal.
Tractor Power Generation System is making rattling noise.	Light alternator load or low tractor RPMs.	At lower tractor RPMs and with a light alternator load on the tractor PTO gears, it is normal for a rattling noise when running the power generation system.
	The gear between the alternator and gear case is dry.	Verify that the drive gear has been greased. (See Lubricating the Planter for additional information.)
	The rubber grommets on the bracket are not in contact with the lower support.	Loosen the cap screws on the gear-case support bracket. Use a prying device to leverage the bracket down until the grommets are in contact with the lower support. Tighten the cap screws while applying leverage to the bracket.

OUO6074,0000FF6-19-16OCT25

MaxEmerge 5e Seed Meter

Symptom	Problem	Solution
The monitor is showing false readings.	The seed tube sensors are dirty.	Clean the sensors (See Clean the Seed Tube Sensor).
No seeds are being planted.	The row unit hoppers are empty.	Fill the hoppers.
	The seed meters have no vacuum.	Verify that the vacuum is turned ON.
		See the solutions for the planter has low vacuum in this list.
	The seed tube is plugged or damaged.	Inspect the seed tube. Verify that the seed tubes are hooked properly in the unit shank. Replace the seed tube, if damaged.
		Clean off any mud with the cleaning brush.
	The meter drive is not engaged.	Engage the meter drive.
The seed meter has poor seed spacing.	The seed disk vacuum holes are plugged.	Clean the seed disk.
	The farmer-applied seed treatment is causing buildup and the seeds stick inside the meter or seed tube.	Follow the recommended meter lubricant usage and application procedure (See Meter Lubrication section).
		Clean the meter and disks.
	The seed meter has worn meter brushes.	Replace the brushes.
	The planter has low vacuum.	See the solutions for the planter has low vacuum in this list.
	Dirt has built-up on the herbicide or the insecticide drive.	Clean the drive.
	The seed meter has worn vacuum seals.	Replace the seals.
	The seed disk hub is misadjusted.	Readjust the hub.
	The seed meter has the incorrect vacuum for the seed being planted.	Adjust the vacuum level to recommended levels, see the vacuum level charts.
	The meter has a faulty vacuum sensor.	Check the air line to the vacuum sensor. If plugged, clean the air line. If damaged or cut, replace the air line.

Symptom	Problem	Solution
	The seed meter has worn seed disk.	Replace the seed disk.
	The seed tube is improperly installed or worn.	Reinstall or replace the seed tube. Verify that the seed tube hook is properly positioned in the unit shank.
	There is mud inside the seed tube.	Remove the seed tube. Clean out the mud with the cleaning brush. Reinstall the seed tube.
	The seed tube guard is worn.	Replace the guard.
	The seed disk has treated seed sticking in the cell.	Clean the disk.
		Increase the application rate or amount of the John Deere meter lubricant (See Meter Lubrication section).
	The seed disks have not been sprayed with Graphite Lubricant.	Spray the seed disks with the spray of Graphite Lubricant TY25797.
The monitor shows a low seed population.	If low population displays on the monitor and the field counts are accurate, the sensors are dirty.	Clean the seed tubes and sensors.
		Verify that the sensors are performing properly (See the SeedStar Application Help or the SeedStar Operator's Manual for additional information about the seed sensor readings, setup seed rates, or runoff procedures).
	The seed disk vacuum holes are plugged.	Clean the seed disk.
		Install the knockout wheel assembly or replace the worn knockout wheel assembly.
	The seed disk has dirty seed plugging the vacuum holes.	Use clean seed.
		Install the knockout wheel assembly or replace the worn knockout wheel assembly.
	The seed disk wiper is missing.	Install or replace the wiper.
	The seed disk has treated seed sticking in the cells.	Inspect the seed disk. Clean the disk, if buildup is present.

Symptom	Problem	Solution
		Add the recommended meter lubricant to the seed.
	The farmer-applied seed treatment is causing buildup and the seed is sticking in the meter.	Discontinue use of treatments or increase use of meter lubricant.
	The seed meter has foreign material (chaff) built up in the vacuum dome.	Inspect and clean the dome.
	The seed meter has worn vacuum seals.	Replace the seals.
	The seed meter has a worn seed disk.	Replace the seed disk.
	The seed is bridging in the hopper or meter.	Increase the amount of recommended meter lubricant (See the Meter Lubrication section).
		Clean the seed meter and hopper.
	The seed size is not compatible with the seed disk.	Use the correct seed disk.
	The operator is planting too fast for the rough field conditions.	Plant at the speed recommended (See Recommended Operating Speed).
		Increase the vacuum level.
		Increase the downforce pressure on the row unit.
	The meter brush is improperly installed or worn.	Install the brush properly or replace.
	The double eliminator is set incorrectly.	See Operate Double Eliminator.
The monitor is showing a high seed population.	If high population displays on the monitor and the field counts are accurate, the sensors are dirty.	Clean the seed tubes and sensors.
		See the SeedStar Application Help or the SeedStar Operator's Manual for additional information about the seed sensor readings, setup seed rates, or rotate and runoff procedures.
	The seed meter vacuum level is set too high.	Adjust the vacuum level (See Set the Vacuum Level).
	The seed meter has a faulty vacuum sensor.	Check the air line to the vacuum sensor. If plugged, clean the air line. If damaged or cut, replace the air line.

Symptom	Problem	Solution
	The seed meter has a worn seed disk.	Replace the seed disk.
	The seed size is not compatible with the seed disk.	Use the correct seed disk.
	The seed meter is planting too slow.	Plant at the speed recommended (See Recommended Operating Speed).
	The meter brush is improperly installed.	Install the brush properly (See Change the Vacuum Seed Meter Brush).
	The seed disk hub is loose.	Tighten the hub (See Adjust Meter Hub).
	The double eliminator is set incorrectly.	See Operate Double Eliminator.
The seed tubes are plugging.	The planter is rolling backward when lowering.	Lower the planter while moving the planter forward.
	There is mud inside the seed tubes.	Clean out the mud with the cleaning brush.
	The operator is turning the tractor steering wheel when the planter is down and stationary. (Four-Wheel Drive or Track tractors only.)	Avoid turning the tractor steering when the planter is down and stationary.
The planter is planting at an inconsistent seed depth.	The operator is planting in a rough seed bed.	Increase the downforce pressure being applied to the row unit.
	The seed tubes are partially plugged or improperly installed.	Inspect the seed tubes. Ensure that the seed tubes are hooked properly in the unit shanks.
		Clean out the mud with the cleaning brush.
The monitor is showing too many skips while planting.	The planter has a low vacuum setting.	Increase the vacuum level (See Set the Vacuum Level).
	The operator is planting too fast.	Reduce the planting speed (See Recommended Operating Speed).
	The planter has low seed level in the hopper.	Fill the hopper.
The planter has premature failure of the vacuum motor seal.	The vacuum motor has incorrect hydraulic connections.	Verify the hydraulic connections.
	The vacuum motor has high case drain pressure.	Check for 172 kPa (1.72 bar) (25 psi) or less back pressure at the vacuum motor.

Symptom	Problem	Solution
		Verify that the case drain hose is connected and the hose not kinked.
	The vacuum motor has excessive oil leakage near the motor or seal.	Check for loose hardware on the motor or loose fittings for the hydraulic hoses (See Inspect and Replace the Vacuum Motor).
The planter has low vacuum.	Vacuum system seals are not aligned.	Inspect the seals where the vacuum system connects on a folding frame implement.
	The vacuum motor has incorrect hydraulic connections.	Verify the hydraulic connections.
	The vacuum hoses are not connected to the meter.	Connect the vacuum hoses to the meter.
	The flow control valve is misadjusted.	If equipped, adjust the flow control valve for the vacuum motor.
	The planter vacuum level needs adjusted.	Adjust the vacuum level (See your SeedStar Application Help or the SeedStar Operator's Manual for additional information on the vacuum automation control).
	The air manifold system is clogged with dust.	Clean the air manifold system (See Clean Vacuum System).
	The manifold hoses are kinked or pinched.	To remove kinks or pinches, reposition the hoses.
	The blower guard is clogged with dust or seed treatments.	Clean the blower guard.
	The meter dome strap is not engaged.	Attach the meter dome strap to the chamber.
	The seed meter seals are worn or flipped.	Inspect the seals for damage or wear. Reposition or replace the seals (See Install New Vacuum Meter Seal).
	The vacuum system is assembled without the O-rings.	Disassemble air manifold system and add in the O-rings were needed.
	The seed meter has foreign material (chaff) built up in the meter dome.	Inspect and clean the meter dome, if necessary (See Inspect and Service the Seed Meter).
The planter has erratic vacuum levels.	Vacuum system seals are not aligned.	Inspect the seals where the vacuum system connects on a folding frame implement.

Symptom	Problem	Solution
	The air manifold system is clogged with dust.	Clean the air manifold system (See Clean Vacuum System).
	The flow control valve has failed.	Replace the flow control valve.
	The tractor oil level is low.	Add oil to the tractor oil reservoir.
	The tractor is not stabilizing the flow (when controlled with the tractor SCV).	Add the motor adapter to the vacuum motor.
The vacuum sensor does not zero.	The vacuum sensor has not been adjusted.	Zero the adjustment on the vacuum sensor (See your SeedStar Application Help or the SeedStar Operator's Manual for additional information on zeroing the vacuum sensor).
Tractor Power Generation System is making rattling noise.	Light alternator load or low tractor RPMs.	At lower tractor RPMs and with a light alternator load on the tractor PTO gears, it is normal for a rattling noise when running the power generation system. Verify that the drive gear has been greased.
	The rubber grommets on the bracket are not in contact with the lower support.	Loosen the mounting bolts. Use a prying device to leverage the bracket down until the grommets are in contact with the lower support. Retighten the mounting bolts while applying leverage to the bracket.

OUO6074,0000FF7-19-14FEB25

CCS Blower Assembly

Symptom	Problem	Solution
CCS blower motor leaks.	Case drain line crimped, not connected to low-pressure port, or connected to wrong port with high backpressure.	Repair blower motor. To avoid future failures, be sure to connect drain line to low-pressure (sump) return on tractor or place hose in storage position. Case drain must have less than 172 kPa (1.72 bar) (25 psi).
	CCS blower motor seal leaking.	Some motor seal leakage is normal. See a John Deere dealer or other service provider.
	Case drain line pulled out of coupler on tractor.	Check hose routing of hydraulic hoses across hitch. Ensure that case drain is properly attached to tractor. Repair blower motor.

Symptom	Problem	Solution
CCS blower not turning.	SCV not in continuous detent position.	Place SCV in retract detent position.
	Low hydraulic oil level.	Check and fill reservoir.
	Tractor control valve return line not open.	Cycle control lever in opposite direction momentarily.
	Faulty CCS blower motor.	Repair or replace motor. See a John Deere dealer or other service provider.
	Faulty CCS flow control valve.	Repair or replace valve. See a John Deere dealer or other service provider.
	Row unit switch is depressed.	Lower machine to ground and adjust switch as needed.
	Row unit switch faulty.	Replace switch.
	Flow control valve incorrectly set.	Increase flow control setting.
	Return hose not fully engaged in SCV outlet.	Check connections.
CCS blower vibrates.	Dirty blower blades.	Clean blower.
	Broken blower blades; blower out of balance.	Replace blower assembly.
CCS blower surges.	Flow control valve incorrectly set.	Adjust flow control valve or replace.
Premature CCS blower motor seal failure.	CCS case drain not connected to sump.	Connect case drain hose to sump. Case drain must have less than 172 kPa (1.72 bar) (25 psi).
Tank pressure too low.	CCS pressure gauge was not zeroed.	Zero CCS pressure gauge.
	CCS pressure gauge hose not connected or damaged.	Reconnect or replace hose.
	Tractor flow control set too low.	Increase valve setting.
	Faulty CCS control valve.	Repair or replace valve. See a John Deere dealer or other service provider.
	Machine flow control valve set incorrect.	Increase valve setting.
	Tractor pressure too low.	Check and repair tractor hydraulic system. See a John Deere dealer or other service provider.
	CCS blower motor seal leaking.	Some seal leakage is normal. See a John Deere dealer or other service provider.

Symptom	Problem	Solution
	Faulty CCS blower motor.	Repair or replace motor. See a John Deere dealer or other service provider.
	CCS blower turning backward.	Check valve removed from return line. Check and correct hose connections to tractor.
	Excessive air leakage from tank.	Install lids.
	Pressure gauge broken.	Repair or replace gauge.
Pressure gauge does not zero.	Gauge not adjusted.	Zero gauge. (See Zero CCS Blower Pressure Gauge in Service and Adjustments section.)
	Gauge damaged.	Replace gauge.
	Moisture in gauge.	Dry out gauge.
	Suction hose plugged.	Clean or replace hose as needed.
CCS blower turning on and off while going though the field.	Frame height too high causing the row unit switch to open and close.	Adjust frame height. (See Adjust Frame Height in operator manual.)
	Row unit blower switch misadjusted.	Adjust switch. (See Set CCS Row Unit Blower Switch in Service and Adjustments section.)

AG,OUO6023,1197-19-16OCT25

CCS Product Delivery

Symptom	Problem	Solution
The delivery hoses are plugged.	Foreign material is mixed with the seed.	Clean the seed or use a lid screen on the tank.
	The tank lids were opened with the CCS blower running.	Wait until the CCS blower stops before opening the tank lids.
	Excessive blower pressure.	Reduce the CCS pressure.
	The CCS tank pressure is too high.	Reduce the pressure setting.
	The tank lid is open or leaking excessively.	Close the lid and repair as needed.
	Delivery hose is pinched or crushed.	Replace or repair the hose.
	The air volume is too low.	Increase the CCS blower speed (see Set the CCS Tank Pressure).

Symptom	Problem	Solution
	Foreign material is blocking the air system.	**IMPORTANT: Avoid damage to the nozzle. Pull the hose straight off the nozzle (do not twist).** Remove the hose from the nozzle and remove the foreign material.
	The delivery hoses are routed flat, upward, or have large droops.	Route the hoses in a continuous downward direction.
	Seed flow is poor due to high humidity	Use more meter lubricant and mix it thoroughly with the seed or wait for drier conditions.
	The CCS blower was left running while the planter was stationary for an excessive time.	Turn off the blower when stationary for more than a few minutes.
Seed distribution to the row units is uneven.	Seed level too low for accurate delivery.	Fill the CCS tank.
	The mini-hopper screen is plugged.	Remove screen and tap until clear.
	Discharge elbow plugged.	Remove the elbow and clean the obstruction. Verify that the gray discharge elbows are installed properly (See Central Commodity System section).
	The tank pressure is low.	Increase the CCS tank pressure (See Set the CCS Tank Pressure).
	A seed delivery hose is blocked.	Remove the hose and clear the obstruction (See Bridged and Blocked CCS System).
	A tank nozzle is blocked.	Pull the hose straight off the nozzle (do not twist). Remove the hose from the nozzle and remove the foreign material (See Bridged And Blocked CCS System).
	Seed is compacted in the tank nozzles.	See Bridged And Blocked CCS System.
	The nozzle inserts (for small seed) are installed when planting large seed.	Remove the nozzle inserts when planting large seed.
	The agitator is not running.	Verify that the agitators are turned on in the SeedStar Application. Check the fuse, power connector, and the ground lead.

Symptom	Problem	Solution
There is no seed in the meter.	The tank pressure is too low.	Verify that the tank pressure is set to the recommended pressure. (See the Central Commodity System section.)
	A seed delivery hose is blocked.	See Bridged and Blocked CCS System.
		Check that both tank lids are securely closed.
	A tank nozzle is blocked.	Pull the hose straight off the nozzle (do not twist). Remove the hose from the nozzle and remove the foreign material.
	Seed is compacted in the tank nozzles.	See Bridged and Blocked CCS System.
	Seed flow is poor due to high humidity.	Use more meter lubricant and mix it thoroughly with the seed, or wait for drier conditions.
	The tank lid is open or leaking excessively.	Close the lid and repair as needed.
	The cleanout doors on the bottom of the tank are open or leaking air.	*NOTE: Only open the doors if the tank is nearly empty or is empty.*
		Verify that the doors are closed.
	The discharge elbow is plugged.	Clear plug and decrease CCS tank pressure.
		Verify that gray discharge elbows are installed properly. (See Central Commodity System section.)
	Seed is bridging over the tank nozzles.	Verify that the agitators are turned on in the SeedStar Application.
		Check the fuse, power connector, and the ground lead.
		Increase the CCS tank pressure.
		Add more meter lubricant. Mix the lubricant thoroughly.
	The CCS tanks are empty.	Fill the tanks.
	The nozzle inserts (for small seed) are installed when planting large seed.	Remove the nozzle inserts when planting large seed.
Seed is damaged during delivery to the meter.	The tank pressure is too high.	Reduce the CCS tank pressure (See Set the CCS Tank Pressure).

Symptom	Problem	Solution
		Add meter lubricant
	The seed is old and dry.	Use fresh seeds.
Individual rows are overpopulating.	The vacuum level is too high.	Decrease the vacuum level.
	The vent on the seed meter is plugged.	Clean the vent.
	The vent on the seed discharge elbow is plugged.	Clean the vent holes in the elbow.
		Clean the vent holes in the elbow.
	Seed sensor installed incorrectly in the BrushBelt cartridge.	Verify that the tab in the center wear liner is inserted into the slot on the sensor (See the Service section for details).
Seed delivery is uneven or inaccurate.	The CCS tanks are nearly empty.	Redistribute the seed in the CCS tanks, or fill them.
	The seed in the row unit hopper is too low for accurate delivery.	Increase the CCS tank pressure.
	Foreign material is blocking seed passages.	Remove the blockage. Use screens when filling the tanks (See Bridged And Blocked CCS System).
	The mini-hopper screen is plugged.	Remove the screen and clear the obstruction.
	Lumps in the seed.	Use clean seed. Use screens when filling the tanks.
	Seed is bridging over the tank nozzles.	Verify that the agitators are turned on in the SeedStar Application.
		Check the fuse, power connector, and the ground lead.
		Increase the CCS tank pressure.
		Add more meter lubricant. Mix the lubricant thoroughly.
		Realign the rubber flap to sit flat on the row unit when the meter is installed.
There is no seed flow.	The seed delivery hose is plugged.	Remove the blockage. Use screens when filling the tanks (See Bridged and Blocked CCS System).

Symptom	Problem	Solution
		Do not operate machine with nearly all meters out of seed as the seed hoses to rows with seed can plug. (See Bridged And Blocked CCS System.)
	The tank pressure is incorrect.	Adjust the tank pressure to the recommended level.
		Run the CCS blower for 10 minutes before planting to warm the oil. Cold oil reduces the blower speed.
	The hydraulic oil is cold.	Run the CCS blower for 10 minutes before planting to warm the oil.
The CCS blower surges.	The flow control valve is faulty.	Replace the valve.
The CCS blower turns on and off while going through the field.	The frame height is too high. The row unit switch, related to the blower control, is sensing that the frame is raising.	Adjust frame height to the recommendation (See the Preparing Machine section).
	The row unit switch is out of adjustment.	Adjust the row unit switch that controls the blower (See the Preparing Machine section).
The planter raises slowly.	The CCS blower is running during the raise cycle.	The row unit switch or the frame height is not adjusted correctly.
		The tractor hydraulic flow is insufficient.
		Increase the tractor engine rpm or increase the SCV flow.
The CCS seed delivery is slow.	A delivery hose is pinched or routed upward.	Straighten or repair the hose. Keep hoses as horizontal as possible.
	Foreign material is lodged in the hose or manifold.	Locate and remove the blockage (See Bridged And Blocked CCS System).
	The tank pressure is incorrect.	Verify that the tank lids are installed correctly.
		Increase the CCS tank pressure.
The display is not showing the low warning message when a CCS tank is almost empty.	The sensor for the CCS tank level is dirty.	Clean the sensor LEDs with a brush (See Clean the Tank Level Sensor).

JF72098,000008F-19-22OCT25

ExactRate Liquid Fertilizer System

Symptom	Problem	Solution

Symptom	Problem	Solution
The fertilizer flow rate is slow or stopped because of a blockage or priming issue.	The nozzle or in-line orifice is plugged.	Clean and reassemble the in-line orifices or nozzles.
	The strainer is plugged.	Clean the strainer.
	The distribution tube at the wings or at a row is kinked.	Adjust the routed position of the tube or replace the pinched tube.
	The ExactRate system is not primed correctly.	Verify the priming procedure by priming the ExactRate fertilizer system again. Make sure that all the air is purged from the primary hoses from the liquid fertilizer tank.
The fertilizer rate is uneven row to row.	The distribution tube is routed incorrectly.	Verify that there are no large hills or valleys in the routed position of the fertilizer distribution tube. To eliminate hills, valley, kinks, or pinching of the tube, adjust the position of the distribution tube routing.
	Some of the fertilizer tubes are pinched.	Adjust the routed positions of the tubes or replace the pinched tubes.
The fertilizer opener is not penetrating the ground sufficiently.	The downforce pressure for the fertilizer opener is improperly adjusted.	Increase the amount of downforce pressure on the opener. Lower the depth setting of the opener.
		Install a heavy-duty spring on the opener.
The fertilizer opener is penetrating too deeply in the ground.	The downforce pressure for the fertilizer opener is improperly adjusted.	Reduce the amount of downforce pressure on the opener. Raise the depth setting of the opener.
		Install a regular-duty spring on the opener.
One fertilizer opener is not distributing fertilizer.	The valve body is not functioning correctly.	Disassemble, clean, and reassemble the valve body. If cleaning does not fix the issue, replace the valve body.
		Check for a diagnostic trouble code (DTC) on the tractor display. Repair the problem in the valve body being shown in the DTC.
	The nozzle or in-line orifice is plugged.	Check for a blockage within the distribution system because of a flow error on the tractor display. Remove the blockage and reassemble the in-line orifice or nozzle.

Symptom	Problem	Solution
	The fertilizer opener spout is plugged.	Check for a blockage within the distribution system because of a flow error on the tractor display. Remove the blockage and reassemble the fertilizer opener spout.
	The distribution tube is pinched, preventing fertilizer flow to the opener.	Adjust the routed position of the tube or replace the pinched tube.
The ExactRate liquid fertilizer system is leaking.	The fertilizer is leaking at the row unit while the system is turned OFF.	Remove the solenoid cartridge from the valve body for this row and see what is holding the plunger open. Clean out any debris, check plunger movement ability, and then reassemble. (See Remove Valve Body in the Service and Adjustments —Liquid Fertilizer, ExactRate section.)
	The tubing is not inserted fully into the coupler.	Push the tubing into the coupler so it is inserted fully.
	The tubing is not squarely cut or is not chamfered.	Remove the tubing, squarely cut and chamfer the tube before inserting into the coupler.
The pump will not prime.	The tank does not have enough fertilizer solution in it.	Fill the fertilizer tank with fertilizer solution.
	The primary hoses have air in them.	Use priming procedure to remove air from the primary hoses. (See Prime and Start the ExactRate Pump in the Liquid Fertilizer— ExactRate System section.)
	The primary hoses have a leak.	Inspect the primary hoses from the fertilizer tank to the pump for leaks. Tighten and seal the hoses where needed.
	The primary hoses have a blockage.	Inspect the primary hoses from the fertilizer tank to the pump for the blockage. Clear blockage from the primary hoses. To prime the hoses and pump after the blockage is cleared, use the priming procedure. (See Prime and Start the ExactRate Pump in the Liquid Fertilizer— ExactRate System section.)
	The strainer is plugged.	Clean the strainer.
	The pressure-based rate is set too low.	Adjust the pump pressure to 483 kPa (4.83 bar) (70 psi) while priming the pump.

Symptom	Problem	Solution
	The pump internal components are fouled.	See a John Deere dealer or other service provider.
The pump is metering low.	The primary hoses have a leak.	Inspect the primary hoses from the fertilizer tank to the pump for leaks. Tighten and seal the hoses where needed.
	The strainer is plugged.	Clean the strainer.
	The pump rate is set too low.	Adjust the pump rate through the display to a higher rate.
		Increase the speed when running at the bottom of the range.
The pump is metering high.	The pump rate is set too high.	Adjust the pump rate through the display to a lower rate.
	DTC on the tractor display states the pump valve is stuck open.	See a John Deere dealer or other service provider.
The pump is using excessive oil.	The oil seals are worn.	See a John Deere dealer or other service provider.
	The O-rings are leaking.	See a John Deere dealer or other service provider.
The pump is noisy during operation.	The pump components are worn.	See a John Deere dealer or other service provider.
	Air is in the pump system.	Prime the pump and distribution system until all the air is out of the system. If the noise still continues, see a John Deere dealer or other service provider.
The main strainer screen is plugged frequently.	The main strainer mesh is too fine.	Use a courser mesh screen. (See Strainer Recommendations in the Liquid Fertilizer— ExactRate System section.)
	The fertilizer is dirty or crystallized.	Install the finer mesh strainer on the nurse tank.
The liquid fertilizer tank does not fill.	The shutoff valve for the tank is closed.	Ensure that the shutoff valve is open all the way for the liquid fertilizer tank.
	The drip line or fitting is plugged.	Clean the fitting and the drip line. (See Clean Liquid Fertilizer Tank Lid Fittings and Drip Line Hoses in the Service and Adjustments section.)

Symptom	Problem	Solution
The fertilizer leaks at the opener when the planter is stopped.	The solenoid valve is stuck open or leaking in the valve body.	Remove, disassemble, and clean the leaking solenoid valve. Assemble the valve body and install on the implement. (See the Liquid Fertilizer—ExactRate System section.) If leaking problems persist, see a John Deere dealer or other service provider.

WP29706,0000DCC-19-15OCT25

ExactShot Liquid Fertilizer System

Symptom	Problem	Solution
The fertilizer flow rate is slow or stopped because of a blockage or priming issue.	A nozzle or in-line fitting is plugged.	Clean and reassemble the in-line fittings or nozzles.
	The strainer is plugged.	Clean the strainer.
	The distribution tube at the wings or at a row is kinked.	Adjust the routing of the tube or replace the pinched tube.
	The fertilizer system is not primed correctly.	Verify the priming procedure by priming the fertilizer system again. Verify that all the air is purged from the pump supply hoses.
The fertilizer rate is uneven row to row.	The distribution tube is routed incorrectly.	Verify that there are no large hills or valleys in the routed position of the fertilizer distribution tube. To eliminate hills, valley, kinks, or pinching of the tube, adjust the position of the distribution tube routing.
	Some of the fertilizer tubes are pinched.	Adjust the routed positions of the tubes or replace the pinched tubes.
One fertilizer opener is not distributing fertilizer.	The dosing valve is not functioning correctly.	Disassemble, clean, and reassemble the dosing valve. If cleaning does not fix the issue, replace the valve. Check for a diagnostic trouble code (DTC) on the display. Repair the problem in the dosing valve shown in the DTC.
	A flow error on the display indicates that a nozzle or in-line fitting is plugged.	Check for a blockage within the distribution system.
	The distribution tube is pinched, preventing fertilizer flow to the opener.	Adjust the routing of the tube or replace the pinched tube.

Symptom	Problem	Solution
The liquid fertilizer system is leaking.	The fertilizer is flowing at the row unit while the system is turned OFF.	Remove the solenoid cartridge from the dosing valve for this row and see what is holding the plunger open. Remove any debris, check the plunger movement ability, and then reassemble. (See Disassemble and Inspect Fertilizer Dosing Solenoid in the Service section.)
	The tubing is not inserted fully into the coupler.	Push the tubing into the coupler so it is inserted fully.
	The tubing is not squarely cut or is not chamfered.	Remove the tubing, squarely cut and chamfer the tube before inserting into the coupler.
The pump does not prime.	The tank does not have enough fertilizer in it.	Fill the fertilizer tank with fertilizer.
	The pump supply hoses have air in them.	Use the priming procedure to remove air from the pump supply hoses. (See Prime and Start the Fertilizer Pump in the Fertilizer System Operation section.)
	The pump supply hoses have a leak.	Inspect the pump supply hoses between the fertilizer tank and the pump for leaks. Tighten and seal the hoses where needed.
	The pump supply hoses have a blockage.	Inspect the pump supply hoses from the fertilizer tank to the pump for the blockage. Clear the blockage from the pump supply hoses. Perform the priming procedure after the blockage is cleared. (See Prime and Start the Fertilizer Pump in the Fertilizer System Operation section.)
	The strainer is plugged.	Clean the strainer.
	The pressure-based rate is set too low.	Adjust the pump pressure to 483 kPa (4.83 bar) (70 psi) while priming the pump.
	The pump internal components are fouled.	See a John Deere dealer or other service provider.
The pump is metering low.	The pump supply hoses have a leak.	Inspect the pump supply hoses from the fertilizer tank to the pump for leaks. Tighten and seal the hoses where needed.
	The strainer is plugged.	Clean the strainer.

Symptom	Problem	Solution
	The pump rate is set too low.	Adjust the pump rate through the display to a higher rate. Increase the speed when running at the bottom of the range.
The pump is metering high.	The pump rate is set too high.	Adjust the pump rate through the display to a lower rate.
	A DTC on the display indicates that the pump valve is stuck open.	See a John Deere dealer or other service provider.
The pump is using excessive oil.	The oil seals are worn.	See a John Deere dealer or other service provider.
	The O-rings are leaking.	See a John Deere dealer or other service provider.
The pump is noisy during operation.	The pump components are worn.	See a John Deere dealer or other service provider.
	Air is in the pump system.	Prime the pump and distribution system until all the air is out of the system. If the noise continues, see a John Deere dealer or other service provider.
The main strainer screen is plugged frequently.	The main strainer mesh is too fine.	Use a courser mesh screen. (See Strainer Recommendations in the Fertilizer System Operation section.)
	The fertilizer is dirty or crystallized.	Install the finer mesh strainer on the nurse tank.
The liquid fertilizer tank does not fill.	The shutoff valve for the tank is closed.	Ensure that the shutoff valve is open all the way for the liquid fertilizer tank.
	The drip line or fitting is plugged.	Clean the fitting and the drip line. (See Clean the Liquid Fertilizer Tank Lid Fitting and Drip Line Hose in the Service section.)
The fertilizer flows at the opener when the planter is stopped.	The dosing valve is stuck open or leaking.	Remove, disassemble, and clean the leaking solenoid valve. (See the Service section.) If the problems persist, see a John Deere dealer or other service provider.

ouo6074,1684321372594-19-15OCT25

Liquid Fertilizer System

Symptom	Problem	Solution

Symptom	Problem	Solution
Fertilizer flow rate slow or stopped.	Plugged in-line orifice or nozzle.	Clean in-line orifices or nozzles or increase in-line orifice size or nozzle size per rate chart.
	Excessive drive tire slippage	Reduce row unit down force. Check drive for misalignment or binding.
	Plugged strainer.	Clean strainer.
	Kinked delivery hose at wings or at row.	Fix or replace pinched hose.
	Drive tire or contact tire pressure low.	Inflate to proper pressure.
Fertilizer rate uneven row to row.	14 kPa (0.1 bar) (2 psi) check valves dirty or stuck.	Inspect check valves. Clean or replace as necessary.
	System pressure is too low.	Verify system in between 103—621 kPa (1.0—6.2 bar) (15—90 psi). If low, then install smaller in-line orifices or increase travel speed.
	Incorrect hose routing.	Verify there are no large hills or valleys in fertilizer distribution hose routing.
	System not primed correctly.	Prime system and make sure that all air is purged from distribution hoses.
	Some fertilizer hoses are pinched.	Fix or replace pinched hoses.
	Different size in-line orifices or nozzles installed at each row.	Verify all in-line orifices or nozzles are the same size.
Fertilizer opener does not penetrate sufficiently.	Improper adjustment of pressure.	Increase the amount of down force on the opener. Lower the depth setting of the opener.
		Install heavy spring.
Fertilizer opener penetrates too deeply.	Improper adjustment of pressure.	Reduce the amount of down force on the opener. Raise the depth setting of the opener.
		Install light spring.
One fertilizer opener not distributing fertilizer.	Check valve bad or installed in wrong direction.	Replace or reassemble check valve.
	Fertilizer tube opener spout plugged.	Inspect, clean, and remove obstruction.

Symptom	Problem	Solution
	Manifold pressure too low.	Use smaller in-line orifices or nozzles to increase pressure to between 103—621 kPa (1.0—6.2 bar) (15—90 psi) Add gauge to monitor pressure.
	Drive tire or contact tire pressure low.	Inflate to proper pressure.
	Distribution hose pinched, preventing flow to opener.	Reroute hose.
Fertilizer system leaks.	High system pressure.	Verify system pressure is between 103—621 kPa (1.0—6.2 bar) (15—90 psi). If high, then reduce ground speed or increase in-line orifice size.
	Tubing in not fully pushed in.	Push tubing into coupler so it is fully inserted.
	Tubing is not squarely cut or is not chamfered.	Remove tubing, squarely cut and chamfer before re-inserting into coupler.
	In-line orifice outer surface is scored.	Replace in-line orifice.
	O-ring is damaged or missing in coupler.	Replace coupler.

OUO6064,000057A-19-31OCT11

Liquid Fertilizer—Piston Pump System

Symptom	Problem	Solution
The pump is hard to prime.	The suction hoses have a leak.	Check the plumbing for leaks. Tighten and seal the areas where needed.
	Open the special fitting check valve.	See Prime and Start the Pump in the Liquid Fertilizer System section.
The pump will not prime.	The strainer is plugged.	Clean the strainer.
	The pump rate is set too low.	Set the pump according to the rate chart.
	The pump valve is fouled.	See a John Deere dealer or other service provider.
	The packings are worn.	See a John Deere dealer or other service provider.
The pump is metering low.	The suction hoses have a leak.	Check the plumbing for leaks. Tighten and seal the areas where needed.
	Open the special fitting check valve.	See a John Deere dealer or other service provider.

Symptom	Problem	Solution
	The strainer is plugged.	Clean the strainer.
	The pump rate is set too low.	Set the pump according to the rate chart.
	The pump valve is fouled.	See a John Deere dealer or other service provider.
	The pump drive range is set incorrectly.	Set the drive according to the rate chart.
	The valve spring is broken.	See a John Deere dealer or other service provider.
The pump is metering high.	The pump rate is set too high.	Select the pump setting number according to the rate chart. Adjust the pump setting upward due to the low drive wheel slippage.
	The pump drive range is set incorrectly.	Set the drive according to the rate chart.
	The pump valve is stuck open.	See a John Deere dealer or other service provider.
	The valve spring is broken.	See a John Deere dealer or other service provider.
	There are contaminates under the valve.	See a John Deere dealer or other service provider.
The fertilizer leaks past the pump when the pump is stopped.	The pump valve is stuck open.	See a John Deere dealer or other service provider.
	The valve spring is broken.	See a John Deere dealer or other service provider.
There are leaks between the pump and the crankcase.	The rod packing is worn.	See a John Deere dealer or other service provider.
The pump is using excessive oil.	The oil seals are worn.	See a John Deere dealer or other service provider.
	The O-rings are leaking.	See a John Deere dealer or other service provider.
The pump is noisy during operation.	The pump components are worn.	See a John Deere dealer or other service provider.
The fertilizer leaks at the opener when the planter is stopped.	The check valve is malfunctioning.	Repair or replace the check valve.

Symptom	Problem	Solution
The main strainer screen is plugged frequently.	The main strainer mesh is too fine.	Use a courser mesh screen (See Strainer Recommendations in the Liquid Fertilizer System section).
	The fertilizer is dirty or crystallized.	Install the finer mesh strainer on the nurse tank.
The liquid fertilizer tank does not fill.	The drip line or fitting is plugged.	**CAUTION: Avoid personal injury. Do not service if the system is under pressure. Relieve the pressure through the spring loaded vent of the tank cap. Do not remove the cap if the system is under pressure.** Clean the fitting and the drip line (See Clean Liquid Fertilizer Tank Lid Fittings and Drip Line Hoses in the Service and Adjustments section).
The fertilizer manifold pulsates or shakes.	The incorrect in-line orifice or nozzle is used.	Install the correct in-line orifice or nozzle. Install the gauge to the monitor system pressure then verify that the pressure is between 103—621 kPa (1.0—6.2 bar) (15—90 psi). If high, then use a larger in-line orifice or decrease the travel speed.
	The main row strainer is plugged.	Clean the strainer. Install the strainer on the nurse tank.
The fertilizer leaks at the opener when the planter is stopped.	The check valve is stuck open or leaking.	Clean or replace the check valve.

OUO6064,000057B-19-15OCT25

Removing from Storage

IMPORTANT: Do not use heavy petroleum base lubricant. Buildup of dust or dirt occur on sprocket or gear teeth, when wrong lubrication is used.

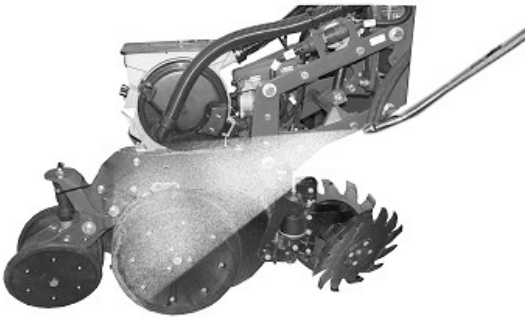
Before using machine after it has been stored, inspect seed hoppers for cleanliness to be certain seed will flow from hoppers freely.

Thoroughly inspect machine for loose parts and adjust as necessary.

IMPORTANT: Direct contact from high-pressure washers damage electrical components, bearings, hoses, and hoppers. Use caution, when power washing machine.



A78702—UN—27AUG13



A90528—UN—10MAY16

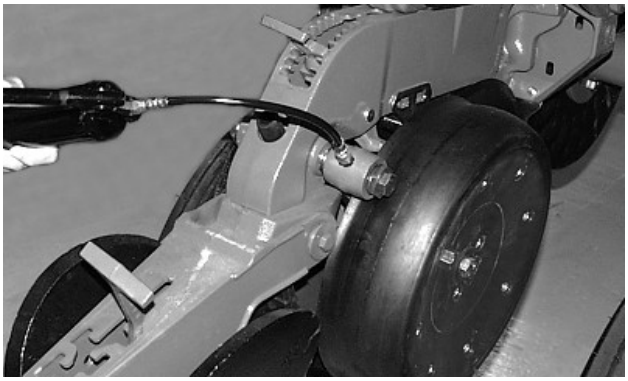
Clean any dirt or grease which accumulates on moving parts, gears, and chains before operating machine. Cleaning prevents abrasive action that causes excessive wear.

When roller chains remain unused for several days, moisture in the air accumulates on chain, causing chain to rust. Rust becomes serious enough in time to cause the chain joints to become stiff, restricting their normal free movement. Chain stiffness causes operation abnormally and disturbs the smooth rotation of important meter components causing deterioration in performance.

If machine is not used for several days thoroughly lubricate chains with John Deere Multipurpose Spray Lube TY6350.

The meter driveshaft and seed meter should turn freely by hand. Rotate driveshaft forward only, as assemblies are not designed to rotate in reverse.

Adjust machine for planting conditions to be encountered.

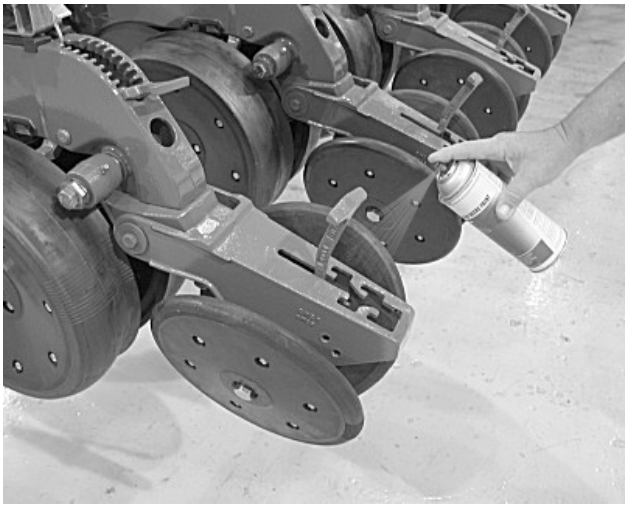


A53141—UN—04NOV03

Lubricate planting units as outlined in the Lubrication section.

WP29706,0000867-19-08DEC16

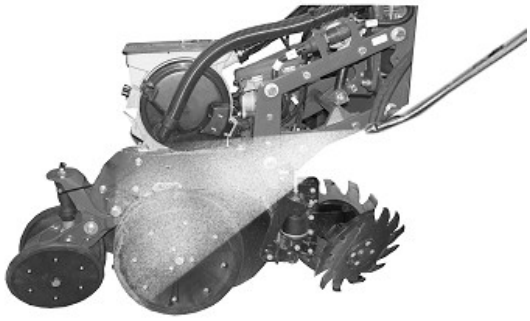
Store the Planter



A68112—UN—14JUL10



A78702—UN—27AUG13



A90528—UN—10MAY16

CAUTION: Avoid skin, eye, and respiratory injury. Follow chemical manufacturer's precautions when handling parts coated with chemicals or treatments. Use proper skin, eye, and respiratory protection.

IMPORTANT: Avoid damage to electrical components, bearings, hoses, or hoppers. Avoid direct spray at sensitive components. Use caution, if power washing the planter.

When planting is completed for one season, store the planter under a cover with all parts in operating condition.

Store the planter in a raised position with the service locks installed.

Paint all parts which are chipped or worn.

Clean the planter thoroughly to remove dirt and residue that hold moisture on the planter components.

Lubricate the planter as outlined in the Lubrication section. Grease exposed cylinder rods.

Thoroughly lubricate the chains with John Deere Multipurpose Spray Lube, TY6350, at beginning of the idle period.

Empty and clean the hoppers.

Inspect the planter for worn or broken parts. See a John Deere dealer or other service provider during the off season so that parts or services are acquired when the planter is not needed in the field.

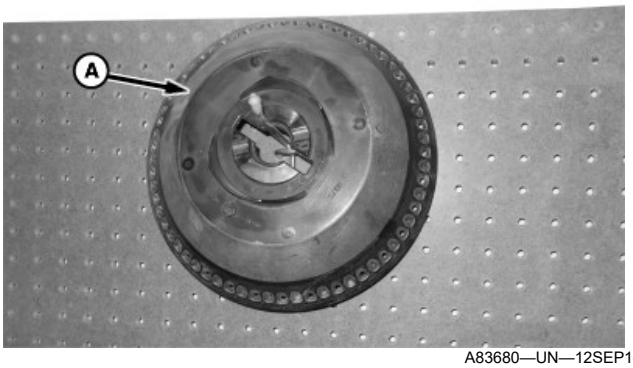
Store the planter in a clean, dry place with the planting unit gauge wheels and the closing wheels out of the sun.

Relieve the pressure from the closing wheels.

Relieve the row unit down force.

Clean the liquid and dry fertilizer components thoroughly as various fertilizers deteriorate system components (if equipped).

Thoroughly the flush liquid systems with clean water and winterize in cold climates. Follow the chemical manufacturer's label.



A83680—UN—12SEP14

A—Bowl Disk

Remove the bowl disk from the meter. (See Inspect and Service ExactEmerge Seed Meter in Service section.)

Clean the meter housing, meter chamber, and seed bowl with mild detergent and soft brush.

Spray the bowl disk with a graphite lubricant.

Store the bowl disk (A) in a box or hang the bowl disks on the wall.

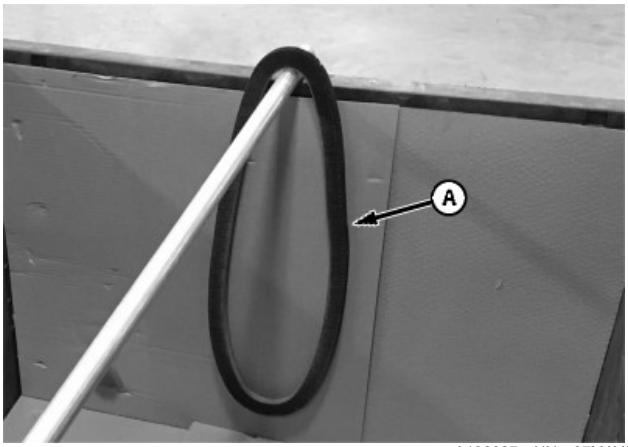
IMPORTANT: Store the bowl disks away from extreme heat or direct sunlight. Do not leave the bowl disks in the meters during the off season. Do not store under heavy parts.

Clean the vacuum system. (See Clean Vacuum System in the Service section.)

Check for hydraulic leaks.

Check and clean the seed meters.

Check and replace the necessary seed meter seals.



A106827—UN—07MAY20

A—BrushBelt

Verify that the BrushBelt is clean and purged of all seed. (See Rotate and Runoff Procedures in the SeedStar OM for purge instructions.)

The BrushBelt can be stored in the planter during the off season. Remove the tension from the cartridge for extended storage periods.

When removing the BrushBelt for storage, clean and hang it from a curved object for best results. (See Remove and Install the BrushBelt Cartridge in the ExactEmerge Service and Adjustments section.)

JF72098,0000091-19-22OCT25

Liquid Fertilizer System Storage with ExactRate Pumps

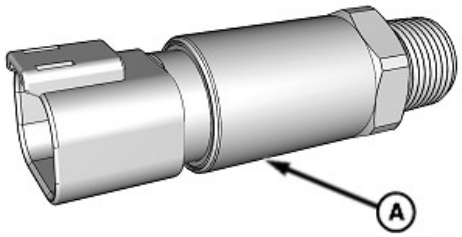
Keep the pump from freezing.

IMPORTANT: To prevent damage within the ExactRate pump, keep air out of the pump. Entrance of air into the pump causes rapid and severe corrosion to the interior pump components, even for short periods of storage.

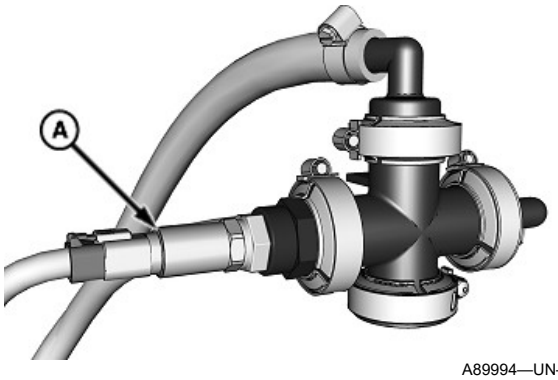
Suspension fertilizer must be flushed from the pump for any storage period.		
Clear Liquid Fertilizer		
Overnight	Dropping Temperatures	The fertilizer solution is likely to settle out overnight. Draw fresh water from the rinse tank into the pump and leave the pump filled. Do not admit air. If the temperature is dropping below freezing, use a winterizer solution instead of water.
Overnight	Steady or Rising Temperatures	Leave the pump and hoses filled with the fertilizer solution.
One to Two Weeks	Preferred	Rinse the system using fresh water. See the rinse procedure in the Operating section.
Winter	Preferred	Drain excess fertilizer from the tank and Quik-Fill hoses. Follow the winterization procedure in the Operating section.

WP29706,0000DAB-19-09FEB23

Liquid Fertilizer Sensor (If Equipped)



A89995—UN—30MAR16



A89994—UN—30MAR16

A—Liquid Fertilizer Sensor

Remove the sensor (A) and flush it with clean water.

Do not insert any object or tool into the fluid port.

WP29706,0000804-19-12MAY17

Liquid Fertilizer System Storage Procedures with John Blue Pumps

IMPORTANT: To prevent damage to piston pump:

Keep air out of pump. Entrance of air into the pump causes rapid and severe corrosion to the interior pump components, even for short periods of storage.

Keep pump from freezing.

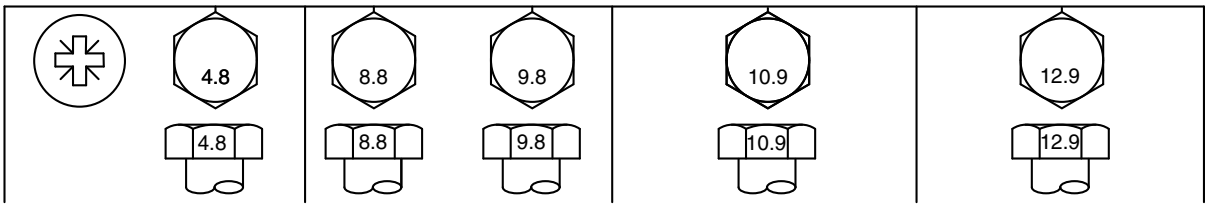
Remove drive chain when not in use.

Suspension fertilizer must be flushed from the pump for any storage period.		
Clear Liquid Fertilizer		
Overnight	Cooling Temperatures	Solution is likely to settle out. Draw fresh water into pump and leave filled. Do not admit air.
Overnight	Steady or Rising Temperatures	Leave pump and hoses filled with solution.
One to Two Weeks	Acceptable	Draw fresh water into pump to dilute and flush fertilizer solution. Do not drain. Keep pump sealed to exclude air.
One to Two Weeks	Preferred	Use approximately 19—38 L (5—10 gal) of fresh water and operate pump to flush system thoroughly. Install 19 L (5 gal) of SprayMaster Winterizer Fluid or RV antifreeze[a] to the tank . Operate pump to circulate winterizer into system until the solution starts to come out the openers.
Winter	Preferred	Drain any excess fertilizer from the tank and manifolds. Operate pump to clear fertilizer from distribution hoses and check valves. Use approximately 19—38 L (5—10 gal) of fresh water and operate pump to flush system thoroughly. Install 19 L (5 gal) of SprayMaster Winterizer Fluid or RV antifreeze[a] to the tank . Operate pump to circulate winterizer into system until the solution starts to come out the openers.

[a]Mix winterizer fluids to the correct ratio for system protection down to the lowest expected temperature

OUO6064,0000584-19-22OCT25

Metric Bolt and Screw Torque Values



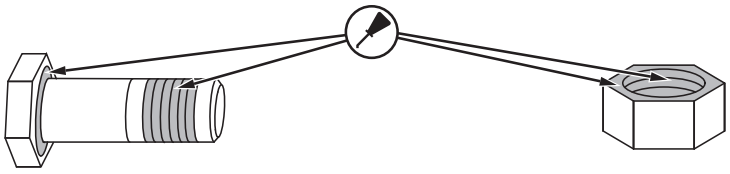
TS1742—UN—31MAY18

Bolt or Screw Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Hex Head[a]		Flange Head[b]		Hex Head[a]		Flange Head[b]		Hex Head[a]		Flange Head[b]		Hex Head[a]		Flange Head[b]	
	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in
M6	3.6	31.9	3.9	34.5	6.7	59.3	7.3	64.6	9.8	86.7	10.8	95.6	11.5	102	12.6	112
									N·m	lb·ft	N·m	lb·ft	N·m	lb·ft	N·m	lb·ft
M8	8.6	76.1	9.4	83.2	16.2	143	17.6	156	23.8	17.6	25.9	19.1	27.8	20.5	30.3	22.3
			N·m	lb·ft	N·m	lb·ft	N·m	lb·ft								
M10	16.9	150	18.4	13.6	31.9	23.5	34.7	25.6	46.8	34.5	51	37.6	55	40.6	60	44.3
	N·m	lb·ft														
M12	—	—	—	—	55	40.6	61	45	81	59.7	89	65.6	95	70.1	105	77.4
M14	—	—	—	—	87	64.2	96	70.8	128	94.4	141	104	150	111	165	122
M16	—	—	—	—	135	99.6	149	110	198	146	219	162	232	171	257	190
M18	—	—	—	—	193	142	214	158	275	203	304	224	322	245	356	263
M20	—	—	—	—	272	201	301	222	387	285	428	316	453	334	501	370
M22	—	—	—	—	365	263	405	299	520	384	576	425	608	448	674	497
M24	—	—	—	—	468	345	518	382	666	491	738	544	780	575	864	637
M27	—	—	—	—	683	504	758	559	973	718	1080	797	1139	840	1263	932
M30	—	—	—	—	932	687	1029	759	1327	979	1466	1081	1553	1145	1715	1265
M33	—	—	—	—	1258	928	1398	1031	1788	1319	1986	1465	2092	1543	2324	1714
M36	—	—	—	—	1617	1193	1789	1319	2303	1699	2548	1879	2695	1988	2982	2199

The nominal torque values listed are for general use only with the assumed wrenching accuracy of 20%, such as a manual torque wrench.
DO NOT use these values if a different torque value or tightening procedure is given for a specific application.
For lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application.

Replace fasteners with the same or higher property class. If higher property class fasteners are used, tighten these to the strength of the original.

- Make sure that fastener threads are clean.
- Apply a thin coat of Hy-Gard or equivalent oil under the head and on the threads of the fastener, as shown in the following image.
- Be conservative with the amount of oil to reduce the potential for hydraulic lockup in blind holes due to excessive oil.
- Properly start thread engagement.

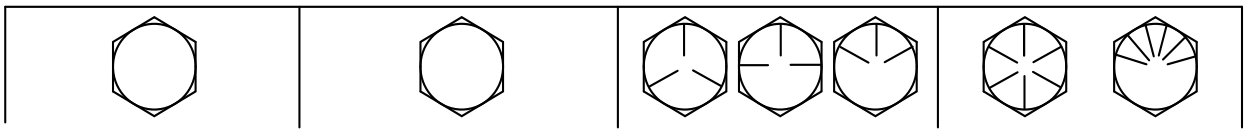


TS1741—UN—22MAY18

[a] *Hex head column values are valid for ISO 4014 and ISO 4017 hex head, ISO 4162 hex socket head, and ISO 4032 hex nuts.*
[b] *Hex flange column values are valid for ASME B18.2.3.9M, ISO 4161, or EN 1665 hex flange products.*

DX,TORQ2(T)-19-09MAY22

Unified Inch Bolt and Screw Torque Values



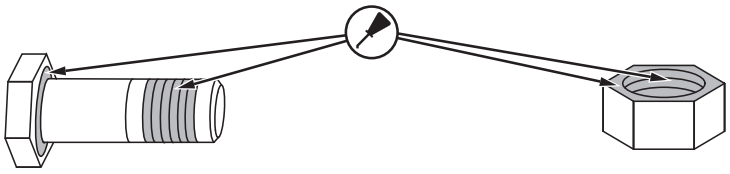
TS1671—UN—01MAY03

Bolt or Screw Size	SAE Grade 1[a]				SAE Grade 2[b]				SAE Grade 5, 5.1 or 5.2				SAE Grade 8 or 8.2			
	Hex Head[c]		Flange Head[d]		Hex Head[c]		Flange Head[d]		Hex Head[c]		Flange Head[d]		Hex Head[c]		Flange Head[d]	
	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in
1/4	3.1	27.3	3.2	28.4	5.1	45.5	5.3	47.3	7.9	70.2	8.3	73.1	11.2	99.2	11.6	103
													N·m	lb·ft	N·m	lb·ft
5/16	6.1	54.1	6.5	57.7	10.2	90.2	10.9	96.2	15.7	139	16.8	149	22.2	16.4	23.7	17.5
									N·m	lb·ft	N·m	lb·ft				
3/8	10.5	93.6	11.5	102	17.6	156	19.2	170	27.3	20.1	29.7	21.9	38.5	28.4	41.9	30.9
					N·m	lb·ft	N·m	lb·ft								
7/16	16.7	148	18.4	163	27.8	20.5	30.6	22.6	43	31.7	47.3	34.9	60.6	44.7	66.8	49.3
	N·m	lb·ft	N·m	lb·ft												
1/2	25.9	19.1	28.2	20.8	43.1	31.8	47	34.7	66.6	49.1	72.8	53.7	94	69.3	103	75.8
9/16	36.7	27.1	40.5	29.9	61.1	45.1	67.5	49.8	94.6	69.8	104	77	134	98.5	148	109
5/8	51	37.6	55.9	41.2	85	62.7	93.1	68.7	131	96.9	144	106	186	137	203	150
3/4	89.5	66	98	72.3	149	110	164	121	230	170	252	186	325	240	357	263
7/8	144	106	157	116	144	106	157	116	370	273	405	299	522	385	572	422
1	216	159	236	174	216	159	236	174	556	410	609	449	785	579	860	634
1-1/8	305	225	335	247	305	225	335	247	685	505	751	554	1110	819	1218	898
1-1/4	427	315	469	346	427	315	469	346	957	706	1051	775	1552	1145	1703	1256
1-3/8	564	416	618	456	564	416	618	456	1264	932	1386	1022	2050	1512	2248	1658
1-1/2	743	548	815	601	743	548	815	601	1665	1228	1826	1347	2699	1991	2962	2185

The nominal torque values listed are for general use only with the assumed wrenching accuracy of 20%, such as a manual torque wrench.
DO NOT use these values if a different torque value or tightening procedure is given for a specific application.
For lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application.

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- Apply a thin coat of Hy-Gard or equivalent oil under the head and on the threads of the fastener, as shown in the following image.
- Be conservative with the amount of oil to reduce the potential for hydraulic lockup in blind holes due to excessive oil.
- Properly start thread engagement.



TS1741—UN—22MAY18

[a]Grade 1 applies for hex cap screws over 6 in (152 mm) long, and for all other types of bolts and screws of any length.
[b]Grade 2 applies for hex cap screws (not hex bolts) up to 6 in (152 mm) long.
[c]Hex head column values are valid for ISO 4014 and ISO 4017 hex head, ISO 4162 hex socket head, and ISO 4032 hex nuts.
[d]Hex flange column values are valid for ASME B18.2.3.9M, ISO 4161, or EN 1665 hex flange products.

DX,TORQ1(T)-19-09MAY22

Specifications

NOTE: Weights are with typical optional equipment.
Weight with other optional equipment varies.

Planter		Row Spacing	Average Empty Weight
DB44	24-Row	56 cm (22 in)	9344 kg (20 600 lb)
DB60	24-Row	76 cm (30 in)	13 989 kg (30 840 lb)
DB60	36-Row	51 cm (20 in)	15 785 kg (34 800 lb)
DB60	47-Row	38 cm (15 in)	18 280 kg (40 300 lb)
DB60	48-Row	38 cm (15 in)	18 416 kg (40 600 lb)
DB66	36-Row	56 cm (22 in)	16 148 kg (35 600 lb)
DB80	32-Row	76 cm (30 in)	16 057 kg (35 400 lb)
DB80	48-Row	51 cm (20 in)	17 599 kg (38 800 lb)
DB88	48-Row	56 cm (22 in)	18 552 kg (40 900 lb)
DB90	36-Row	76 cm (30 in)	16 851 kg (37 150 lb)
DB90	54-Row	51 cm (20 in)	21 727 kg (47 900 lb)

Frame Types	DB44 DB60 DB66 DB80 DB88 DB90
Air System	Hydraulic Drive (motors): 7.6—19.0 L/min (2—5 gal/min) Horsepower Required: 4.5—10.4 kW (6—14 hp)
Planting Meter Type	Vacuum
Seed Openers	Tru-Vee Double Disk
Liquid Fertilizer Tank Capacity (DB44 Planters)	1590 L (420 gal)
Liquid Fertilizer Tank Capacity (DB60, DB66, DB80, DB88, and DB90 Planters)	2271 L (600 gal)
Type of Lift	Wheel Modules with Rephasing Hydraulic Cylinders
Type of Drive	56 V Electric Motors
Tires Size and Inflation Pressures	
Center Frame Tires	400/55-R22.5 552 kPa (5.5 bar) (80 psi)
Center Frame Tires	600/50R22.5 379 kPa (3.8 bar) (55 psi)
14-Ply Center Frame Tires	31-13.5X15 621 kPa (6.2 bar) (90 psi)
Center Frame Steel-Belted Radial Tires	445/50R22.5 VF 448 kPa (4.5 bar) (65 psi)
6-Ply Wing Frame Implement Tires	31-13.5X15 152 kPa (1.5 bar) (22 psi)
8-Ply Wing Frame Skid Steer Tires	31-13.5X16.5 241 kPa (2.4 bar) (35 psi)
Row Unit Seed Hopper Capacity	Vacuum Meter: 2.2 L (1/16 bu)
Seed Tank Capacity	CCS Bulk Tanks, Two 1762 L (50 bu) CCS Bulk Tanks, Two 2290 L (65 bu)
Markers	Automatic Alternating or Independently Controlled
Hydraulic Oil Pump Required to Operate Electric Drive Planter	60 gal/min
Tractor Standby Pressure	15 500 kPa (155 bar) (2300 psi)
Hydraulic System Working Pressure	20 684 kPa (207 bar) (3000 psi)
Hydraulic System Burst Pressure	82 737 kPa (827 bar) (12 000 psi)
Seed Monitoring	SeedStar
Specifications and design subject to change without notice.	

WP29706,0000BB3-19-14OCT25

Liquid Fertilizer Specifications—Ground-Driven Pump

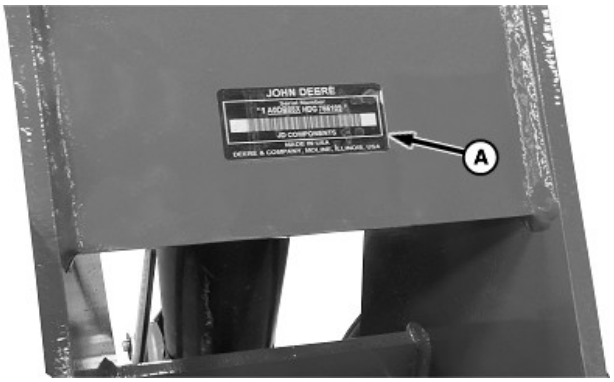
Operating Specifications	
Nozzles (single-disk injection opener only)	00015 (1.5) 00025 (2.5) 0005 (5) 0008 (8) 0012 (12)
In-Line Orifices (non-injection style, frame-mounted fertilizer openers)	Green (0.70) Yellow (1.2) Black (1.7) Gray (2.5)
Operating Speed	8—11 km/h (5—7 mph)
Operating System Pressure	103—621 kPa (1.0—6.2 bar) (15—90 psi)
Fertilizer Tank Fill Opening	Quik-Fill
Fertilizer Tank Strainer	80 Mesh
Specifications and design subject to change without notice.	

OUO6064,0000773-19-09OCT25

Record Serial Number



A101214—UN—26JUN18



A82412—UN—21APR14

A—Serial Number Plate

Serial number plate (A) is on the front main frame. Record number in the spaces provided.

Machine Model	
Serial Number	

OUO6074,0000DB1-19-11JUL18

Keep Proof of Ownership



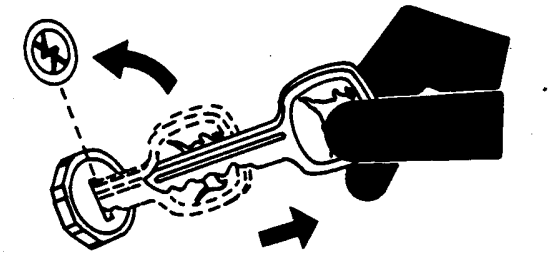
TS1680—UN—09DEC03

1. Maintain in a secure location an up-to-date inventory of all product and component serial numbers.
2. Regularly verify that identification plates have not been removed. Report any evidence of tampering to law enforcement agencies and order duplicate plates.
3. Other steps you can take:
   - Mark your machine with your own numbering system

- Take color photographs from several angles of each machine

DX,SECURE1-19-18NOV03

Keep Machines Secure



TS230—UN—24MAY89

1. Install vandal-proof devices.
2. When machine is in storage:
   - Lower equipment to the ground
   - Set wheels to widest position to make loading more difficult
   - Remove any keys and batteries
3. When parking indoors, put large equipment in front of exits and lock your storage buildings.
4. When parking outdoors, store in a well-lighted and fenced area.
5. Make note of suspicious activity and report any thefts immediately to law enforcement agencies.
6. Notify your John Deere dealer of any losses.

DX,SECURE2-19-18NOV03

Limited Battery Warranty

NOTE: Applicable in North America only. For complete machine warranty, reference a copy of the John Deere warranty statement. Contact your John Deere dealer to obtain a copy.

To Secure Warranty Service

The purchaser must request warranty service from a John Deere dealer authorized to sell John Deere batteries, and present the battery to the dealer with the top cover plate codes intact.

Replacement

Any new battery which becomes unserviceable (not merely discharged) due to defects in material or workmanship will be eligible for warranty consideration.

This Warranty Does Not Cover

Breakage of the container, cover, or terminals.

Depreciation or damage caused by lack of reasonable and necessary maintenance or by improper maintenance.

Transportation, mailing, or service call charges for warranty service.

Limitation of Implied Warranties and Purchaser's Remedies

To the extent permitted by law, neither John Deere nor any company affiliated with it makes any warranties, representations or promises as to the quality, performance or freedom from defect of the products covered by this warranty. IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, TO THE EXTENT APPLICABLE, SHALL BE LIMITED IN DURATION TO THE APPLICABLE ADJUSTMENT PERIOD SET FORTH HERE. THE PURCHASER'S ONLY REMEDIES IN CONNECTION WITH THE BREACH OR PERFORMANCE OF ANY WARRANTY ON JOHN DEERE BATTERIES ARE THOSE SET FORTH HERE. IN NO EVENT WILL THE DEALER, JOHN DEERE OR ANY COMPANY AFFILIATED WITH JOHN DEERE BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. (Note: Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages. So these limitations and exclusions may not apply to you.) This warranty gives you specific legal rights, and you may also have some rights which vary from state to state.

No Dealer Warranty

The selling dealer makes no warranty of its own and the dealer has no authority to make any representation or promise on behalf of John Deere, or to modify the terms or limitations of this warranty in any way.

DX,BATWAR,NA-19-09MAY25

Index

A

Access
ExactRate 50-A-3
ExactShot 50-B-6
Accumulator
Charge
Individual row hydraulic downforce
Gen 2 ..... 80-A-23
Test
Individual row hydraulic downforce
Gen 1 ..... 80-A-20
Gen 2 ..... 80-A-21
Adjust
Coulter bearing 80-A-42
Main frame height 25-B-3
Marker Disk Angle 25-B-9, 80-A-26
Wing frame height 25-B-4
Adjust marker length
24 row 80-A-28
Adjustment
Wheel Wear 80-A-43
Agitation strip
ExactEmerge seed meter
Wear guidelines 80-D-2
Agitator
Control
easy fold
Easy Fold 40-A-1
Agitator strip
Install 40-B-6, 80-D-12
Air filter
Pneumatic compressor
Clean or replace 80-A-44
Air tank
Inspection 80-A-47
Altenator
Implement power generation
Attaching 30-A-4
Alternator
Power generation
7R installation 30-B-1
8R models 30-B-4
9R models 30-B-7
9RT an 9x30T models 30-B-10
Removal 30-B-21
Alternator gear
Grease
Tractor power generator 75-B-2
Assemble
Valve body components
Valve body parts
valve body parts 80-F-7
Valve body solenoid
valve body solenoid
Valve Body solenoid 80-F-11
Assemble valve body components
valve body components
valve components
valve parts 80-F-7
Assemble valve body solenoid
Assemble Valve Body Solenoid 80-F-11
Attach
Warning light harness 30-A-3

B

Baffle
Vacuum seed meter
Adjust baffle 80-C-4
Baffle, seed meter
Recommendations
MaxEmerge 40-C-1
Ballast attachment 70-A-7
Battery
Access
Implement power generation 80-A-31
Cable installation
Implement power generation 80-A-36
Charging
Implement power generation 80-A-33
Cleaning
Implement power generation 80-A-34
Inspection
Implement power generation 80-A-31
Replacement
Implement power generation 80-A-33
Terminal torque
Implement power generation 80-A-36
Voltage check
Implement power generation 80-A-33
Warranty 100-5
Battery Handling, Safety
Safety, Battery Handling 05-3
Before use 25-B-1
bleeding frame weight distribution cylinders
frame weight distribution
bleeding cylinder
frame weight distribution cylinders 80-A-25
Blockage
CCS seed delivery hose 40-F-10
Blower hydraulic requirements 30-A-2
Blower motor hydraulic requirements 30-A-2
Bolt and screw torque values
Metric 100-1
Unified inch 100-2
Bowl, seed
Meter selection 40-B-1
Vacuum meter
Install
Seed Disk Bowl 40-B-9
Bowl, seed disk
Wear pad 80-D-13

Bridged
CCS system 40-F-11
CCS tank manifold 40-F-11
Bridged and blocked
CCS system 40-F-10
Bridging
Explanation and solution 40-F-1
Brush
ExactEmerge meter baffle
Change 80-D-16
Meter settings 40-B-1
Vacuum seed meter
Change 80-C-3
Brush belt
Meter selection 40-B-1
Residue shield 40-B-1, 40-B-11
Brush, seed meter
Recommendations
MaxEmerge 40-C-1
Brushbelt
Brush belt
Sensor
Clean 80-D-8
BrushBelt
ExactEmerge seed meter
Wear guidelines 80-D-2
Use with liquid fertilizer 50-C-5
Used with liquid fertilizer 50-A-5, 50-B-7
BrushBelt cartridge
Install and remove 40-B-15
Remove and install 40-B-15
BrushBelt guard
Replace 80-C-13, 80-D-20
BrushBelt Seal
BrushBelt
cartridge seal 40-B-6, 80-D-16

C

Cable installation
Battery
Implement power generation 80-A-36
Cartridge
Guard
Replacement 80-C-13, 80-D-20
Cartridge Vacuum Seal
Install
Brushbelt Seal 40-B-6, 80-D-16
Case drain
Low pressure connection
Case Drain requirements 25-A-5
Case drain hose
Requirements 30-A-2
Catch pan
Cleanout 40-C-10
CCS
Blower override 40-A-1, 40-F-9
Delivery hose cleanout 40-F-9
Tank lid 40-F-2
CCS blower
Gauge filter
Replacing 80-A-29, 80-A-44
CCS blower assembly
Troubleshooting 90-15
CCS blower gauge, zeroing
Zero the CCS Blower
Zero the CCS Blower Pressure Gauge ... 80-A-29
CCS pressure level gauge
Zeroing 80-A-29
CCS product delivery
Troubleshooting 90-17
CCS seed delivery hose
Blockage 40-F-10
CCS system
Bridged and blocked 40-F-10
CCS system, operate
Heavily treated seed or very large seed corn 40-F-6
Small seed nozzle and elbow 40-F-6
Using small seed 40-F-6
CCS system, operating
Planting seed plots 40-F-7
CCS tank
Initial use of talc 25-B-1
Setting pressure
ExactEmerge on DB Planter 40-F-4
CCS tank fill lights 40-F-2
CCS tank pressure
Setting
ExactEmerge on DB Planter 40-F-4
CCS tanks
Cleanout 40-F-8
Fill 40-F-3
Leveling seed 40-F-2
Partially cleaning out 40-F-7
Central commdity system
Lubricant
Talc 75-A-1
Chains
Drive
Tighten 80-A-42
Chamber Fluid Maintenance
Pump Fluid
chamber fluid
pump 80-F-18, 80-G-24
Change from narrow to wide rows
Split row machines 25-B-5
Change from wide to narrow rows
Split row machines 25-B-6
Charge
Accumulator Gen 2 ..... 80-A-23
Battery
Implement power generation 80-A-33
Check liquid fertilizer rates 50-C-3

Checking frame height 25-B-3
Cleaners
Easy adjust 70-A-5
Manual adjust
Unit mounted row 70-A-5
Cleanout
CCS tanks 40-F-8
Vacuum meter
Catch pan 40-C-10
Clevis
Hitch position 30-A-8
Closing wheels
Adjust spacing
Adjust the Closing Wheel Spacing 40-A-8
Alignment
Center the Closing Wheels 40-A-8
Downforce adjustment 40-A-7
Heavy-duty
Heavy-duty Closing Wheels
heavy-duty closing wheels 70-A-3
Stagger adjustment
Stagger the Closing Wheels 40-A-8
Closing Wheels
Pneumatic
Pneumatic Closing Wheels
pneumatic closing wheels 70-A-2
Compatibility
Tractor Drawbar
Planter Hitch Ring 25-B-1
Tractor hydraulics 25-A-3
Compressor
Air filter
Clean or replace 80-A-44
Compressor, pneumatic down force
Hydraulically driven
Change or fill oil 80-A-46
Check oil 80-A-46
Conditioner, BrushBelt
ExactEmerge seed meter
Wear guidelines 80-D-2
connect implement hose
disconnect fill hose
disconnect implement hose 50-F-2
Connect or Disconnect the Implement or Fill Hose
Implement Hose
Fill Hose
connect fill hose 50-F-2
Connections
Hose to tractor 30-A-6
Contamination cleanout
Individual row hydraulic downforce hoses 30-A-8
Corn
Vacuum level
Polytine double eliminator 40-B-19
Vacuum level, optional
Brush type double eliminator 40-B-20
Cotton
Residue shield, BrushBelt 40-B-11
Vacuum level
Polytine double eliminator 40-B-20
Coulter
Bearing
Adjust 80-A-42
Unit mounted 70-A-3
Coulter
Maintenance 80-A-42

D

Delivery hoses
CCS cleanout 40-F-9
Depressurize
Pneumatic downforce system 70-B-2
Depth gauge wheels
Adjust
Gauge wheels 80-C-14, 80-D-21
Adjustment 40-A-6
Depth of planting
Adjust Depth Gauge Wheels 40-A-6
Detach machine 35-1
Detent
Time, settings 30-A-6
Disk closing attachment
Servicing 80-A-43
Disk selection, corn
For optimum performance 40-C-3
Disk, meter
Wear pad 80-D-13
Disk, seed
Recommendations
MaxEmerge 40-C-1
Disks
Seed furrow
Inspect and adjust 80-C-12, 80-D-18
Replacement 80-C-13, 80-D-20
Display
ExactRate
Access 50-A-3
Main page 50-A-4
Overview 50-A-1
ExactShot
Access 50-B-6
Main page 50-B-5
Nozzle tip recommendations 50-B-16
Overview 50-B-1
Specific gravity 50-B-29
Distribution system
ExactRate pump
Overview 50-A-2
ExactShot liquid fertilizer 50-B-4
Liquid fertilizer 50-C-1

Distribution tube
Fertilizer
Fix or replace 80-A-38, 80-E-1, 80-F-15
Double eliminator
Calibration
MaxEmerge 5 ..... 80-C-9
MaxEmerge 5e 80-C-9
ExactEmerge seed meter
Wear guidelines 80-D-2
Inner
Adjustment
ExactEmerge 40-B-7
Meter settings 40-B-1
Recommendations
MaxEmerge 40-C-1
Replace
Inner and outer 80-D-16
Selection and use 40-B-1
Vacuum meters
Operation 80-C-10
Doubles
Select optimum seed disk for corn 40-C-3
Downforce
Integrated pneumatic 70-A-1
Pneumatic 70-B-1
Drain connection, low pressure 25-A-5
Drain ExactRate Fertilizer Transfer System
Drain Liquid Fertilizer Transfer
drain fertilizer
drain exactrate fertilizer transfer system 50-F-4
Drain Liquid Fertilizer
drain fertilizer transfer system
transfer system
ExactRate Transfer System 50-F-4
Drawbar
Control 40-A-1
Position, tractor 25-B-1
Tractor settings 25-A-6
Drawbar category
Tractor 25-B-1
Drawbar static load 25-A-1
Drive chains
Tighten 80-A-42

E

Ehternet
Harness connection 30-A-4
Electric drive
Work safely 05-4, 30-B-1, 80-A-9
Electric Drive
Meter selection 40-B-1
Electric power generation
Attaching the altenator 30-A-4
Hydraulic
Filter change 80-A-30
Enhanced monitoring
Drain air storage tank 70-B-3, 80-A-44
EPG
Electric drive alert 05-4, 30-B-1, 80-A-9
ExactEmerge
Double eliminator
Inner
Adjustment 40-B-7
Service
Wear guidelines 80-D-2
Vacuum seed meter
Accessing 40-B-5
Wear guidelines 80-D-2
ExactEmerge meter
Baffle brush
Change 80-D-16
Double eliminator
Inner and outer
Replace 80-D-16
ExactEmerge Tractor Requirements
ExactEmerge 25-A-2
ExactRate
Access 50-A-3
Main page 50-A-4
Overview 50-A-1
ExactRate fertilizer
Pump adjustment
Keypad 50-A-14, 50-B-15
Pump priming
Offboard tank
Centrally mounted pump 50-A-12
Wing mounted pump 50-A-9
Onboard tank
Centrally mounted pump 50-A-11
Wing mounted pump 50-A-6
Strainer recommendations 50-A-16, 50-B-30
ExactRate pump
Fertilizer distribution
Overview 50-A-2
ExactRate Pump
Rinse tank 50-A-15, 50-B-30
Winterization
DB planter 50-A-17, 50-B-31
ExactShot
Access 50-B-6
Main page 50-B-5
Overview 50-B-1
Select tip
Nozzle recommendations 50-B-16
Service
Intervals 80-G-1
Specific gravity 50-B-29
ExactShot fertilizer
High pressure distribution 50-B-4

Pump priming
Offboard tank
Centrally mounted pump 50-B-13
Wing mounted pump..... 50-B-10
Onboard tank
Centrally mounted pump 50-B-12
Wing mounted pump.....50-B-7
ExactShot liquid fertilizer
Fertilizer dosing solenoid
Assemble.....80-G-13
Disassemble and Inspect..... 80-G-11
Fertilizer dosing valve
Assemble..... 80-G-8
Disassemble and Inspect..... 80-G-5
Install..... 80-G-4
Remove..... 80-G-2
Hoses and manifold tubes, inspect and replace
Delivery hoses.....80-G-18
Distribution hoses 80-G-18
Manifold tubes 80-G-18
Shutoff valve and fittings 80-G-18
Straight fitting/support.....80-G-18

F

Fertilizer
Distribution tube
Fix.....80-A-38, 80-E-1, 80-F-15
Replace.....80-A-38, 80-E-1, 80-F-15
ExactRate 50-A-3
ExactRate pump
Overview 50-A-2
ExactShot.....50-B-6
ExactShot liquid distribution.....50-B-4
Liquid distribution..... 50-C-1
Specific gravity..... 50-B-29
Storage, short- or long-term
Guidelines..... 50-A-16, 50-B-31
Fertilizer manifold T-fittings, inspect and replace .....
80-G-15
Fertilizer quik-fill
Liquid.....50-A-5
Fertilizer system
Strainer recommendations 50-C-5
Fertilizer system
Safety 50-A-3, 50-B-7
Fertilizer tubes
Replace.....80-G-24
Fertilizer Tubes
Replace
Replace Fertilizer Tubes.....80-G-24
Fertilizer, liquid
Change the in-line orifices..... 50-C-6
Strainer screen
Service..... 80-F-18, 80-G-24
Use with the BrushBelt 50-C-5
Used with the BrushBelt..... 50-A-5, 50-B-7
Fill CCS tank 40-F-3
Fill Liquid Fertilizer Tanks from Rear of Implement
Fill Liquid Tanks
fill tank
fill tanks.....50-F-3
Fill Liquid Fertilizer Tanks from Tractor
Fill Liquid Tanks
fill tank
fill tanks.....50-F-3
Filling CCS tank
Initial use of talc 25-B-1
Filter
CCS blower gauge
Replacing..... 80-A-29, 80-A-44
Implement power generation
Change 80-A-30
Pneumatic compressor
Clean or replace..... 80-A-44
Float range
Marker
24 row 40-A-9
Flow
Tractor hydraulics, settings.....30-A-6
Flow control valve, setting
8000 and 9000 series tractors 25-A-1
Fold
Functions and control 40-A-1
Fold and unfold 40-A-6
Fold assist 35-1
Foreword..... 2
Frame
Control 40-A-1
Weight distribution
Operation.....40-A-2
5 section frame.....40-A-2
Frame control
Connect harness 30-A-3
Frame height
Main frame
Adjust 25-B-3
Wing frame
Adjust 25-B-4
Frame weight distribution
Operation.....40-A-2
5 section frame 40-A-2
Frame Weight Distribution
Bleeding cylinders
Bleeding Frame Weight Distribution Cylinders
Frame Weight Distribution Cylinders... 80-A-25
Front Fill and Fertilizer Tank Overview
fertilizer transfer system overview
front fill overview
fertilizer transfer system.....50-F-1
Furrow disks
Replace..... 80-C-13, 80-D-20

Furrow opener disks
Inspect and adjust 80-C-12, 80-D-18
Replacement 80-C-13, 80-D-20
Fuse
Identification
Electric drive 80-A-11

G

Gate
Seed hopper 40-C-10
Gear case
ExactEmerge seed meter
Wear guidelines 80-D-2
Power generation
Removal 30-B-21
Gear case oil 75-B-2
Tractor power generator 75-B-2
General attachments 70-A-1
Grease
Multipurpose Extreme Pressure (EP) 75-B-1
Guage wheels
Walking type 70-A-1
Guard
Replacement
BrushBelt 80-C-13, 80-D-20

H

Hardware torque values
Metric 100-1
Unified inch 100-2
Harness
Ethernet Connection 30-A-4
Frame control 30-A-3
High pressure fertilizer 50-C-1
ExactShot 50-B-4
Hitch
Leveling 30-A-8
Hitch category
Tractor and implement 25-B-1
Hitch load
Maximum weight 25-A-1
Hopper
Seed gate 40-C-10
Hopper extensions
Vacuum meter
Install 80-C-11
Hopper screen, row unit
Clean 80-C-2
Hose
Cleanout
Individual row hydraulic downforce 30-A-8
Connections 30-A-6
Hoses
CCS delivery cleanout 40-F-9
Housing
ExactEmerge seed meter
Wear guidelines 80-D-2
Hub bearing
ExactEmerge seed meter
Wear guidelines 80-D-2
Hub, seed meter
Adjustment 80-C-7
Hydraulic
Case drain hose
Requirements 30-A-2
Hose cleanout
Individual row hydraulic downforce 30-A-8
Tractor
System check 25-A-3
Hydraulic connections
Tractor
Recommendations 30-A-6
Hydraulic driven Compressor
Pneumatic down force
Change or fill oil 80-A-46
Check oil 80-A-46
Hydraulic hook-up
8000 and 9000 series tractors
Flow control valve 25-A-1
Power beyond 30-A-2
Return coupler
Hydraulic motors 30-A-2
Hydraulic Motor Requirements 25-A-5
Hydraulic oil 75-B-2
Hydraulic Requirements
Motor Requirements 25-A-5
Hydraulic system
Check 30-A-3
Hydraulics
Vacuum system
Operate 40-A-1

I

Implement
Electric power generation 30-A-4
Implement power generation
Electric drive alert 05-4, 30-B-1, 80-A-9
Individual row hydraulic downforce
Acuumulator charge
Gen 2 ..... 80-A-23
Acuumulator test
Gen 1 ..... 80-A-20
Gen 2 ..... 80-A-21
Hydraulic hose cleanout 30-A-8
Tractor connection recommendations 30-A-6
Valve flush 80-A-20
Valve test 80-A-20
Inflation
Tire pressure 25-B-3

Inspect
Vacuum meter 80-D-22
Vacuum motor 80-A-43
install service locks
install locks
cylinder locks
cylinder service locks 80-A-13, 80-E-5, 80-F-1, 80-G-2
Install valve body 80-F-3
Installation
Valve body..... 80-F-3
Integrated pneumatic downforce..... 70-A-1
Intervals of lubrication..... 75-B-3

J

John Blue pump
Fixed rate
Pump setting number..... 50-C-1

K

Keypad
ExactRate 50-A-14, 50-B-15
Knockout wheel
ExactEmerge seed meter
Wear guidelines 80-D-2
Identification..... 80-C-5
Install, vacuum meter 40-B-11
Install, vacuum seed meter..... 80-C-5
Meter settings..... 40-B-1
Operation 40-B-10, 40-C-13
Recommendations
MaxEmerge 40-C-1

L

Latches, wing 35-1
Level
Planter hitch..... 30-A-8
Level sensor, tank 40-F-1
Leveling seed
CCS tanks..... 40-F-2
Light module
Use
Flash patterns..... 05-9
Lights, warning
Enhancement module
Flash pattern..... 05-9
Liquid carrier tank
Strainer
Clean..... 80-A-41
Liquid fertilizer
Adjust John Blue setting number..... 50-C-1
Clean tank..... 80-E-6, 80-F-13, 80-G-16
High pressure distribution 50-C-1
Priming and initial startup 50-C-2
Pump setting number
John Blue fixed rate pump 50-C-1
Rinse Tank 50-A-15, 50-B-30
Winterization
DB planter..... 50-A-17, 50-B-31
Liquid fertilizer attachment
Check fertilizer rates 50-C-3
Setting fertilizer rates 50-C-2
Liquid fertilizer quik-fill 50-A-5
Liquid fertilizer rate
Adjust 50-C-2
Liquid fertilizer rate charts 50-C-6
Liquid fertilizer tank lid fitting and drip line hose
Cleaning 80-E-4, 80-F-14, 80-G-18
Liquid Fertilizer Transfer
ExactRate Liquid Fertilizer Transfer
rinse transfer system
rinse liquid fertilizer 50-F-5
Liquid fertilizer, ExactRate
Priming and initial startup
Offboard tank
Centrally mounted pump 50-A-12
Wing mounted pump..... 50-A-9
Onboard tank
Centrally mounted pump 50-A-11
Wing mounted pump..... 50-A-6
Liquid fertilizer, ExactShot
Priming and initial startup
Offboard tank
Centrally mounted pump 50-B-13
Wing mounted pump..... 50-B-10
Onboard tank
Centrally mounted pump 50-B-12
Wing mounted pump..... 50-B-7
Liquid fertilizer, servicing and adjusting
ExactShot
Fertilizer dosing solenoid
Assemble..... 80-G-13
Diassemble and inspect..... 80-G-11
Fertilizer dosing valve
Assemble..... 80-G-8
Diassemble and inspect..... 80-G-5
Install 80-G-4
Remove 80-G-2
Low pressure drain connection
Case Drain and Hydraulic Motor Requirements 25-A-5
Lubricant
Talc
Use..... 75-A-1
Talc and graphite
Use..... 75-A-2
Wax-based
Use..... 75-A-3
Lubrication..... 75-B-1
Alternative by geographic area 75-B-2

Intervals....75-B-3
Lubrication procedures....75-B-1
Lubrication symbols....75-B-2

M

Main page
ExactRate....50-A-4
ExactShot....50-B-5
Maintenance....75-B-1
Lubrication....75-B-3
Scheduled.... 80-A-5, 80-C-1, 80-D-1, 80-E-5, 80-F-1
Maintenance procedures....75-B-1
Marker
Control....40-A-1
Length....25-B-8
Rod adjustment....25-B-9, 80-A-26
Swing out adjustment....25-B-9, 80-A-26
Marker breakaway bolt
Replace
24 row.... 80-A-27
Marker Disk
Adjust Angle....25-B-9, 80-A-26
Marker float range
24 row....40-A-9
Marker Length
Adjust
24 row.... 80-A-28
MaxEmerge 5 vacuum meter
Double eliminator
Calibrate.... 80-C-9
MaxEmerge 5e Tractor Requirements
MaxEmerge 5e....25-A-2
MaxEmerge 5e vacuum meter
Double eliminator
Calibrate.... 80-C-9
Meter
Double eliminator
Operation.... 80-C-10
Lubricant
Talc....75-A-1
Talc and graphite....75-A-2
Wax-based....75-A-3
Optimize performance.... 40-C-23
Performance check.... 40-C-23
Seed
How to access.... 40-C-10
Segue
Install rubber boot.... 80-D-14
Settings....40-B-1
Strip (agitation, smooth)
Meter settings....40-B-1
Meter handle
Replace.... 80-C-2
Meter hub
ExactEmerge
Adjust....40-B-9
Meter hub, seed
Adjustment.... 80-C-7
Meter latch
Tighten
tighten the meter latch
Tighten the Meter Latch.... 80-D-18
Meter seal
Vacuum
Install.... 80-C-3
Meter strip
Agitation or smooth.... 40-B-6, 80-D-12
Meter, seed
Install
ExactEmerge.... 40-B-14, 80-D-7
Remove
ExactEmerge.... 40-B-14, 80-D-7
Metering units
Inspect
ExactEmerge meter unit.... 40-B-15
Meters
Seed disk recommendations.... 40-C-5
Metric bolt and screw torque values....100-1
Milo
Vacuum level
Polytine double eliminator.... 40-B-22
Mini hopper
Hopper extensions.... 80-C-11
Mini-Hopper Lids, Operate....40-F-3
Multipurpose Extreme Pressure (EP) grease ..75-B-1

N

Nozzle
Tip recommendations.... 50-B-16

O

Oil
Gear case....75-B-2
Hydraulic....75-B-2
Steering....75-B-2
Transmission....75-B-2
Oil leak
Vacuum motor.... 80-A-43
Opener
Fertilizer tubes
Replace....80-G-24
Opener disks
Inspect and adjust....80-C-12, 80-D-18
Replacement....80-C-13, 80-D-20
Operate machine....40-A-1

operate the valve body
conditions of the valve body
valve body
valve body lights 50-A-15
Operation of the Valve Body
Operation of the valve body
operation of the valve body
Operation Condition of the Valve Body 50-A-15
Operator's manual, tractor, use 25-A-1
Optimize
Seed spacing 40-C-23
Orifices, in-line
Liquid fertilizer
How to change 50-C-6
Over-population
Baffle usage 80-C-4
Override
CCS blower 40-F-9
Overview
ExactRate 50-A-1
ExactShot 50-B-1

P

Planter
Speed
Operating 40-A-1
Planting seed plots
CCS system, operation 40-F-7
Planting units
Seed depth 40-A-6
Plugging
Explanation and solution 40-F-1
Pneumatic compressor
Air filter
Clean or replace 80-A-44
Pneumatic down force
Hydraulic driven compressor
Change or fill oil 80-A-46
Check oil 80-A-46
Pneumatic downforce 70-B-1
Pneumatic downforce system
Depressurize 70-B-2
Popcorn
Vacuum level
Polytine double eliminator 40-B-20
Population check
Rate check 45-1
Power beyond
Hydraulic connectors 30-A-2
Power generation
Tractor system
General 30-B-1
John Deere tractor
7R 30-B-1
8R models 30-B-4
9R models 30-B-7
9RT and 9x30T models 30-B-10
Non-John Deere tractor 30-B-18
Removal 30-B-21
Power generation system
Attaching the altenator 30-A-4
Pressure
Charge Gen 2 accumulator 80-A-23
Test Gen 2 accumulator 80-A-21
Tire inflation 25-B-3
Pressure setting
CCS tank
ExactEmerge on DB Planter 40-F-4
Prime
Fertilizer pump 50-C-2
Fertilizer pump (centrallly mounted)
ExactShot
Offboard tank 50-B-13
Fertilizer pump (centrally mounted)
ExactRate
Offboard tank 50-A-12
Onboard tank 50-A-11
ExactShot
Onboard tank 50-B-12
Fertilizer pump (wing mounted)
ExactRate
Offboard tank 50-A-9
Onboard tank 50-A-6
ExactShot
Offboard tank 50-B-10
Onboard tank 50-B-7
Pump setting number
John Blue fixed rate 50-C-1
Pump, fertilizer
Priming 50-C-2
Purge
CCS delivery hoses 40-F-9

Q

Quik-Fill
Liquid fertilizer 50-A-5

R

Rate check
Population check 45-1
Ready System to Apply Fertilizer
liquid fertilizer
apply fertilizer
fertilizer transfer system 50-F-6
rear
steering
calibration
calibrate 40-A-4
operation
operate 40-A-4

Rear
Steering
Calibration....40-A-4
Operation....40-A-4
Rear Fill and Fertilizer Tank Overview
fertilizer transfer system overview
rear fill overview
fertilizer transfer system....50-F-1
Rear Steering
Calibration....40-A-4
Operation....40-A-4
Recommendations
Seed disk
Crops other than field corn.... 40-C-5
Seed meter settings
MaxEmerge 40-C-1
Removal
Valve body....80-F-2
Remove valve body
valve body....80-F-2
Repair
half clamp
Half Clamp
Half clamp.... 80-F-13
Valve body components
Valve body parts
valve body parts....80-F-5
Valve body solenoid
valve body solenoid
Valve Body solenoid 80-F-8
Repair the half clamp
Repair the Half Clamp 80-F-13
Repair valve body components
valve body components
valve components
valve parts 80-F-5
Repair valve body solenoid
Repair Valve Body Solenoid 80-F-8
Replace
Fertilizer tube 80-G-24
Replace marker breakaway bolt
24 row.... 80-A-27
Residue shield
BrushBelt 40-B-11
Return coupler 30-A-2
Hydraulic motor....30-A-2
Rigid Scraper....70-A-2
Ring
Hitch Ring
Hitch 25-B-1
Rinse
Fertilizer system
Short- or long-term storage
Guidelines.... 50-A-16, 50-B-31
Rinse ExactRate Fertilizer Transfer System
rinse fertilizer
transfer system
Rinse Fertilizer System....50-F-5
Rinse tank
Fertilizer pump
ExactRate pump.... 50-A-15, 50-B-30
Row cleaner
Easy adjust....70-A-5
Manual adjust
Unit mounted....70-A-5
Row spacing
Change from narrow to wide
Split row machines....25-B-5
Change from wide to narrow
Split row machines....25-B-6
Row unit
drive chains
Tighten.... 80-A-42
Switch
Set 80-A-38
Row unit hopper screen
Clean.... 80-C-2
Row unit hoppers
Filling....40-F-4
Rubber boot
Segue
Clean or replace.... 80-D-14

S

Safety
Fertilizer system service.... 50-A-3, 50-B-7
Operator ability.... 05-5
Safe maintenance, practice 05-12, 80-A-7
Safety, Avoid High-Pressure Fluids
Avoid High-Pressure Fluids 05-13
Safety, Battery 80-A-30
Safety, Steps and Handholds
Use Steps and Handholds Correctly 05-7
Scheduled
Service.... 80-A-5, 80-C-1, 80-D-1, 80-E-5, 80-F-1
Scraper
Heavy-duty 70-A-2
Rigid....70-A-2
Screen
Liquid Fertilizer
Service.... 80-F-18, 80-G-24
Seal, seed meter dome
ExactEmerge seed meter
Wear guidelines 80-D-2
Seed
Depth adjustment....40-A-6
Meter settings....40-B-1
Population check 45-1

Seed bowl
Meter selection....40-B-1
Seed disk
Vacuum seed meter
Install.... 80-C-7
Seed disk (bowl)
Wear guidelines.... 80-D-2
Seed disk bowl
Remove
seed bowl
seed disk....40-B-5
Vacuum meter
Install....40-B-9
Seed disk cell
Inspecting
Vacuum seed meter.... 80-C-6
Seed disk recommendations
For crops other than field corn.... 40-C-5
Seed disk, corn
Select for optimum performance.... 40-C-3
Seed furrow disks
Inspect and adjust....80-C-12, 80-D-18
Replacement....80-C-13, 80-D-20
Seed guide (segue)
ExactEmerge seed meter
Wear guidelines 80-D-2
Seed meter
Cleanout....40-C-10
ExactEmerge
Wear guidelines 80-D-2
Install
ExactEmerge.... 40-B-14, 80-D-7
Remove
ExactEmerge.... 40-B-14, 80-D-7
Segue
Install rubber boot.... 80-D-14
Seed meter settings
Vacuum seed meter
MaxEmerge 40-C-1
Seed sensor
ExactEmerge seed meter
Wear guidelines 80-D-2
Seed spacing
Meter performance 40-C-23
Optimize 40-C-23
Seed tube
Sensor
Clean.... 80-C-2
Seed tubes 70-A-7
Install seed tubes.... 80-C-1
Remove seed tubes.... 80-C-1
SeedStar
Connect harness 30-A-4
Electric Drive....70-A-1
SeedStar XP
Drain air storage tank....70-B-3, 80-A-44
Segue
Install
Rubber boot.... 80-D-14
Rubber boot
Install segue 80-D-14
Selective control valve
Hose connection....30-A-6
Sensor
Brush belt
Brushbelt
Clean 80-D-8
Seed tube
Clean.... 80-C-2
Serial number, recording....100-4
Service 05-6, 80-A-6
Adjust center frame height 25-B-3
Adjust wing frame height 25-B-4
ExactShot
Intervals 80-G-1
Intervals.... 80-A-5, 80-C-1, 80-D-1, 80-E-5, 80-F-1
Safety
Safety Before Service
safety before service... 80-A-5, 80-E-4, 80-F-1, 80-G-1
Vacuum meter 80-D-22
Service fertilizer system safely..... 50-A-3, 50-B-7
Service Locks
Install Locks
service locks
Install service locks .. 80-A-13, 80-E-5, 80-F-1, 80-G-2
Servicing and adjusting
Liquid fertilizer
ExactShot
Assemble fertilizer dosing solenoid 80-G-13
Assemble fertilizer dosing valve..... 80-G-8
Disassemble and inspect fertilizer dosing solenoid 80-G-11
Disassemble and inspect fertilizer dosing valve.... 80-G-5
Install fertilizer dosing valve 80-G-4
Remove fertilizer dosing valve..... 80-G-2
Settings
Tractor 25-A-6
Shear pin
Marker
Replace.... 80-A-27
Shear protection points
Replace meter handle 80-C-2
Signal words, understand..... 05-2
Skips
Select optimum seed disk for corn 40-C-3
Smooth strip
Install.... 40-B-6, 80-D-12

Sorghum
Vacuum level
Polytine double eliminator 40-B-22
Soybean
Vacuum level
Polytine double eliminator 40-B-19
Vacuum level, optional
Brush type double eliminator 40-B-20
Specific gravity 50-B-29
Specifications 100-3
Speed
Operating 40-A-1
Standard Spacing
Contour Spacing 70-A-3
Steering oil 75-B-2
Storage
Beginning of season 95-1
End of season 95-1
Fertilizer system
Short- or long-term guidelines .. 50-A-16, 50-B-31
Liquid fertilizer
ExactRate pump
exactrate pump 95-4
John Blue pump 95-5
Liquid fertilizer sensor 95-4
SeedStar XP
Drain air storage tank 70-B-3, 80-A-44
Strainer
Carrier tank
Clean 80-A-41
Clean 80-A-41
Recommendations 50-A-16, 50-B-30, 50-C-5
Strainer screen
Clean 80-F-18, 80-G-24
Cleaning 80-E-1
Sugar beet
Vacuum level
Brush type double eliminator 40-B-21
Sunflower
Vacuum level
Polytine double eliminator 40-B-23
Switch
Row unit
Set 80-A-38

T

Talc
Initial use in CCS tank 25-B-1
Talc and graphite lubricant
Use 75-A-2
Talc lubricant
Use 75-A-1
Tank
Cleanout 40-F-8
Fill 40-F-3
Liquid fertilizer
Clean 80-E-6, 80-F-13, 80-G-16
Partial cleanout 40-F-7
Tank Clean Out or Pump Hose Overview
tank clean out or pump hose overview
clean out
pump hose 50-F-1
Tank level sensor 40-F-1
Tank level sensors
Cleaning
Clean the CCS Tank Level Sensors 80-A-28
Tank lids, operating 40-F-2
Tank, air
Inspection 80-A-47
Terminal Connections
Battery
Implement power generation 80-A-36
Test
Accumulator Gen 2 ..... 80-A-21
Theory of operation
CCS system 40-F-1
Tire pressure, inflation 25-B-3
Torque charts
Metric 100-1
Unified inch 100-2
Track
Track Undercarriage
Align
Align Track Undercarriage 80-A-15
Tractor
Drawbar position 25-B-1
Electric power generation 30-A-4
Hydraulic connections
Recommendations 30-A-6
Hydraulic system check 25-A-3
Power generation
General 30-B-1
John Deere tractor
8R models 30-B-4
9R models 30-B-7
9RT and 9x30T models 30-B-10
Non-John Deere tractor 30-B-18
Removal 30-B-21
Setup recommendations 25-A-6
Tractor drawbar category
Determine 25-B-1
Tractor manual
Use 30-A-1
Tractor operator's manual
use 25-A-1
Tractor power generation
Electric drive alert 05-4, 30-B-1, 80-A-9
Tractor weight for safe transport
Calculating minimum 25-A-4
Transfer, liquid fertilizer
Valve position guide 50-F-2

Transmission oil....75-B-2
Transport pins
Tracks
Usage....40-A-6
Troubleshoot
ExactEmerge seed meter
ExactEmerge.... 90-3
Liquid fertilizer system....90-27
ExactRate....90-21
ExactShot....90-25
Piston pump system....90-29
Row units.... 90-1
Troubleshooting
CCS blower assembly....90-15
CCS product delivery....90-17
Electric Drive System.... 90-1
MaxEmerge 5e Seed Meter
MaxEmerge 5e Meter
Seed Meter....90-10
Twister Adjust
Wear Adjustment.... 80-A-43
Flip Closing Wheel
Spacing.... 80-A-43

U

Unfold
Functions and control....40-A-1
Unfold and fold....40-A-6
Unified inch bolt and screw torque values.... 100-2
Unit mounted row cleaners
Manual adjust....70-A-5

V

Vacuum
Connection and settings, hose....30-A-6
Level
Corn.... 40-C-15
Cotton ProMax (flat type) disk.... 40-C-20
Edible bean (flat type) disk.... 40-C-21
How to set.... 40-B-18
Oil sunflower.... 40-C-16
Peanuts.... 40-C-22
Sugar beet.... 40-C-23
Sweet corn.... 40-C-18
Wheat Disk
wheat.... 40-C-19
Level recommendations
Corn and soybean.... 40-B-19
Corn and soybean, optional.... 40-B-20
Cotton and popcorn.... 40-B-20
Milo
Sorghum.... 40-B-22
Sugar beet.... 40-B-21
Sunflower.... 40-B-23
Meter lubricant
Talc....75-A-1
Talc and graphite....75-A-2
Wax-based....75-A-3
Meter seal
Install.... 80-C-3
Seed meter
Adjust baffle.... 80-C-4
How to access.... 40-C-10
Settings....40-B-1
System
Cleaning.... 80-A-29
Vacuum level
Confectionary sunflower.... 40-C-17
Set.... 40-C-13
Vacuum meter
Cartridge Seal.... 40-B-6, 80-D-16
Double eliminator
Operation.... 80-C-10
Double eliminator, inner
Adjustment
ExactEmerge....40-B-7
ExactEmerge
Adjust meter hub....40-B-9
Hopper extensions.... 80-C-11
Inspect and service....80-C-15, 80-D-22
Knockout wheel
Operation.... 40-B-10, 40-C-13
Knockout wheel assembly
Install.... 40-B-11
Seed disk
Install
Seed bowl....40-B-9
Set vacuum level.... 40-C-13
Vacuum meter unit
Seal service.... 80-D-16
Vacuum meter, MaxEmerge 5
Double eliminator
Calibrate.... 80-C-9
Vacuum meter, MaxEmerge 5e
Double eliminator
Calibrate.... 80-C-9
Vacuum motor
Inspect.... 80-A-43
Return coupler....30-A-2
Vacuum Motor
Operate....40-A-1
Vacuum seal
Install
New Vacuum Seal.... 80-D-16
Vacuum seed meter
Adjust meter hub.... 80-C-7
Brush
Change.... 80-C-3
ExactEmerge
Accessing....40-B-5

Knockout wheel assembly
Install. 80-C-5
Seed disk
Cell inspection 80-C-6
Install. 80-C-7
Seed meter settings
MaxEmerge 40-C-1
Valve
Flush
Individual row hydraulic downforce. 80-A-20
Test
Individual row hydraulic downforce. 80-A-20
Valve body
assemble
valve body. 80-F-7
Install. 80-F-3
Removal 80-F-2
repair
valve body. 80-F-5
Repair
Valve Body 80-F-13
Valve body
Assemble
vale body
Assemble Valve Body 80-F-11
Repair
vale body
Repair Valve Body 80-F-8
Valve Body Operation
vale body lighting
blinking light
solid light 50-A-15
Valve Position Guide
valve guide
valve position
fertilizer transfer system 50-F-2
Variable rate drive
Connection and settings, hose. 30-A-6
Return coupler 30-A-2
Voltage
Electric drive alert 05-4, 30-B-1, 80-A-9

W

Walking gauge wheels 70-A-1
Warning light harness
Attach 30-A-3
Warning lights
SMV
Style A 30-A-5
Warning lights, using 05-9
Wax-based lubricant
Use 75-A-3
Wear guidelines
ExactEmerge seed meter 80-D-2
Wear pad
Replace 80-D-13
Wear pads
ExactEmerge seed meter
Wear guidelines 80-D-2
Wheel bolts
Torque specification 25-B-2, 80-A-14
Wing frame height
Adjust 25-B-4
Wing latches. 35-1
Winterization
ExactRate
DB planter 50-A-17, 50-B-31

Y

Yetter Twister
Closing Wheel 70-A-3