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1745 Drawn Rigid Frame MaxEmerge 5 Planter Operator's

(Serial No. 000001 -)



JOHN DEERE

OPERATOR'S MANUAL

1745 Drawn Rigid Frame MaxEmerge 5 Planter

OMKK54031 ISSUE J8 (ENGLISH)

John Deere Mexico

Export Edition

PRINTED IN U.S.A.

Introduction

Foreword

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

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

WRITE PRODUCT IDENTIFICATION NUMBERS (P.I. N.) in the Specification section. Accurately record all the numbers to help in tracing the machine should it be stolen. Your dealer also needs these numbers when you order parts. File the identification numbers in a secure place off the machine.

WARRANTY is provided as part of John Deere's support

program for customers who operate and maintain their equipment as described in this manual. The warranty is explained on the warranty certificate or statement which you should have received from your dealer

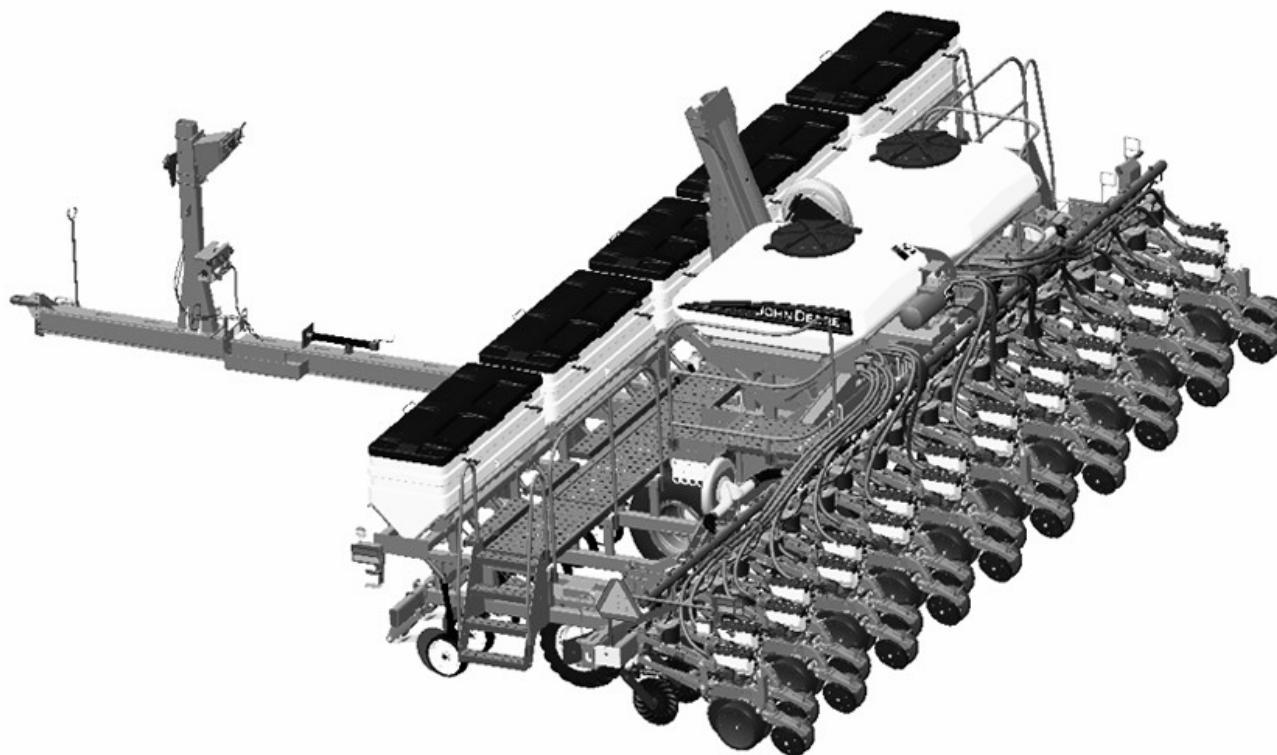
This warranty provides you the assurance that John Deere will back its products where defects appear within the warranty period. In some circumstances, John Deere also provides field improvements, often without charge to the customer, even if the product is out of warranty. Should the equipment be abused,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

THE TIRE MANUFACTURER'S warranty applicable to your machine may not apply outside the U.S.

If you are not the original owner of this machine, 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.

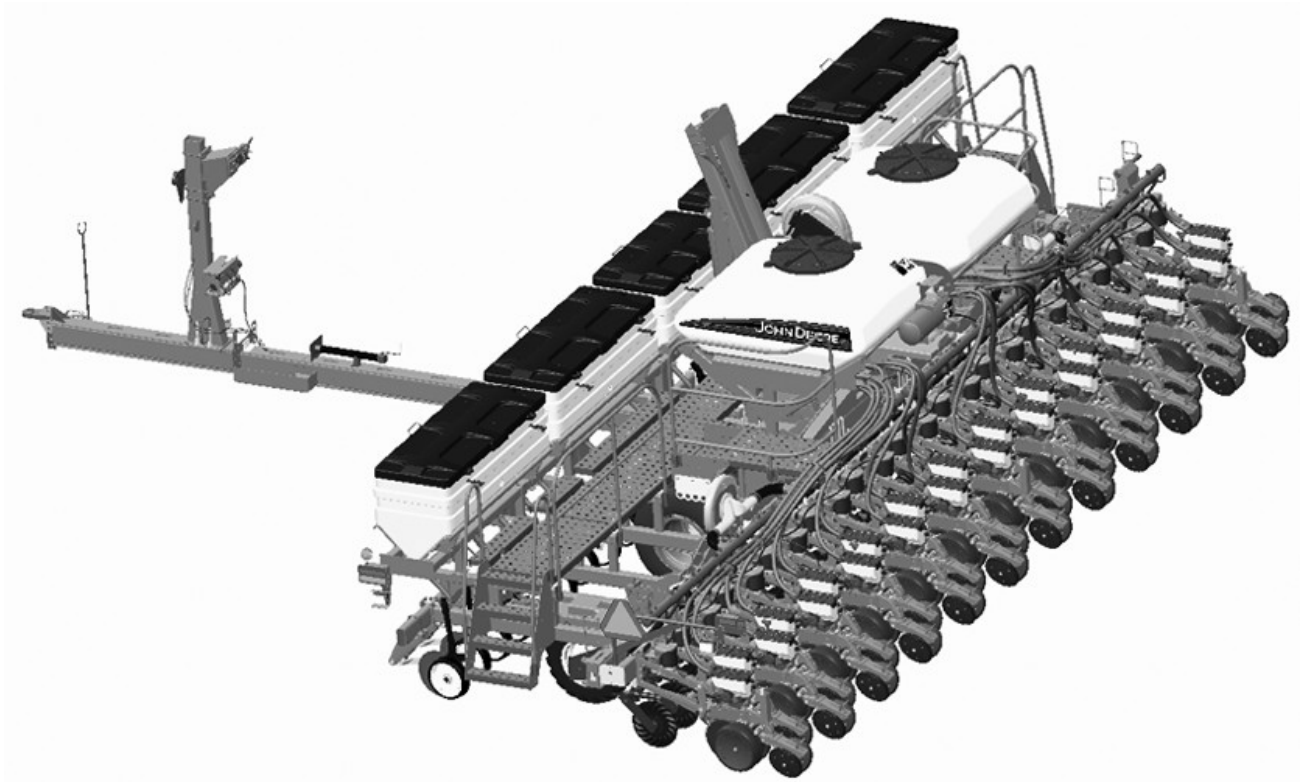
DX, IFC2-19-03APR09

Product View



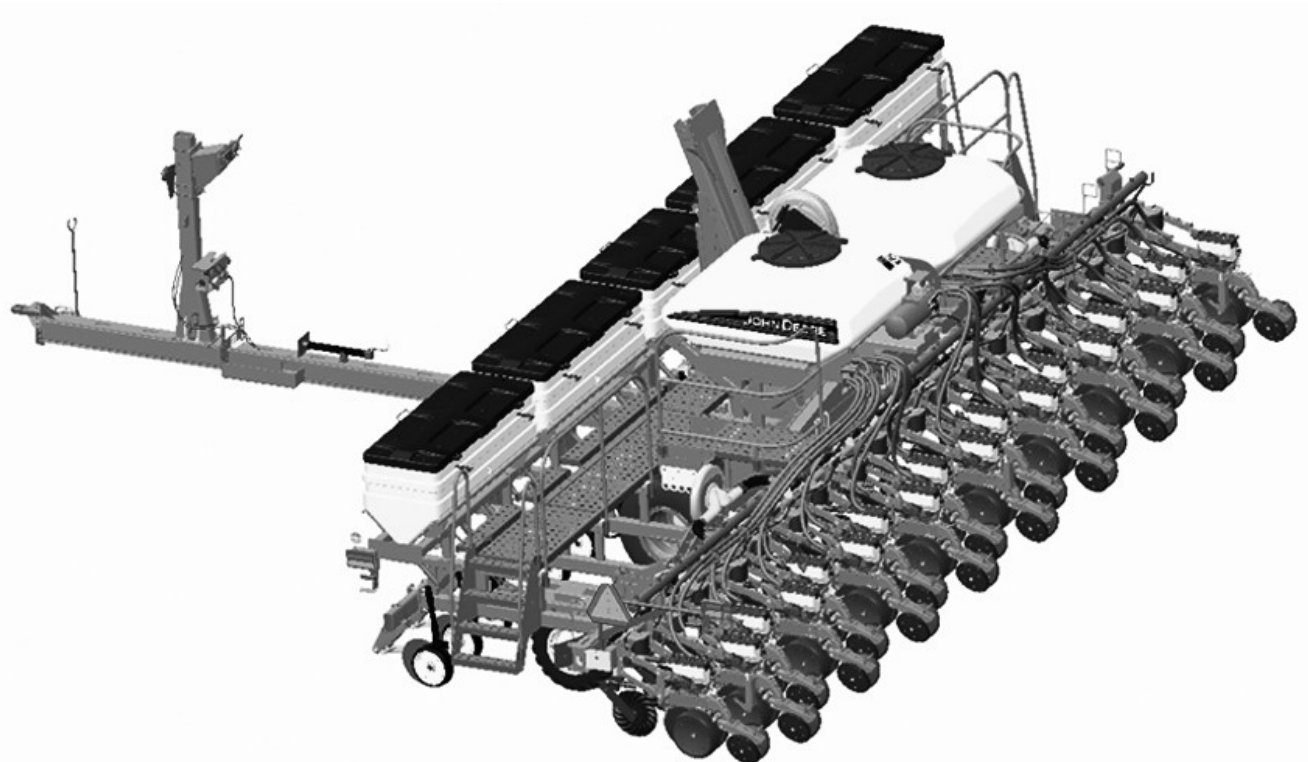
24 Row 38 cm MaxEmerge™ 5 CCS Version

P17537—UN—19JAN15



20 Row 45 cm MaxEmerge™ 5 Individual Hopper Version

P17538—UN—19JAN15



18 Row 52.5 cm MaxEmerge™ 5 Individual Hopper Version

P17539—UN—19JAN15

A Message to Our Customers

We appreciate the confidence placed in us by your purchase of this machine. Before this machine was brought to market, countless hours were spent designing and testing to ensure that its performance would be at the highest level. To achieve maximum performance, it is imperative this machine be operated in accordance with the procedures outlined in this manual.

Information in this manual is divided into sections. These sections are identified at the top of each page. Specific information within each section is organized into modules.

These modules are encased in boxes with principle modules identified with a heading at the top left side of the box. Two-part page numbers identify both the section and page of that section.

By reviewing this manual often, one will quickly learn which section to go to for specific information. For instance, machine adjustments would be found in the Operating the Machine section, lubrication intervals in the Lubrication section, seed opener maintenance in the Service section, etc. A detailed Table of Contents is found immediately behind this page, and an Index is provided at the back of the manual.

Thanks again for purchasing this machine.

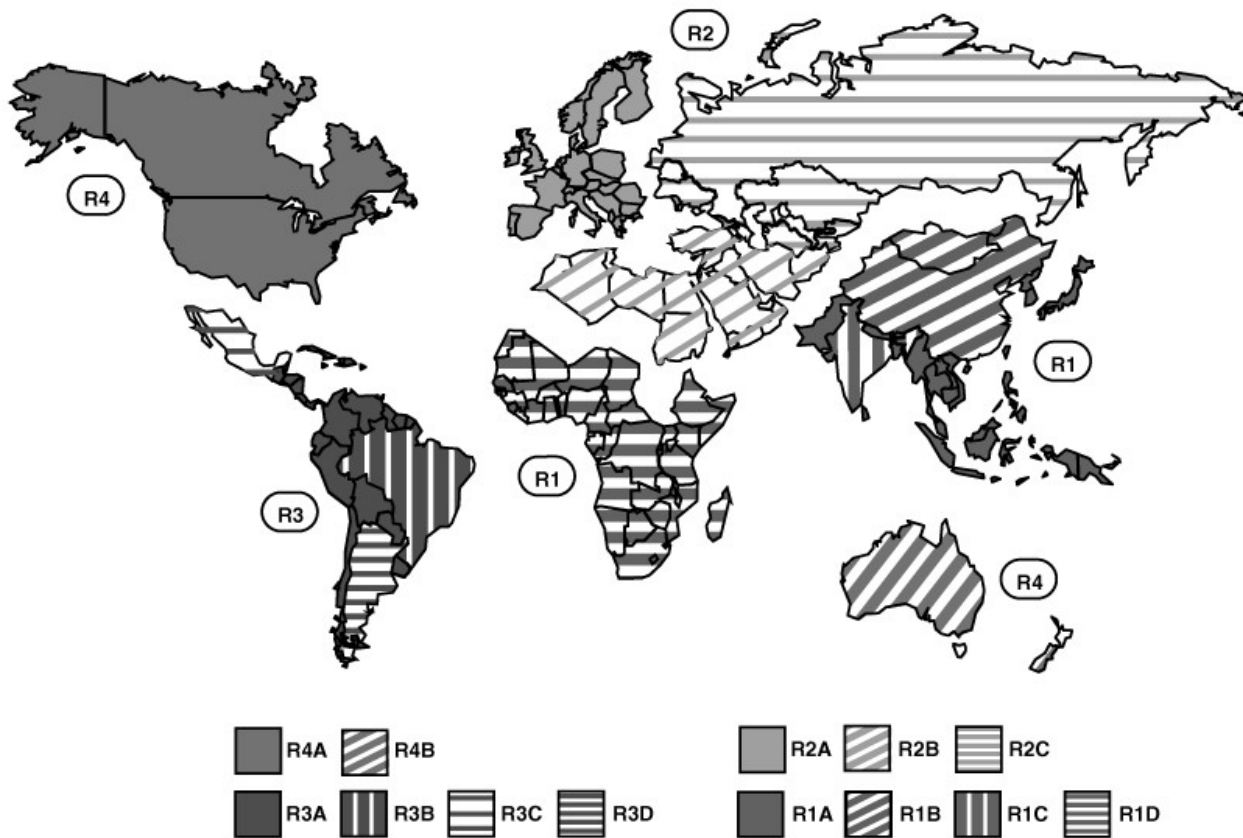
Preliminary Checks

To inspect items before operation use the following list

as a reminder. Detailed operation and service information is available in other sections.

Check and Inspect Equipment		OK / Not OK
After final assembly, adjustment, lubrication, and before machine use; conduct inspections.	Review manual and machine for safety signs.	
	Review manual for proper operation, adjustment, and service.	
	Review manual for regular lubrication points and intervals.	
	Review manual for lighting and devices available when transporting machine.	
	Review manual for attachment / connection process to tractor and control devices (hitch, hydraulic, and electrical).	
	Review additional documentation (instructions, warranty, serial numbers).	
	Machine is assembled according to instructions (nuts and bolts tightened properly).	
	Equipment is lubricated, rotates, or moves freely (without dragging or interference).	
	Transport link is adjusted to reach lug when the cylinder fully extended.	
	Paint all unpainted bolts and nuts or any parts scratched in shipment.	
	Properly connect machine to tractor drawbar.	
	Axle lift fittings are installed and lubricated.	
	All grease fittings are installed.	
During the first season of operation; inspect proper operating conditions.	Check entire machine for loose or missing hardware (replace or retorque as necessary).	
	Check entire machine for broken, damaged, or missing parts (repair as necessary).	
	If possible; operate machine to check for proper functionality.	
	Review manual for proper safety, operation, lubrication, and service of machine.	
	Contact John Dealer for assistance (checks, inspections, operation, lubrication, service, or additional equipment).	
Daily inspect machine lubrication and operation.	Lubricate machine according to service intervals.	
	Check for loose or missing hardware or damaged parts.	
	Check machine connections to tractor (hitch, hydraulic, and electrical).	
	Check machine and tractor operating controls.	

Regions and Country Versions



RXA0150915—UN—01FEB16

R1—Asia and Sub-Saharan Africa
 R1A—Far East, Sri Lanka, and Pakistan
 R1B—China
 R1C—India
 R1D—Sub-Saharan Africa
 R2—Europe, North Africa, Mid East, CIS
 R2A—European Union (EU 28+)
 R2B—North Africa and North Middle East (NANME)
 R2C—Common Wealth of Independent States (CIS)

R3—Central and South America
 R3A—Latin America (JDLA)
 R3B—Brazil
 R3C—Mexico
 R3D—Argentina
 R4—North America
 R4A—USA and Canada
 R4B—Oceania (Australia and New Zealand)

Regions 1, 2 and 3 are equipped with **ECE** (ECONOMIC COMMISSION FOR EUROPE) electrical systems.

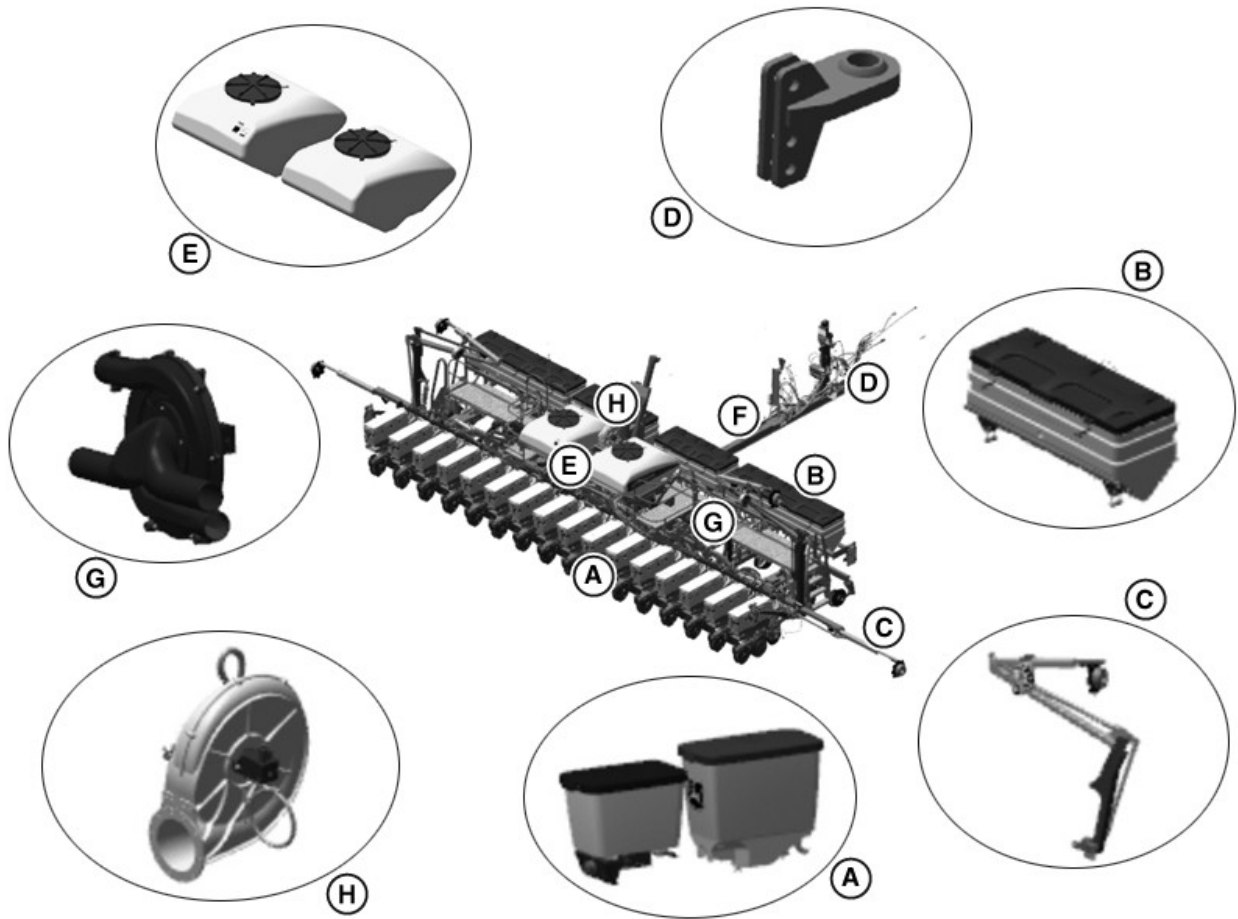
Regions 4 are equipped with **SAE** (SOCIETY OF AUTOMOTIVE ENGINEERS) electrical systems.

NOTE: The main difference between ECE and SAE electrical systems is the turn-signal light. The turn-signal lights operate in different ways. With SAE electrics, the turn signal flashes on the side selected, while the light on the opposite side comes on but does not flash. With ECE electrics, all that happens is that the turn signal flashes on the side selected. There is one more difference concerning the lighting system.

Machine Overview

IMPORTANT: READ THIS MANUAL carefully to learn how to operate and service your machine correctly. Failure to do so could result in personal injury or equipment damage. This manual and safety signs on your machine may be available in other languages. See your John Deere dealer for specific language requirements and to place an order.

Review manual Controls and Transporting sections before operation.



1745 Drawn Rigid Frame MaxEmerge™ 5 Planter

APY00700—UN—23MAR18

A—Seed Hopper
B—Fertilizer Hopper
C—Marker
D—Toung

E—CCS Tank
F—Frame
G—Vacuum Blower
H—CCS Blower

Operating the Machine Introduction:

See relevant section in the operator manual for operating procedures.

- Controls
- Transporting
- Operating Machine
- Specifications

Preliminary Overview

Inspect the machine before operation, use the following list as a reminder. Detailed operation and service information is available in this operator manual.

- Review manual and machine for safety information and safety signs.
- Review manual for proper operation, adjustment, and service.
- Review manual for control devices (hydraulic and electrical).

- Review manual for regular lubrication points and intervals.
- Check machine mechanical, hydraulic, and electrical connection points.
- Check for visual signs of leaks, damage, and failures.
- Perform machine daily maintenance.

Using this Manual:

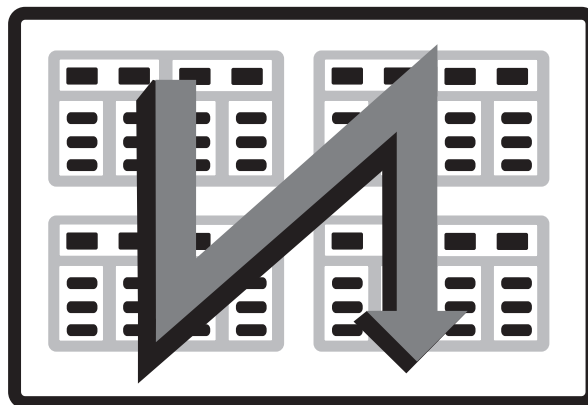
The information provided in this manual is divided into sections. The sections are organized with the typical machine features or functional systems together. These sections are identified at the top of each page. Specific information within each section is organized into modules. These modules are enclosed in boxes and the main modules are identified with a heading at the top left. Page numbers identify the section as well as the number of the page in the section.

By reviewing this manual frequently you learn which section to turn to for specific information. For example, the safety information is covered at the beginning, the operation of all features and systems is covered in the first half of the manual. Maintenance intervals are in the middle of the manual, the maintenance of all the

features and systems is covered in the second half of the manual. The specifications are covered at the end.

A detailed table of contents appears before safety information and there is an alphabetical index at the very end of the manual.

The Operator's Manual content flows as sequential reading down one column of text and graphic then over to the top of the next column as shown.



W28329—UN—18OCT17
CN80434,000085E-19-10MAY18

Additional Information Required

Required Manual	Optional Manuals
RATE CHARTS AND SETTINGS MANUAL This manual is used with the planter operator's manual. This manual contains the following.	The following operator manuals are required when planter is equipped with these options. Some options are not available on every planter model.
All setup information for seed meters All setup information for granular chemical All settings for seed transmission All seed rate charts All vacuum settings All meter lubrication information. (Talc and Graphite)	SEEDSTAR 2™ and SEEDSTAR XP™ Monitor, Variable Rate Drive, and Variable Rate Fertilizer Manual: This manual is used when planter is equipped with SEEDSTAR™ seed monitor, variable rate drive, or variable rate fertilizer.
	COMPUTER TRAK™ Operator's Manual: This manual is used when planter is equipped with COMPUTER TRAK™ seed monitor.
	Liquid Fertilizer Block Manifold Operator's Manual: This manual is used when planter is equipped with liquid fertilizer delivery system.

CN80434,0000863-19-10MAY18

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

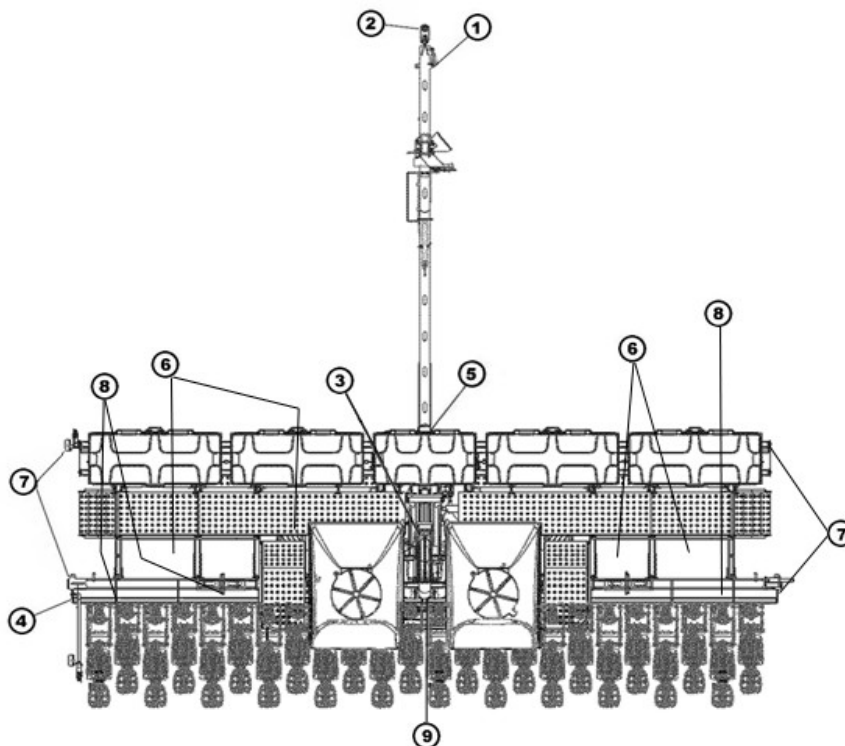
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Safety

1745 Planter Safety Features



All 1745 Configuration Safety Features are Identical

P17540—UN—19JAN15

- 1—Safety Chain
- 2—Planter Hitch Pin
- 3—Safety Stop
- 4—32 KM Speed Decal
- 5—Hydraulic Marker Lock

- 6—Antislip Walkway
- 7—Highway Transport Light and Signaling Panel
- 8—Handrail
- 9—Registration Lamp

In addition to the safety features shown here, other systems and components, machine safety labels, safety precautions and instructions contained in the Operator's Manual contribute to safe planter operations when combined with the care and attention of a qualified operator.

The construction of this implement 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 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.

PX03972,000119D-19-13JUL15

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-19-29SEP98

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-19-16JUN09

Operating the Planter Safely



PUM2202—UN—24APR08

Operate the planter carefully to avoid injury.

If the planter must be raised for servicing or work near the planter, verify to install the tower safety lock and close the marker lock valve.

Contact with electrical cables can cause severe injury or death. When transporting this machine near electrical cables be careful to avoid contact with them.

Stand away from the machine when moving from the transport position to the operating position or vice versa. The frame can move quickly if there is a mechanical or hydraulic failure.

Verify the cylinder and hoses are full of oil before operating the system.

Be careful when operating on slopes; the tractor can overturn if it hits a well or ditch or if it encounters rough terrain.

Only one person, the operator, should be in the tractor when the tractor and planter are in use.

When detaching the planter while in the operating position, lower the planter to the ground before detaching it from the tractor. Make sure the planter is on a firm and level surface.

PX03972,00002EA-19-23APR14

Comply With Traffic Regulations

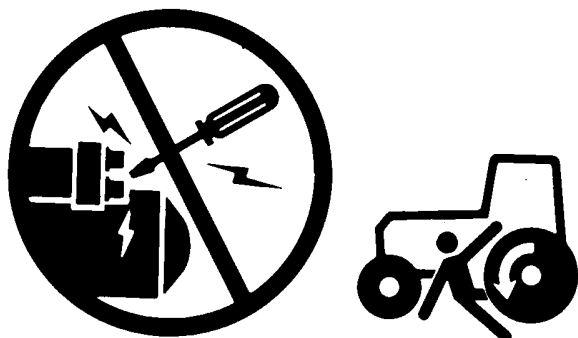


PUM2203—UN—28APR08

CAUTION: Become familiar with the regulations for operating on public roadways.

SA61034,0000377-19-16JUN08

Prevent Machine Runaway



TS177—UN—11JAN89

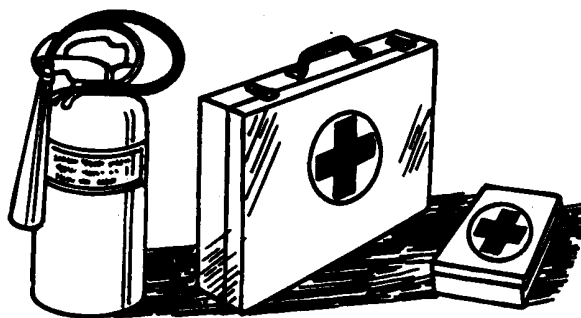
Avoid possible injury or death from machinery runaway.

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

Prepare for Emergencies



TS291—UN—15APR13

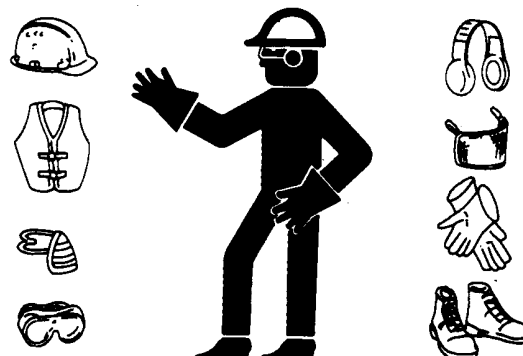
Be prepared if a fire starts.

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.

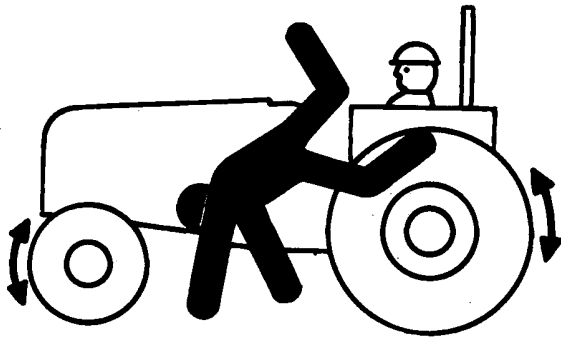
Prolonged exposure to loud noise can cause impairment or loss of hearing.

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

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

Charge Row Marker Hydraulic System



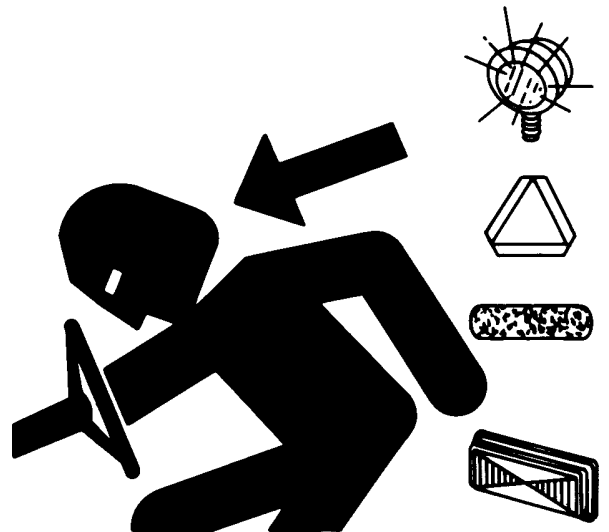
N39213—UN—22SEP88

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

Use Safety Lights and Devices



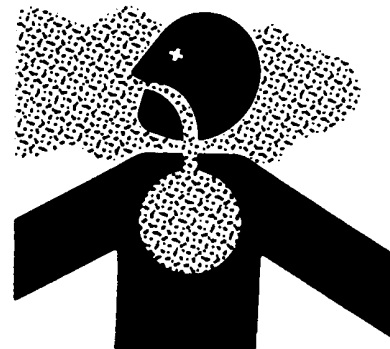
TS951—UN—12APR90

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. An implement safety lighting kit is available from your John Deere dealer.

DX,FLASH-19-07JUL99

Handle Agricultural Chemicals Safely



TS220—UN—15APR13



A34471

A34471—UN—11OCT88

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

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

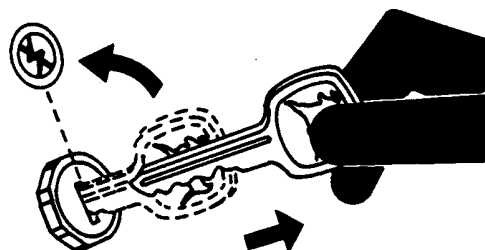
Reduce risk of exposure and injury:

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

empty containers and puncture or crush containers and dispose of properly.

DX,WW,CHEM01-19-24AUG10

Park Machine Safely



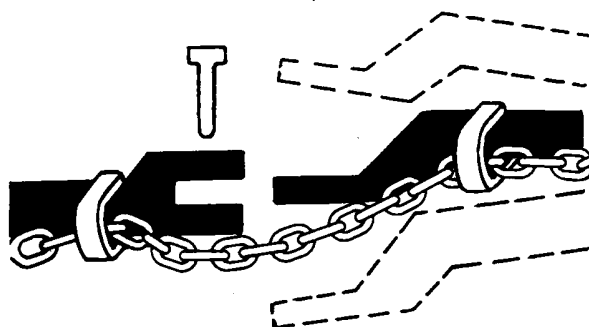
TS230—UN—24MAY89

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

Use a Safety Chain



TS217—UN—23AUG88

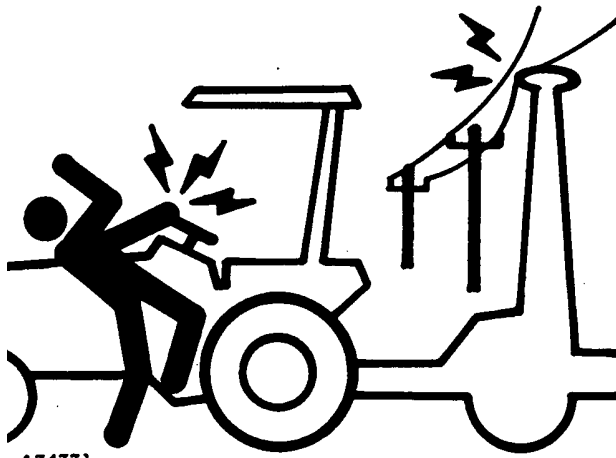
A safety chain will help control drawn equipment should it accidentally separate from the drawbar.

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.

See your John Deere dealer for a chain with a strength rating equal to or greater than the gross weight of the towed machine. Do not use safety chain for towing.

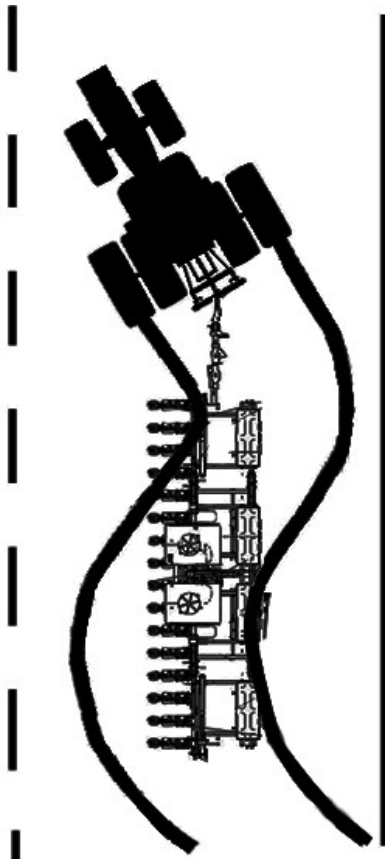
DX,CHAIN-19-03MAR93

Transport Safely



A34331

A34331—UN—13OCT88



P16989—UN—23JUN13

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.

Raise 3-point hitch to fully raised position.

Tractor brakes must be latched together.

Attach a properly sized safety chain.

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 with product in tanks or hoppers.

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.

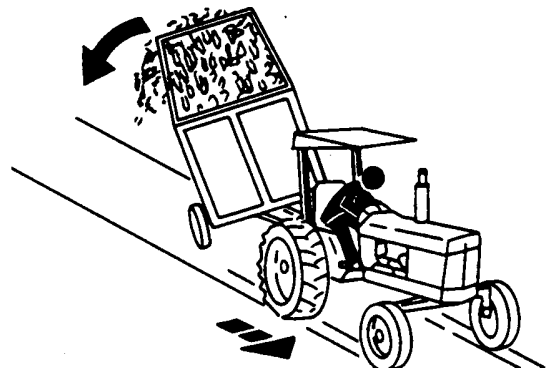
Know transport height and width of machine.

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.

PX03972.00001FF-19-02MAR15

Tow Loads Safely



TS216—UN—23AUG88

Stopping distance increases with speed and weight of towed loads, and on slopes. Towed loads with or without

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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

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

Practice Safe Maintenance

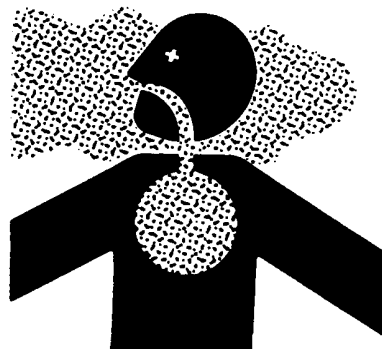


TS218—UN—23AUG88

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

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

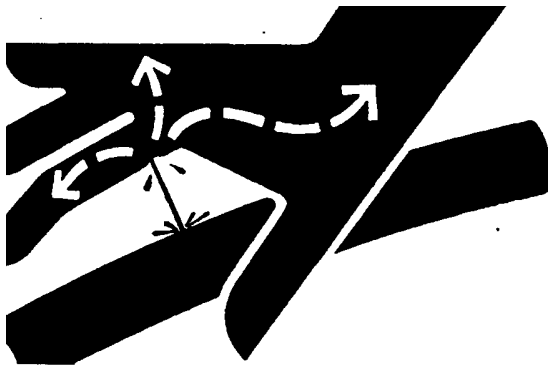


TS953—UN—15MAY90

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

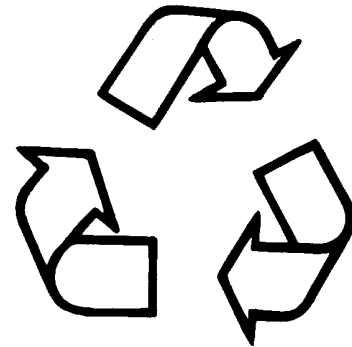
disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

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

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

Store Attachments Safely



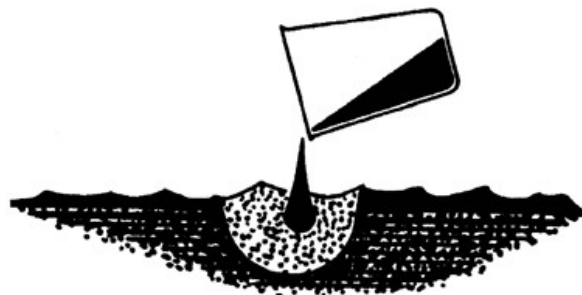
TS219—UN—23AUG88

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

Comply with Environmental Protection Regulations



PUM2207—UN—28APR08

Always keep the environment and ecology in mind.

Before draining any fluid, determine the proper manner of disposal.

When it is necessary to dispose of oil, fuel, coolant, brake fluid, filters, and batteries, comply with the appropriate environmental protection regulations.

PX07220,00012EE-19-02JAN10

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

Safety Signs

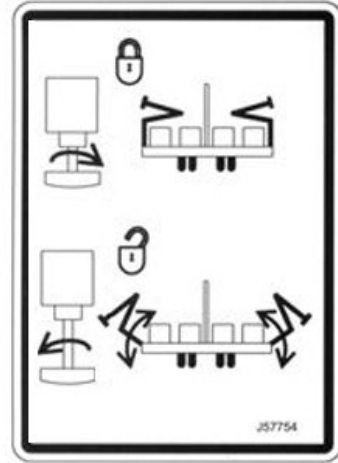
Pictorial Safety Signs



TS231—19—07OCT88

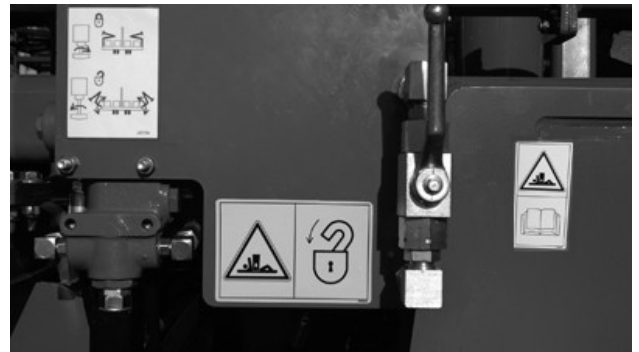
At several important places of this machine safety signs are affixed intended to signify potential danger. The hazard is identified by a pictorial in a warning triangle. An adjacent pictorial provides information how to avoid personal injury. These safety signs, their placement on the machine and a brief explanatory text are shown below.

FX,WBZ-19-19NOV91



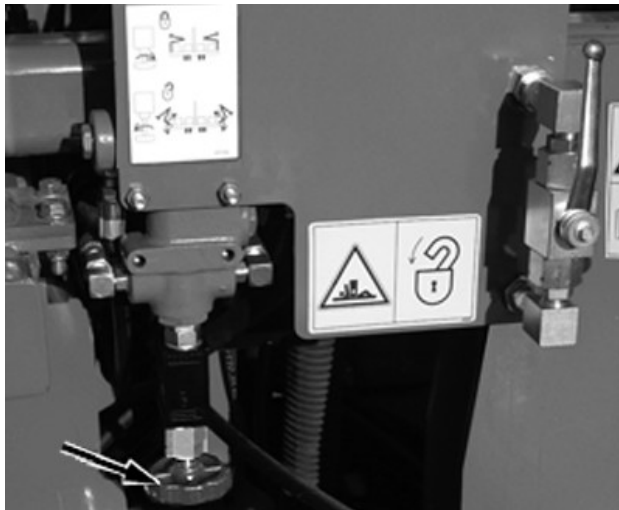
P16734—UN—19APR13

CAUTION: Lock the markers before turning the machine.

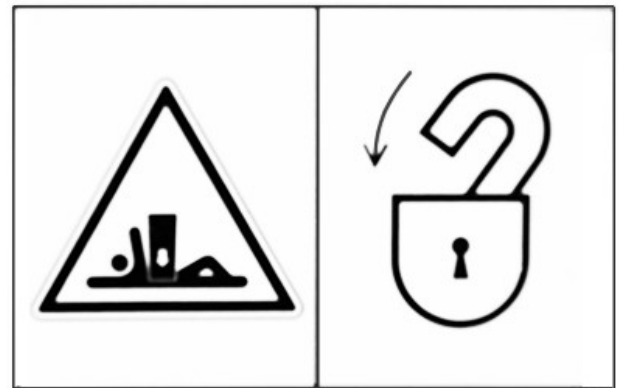


P16814—UN—21MAY13

Safety Signs

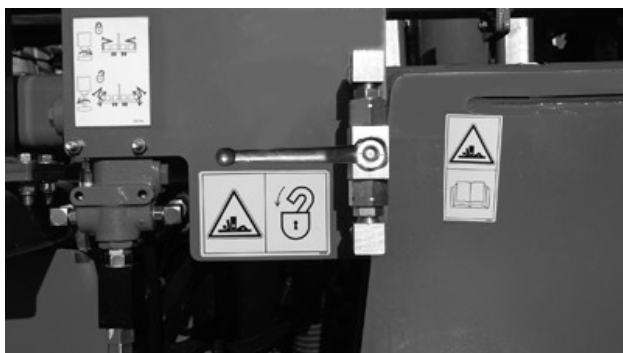


P17003—UN—27JUN13

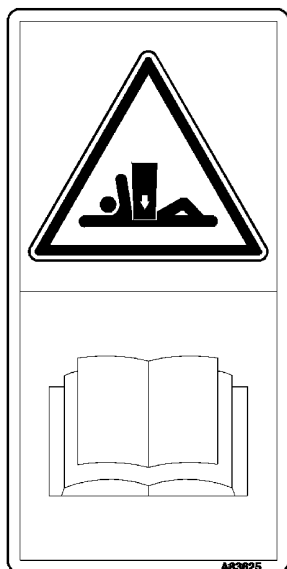


P16815—UN—27JUN13

IMPORTANT: Never stand under the planter when it is in this position if the blocking lever is not properly activated (Locked).



P16986—UN—19JUN13



PUM3004—UN—02FEB09

WARNING: To avoid crushing, injuries or death, lock the machine in the up position by closing the safety lock valve and then install the locking pin before performing any maintenance or adjustment work under the machine.



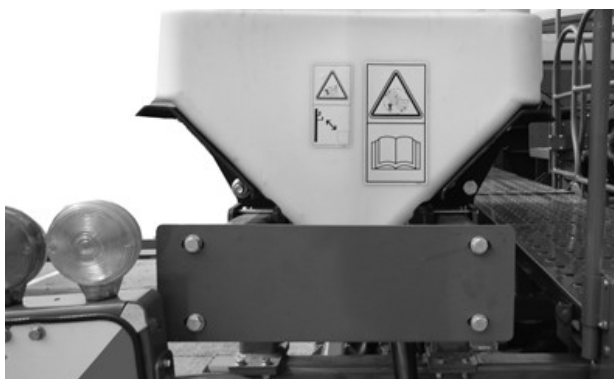
P16915—UN—21MAY13



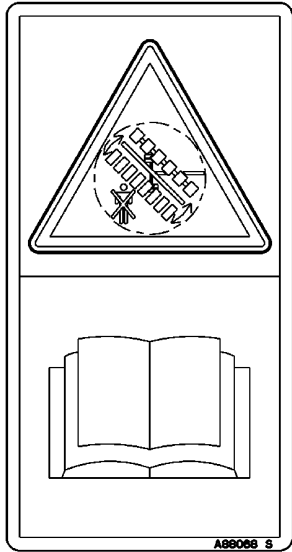
P16723—UN—09APR13

WARNING: Avoid being hit by a marker.

1. During maintenance, transport or storage, use the locking valve to lock the markers in the raised position.
2. Verify the cylinder and hoses are free of air before opening the locking valve. Failure to do so will result in the markers falling rapidly.
3. Keep away markers when raising or lowering.

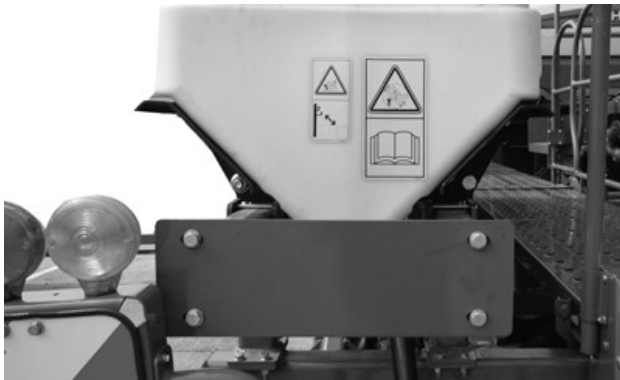


P16916—UN—21MAY13

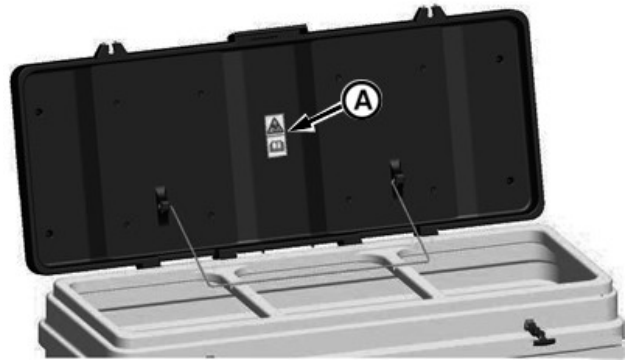


PUM3007—UN—02FEB09

DANGER: When folding the machine. Do not stand near the machine when it is turning.

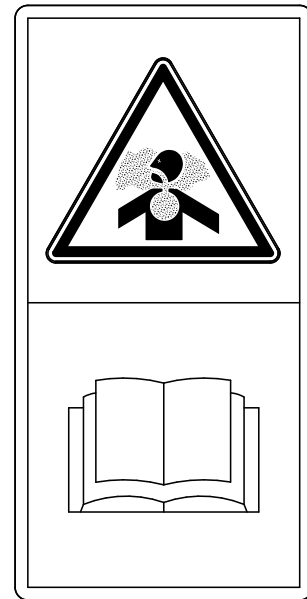


P16916—UN—21MAY13



P16993—UN—24JUN13

Dry Fertilizer Hoppers

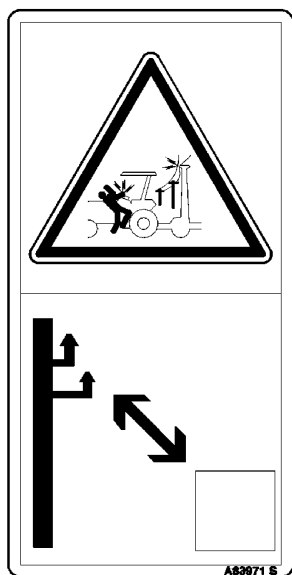


SSA83761—UN—05JUL07

A—Warning

A—Warning Agricultural chemicals may cause eye, skin, or breathing problems. To avoid injury:

1. Select the appropriate chemical for the job.
2. Wear face mask, gloves, and goggles.
3. Handle and apply with care. Read and follow safety instruction on the suppliers chemical label.
4. Monitor tank fills to avoid spills or tank rupture.



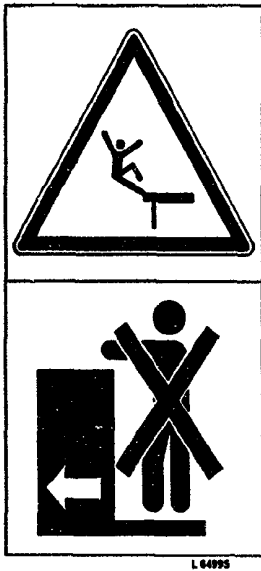
PUM3009—UN—02FEB09

DANGER: When transporting or operating the machine, avoid contact with electrical lines.



P16917—UN—21MAY13

Do not climb on the deck



L 64995

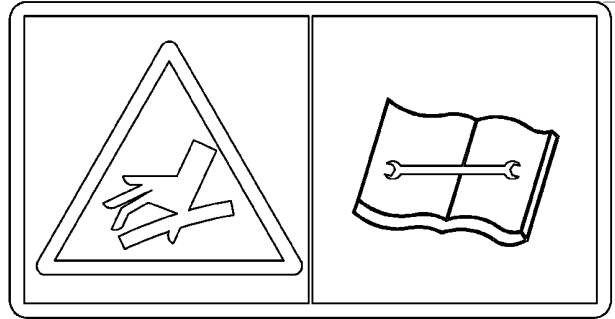
PUM3011—UN—02FEB09

WARNING: Do not stand above the deck when the machine is moving.



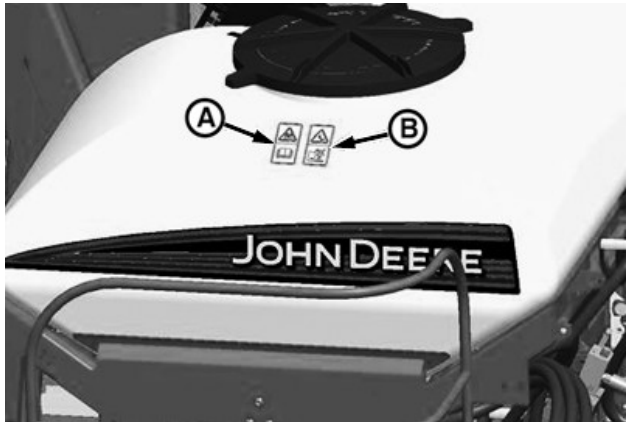
P16918—UN—21MAY13

Hydraulic System



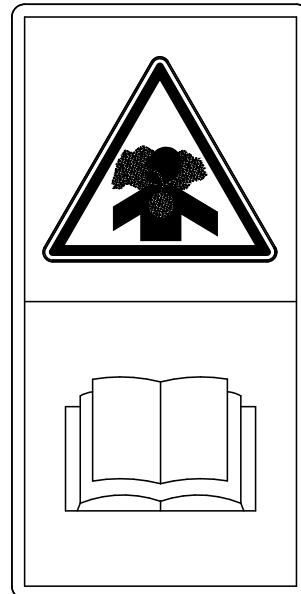
PUM3015—UN—02FEB09

WARNING: When performing any hydraulic system adjustment, or when loosening or removing any line, verify the system is not pressurized.



P17004—UN—27JUN13

CCS Tank



SSA84336—UN—31MAR06

A—Warning



B—Warning

SSA84352—UN—31MAR06

A—Warning Avoid exposure to airborne chemicals.

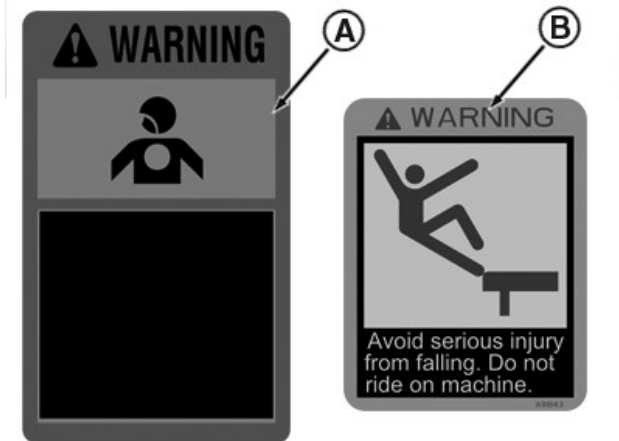
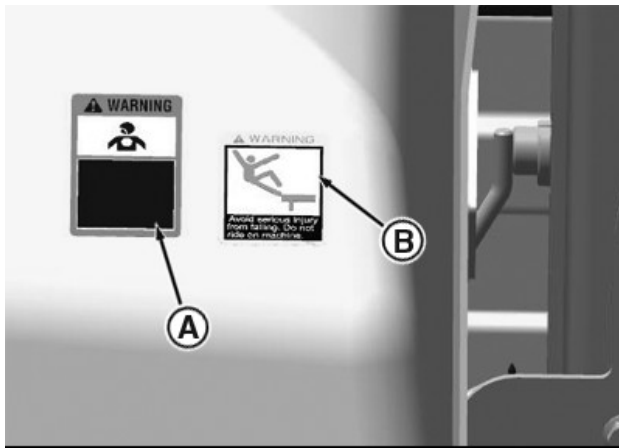
This tank may be pressurized. Lid may fly upward if lid is opened while fan is operating. Dust and fumes will be exhausted if tank lid is opened.

B—Warning Avoid serious injury from falling. Do not ride on machine.



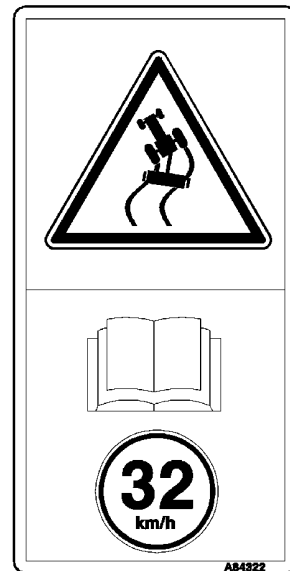
P16919—UN—21MAY13

Maximum Recommended Speed



CCS Tank

APY13614—UN—20SEP18

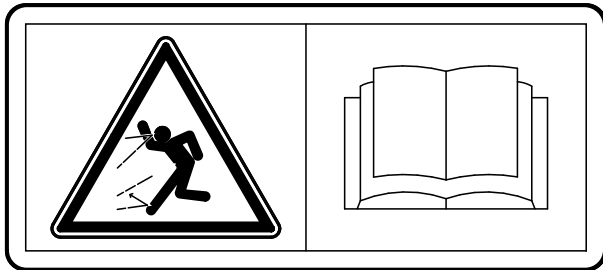


PUM3017—UN—02FEB09

IMPORTANT: The maximum recommended travel speed is 32 km/h.

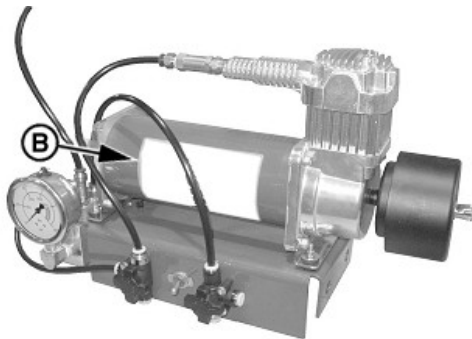
A—Warning
B—Warning

**For Planters Equipped with Pneumatic Down Force
(Manually Controlled at the Compressor)**



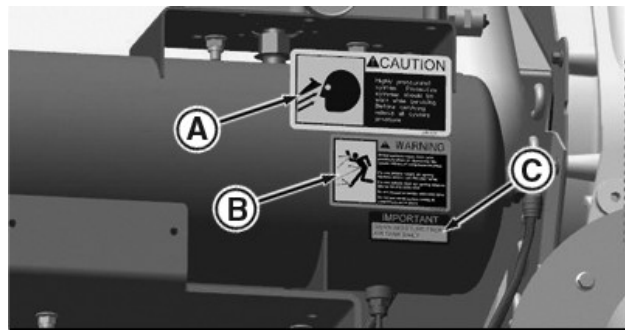
SSA83934—UN—31MAR06

B—Warning



APY00629—UN—12DEC17

B—Warning Avoid serious injury from exploding parts due to over pressurization or operating the system without all components in place. Do not inflate single bag system above 827 kPa (8.27 bar) (120 psi). Do not pressurize system unless all row unit components are in place.



APY13615—UN—20SEP18

Integrated Pneumatic Downforce

A—Caution
B—Warning
C—Important

CAUTION: Highly pressurized system. Protective eyewear should be worn while servicing. Before servicing relieve all system pressure.

WARNING: Avoid serious injury from over pressurization or operating the system without all components in place.

Do not inflate single air spring system above 120 PSI (827 kPa).

Do not inflate dual air spring system above 80 PSI (552 kPa).

Do not remove or tamper with relief valve.

IMPORTANT : Drain moisture form air tank daily.

CN80434,0000914-19-26SEP18

Planter Positions

Planter Positions

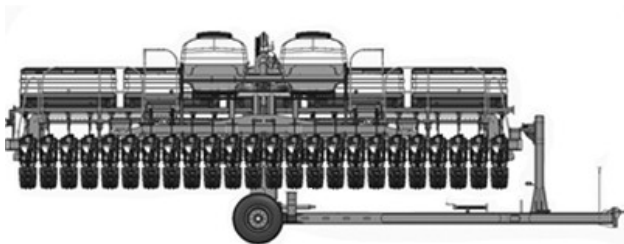
The following positions are defined for the 1745 Planter:

- Transport Position
- Headland Position
- Working Position

Each is explained separately below.

PX03972,00001AA-19-10JUN13

Transport Position



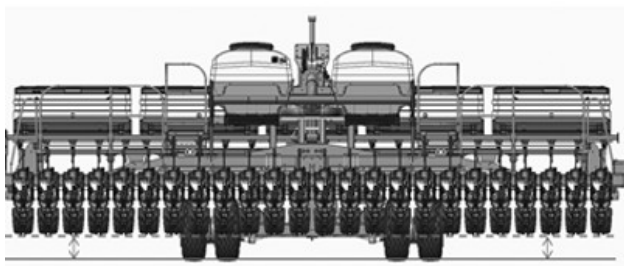
APY00602—UN—07DEC17

Used to move the transport on public roads, farm trails, etc.

IMPORTANT: To reduce the risk of accidents and injury, follow the instructions for transporting the planter safely.

CN80434,00006E0-19-06DEC17

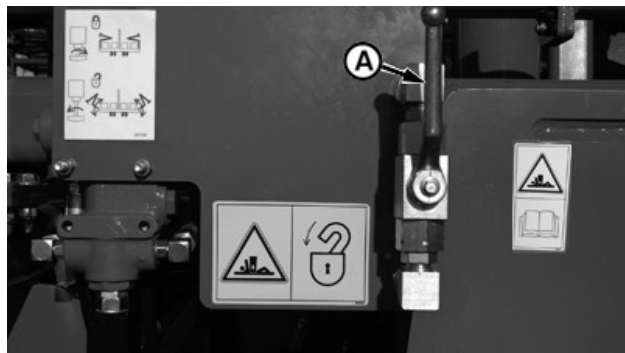
Headland Position



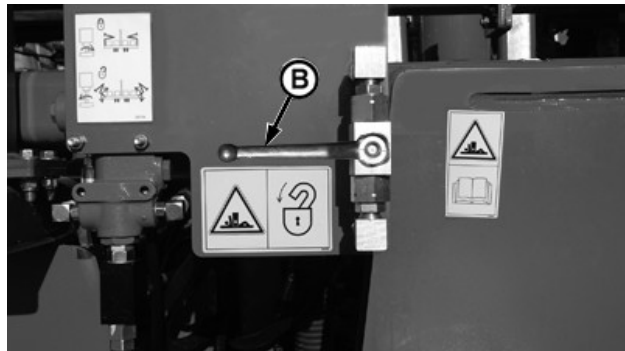
P17542—UN—19JAN15

Used when the planter is raised for turning at the ends of the field.

IMPORTANT: To prevent injuries, verify there is no one under the planter when it is operating in this position. Comply with the instructions on safety signs. (See Safety Signs section.)



P16913—UN—21MAY13



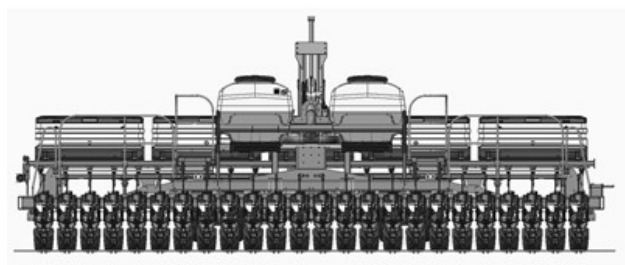
P16914—UN—21MAY13

A—Unlocked Position
B—Locked Position

IMPORTANT: Never stand under the planter when the lever (A) is in the unlocked position. Close the safety lock valve lever as shown in locked position (B) and then install the locking pin before performing any maintenance or adjustment work under the machine.

PX03972,000124B-19-10MAR15

Working Position



P17543—UN—19JAN15

Used when planting.

IMPORTANT: Follow the recommendations given in the Safety section to work safely.

PX03972,00011A0-19-19JAN15

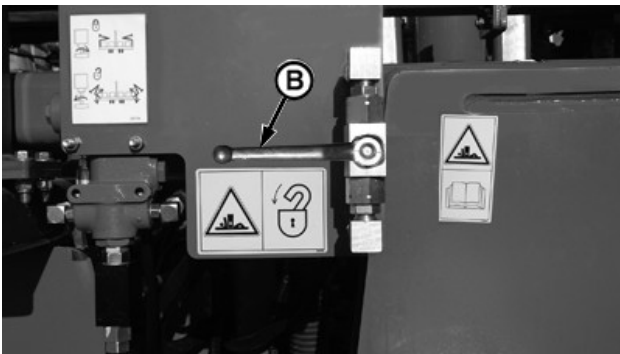
Changing from Working to Transport Position

IMPORTANT: Verify the markers are folded. If not, raise the planter to the headland position and once both markers are raised, lock them in this position using the hydraulic valve.

1. Lift lever (A). Next, operate the tractor SCV control lever to raise the carriage supporting the planter frame to its maximum height.



P16728—UN—17APR13



P16816—UN—21MAY13

A—Lift lever
B—Locked Position

IMPORTANT: To prevent damage to the planter, verify the bypass valve is in the "Raise" position before operating the tractor SCV lever.

2. In order to operate the planter safely, lock the position of the planter by closing the safety lock valve lever as shown in locked position (B).

IMPORTANT: This safety lock valve **MUST NOT** be used for daily maintenance or for transporting the planter. The locking pin is used for these purposes on the planter.

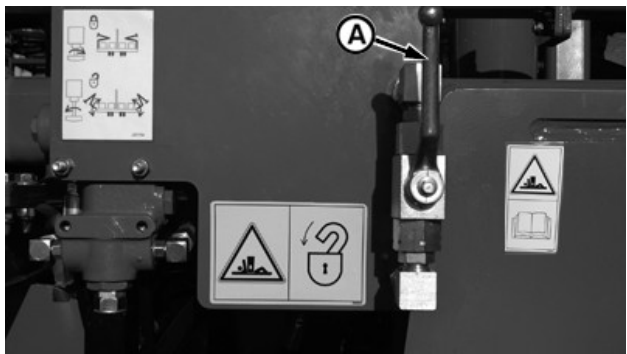
3. Install the locking pin (A) in the transport position hole and secure it with the handle nut.



P17293—UN—23APR14

A—Locking Pin

IMPORTANT: Verify there is no one under the planter.



P16730—UN—21MAY13

A—Blocking Lever

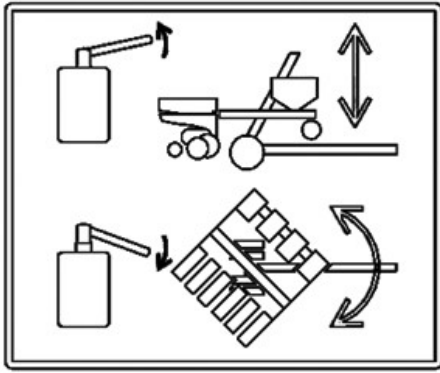
4. Release the blocking lever (A) and lower the planter until the tower carriage wheels are supported by the stop pin.

IMPORTANT: To avoid damage to the the end of the hydraulic lift system main rod, verify the carriage wheels are always supported by the lock pin aligned with the opening for the transport lock on on the column,

5. Place the bypass valve handle (A) in the "Swivel" position as shown on the label.



APY00604—UN—07DEC17



APY00601—UN—07DEC17

A—Bypass Valve Handle
B—Valve

Open the valve (B).

Operate the tractor SCV control lever so that the assembly connected to the tower swivels 90°.

IMPORTANT: To prevent damage to the planter, verify the bypass valve is in the "Swivel" position before operating the tractor SCV control lever.

IMPORTANT: Label Information:

- Place handle (A) at upper position for raise and lower planter
- Place handle (A) at lower position for rotate planter

6. Operate the tractor SCV control lever slowly so that the tower supporting the planter frame swivels. It will swivel until the main transport latching pin (A) is locked on the column that supports the control panel.

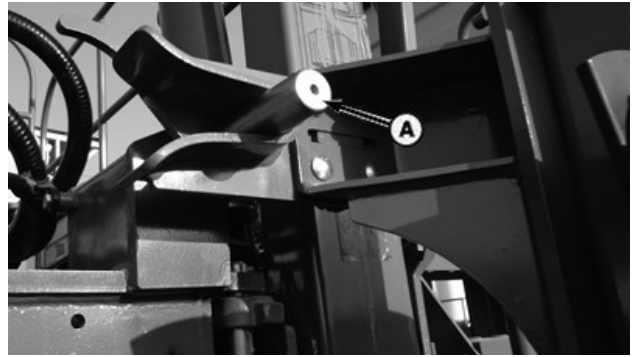


P16926—UN—22MAY13

A—Transport Latching Pin

IMPORTANT: Verify there is no one near the planter when it swivels.

7. Verify the transport latching pin (A) is securely locked in the latch.

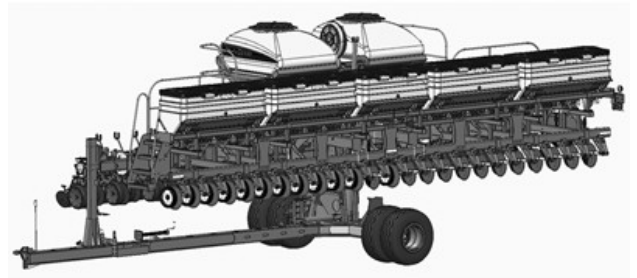


P16561—UN—22AUG12

A—Transport Latching Pin

CN80434,00006DF-19-06DEC17

Planter in Transport Position

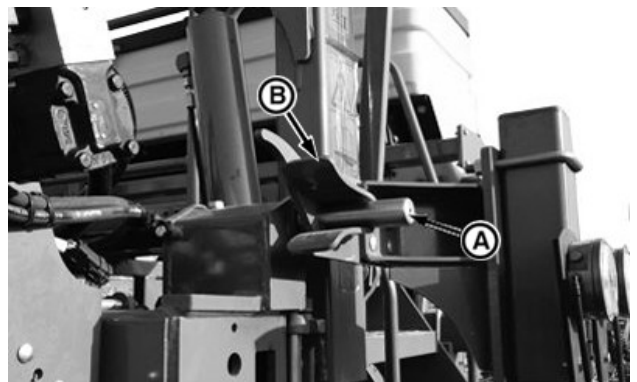


APY00603—UN—07DEC17

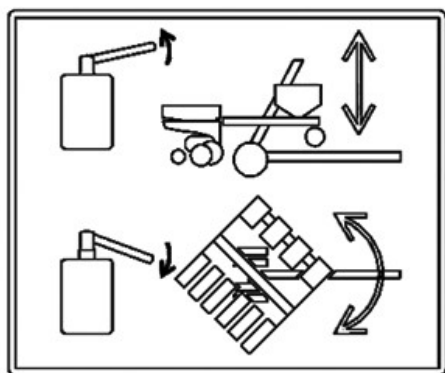
IMPORTANT: Never transport machine with product in tanks or hoppers.

CN80434,00006DB-19-05DEC17

Planter Rotation



P16987—UN—19JUN13



APY00601—UN—07DEC17

A—Pin
B—Latch Lever

Release the pin (A) by lifting the latch lever (B). Operate the tractor SCV control lever slowly so that the assembly connected to the tower swivels 90°.

IMPORTANT: To prevent damage to the planter, verify the bypass valve is in the "Swivel" position (A) before operating the tractor SCV control lever.

IMPORTANT: Verify the tower base touches the swivel stop before lowering the planter frame.

IMPORTANT: Label Information:

- Place handle at upper position to raise and lower planter
- Place handle at lower position to rotate planter

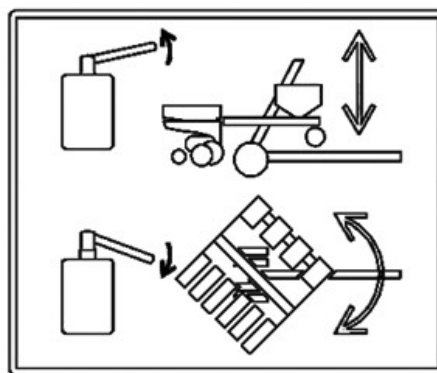
CN80434,0006DC-19-06DEC17

Planter Lowering

IMPORTANT: Verify there is no one under the planter.



APY00604—UN—07DEC17



APY00601—UN—07DEC17

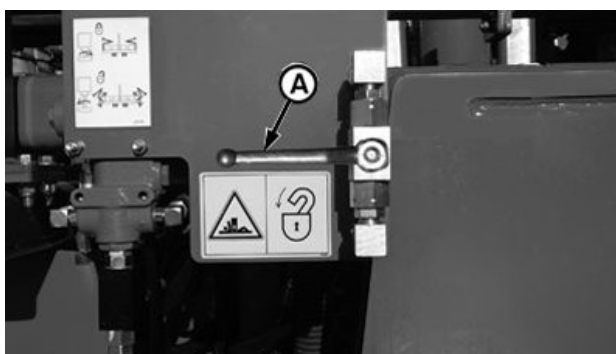
A—Bypass Valve Handle
B—Valve

1. Place the bypass valve handle (A) in the "Raise" position as shown on the label. Close the valve (B).

IMPORTANT: Label Information:

- Place handle at upper position for raise and lower planter
- Place handle at lower position for rotate planter

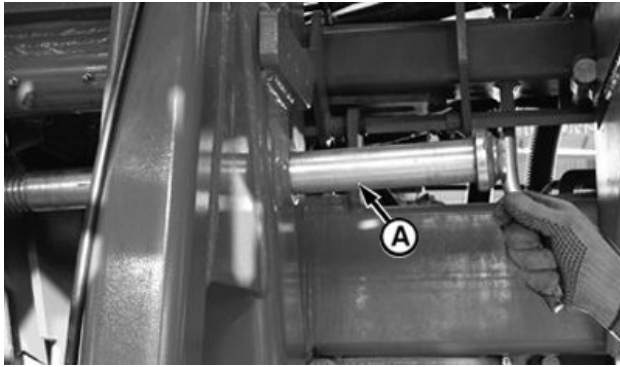
2. Operate the tractor SCV control lever to raise the carriage supporting the planter frame to its maximum height.
3. In order to operate the planter safely, lock the position of the planter by closing the safety lock valve lever as shown in locked position (A).



P16927—UN—22MAY13

A—Locked Position

IMPORTANT: This safety lock valve **MUST NOT** be used for daily maintenance or for transporting the planter. The locking pin is used for these purposes on the planter.



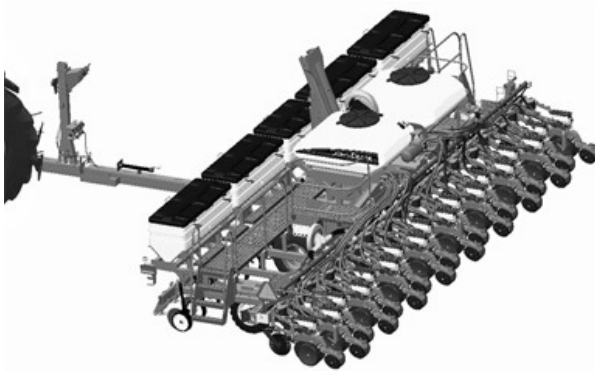
P17293—UN—23APR14

A—Locking Pin

4. Remove the handle nut and remove the locking pin (A) from the transport position hole.
5. Remove the lift cylinder safety stop.
6. Operate the tractor SCV control lever to lower the carriage supporting the planter frame to the ground.
7. The planter is now in the working position.

Steps to Change Planter from Working Position to Transport Position	
Step	
1	With planter lowered; raise lift lever at front of frame
2	Lift planter so the markers fold.
3	Lock Markers
4	Place the lock valve in the closed position
5	Put locking pin in transport position
6	Place the lock valve in the open position
7	Lower the planter
8	Place the lock valve in the closed position
9	Place the bypass valve in swivel position
10	Place the swivel cylinder locking valve in open position
11	Swivel the planter
12	Close the swivel cylinder locking valve

CN80434,00006DE-19-06DEC17



APY00605—UN—07DEC17
CN80434,00006DD-19-06DEC17

Summary of Steps to Change Planter Position

Steps to Change Planter from Transport Position to Working Position	
Step	
1	Release transport latching pin retainer
2	Open the swivel cylinder lock valve
3	Place bypass valve in swivel position
4	Swivel the planter
5	Close the swivel cylinder lock valve
6	Place the bypass valve in raise position
7	Raise the planter
8	Place the lock-up valve in the closed position
9	Remove locking pin
10	Open lock up valve
11	Lower the planter
12	Lower headland stop lever
13	Unlock markers

Preparing the Tractor

General

For complete instructions on operating the tractor, see the tractor Operator's Manual.

PX03972,0000E6B-19-22AUG12

Recommended Tractor Settings

See Tractors Operator's Manual for complete operating instructions.

Tractor Settings	
Item to set	Planter Models
	1745 Planters
Drawbar distance from ground	460 mm (18 in.)
Drawbar Length	Extended and Centered
Quick Coupler	Removed
Three Point Links	Adjust to fully raised position
Three Point Center Link	Quick coupler vertical when planting
Tire Ballast	Limit liquid or cast weight on rear tires ^{ab}
Tractor Hydraulics	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 Tractor Operator's Manual.
Hydraulic Controls	See HYDRAULIC CONNECTIONS RECOMMENDATIONS in Attach Machine section.

^aDual rear tractor tires are recommended for stability and for load carrying capacity, especially when the machine is folded for transport.

^bTo carry the machine for transport, limit liquid or cast wheel weights on rear tractor tires as tire load carrying capacity is decreased.

CN80434,00006F1-19-12DEC17

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

IMPORTANT: Use the connection kits listed in table on John Deere tractors. If low-pressure drain connection kit is already installed, ensure that it matches what is listed on table.

NOTE: John Deere Connection Kits include Installation Instructions.

Case Drain Connection Kits	
Tractor Model	Kit Number
6000 and 10 Series 7420 and 7520 Series with serial numbers (-12451)	BA30216 ^a
6020, 7220, 7320, 7420, 7520 Series	AL169965
6030 Series	RE228000
6D Series	SJ288860
7200, 7400, 7600, 7700, 7800 and 10 Series	BA30218 ^a
7720, 7820 and 7920 Series	RE211441
7030 Small Frame and Premium Tractors	RE228000
7030 Large Frame Tractors	RE211441
7R Series Tractors	RE327561
8000, 8000T, 8010, 8010T, 8020, 8020T, 8030, 8030T, 8R, and 8RT Series	RE222721
9000, 9000T, 9010, 9010T, 9020, 9020T, 9030 and 9030T Series	RE218665
9R and 9RT Series	RE299261

^aOrder through service parts.

CN80434,0000700-19-13DEC17

Low Pressure Case Drain Connection

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



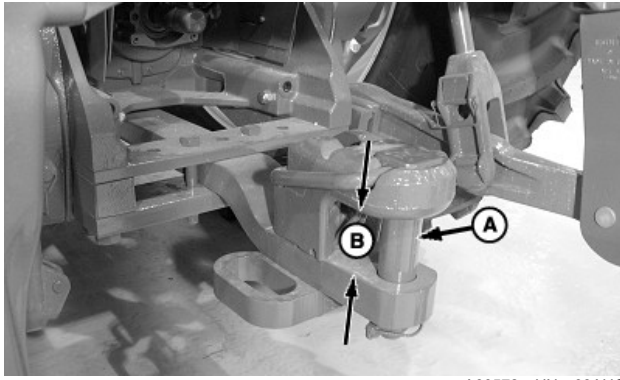
A53392—UN—25NOV03

Flush Face Case Drain Hose Tip

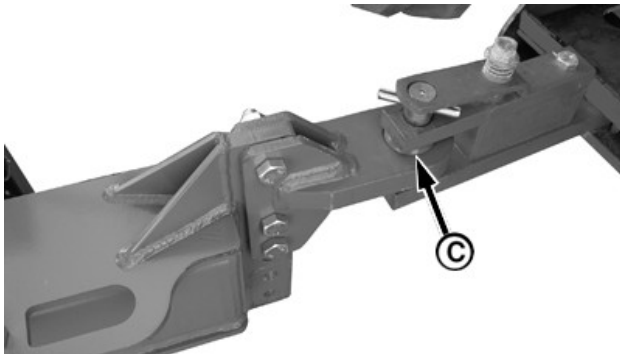
Determine Tractor Drawbar and Implement Clevis Compatibility

IMPORTANT: Avoid machine damage. Match tractor drawbar and implement clevis. Refer to tractor operators manual for specific drawbar information.

Do not exceed static vertical load capacity of tractor drawbar. See Specifications section for vertical load and see tractor manual for drawbar limits and heavy duty supports.



A60572—UN—08AUG07



P16813—UN—16MAY13

A—Drawbar Pin
B—Drawbar Opening
C—Slot

Match tractor drawbar and implement clevis. The only exception is a category 4 clevis used with a category 3 drawbar that has a 90 mm (3.54 in.) opening. Never exceed vertical load limits.

Drawbar and Clevis Compatibility					
	Tractor Drawbar		Implement Clevis		
Drawbar and Clevis Category	Drawbar Pin (A) Diameter	Drawbar Opening (B)	Slot (C) Length	Slot (C) Width (Minimum)	Clevis Thickness
3	38 mm (1.50 in.)	70—90 mm (2.75—3.54 in.)	41—66 mm (1.61—2.60 in.)	41 mm (1.61 in.)	48 mm (1.89 in.)
4	51 mm (2.00 in.)	90 mm (3.54 in.)	55—70 mm (2.17—2.75 in.)	55 mm (2.17 in.)	50 mm (1.97 in.)

CN80434,00006F6-19-12DEC17

Check Tractor Hydraulic System

IMPORTANT: Do not use an open center tractor hydraulic system to operate machine. Permanent damage to tractor pump can result.

For complete tractor operating instructions, refer to the tractor operator's manual.

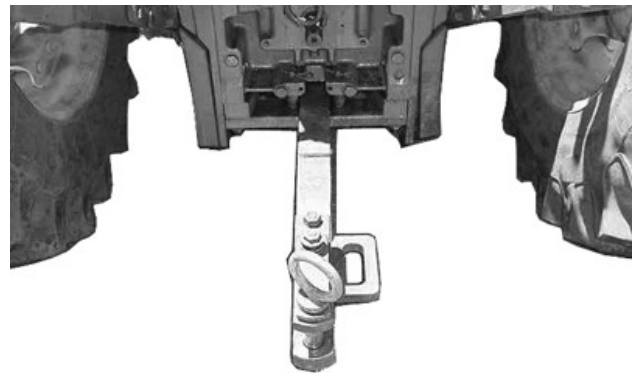
The CCS blower, vacuum motor, and variable rate drive hydraulic systems are designed to be operated with closed center tractor hydraulic systems (tractors with load sensing or pressure on-demand hydraulics are classified as closed center systems). Open center tractor hydraulics are NOT compatible with system.

Minimum tractor standby pressure required to operate the CCS blower, vacuum motor, and variable rate drive hydraulic systems is approximately 15 513 kPa (155 bar) (2250 psi) depending on frame configuration, planting speed, and number of rows on machine.

Hydraulic system working pressure is 20 684 kPa (207 bar) (3000 psi). Hydraulic system burst pressure is 82 737 kPa (827 bar) (12 000 psi).

OUC06074,00003EB-19-23FEB16

Adjust Tractor Drawbar



APY00630—UN—12DEC17

The tractor drawbar should be approximately 450 mm above the ground. Adjust height as needed and secure the drawbar to the center of the support.

To adjust drawbar, see the tractor Operator's Manual.

CN80434,00006F2-19-13DEC17

Rear Wheel Spacing

Adjust rear wheel spacing (between tire centers) so that they are offset from the rows.

For more information, see the applicable chapter of the tractor Operator's Manual.

PX03972,0000E6E-19-22AUG12

Check Inflation Pressure

Inflate the front and rear tires to the proper pressure according to the recommendations in the tractor Operator's Manual.

Also see the Ballasting section of the tractor Operator's Manual.

PX03972,0000E6F-19-22AUG12

Preparing the Machine

Initial Use of CCS™ System

The first time a new seed tank is used, coat the inside bottom of bulk seed tanks with a thin layer of meter lubricant. Mix triple the amount of meter lubricant into the first two or three bushels of seed placed in the bulk tank (See Meter Lubrication section). The lubricant coats the inside of the CCS™ system and hoses with a protective layer to help resist buildup of seed coatings.

OUO6074,0000EC7-19-09FEB17

Tightening Hardware

Verify the cap screws and nuts are tight. (See Cap Screw and Nut Torque Table in Service section.)

PX03972,0000E70-19-23APR14

Tire Inflation

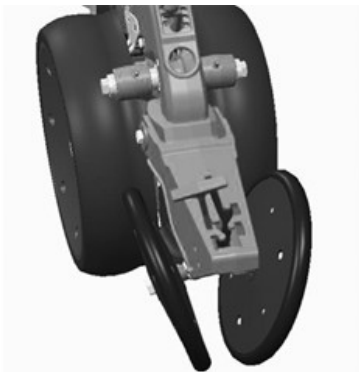
- Inflate drive tires (7.6 x 15 – 6PR) to 206 kPa (2.1kg/cm²) (30 psi).
- Inflate transport tires (440/55R18 IMP to 551 kPa (5.51 kg/cm²) (80 psi). Tighten wheel-to-hub cap screws to 436 N•m (320 lb-ft).

IMPORTANT: A small variation in drive tire inflation pressure will have a significant effect on the number of plants per hectare. A periodic check of tire pressure is very important.

IMPORTANT: Low air pressure in the transport tires could result in premature wear.

PX03972,00011E6-19-24FEB15

Lubrication



APY00606—UN—07DEC17

Verify the planter and planting units are properly lubricated. (See the Lubrication section.)

CN80434,00006E1-19-11DEC17

Planting Unit Shaft Alignment

Place the planter in the working position. (See Planter Positions section.)

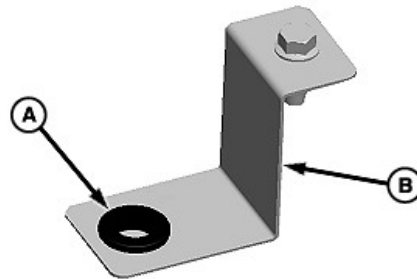
The planting unit drive shafts must be aligned to prevent premature wear and/or damage to couplings and other drive system components.

(See Planting Unit Shaft Alignment in Service section.)

PX03972,0000E73-19-22AUG12

Assemble Pneumatic Down Force Air Compressor Remote Air Filter

NOTE: Electric down force compressors only.

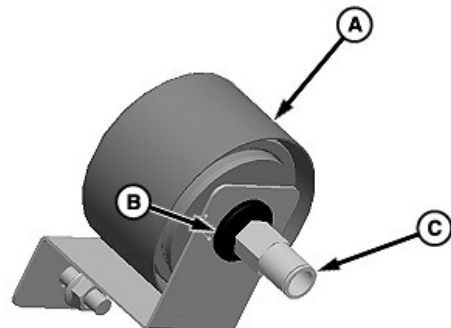


A71711—UN—03JUN11

A—Grommet
B—Bracket

1. Install grommet (A) in bracket (B).

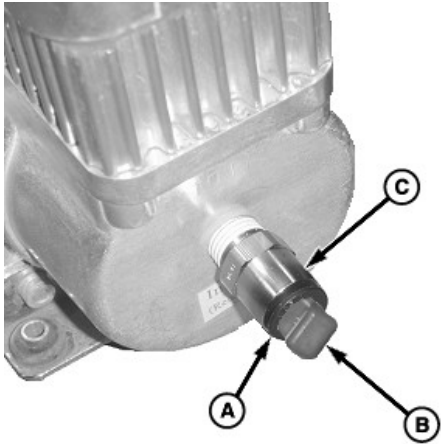
NOTE: Fitting does not tighten against grommet. Do not over tighten.



A71712—UN—03JUN11

A—Filter Housing
B—Grommet
C—Fitting

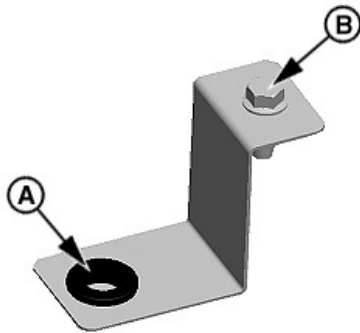
2. Install filter housing (A) through grommet (B) in bracket and install fitting (C).



A71718—UN—03JUN11

A—Ring
B—Plug
C—Air Compressor Fitting

3. Press in ring (A) and remove plug (B) from air compressor fitting (C).



APY00607—UN—07DEC17

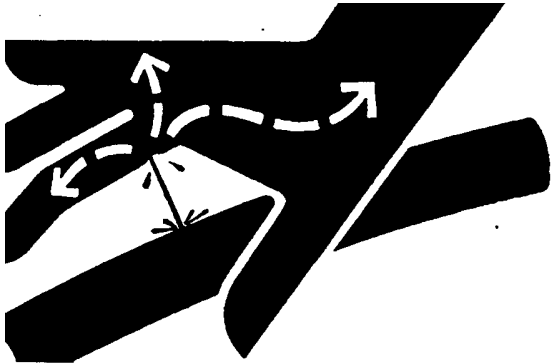
A—Filter Hose
B—Ring

4. To install filter hose (A), push in rings (B) on fittings and push filter hose into fittings approximately 17 mm (11/16 in.).

CN80434,00006E2-19-11DEC17

Attaching and Detaching

Check Hydraulic System



X9811—UN—23AUG88

- CAUTION:** Escaping fluid under pressure can penetrate the skin and cause 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 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.

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

- CAUTION:** Hydraulic hoses can fail due to physical damage, kinks, age and exposure to the elements.
- Check hoses regularly. Replace damaged hoses.

- IMPORTANT:** Be certain to check tractor hydraulic oil level after filling cylinders with oil for the first time.
- Remove all trapped pressure out of planter hydraulic system.

PX03972,0000E7A-19-22AUG12

Hydraulic Connections Recommendations



A64361—UN—11MAR09
Extend Symbol



A64362—UN—11MAR09
Retract Symbol

Extend and Retract symbols are on SCV cover.

Refer to tractor operator's manual for specific hydraulic operational details.

- IMPORTANT:** Case drain hose must be attached prior to any hose being connected.

Hose Connections				Function Setting
Hose Identification	SCV	Pressure	Return	Detent (Time)
Frame Functions, Markers and CCS System	I	Extend	Retract	Constant "C" CCS level controlled with CCS Valve
Vacuum System	II	Retract	Extend	Constant "C"
Variable Rate Drive on SCV (if equipped)	III	Retract	Extend	Constant "C"
Variable Rate Drive on Power Beyond with Load Sense (If planter equipped with VRD and tractor equipped with Power Beyond coupler kit)		Power Beyond Pressure	Power Beyond Return	

- CAUTION:** Hydraulic hoses can fail due to physical damage, kinks, age, and exposure. Check hoses regularly. Replace damaged hoses.

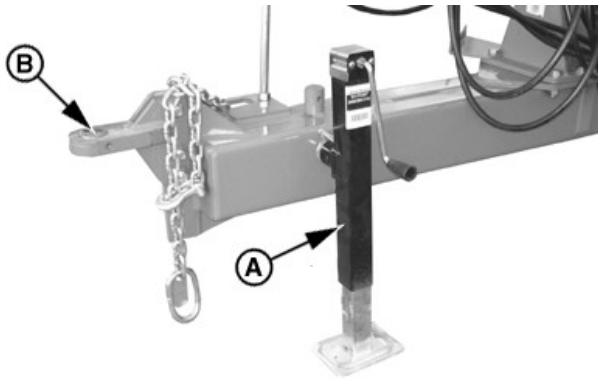
- IMPORTANT:** Vacuum and Variable Rate Drive return hoses, with special tip, must be connected to tractor "Extend" port. Avoid damaging pressure spikes; shut vacuum motor and variable rate drive off by placing SCV lever in "Float" position.

CCS control valve is used to control CCS tank pressure. SeedStar™ system is used to control variable rate drive.

PX03972,00011A7-19-19JAN15

SeedStar is a trademark of Deere & Company

Attaching to Tractor



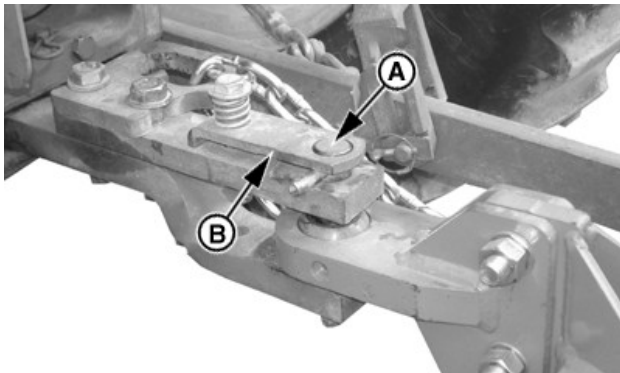
APY00609—UN—07DEC17

A—Jack
B—Level Hitch

Back the tractor up and position the drawbar about 300 mm in front of the planter hitch.

Use jack (A) to level hitch (B) with the tractor drawbar.

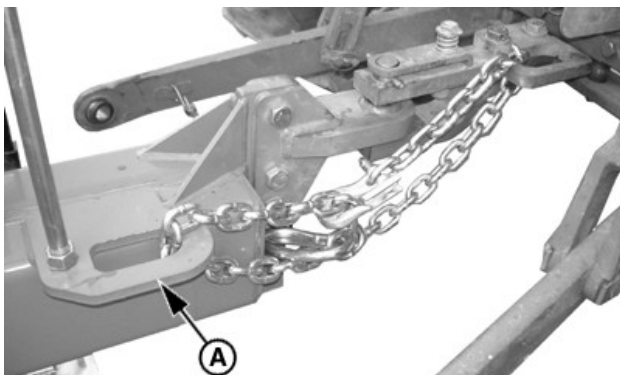
IMPORTANT: For proper operation, the tractor must be level and this is achieved when the top of the tongue is horizontal. (See **LEVELING THE PLANTER** in the Operating the Planter section.)



APY00608—UN—07DEC17

A—Hitch Pin
B—Plate

Attach the planter to the tractor drawbar with hitch pin (A) and then install the safety plate (B). If plate (B) is not used, secure the hitch pin (A) with a spring pin.

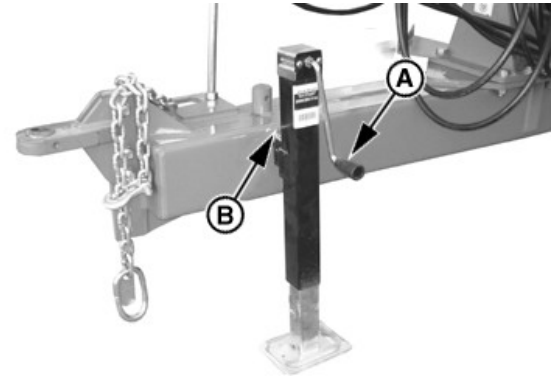


APY00610—UN—07DEC17

A—Support

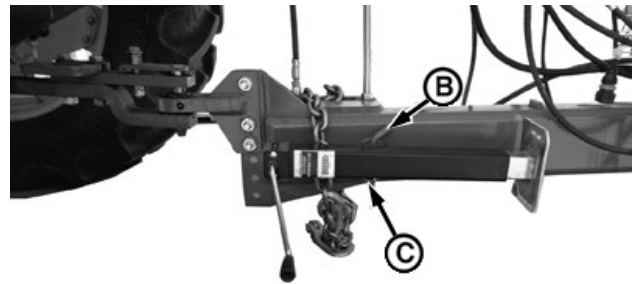
Route the safety chain through the support (A) and around the tractor drawbar support and connect as shown in the photograph.

NOTE: Verify the chain is not tight by turning the tractor from one side to the other.



APY00611—UN—07DEC17

Working Position



P16578—UN—22AUG12

Transport Position

A—Jack Handle
B—Pin
C—Spring Pin

Turn the jack handle (A) to release the tongue load and move it from the working position to the transport position by removing pin (B). Secure with the pin and spring pin (C).

CN80434.000071E-19-02JAN18

CCS™ Blower and VacuMeter™ Motor (Case) Drain Requirements

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

CCS™ blower and VacuMeter™ case drain hose (A) must be attached to low-pressure drain connection prior to any other hose connection.

CCS is a trademark of Deere & Company
VacuMeter is a trademark of Deere & Company



Connect Hydraulic Hoses

Connect Case Drain Hose



A—Motor Seal (Case) Drain Hose

APY00612—UN—07DEC17

The hydraulic motors used on the CCS™ blower and VacuMeter™ are low flow, high-pressure motors. The motors are designed to operate on a closed-center hydraulic system. Connecting the CCS™ blower or the VacuMeter™ to an open-center system is not recommended. See your John Deere™ dealer for more information.

CN80434.00006F4-19-12DEC17

VacuMeter™ Hydraulic Motor and Variable Rate Drive Return Coupler



A53457—UN—02MAR04

All machines are equipped with a special return coupler on the Variable Rate Drive and Vacuum Motor return hoses.

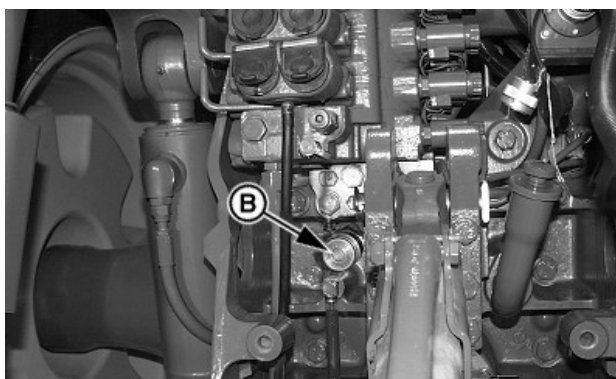
Return couplers are equipped with check valves to eliminate the possibility of turning the motors backwards.

Relieve pressure when shutting off hydraulic motors. Place SCV in “Float” position and allow the motors to stop gradually.

CN80434.00006E3-19-11DEC17

Flush Face Fitting

APY00612—UN—07DEC17



APY00613—UN—07DEC17

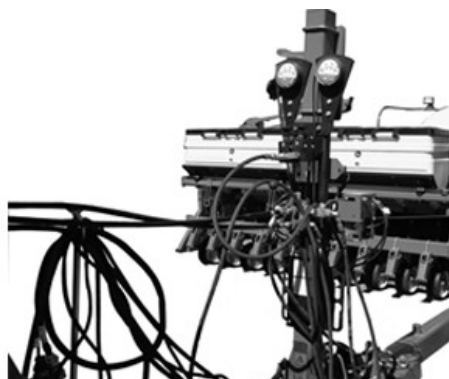
A—Case Drain Hose

B—Low-Pressure Drain Coupler

Connect case drain hose (A) to tractor low-pressure drain coupler (B).

Connect Lift and Swivel System

The lift and swivel system hydraulic hoses are connected to the bypass valve on the control panel and must be connected so that the planter lowers when the tractor SCV control lever is moved forward and the planter raises when the control lever is moved backward.



APY00614—UN—07DEC17

CN80434.00006F5-19-12DEC17

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.



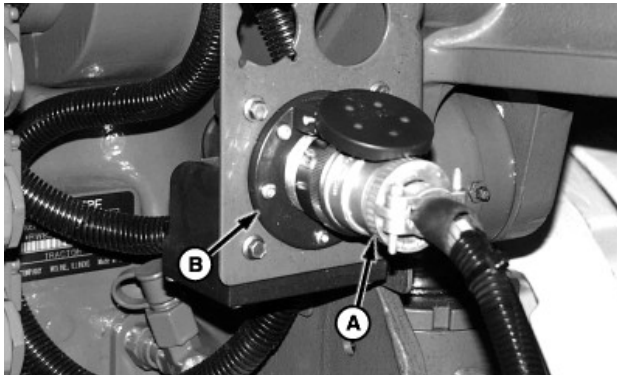
RW20845—UN—07MAY92

Attach the light harness to the 7-pin connector.

OOU01074,0000042-19-11MAY16

Connect SeedStar™ Monitor Harness

NOTE: Harness locations will vary from tractor to tractor.



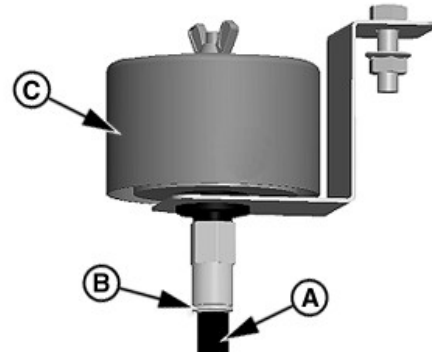
A47096—UN—02FEB01

A—Monitor Harness
B—Connector

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

OOU06064,00000A3-19-27APR10

Connect Pneumatic Down Force Filter



APY00615—UN—07DEC17

A—Filter Hose
B—Air Filter Assembly
C—Ring

Install filter hose (A) in air filter assembly (B), push in ring (C) on fitting and push filter hose into fitting approximately 17 mm (11/16 in.).

NOTE: Remote filter assembly is mounted on tractor operator station.

CN80434,00006ED-19-12DEC17

Dual Vacuum Connection and Operation

IMPORTANT: To prevent damage to the hydraulic motor, connect the pressure line (with ISO coupler) to tractor Retract and connect the return line (with return coupler) to tractor Extend.

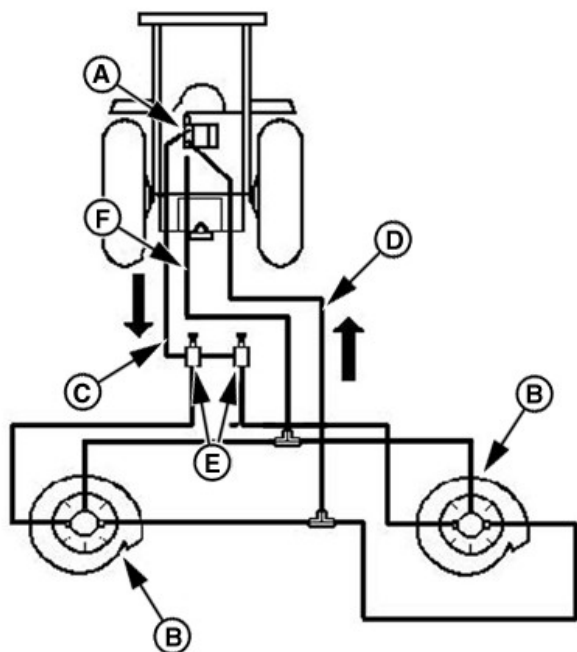
IMPORTANT: On John Deere tractors equipped with a 301 valve or any tractor equipped with a selective control valve to regulate hydraulic system flow, flow should be set to the **MINIMUM** level required to activate the vacuum system.

IMPORTANT: On stopping the fan, move the SCV control lever to the **FLOAT** position and then shut off the tractor engine. With the engine off, move the control lever to the **NEUTRAL** position.

Adjusting Vacuum

1. Open both control valves (E).
2. Activate vacuum hydraulics.

Detaching from Tractor



APY00631—UN—12DEC17

- A—Series 301 Valve
- B—Hydraulic Vacuum Motor
- C—Pressure Line
- D—Return Line
- E—Control Valve
- F—Case Drain

3. After the seed disks are filled with seed adjust tractor hydraulic flow until target vacuum level is reached on indicator.

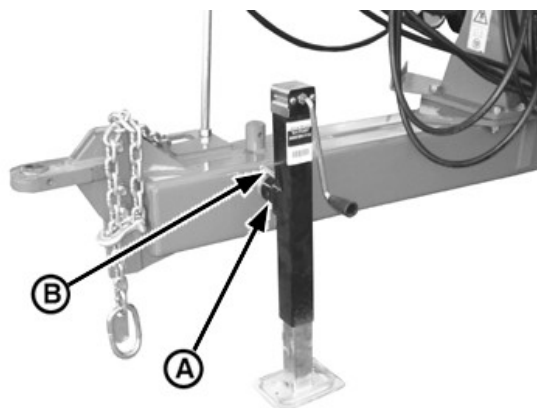
4. If one vacuum level is higher than the other, adjust the control valve (E) until the higher reading lowers to target vacuum.

CN80434,00006EE-19-13DEC17



P16581—UN—22AUG12

Transport Position



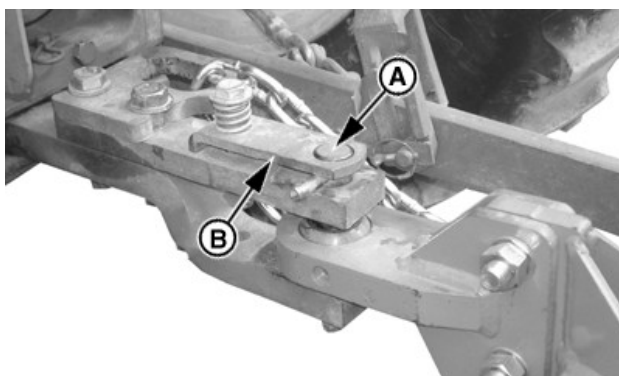
PUM3053—UN—02FEB09

Working Position

- A—Spring Pin
- B—Hitch Pin

With the planter attached in the transport position, remove spring pin (A) and remove hitch pin (B).

Place the jack in the working position and replace the hitch pin and spring pin.

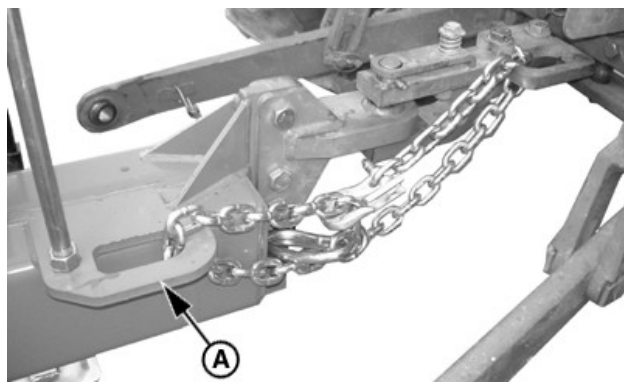


APY00608—UN—07DEC17

- A—Hitch Pin
- B—Safety Plate

Operate the jack handle until the planter hitch is not resting on the tractor hitch.

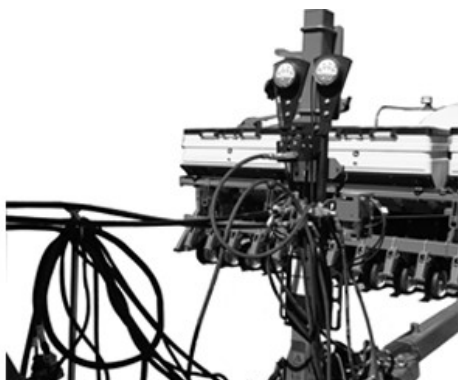
Release safety plate (B) and remove hitch pin (A).



APY00610—UN—07DEC17

A—Safety Chain

Remove the safety chain (A) that attaches the planter to the tractor and leave it on the tongue.



APY00614—UN—07DEC17

CAUTION: To avoid injury from escaping hydraulic oil under pressure, relieve the pressure in the system by putting the SCV lever in the float position with tractor running, and then stop the engine.

CAUTION: Hydraulic hoses can fail due to physical damage, kinks, age and exposure to the elements. Check hoses regularly. Replace damaged hoses.

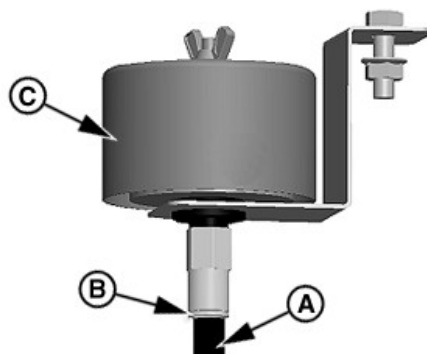
Disconnect all hydraulic hoses.

Disconnect the warning light wiring harness from the seven-pin connector and place it in the protective housing in the control panel.

Disconnect the seed monitor and radar harness if equipped.

CN80434,00006EF-19-12DEC17

Disconnect Pneumatic Down Force Filter



APY00615—UN—07DEC17

A—Ring
B—Filter Hose
C—Air Filter Assembly

Push in ring (A) on fitting and remove filter hose (B) from air filter assembly (C).

CN80434,00006F0-19-12DEC17

Transporting

Transport Safely

CAUTION: When the machine is transported on a road or highway at night or during the day, warning lights and devices should be used to provide adequate warning to operators of other vehicles. Additional safety devices and lights are available from your John Deere dealer.

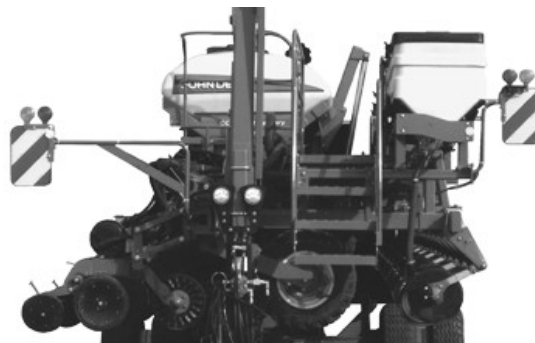
Do not exceed 30 km/h when transporting the planter on paved roads. Reduce speed when traveling over uneven ground or in adverse conditions.

CAUTION: Verify there is no one near the planter.

Contact with electrical cables can cause severe injury or death. When transporting or operating the planter, verify to avoid contact with electrical lines.

PX03972,0000171-19-24APR14

Safety Lights

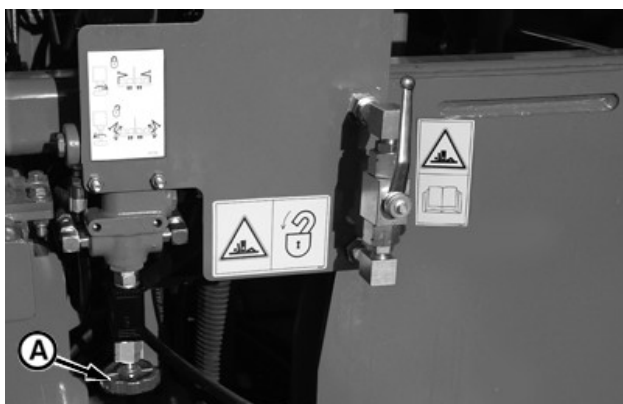


P16812—UN—13MAY13

Verify the safety lights are connected to the tractor.

PX03972,00011AA-19-19JAN15

Locking Markers



P16731—UN—23JUN13

A—Locking Valve

Use the hydraulic locking system to lock the markers.

To lock the markers, close the locking valve (A) located in the center of the front beam. Comply with the instructions on safety signs. (See Safety Signs section.)

PX03972,00000EF-19-22APR14

Transport Position

To move the planter to the transport position, see CHANGE FROM WORKING POSITION TO TRANSPORT POSITION in the Planter Positions section.

PX03972,0000DB0-19-22AUG12

Operating the Machine

General

IMPORTANT: DO NOT put 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 seed tubes 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 can be difficult with some attachment combinations, especially when planting in hard to penetrate soil conditions. If this situation is encountered, the following action can be warranted: Reduce attachment down force levels. Avoid using more attachment down force than required.

1. Use recommended size tractor. See Specifications section.
2. Verify tractor and machine have been properly prepared. See Prepare Tractor and Prepare Machine sections.
3. Use clean seed for best results.
4. Check seed rates carefully.
5. Check tire pressure before seeding.
6. Allow tractor hydraulic oil to warm up thoroughly before seeding.

OUC6074,00009A1-19-19MAY09

VacuMeter™ Hydraulic System Operation

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

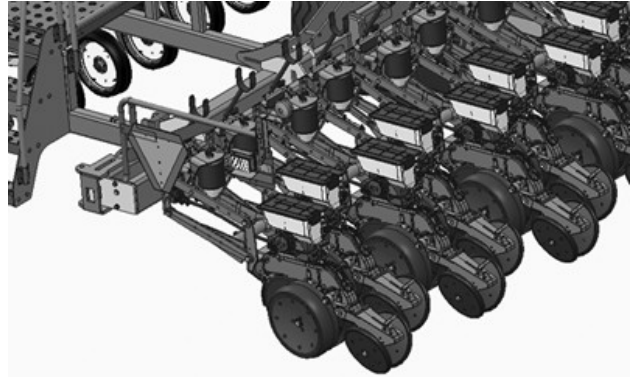
To engage the vacuum system, move the SCV lever forward and lock it into forward (retract) detent.

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 can be returned to “Neutral” position.

OUC6045,00008B4-19-22FEB16

Operating the Planter



P17546—UN—19JAN15

The planting unit parallel arms need to be approximately horizontal for the planter to operate correctly. This position allows the planting unit to move freely and adapt to the terrain contour.

PX03972,00011AB-19-19JAN15

Planting Unit Spacing

Row spacing requires a final adjustment in the field. The row units are factory set to within 6 mm of the row spacing specified by the customer.

We recommend the following:

- Plant a short distance on level ground.
- Stop with the planter still in the ground, raise it and drive forward.
- Measure the distance between furrows and adjust the planting units as required.
- Start any row unit adjustments from the center of the planter.

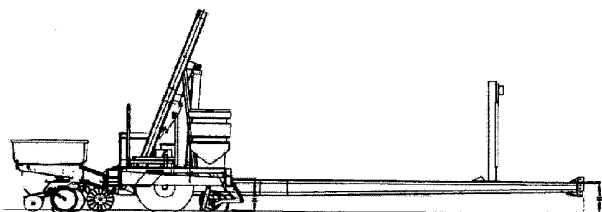
PX03972,0000DD1-19-24APR14

Leveling

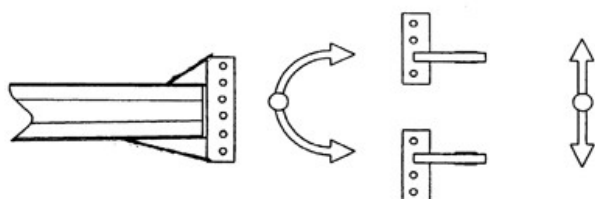
The planter must be leveled horizontally to assure that the planting units operate at maximum efficiency.

PX03972,0000DD2-19-22AUG12

Leveling the Planter



PUM2290—UN—30APR08



PUM2291—UN—30APR08

Perform the following procedure with the planter attached to the tractor and the transport tires set to the pressure indicated:

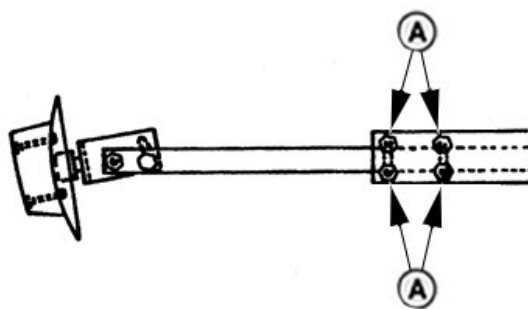
1. Select a flat area in the field and lower the planter to the ground.
2. Measure the distance from the ground to at the front and rear of the tongue. This distance will be equal if the planter is level.
3. To level the planter front-to-rear, support the planter with the tongue jack and detach it from the tractor.

Use the jack to level the planter.

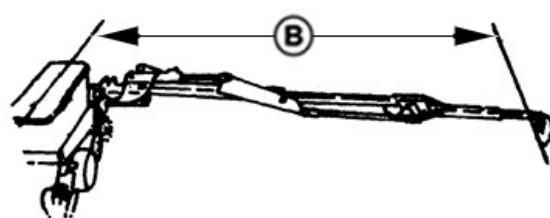
The planter hitch can be rotated, raised or lowered. Find the best combination to achieve the required level.

PX03972,00011AF-19-05FEB15

Adjust 24, 20, 18 and 12 Row Marker Length



PUM2292—UN—30APR08



PUM2293—UN—30APR08

A—Self-Locking Nuts
B—Dimension

To adjust marker do the following:

- Lower marker
- Loosen self-locking nuts (A) on marker.
- Adjust to length shown in table.
- Dimension (B) is measured from the center line of the planting unit to the marker disk.
- This is an approximate measurement and must be checked by measuring the distance between the last seed furrow and the furrow left by the marker.

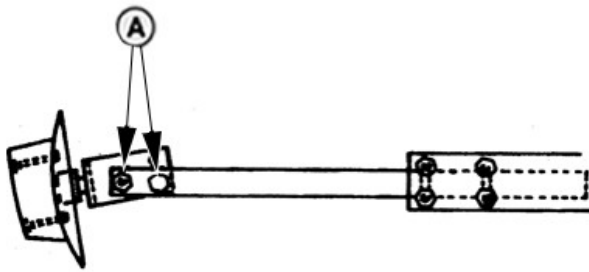
Machine	Row Spacing	Dimension "B"
24-Row	38 cm	437 cm
20-Row	45 cm	427.5 cm
18-Row	52.5 cm	446.25 cm
12-Row	76 cm	494 cm

Tighten lock nuts (A) to specification.

Item	Measurement	Specification
Self-Locking Nuts	Torque	50 N·m (37 lb-ft)

PX03972,00011B0-19-09JUN15

Marker Adjustment



A—Nuts

PUM2322—UN—30APR08

The marker disk leaves a furrow on the ground. Changing the marker disk angle of incidence changes the furrow size. Use only enough disk angle to leave a sufficient mark in the field.

Loosen nuts (A), adjust the marker disk to the desired angle and tighten the nuts to 240 Nm (175 lb-ft).

PX03972,0000DD5-19-28APR14

and lowered. When the marker cylinder operating lever (A) is moved backward, the marker rises. When the lever is moved forward, the marker lowers. The markers will alternate each time the lever completes a full cycle.

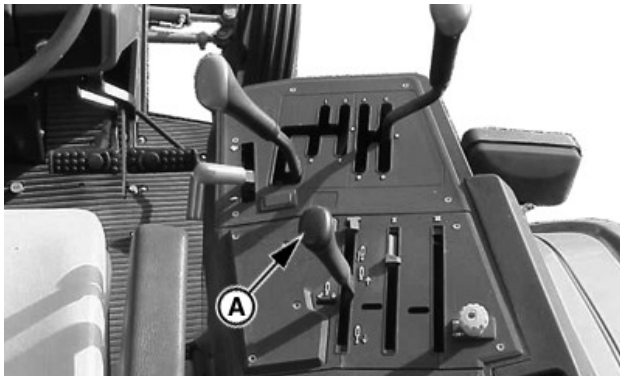
Use the marker hydraulic shut-off valve (B) to lock the markers. This valve allows the markers to rise even when closed.

The sequence valve (C) automatically changes oil flow (so that the opposite marker is lowered) each time the lever moves up or down (even if the lever is only moved slightly).

This valve also allows both markers to be lowered (as when starting to plant in the middle of the field). When lowered, move the lever back from the float position and hold it there until the other marker finishes lowering.

CN80434,00006E5-19-12DEC17

Automatic Raising and Lowering of Markers



APY00617—UN—12DEC17

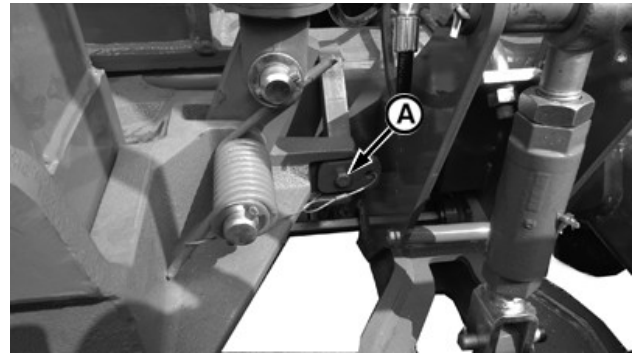


APY00618—UN—12DEC17

A—Lever
B—Shut-off Valve
C—Valve

The planter is equipped with automatic markers that move with the planter frame when the planter is raised

Marker Breakaway Bolt



P16931—UN—22MAY13

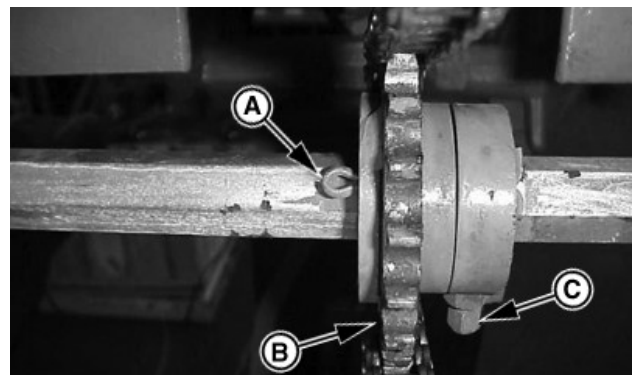
A—Shear Bolt

Shear bolt (A) prevents marker breakaway or failure when contact is made with an obstacle.

To change the shear bolt, see REPLACE MARKER BREAKAWAY BOLTS in the Service section.

PX03972,00001EC-19-22APR14

Lower Shaft Shear Pin



APY00619—UN—12DEC17

A—Cotter Pin

B—Chain
C—Cap Screws

Shear cotter pin (A) retains the sprocket on the lower drive shaft (one on each side of the planter) and will fail when an excessive load is applied to the lower shaft.

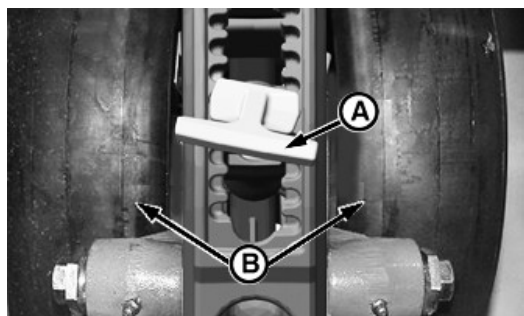
The shear cotter pin can be deformed by continuous use under normal conditions. In this situation, the shear cotter pin may fail even when there is no problem with the planter. A misaligned chain or the lack of lubrication can cause improper operation that results in the failure of the shear pin.

To change the shear cotter pin, see REPLACE LOWER SHAFT SHEAR PIN in the Service section.

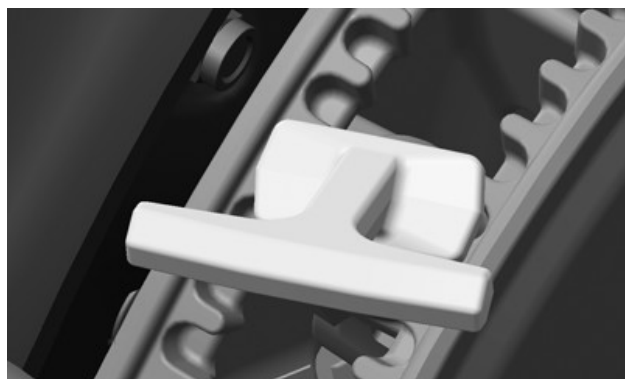
CN80434,00006E6-19-12DEC17

Adjust Planting Depth of Tru-Vee Planting Units

NOTE: Closing wheel down force can affect seed placement and depth. Do not apply more force than necessary to close the seed furrow, especially in light soils.

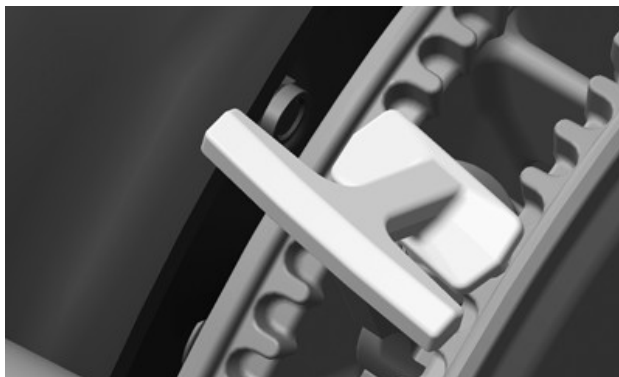


P17151—UN—29OCT13



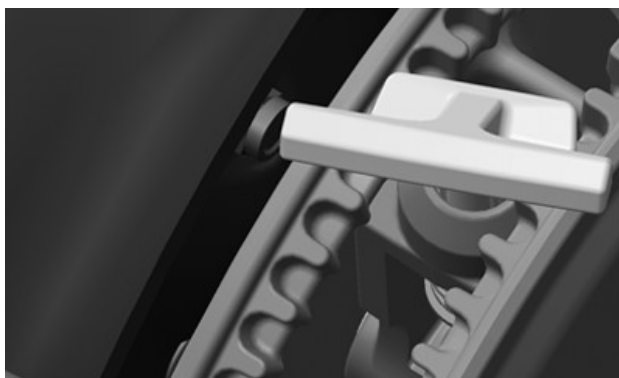
APY00620—UN—12DEC17

"Walking" The Handle in 6-mm (1/4-in.) increments



APY00621—UN—12DEC17

"Walking" The Handle in 6-mm (1/4-in.) increments



APY00622—UN—12DEC17

"Walking" The Handle in 6-mm (1/4-in.) increments

A—Depth Adjustment Handle
B—Gauge Wheels

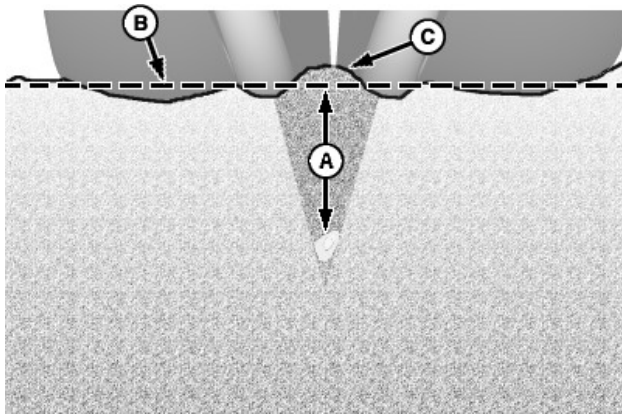
In Tru-Vee Planting Units, gauge wheels (B) regulate seed depth.

Adjust planting depth as follows:

1. Raise the machine to remove weight from gauge wheels.
2. Lift depth adjustment handle (A). Move it forward to decrease planting depth or backward to increase planting depth. If small-increments are desired, "walk" handle from side to side. Each adjusting position changes planting depth 6 mm (1/4 in.)
3. Adjust all rows to the same initial setting.

IMPORTANT: Prevent seed tubes from plugging.
When operating in the field, lower the machine only when tractor is moving forward.

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



A57713—UN—20APR06

Soil Cross Section

A—Depth
B—Topsoil Profile
C—Edge

5. Check the planting depth in each row.
 - a. Dig vertically into the soil until getting to the seed.
 - b. Measure distance (A) from seed to topsoil profile (B). Do not measure to the top of the edge (C) formed by the closing wheels.

CN80434,00006E7-19-12DEC17

Closing Wheel Offset

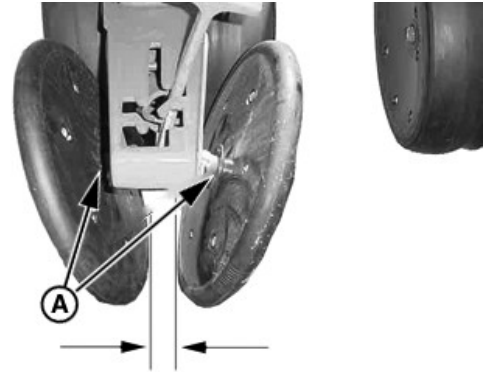


PUM2299—UN—30APR08

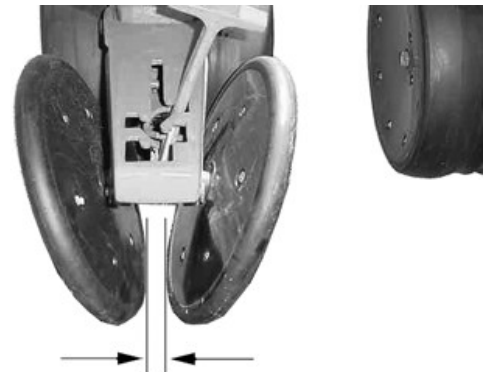
For direct or minimum-till planting, trash or root balls can accumulate between the closing wheels. To reduce the possibility of this occurring, remove one closing wheel from the planter and install it in the rear hole of the casting to offset the closing wheels.

CN80434,00006E8-19-12DEC17

Adjust Closing Wheels for Shallow Planting of Small Seeds



APY00625—UN—12DEC17



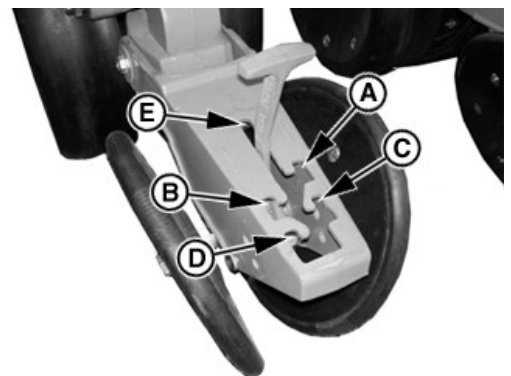
APY00626—UN—12DEC17

A—Nuts and Spacers

Closing wheel spacing is set so that the closing system can adapt to needs when planting small seeds at a shallow depth. To change spacing, remove the wheels, nuts and spacers (A) and reinstall with the spacer outboard of the closing wheel.

CN80434,00006E9-19-12DEC17

Adjust Closing Wheel Down Force



APY00627—UN—12DEC17

A—Slot A
B—Slot B
C—Slot C
D—Slot D
E—Slot E

The inclined closing wheels run behind the openers to

cover the seed furrow left by the openers. The adjustable spring force permits proper closing of the seed furrow by compacting the soil on each side of the seed, not directly over the seed.

Closing wheel down force can be adjusted by placing the lever in slots (A), (B), (C) or (D), depending on varying soil conditions. Placing the lever in the center slot (E) will allow the closing wheels to FLOAT and apply only the weight of the closing wheel system to the soil surface.

CN80434,00006EA-19-12DEC17

Walking Gauge Wheels

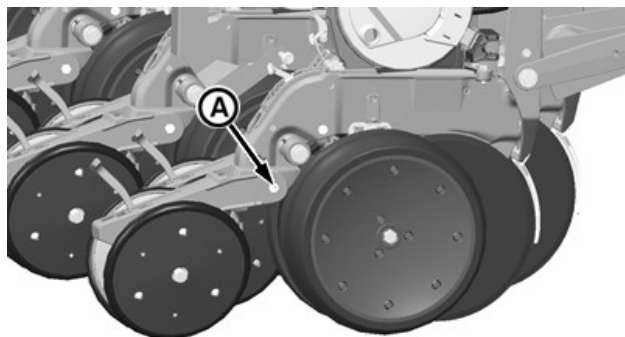


APY00628—UN—12DEC17

The independent vertical movement of walking gauge wheels optimizes control in rocky ground or soil made uneven by clumps or trash. In these conditions the system reduces opener vertical movement when a gauge wheel passes over an obstacle. The reduced opener movement increases control over seeding depth. Movement is reduced for very deep or very shallow planting.

CN80434,00006EC-19-12DEC17

Closing Wheel Centering (Alignment)



P17570—UN—05FEB15

A—Cap Screws

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

Raise the planter.

Loosen cap screws (A) and adjust the closing wheels to the right or left. Center them visually as needed. Tighten cap screws (A).

CN80434,00006EB-19-12DEC17

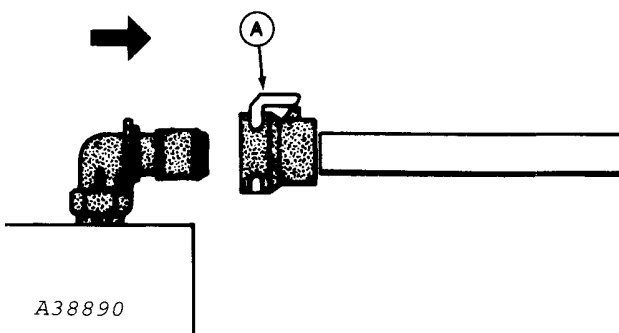
Cleanout and Inspection of Seed Hoppers and Vacuum Meters



A77659—UN—06NOV13

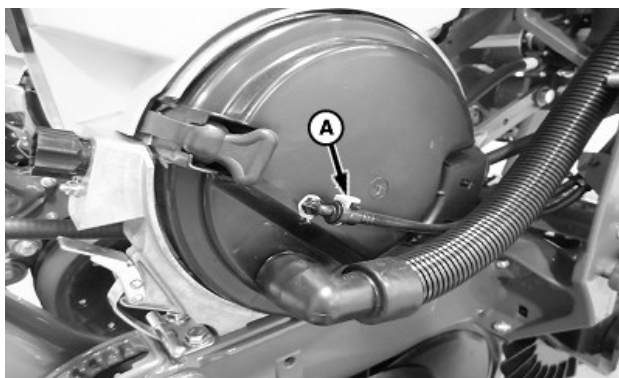
A—Vacuum Hose

1. Remove vacuum hose (A) from vacuum meter.



A38890

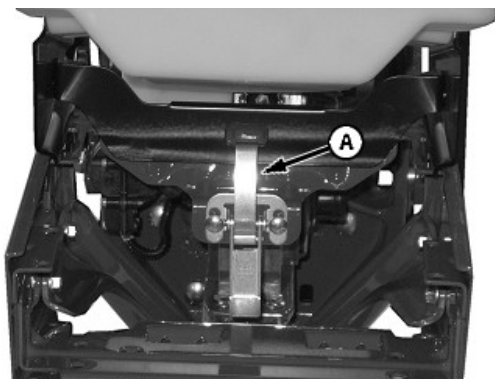
A38890—UN—12JAN96



A78915—UN—17OCT13

A—Retainer

2. On vacuum meters equipped with vacuum gauge hose, squeeze retainer (A) and disconnect hose.



A80234—UN—28FEB14

106 L (3 bu.) Seed Hopper

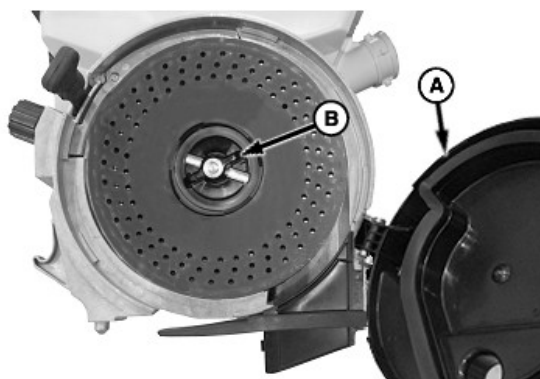


A78914—UN—06NOV13

A—Hopper Latch
B—Meter Latch

3. To remove seed hopper from planting unit, disengage hopper latch (A) or meter latch (B). Rotate meter and hopper forward then lift upward to remove.

NOTE: If using seed treatments, remove any buildup from bottom of hopper.



A78557—UN—15OCT13

Vacuum Meter

A—Door
B—Meter Hub

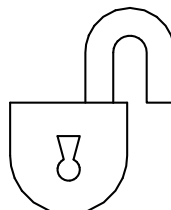
4. To inspect meter, lay hopper on side and turn meter hub (B) by hand to determine if mechanism is free of dirt, chaff, or other foreign material. Inspect brush for gaps, hub seal for cracks, and vacuum seal for

cracks and wear areas. If repair is necessary, see meter service procedures in the Service section.

5. Install seed disk back into meter.
6. Install meter and hopper back onto planting unit. Engage hopper latch and meter latch.
7. Return seed meter catch pan to storage position.

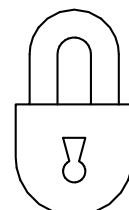
PX03972,000125F-19-15APR15

Disengage Meter Drive



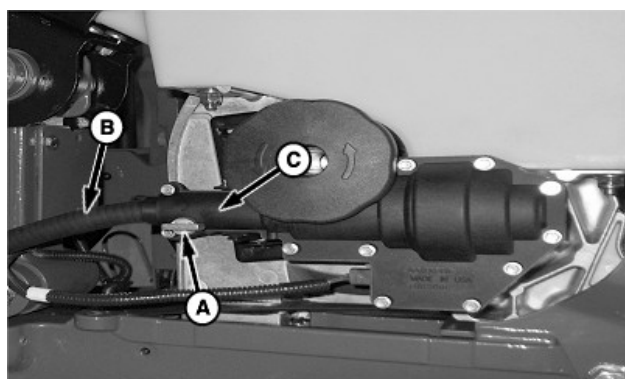
A62348—UN—27MAR08

Unlocked Symbol Up



A62347—UN—27MAR08

Locked Symbol Up



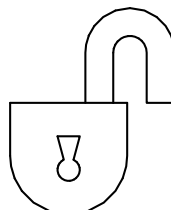
A78524—UN—22NOV13

A—Lock Pin
B—Cable
C—Gearbox Housing

1. Rotate lock pin (A) 180 degrees until the “unlocked” symbol is on top.
2. Pull Pro-Shaft Drive cable (B) approximately 38 mm (1.5 in.) from gearbox housing (C).
3. Rotate lock pin (A) 180 degrees until the “locked” symbol is on the top.

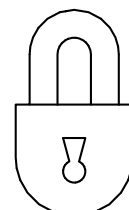
WP29706,000062F-19-11OCT13

Engage Meter Drive



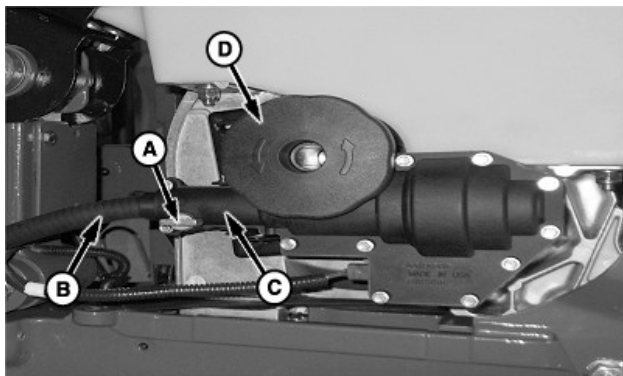
A62348—UN—27MAR08

Unlocked Symbol Up



A62347—UN—27MAR08

Locked Symbol Up



A78559—UN—22NOV13

A—Lock Pin
B—Cable
C—Gearbox Housing
D—Meter Drive Handle

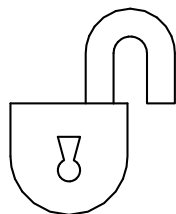
1. Rotate lock pin (A) 180 degrees until the “unlocked” symbol is on top.

NOTE: If Pro-Shaft Drive cable does not fully engage gearbox, rotate meter drive handle (D) until cable slides into gearbox.

2. Push Pro-Shaft Drive cable (B) into gearbox housing (C).
3. Rotate lock pin (A) 180 degrees until the “locked” symbol is on the top.

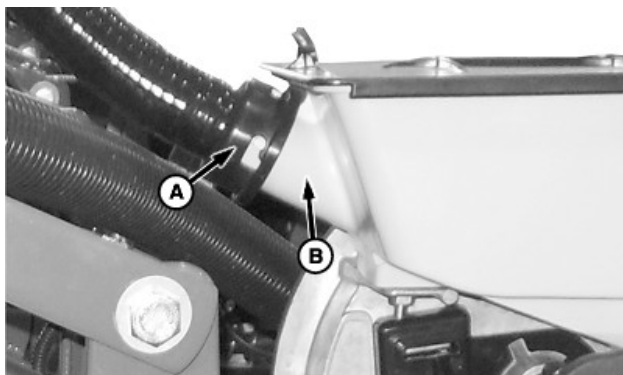
WP29706,0000630-19-21JUN18

Remove Seed Meter Assembly From Row Unit



Unlocked Symbol Up

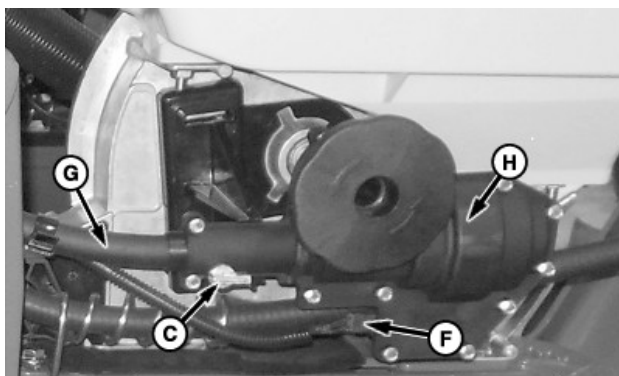
A62348—UN—27MAR08



A78828—UN—04OCT13



A77478—UN—06NOV13



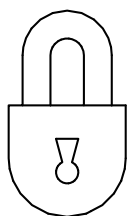
A78829—UN—04OCT13

A—Delivery Hose
B—Fill Neck
C—Lock Pin
D—Vacuum Hose
E—Latch
F—Electrical Connector
G—Cable
H—Clutch

1. Rotate CCS seed delivery hose (A) counterclockwise until it unsnaps from hopper fill neck (B) and pull off hose.
2. Rotate lock pin (C) 180 degrees until the “unlocked” symbol is on top.
3. Remove vacuum hose (D).
4. Push down on latch (E) to unlock meter assembly from row unit.
5. Disconnect electrical connector (F) from RowCommand clutch (if equipped).
6. Pull Pro-Shaft Drive cable (G) from RowCommand clutch (H) while raising rear of meter upward and rearward.

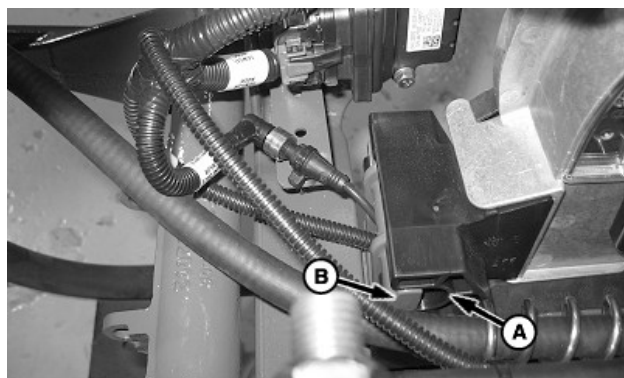
PX03972,000124E-19-10MAR15

Install Seed Meter Assembly on Row Unit

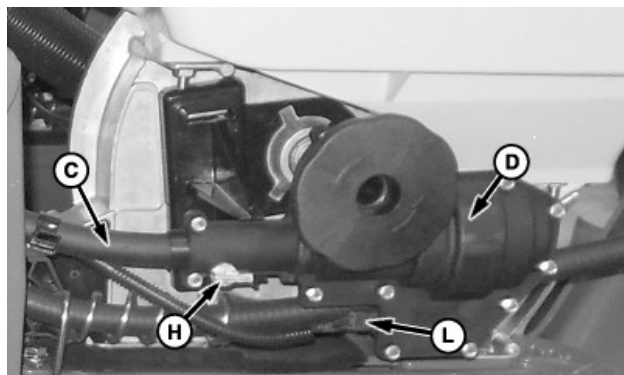


Locked Symbol Up

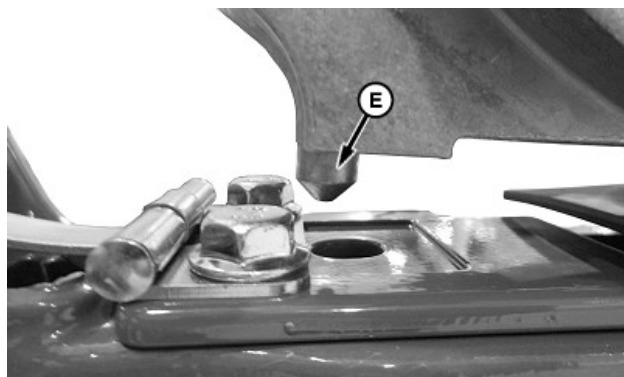
A62347—UN—27MAR08



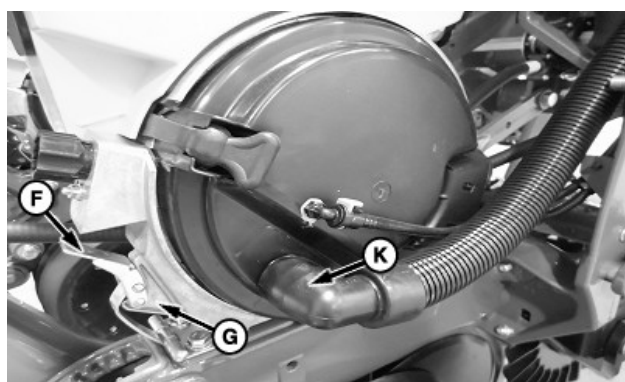
A77480—UN—21MAR13



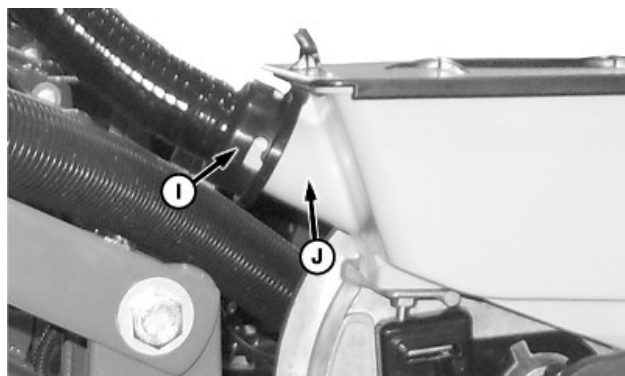
A78831—UN—04OCT13



A77482—UN—21MAR13



A77484—UN—06NOV13



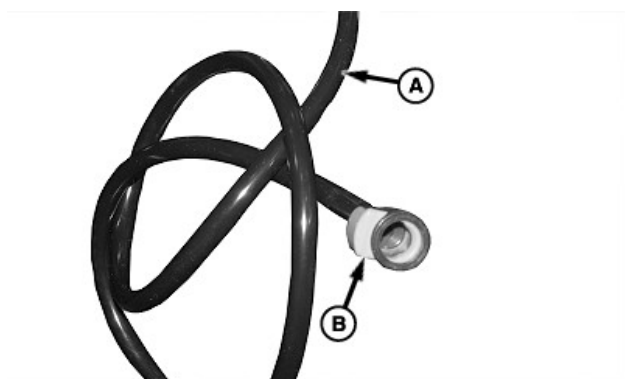
A78830—UN—04OCT13

- A—Alignment Notch
- B—Bracket Pin
- C—Cable
- D—Clutch
- E—Alignment Pin
- F—Latch
- G—Hook
- H—Lock Pin
- I—Seed Delivery Hose
- J—Hopper Fill Neck
- K—Vacuum Hose
- L—Electrical Connector

1. Push the hopper alignment notch (A) over the bracket pin (B) (both sides).
2. Push the Pro-Shaft™ drive cable (C) into the RowCommand™ clutch (D) while rotating meter down.
3. Verify the alignment pin (E) on the bottom of meter is aligned with the hole on the row unit and the hook is latched into the row unit.
4. Lift the latch (F) onto the hook (G) until snapped into position as shown.
5. Rotate the lock pin (H) 180 degrees until the "locked" symbol is on top.
6. Push the CCS™ seed delivery hose (I) onto the hopper fill neck (J) and rotate clockwise until it snaps into place.
7. Install the vacuum hose (K).

Pro-Shaft is a trademark of Deere & Company
RowCommand is a trademark of Deere & Company
CCS is a trademark of Deere & Company

8. Connect the electrical connector (L) to the RowCommand™ clutch (if equipped).



A96464—UN—10MAY17



A96516—UN—15MAY17



A96517—UN—15MAY17

A—Vacuum Sense Hose
B—Tab
C—Port

9. On the row units with the vacuum sensors, locate the vacuum sense hose (A) and verify that the hose is not dirty or kinked before attaching to meter.
10. Push and hold the tab (B) for the sense hose connector.
11. Install the sense hose connector onto the port (C) of the seed meter dome. Release tab and continue pushing onto the port until the connector makes a click sound. Finished attachment of the vacuum sense hose must match graphic shown.
12. Verify that the hose is connected properly by lightly pulling on the hose:

- If the hose pulls off easily, it was not seated correctly. Install the hose again. If continued issues with connection, verify that the opening to the connector has no debris and the tab moves freely. If still not retaining position, see your John Deere dealer for possible replacement of connector part for the sense hose.
- If the hose stays connected to the port, it is seated correctly.

CN80434,00006F7-19-12DEC17

Inspect Vacuum Meter Units

NOTE: If using seed treatments, remove any buildup that may occur in bottom of hopper.



A51186—UN—19NOV02

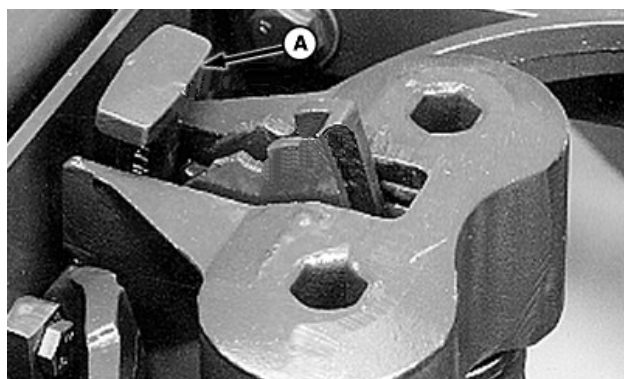
Vacuum Meter

A—Door
B—Meter Hub

To inspect meter, lay hopper on side and open door (A) to remove seed disk. Turn meter hub (B) by hand to determine if mechanism is free of dirt, chaff, or other foreign material. Inspect brush for gaps, hub seal for cracks and vacuum seal for cracks and wear areas. If replacement is necessary, see Service and Adjustments section.

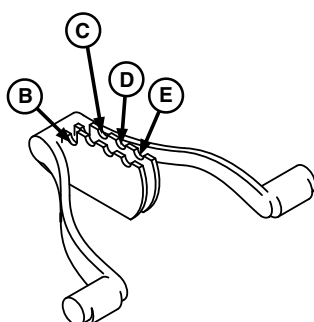
OJ06435,0001DBA-19-23FEB16

Heavy-Duty Down Force Springs



A47325—UN—12APR01

Handle In Minimum Position



A47306—UN—11APR01

- A—Spring-Adjusting Handle**
B—Notch
C—Notch
D—Notch
E—Notch

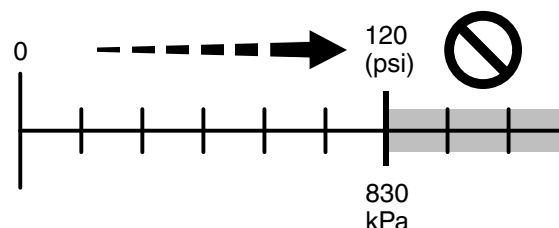
The adjustable heavy-duty down force spring system is recommended when planting in rough field conditions and when soil or soil residue is difficult to penetrate. Spring system will transfer main frame weight to planting unit, to minimize bounce and to assist opener in penetrating hard soil conditions. The amount of force transfer is adjustable from 0 to 181 kg (0 to 400 lb). Never use more down force than necessary to prevent excessive drive wheel slip. In tough conditions, ballast weight may be required.

To adjust down force springs, proceed as follows:

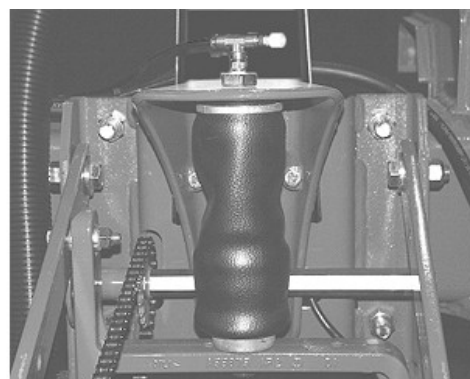
1. Raise machine.
2. Lift spring-adjusting handle (A) and place into notch (B), (C), (D) or (E) for desired amount of down force.
 - Use notch (B) for Zero kg (lb.) of down force.
 - Use notch (C) for 57 kg (125 lb.) of down force.
 - Use notch (D) for 113 kg (250 lb.) of down force.
 - Use notch (E) for 181 kg (400 lb.) of down force.

OUC6074,0000887-19-15MAY09

Pneumatic Down Force



A78181—UN—27JUN13



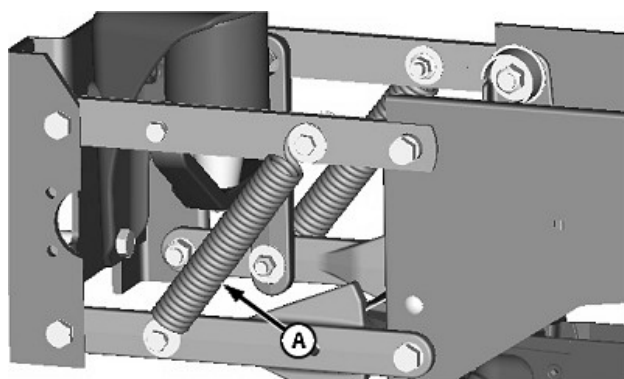
APY00635—UN—12DEC17

Properly Rolled Air Spring



APY00636—UN—12DEC17

Improperly Rolled Air Spring



A78186—UN—27JUN13

A—Spring

CAUTION: Avoid serious injury from exploding parts due to overpressurization or operating the system without all components in place.

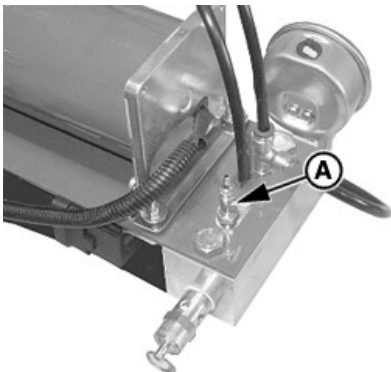
- Do not inflate system above 827 kPa (8.2 bar) (120 psi).
- Do not remove or disable pressure relief valve.
- Do not pressurize system unless all row unit components are in place.

IMPORTANT: Do not lower machine with zero air pressure in system. Maintain 34 kPa to 55 kPa (0.3 bar to 0.5 bar) (5 psi to 8 psi) in system or air springs can wrinkle. If air spring wrinkles, raise machine and pressurize the system until air springs straighten.

IMPORTANT: Do not operate if a pinched or unrolled air spring occurs. Lower system pressure until air springs can be rolled by hand. Lower the frame until units contact ground so that air spring can be rolled over lower piston. Lower the frame in small increments and continue to roll the spring until condition is corrected.

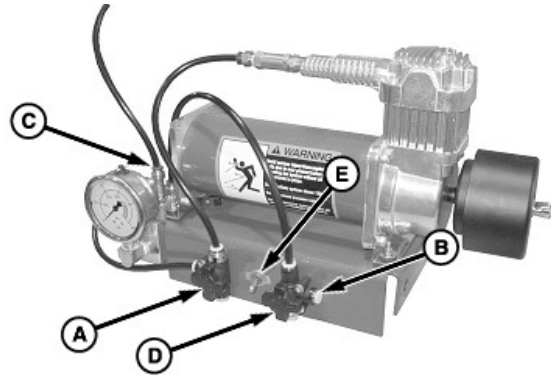
NOTE: It is normal for system air pressure to drop when frame is raised and increase when frame is lowered.

NOTE: If additional down force on row units that follow in tractor tire tracks is required, springs (A) can be installed. Each spring applies 20 kg (45 lb.).



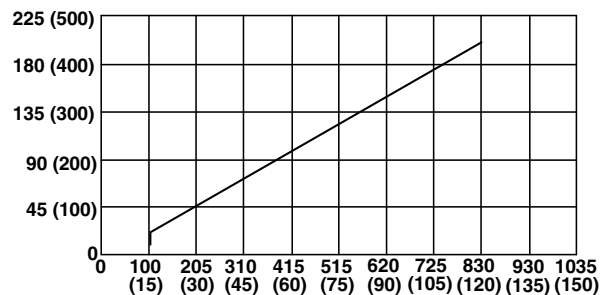
A—Valve Stem

1. With machine lowered into planting position, apply shop air to valve stem (A) to preset down force to target setting.



A67516—UN—25MAY10

(F) Down Force kg (lb.)



(G) Air Pressure kPa (psi)

A78172—UN—27JUN13

- A—Valve
- B—Toggle Switch
- C—T-fitting
- D—Valve
- E—Fitting
- F—Down Force kg (lb.)
- G—Air Pressure kPa (psi)

2. If equipped with split rows, attach hose with white mark to fitting (B). Attach hose without white mark, for primary rows, to T-fitting (C).

Pneumatic Down Force Valve Settings		
	Rotate Valve (A)	Rotate Valve (D)
Pressurize	Counter Clockwise	
Depressurize	Clockwise	
Pressurize (Split Rows)	Counter Clockwise	Counter Clockwise
Depressurize (Split Rows)	Clockwise	Clockwise

NOTE: Power to compressor is linked to tractor ignition switch. Compressor cannot run when ignition switch is in "off" position.

3. To increase system down force, turn compressor on using toggle switch (E) and open appropriate valves as described in preceding table. When target setting is reached, turn off compressor.
4. Pressure drop in excess of 83 kPa (0.8 bar) (12 psi) in 10 hours is considered excessive and can indicate a fitting leak.

NOTE: Spray soapy water on fittings. Bubbles appear when air is leaking.

For excessive pressure drops, check all connections with soapy water in the following order:

- a. Threaded Compressor Fittings—If leaking, tighten, or tape threads with thread tape and install fittings.
- b. Hose Compression Fittings—If leaking, push hose completely into coupler.

If leak persists, first relieve system pressure, then simultaneously push in compression ring and gently pull air line out of fitting. Cut hose tip off squarely, clean the surfaces, and reinstall hose in coupler.

- c. Swivel Tee or Elbow fitting on top of air spring—If leaking, first relieve system pressure, then remove fitting. Check O-ring and seal surfaces for damage. Clean seal surfaces and reinstall fitting.

CN80434,00006F9-19-12DEC17

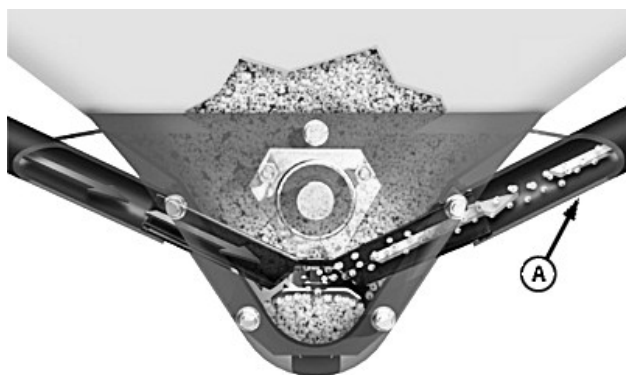
Central Commodity System

Initial Use of CCS™ System

The first time a new seed tank is used, coat the inside bottom of bulk seed tanks with a thin layer of meter lubricant. Mix triple the amount of into the first two or three bushels of seed placed in bulk tank (See Meter Lubrication section). The lubricant coats the inside of CCS™ system and hoses with a protective layer to help resist buildup of seed coatings.

PX03972,00011B3-19-05FEB15

CCS Operation



A53379—UN—20NOV03

A—Delivery Hose

Seed treatments, field conditions, humidity, and seed size alters CCS pressures required to deliver seed to all rows. Talc lubrication is required on ALL crops to lubricate seed. Chemically treated seed can require two to three times the rate of lubrication to avoid plugging. When changing crops, use the initial setting found in SETTING CCS TANK PRESSURE in this section before adjusting for field conditions.

Generally, the CCS system performs best when using the lowest possible pressure setting to deliver seed to all row units.

Some light weight 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 light weight seeds to flow at optimum rates and reasonable pressures ensuring reliable seed delivery to all rows.

IMPORTANT: Avoid hydraulic motor and tank lid damage. DO NOT exceed 24 in. of tank pressure.

Random drops in population that last only short periods (5—20 seconds) can indicate the CCS system is not maintaining adequate seed flow.

Verify meters and vacuum system is functioning properly before adjusting CCS system.

Increase CCS pressure in 2 inch increments until

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random population drops stop. Excessive CCS pressure can lead to CCS hose plugging.

If 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:

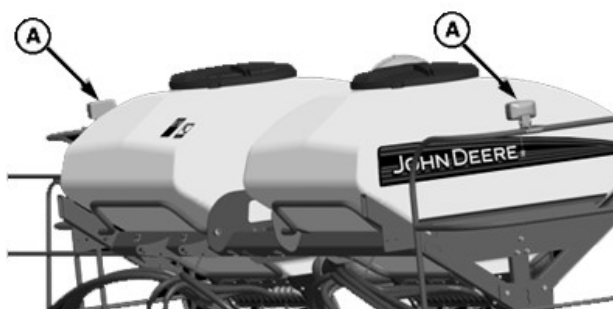
See BRIDGED AND BLOCKED CCS SYSTEM in this section.

PX03972,00011B4-19-05FEB15

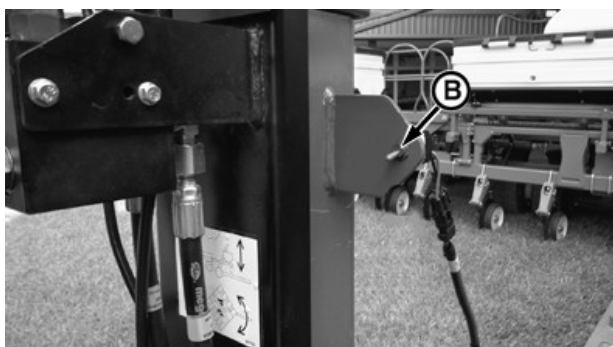
Operating CCS Tank Fill Lights

IMPORTANT: Tractor field lights must be on for fill lights to operate.

IMPORTANT: Never transport with field or fill lights on.



P16711—UN—04APR13



P16928—UN—10JUN13

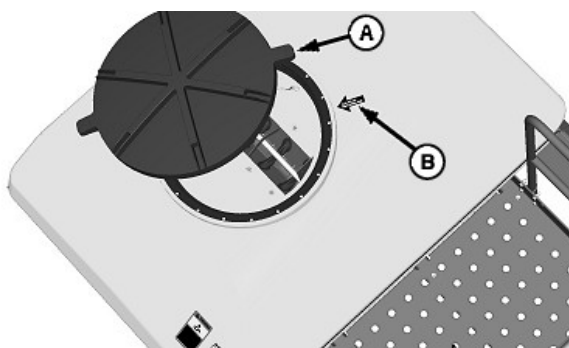
A—Fill Lights
B—Fill Light Switch

With tractor field lights on, use fill light switch (B) to turn fill lights (A) on.

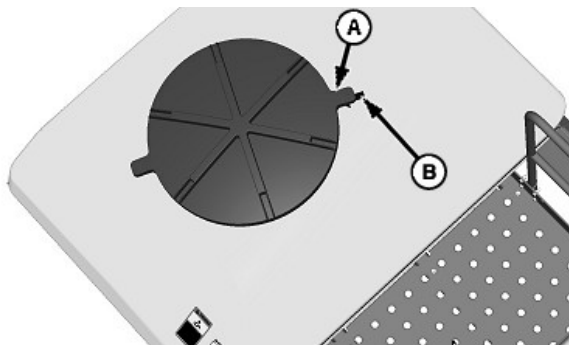
PX03972,00011B5-19-05FEB15

Operating Tank Lids

CAUTION: Do not open lids when CCS blower is running. Lids and harmful chemicals may be blown into face and seed lines will plug.



A53374—UN—20NOV03



A53375—UN—20NOV03

A—Handle
B—Arrow

To open, turn lid counterclockwise. To close lid, line up handle (A) with arrow (B) and turn clockwise.

PX03972,00011B6-19-05FEB15

Filling CCS Tanks

CAUTION: Never transport machine with product in tanks or hoppers.

Do not open tank lids when CCS blower is running. Lids and harmful chemicals can be blown into face. Seed lines plug if CCS fan is left running during fill.

CAUTION: Follow chemical manufacturers precautions when handling parts coated with seed treatments. Use proper skin, eye, and respiratory protection.

IMPORTANT: Remove any buildup of seed treatments or talc between CCS tank fills.

IMPORTANT: Keep seed free of debris. Debris can cause blockage at CCS nozzles. Optional fill screen is available, see your John Deere dealer.

IMPORTANT: Clean seed level sensor before filling seed tanks.



A34471

A34471—UN—11OCT88



A49921—UN—20AUG02

The first time a new tank is used, coat inside bottom of tank. Use talc to coat inside of tank if using a vacuum meter. Mix triple the amount of talc or graphite into the first two or three bushels of seed placed in bulk tank.

Extra talc or graphite coats the inside of CCS system with a protective layer to help resist buildup of seed coatings.

Avoid plugging delivery hoses at CCS tank. Tank agitators always run when machine is lowered and tractor key is on. Agitator operation without CCS fan air flow can cause some seed types to plug in hoses at tank. If machine is lowered for extended periods with seed in CCS tank, turn tractor key off or unplug agitator.

Crops approved for delivery through the CCS system are Corn, Soybeans, Sorghum, Cotton, and Sunflower. All other seed types must be placed directly in the row unit hoppers.

Row unit mini hopper extensions are available to provide additional capacity for planting non-approved crops with. See your John Deere Dealer.

Add talc when machine is equipped with vacuum meters.

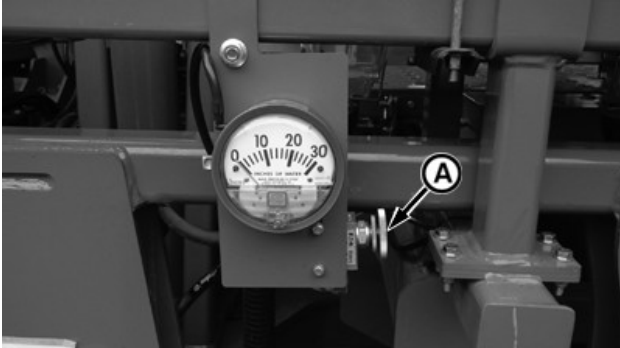
For best performance, level off seed in tanks after filling to minimize amount of seed remaining in tanks when planting ends. Use a 203 mm (8 in.) wide, stiff bristled broom with 1372 mm (4.5 ft.) handle to level seed in CCS tanks.

Close lids tightly after filling to avoid plugging of delivery lines when CCS system is activated.

PX03972,00011B7-19-05FEB15

Setting CCS Tank Pressure

CAUTION: Do not operate CCS blower without tank lids installed. Harmful chemicals can be blown into face and seed lines will plug.



A—Flow Control Valve Handle

P16929—UN—22MAY13

To set the tank pressure proceed as follows:

1. Verify sure tank lids are closed.

IMPORTANT: Warm oil by running vacuum blowers (if equipped) or install a hose loop in SCV per tractor operator's manual. DO NOT use CCS fan to warm oil or seed delivery hoses can plug.

2. Warm oil for 15 minutes prior to setting pressure.
3. Lower machine, leave SCV in constant lower detent position.
4. Open CCS fan flow control valve handle (A) (counterclockwise) until seed starts flowing to row hoppers.

IMPORTANT: DO NOT exceed 24 in. of tank pressure or damage can occur to the hydraulic motor and seed tank lids.

NOTE: If low warnings are received while planting and row meters are empty, increase tank pressure by two inches until meters stay full.

5. When hoppers are full and machine is not moving, adjust pressure according to crop being planted. See CCS Tank Pressure Settings table below.

Product	Pressure in Inches of Water	Nozzle Insert	Small Seed Discharge Elbow (Vacuum Only)
Soybeans	12	NO	NO
Small Corn Over 4400 seeds/kg (2000 seeds/lb.)	10	NO	NO
Medium Corn Between 4400 and 2640 seeds/kg (2000 and 1200 seeds/lb.)	12	NO	NO
Large Corn Less than 2640 seeds/kg (1200 seeds/lb.)	14	NO	NO
Large Popcorn Over 9900 seeds/kg (4500 seeds/lb.)	10	NO	NO
Small Popcorn Less than 9900 seeds/kg (4500 seeds/lb.)	10	YES	Optional
Sweetcorn	10	NO	NO
Cotton	10	NO	NO
Sorghum	8	YES	YES
Sunflowers	6	NO	NO

CN80434,00006FA-19-12DEC17

Operating CCS System with Heavily Treated Seed or Very Large Seed Corn

IMPORTANT: Talc or graphite must be mixed thoroughly during filling of tanks.

IMPORTANT: Remove any buildup of seed treatment or talc with stiff bristled 1372 mm (4.5 ft) handle 203 mm (8 in.) wide broom.

VACUUM METERS: When operating CCS system with heavily treated seed or very large seed corn, use two to three times the rate of talc.

PX03972,00011B9-19-05FEB15

Bridged and Blocked CCS System



A—Hopper Inlet

A78939—UN—21OCT13

If seed monitor issues a Row Failed warning, first determine if seed delivery tube is plugged or product is bridged in CCS tank. To determine cause, do the following:

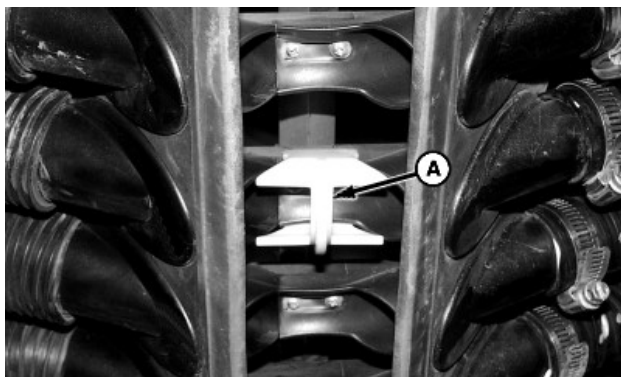
1. Start CCS fan.
2. Remove lid from affected row unit hopper.
3. Observe the amount of air flowing through hopper inlet (A).
 - If **Low Air Flow** is noted, the CCS delivery hose has plugged. See Remove CCS Hose Blockage in this procedure.
 - If **High Air Flow** is noted, product has bridged in CCS manifold. See Product Has Bridged in CCS Tank Manifold in this procedure.

Remove CCS Hose Blockage

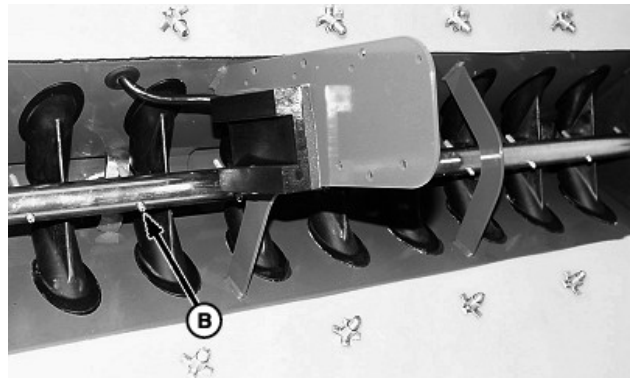
1. Turn off CCS fan.
2. Remove seed delivery hose from affected row unit.
3. Shake hose vigorously from hopper to CCS tank until blockage spills from end of hose.
4. Reconnect hose.
5. Start CCS fan and check that seed flows into hopper.
6. If no seed flow is observed, repeat procedure.

Product Has Bridged in CCS Tank Manifold

1. The following items must be checked to ensure proper operation of CCS system:
 - CCS tank pressure set to recommended setting for crop being planted.
 - Tank agitator turning when CCS fan is on.



A50710—UN—17OCT02



A62189—UN—06MAR08

A—Nozzle Insert
B—Pins

2. Nozzle inserts (A) installed or removed for specific crop being planted.
3. Agitator pins (B) centered between tank nozzles.

IMPORTANT: DO NOT exceed 24 in. of tank pressure or damage can occur 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.

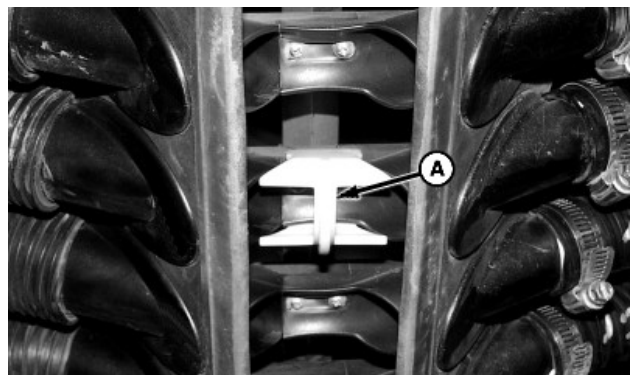
CN80434,00006FB-19-12DEC17

Operating CCS System When Planting Sorghum and Small Popcorn

IMPORTANT: Remove nozzle inserts (A) before switching to crop with larger seed. Larger seed will not come out of tanks with nozzle inserts installed. Tanks will then have to be drained, nozzle inserts removed, and refilled.

NOTE: Cotton seeds that are especially small in size can require nozzle inserts and discharge elbows.

NOTE: See SETTING CCS TANK PRESSURE for application requirements.

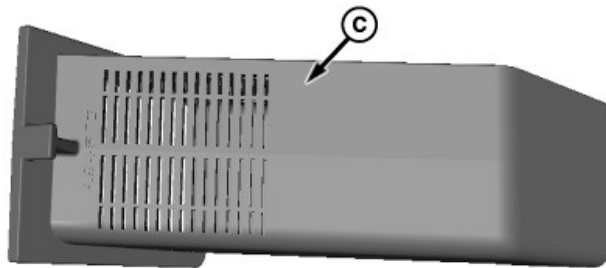


A50710—UN—17OCT02

Nozzle Inserts



A79241—UN—21NOV13



A79121—UN—21NOV13

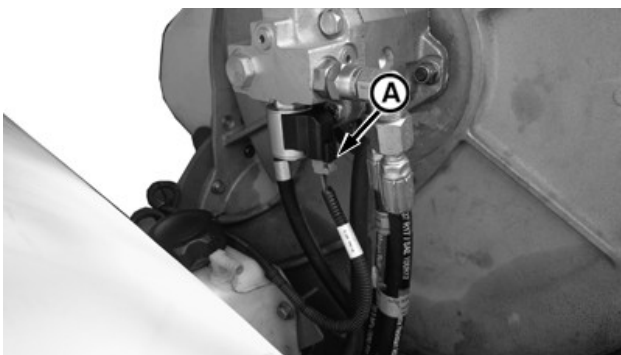
Elbow - Sorghum

- A—Nozzle Inserts
- B—Elbow (Standard Seed)
- C—Elbow (Sorghum)

1. Install nozzle inserts (A) over all nozzles before filling tank.
2. Remove elbow (B) with small holes from mini hoppers.
3. Install elbow (C) with slotted holes in mini hoppers.

PX03972,00011BB-19-05FEB15

Planting Seed Plots with CCS Systems



P16930—UN—22MAY13

A—CCS Fan Harness Connector

1. Disconnect harness connector (A) from CCS fan.
2. Fill row units individually instead of using CCS tanks.

NOTE: Due to the small quantity of seed being planted, removing the CCS system from operation and fill row units individually.

NOTE: See Mini hopper extension in attachment section for more information.

CN80434,00006FE-19-13DEC17

Partially Cleaning Out CCS Tanks



A52501—UN—01JUN04

A—Door

To remove only a portion of seed from CCS tanks, there is a small variable cleanout door that can be opened or closed to control the amount of seed being removed.

Slide door (A) until desired amount of seed is coming out.

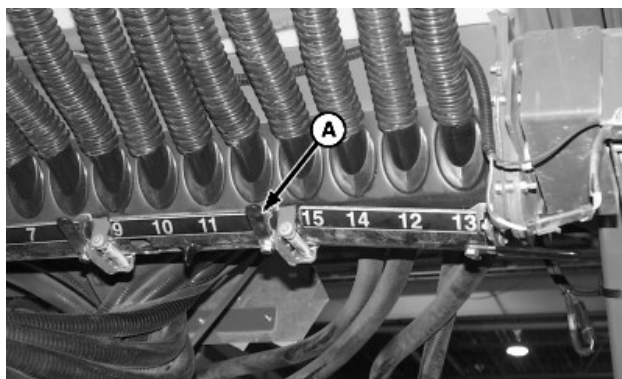
PX03972,00011BD-19-05FEB15

Clean Out CCS Tanks

IMPORTANT: When cleaning tank for certified seed, remove all seed from tank with stiff bristled 1372 mm (4.5 ft.) handle 203 mm (8 in.) wide broom.

IMPORTANT: Remove any buildup of seed treatment or talc before refilling tanks.

IMPORTANT: Verify cleanout doors on CCS tanks are closed before folding machine or they can be damaged.



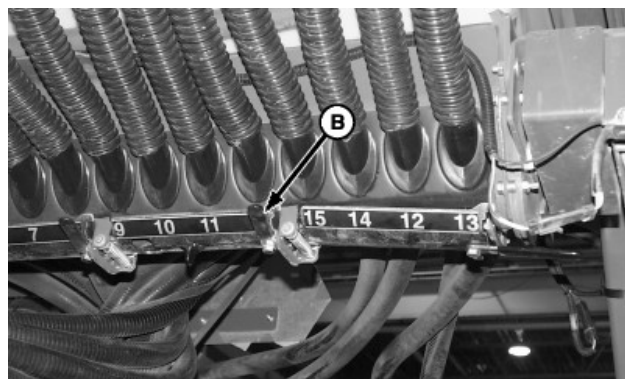
A52502—UN—30JUL03



A52501—UN—01JUN04



APY00638—UN—13DEC17



A54392—UN—01JUN04

A—Cleanout Door
B—Bucket

1. Open cleanout door (A) on bottom of CCS tank.
2. Place a bucket (B) or container under cleanout door to catch remaining seed from tank.

NOTE: Once cleanout doors (A) are open they cannot be closed completely until seed stops flowing.

3. Close cleanout door.
4. Repeat for all other cleanout doors.

CN80434,00006FC-19-13DEC17



APY00639—UN—13DEC17

A—Slide Door
B—Cleanout Doors
C—Bucket

Cleaning Out Delivery Hoses and Vacuum Metering Units



A34471

A34471—UN—11OCT88

CAUTION: Avoid injury from crushing. Service machine only when planter is fully raised with the safety pin installed or lowered with the tractor in parking position.

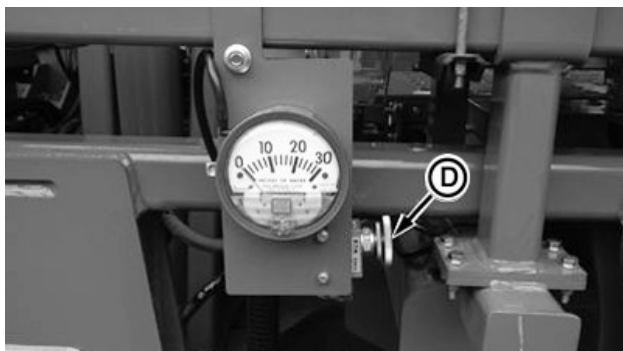
CAUTION: Use caution if using seed treatments when opening meter doors. Chemical can cause eye, skin, or breathing problems. Wear mask, gloves, and goggles. Read and follow safety instructions on the chemical supplier's label.

IMPORTANT: When cleaning tank for certified seed, remove all seed from tank with stiff bristled 1372 mm (4.5 ft.) handle 203 mm (8 in.) wide broom.

IMPORTANT: Remove any buildup of seed treatment or talc with stiff bristled 1372 mm (4.5 ft.) handle 203 mm (8 in.) wide broom.

IMPORTANT: Verify cleanout doors on CCS tanks are closed prior to folding machine.

1. Raise machine.
2. Insert safety pin.
3. If tanks contain large amounts of seed, use slide door (A) to reduce seed to a manageable level. Once cleanout doors (B) are open they cannot be closed completely until seed stops flowing. Repeat on each tank.
4. Place a bucket (C) or other container under cleanout door (B) and open door to clean out remaining seed.
5. Close cleanout door.
6. Repeat on remaining cleanout doors.
7. Remove safety pin.
8. Lower machine.
9. Place tractor in park and apply parking brake.
10. Disconnect the seed hoses to be cleaned.
11. Use a bucket or similar to collect the seed from the hoses.
12. Place SCV lever into frame lower-detent position.



P16932—UN—04MAR14

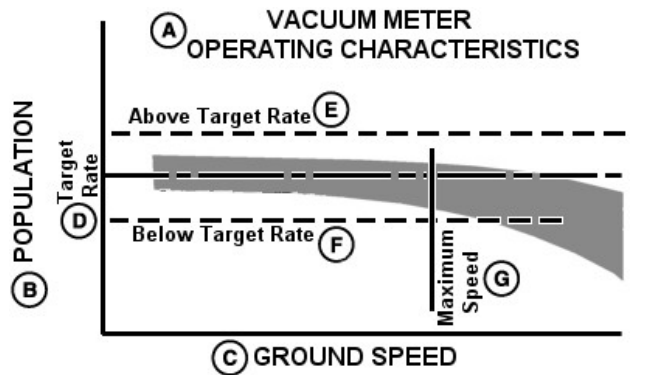
D—Control Knob

13. Adjust CCS fan control knob (D) until 24 inches of tank pressure is achieved to guarantee good cleanout.
14. Place tractor SCV's in Neutral position.

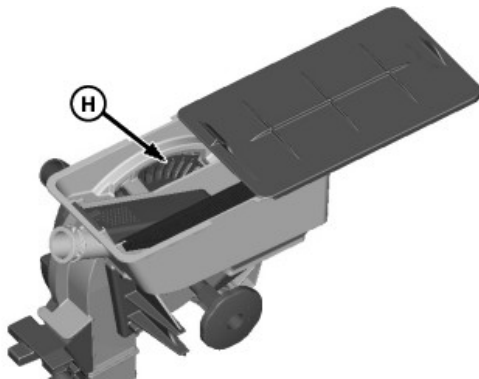
CN80434,00006FD-19-13DEC17

Vacuum Meter Setup

Vacuum Meter Operating Characteristics



A68173—UN—14JUL10



A82415—UN—23APR14

- A—Vacuum Meter Operating Characteristics
- B—Population
- C—Ground Speed
- D—Target Rate
- E—Higher Than Target Rate
- F—Lower Than Target Rate
- G—Maximum Speed
- H—Seed Cell

The operating band (gray area) illustrates how a vacuum meter performs in relation to target rate (D).

The width of the operating band varies based upon:

- Various sizes and shapes of seeds
- Planting rate variations
- Field Conditions

In most cases, meter accuracy does not decline unless maximum planting speed is exceeded.

The maximum speed varies based upon field conditions. Rough field conditions can knock seed off seed disks and can cause row unit bounce which severely affects seed placement. Adding attachments such as pneumatic down force improves seed placement in rough field conditions.

Always verify that the correct seed disk is used for seed selection. If the seed is unusually sized or shaped, try a disk for a different crop and re-evaluate the performance. See SEED DISK RECOMMENDATIONS in this section or your John Deere™ dealer.

If seed varies widely in size and shape, try a flat disk and double eliminator for improved population control.

To check for the proper seed disk application with mini-hoppers:

- Remove lid from seed hopper.
- Place seed in meter.
- Connect vacuum hose to meter dome.
- Activate vacuum to recommended level for crop.
- To verify that only one seed fits into each cell (H), turn meter by hand.

CROP STAND = SEED SINGULATION + SEED PLACEMENT + AGRONOMIC FACTORS

Seed Singulation = Seed Selection + Seed Disk Selection + Vacuum Level + Field Conditions + Maintenance

Seed Placement = Row Unit Maintenance + Speed + Field Conditions + Planter Attachments + Observation & Adjustment

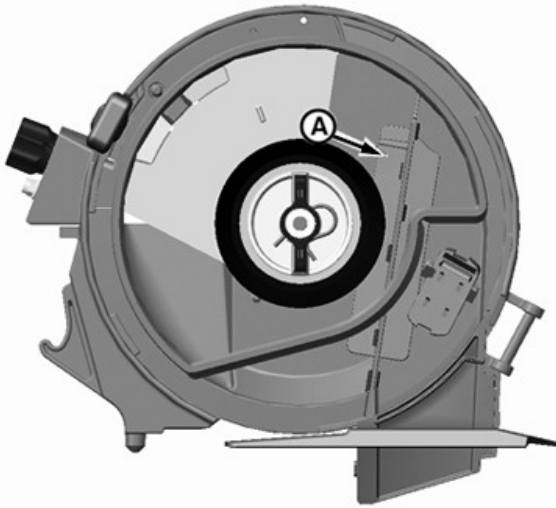
Agronomic Factors = Seed Germination + Soil Temperature + Moisture + Nutrients + Pest Control + Weather

OUO6074,0000CF5-19-23APR14

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Meter Settings

A—Front Brush



Front Brush

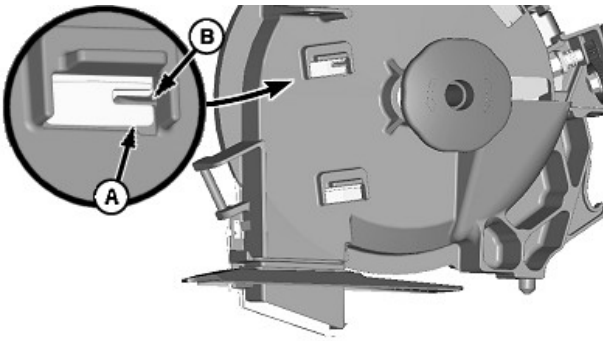
P17597—UN—15APR15

CCS Compatible	Crop	Disk	Front Brush (A)	Baffle Position ^a	Doubles Eliminator	Knockout Wheel
This table can be used as a quick reference for some common settings. For additional recommendations and adjustment information, see recommendations and adjustment procedures outlined in this section.						
Yes	Corn	Corn	Long	Upper	See Footnote ^b	No ^c
Yes	Corn	ProMax 40	Long	Upper	See Footnote ^d	Yes
Yes	Sweet Corn	ProMax 40 or Small Sweet Corn	Long	Upper	See Footnote ^e	Yes
Yes	Popcorn	Sunflower, Popcorn, or Sorghum	Long	Lower	See Footnote ^b	Yes
Yes	Oil Sunflower	Sunflower or Popcorn	Long	Lower	See Footnote ^b	No ^c
Yes	Confectionary Sunflower	ProMax 40 or Small Sweet Corn	Long	Upper	See Footnote ^e	Yes
Yes	Low Rate Cotton	Cotton 32 Cell	Long	Upper	See Footnote ^b	No ^c
Yes	Cotton	Cotton 64 Cell	Long	Upper	See Footnote ^b	No ^c
Yes	Cotton	Edible Bean Flat Type	Long	Upper	See Footnote ^e	Yes
Yes	4 Seed Cotton Hill drop	Cotton 48 Cell (4 seed drop)	Short	Upper	See Footnote ^b	No ^c
Yes	2 Seed Cotton Hill drop	Cotton 64 Cell (2 seed drop)	Long	Upper	See Footnote ^b	No ^c
Yes	Low Rate Sorghum	Sorghum 45 Cell	Long	Lower	See Footnote ^b	Yes
Yes	High Rate Sorghum	Sorghum 90 Cell	Long	Lower	See Footnote ^b	Yes
Yes	Sorghum	Sugar Beet	Long	Lower	See Footnote ^b	Yes
Yes	Soybean	Soybean	Long	Upper	See Footnote ^b	No ^c
Yes	Soybean	Cotton 64 Cell	Long	Upper	See Footnote ^b	No ^c
Yes	Sugar Beet	Sugar Beet	Long	Lower	See Footnote ^b	Yes
The following crops are not approved for CCS delivery.						
No	Small Edible Bean	Small Edible Bean Cell Type	Long	Upper	See Footnote ^b	No ^c
No	Medium Edible Bean	Medium Edible Bean Cell Type	Short	Upper	See Footnote ^b	No ^c
No	Large Edible Bean	Large Edible Bean Cell Type	Short	Upper	See Footnote ^b	No ^c
No	Small, Medium, and Large Edible Beans	Edible Bean Flat Type	Long	Upper	See Footnote ^e	Yes
No	Runner and Spanish Peanut	Large Edible Bean Cell Type	Short	Upper	See Footnote ^b	No ^c
No	Virginia Peanut	Virginia Peanut	Short	Upper	See Footnote ^b	No ^c

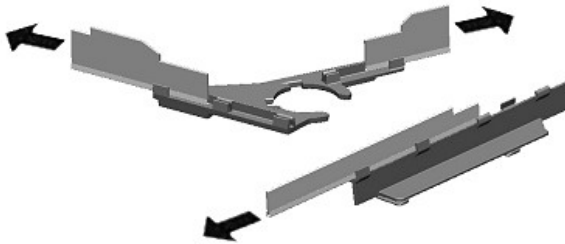
^aWith 1.6, 2, and 3 bushel hoppers.^bDouble eliminator not used with this disk. Set double eliminator to position "0" with adjustment knob.^cInstall wiper attachment when knockout wheel is not used.^dSet eliminator with far right tooth covering 50 percent of the hole for most corn seed sizes (See Double Eliminator Operation in this section).^eAdjust tip of eliminator towards center of meter as far as possible.

PX03972.00002EB-19-15APR15

Change Vacuum Meter Brush



A77792—UN—01MAY13



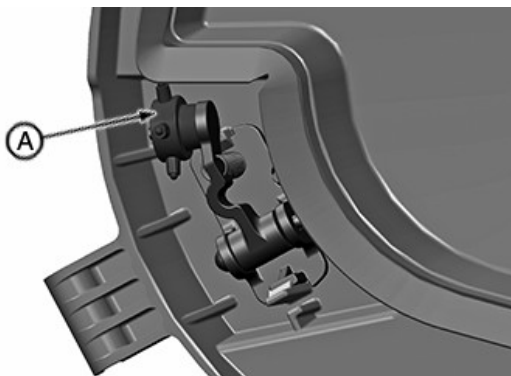
A77794—UN—01MAY13

A—Front Brush Tab
B—Lock

1. Open vacuum meter. (See ACCESS THE VACUUM METER in this section.)
2. Inspect brushes for wear and replace as needed.
3. (See METER SETTINGS in this section for recommended brushes.)
4. Pry the front brush tab (A) over the lock (B) and remove brush holder from meter.

PX03972,00002EC-19-29APR14

Seed Knockout Wheel Operation



CQ297999—UN—26FEB14

A—Seed Knockout Wheel

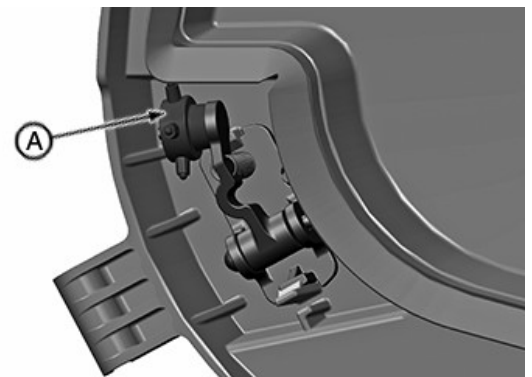
The seed knockout wheel (A) is used to push seeds

from the seed cell. Wheel projections engage the seed cell holes, forcing all the seeds and foreign material from the seed cell.

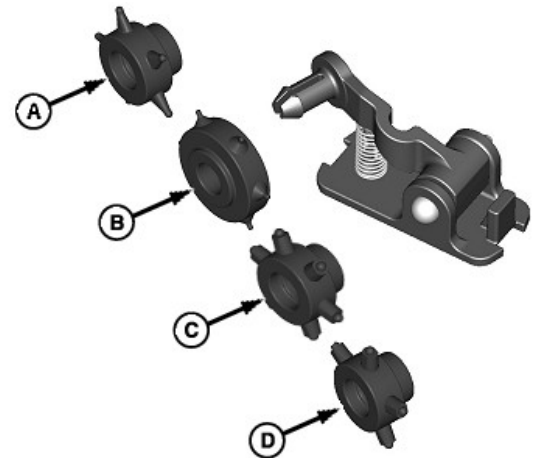
The seed knockout wheel is required when planting sorghum, mono-germ sugar beet, and seed planted with flat type seed disks. Sugar beet and sweet corn seed can have sharp edges and is typically irregular in shape, which contributes to seed lodging in the seed cell. Some sorghum seed contains large amounts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

WP29706,000051F-19-29MAR18

Install Knockout Wheel Assembly



CQ297999—UN—26FEB14



A86304—UN—08MAY15



Wheel A

A86283—UN—08MAY15



Wheel B

A86264—UN—08MAY15



Wheel C

A82573—UN—09MAY14



Wheel D

A82576—UN—09MAY14

- A—Knockout Wheel (Type A)
- B—Knockout Wheel (Type B)
- C—Knockout Wheel (Type C)
- D—Knockout Wheel (Type D)

NOTE: The knockout wheel is used to ensure that irregular shaped seeds are fully released from vacuum hole. Wheel projections engage vacuum holes to eject all seeds and foreign material from seed cell.

There are four knockout wheels available for use with different seed disks and seed types. (Refer to Seed Meter Settings in this section for knockout wheel recommendations.)

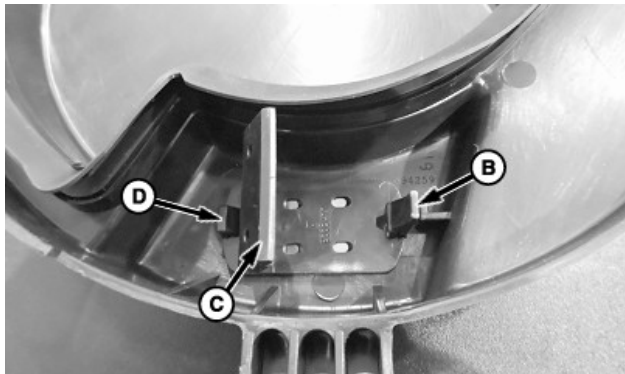
To remove the wheel, squeeze the wheel hub. Press alternate wheel onto hub.

Knockout Wheel Identification	
Knockout Wheel	Part Number
Type A	A102718

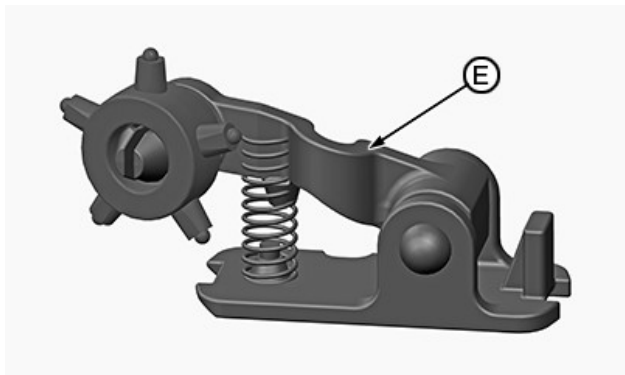
Knockout Wheel Identification	
Type B	H136448
Type C	A52389
Type D	A53272



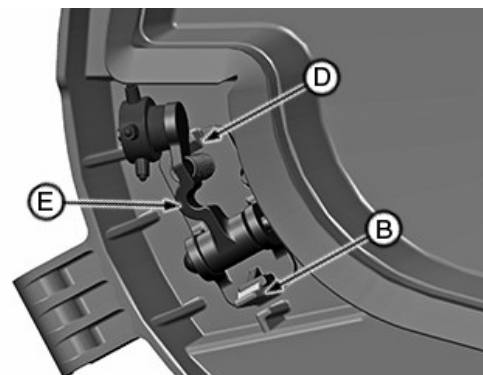
A77660—UN—06NOV13



A77663—UN—27AUG13



CQ298000—UN—26FEB14



CQ298001—UN—26FEB14

A—Handle

B—Retaining Clip
C—Wiper Assembly
D—Fastener Clip
E—Knockout Assembly

1. Disengage handle (A) and open vacuum seed meter.
2. To remove wiper assembly (C), push retaining clip (B) and pull wiper assembly away from fastener clip (D).
3. Install knockout assembly (E) between retaining clip (B) and fastener clip (D).

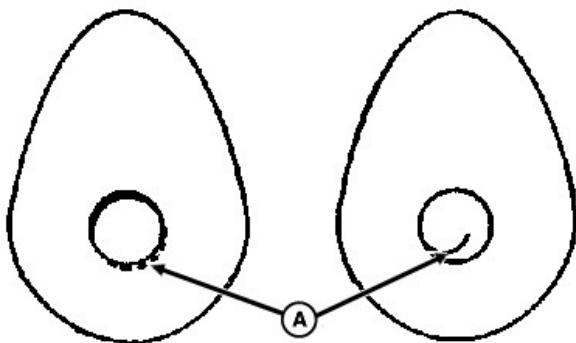
Close and latch the meter cover.

NOTE: When closing the cover, verify that the wheel is aligned with the row of seed cells on seed disk.

CN80434,0000701-19-13DEC17

Checking Seed Disk Cell

NOTE: Perform a field check to determine seed meter accuracy. It is not necessary to replace any seed disk if metering performance is satisfactory.



A46242—UN—27JUL00

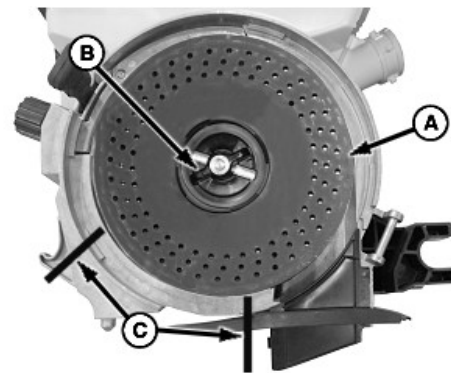
A—Flash

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 can not be easily removed, disk should be replaced.

AG,OUO6074,1176-19-09APR09

Install Seed Disk

1. Open the seed meter dome.



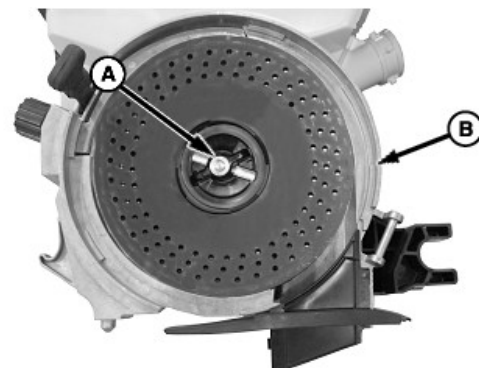
A77666—UN—15OCT13

A—Seed Disk
B—Hub Handle
C—Section

2. Fit the seed disk (A) into housing. Hold the seed disk stationary and rotate hub handle (B) into locked position.
3. Inspect the hub adjustment (See Adjust Meter Hub if the following conditions are not met).
 - ☐ Verify that the seed disk (A) continues to rotate approximately a quarter revolution after the hub is spun rapidly by hand and quickly released.
 - ☐ Verify that there is a 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 the section (C) as the seed disk is rotated.

CN80434,00006FF-19-13DEC17

Adjust Meter Hub



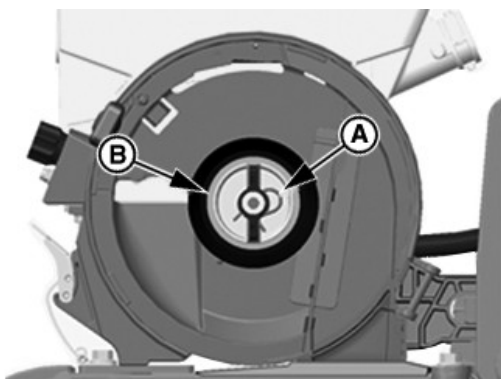
A77664—UN—15OCT13

A—Hub Handle
B—Housing

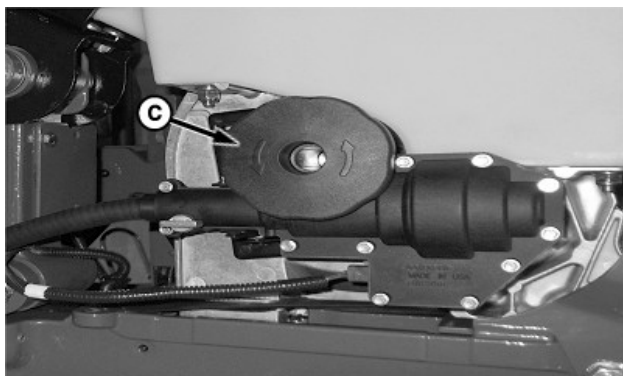
Improve meter accuracy and minimize seed damage with a properly adjusted meter hub. Check this adjustment whenever seed disks are changed. If there is a gap between seed disk and meter housing (B) or if disk is difficult to turn, adjust meter hub as follows.

1. Open vacuum meter.

2. Turn hub handle (A) counterclockwise. Remove seed disk.



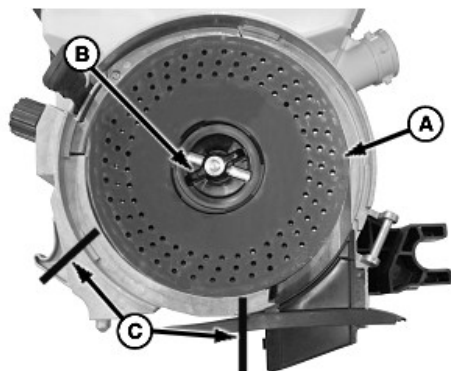
APY00642—UN—15DEC17



A78485—UN—11NOV13

- A—Spring Clip
B—Hub
C—Meter Handle

3. Remove spring clip (A).
4. Adjust hub (B).
 - Make small adjustments.
 - Hold meter handle (C).
 - Thread hub (B) clockwise to move seed disk closer to meter housing.
 - Thread hub (B) counterclockwise to move seed disk away from meter housing.
5. Align slot with hole in shaft and install spring clip (A).



A77666—UN—15OCT13



A44241—UN—19NOV97

Storage

- A—Seed Disk
B—Hub Handle
C—Area

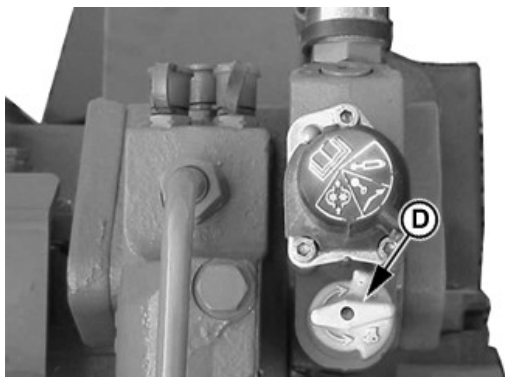
6. Install seed disk (A) and lock hub handle (B).
7. Inspect adjustment.
 - a. Spin and release disk rapidly by hand.
 - b. Observe distance disk rotates. If disk rotates approximately 1/4 to 1/2 revolution and stops, hub is adjusted properly.
 - c. Repeat hub adjustment until correct.

IMPORTANT: Avoid warped disks. Do not store disks in meters. Store disks flat on hub or hang on wall from hub. Do not store under heavy items or hang from seed hole. Store away from high heat and sunlight.

8. Rotate disk slowly by hand and observe disk contact with housing in area (C). If a gap appears as disk is rotated, replace disk.

CN80434,0000702-19-13DEC17

Operate Double Eliminator



APY00644—UN—15DEC17

Number Indicator and Adjustment Knob



P17600—UN—15APR15

Eliminator Plate

A—Indicator
B—Adjustment Knob
C—Eliminator Plate

NOTE: Set vacuum level using vacuum chart and disk for seed used.

NOTE: Number indicator on meter has a range of 0—10.

There is a number indicator (A) next to the knob for consistent adjustment.

Lower Numbers on Indicator = Less hole covered.

Middle Numbers on Indicator = 1/2 of hole covered. Detent position.

Higher Numbers on Indicator = More hole covered.

Double Eliminator Operating Tips:

- Use adjustment knob (B) to adjust position of eliminator plate (C) to cover more or less of the holes on the seed disk.

Normal operating position is number 5 on the indicator for flat corn disk.

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 double eliminator to lower setting. If doubles are occurring, adjust double eliminator to a higher setting to cover more of the hole.

- Disk hub height is critical for proper performance. Adjust seed-disk hub, so 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 METER HUB in this section.)

CN80434,0000705-19-13DEC17

Seed Disk Selection Guidelines

IMPORTANT: These seed disk recommendations are based on seed testing from a variety of sources. Because seed size and shape changes from year to year, there is always a possibility that an alternative disk can provide better performance. Consult your John Deere dealer for the most complete and up to date listing of available seed disks and recommendations.

The following seed disk recommendations show a seed size range where optimum performance can be expected with each seed disk. Select a disk which best handles the seed to be planted or best represents the majority of seed sizes to be planted. If several seed sizes are planted and their seed size falls within overlapping areas of two seed disks, it is recommended that BOTH seed disks are ordered to optimize performance to individual seed shape.

To determine proper disk usage, place a sample of seed into the cells of seed disk. If two seeds easily fit in the cell, a smaller disk must be used. If one seed does not fit properly in the cell, a larger disk must be used. If two disks work well for a particular seed size, always use the smaller disk. Increase vacuum to compensate for skips (and rough fields). Lower vacuum to eliminate doubles.

For seed sizes outside ranges listed, seed disks for other crops can be used. As with any seed disk change, population and spacing must always be checked in the field.

CN80434,0000704-19-13DEC17

Select The Correct Field Corn Seed Disk For Optimum Performance

Corn Seed Disk Selection Guide					
Seed Shape	Seed/kg (Seed/lb.)	Disk Name	Part Number	Number of Cells (Hole Diameter [mm])	If population is difficult to control:
Non-Uniform (mixed shapes)	Mixed Sizes (Mixed Sizes)	ProMax 40 With Double Eliminator	A52391	40 (4.5)	If over or under populating with starting disk, adjust double eliminator
Uniform Flat	Less than 3308 (1500)	ProMax 40 With Double Eliminator	A52391	40 (4.5)	If over or under populating with starting disk, adjust double eliminator
Uniform Flat	3308-6175 (1500-2800)	Small Corn Disk	A43215	30 (3.6)	Adjust vacuum first. If problems persist, switch to overlapping disk shown in vacuum level chart ^a
Uniform Flat	Greater than 6175 (2800)	Sunflower and Popcorn	H136478	30 (2.6)	Adjust vacuum first. If problems persist, switch to Small Corn Disk (A43215)
Uniform Round	Less than 3308 (1500)	Standard Corn Disk	A50617	30 (3.6)	Adjust vacuum
Uniform Round	3308-6175 (1500-2800)	Small Corn Disk	A43215	30 (3.6)	Adjust vacuum first. If problems persist, switch to Standard Corn Disk (A50617)
Uniform Round	Greater than 6175 (2800)	Sunflower and Popcorn	H136478	30 (2.6)	Adjust vacuum first. If problems persist, switch to Small Corn Disk (A43215)

^aFor larger seed sizes less than 3970 seeds/kg (1800 seeds/lb.), switch to Standard Corn Disk (A50617). If population control problems persist, switch to ProMax 40 Disk (A52391) with double eliminator. For smaller seed sizes greater than 5072 seeds/kg (2300 seeds/lb.), switch to Sunflower and Popcorn Disk (H136478). If population control problems persist, switch to ProMax 40 Disk (A52391) with double eliminator.

To determine the recommended seed disk, first use the Corn Seed Disk Selection Guide chart and then refer to vacuum level chart for initial vacuum setting.

Nearly 100 percent of target population is achievable, when the proper vacuum level and the small corn or standard corn seed disks (with seed cells) are used.

Using cell-type disks (Small and Standard Corn Seed Disks) requires careful seed selection for proper 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 Disk (A52391) with double eliminator is required for optimum seed singulation and seed release when seeds vary in size.

D—Standard Corn Disk
E—Small Corn Disk
F—Sunflower and Popcorn Disk

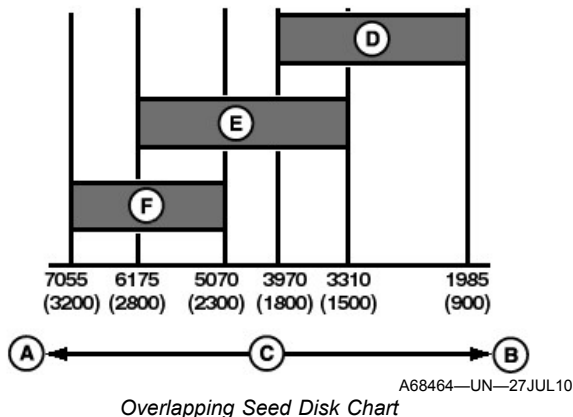
NOTE: A knockout wheel is required when using John Deere™ flat disks.

For seed sizes that overlap the Small Corn Disk (A43215) and the Standard Corn Disk (A50617), choose the Small Corn Disk for initial setting. If population is difficult to control, switch to Standard Corn Disk.

DIFFICULT TO PLANT SEEDS

IMPORTANT: Avoid population errors. Adjust all settings on the planter and monitor when using the ProMax 40 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 40 Disk is a flat disk used to improved seed singulation with difficult to plant seeds. The ProMax 40 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.



A—Small Seeds
B—Large Seeds
C—Seed Size, Seeds/kg (Seeds/lb.)

PLANTING CORN IN HILLSIDE CONDITIONS

Diminished meter performance is possible on steep hillsides or when changing directions on a hillside. If the

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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 forced against the seed disk and a large seed reservoir next to the seed disk. To maximize vacuum meter performance on hillsides, follow these steps:

- Use a disk with the fewest holes possible when using Cell 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 the ProMax 40 disk.

- If round seed is not available or hillsides are steep, use a flat disk with double eliminator. The flat 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 seed disk. The knockout wheel is used to remove debris from holes in seed disk.

CN80434,0000703-19-13DEC17

Seed Disk Recommendations For Crops Other Than Field Corn

John Deere flat disks meter a wide variety of seed sizes and shapes that are non-approved crops for the CCS system.

SWEET CORN

Disk Name	Part Number	Seed/kg	Seed/lb	Number of Cells	Hole Diameter (mm)
ProMax 40	A52391	<8600	<3900	40	4.5
Small Sweet Corn	A52390	>7700	>3500	40	3.75

POPCORN

Disk Name	Part Number	Seed/kg	Seed/lb	Number of Cells	Hole Diameter (mm)
Sunflower/ Popcorn	H136478	5500 to 9900	2500 to 4500	30	2.6
Sorghum	A43066	>9900	>4500	45	1.5

On difficult to plant seeds use of the Small Sweet Corn disk (Part No. A52390) may improve performance.

In some cases a Small Corn (Part No. A43215) or Sunflower (Part No. H136478) cell type disk may provide satisfactory performance depending upon seed size and shape.

CONFECTIONARY SUNFLOWER

Disk Name	Part Number	Seed/kg	Seed/lb	Number of Cells	Hole Diameter (mm)
ProMax 40 Flat Type with Double Eliminator	A52391	5000 to 7200	2250 to 3250	40	4.5
Small Sweet Corn Flat Type with Double Eliminator	A52390	7200 to 11 600	3250 to 5250	40	3.75

OIL SUNFLOWER

Disk Name	Part Number	Seed Sizes	Number of Cells	Hole Diameter (mm)
Sunflower/ Popcorn	H136478	4 (Small) 3 (Medium) 2 (Large)	30	2.6

For oil sunflower seed sizes 1 (Extra Large) and 5 (Extra Small) see the recommendations above for confectionary sunflowers. Part No. H136478 is recommended for oil sunflower seed sizes 4 (small), 3 (medium) and 2 (large). This disk is NOT recommended for oil sunflower seed sizes 1 (extra large) and 5 (extra small) or confectionary sunflower seeds.

DRILLED COTTON

Disk Name	Part Number	Seed/kg	Seed/lb	Number of Cells	Hole Diameter (mm)
Acid Delinted Cotton	A56251	8800 to 13 200	4000 to 6000	64	2.5

For small seeds that result in doubles on the Acid-Delinted Cotton disk, using a Small Edible Bean Disk (Part No. A52903) with Double Eliminator is recommended.

4-CELL HILLDROP COTTON

Disk Name	Part Number	Seed/kg	Seed/lb	Number of Cells	Hole Diameter (mm)
4-Cell Hilldrop	A65622	8800 to 13 200	4000 to 6000	48	2.5

For small seeds that result in dropping more than four

seeds, use of the 2-Cell Hilldrop Cotton disk is recommended.

2-CELL HILLDROP COTTON

Disk Name	Part Number	Seed/kg	Seed/lb	Number of Cells	Hole Diameter (mm)
2-Cell Hilldrop	A74961	8800 to 13 200	4000 to 6000	64	2.5

COTTON USING EDIBLE BEAN - Flat Disk A52903 Small

Cotton Seed	Seeds/kg	Seeds/lb	Number of Cells	Hole Diameter (mm)
Small	3520 to 7260	1600 to 3300	50	3.75

Small cotton seed can also be planted using this disk when cotton disks result in doubles (double eliminator is recommended).

SOYBEANS

Disk Name	Part Number	Seed/kg	Seed/lb	Number of Cells	Hole Diameter (mm)
Soybean	A42586	Below 7700	Below 3500	108	4.4
Cotton	A56251	Above 7700	Above 3500	64	2.5

For smaller seed sizes that result in doubles, a Cotton Seed disk (Part No. A56251) can provide improved performance.

LOW-RATE SORGHUM

Disk Name	Part Number	Seed/kg	Seed/lb	Number of Cells	Hole Diameter (mm)
Low-Rate Sorghum	A43066	22 000 to 35 300	10 000 to 16 000	45	1.5

For smaller seed sizes that result in doubles, a Medium Sugar Beet disk (Part No. H136445) or a Small Sugar Beet disk (Part No. A51712) can provide improved performance.

HIGH-RATE SORGHUM

Disk Name	Part Number	Seed/kg	Seed/lb	Number of Cells	Hole Diameter (mm)
High-Rate Sorghum	A52802	22 000 to 35 300	10 000 to 16 000	90	1.5

MONO-GERM SUGAR BEETS

Disk Name	Part Number	Seed Size	Number of Cells	Hole Diameter (mm)
Small Sugar Beet	A51712	2.6—3.2 mm Seed	45	1.5
Small and Medium Sugar Beet	H136445	3.0—3.6 mm Seed	45	1.5
Large Sugar Beet	A51713	3.4—4.0 mm Seed	45	1.6

PELLETED SUGAR BEETS

Disk Name	Part Number	Seed Size	Number of Cells	Hole Diameter (mm)
Small and Medium Sugar Beet	H136445	3.2—4.0 mm Seed	45	1.5
Large Sugar Beet	A51713	3.6—4.6 mm Seed	45	1.5
Sorghum	A43066	3.6—4.6 mm Seed	45	1.5

SMALL EDIBLE BEAN - Cell Disk H136468

Seed	Seeds/kg	Seeds/lb	Number of Cells	Hole Diameter (mm)
Black Turtle	4180 to 5720	1900 to 2600	108	3.5
Navy	3960 to 5500	1800 to 2500	108	3.5
Pink Viva	3740 to 4290	1700 to 1950	108	3.5
Small White	5280 to 6600	2400 to 3000	108	3.5
Smooth Pea	6160 to 7040	2800 to 3200	108	3.5

MEDIUM EDIBLE BEAN - Cell Disk A51696

Seed	Seeds/kg	Seeds/lb	Number of Cells	Hole Diameter (mm)
Blackeyed Pea	3520 to 4400	1600 to 2000	56	4
Green Beans (Garden)	2200 to 4840	1000 to 2200	56	4
Kidney (Small)	2530 to 3080	1150 to 1400	56	4
Pinto	1760 to 3080	800 to 1400	56	4
Red Mexican (Small)	2640 to 3300	1200 to 1500	56	4
Wrinkle Pea	3960 to 5060	1800 to 2300	56	4

LARGE EDIBLE BEAN - Cell Disk H136092

Seed	Seeds/kg	Seeds/lb	Number of Cells	Hole Diameter (mm)
Cranberry Bean	1760 to 2640	800 to 1200	50	4.8
Kidney (Medium)	2090 to 2530	950 to 1150	50	4.8
Great Northern	1980 to 2860	900 to 1300	50	4.8
Garbanzo	1650 to 1980	750 to 900	50	4.8
Peanuts (Runner)	1430 to 1760	650 to 800	50	4.8
Peanuts (Spanish)	2200 to 2750	1000 to 1250	50	4.8

EDIBLE BEAN - Flat Disk A52903 Small

Edible Bean Seed - Small	Seeds/kg	Seeds/lb	Number of Cells	Hole Diameter (mm)
Green Garden, Small	3520 to 5280	1600 to 2400	50	3.75
Black Turtle	4180 to 5720	1900 to 2600	50	3.75
Navy	3960 to 5720	1800 to 2600	50	3.75
Small White	5280 to 7260	2400 to 3300	50	3.75
Edible Peas	Seeds/kg	Seeds/lb	Number of Cells	Hole Diameter (mm)
Wrinkle	3740 to 5060	1700 to 2300	50	3.75

EDIBLE BEAN - Flat Disk A52904 Medium

Edible Bean Seed - Medium	Seeds/kg	Seeds/lb	Number of Cells	Hole Diameter (mm)
Green Garden, Medium	2640 to 3520	1200 to 1600	50	4.5
Small Red	2640 to 3300	1200 to 1500	50	4.5
Pinto	All Sizes		50	4.5
Medium Kidney	2530 to 3080	1150 to 1400	50	4.5
Lima	2640 to 3520	1200 to 1600	50	4.5
Corn Seed	3300 to 7040	1500 to 3200	50	4.5
Pink Viva	3740 to 4180	1700 to 1900	50	4.5
Edible Peas	Seeds/kg	Seeds/lb	Number of Cells	Hole Diameter (mm)

Edible Bean Seed - Medium	Seeds/kg	Seeds/lb	Number of Cells	Hole Diameter (mm)
Black-eyed	3520 to 4400	1600 to 2000	50	4.5
Smooth	6160 to 7040	2800 to 3200	50	4.5

EDIBLE BEAN - Flat Disk A52878 Large

Edible Bean Seed - Large	Seeds/kg	Seeds/lb	Number of Cells	Hole Diameter (mm)
Green Garden, Large	1540 to 2640	700 to 1200	50	5.0
Cranberry	1760 to 2640	800 to 1200	50	5.0
Large Kidney	1870 to 2530	850 to 1150	50	5.0
Great Northern	1980 to 2860	900 to 1300	50	5.0
Garbanzo	1650 to 1980	750 to 900	50	5.0

VIRGINIA PEANUT

Part No. H138722 is recommended for seed sizes ranging from 1100 seeds/kg to 1760 seeds/kg (500 seeds/lb to 800 seeds/lb). It has 46 cells with 5.3 mm diameter holes.

BLANK SEED DISK

Part No. A52554

The blank seed disk allows custom drilling of specific hole sizes for specialty crops. See your John Deere dealer for details.

OUO6074,0000ECF-19-09APR09

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.

OUC6074,0000ED1-19-29MAR18

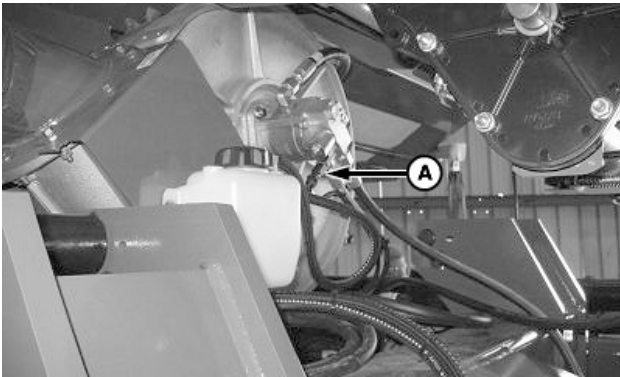
Check Meter Performance

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.

OUC6074,0000ED0-19-10APR14

Install Hopper Extensions (Mini-Hopper Only)



A—CCS Solenoid Harness

A74976—UN—23MAR12

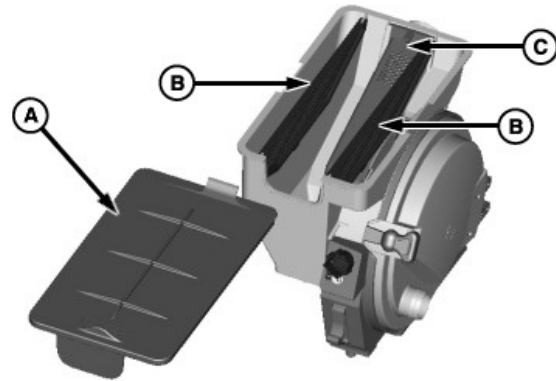
NOTE: When sugar beets are used or when using seed not approved for CCS bulk tank delivery, the seed must be added to the hoppers not the CCS tanks. The extensions allow for more seeds to be planted. Extensions can be used when planting seed plots.

Disable CCS fan when using mini-hopper extensions.

Do not install more than one extension onto a mini-hopper.

When filling mini-hopper extension, do not fill with seed above screen vent holes.

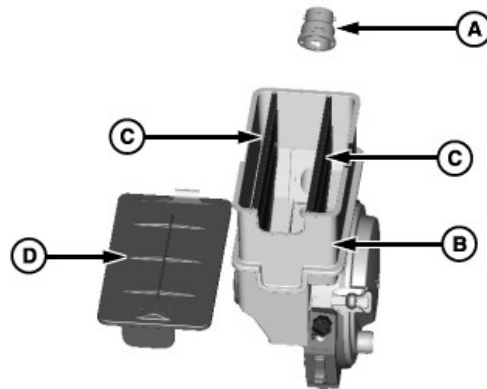
Disconnect harness (A) to disable CCS fan.



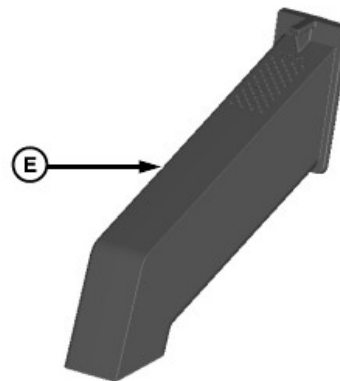
A78492—UN—31JUL13

A—Lid
B—Screened Dividers
C—Discharge Tube

2. Remove lid (A), screened dividers (B), and 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 CCS tube and hose.

NOTE: Mini-hopper extensions can be left on the mini-hopper when using CCS delivery system. To return to CCS system use, install discharge tube (E) removed in step 2, reconnect CCS fan harness, and remove cap (A) (if used).

NOTE: DO NOT fill mini hopper above bottom of screens. If seeds cover airflow of screens meter performance will suffer do to lower makeup air.

4. Install extension (B) onto mini-hopper.
5. Install dividers (C) into mini-hopper and extension (B).
6. Reinstall lid (D).

PX03972,00002ED-19-29APR14

Set Vacuum Levels

Use of Talc Lubricant

See Use Of Talc Lubricants section.

PX03972,00002EA-19-22APR14

Zero the Vacuum Sensor

NOTE: To zero the SeedStar™ monitor vacuum sensors, refer to your SeedStar™ monitor operator's manual.

OUC06074,00009C3-19-11MAY16

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. Make the final setting after the oil has warmed and the seed disks are full.

The vacuum level is indicated on the vacuum gauge or on-screen.

VACUUM LEVEL CHART	
Crop	Vacuum Level, mm (in) of water
Sugar Beet	See Chart
Corn	See Chart
Sweet Corn	See Chart

VACUUM LEVEL CHART	
Crop	Vacuum Level, mm (in) of water
Popcorn	See Chart
Small, Medium, and Large Edible Beans with a Cell Type Seed Disk	203 (8) for edible beans except the following: 152 (6) for small edible beans with 6160 seeds/kg (2800 seeds/lb) or more 152 (6) for medium edible beans with 3960 seeds/kg (1800 seeds/lb) or more
Small, Medium, and Large Edible Beans with a Flat-Type Seed Disk	See Chart
Cotton	203 (8)
Cotton Hilddrop	203 (8)
Cotton with a Flat Edible Bean Disk	See Chart
Peanuts (Runner, Spanish, and Virginia)	See Chart
Sorghum	203 (8)
High Rate Sorghum	203 (8)
Oil Sunflower	See Chart
Confectionary Sunflower	See Chart
Soybean	203 (8)
Soybean with a Cotton Disk	127—178 (5—7)
Acid-Delinted Cotton	203 (8)

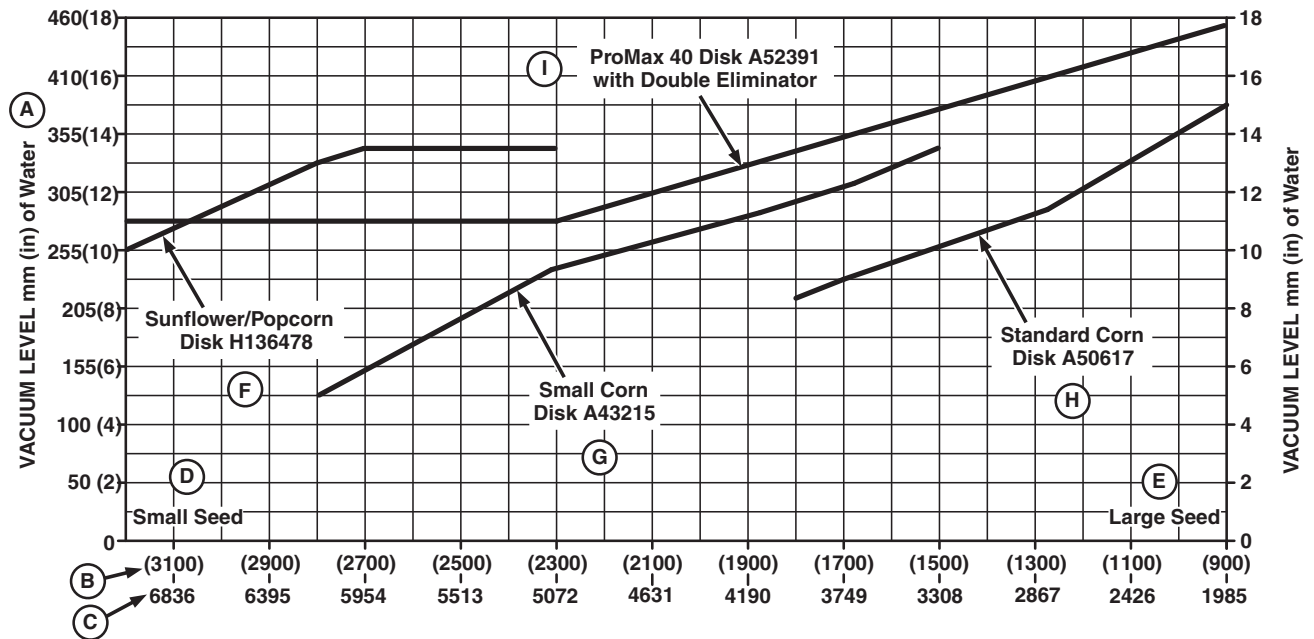
Set the vacuum level as follows:

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 planter valves or activate the vacuum automation on-screen.
6. To refine the vacuum level, perform a meter performance test using the runoff feature on-screen.

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.

CN80434,0000707-19-13DEC17

Vacuum Level for Corn Using H136478, A43215, A50617, or A52391 Seed Disks



A96357—UN—04MAY17

A—Vacuum Level, mm (in) of Water
 B—Seeds Per Pound
 C—Seeds Per Kilogram
 D—Small Seed
 E—Large Seed

F—Sunflower/Popcorn Disk
 G—Small Corn Disk
 H—Standard 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 small corn disk.

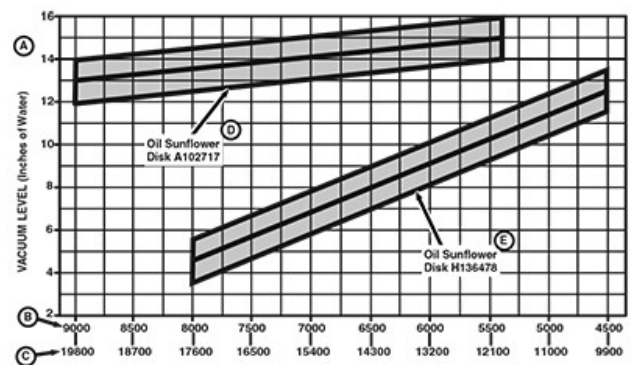
Use the vacuum level charts for the initial vacuum setting and adjust the level as needed. The charts are based on a typical ground speed and population rate. If high population rates or high ground speeds affect seed placement, increase the vacuum level. If low population rates or low ground speeds 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 small and standard corn disks overlap, select the small seed disk initially. If the target rate is difficult to control, switch to the standard corn disk.

MH69740,000055C-19-03MAY17

Vacuum Level for Oil Sunflower



APY00651—UN—21DEC17

A—Vacuum Level, mm (in) of Water
 B—Seeds Per Pound
 C—Seeds Per Kilogram
 D—Oil Sunflower Disk
 E—Oil Sunflower 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.

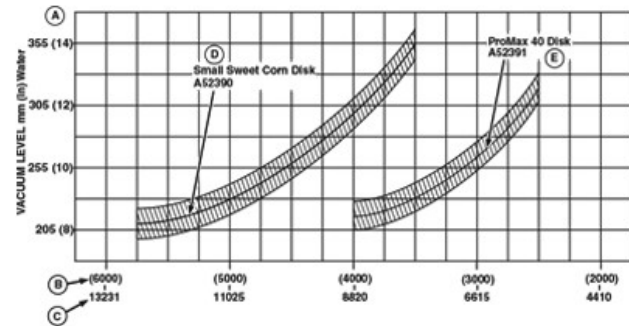
EXAMPLE: If there are 12 100 seeds per kg (5500 seeds per lb), the chart indicates a vacuum level of 254 mm (10 in) with the oil sunflower disk (E).

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.

CN80434,0000708-19-21DEC17

Vacuum Level for Sweet Corn



APY00649—UN—21DEC17

- A—Vacuum Level, mm (in) of Water
 B—Seeds Per Pound
 C—Seeds Per Kilogram
 D—Small Sweet Corn Disk
 E—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.

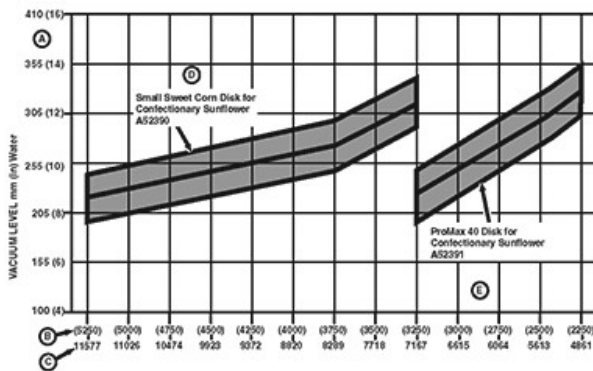
EXAMPLE: If there are 9370 seeds per kg (4250 seeds per lb), the chart indicates a vacuum level of 280 mm (11 in) with a small sweet corn disk.

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.

CN80434,0000715-19-21DEC17

Vacuum Level for Confectionary Sunflower



APY00650—UN—21DEC17

- A—Vacuum Level, mm (in) of Water
 B—Seeds Per Pound
 C—Seeds Per Kilogram
 D—Small Sweet Corn Disk
 E—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 9372 seeds per kg (4250 seeds per lb), the chart indicates a vacuum level of 254 mm (10 in) with a small sweet 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.

CN80434,0000714-19-21DEC17

Vacuum Level for the Edible-Bean (Flat Type) Disk

Vacuum Chart Using the Edible Bean (Flat Type) Disk						
	Edible Bean (Flat Type) Disks			Vacuum	Doubles Eliminator	Seed Size
Crop	Small A52903	Medium A52904	Large A52878	mm (in) of Water	Percent of Hole Covered	Recommendations Seeds/kg (Seeds/lb)
Small 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 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 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						
Blackeye		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)
Small Cotton	X			305—457 (12—18)	0—50	3520—7260 (1600—3300)

NOTE: To maintain the vacuum levels when using a flat edible-bean disk, do not exceed 12-row units per vacuum blower.

A vacuum gauge (AA38407) for the flat edible-beans is available from your John Deere dealer or qualified service provider.

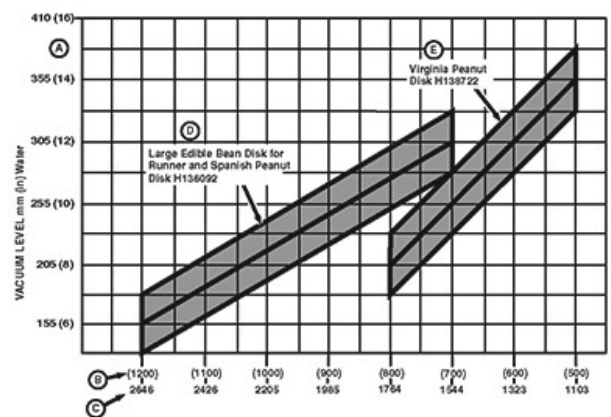
Determine the vacuum level based on the seeds per kg (lb). To calculate the seeds per kg (lb), divide the number of seeds in a bag by the weight of the bag.

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.

MH69740,0000564-19-14JUN18

Vacuum Level for Peanuts



APY00648—UN—21DEC17

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.

degrades the seed furrow. If all the possible adjustments do not reduce seed skips, reduce ground speed.

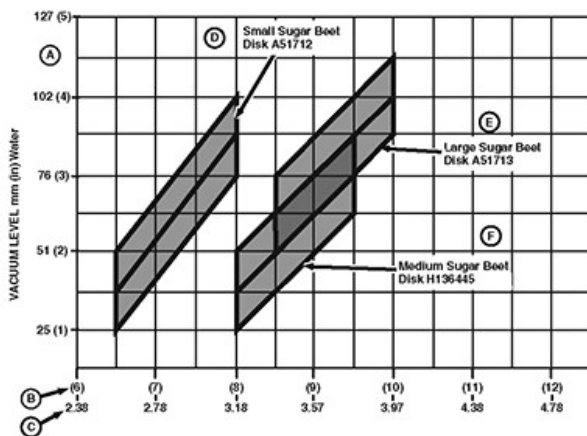
CN80434,0000717-19-21DEC17

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.

CN80434,0000716-19-21DEC17

Vacuum Level for Sugar Beet



APY00647—UN—21DEC17

- 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

Planting Rate Charts - Vacuum Meter

How to Use Planting Rate Charts

1. Select the desired row spacing or seed population in the applicable column.
2. Choose the HIGH - LOW sprocket. For a higher population, use the high range input sprocket and HIGH RANGE chart for the corresponding seed. For a lower population, use the low range input sprocket and LOW RANGE chart for the corresponding seed.
3. Determine the correct sprocket combination.
4. Determine the desired ground speed range. The highest speed is for optimum conditions. Reduce speed and increase unit down force when planting on rough ground.

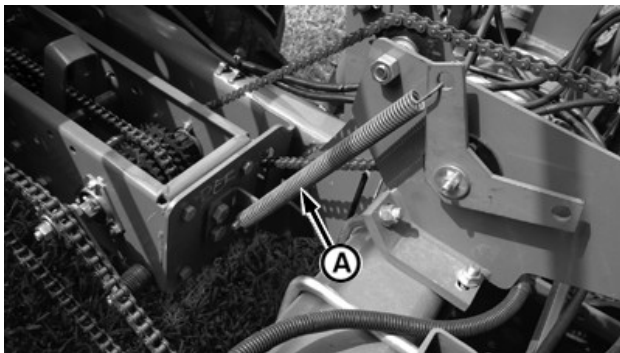
NOTE: The populations shown in the tables do not take into account any drive wheel slippage. Crop residue, machine down force, tire pressure and/or soil conditions will affect drive wheel slippage.

IMPORTANT: To prevent errors, perform field tests to verify the desired population is being planted. See the Checking Seed Population section.

PX03972,0000E12-19-29APR14

Changing High/Low Rate Sprocket Combinations

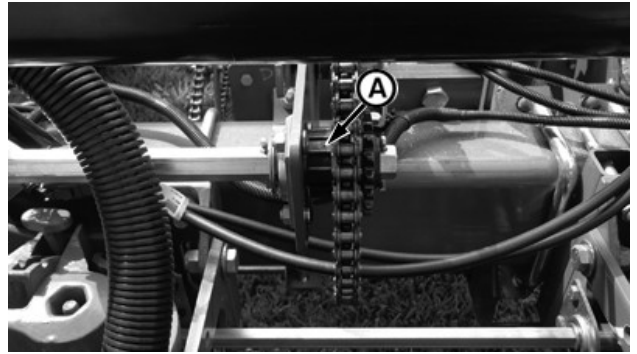
See the appropriate planting rate table to determine sprocket combinations.



P16933—UN—22MAY13

A—Spring

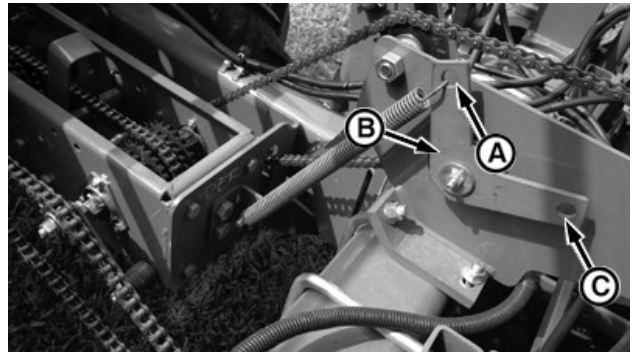
1. Remove spring (A) from the chain tensioner.



P16934—UN—22MAY13

A—Rubber Spacer

2. Place the chain on the desired sprocket:
18-Tooth Sprocket - High Range
48-Tooth Sprocket - Low Range
3. Use rubber spacer (A) to align the desired sprocket with the chain idlers.



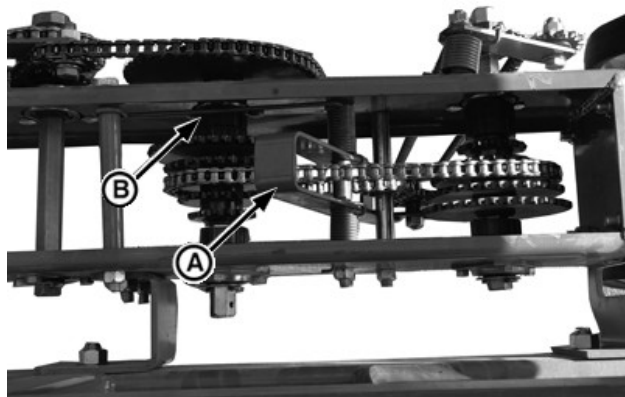
P16935—UN—22MAY13

A—Hole
B—Arm
C—Hole

4. If the chain is aligned with the high range sprocket, place the spring in chain tensioner hole (A).
5. If the chain is installed on the low range sprocket, place the spring in chain tensioner hole (C).

CN80434,0000706-19-13DEC17

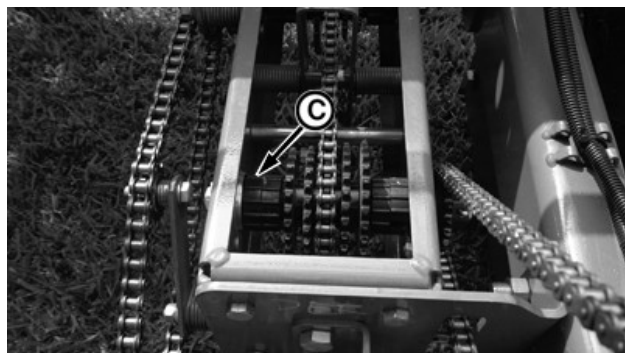
Changing Seeding Rate Sprocket Combinations



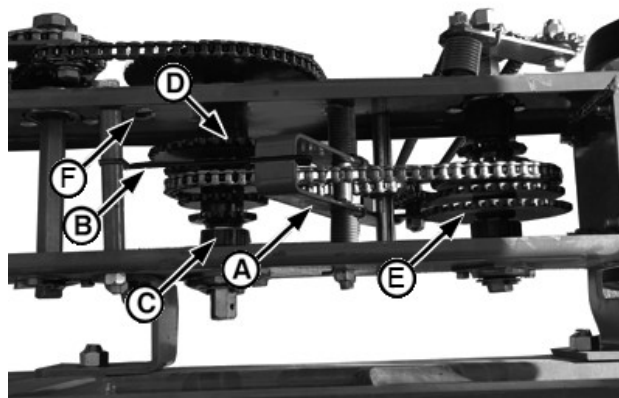
A—Chain Tensioner
B—Retaining Hook

See the appropriate planting rate table to determine sprocket combinations.

1. Remove retaining hook (B) from its storage position.
2. Pull the chain tensioner (A) down and secure it with hook (B).



P16936—UN—22MAY13



P16606—UN—22AUG12

A—Chain Tensioner
B—Retaining Hook
C—Rubber Sprocket Spacers
D—Drive Sprockets
E—Driven Sprockets
F—Clamp

3. Remove the required number of rubber spacers (C).
4. Take the chain off the sprockets. Slide the drive and driven sprockets (D) and (E) until they are aligned with the chain tensioner and reinstall the chain.
5. Remove the hook from the chain tensioner. Store the hook by pressing it against the clamp (F).
6. Reinstall the sprocket rubber spacers on the upper and lower shafts.

PX03972,0000159-19-22MAY13

Soybeans (A42586) - 108 Cells

AVERAGE SEEDS PER HECTARE OF SOYBEANS
PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE

Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	1.4	71.6	1884730	1591550	1364185	942365	3.2 to 12.8
35	25	1.5	68.8	1809340	1527887	1309617	904670	3.2 to 12.8
35	26	1.5	66.1	1739751	1469123	1259248	869876	3.2 to 12.8
35	27	1.6	63.7	1675316	1414711	1212609	837658	3.2 to 12.8
35	28	1.6	61.4	1615482	1364185	1169301	807741	3.2 to 12.8
29	24	1.7	59.3	1561634	1318713	1130325	780817	3.2 to 12.8
29	25	1.8	57.0	1499168	1265964	1085112	749584	3.2 to 12.8
29	26	1.8	54.8	1441508	1217274	1043377	720754	3.2 to 12.8
29	27	1.9	52.7	1388118	1172189	1004733	694059	3.2 to 12.8
29	28	2.0	50.9	1338542	1130324	968849	669271	3.2 to 12.8
24	24	2.0	49.1	1292386	1091348	935441	646193	3.2 to 12.8
24	25	2.1	47.1	1240691	1047695	898024	620346	3.2 to 12.8
24	26	2.2	45.3	1192971	1007398	863484	596486	3.2 to 12.8
24	27	2.3	43.7	1148788	970088	831504	574394	3.2 to 12.8

Planting Rate Charts - Vacuum Meter

24	28	2.4	42.1	1107759	935441	801807	553880	3.2 to 12.8
20	24	2.4	40.9	1076989	909457	779535	538495	3.2 to 12.8
20	25	2.5	39.3	1033909	873079	748353	516955	3.2 to 12.8
20	26	2.6	37.8	994144	839499	719571	497072	3.2 to 12.8
20	27	2.7	36.4	957324	808407	692920	478662	3.2 to 12.8
20	28	2.9	35.1	923132	779534	668172	461566	3.2 to 12.8
16	24	3.1	32.7	861591	727566	623628	430796	4.8 to 12.8
16	25	3.2	31.4	827127	698463	598683	413564	4.8 to 12.8
16	26	3.3	30.2	795314	671599	575656	397657	4.8 to 12.8
16	27	3.4	29.1	765859	646725	554336	382930	4.8 to 12.8
16	28	3.6	28.1	738506	623627	534537	369253	4.8 to 12.8

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.7	26.9	706773	596831	511569	353387	4.8 to 12.8
35	25	3.9	25.8	678503	572958	491107	339252	4.8 to 12.8
35	26	4.0	24.8	652406	550920	472217	326203	4.8 to 12.8
35	27	4.2	23.9	628243	530516	454728	314122	4.8 to 12.8
35	28	4.3	23.0	605806	511569	438488	302903	6.4 to 12.8
29	24	4.5	22.3	585613	494517	423872	292807	6.4 to 12.8
29	25	4.7	21.4	562188	474737	406917	281094	6.4 to 12.8
29	26	4.9	20.5	540566	456478	391267	270283	6.4 to 12.8
29	27	5.1	19.8	520544	439570	376775	260272	6.4 to 12.8
29	28	5.2	19.1	501953	423872	363319	250977	6.4 to 12.8
24	24	5.4	18.4	484645	409256	350791	242323	6.4 to 12.8
24	25	5.7	17.7	465259	392885	336759	232630	6.4 to 12.8
24	26	5.9	17.0	447364	377774	323807	223682	6.4 to 12.8
24	27	6.1	16.4	430795	363782	311813	215398	6.4 to 12.8
24	28	6.3	15.8	415409	350790	300677	207705	6.4 to 12.8
20	24	6.5	15.3	403871	341046	292325	201936	6.4 to 12.8
20	25	6.8	14.7	387715	327404	280632	193858	6.4 to 12.8
20	26	7.1	14.2	372803	314812	269839	186402	6.4 to 12.8
20	27	7.3	13.6	358997	303153	259845	179499	6.4 to 12.8
20	28	7.6	13.2	346174	292325	250564	173087	6.4 to 12.8
16	24	8.1	12.3	323096	272837	233860	161548	6.4 to 12.8
16	25	8.5	11.8	310172	261923	224505	155086	6.4 to 12.8
16	26	8.8	11.3	298242	251849	215871	149121	6.4 to 12.8
16	27	9.2	10.9	287197	242522	207876	143599	6.4 to 12.8
16	28	9.5	10.5	276940	233861	200452	138470	6.4 to 12.8

48-TOOTH SPROCKET - LOW RANGE

PX03972.00011C6-19-09JUN15

Standard (A50617) and Small (A43215) Corn - 30 Cells

AVERAGE SEEDS PER HECTARE OF CORN
PLANTED WITH VACUUM METER

Planting Rate Charts - Vacuum Meter

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	5.0	19.9	523536	442097	378940	261768	3.2 to 4.8
35	25	5.2	19.1	502594	424413	363783	251297	3.2 to 4.8
35	26	5.4	18.4	483263	408089	349791	241632	3.2 to 4.8
35	27	5.7	17.7	465366	392975	336836	232683	3.2 to 5.6
35	28	5.9	17.1	448746	378941	324807	224373	3.2 to 5.6
29	24	6.1	16.5	433786	366308	313979	216893	3.2 to 5.6
29	25	6.3	15.8	416436	351657	301420	208218	3.2 to 5.6
29	26	6.6	15.2	400418	338131	289827	200209	3.2 to 6.4
29	27	6.8	14.7	385588	325607	279092	192794	3.2 to 6.4
29	28	7.1	14.1	371818	313980	269125	185909	3.2 to 6.4
24	24	7.3	13.6	358997	303153	259845	179499	3.2 to 7.2
24	25	7.6	13.1	344636	291026	249451	172318	3.2 to 7.2
24	26	7.9	12.6	331382	279834	239857	165691	3.2 to 7.2
24	27	8.2	12.1	319108	269469	230973	159554	3.2 to 8.1
24	28	8.6	11.7	307711	259845	222724	153856	3.2 to 8.1
20	24	8.8	11.4	299163	252627	216537	149582	3.2 to 8.9
20	25	9.2	10.9	287197	242522	207876	143599	3.2 to 8.9
20	26	9.5	10.5	276150	233193	199880	138075	3.2 to 9.7
20	27	9.9	10.1	265923	224557	192477	132962	3.2 to 9.7
20	28	10.3	9.7	256427	216538	185604	128214	3.2 to 10.5
16	24	11.0	9.1	239330	202101	173229	119665	3.2 to 10.5
16	25	11.5	8.7	229758	194018	166301	114879	3.2 to 11.3
16	26	11.9	8.4	220920	186555	159904	110460	3.2 to 11.3
16	27	12.4	8.1	212739	179646	153983	106370	3.2 to 12.1
16	28	12.8	7.8	205141	173230	148483	102571	3.2 to 12.9

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	13.4	7.5	196326	165786	142103	98163	4.8 to 12.9
35	25	14.0	7.2	188473	159155	136419	94237	4.8 to 12.9
35	26	14.5	6.9	181224	153034	131172	90612	4.8 to 12.9
35	27	15.1	6.6	174512	147366	126313	87256	4.8 to 12.9
35	28	15.6	6.4	168280	142103	121803	84140	4.8 to 12.9
29	24	16.2	6.2	162671	137366	117743	81336	6.4 to 12.9
29	25	16.9	5.9	156163	131871	113032	78082	6.4 to 12.9
29	26	17.5	5.7	150157	126800	108685	75079	6.4 to 12.9
29	27	18.2	5.5	144596	122103	104660	72298	6.4 to 12.9
29	28	18.9	5.3	139431	117742	100921	69716	6.4 to 12.9
24	24	19.5	5.1	134623	113682	97441	67312	6.4 to 12.9
24	25	20.4	4.9	129238	109135	93544	64619	6.4 to 12.9
24	26	21.2	4.7	124268	104938	89947	62134	6.4 to 12.9
24	27	22.0	4.5	119665	101050	86615	59833	6.4 to 12.9
24	28	22.8	4.4	115391	97442	83521	57696	6.4 to 12.9
20	24	23.5	4.3	112186	94735	81201	56093	6.4 to 12.9
20	25	24.4	4.1	107699	90946	77953	53850	6.4 to 12.9
20	26	25.4	3.9	103556	87447	74955	51778	6.4 to 12.9
20	27	26.4	3.8	99721	84208	72179	49861	6.4 to 12.9
20	28	27.4	3.7	96160	81202	69601	48080	6.4 to 12.9

Planting Rate Charts - Vacuum Meter

16	24	29.3	3.4	89749	75788	64961	44875	6.4 to 12.9
16	25	30.5	3.3	86159	72756	62363	43080	6.4 to 12.9
16	26	31.8	3.1	82845	69958	59964	41423	6.4 to 12.9
16	27	33.0	3.0	79776	67366	57743	39888	6.4 to 12.9
16	28	34.2	2.9	76928	64962	55681	38464	6.4 to 12.9

48-TOOTH SPROCKET - LOW RANGE

PX03972.00011C7-19-09JUN15

Corn Using Flat Edible Bean Disk - 50 Cells

AVERAGE SEEDS PER HECTARE OF CORN
PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.0	33.2	872559	736828	631567	436280	4.8 to 6.4
35	25	3.1	31.8	837657	707355	606304	418829	4.8 to 6.4
35	26	3.3	30.6	805440	680150	582985	402720	4.8 to 6.4
35	27	3.4	29.5	775609	654959	561393	387805	4.8 to 6.4
35	28	3.5	28.4	747909	631568	541344	373955	4.8 to 7.2
29	24	3.6	27.5	722978	610515	523299	361489	4.8 to 7.2
29	25	3.8	26.4	694059	586094	502367	347030	4.8 to 7.2
29	26	3.9	25.4	667365	563553	483045	333683	4.8 to 7.2
29	27	4.1	24.4	642648	542680	465155	321324	4.8 to 7.2
29	28	4.2	23.5	619695	523298	448541	309848	4.8 to 7.2
24	24	4.4	22.7	598327	505254	433075	299164	4.8 to 7.2
24	25	4.6	21.8	574394	485044	415752	287197	4.8 to 7.2
24	26	4.8	21.0	552302	466388	399761	276151	6.4 to 8.1
24	27	4.9	20.2	531845	449114	384955	265923	6.4 to 8.1
24	28	5.1	19.5	512851	433074	371207	256426	6.4 to 8.1
20	24	5.3	18.9	498606	421045	360896	249303	6.4 to 8.1
20	25	5.5	18.2	478662	404203	346460	239331	6.4 to 8.1
20	26	5.7	17.5	460252	388657	333135	230126	6.4 to 8.1
20	27	5.9	16.8	443205	374262	320796	221603	6.4 to 9.7
20	28	6.2	16.2	427376	360895	309339	213688	6.4 to 9.7
16	24	6.6	15.2	398884	336835	288716	199442	6.4 to 9.7
16	25	6.9	14.6	382929	323363	277168	191465	6.4 to 9.7
16	26	7.1	14.0	368202	310926	266508	184101	6.4 to 9.7
16	27	7.4	13.5	354565	299410	256637	177283	6.4 to 9.7
16	28	7.7	13.0	341900	288716	247471	170950	6.4 to 9.7

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	8.0	12.4	327209	276310	236837	163605	6.4 to 9.7
35	25	8.4	11.9	314121	265258	227364	157061	6.4 to 9.7
35	26	8.7	11.5	302041	255057	218620	151021	6.4 to 9.7
35	27	9.0	11.1	290854	245610	210523	145427	6.4 to 9.7
35	28	9.4	10.7	280466	236838	203004	140233	6.4 to 9.7
29	24	9.7	10.3	271117	228944	196237	135559	6.4 to 9.7
29	25	10.1	9.9	260273	219786	188388	130137	6.4 to 9.7

Planting Rate Charts - Vacuum Meter

29	26	10.5	9.5	250261	211332	181141	125131	6.4 to 9.7
29	27	10.9	9.2	240993	203506	174433	120497	6.4 to 9.7
29	28	11.3	8.8	232385	196236	168203	116193	6.4 to 9.7
24	24	11.7	8.5	224372	189470	162403	112186	6.4 to 9.7
24	25	12.2	8.2	215397	181891	155907	107699	6.4 to 9.7
24	26	12.7	7.9	207113	174896	149911	103557	6.4 to 9.7
24	27	13.2	7.6	199443	168418	144359	99722	6.4 to 9.7
24	28	13.7	7.3	192319	162403	139203	96160	6.4 to 9.7
20	24	14.1	7.1	186977	157892	135336	93489	6.4 to 9.7
20	25	14.7	6.8	179498	151576	129923	89749	6.4 to 9.7
20	26	15.2	6.6	172594	145746	124925	86297	6.4 to 9.7
20	27	15.8	6.3	166202	140348	120299	83101	6.4 to 9.7
20	28	16.4	6.1	160267	135336	116003	80134	6.4 to 9.7
16	24	17.6	5.7	149583	126314	108269	74792	6.4 to 9.7
16	25	18.3	5.5	143598	121260	103937	71799	6.4 to 9.7
16	26	19.1	5.2	138075	116597	99940	69038	6.4 to 9.7
16	27	19.8	5.1	132961	112278	96239	66481	6.4 to 9.7
16	28	20.5	4.9	128212	108268	92801	64106	6.4 to 9.7

48-TOOTH SPROCKET - LOW RANGE

PX03972,00011C8-19-09JUN15

Corn Using Sweet Corn Disk - 40 Cells

AVERAGE SEEDS PER HECTARE OF CORN
PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.8	26.5	698047	589462	505253	349024	0.8 to 2.4
35	25	3.9	25.5	670127	565885	485044	335064	0.8 to 2.4
35	26	4.1	24.5	644352	544119	466388	322176	0.8 to 2.4
35	27	4.2	23.6	620487	523967	449115	310244	0.8 to 2.4
35	28	4.4	22.7	598327	505254	433075	299164	0.8 to 2.4
29	24	4.5	22.0	578382	488412	418639	289191	0.8 to 3.2
29	25	4.7	21.1	555247	468876	401893	277624	0.8 to 3.2
29	26	4.9	20.3	533892	450842	386436	266946	0.8 to 3.2
29	27	5.1	19.5	514119	434145	372124	257060	0.8 to 3.2
29	28	5.3	18.8	495757	418639	358833	247879	0.8 to 3.2
24	24	5.5	18.2	478662	404203	346460	239331	0.8 to 3.2
24	25	5.7	17.5	459515	388035	332601	229758	0.8 to 4.0
24	26	6.0	16.8	441842	373111	319809	220921	1.6 to 4.0
24	27	6.2	16.2	425477	359291	307964	212739	1.6 to 4.0
24	28	6.4	15.6	410281	346460	296965	205141	1.6 to 4.0
20	24	6.6	15.2	398884	336835	288716	199442	1.6 to 4.0
20	25	6.9	14.6	382929	323363	277168	191465	1.6 to 4.8
20	26	7.1	14.0	368202	310926	266508	184101	1.6 to 4.8
20	27	7.4	13.5	354565	299410	256637	177283	1.6 to 4.8
20	28	7.7	13.0	341900	288716	247471	170950	1.6 to 4.8
16	24	8.2	12.1	319108	269469	230973	159554	1.6 to 5.6
16	25	8.6	11.6	306344	258690	221735	153172	1.6 to 5.6
16	26	8.9	11.2	294560	248740	213205	147280	1.6 to 5.6
16	27	9.3	10.8	283651	239528	205309	141826	2.4 to 6.4

Planting Rate Charts - Vacuum Meter

16	28	9.6	10.4	273521	230974	197977	136761	2.4 to 6.4
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18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	10.1	9.9	261769	221049	189471	130885	2.4 to 6.4
35	25	10.5	9.5	251298	212207	181892	125649	2.4 to 7.2
35	26	10.9	9.2	241633	204045	174896	120817	2.4 to 7.2
35	27	11.3	8.8	232682	196487	168417	116341	2.4 to 8.1
35	28	11.7	8.5	224372	189470	162403	112186	2.4 to 8.1
29	24	12.1	8.2	216893	183154	156989	108447	3.2 to 8.1
29	25	12.6	7.9	208217	175828	150709	104109	3.2 to 8.9
29	26	13.1	7.6	200209	169066	144913	100105	3.2 to 8.9
29	27	13.6	7.3	192795	162804	139547	96398	3.2 to 9.7
29	28	14.2	7.1	185909	156990	134563	92955	3.2 to 9.7
24	24	14.7	6.8	179498	151576	129923	89749	3.2 to 10.5
24	25	15.3	6.5	172318	145513	124725	86159	4.0 to 10.5
24	26	15.9	6.3	165690	139916	119928	82845	4.0 to 10.5
24	27	16.5	6.1	159554	134734	115487	79777	4.0 to 10.5
24	28	17.1	5.8	153856	129923	111363	76928	4.0 to 10.5
20	24	17.6	5.7	149583	126314	108269	74792	4.0 to 10.5
20	25	18.3	5.5	143598	121260	103937	71799	4.8 to 10.5
20	26	19.1	5.2	138075	116597	99940	69038	4.8 to 10.5
20	27	19.8	5.1	132961	112278	96239	66481	4.8 to 10.5
20	28	20.5	4.9	128212	108268	92801	64106	4.8 to 10.5
16	24	22.0	4.5	119665	101050	86615	59833	5.6 to 10.5
16	25	22.9	4.4	114879	97009	83151	57440	5.6 to 10.5
16	26	23.8	4.2	110460	93277	79952	55230	5.6 to 10.5
16	27	24.7	4.0	106369	89822	76991	53185	6.4 to 10.5
16	28	25.7	3.9	102570	86615	74241	51285	6.4 to 10.5

48-TOOTH SPROCKET - LOW RANGE

PX03972.00011C9-19-09JUN15

Small (A52390) and Large (A52391) Sweet Corn - 40 Cells

AVERAGE SEEDS PER HECTARE OF SWEET CORN
PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.8	26.5	698047	589462	505253	349024	0.8 to 2.4
35	25	3.9	25.5	670127	565885	485044	335064	0.8 to 2.4
35	26	4.1	24.5	644352	544119	466388	322176	0.8 to 2.4
35	27	4.2	23.6	620487	523967	449115	310244	0.8 to 2.4
35	28	4.4	22.7	598327	505254	433075	299164	0.8 to 2.4
29	24	4.5	22.0	578382	488412	418639	289191	0.8 to 3.2
29	25	4.7	21.1	555247	468876	401893	277624	0.8 to 3.2
29	26	4.9	20.3	533892	450842	386436	266946	0.8 to 3.2
29	27	5.1	19.5	514119	434145	372124	257060	0.8 to 3.2
29	28	5.3	18.8	495757	418639	358833	247879	0.8 to 3.2

Planting Rate Charts - Vacuum Meter

24	24	5.5	18.2	478662	404203	346460	239331	0.8 to 3.2
24	25	5.7	17.5	459515	388035	332601	229758	0.8 to 4.0
24	26	6.0	16.8	441842	373111	319809	220921	1.6 to 4.0
24	27	6.2	16.2	425477	359291	307964	212739	1.6 to 4.0
24	28	6.4	15.6	410281	346460	296965	205141	1.6 to 4.0
20	24	6.6	15.2	398884	336835	288716	199442	1.6 to 4.0
20	25	6.9	14.6	382929	323363	277168	191465	1.6 to 4.8
20	26	7.1	14.0	368202	310926	266508	184101	1.6 to 4.8
20	27	7.4	13.5	354565	299410	256637	177283	1.6 to 4.8
20	28	7.7	13.0	341900	288716	247471	170950	1.6 to 4.8
16	24	8.2	12.1	319108	269469	230973	159554	1.6 to 5.6
16	25	8.6	11.6	306344	258690	221735	153172	1.6 to 5.6
16	26	8.9	11.2	294560	248740	213205	147280	1.6 to 5.6
16	27	9.3	10.8	283651	239528	205309	141826	2.4 to 6.4
16	28	9.6	10.4	273521	230974	197977	136761	2.4 to 6.4

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	10.1	9.9	261769	221049	189471	130885	2.4 to 6.4
35	25	10.5	9.5	251298	212207	181892	125649	2.4 to 7.2
35	26	10.9	9.2	241633	204045	174896	120817	2.4 to 7.2
35	27	11.3	8.8	232682	196487	168417	116341	2.4 to 8.1
35	28	11.7	8.5	224372	189470	162403	112186	2.4 to 8.1
29	24	12.1	8.2	216893	183154	156989	108447	3.2 to 8.1
29	25	12.6	7.9	208217	175828	150709	104109	3.2 to 8.9
29	26	13.1	7.6	200209	169066	144913	100105	3.2 to 8.9
29	27	13.6	7.3	192795	162804	139547	96398	3.2 to 9.7
29	28	14.2	7.1	185909	156990	134563	92955	3.2 to 9.7
24	24	14.7	6.8	179498	151576	129923	89749	3.2 to 10.5
24	25	15.3	6.5	172318	145513	124725	86159	4.0 to 10.5
24	26	15.9	6.3	165690	139916	119928	82845	4.0 to 10.5
24	27	16.5	6.1	159554	134734	115487	79777	4.0 to 10.5
24	28	17.1	5.8	153856	129923	111363	76928	4.0 to 10.5
20	24	17.6	5.7	149583	126314	108269	74792	4.0 to 10.5
20	25	18.3	5.5	143598	121260	103937	71799	4.8 to 10.5
20	26	19.1	5.2	138075	116597	99940	69038	4.8 to 10.5
20	27	19.8	5.1	132961	112278	96239	66481	4.8 to 10.5
20	28	20.5	4.9	128212	108268	92801	64106	4.8 to 10.5
16	24	22.0	4.5	119665	101050	86615	59833	5.6 to 10.5
16	25	22.9	4.4	114879	97009	83151	57440	5.6 to 10.5
16	26	23.8	4.2	110460	93277	79952	55230	5.6 to 10.5
16	27	24.7	4.0	106369	89822	76991	53185	6.4 to 10.5
16	28	25.7	3.9	102570	86615	74241	51285	6.4 to 10.5

48-TOOTH SPROCKET - LOW RANGE

PX03972,00011CA-19-09JUN15

Oil Sunflower (H136478) - 30 Cells

AVERAGE SEEDS PER HECTARE OF OIL
SUNFLOWER PLANTED WITH VACUUM METER

Planting Rate Charts - Vacuum Meter

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	5.0	19.9	523536	442097	378940	261768	3.2 to 4.8
35	25	5.2	19.1	502594	424413	363783	251297	3.2 to 4.8
35	26	5.4	18.4	483263	408089	349791	241632	3.2 to 4.8
35	27	5.7	17.7	465366	392975	336836	232683	3.2 to 5.6
35	28	5.9	17.1	448746	378941	324807	224373	3.2 to 5.6
29	24	6.1	16.5	433786	366308	313979	216893	3.2 to 5.6
29	25	6.3	15.8	416436	351657	301420	208218	3.2 to 5.6
29	26	6.6	15.2	400418	338131	289827	200209	3.2 to 6.4
29	27	6.8	14.7	385588	325607	279092	192794	3.2 to 6.4
29	28	7.1	14.1	371818	313980	269125	185909	3.2 to 6.4
24	24	7.3	13.6	358997	303153	259845	179499	3.2 to 7.2
24	25	7.6	13.1	344636	291026	249451	172318	3.2 to 7.2
24	26	7.9	12.6	331382	279834	239857	165691	3.2 to 7.2
24	27	8.2	12.1	319108	269469	230973	159554	3.2 to 8.1
24	28	8.6	11.7	307711	259845	222724	153856	3.2 to 8.1
20	24	8.8	11.4	299163	252627	216537	149582	3.2 to 8.9
20	25	9.2	10.9	287197	242522	207876	143599	3.2 to 8.9
20	26	9.5	10.5	276150	233193	199880	138075	3.2 to 9.7
20	27	9.9	10.1	265923	224557	192477	132962	3.2 to 9.7
20	28	10.3	9.7	256427	216538	185604	128214	3.2 to 10.5
16	24	11.0	9.1	239330	202101	173229	119665	3.2 to 10.5
16	25	11.5	8.7	229758	194018	166301	114879	3.2 to 11.3
16	26	11.9	8.4	220920	186555	159904	110460	3.2 to 11.3
16	27	12.4	8.1	212739	179646	153983	106370	3.2 to 12.1
16	28	12.8	7.8	205141	173230	148483	102571	3.2 to 12.9

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	13.4	7.5	196326	165786	142103	98163	4.8 to 12.9
35	25	14.0	7.2	188473	159155	136419	94237	4.8 to 12.9
35	26	14.5	6.9	181224	153034	131172	90612	4.8 to 12.9
35	27	15.1	6.6	174512	147366	126313	87256	4.8 to 12.9
35	28	15.6	6.4	168280	142103	121803	84140	4.8 to 12.9
29	24	16.2	6.2	162671	137366	117743	81336	6.4 to 12.9
29	25	16.9	5.9	156163	131871	113032	78082	6.4 to 12.9
29	26	17.5	5.7	150157	126800	108685	75079	6.4 to 12.9
29	27	18.2	5.5	144596	122103	104660	72298	6.4 to 12.9
29	28	18.9	5.3	139431	117742	100921	69716	6.4 to 12.9
24	24	19.5	5.1	134623	113682	97441	67312	6.4 to 12.9
24	25	20.4	4.9	129238	109135	93544	64619	6.4 to 12.9
24	26	21.2	4.7	124268	104938	89947	62134	6.4 to 12.9
24	27	22.0	4.5	119665	101050	86615	59833	6.4 to 12.9
24	28	22.8	4.4	115391	97442	83521	57696	6.4 to 12.9
20	24	23.5	4.3	112186	94735	81201	56093	6.4 to 12.9
20	25	24.4	4.1	107699	90946	77953	53850	6.4 to 12.9
20	26	25.4	3.9	103556	87447	74955	51778	6.4 to 12.9
20	27	26.4	3.8	99721	84208	72179	49861	6.4 to 12.9
20	28	27.4	3.7	96160	81202	69601	48080	6.4 to 12.9

Planting Rate Charts - Vacuum Meter

16	24	29.3	3.4	89749	75788	64961	44875	6.4 to 12.9
16	25	30.5	3.3	86159	72756	62363	43080	6.4 to 12.9
16	26	31.8	3.1	82845	69958	59964	41423	6.4 to 12.9
16	27	33.0	3.0	79776	67366	57743	39888	6.4 to 12.9
16	28	34.2	2.9	76928	64962	55681	38464	6.4 to 12.9

48-TOOTH SPROCKET - LOW RANGE

PX03972,00011CB-19-09JUN15

Small (A52390) and Large (A52391) Confectionary Sunflower - 40 Cells

AVERAGE SEEDS PER HECTARE OF SUNFLOWER
PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.8	26.5	698047	589462	505253	349024	0.8 to 2.4
35	25	3.9	25.5	670127	565885	485044	335064	0.8 to 2.4
35	26	4.1	24.5	644352	544119	466388	322176	0.8 to 2.4
35	27	4.2	23.6	620487	523967	449115	310244	0.8 to 2.4
35	28	4.4	22.7	598327	505254	433075	299164	0.8 to 2.4
29	24	4.5	22.0	578382	488412	418639	289191	0.8 to 3.2
29	25	4.7	21.1	555247	468876	401893	277624	0.8 to 3.2
29	26	4.9	20.3	533892	450842	386436	266946	0.8 to 3.2
29	27	5.1	19.5	514119	434145	372124	257060	0.8 to 3.2
29	28	5.3	18.8	495757	418639	358833	247879	0.8 to 3.2
24	24	5.5	18.2	478662	404203	346460	239331	0.8 to 3.2
24	25	5.7	17.5	459515	388035	332601	229758	0.8 to 4.0
24	26	6.0	16.8	441842	373111	319809	220921	1.6 to 4.0
24	27	6.2	16.2	425477	359291	307964	212739	1.6 to 4.0
24	28	6.4	15.6	410281	346460	296965	205141	1.6 to 4.0
20	24	6.6	15.2	398884	336835	288716	199442	1.6 to 4.0
20	25	6.9	14.6	382929	323363	277168	191465	1.6 to 4.8
20	26	7.1	14.0	368202	310926	266508	184101	1.6 to 4.8
20	27	7.4	13.5	354565	299410	256637	177283	1.6 to 4.8
20	28	7.7	13.0	341900	288716	247471	170950	1.6 to 4.8
16	24	8.2	12.1	319108	269469	230973	159554	1.6 to 5.6
16	25	8.6	11.6	306344	258690	221735	153172	1.6 to 5.6
16	26	8.9	11.2	294560	248740	213205	147280	1.6 to 5.6
16	27	9.3	10.8	283651	239528	205309	141826	2.4 to 6.4
16	28	9.6	10.4	273521	230974	197977	136761	2.4 to 6.4

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	10.1	9.9	261769	221049	189471	130885	2.4 to 6.4
35	25	10.5	9.5	251298	212207	181892	125649	2.4 to 7.2
35	26	10.9	9.2	241633	204045	174896	120817	2.4 to 7.2
35	27	11.3	8.8	232682	196487	168417	116341	2.4 to 8.1
35	28	11.7	8.5	224372	189470	162403	112186	2.4 to 8.1
29	24	12.1	8.2	216893	183154	156989	108447	3.2 to 8.1

Planting Rate Charts - Vacuum Meter

29	25	12.6	7.9	208217	175828	150709	104109	3.2 to 8.9
29	26	13.1	7.6	200209	169066	144913	100105	3.2 to 8.9
29	27	13.6	7.3	192795	162804	139547	96398	3.2 to 9.7
29	28	14.2	7.1	185909	156990	134563	92955	3.2 to 9.7
24	24	14.7	6.8	179498	151576	129923	89749	3.2 to 10.5
24	25	15.3	6.5	172318	145513	124725	86159	4.0 to 10.5
24	26	15.9	6.3	165690	139916	119928	82845	4.0 to 10.5
24	27	16.5	6.1	159554	134734	115487	79777	4.0 to 10.5
24	28	17.1	5.8	153856	129923	111363	76928	4.0 to 10.5
20	24	17.6	5.7	149583	126314	108269	74792	4.0 to 10.5
20	25	18.3	5.5	143598	121260	103937	71799	4.8 to 10.5
20	26	19.1	5.2	138075	116597	99940	69038	4.8 to 10.5
20	27	19.8	5.1	132961	112278	96239	66481	4.8 to 10.5
20	28	20.5	4.9	128212	108268	92801	64106	4.8 to 10.5
16	24	22.0	4.5	119665	101050	86615	59833	5.6 to 10.5
16	25	22.9	4.4	114879	97009	83151	57440	5.6 to 10.5
16	26	23.8	4.2	110460	93277	79952	55230	5.6 to 10.5
16	27	24.7	4.0	106369	89822	76991	53185	6.4 to 10.5
16	28	25.7	3.9	102570	86615	74241	51285	6.4 to 10.5

48-TOOTH SPROCKET - LOW RANGE

PX03972.00011CC-19-09JUN15

Sorghum (A43066) - 45 Cells

AVERAGE SEEDS PER HECTARE OF SORGHUM
PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.4	29.8	785304	663146	568411	392652	3.2 to 8.8
35	25	3.5	28.6	753893	636620	545675	376947	3.2 to 8.8
35	26	3.6	27.5	724896	612134	524687	362448	3.2 to 9.6
35	27	3.8	26.5	698047	589462	505253	349024	3.2 to 9.6
35	28	3.9	25.6	673118	568411	487209	336559	3.2 to 10.4
29	24	4.0	24.7	650681	549464	470969	325341	3.2 to 10.4
29	25	4.2	23.7	624652	527484	452129	312326	3.2 to 11.2
29	26	4.4	22.8	600628	507197	434740	300314	3.2 to 11.2
29	27	4.5	22.0	578382	488412	418639	289191	3.2 to 12.0
29	28	4.7	21.2	557727	470969	403688	278864	3.2 to 12.0
24	24	4.9	20.5	538493	454728	389767	269247	3.2 to 12.9
24	25	5.1	19.6	516954	436539	374176	258477	3.2 to 12.9
24	26	5.3	18.9	497072	419750	359785	248536	3.2 to 12.9
24	27	5.5	18.2	478662	404203	346460	239331	3.2 to 12.9
24	28	5.7	17.5	461567	389768	334087	230784	3.2 to 12.9
20	24	5.9	17.1	448746	378941	324807	224373	3.2 to 12.9
20	25	6.1	16.4	430795	363782	311813	215398	3.2 to 12.9
20	26	6.4	15.7	414227	349792	299821	207114	3.2 to 12.9
20	27	6.6	15.2	398884	336835	288716	199442	3.2 to 12.9
20	28	6.8	14.6	384639	324806	278405	192320	3.2 to 12.9
16	24	7.3	13.6	358997	303153	259845	179499	4.8 to 12.9
16	25	7.6	12.6	344636	291026	249451	172318	4.8 to 12.9
16	26	7.9	12.1	331382	279834	239857	165691	4.8 to 12.9

Planting Rate Charts - Vacuum Meter

16	27	8.2	11.7	319108	269469	230973	159554	4.8 to 12.9
16	28	8.6	13.1	307711	259845	222724	153856	4.8 to 12.9

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	8.9	11.2	294488	248679	213153	147244	4.8 to 12.9
35	25	9.3	10.7	282710	238733	204628	141355	4.8 to 12.9
35	26	9.7	10.3	271836	229550	196757	135918	4.8 to 12.9
35	27	10.1	9.9	261769	221049	189471	130885	4.8 to 12.9
35	28	10.4	9.6	252420	213155	182704	126210	4.8 to 12.9
29	24	10.8	9.3	244005	206049	176613	122003	6.4 to 12.9
29	25	11.2	8.9	234246	197808	169549	117123	6.4 to 12.9
29	26	11.7	8.6	225236	190199	163028	112618	6.4 to 12.9
29	27	12.1	8.2	216893	183154	156989	108447	6.4 to 12.9
29	28	12.6	7.9	209147	176613	151383	104574	6.4 to 12.9
24	24	13.0	7.7	201935	170523	146163	100968	6.4 to 12.9
24	25	13.6	7.4	193858	163702	140316	96929	6.4 to 12.9
24	26	14.1	7.1	186403	157407	134920	93202	6.4 to 12.9
24	27	14.7	6.8	179498	151576	129923	89749	6.4 to 12.9
24	28	15.2	6.6	173088	146163	125283	86544	6.4 to 12.9
20	24	15.6	6.4	168280	142103	121803	84140	6.4 to 12.9
20	25	16.3	6.1	161549	136419	116931	80775	6.4 to 12.9
20	26	16.9	5.9	155336	131172	112433	77668	6.4 to 12.9
20	27	17.6	5.7	149583	126314	108269	74792	6.4 to 12.9
20	28	18.2	5.5	144239	121802	104401	72120	6.4 to 12.9
16	24	19.5	5.1	134623	113682	97441	67312	6.4 to 12.9
16	25	20.4	4.9	129238	109135	93544	64619	6.4 to 12.9
16	26	21.2	4.7	124268	104938	89947	62134	6.4 to 12.9
16	27	22.0	4.5	119665	101050	86615	59833	6.4 to 12.9
16	28	22.8	4.4	115391	97442	83521	57696	6.4 to 12.9

48-TOOTH SPROCKET - LOW RANGE

PX03972,00011CD-19-09JUN15

High Rate Sorghum (A52802) - 90 Cells

AVERAGE SEEDS PER HECTARE OF SORGHUM
PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	1.7	59.7	1570608	1326292	1136821	785304	3.2 to 8.0
35	25	1.7	57.3	1507783	1273239	1091348	753892	3.2 to 8.0
35	26	1.8	55.1	1449792	1224269	1049373	724896	3.2 to 8.8
35	27	1.9	53.1	1396097	1178926	1010508	698049	3.2 to 8.8
35	28	2.0	51.2	1346236	1136822	974419	673118	3.2 to 8.8
29	24	2.0	49.5	1301361	1098927	941937	650681	3.2 to 8.8
29	25	2.1	47.5	1249307	1054970	904260	624654	3.2 to 9.6
29	26	2.2	45.6	1201257	1014395	869481	600629	3.2 to 10.5
29	27	2.3	44.0	1156765	976824	837277	578383	3.2 to 10.5
29	28	2.4	42.4	1115452	941937	807375	557726	3.2 to 11.2

Planting Rate Charts - Vacuum Meter

24	24	2.4	40.9	1076989	909457	779535	538495	3.2 to 11.2
24	25	2.5	39.3	1033909	873079	748353	516955	3.2 to 12.0
24	26	2.6	37.8	994144	839499	719571	497072	3.2 to 12.0
24	27	2.7	36.4	957324	808407	692920	478662	3.2 to 12.8
24	28	2.9	35.1	923132	779534	668172	461566	3.2 to 12.8
20	24	2.9	34.1	897490	757881	649612	448745	3.2 to 12.8
20	25	3.1	32.7	861591	727566	623628	430796	4.8 to 12.8
20	26	3.2	31.5	828452	699582	599641	414226	4.8 to 12.8
20	27	3.3	30.3	797770	673672	577433	398885	4.8 to 12.8
20	28	3.4	29.2	769278	649612	556811	384639	4.8 to 12.8
16	24	3.7	27.3	717992	606304	519689	358996	4.8 to 12.8
16	25	3.8	26.2	689273	582053	498903	344637	4.8 to 12.8
16	26	4.0	25.2	662762	559666	479713	331381	4.8 to 12.8
16	27	4.1	24.3	638216	538938	461947	319108	4.8 to 12.8
16	28	4.3	23.4	615422	519689	445448	307711	4.8 to 12.8

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	4.5	22.4	588978	497359	426308	294489	4.8 to 12.8
35	25	4.7	21.5	565419	477465	409256	282710	4.8 to 12.8
35	26	4.8	20.7	543672	459100	393515	271836	4.8 to 12.8
35	27	5.0	19.9	523536	442097	378940	261768	4.8 to 12.8
35	28	5.2	19.2	504838	426308	365407	252419	4.8 to 12.8
29	24	5.4	18.5	488011	412098	353227	244006	4.8 to 12.8
29	25	5.6	17.8	468490	395614	339097	234245	4.8 to 12.8
29	26	5.8	17.1	450470	380397	326055	225235	4.8 to 12.8
29	27	6.1	16.5	433786	366308	313979	216893	4.8 to 12.8
29	28	6.3	15.9	418294	353226	302765	209147	4.8 to 12.8
24	24	6.5	15.3	403871	341046	292325	201936	4.8 to 12.8
24	25	6.8	14.7	387715	327404	280632	193858	4.8 to 12.8
24	26	7.1	14.2	372803	314812	269839	186402	4.8 to 12.8
24	27	7.3	13.6	358997	303153	259845	179499	4.8 to 12.8
24	28	7.6	13.2	346174	292325	250564	173087	4.8 to 12.8
20	24	7.8	12.8	336558	284205	243604	168279	4.8 to 12.8
20	25	8.1	12.3	323096	272837	233860	161548	4.8 to 12.8
20	26	8.5	11.8	310669	262343	224865	155335	4.8 to 12.8
20	27	8.8	11.4	299163	252627	216537	149582	4.8 to 12.8
20	28	9.1	11.0	288479	243605	208804	144240	4.8 to 12.8
16	24	9.8	10.2	269248	227365	194884	134624	4.8 to 12.8
16	25	10.2	9.8	258477	218269	187088	129239	4.8 to 12.8
16	26	10.6	9.4	248535	209874	179892	124268	4.8 to 12.8
16	27	11.0	9.1	239330	202101	173229	119665	4.8 to 12.8
16	28	11.4	8.8	230783	194883	167043	115392	4.8 to 12.8

48-TOOTH SPROCKET - LOW RANGE

PX03972.00011CE-19-09JUN15

Small Edible Beans (H136468) - Cell Type Disk - 108 Cells

AVERAGE SEEDS PER HECTARE OF SMALL EDIBLE
BEANS PLANTED WITH VACUUM METER

Planting Rate Charts - Vacuum Meter

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	1.4	71.6	1884730	1591550	1364185	942365	3.2 to 6.4
35	25	1.5	68.8	1809340	1527887	1309617	904670	3.2 to 6.4
35	26	1.5	66.1	1739751	1469123	1259248	869876	3.2 to 6.4
35	27	1.6	63.7	1675316	1414711	1212609	837658	3.2 to 6.4
35	28	1.6	61.4	1615482	1364185	1169301	807741	3.2 to 6.4
29	24	1.7	59.3	1561634	1318713	1130325	780817	3.2 to 7.2
29	25	1.8	57.0	1499168	1265964	1085112	749584	3.2 to 7.2
29	26	1.8	54.8	1441508	1217274	1043377	720754	3.2 to 8.1
29	27	1.9	52.7	1388118	1172189	1004733	694059	3.2 to 8.1
29	28	2.0	50.9	1338542	1130324	968849	669271	3.2 to 8.9
24	24	2.0	49.1	1292386	1091348	935441	646193	3.2 to 8.9
24	25	2.1	47.1	1240691	1047695	898024	620346	4.8 to 9.7
24	26	2.2	45.3	1192971	1007398	863484	596486	4.8 to 9.7
24	27	2.3	43.7	1148788	970088	831504	574394	4.8 to 9.7
24	28	2.4	42.1	1107759	935441	801807	553880	4.8 to 10.5
20	24	2.4	40.9	1076989	909457	779535	538495	4.8 to 10.5
20	25	2.5	39.3	1033909	873079	748353	516955	6.4 to 11.3
20	26	2.6	37.8	994144	839499	719571	497072	6.4 to 11.3
20	27	2.7	36.4	957324	808407	692920	478662	6.4 to 12.1
20	28	2.9	35.1	923132	779534	668172	461566	6.4 to 12.1
16	24	3.1	32.7	861591	727566	623628	430796	6.4 to 12.9
16	25	3.2	31.4	827127	698463	598683	413564	6.4 to 12.9
16	26	3.3	30.2	795314	671599	575656	397657	6.4 to 12.9
16	27	3.4	29.1	765859	646725	554336	382930	6.4 to 12.9
16	28	3.6	28.1	738506	623627	534537	369253	6.4 to 12.9

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.7	26.9	706773	596831	511569	353387	6.4 to 12.9
35	25	3.9	25.8	678503	572958	491107	339252	6.4 to 12.9
35	26	4.0	24.8	652406	550920	472217	326203	6.4 to 12.9
35	27	4.2	23.9	628243	530516	454728	314122	6.4 to 12.9
35	28	4.3	23.0	605806	511569	438488	302903	6.4 to 12.9
29	24	4.5	22.3	585613	494517	423872	292807	6.4 to 12.9
29	25	4.7	21.4	562188	474737	406917	281094	6.4 to 12.9
29	26	4.9	20.5	540566	456478	391267	270283	6.4 to 12.9
29	27	5.1	19.8	520544	439570	376775	260272	6.4 to 12.9
29	28	5.2	19.1	501953	423872	363319	250977	6.4 to 12.9
24	24	5.4	18.4	484645	409256	350791	242323	6.4 to 12.9
24	25	5.7	17.7	465259	392885	336759	232630	6.4 to 12.9
24	26	5.9	17.0	447364	377774	323807	223682	6.4 to 12.9
24	27	6.1	16.4	430795	363782	311813	215398	6.4 to 12.9
24	28	6.3	15.8	415409	350790	300677	207705	6.4 to 12.9
20	24	6.5	15.3	403871	341046	292325	201936	6.4 to 12.9
20	25	6.8	14.7	387715	327404	280632	193858	6.4 to 12.9
20	26	7.1	14.2	372803	314812	269839	186402	6.4 to 12.9
20	27	7.3	13.6	358997	303153	259845	179499	6.4 to 12.9
20	28	7.6	13.2	346174	292325	250564	173087	6.4 to 12.9

Planting Rate Charts - Vacuum Meter

16	24	8.1	12.3	323096	272837	233860	161548	6.4 to 12.9
16	25	8.5	11.8	310172	261923	224505	155086	6.4 to 12.9
16	26	8.8	11.3	298242	251849	215871	149121	6.4 to 12.9
16	27	9.2	10.9	287197	242522	207876	143599	6.4 to 12.9
16	28	9.5	10.5	276940	233861	200452	138470	6.4 to 12.9

48-TOOTH SPROCKET - LOW RANGE

PX03972.00011CF-19-09JUN15

Medium Edible Beans (H51696) - Cell Type Disk - 56 Cells

AVERAGE SEEDS PER HECTARE OF MEDIUM
EDIBLE BEANS PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	2.7	37.1	977266	825247	707355	488633	6.4 to 7.2
35	25	2.8	35.7	938177	792238	679061	469089	6.4 to 7.2
35	26	2.9	34.3	902094	761768	652944	451047	6.4 to 8.1
35	27	3.0	33.0	868682	733553	628760	434341	6.4 to 8.1
35	28	3.1	31.8	837657	707355	606304	418829	6.4 to 8.1
29	24	3.2	30.8	809736	683777	586095	404868	6.4 to 8.1
29	25	3.4	29.5	777346	656426	562651	388673	6.4 to 8.1
29	26	3.5	28.4	747449	631179	541011	373725	6.4 to 8.1
29	27	3.7	27.4	719766	607802	520973	359883	6.4 to 9.7
29	28	3.8	26.4	694059	586094	502367	347030	6.4 to 9.7
24	24	3.9	25.5	670127	565885	485044	335064	6.4 to 10.5
24	25	4.1	24.4	643320	543248	465641	321660	6.4 to 10.5
24	26	4.3	23.5	618577	522354	447732	309289	6.4 to 11.3
24	27	4.4	22.6	595667	503008	431149	297834	6.4 to 11.3
24	28	4.6	21.8	574394	485044	415752	287197	6.4 to 12.1
20	24	4.7	21.2	558438	471570	404203	279219	6.4 to 12.9
20	25	4.9	20.4	536101	452707	388035	268051	6.4 to 12.9
20	26	5.1	19.6	515482	435296	373111	257741	6.4 to 12.9
20	27	5.3	18.9	496390	419174	359292	248195	6.4 to 12.9
20	28	5.5	18.2	478662	404203	346460	239331	6.4 to 12.9
16	24	5.9	17.0	446751	377256	323363	223376	6.4 to 12.9
16	25	6.1	16.3	428881	362166	310428	214441	6.4 to 12.9
16	26	6.4	15.7	412385	348236	298488	206193	6.4 to 12.9
16	27	6.6	15.1	397112	335339	287433	198556	6.4 to 12.9
16	28	6.9	14.6	382929	323363	277168	191465	6.4 to 12.9

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	7.2	13.9	366476	309468	265259	183238	6.4 to 12.9
35	25	7.5	13.4	351816	297089	254648	175908	6.4 to 12.9
35	26	7.8	12.9	338284	285662	244853	169142	6.4 to 12.9
35	27	8.1	12.4	325756	275083	235785	162878	6.4 to 12.9
35	28	8.4	11.9	314121	265258	227364	157061	6.4 to 12.9
29	24	8.7	11.5	303651	256416	219785	151826	6.4 to 12.9

Planting Rate Charts - Vacuum Meter

29	25	9.0	11.1	291504	246159	210993	145752	6.4 to 12.9
29	26	9.4	10.7	280293	236692	202879	140147	6.4 to 12.9
29	27	9.7	10.3	269913	227926	195365	134957	6.4 to 12.9
29	28	10.1	9.9	260273	219786	188388	130137	6.4 to 12.9
24	24	10.5	9.5	251298	212207	181892	125649	6.4 to 12.9
24	25	10.9	9.2	241246	203719	174616	120623	6.4 to 12.9
24	26	11.3	8.8	231967	195883	167900	115984	6.4 to 12.9
24	27	11.8	8.5	223376	188628	161681	111688	6.4 to 12.9
24	28	12.2	8.2	215397	181891	155907	107699	6.4 to 12.9
20	24	12.6	8.0	209414	176839	151576	104707	6.4 to 12.9
20	25	13.1	7.6	201038	169766	145513	100519	6.4 to 12.9
20	26	13.6	7.3	193305	163235	139916	96653	6.4 to 12.9
20	27	14.1	7.1	186147	157190	134735	93074	6.4 to 12.9
20	28	14.7	6.8	179498	151576	129923	89749	6.4 to 12.9
16	24	15.7	6.4	167532	141472	121261	83766	6.4 to 12.9
16	25	16.4	6.1	160831	135812	116411	80416	6.4 to 12.9
16	26	17.0	5.9	154645	130589	111933	77323	6.4 to 12.9
16	27	17.7	5.7	148918	125753	107788	74459	6.4 to 12.9
16	28	18.3	5.5	143598	121260	103937	71799	6.4 to 12.9

48-TOOTH SPROCKET - LOW RANGE

PX03972,00011D0-19-09JUN15

Large Edible Beans (H136092) - Flat Type Disk - 50 Cells

AVERAGE SEEDS PER HECTARE OF LARGE EDIBLE
BEANS PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.0	33.2	872559	736828	631567	436280	6.4 to 7.2
35	25	3.1	31.8	837657	707355	606304	418829	6.4 to 7.2
35	26	3.3	30.6	805440	680150	582985	402720	6.4 to 7.2
35	27	3.4	29.5	775609	654959	561393	387805	6.4 to 7.2
35	28	3.5	28.4	747909	631568	541344	373955	6.4 to 7.2
29	24	3.6	27.5	722978	610515	523299	361489	6.4 to 8.1
29	25	3.8	26.4	694059	586094	502367	347030	6.4 to 8.8
29	26	3.9	25.4	667365	563553	483045	333683	6.4 to 8.8
29	27	4.1	24.4	642648	542680	465155	321324	6.4 to 8.8
29	28	4.2	23.5	619695	523298	448541	309848	6.4 to 9.7
24	24	4.4	22.7	598327	505254	433075	299164	6.4 to 9.7
24	25	4.6	21.8	574394	485044	415752	287197	6.4 to 10.5
24	26	4.8	21.0	552302	466388	399761	276151	6.4 to 10.5
24	27	4.9	20.2	531845	449114	384955	265923	6.4 to 11.3
24	28	5.1	19.5	512851	433074	371207	256426	6.4 to 11.3
20	24	5.3	18.9	498606	421045	360896	249303	6.4 to 12.1
20	25	5.5	18.2	478662	404203	346460	239331	6.4 to 12.1
20	26	5.7	17.5	460252	388657	333135	230126	6.4 to 12.9
20	27	5.9	16.8	443205	374262	320796	221603	6.4 to 12.9
20	28	6.2	16.2	427376	360895	309339	213688	6.4 to 12.9
16	24	6.6	15.2	398884	336835	288716	199442	6.4 to 12.9
16	25	6.9	14.6	382929	323363	277168	191465	6.4 to 12.9

Planting Rate Charts - Vacuum Meter

16	26	7.1	14.0	368202	310926	266508	184101	6.4 to 12.9
16	27	7.4	13.5	354565	299410	256637	177283	6.4 to 12.9
16	28	7.7	13.0	341900	288716	247471	170950	6.4 to 12.9

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	8.0	12.4	327209	276310	236837	163605	6.4 to 12.9
35	25	8.4	11.9	314121	265258	227364	157061	6.4 to 12.9
35	26	8.7	11.5	302041	255057	218620	151021	6.4 to 12.9
35	27	9.0	11.1	290854	245610	210523	145427	6.4 to 12.9
35	28	9.4	10.7	280466	236838	203004	140233	6.4 to 12.9
29	24	9.7	10.3	271117	228944	196237	135559	6.4 to 12.9
29	25	10.1	9.9	260273	219786	188388	130137	6.4 to 12.9
29	26	10.5	9.5	250261	211332	181141	125131	6.4 to 12.9
29	27	10.9	9.2	240993	203506	174433	120497	6.4 to 12.9
29	28	11.3	8.8	232385	196236	168203	116193	6.4 to 12.9
24	24	11.7	8.5	224372	189470	162403	112186	6.4 to 12.9
24	25	12.2	8.2	215397	181891	155907	107699	6.4 to 12.9
24	26	12.7	7.9	207113	174896	149911	103557	6.4 to 12.9
24	27	13.2	7.6	199443	168418	144359	99722	6.4 to 12.9
24	28	13.7	7.3	192319	162403	139203	96160	6.4 to 12.9
20	24	14.1	7.1	186977	157892	135336	93489	6.4 to 12.9
20	25	14.7	6.8	179498	151576	129923	89749	6.4 to 12.9
20	26	15.2	6.6	172594	145746	124925	86297	6.4 to 12.9
20	27	15.8	6.3	166202	140348	120299	83101	6.4 to 12.9
20	28	16.4	6.1	160267	135336	116003	80134	6.4 to 12.9
16	24	17.6	5.7	149583	126314	108269	74792	6.4 to 12.9
16	25	18.3	5.5	143598	121260	103937	71799	6.4 to 12.9
16	26	19.1	5.2	138075	116597	99940	69038	6.4 to 12.9
16	27	19.8	5.1	132961	112278	96239	66481	6.4 to 12.9
16	28	20.5	4.9	128212	108268	92801	64106	6.4 to 12.9

48-TOOTH SPROCKET - LOW RANGE

PX03972.00011D1-19-09JUN15

Large (A52878) Medium (A52904) and Small (A52903) Edible Beans - Flat Type Disk - 50 Cells

AVERAGE SEEDS PER HECTARE OF EDIBLE BEANS PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.0	33.2	872559	736828	631567	436280	4.8 to 6.4
35	25	3.1	31.8	837657	707355	606304	418829	4.8 to 6.4
35	26	3.3	30.6	805440	680150	582985	402720	4.8 to 6.4
35	27	3.4	29.5	775609	654959	561393	387805	4.8 to 6.4
35	28	3.5	28.4	747909	631568	541344	373955	4.8 to 7.2
29	24	3.6	27.5	722978	610515	523299	361489	4.8 to 7.2
29	25	3.8	26.4	694059	586094	502367	347030	4.8 to 7.2

Planting Rate Charts - Vacuum Meter

29	26	3.9	25.4	667365	563553	483045	333683	4.8 to 7.2
29	27	4.1	24.4	642648	542680	465155	321324	4.8 to 7.2
29	28	4.2	23.5	619695	523298	448541	309848	4.8 to 7.2
24	24	4.4	22.7	598327	505254	433075	299164	4.8 to 7.2
24	25	4.6	21.8	574394	485044	415752	287197	4.8 to 7.2
24	26	4.8	21.0	552302	466388	399761	276151	6.4 to 8.1
24	27	4.9	20.2	531845	449114	384955	265923	6.4 to 8.1
24	28	5.1	19.5	512851	433074	371207	256426	6.4 to 8.1
20	24	5.3	18.9	498606	421045	360896	249303	6.4 to 8.1
20	25	5.5	18.2	478662	404203	346460	239331	6.4 to 8.1
20	26	5.7	17.5	460252	388657	333135	230126	6.4 to 8.1
20	27	5.9	16.8	443205	374262	320796	221603	6.4 to 9.7
20	28	6.2	16.2	427376	360895	309339	213688	6.4 to 9.7
16	24	6.6	15.2	398884	336835	288716	199442	6.4 to 9.7
16	25	6.9	14.6	382929	323363	277168	191465	6.4 to 9.7
16	26	7.1	14.0	368202	310926	266508	184101	6.4 to 9.7
16	27	7.4	13.5	354565	299410	256637	177283	6.4 to 9.7
16	28	7.7	13.0	341900	288716	247471	170950	6.4 to 9.7

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	8.0	12.4	327209	276310	236837	163605	6.4 to 9.7
35	25	8.4	11.9	314121	265258	227364	157061	6.4 to 9.7
35	26	8.7	11.5	302041	255057	218620	151021	6.4 to 9.7
35	27	9.0	11.1	290854	245610	210523	145427	6.4 to 9.7
35	28	9.4	10.7	280466	236838	203004	140233	6.4 to 9.7
29	24	9.7	10.3	271117	228944	196237	135559	6.4 to 9.7
29	25	10.1	9.9	260273	219786	188388	130137	6.4 to 9.7
29	26	10.5	9.5	250261	211332	181141	125131	6.4 to 9.7
29	27	10.9	9.2	240993	203506	174433	120497	6.4 to 9.7
29	28	11.3	8.8	232385	196236	168203	116193	6.4 to 9.7
24	24	11.7	8.5	224372	189470	162403	112186	6.4 to 9.7
24	25	12.2	8.2	215397	181891	155907	107699	6.4 to 9.7
24	26	12.7	7.9	207113	174896	149911	103557	6.4 to 9.7
24	27	13.2	7.6	199443	168418	144359	99722	6.4 to 9.7
24	28	13.7	7.3	192319	162403	139203	96160	6.4 to 9.7
20	24	14.1	7.1	186977	157892	135336	93489	6.4 to 9.7
20	25	14.7	6.8	179498	151576	129923	89749	6.4 to 9.7
20	26	15.2	6.6	172594	145746	124925	86297	6.4 to 9.7
20	27	15.8	6.3	166202	140348	120299	83101	6.4 to 9.7
20	28	16.4	6.1	160267	135336	116003	80134	6.4 to 9.7
16	24	17.6	5.7	149583	126314	108269	74792	6.4 to 9.7
16	25	18.3	5.5	143598	121260	103937	71799	6.4 to 9.7
16	26	19.1	5.2	138075	116597	99940	69038	6.4 to 9.7
16	27	19.8	5.1	132961	112278	96239	66481	6.4 to 9.7
16	28	20.5	4.9	128212	108268	92801	64106	6.4 to 9.7

48-TOOTH SPROCKET - LOW RANGE

PX03972,00011D2-19-09JUN15

Runner and Spanish Peanuts Using Large Edible Bean Disk (H136092)

SPANISH PEANUTS PLANTED WITH VACUUM METER

AVERAGE SEEDS PER HECTARE OF RUNNER AND

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.0	33.2	872559	736828	631567	436280	6.4 to 7.2
35	25	3.1	31.8	837657	707355	606304	418829	6.4 to 7.2
35	26	3.3	30.6	805440	680150	582985	402720	6.4 to 7.2
35	27	3.4	29.5	775609	654959	561393	387805	6.4 to 7.2
35	28	3.5	28.4	747909	631568	541344	373955	6.4 to 7.2
29	24	3.6	27.5	722978	610515	523299	361489	6.4 to 8.1
29	25	3.8	26.4	694059	586094	502367	347030	6.4 to 8.8
29	26	3.9	25.4	667365	563553	483045	333683	6.4 to 8.8
29	27	4.1	24.4	642648	542680	465155	321324	6.4 to 8.8
29	28	4.2	23.5	619695	523298	448541	309848	6.4 to 9.7
24	24	4.4	22.7	598327	505254	433075	299164	6.4 to 9.7
24	25	4.6	21.8	574394	485044	415752	287197	6.4 to 10.5
24	26	4.8	21.0	552302	466388	399761	276151	6.4 to 10.5
24	27	4.9	20.2	531845	449114	384955	265923	6.4 to 11.3
24	28	5.1	19.5	512851	433074	371207	256426	6.4 to 11.3
20	24	5.3	18.9	498606	421045	360896	249303	6.4 to 12.1
20	25	5.5	18.2	478662	404203	346460	239331	6.4 to 12.1
20	26	5.7	17.5	460252	388657	333135	230126	6.4 to 12.9
20	27	5.9	16.8	443205	374262	320796	221603	6.4 to 12.9
20	28	6.2	16.2	427376	360895	309339	213688	6.4 to 12.9
16	24	6.6	15.2	398884	336835	288716	199442	6.4 to 12.9
16	25	6.9	14.6	382929	323363	277168	191465	6.4 to 12.9
16	26	7.1	14.0	368202	310926	266508	184101	6.4 to 12.9
16	27	7.4	13.5	354565	299410	256637	177283	6.4 to 12.9
16	28	7.7	13.0	341900	288716	247471	170950	6.4 to 12.9

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	8.0	12.4	327209	276310	236837	163605	6.4 to 12.9
35	25	8.4	11.9	314121	265258	227364	157061	6.4 to 12.9
35	26	8.7	11.5	302041	255057	218620	151021	6.4 to 12.9
35	27	9.0	11.1	290854	245610	210523	145427	6.4 to 12.9
35	28	9.4	10.7	280466	236838	203004	140233	6.4 to 12.9
29	24	9.7	10.3	271117	228944	196237	135559	6.4 to 12.9
29	25	10.1	9.9	260273	219786	188388	130137	6.4 to 12.9
29	26	10.5	9.5	250261	211332	181141	125131	6.4 to 12.9
29	27	10.9	9.2	240993	203506	174433	120497	6.4 to 12.9
29	28	11.3	8.8	232385	196236	168203	116193	6.4 to 12.9
24	24	11.7	8.5	224372	189470	162403	112186	6.4 to 12.9
24	25	12.2	8.2	215397	181891	155907	107699	6.4 to 12.9
24	26	12.7	7.9	207113	174896	149911	103557	6.4 to 12.9
24	27	13.2	7.6	199443	168418	144359	99722	6.4 to 12.9
24	28	13.7	7.3	192319	162403	139203	96160	6.4 to 12.9
20	24	14.1	7.1	186977	157892	135336	93489	6.4 to 12.9

Planting Rate Charts - Vacuum Meter

20	25	14.7	6.8	179498	151576	129923	89749	6.4 to 12.9
20	26	15.2	6.6	172594	145746	124925	86297	6.4 to 12.9
20	27	15.8	6.3	166202	140348	120299	83101	6.4 to 12.9
20	28	16.4	6.1	160267	135336	116003	80134	6.4 to 12.9
16	24	17.6	5.7	149583	126314	108269	74792	6.4 to 12.9
16	25	18.3	5.5	143598	121260	103937	71799	6.4 to 12.9
16	26	19.1	5.2	138075	116597	99940	69038	6.4 to 12.9
16	27	19.8	5.1	132961	112278	96239	66481	6.4 to 12.9
16	28	20.5	4.9	128212	108268	92801	64106	6.4 to 12.9

48-TOOTH SPROCKET - LOW RANGE

PX03972,00011D3-19-09JUN15

Virginia Peanuts (H138722) - 46 Cells

AVERAGE SEEDS PER HECTARE OF VIRGINIA
PEANUTS PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.3	30.5	802754	677882	581041	401377	0 to 4.8
35	25	3.4	29.3	770645	650767	557800	385323	0 to 4.8
35	26	3.6	28.2	741005	625738	536347	370503	0 to 4.8
35	27	3.7	27.1	713560	602562	516481	356780	0 to 4.8
35	28	3.8	26.1	688076	581042	498036	344038	0 to 4.8
29	24	4.0	25.3	665140	561674	481435	332570	0 to 4.8
29	25	4.1	24.3	638534	539207	462177	319267	4.8 to 5.6
29	26	4.3	23.3	613976	518468	444401	306988	4.8 to 5.6
29	27	4.5	22.5	591235	499265	427941	295618	4.8 to 6.4
29	28	4.6	21.7	570121	481435	412659	285061	4.8 to 6.4
24	24	4.8	20.9	550462	464834	398429	275231	4.8 to 6.4
24	25	5.0	20.1	528443	446241	382492	264222	4.8 to 6.4
24	26	5.2	19.3	508117	429077	367780	254059	4.8 to 7.2
24	27	5.4	18.6	489298	413185	354159	244649	4.8 to 7.2
24	28	5.6	17.9	471824	398429	341511	235912	4.8 to 7.2
20	24	5.7	17.4	458717	387361	332024	229359	4.8 to 8.0
20	25	6.0	16.7	440368	371866	318743	220184	4.8 to 8.0
20	26	6.2	16.1	423432	357565	306484	211716	4.8 to 8.0
20	27	6.5	15.5	407748	344321	295132	203874	4.8 to 8.8
20	28	6.7	14.9	393186	332024	284592	196593	4.8 to 9.6
16	24	7.2	13.9	366973	309888	265619	183487	4.8 to 9.6
16	25	7.5	13.4	352295	297494	254995	176148	4.8 to 10.5
16	26	7.8	12.9	338745	286051	245187	169373	4.8 to 10.5
16	27	8.1	12.4	326198	275456	236105	163099	4.8 to 11.2
16	28	8.4	12.0	314549	265619	227673	157275	4.8 to 12.0

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	8.7	11.4	301033	254206	217891	150517	4.8 to 12.0
35	25	9.1	11.0	288991	244037	209175	144496	4.8 to 12.9
35	26	9.5	10.6	277876	234651	201129	138938	4.8 to 12.9

Planting Rate Charts - Vacuum Meter

35	27	9.8	10.2	267584	225960	193680	133792	4.8 to 12.9
35	28	10.2	9.8	258029	217891	186764	129015	4.8 to 12.9
29	24	10.6	9.5	249428	210628	180539	124714	4.8 to 12.9
29	25	11.0	9.1	239450	202202	173316	119725	4.8 to 12.9
29	26	11.4	8.7	230241	194426	166651	115121	4.8 to 12.9
29	27	11.9	8.4	221714	187225	160479	110857	4.8 to 12.9
29	28	12.3	8.1	213795	180538	154747	106898	4.8 to 12.9
24	24	12.7	7.8	206423	174312	149411	103212	4.8 to 12.9
24	25	13.3	7.5	198166	167340	143435	99083	4.8 to 12.9
24	26	13.8	7.2	190544	160904	137917	95272	4.8 to 12.9
24	27	14.3	7.0	183487	154944	132809	91744	4.8 to 12.9
24	28	14.9	6.7	176934	149411	128067	88467	4.8 to 12.9
20	24	15.3	6.5	172019	145261	124509	86010	4.8 to 12.9
20	25	15.9	6.3	165137	139449	119528	82569	4.8 to 12.9
20	26	16.6	6.0	158788	134087	114932	79394	4.8 to 12.9
20	27	17.2	5.8	152906	129120	110675	76453	4.8 to 12.9
20	28	17.8	5.6	147444	124508	106721	73722	4.8 to 12.9
16	24	19.1	5.2	137614	116208	99607	68807	4.8 to 12.9
16	25	19.9	5.0	132110	111560	95623	66055	4.8 to 12.9
16	26	20.7	4.8	127030	107270	91945	63515	4.8 to 12.9
16	27	21.5	4.6	122325	103297	88540	61163	4.8 to 12.9
16	28	22.3	4.5	117956	99607	85377	58978	4.8 to 12.9

48-TOOTH SPROCKET - LOW RANGE

PX03972,00011D4-19-09JUN15

Hilldrop Cotton (H136587) - 48 Cells

AVERAGE SEEDS PER HECTARE OF COTTON
PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.1	31.8	837657	707355	606304	418829	0 to 5.6
35	25	3.3	30.6	804151	679061	582052	402076	0 to 5.6
35	26	3.4	29.4	773222	652943	559665	386611	0 to 5.6
35	27	3.5	28.3	744584	628760	538937	372292	0 to 5.6
35	28	3.7	27.3	717992	606304	519689	358996	0 to 6.4
29	24	3.8	26.4	694059	586094	502367	347030	0 to 6.4
29	25	3.9	25.3	666297	562651	482272	333149	0 to 6.4
29	26	4.1	24.3	640669	541010	463723	320335	0 to 7.2
29	27	4.3	23.4	616941	520973	446548	308471	0 to 7.2
29	28	4.4	22.6	594908	502367	430600	297454	0 to 7.2
24	24	4.6	21.8	574394	485044	415752	287197	0 to 8.0
24	25	4.8	21.0	551418	465642	399121	275709	0 to 8.0
24	26	5.0	20.1	530209	447732	383771	265105	0 to 8.9
24	27	5.2	19.4	510573	431150	369557	255287	0 to 8.9
24	28	5.3	18.7	492338	415752	356359	246169	0 to 8.9
20	24	5.5	18.2	478662	404203	346460	239331	0 to 9.7
20	25	5.7	17.5	459515	388035	332601	229758	0 to 9.7
20	26	6.0	16.8	441842	373111	319809	220921	0 to 10.5
20	27	6.2	16.2	425477	359291	307964	212739	0 to 10.5
20	28	6.4	15.6	410281	346460	296965	205141	0 to 11.3

Planting Rate Charts - Vacuum Meter

16	24	6.9	14.6	382929	323363	277168	191465	0 to 11.3
16	25	7.2	14.0	367612	310428	266081	183806	0 to 12.9
16	26	7.4	13.4	353472	298488	255847	176736	0 to 12.9
16	27	7.7	12.9	340382	287434	246372	170191	0 to 12.9
16	28	8.0	12.5	328224	277167	237572	164112	0 to 12.9

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	8.4	83.8	314121	265258	227364	157061	0 to 12.9
35	25	8.7	87.3	301557	254648	218270	150779	0 to 12.9
35	26	9.1	90.8	289959	244854	209875	144980	0 to 12.9
35	27	9.4	94.2	279219	235785	202102	139610	0 to 12.9
35	28	9.8	97.7	269247	227364	194884	134624	0 to 12.9
29	24	10.1	101.1	260273	219786	188388	130137	0 to 12.9
29	25	10.5	105.3	249862	210995	180852	124931	0 to 12.9
29	26	11.0	109.5	240250	202878	173895	120125	0 to 12.9
29	27	11.4	113.7	231353	195365	167456	115677	0 to 12.9
29	28	11.8	118.0	223090	188387	161475	111545	0 to 12.9
24	24	12.2	122.2	215397	181891	155907	107699	0 to 12.9
24	25	12.7	127.3	206781	174615	149670	103391	0 to 12.9
24	26	13.2	132.4	198829	167900	143914	99415	0 to 12.9
24	27	13.7	137.4	191466	161682	138585	95733	0 to 12.9
24	28	14.3	142.5	184627	155907	133635	92314	0 to 12.9
20	24	14.7	146.6	179498	151576	129923	89749	0 to 12.9
20	25	15.3	152.7	172318	145513	124726	86159	0 to 12.9
20	26	15.9	158.8	165690	139916	119928	82845	0 to 12.9
20	27	16.5	164.9	159554	134734	115487	79777	0 to 12.9
20	28	17.1	171.0	153856	129923	111363	76928	0 to 12.9
16	24	18.3	183.3	143600	121262	103939	71800	0 to 12.9
16	25	19.1	190.9	137854	116410	99780	68927	0 to 12.9
16	26	19.9	198.5	132551	111932	95942	66276	0 to 12.9
16	27	20.6	206.2	127643	107787	92389	63822	0 to 12.9
16	28	21.4	213.8	123084	103938	89089	61542	0 to 12.9

48-TOOTH SPROCKET - LOW RANGE

PX03972,00011D5-19-09JUN15

Acid Delinted Cotton (A56251) - 64 Cells

AVERAGE SEEDS PER HECTARE OF COTTON
PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	2.4	42.4	1116878	943141	808407	558439	3.2 to 8.8
35	25	2.5	40.7	1072201	905414	776069	536101	3.2 to 8.8
35	26	2.6	39.2	1030964	870592	746221	515482	3.2 to 9.6
35	27	2.7	37.7	992779	838346	718583	496390	3.2 to 9.6
35	28	2.7	36.4	957324	808407	692920	478662	3.2 to 10.4
29	24	2.8	35.2	925413	781460	669823	462707	3.2 to 10.4
29	25	3.0	33.8	888396	750201	643029	444198	3.2 to 11.2

Planting Rate Charts - Vacuum Meter

29	26	3.1	32.5	854227	721347	618297	427114	3.2 to 11.2
29	27	3.2	31.3	822588	694630	595397	411294	3.2 to 12.0
29	28	3.3	30.1	793211	669822	574133	396606	3.2 to 12.0
24	24	3.4	29.1	765859	646725	554336	382930	3.2 to 12.8
24	25	3.6	27.9	735225	620856	532163	367613	3.2 to 12.8
24	26	3.7	26.9	706947	596977	511695	353474	3.2 to 12.8
24	27	3.9	25.9	680763	574866	492743	340382	3.2 to 12.8
24	28	4.0	24.9	656451	554336	475145	328226	3.2 to 12.8
20	24	4.1	24.3	638216	538938	461947	319108	3.2 to 12.8
20	25	4.3	23.3	612686	517379	443468	306343	3.2 to 12.8
20	26	4.5	22.4	589122	497481	426412	294561	3.2 to 12.8
20	27	4.6	21.6	567302	479055	410619	283651	3.2 to 12.8
20	28	4.8	20.8	547041	461946	395953	273521	3.2 to 12.8
16	24	5.2	19.4	510573	431150	369557	255287	4.8 to 12.8
16	25	5.4	18.6	490149	413904	354775	245075	4.8 to 12.8
16	26	5.6	17.9	471297	397984	341129	235649	4.8 to 12.8
16	27	5.8	17.2	453841	383244	328495	226921	4.8 to 12.8
16	28	6.0	16.6	437633	369556	316763	218817	4.8 to 12.8

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	6.3	15.9	418828	353677	303152	209414	4.8 to 12.8
35	25	6.5	15.3	402076	339531	291027	201038	4.8 to 12.8
35	26	6.8	14.7	386612	326472	279833	193306	4.8 to 12.8
35	27	7.1	14.1	372293	314381	269469	186147	4.8 to 12.8
35	28	7.3	13.6	358997	303153	259845	179499	6.4 to 12.8
29	24	7.6	13.2	347029	293046	251183	173515	6.4 to 12.8
29	25	7.9	12.7	333148	281325	241136	166574	6.4 to 12.8
29	26	8.2	12.2	320335	270505	231861	160168	6.4 to 12.8
29	27	8.5	11.7	308472	260487	223275	154236	6.4 to 12.8
29	28	8.8	11.3	297454	251183	215300	148727	6.4 to 12.8
24	24	9.2	10.9	287197	242522	207876	143599	6.4 to 12.8
24	25	9.5	10.5	275710	232822	199561	137855	6.4 to 12.8
24	26	9.9	10.1	265105	223866	191885	132553	6.4 to 12.8
24	27	10.3	9.7	255286	215575	184779	127643	6.4 to 12.8
24	28	10.7	9.4	246168	207875	178179	123084	6.4 to 12.8
20	24	11.0	9.1	239330	202101	173229	119665	6.4 to 12.8
20	25	11.5	8.7	229758	194018	166301	114879	6.4 to 12.8
20	26	11.9	8.4	220920	186555	159904	110460	6.4 to 12.8
20	27	12.4	8.1	212739	179646	153983	106370	6.4 to 12.8
20	28	12.8	7.8	205141	173230	148483	102571	6.4 to 12.8
16	24	13.7	7.3	191465	161681	138584	95733	6.4 to 12.8
16	25	14.3	7.0	183805	155213	133040	91903	6.4 to 12.8
16	26	14.9	6.7	176737	149245	127924	88369	6.4 to 12.8
16	27	15.5	6.5	170190	143716	123185	85095	6.4 to 12.8
16	28	16.0	6.2	164113	138584	118787	82057	6.4 to 12.8

48-TOOTH SPROCKET - LOW RANGE

PX03972.00011D6-19-09JUN15

Small (A51712), Medium (H136445), Large (A51713) and Granulated (A43066) Sugar Beet - 45 Cells

AVERAGE SEEDS PER HECTARE OF SUGAR BEET
PLANTED WITH VACUUM METER

18-TOOTH SPROCKET - HIGH RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	3.4	29.8	785304	663146	568411	392652	3.2 to 4.8
35	25	3.5	28.6	753893	636620	545675	376947	3.2 to 4.8
35	26	3.6	27.5	724896	612134	524687	362448	3.2 to 4.8
35	27	3.8	26.5	698047	589462	505253	349024	3.2 to 5.6
35	28	3.9	25.6	673118	568411	487209	336559	3.2 to 5.6
29	24	4.0	24.7	650681	549464	470969	325341	3.2 to 5.6
29	25	4.2	23.7	624652	527484	452129	312326	3.2 to 6.4
29	26	4.4	22.8	600628	507197	434740	300314	3.2 to 6.4
29	27	4.5	22.0	578382	488412	418639	289191	3.2 to 6.4
29	28	4.7	21.2	557727	470969	403688	278864	3.2 to 6.4
24	24	4.9	20.5	538493	454728	389767	269247	3.2 to 7.2
24	25	5.1	19.6	516954	436539	374176	258477	3.2 to 7.2
24	26	5.3	18.9	497072	419750	359785	248536	3.2 to 7.2
24	27	5.5	18.2	478662	404203	346460	239331	3.2 to 8.0
24	28	5.7	17.5	461567	389768	334087	230784	3.2 to 8.0
20	24	5.9	17.1	448746	378941	324807	224373	3.2 to 8.0
20	25	6.1	16.4	430795	363782	311813	215398	3.2 to 8.8
20	26	6.4	15.7	414227	349792	299821	207114	3.2 to 8.8
20	27	6.6	15.2	398884	336835	288716	199442	3.2 to 9.6
20	28	6.8	14.6	384639	324806	278405	192320	3.2 to 9.6
16	24	7.3	13.6	358997	303153	259845	179499	4.8 to 10.4
16	25	7.6	12.6	344636	291026	249451	172318	4.8 to 10.4
16	26	7.9	12.1	331382	279834	239857	165691	4.8 to 11.2
16	27	8.2	11.7	319108	269469	230973	159554	4.8 to 12.0
16	28	8.6	13.1	307711	259845	222724	153856	4.8 to 12.0

18-TOOTH SPROCKET - HIGH RANGE

48-TOOTH SPROCKET - LOW RANGE								
Sprocket Combinations		Average Seed Spacing (cm)	Average Seeds per meter	Approximate Seed Rate per Hectare				Recommended Speed Range (km/h)
Drive	Driven			38	45	52.5	76	
35	24	8.9	11.2	294488	248679	213153	147244	6.4 to 9.7
35	25	9.3	10.7	282710	238733	204628	141355	6.4 to 9.7
35	26	9.7	10.3	271836	229550	196757	135918	6.4 to 9.7
35	27	10.1	9.9	261769	221049	189471	130885	6.4 to 9.7
35	28	10.4	9.6	252420	213155	182704	126210	6.4 to 9.7
29	24	10.8	9.3	244005	206049	176613	122003	6.4 to 9.7
29	25	11.2	8.9	234246	197808	169549	117123	6.4 to 9.7
29	26	11.7	8.6	225236	190199	163028	112618	6.4 to 9.7
29	27	12.1	8.2	216893	183154	156989	108447	6.4 to 9.7
29	28	12.6	7.9	209147	176613	151383	104574	6.4 to 9.7
24	24	13.0	7.7	201935	170523	146163	100968	6.4 to 9.7
24	25	13.6	7.4	193858	163702	140316	96929	6.4 to 9.7
24	26	14.1	7.1	186403	157407	134920	93202	6.4 to 9.7
24	27	14.7	6.8	179498	151576	129923	89749	6.4 to 9.7

Planting Rate Charts - Vacuum Meter

24	28	15.2	6.6	173088	146163	125283	86544	6.4 to 9.7
20	24	15.6	6.4	168280	142103	121803	84140	6.4 to 9.7
20	25	16.3	6.1	161549	136419	116931	80775	6.4 to 9.7
20	26	16.9	5.9	155336	131172	112433	77668	6.4 to 9.7
20	27	17.6	5.7	149583	126314	108269	74792	6.4 to 9.7
20	28	18.2	5.5	144239	121802	104401	72120	6.4 to 9.7
16	24	19.5	5.1	134623	113682	97441	67312	6.4 to 9.7
16	25	20.4	4.9	129238	109135	93544	64619	6.4 to 9.7
16	26	21.2	4.7	124268	104938	89947	62134	6.4 to 9.7
16	27	22.0	4.5	119665	101050	86615	59833	6.4 to 9.7
16	28	22.8	4.4	115391	97442	83521	57696	6.4 to 9.7

48-TOOTH SPROCKET - LOW RANGE

PX03972,00011D7-19-09JUN15

Operating the Vacuum Meter

Vacuum Meter Adjustment



P16590—UN—22AUG12

Vacuum level is indicated on the vacuum gauge(s) (A).

Vacuum Level

Seed	Vacuum Level
Soybean	8 inches
Corn	(See the following table.)
Popcorn	8 inches
Sweet Corn	(See the following table.)
Oil Sunflower	(See the table.)
Confectionary Sunflower	10 inches
Sorghum	8 inches
Edible Beans	8 inches*
Cotton	8 inches
Peanuts	(See the table.)
Sugar Beet	(See the table.)

NOTE: *For cells disks:

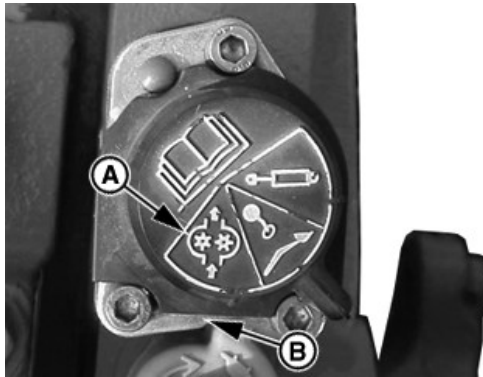
- *Small edible beans: For seeds at 6150 seeds per kilogram or higher, set the vacuum level at 6 inches.*
- *Medium Edible Beans: For seeds at 3950 seeds per kilogram or higher, set the vacuum level at 6 inches.*

NOTE: The recommended vacuum levels are a starting point and can be increased or reduced to adapt to seed type, shape and weight.

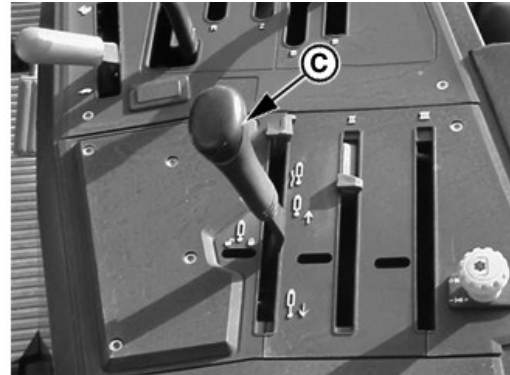
See the table for flat seed disks.

CN80434,0000727-19-04JAN18

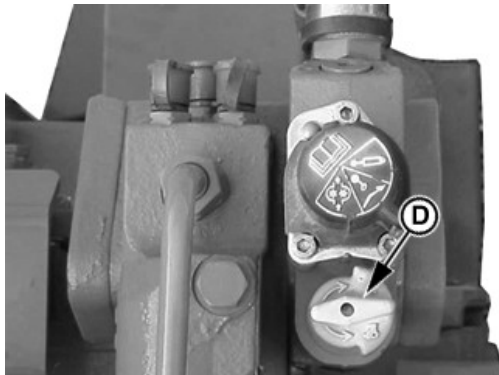
John Deere Series Tractors with 301 SCV



APY00646—UN—15DEC17



APY00645—UN—15DEC17



APY00644—UN—15DEC17

The 301 valve indicator must be aligned with notch (B) in the valve housing to operate the vacuum system in the continuous detent (A) position. Once the pressure hose is connected to the valve's upper quick coupler, SCV 301 lever (C) must be moved forward to activate the vacuum system hydraulic motor and must remain in this position (to have active hydraulic pressure at the fan motor).

NOTE: Verify the pressure hose quick coupler is connected to the SCV 301 pressure fitting. The special vacuum system return fitting must be connected to the SCV 301 return fitting.

IMPORTANT: On stopping the fan, move the SCV control lever to the FLOAT position and then shut off the tractor engine. With the engine off, move the control lever to the NEUTRAL position.

The vacuum gauge needle should point to the vacuum level selected above AT PLANTING SPEED.

Adjust the vacuum level in the following manner: Verify all planter pressure regulating valves are fully open.

1. Turn control valve knob (D) to obtain the minimum vacuum level.
2. Fill hoppers with seed.
3. Drive the tractor 10 meters forward to fill the seed disk cells.
4. Reset the oil flow until the vacuum gauge needle points to the vacuum level indicated above AT PLANTING SPEED.

NOTE: It is not necessary to adjust the vacuum level daily. The vacuum level will be slightly lower when starting the tractor and pump. Some variation in vacuum level is normal during fan operation. A variation of up to 1/2 inch of vacuum between the two fans is normal.

NOTE: Start the fan motor at the lowest flow rate possible and then adjust to the level indicated for the seed to be planted.

IMPORTANT: Use the planter flow regulating valves in the fully open position. Use them only to equalize the vacuum level between the two fans.

Tractors with Piston-Type Hydraulic Pump Only:

The vacuum level can be set using the planter's flow regulating valves.

For tractors with a flow control hydraulic system, the instructions for setting SCV flow are found in the tractor operator's manual or flow can be controlled using the planter regulating valves (A).

On tractors without a flow control hydraulic system, use the planter flow regulating valves (A) to adjust the vacuum level.

NOTE: Verify the pressure hose quick coupler is connected to the SCV pressure fitting.

The special vacuum system return fitting must be connected to the SCV return fitting.

IMPORTANT: On stopping the fan, move the SCV control lever to the FLOAT position and then shut off the tractor engine. With the engine off, move the control lever to the NEUTRAL position.

The vacuum gauge needle should point to the vacuum level indicated above AT PLANTING SPEED.

Adjust the vacuum level in the following manner:

1. Adjust oil flow until a minimum vacuum level is obtained.
2. Fill hoppers with seed.
3. Drive the tractor 10 meters forward to fill the seed disk cells.
4. Reset the oil flow until the vacuum gauge needle points to the vacuum level indicated above AT PLANTING SPEED.

NOTE: It is not necessary to adjust the vacuum level daily. The vacuum level will be slightly lower when starting the tractor and pump. Some variation in vacuum level is normal during fan operation.

NOTE: Start the fan motor at the lowest flow rate possible and then adjust to the level indicated for the seed to be planted.

CN80434.0000728-19-04JAN18

PX03972.0000E08-19-29APR14

Closed-Center Hydraulic System Tractors



P16591—UN—22AUG12

A—Regulating Valves

Zeroing Vacuum Gauge After Installation



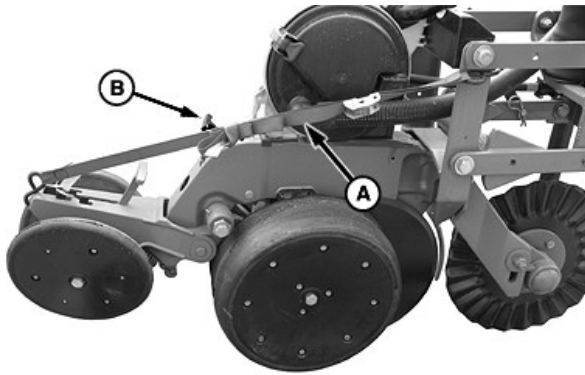
APY00653—UN—15DEC17

With the vacuum producing system off and the vacuum gauge vertical, disconnect the vacuum signal hose. Use zeroing screw (A) to place the vacuum gauge needle at exactly zero. Reconnect the vacuum gauge hose, activate vacuum producing system off, fill the seed disk cells with seed and set the recommended vacuum level.

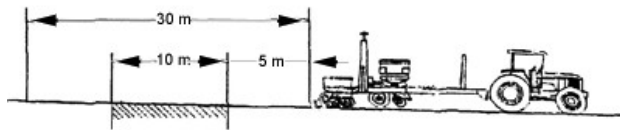
CN80434,0000726-19-08JAN18

Checking Seed Population

Checking Seed Population



A80229—UN—26FEB14



PUM2398—UN—05MAY08

Area to be Checked

A—Depth Handle
B—Ratchet Strap

1. Attach a ratchet strap (A), as shown, to one or more sets of closing wheels, so seed trench remains open.
2. Set depth handle (B) two settings from minimum.
3. Plant a short distance and check to verify that seeds are visible in trench. Adjust depth handle as needed.
4. Plant a distance of approximately 30 meters.
5. Within these 30 meters, select a row section with 10 meters planted at a distance of more than 5 meters from the planter. Count the number of seeds. If the number does not match the values in the table, perform the adjustments needed to achieve the desired population (or number of seeds per meter).

PX03972,00002E2-19-24MAR14

Alternate Method

1. Follow the procedure above until reaching item 4.
2. Refer to the table to determine the distance equal to 1/1000 of a hectare, based on the row width used for planting.

Portion of Hectare	Row Length in Meters			
	Row Width			
	38 cm	45 cm	52.5 cm	76 cm
1/1000	26	22	19	13



PUM2399—UN—05MAY08

A—Flags
B—Seeds

3. Use flags (A) to mark the distance selected.
4. Count the seeds (B) between flags.
5. Multiply the amount of seeds by 1000. If the number of seeds does not match the values in the table, perform the adjustments needed to achieve the desired population (or number of seeds per meter).

NOTE: When planting at shallow depths with the closing wheels raised, seeds may roll or bounce. This will affect seed spacing accuracy.

If field tests indicate that the planter is planting a population significantly different than the rate charts indicate, investigate the following in the order listed:

— Verify ALL transmission sprockets are set according to the rate chart.

— Excessive unit bounce can cause low population and reduce seed spacing control. Reduce excessive bounce by increasing planting unit down force, or drive the tractor slower.

— Verify that the planter drive wheel slippage is more or less normal. Variations in drive wheel slippage can be caused by crop residue, tire inflation pressure, soil conditions and machine down force. The amount of tire slippage can be verified by measuring the rolling circumference of the tires as follows:

Attach a marker, such as a chain or rubber strap, to the tire. Measure the distance between the marks left by the tire when operating at planting speed. The average of five measurements should be within the following ranges:

Drive Tire Size	Rolling Circumference	Tire Inflation Pressure
7.60-15 8PR	2362—2515 mm	207 kPa 2.1 bar 30 psi

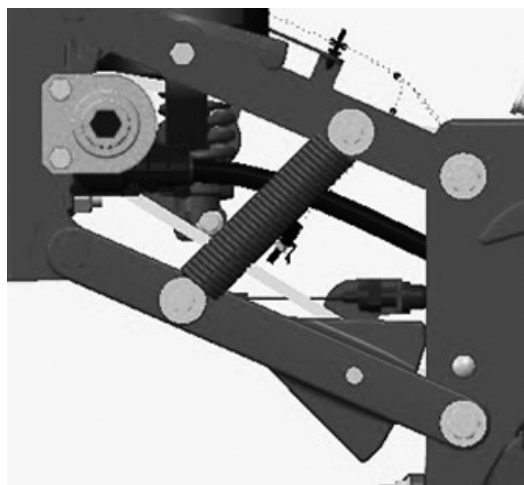
If the average measured rolling circumference is not

within these ranges and the tire pressure is adjusted correctly, the seed transmission can be adjusted to compensate for the slippage. Use a transmission setting that produces the desired population.

— If all settings are correct and the seed population is too high, the vacuum level can be reduced in 1 in. increments until the correct population is achieved. — If the actual population is too low, the vacuum level can be raised in 1 in. increments until the correct population is achieved.

PX03972,00011D8-19-09JUN15

Drive Wheel Slippage



P17273—UN—27MAR14

Another cause of differences in actual seed or fertilizer rates differing from the populations shown in the operator's manual is the amount of drive wheel slippage.

Although a certain amount of wheel slippage is normal, excessive slippage may cause undesirable changes in the actual populations.

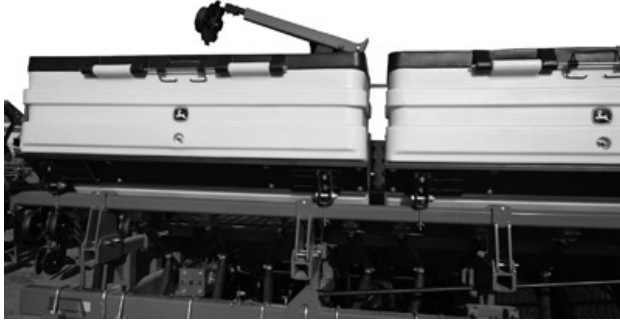
Excessive slippage may be caused by binding or poorly lubricated parts, misaligned bearings or hardened material in the fertilizer or seed hoppers.

IMPORTANT: The populations shown in the operator's manual do not take into account any drive wheel slippage.

PX03972,00002E7-19-27MAR14

Dry Fertilizer

Dry Fertilizer



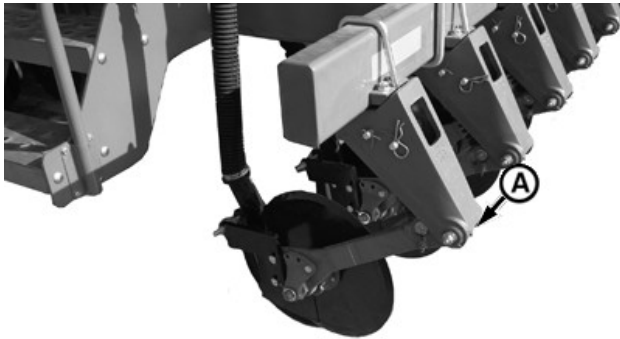
P16597—UN—22AUG12

Each fertilizer hopper has a capacity of approximately 600 liters.



PUM2402—UN—05MAY08

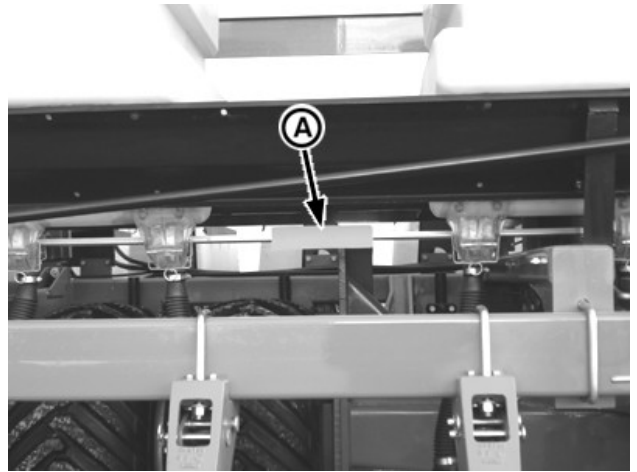
Fertilizer is distributed by meters with metering type wheels at the bottom of each hopper.



P16592—UN—22AUG12

A—Fertilizer Openers

Fertilizer is applied to the soil by fertilizer openers (A).



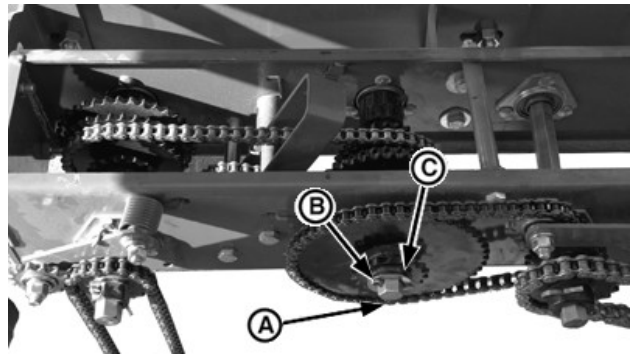
PUM3077—UN—02FEB09

A—Indicator

Indicator (A) turns while the planter is in operation. If this indicator does not turn, check the planter drive system.

PX03972,0001250-19-10MAR15

Changing High/Low Rate Fertilizer Sprocket Combinations

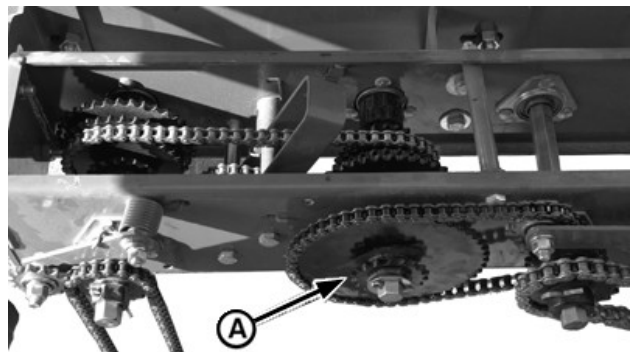


P16593—UN—22AUG12

A—Link
B—Cotter Pin
C—Washer

See the appropriate fertilizer table to determine sprocket combinations.

1. Remove link (A) from the drive chain.
2. Remove cotter pin (B) and washer (C).



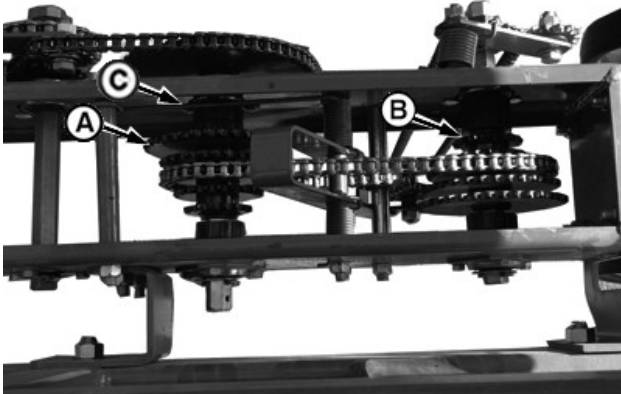
P16594—UN—22AUG12

A—Sprocket

3. Position sprocket (A) in the desired position.
18-TOOTH SPROCKET - HIGH RANGE
48-TOOTH SPROCKET - LOW RANGE
4. Install the washer and cotter pin.

PX03972.00000B8-19-22APR14

Changing Fertilizer Rate Sprocket Combinations

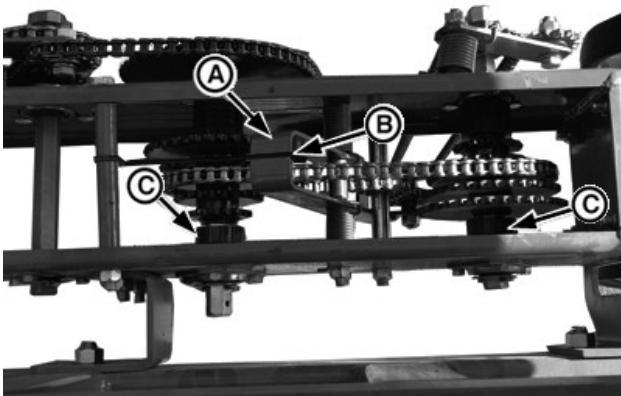


P16596—UN—22AUG12

- A—Drive**
B—Sprockets
C—Retaining Hook

The amount of fertilizer to be applied is determined by the combination of drive (A) and driven sprockets (B).

To change the sprocket combination, remove retaining hook (C) from its storage position.



P16598—UN—22AUG12

- A—Chain Tensioner**
B—Hook
C—Rubber Spacers

1. Pull chain tensioner (A) down and secure it with hook (B).

2. Take the chain off the drive and driven sprockets.
3. Remove rubber spacers (C) from sprockets.
4. Slide the drive and driven sprockets and until they are aligned with the chain tensioner and reinstall the chain.
5. Insert the rubber spacers on the sprockets as needed.

IMPORTANT: Verify the sprockets are aligned with the chain tensioner and secured by rubber spacers. Verify the chain runs correctly over the selected sprockets; a misaligned chain will cause the drives to fail.

NOTE: Because the dry fertilizer meter measures volume rather than weight and, due to differences between brands, chemical composition, temperature and humidity the weight measured can vary by up to 100% from the weight calculated in the fertilizer rate table.

PX03972.0000E3B-19-10MAR15

Check Dry Fertilizer Rates

To verify the exact weight in kilograms of fertilizer that will actually be applied for the 70-cm row spacing, proceed as follows:

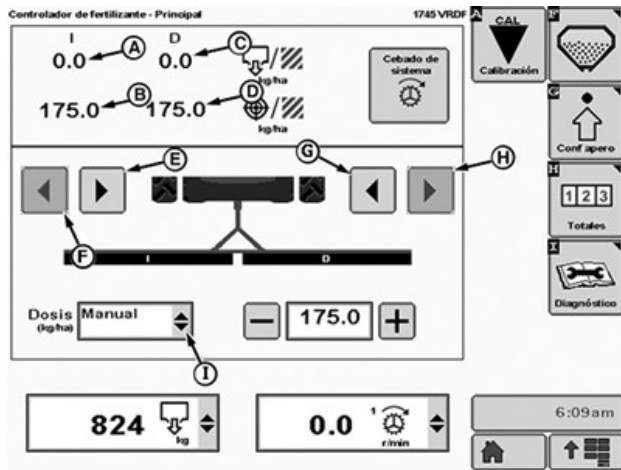
Disconnect a hose from the fertilizer hopper and place a plastic bag or other suitable container under the hopper mouth. Connect the fertilizer attachment and drive 14.3 meters. Weigh the amount of fertilizer (in kg) collected in the container and multiply by 1000. The result will be the weight in kg of fertilizer applied per hectare when planting 70 cm rows.

PX03972.0001251-19-10MAR15

Configuring the Fertilizer Variable Rate Drive System

Initial Settings — Fertilizer

NOTE: Perform these procedures with Tractor switched ON.



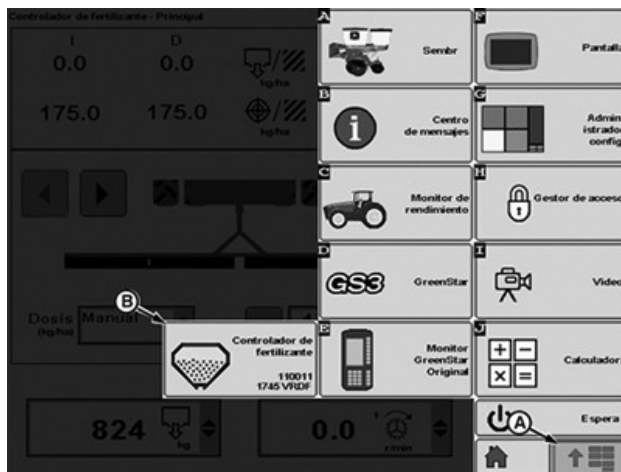
APY00654—UN—15DEC17

- A—Delivery Rate (LHS Section)
- B—Target Rate (LHS Section)
- C—Delivery Rate (RHS Section)
- D—Target Rate (RHS Section)
- E—Deactivate LHS Section
- F—Activate LHS Section
- G—Deactivate RHS Section
- H—Activate RHS Section
- I—Fertilizer Rate Configuration

System Cleanup

NOTE: Perform these procedures with Tractor switched ON.

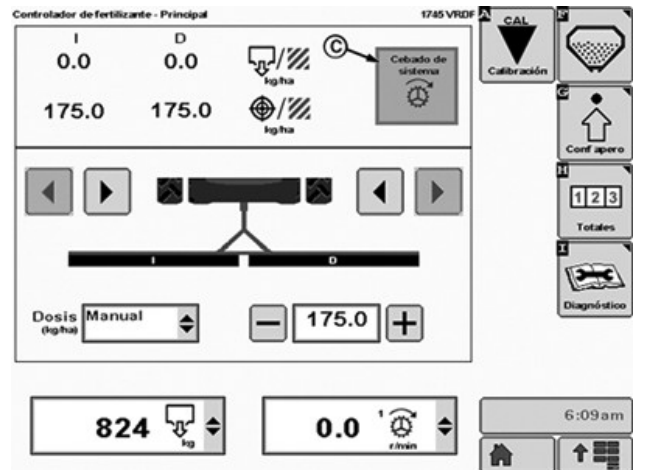
1. Select Fertilizer Control icon (B) in Start Menu (A).



APY00655—UN—15DEC17

- A—Start Menu
- B—Fertilizer Controller

2. Select System Cleanup icon (C).



APY00656—UN—15DEC17

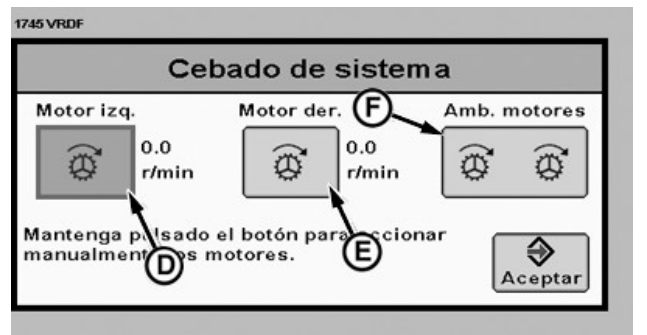
C—System Cleanup

NOTE: Make sure VRD Motors are engaged and both drive sections (G) activated.

3. Press icon (D) to activate left-hand motor, icon (E) to activate right-hand motor and icon (F) to activate both motors manually.



P17596—UN—07APR15



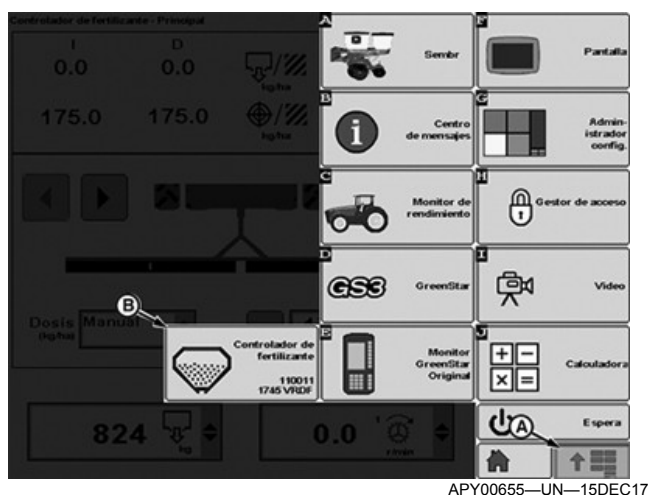
P17606—UN—20APR15

- D—LH Motor Activation
- E—RH Motor Activation
- F—Both Motors Activation
- G—Motors Activation

Configuring the Implement

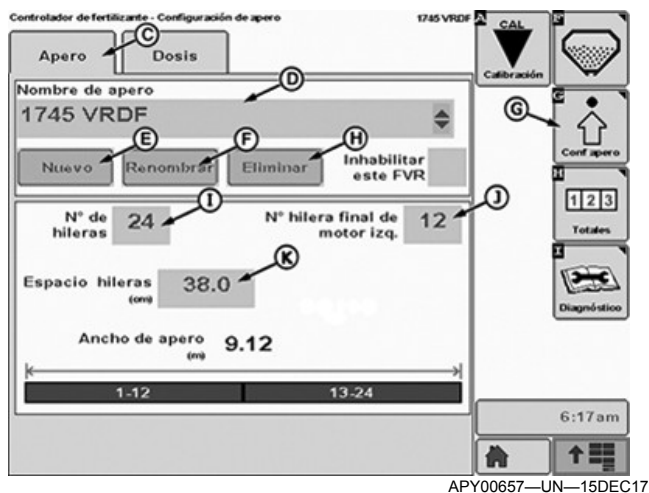
NOTE: Perform these procedures with Tractor switched ON.

1. Select Fertilizer Control icon (B) in Start Menu (A).



A—Start Menu
B—Fertilizer Controller

2. Select Implement Setup icon (G).



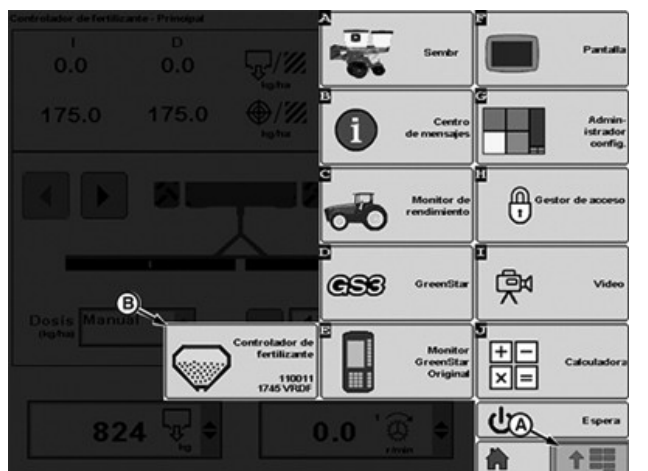
C—Implement
D—Implement Name
E—New
F—Rename
G—Implement Setup
H—Removing
I—Number of Rows
J—Number of Rows for LHS Motor
K—Row Spacing

3. Select Implement icon (C).
4. Select Implement Name icon (D) to select the model.
5. Select New icon (E) to create a new implement name, Rename icon (F) to edit an existing implement name or Remove icon (H) to delete an existing implement name.
6. Select Row Number icon (I) to inform the number of planting rows corresponding to seed drill setup.
7. Select Row Number for LHS Motor icon (J) to inform the number of planting rows connected to LHS motor.
8. Select icon (K) to inform seed drill row spacing.

Configuring the Fertilizer Rate

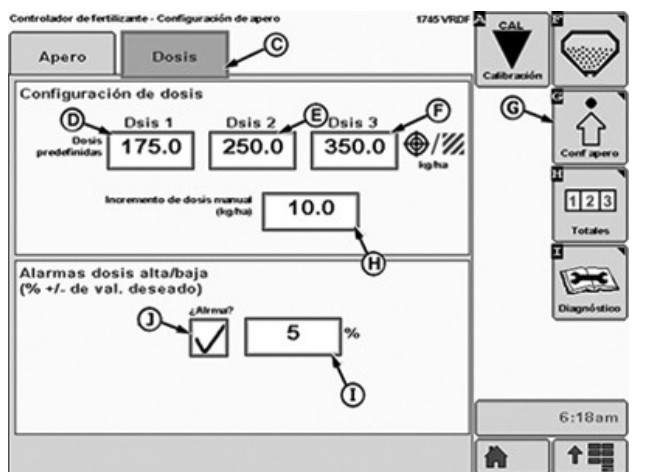
NOTE: Perform these procedures with Tractor switched ON.

1. Select Fertilizer Control icon (B) in Start Menu (A).



A—Start Menu
B—Fertilizer Controller

2. Select Implement Setup icon (G).



C—Rate Configuration
D—Rate 1
E—Rate 2
F—Rate 3
G—Configuring the Implement
H—Manual Rate Change Increment
I—Admissible Variation Percentage
J—Rate Variation Alarm ON/OFF

3. Select Rate Configuration icon (C).
4. Three distinct fertilizer seed rates can be configured, called preset rates. Select icon (D) to set Rate 1, icon (E) to set Rate 2 and icon (F) to set Rate 3.
5. Select Rate Change Increment icon (H) to define the increment added for manual rate variation at fertilizer controller initial screen.
6. Select icon (I) to define target rate variation

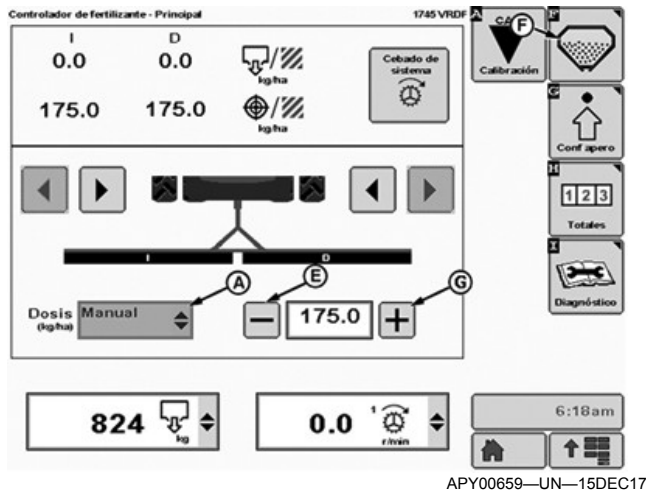
percentage above and below margin that will trigger an alarm.

7. Select icon (J) to engage or disengage the alarm system.

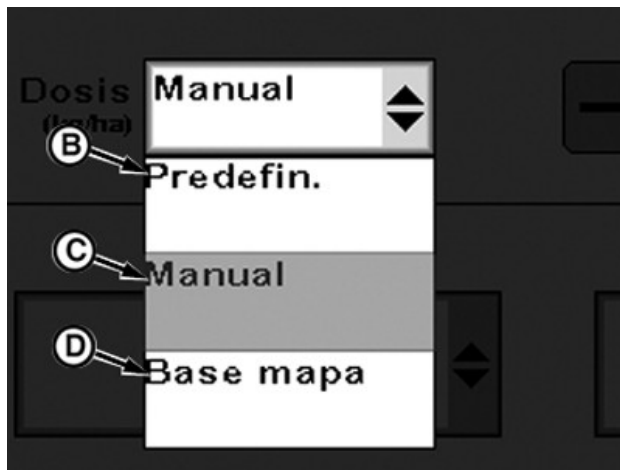
Selecting the Fertilizer Rate

NOTE: Perform these procedures with Tractor switched ON.

1. Select Fertilizer Control icon (F).



APY00659—UN—15DEC17



APY00660—UN—15DEC17

- A—Fertilizer Rate Setup
B—Preset
C—Manual
D—Map Based
E—Reduce
F—Increment

2. Select Fertilizer Setup icon (A) to define the mode to be used:
 - a. **Preset (B):** Select one of the three preset rates, previously adjusted.
 - b. **Manual (C):** Reduce fertilizer rate at icon (E) or increment fertilizer rate at icon (G) during planting.

- c. **Map Based (D):** This will execute an automatic reading according to the map loaded in monitor.

CN80434,0000709-19-15DEC17

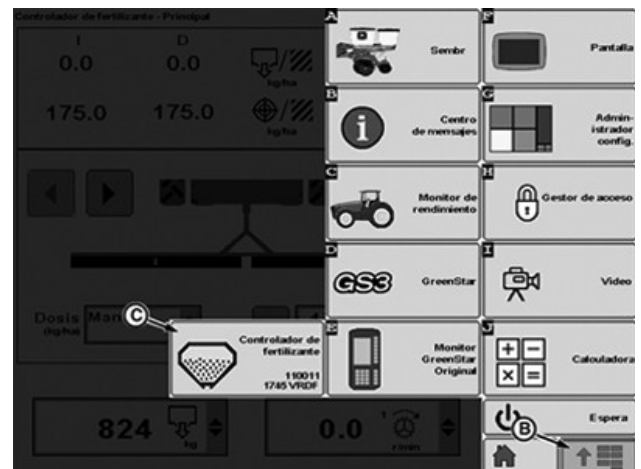
Calibrating the MDV — Fertilizer

NOTE: Perform these procedures with Tractor switched ON.

1. Park seed drill on firm and level terrain.
2. Raise seed drill.

CAUTION: Engage safety stops before performing the procedure. Refer to **Installing Cylinder Safety Stops**, in this Section.

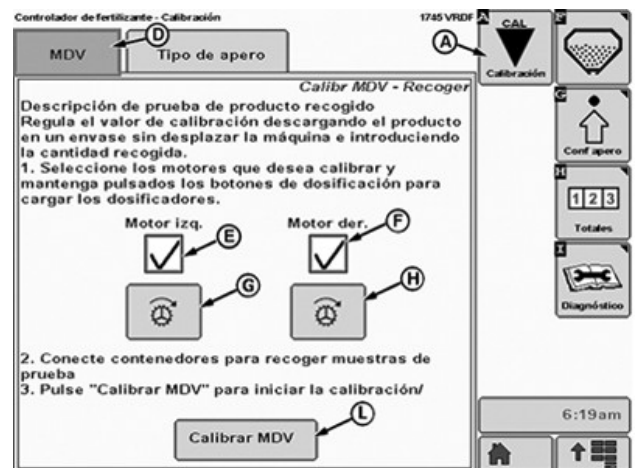
3. Select Fertilizer Control icon (C) in Start Menu (B).



APY00661—UN—15DEC17

- B—Start Menu
C—Fertilizer Controller

4. Select Calibration icon (A).

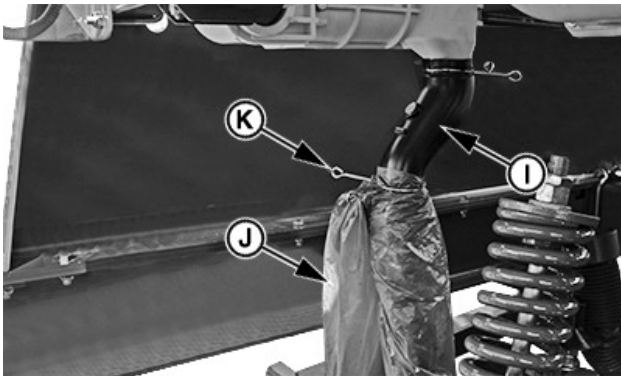


APY00662—UN—15DEC17

- A—Calibration
D—MDV
E—LH Motor
F—RH Motor

G—Activate LH Motor
H—Activate RH Motor
L—Calibrate MDV

5. Select MDV icon (D).
6. Select the motor to be calibrated at icons LHS Motor (E) and RHS Motor (F).
7. Select Activate LHS Motor (G) and Activate RHS Motor (H) icons to turn motor and test operation.
8. Remove fertilizer hoses from fertilizer meter tube (I).



I—Fertilizer Meter Tube
J—Collector Bag
K—Clip

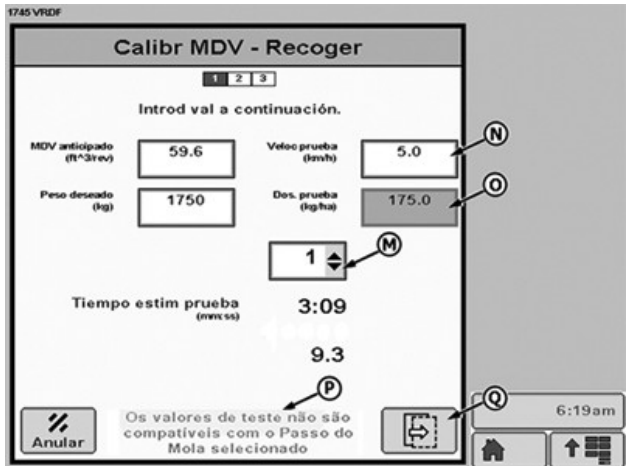
9. Put collector bags (J) on fertilizer meter tube opening (I) and secure using clip (K).

IMPORTANT: Follow these steps for better sampling results:

- Fertilizer should be evenly distributed in fertilizer box.
- Fertilizer box half full.
- Make sure the system is clean and fertilizer meters loaded with fertilizer.
- Repeat the procedure 3 times.
- Collect at least 5 meters of one fertilizer box for each motor.

NOTE: The higher the number of collected meters, the lower system variation will be.

10. Press icon Calibrate MDV (L) to initiate the calibration.
11. 1745 Planter does not use an auger to deliver the fertilizer, select 1 as default.



APY00664—UN—15DEC17

M—Spring Pitch
N—Test Speed
O—Test Rate
P—Error Message
Q—Confirmation

12. Select Test Speed icon (N) and inform average planting speed.
13. Select Test Rate icon (O) and inform Fertilizer Rate that will be applied for planting.

*NOTE: If values that are incompatible with the selected spring pitch are introduced, monitor will display error message (P). Check Section **Fertilizer Rate - Seed Drills with Variable Rate Drive** to consult possible configurations.*

14. Select Confirmation icon (Q) to confirm the parameters.
15. Select Start icon (R) to begin with the test.



APY00665—UN—15DEC17

R—Start
S—Stop

IMPORTANT: Keep tractor engine speed high for calibration. The recommended range is from 1500 rpm to 2000 rpm.

NOTE: To perform the calibration, the VCS must be engaged.

16. If an emergency stop is necessary or if you want to restart the test, press icon Stop (S) to stop the motors and cancel or restart the test.
17. Remove collector bags and weight them. Add total mass and divide by the number of fertilizer lines used in the test.
18. Select icon and insert average value obtained for each fertilizer motor. Based on this information the system will readjust itself to improve system reading precision.

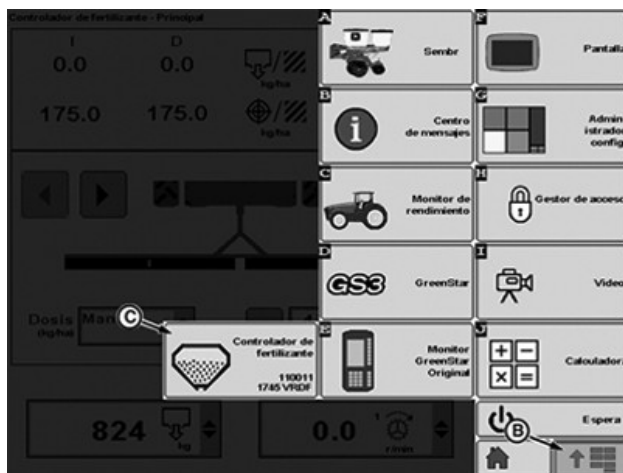
NOTE: It is recommended to repeat this procedure three times to reduce system variation and ensure metering precision.

CN80434,000070A-19-21DEC17

Height Sensor Calibration

NOTE: Perform these procedures with Tractor switched ON.

1. Select Fertilizer Control icon (C) in Start Menu (B).



APY00661—UN—15DEC17

B—Start Menu
C—Fertilizer Controller

2. Select Calibration icon (A).



APY00666—UN—15DEC17

A—Calibration
D—Height Sensor

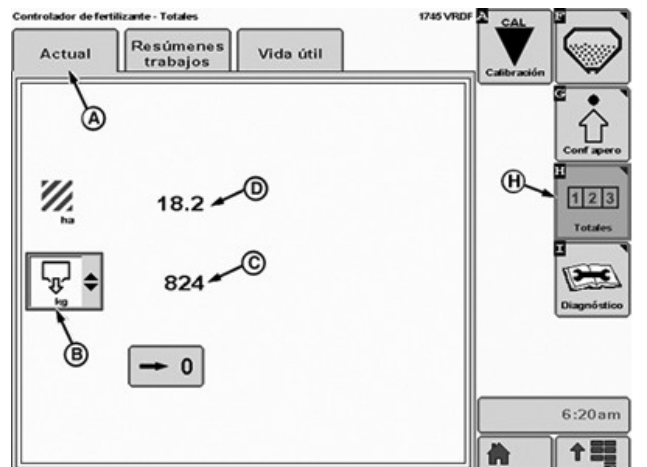
3. Select Height Sensor icon (D).
4. Follow the steps described on Height Sensor Calibration screens.

IMPORTANT: Initial heights above 80% or stops below 20% are not recommended as they may cause unexpected or inconsistent product application.

CN80434,000070B-19-15DEC17

Total Values Information

NOTE: Perform these procedures with Tractor switched ON.



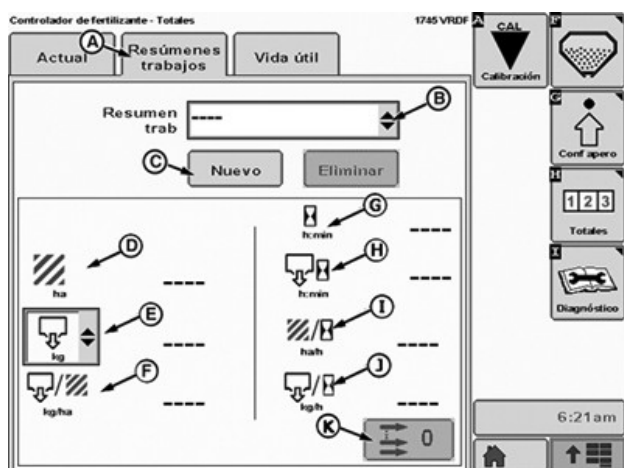
APY00667—UN—15DEC17

A—Current
B—Quantity of Fertilizer
C—Icon
D—Area
H—Totals

1. Select Totals icon (H) and select Actual tab (A) to consult information about:

- (B) Quantity of fertilizer applied.
- (D) Area of fertilizer application.

2. Select icon (C) to clean the fields and start a new count.



APY00668—UN—15DEC17

D—Total Fertilizer Quantity
E—Fertilizer per Total Time

Consult Accumulated Time tab (A) for information about:

- (B) Total Hours
- (C) Total Area
- (D) Total Fertilizer Quantity
- (E) Fertilizer per Total Time

NOTE: The values in Accumulated Time tab cannot be reset.

CN80434.000070C-19-15DEC17

Fertilizer Controller Readings

NOTE: Perform these procedures with Tractor switched ON.

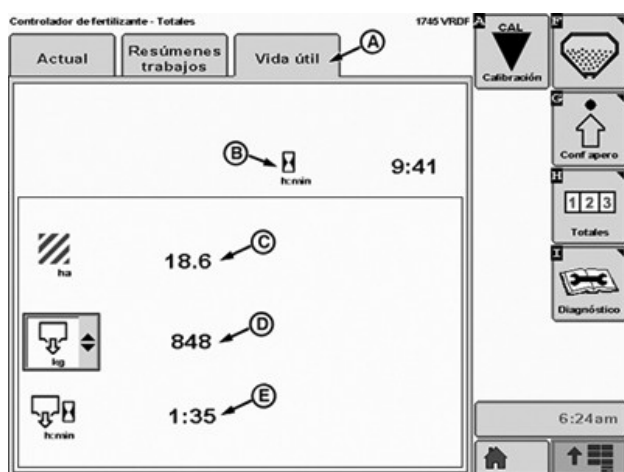
1. Select Operation Totals tab (A) to consult information about:

- (D) Area of fertilizer application.
- (E) Quantity of fertilizer applied.
- (F) Quantity per area of application.
- (G) Total time.
- (H) Application time.
- (I) Time per area of application.
- (J) Quantity of fertilizer per time span.

2. Select icon (B) and choose a job to check totals.

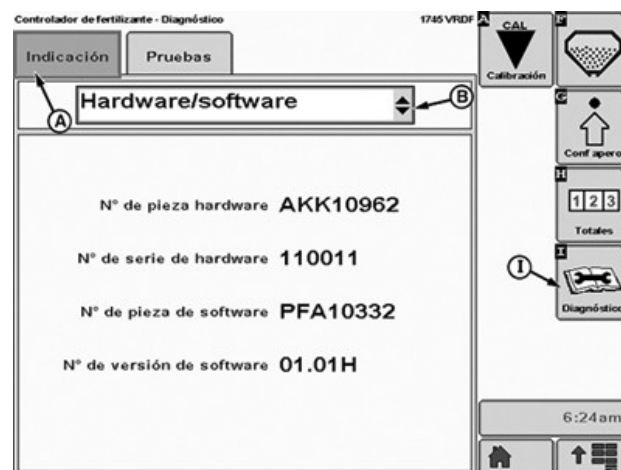
- To create a job, select field (C) and type the requested name. This allows to compare work performed by different operators or in different areas.

3. Select icon (K) to clean the fields and start a new count.



APY00669—UN—15DEC17

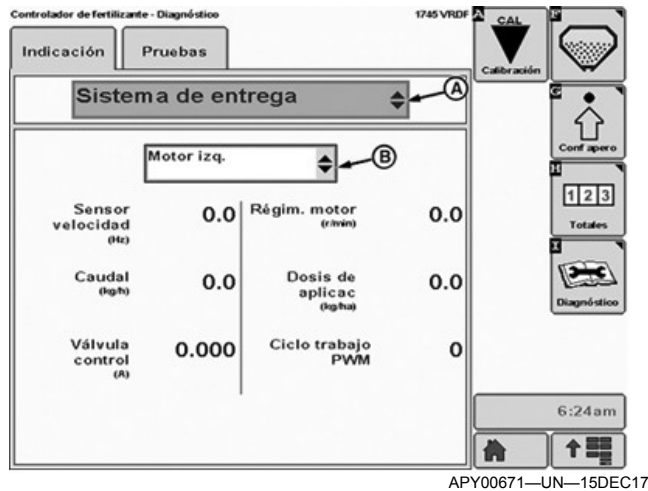
A—Accumulated Time
B—Total Hours
C—Total Area



APY00670—UN—15DEC17

A—Readings
B—Hardware/Software
I—Diagnosis

Select Readings tab (A), Diagnosis icon (I) and select Hardware/software option (A) to consult component version numbers.



APY00671—UN—15DEC17

A—Readings
B—Motor Selection

Select Distribution System option (A) and select Motor (B) to consult information about:

- Speed Sensor
- Flow Rate
- Control Valve
- Motor Speed
- Application Rate
- Duty Cycle



APY00672—UN—15DEC17

A—Voltage System

Select Voltage System option (A) to consult information about:

- ECU Power
- Sensor 1 Supply
- Sensor 2 Supply
- Valve Supply



APY00673—UN—15DEC17

A—Operation Parameters

Select Operation Parameters option (A) to consult information about:

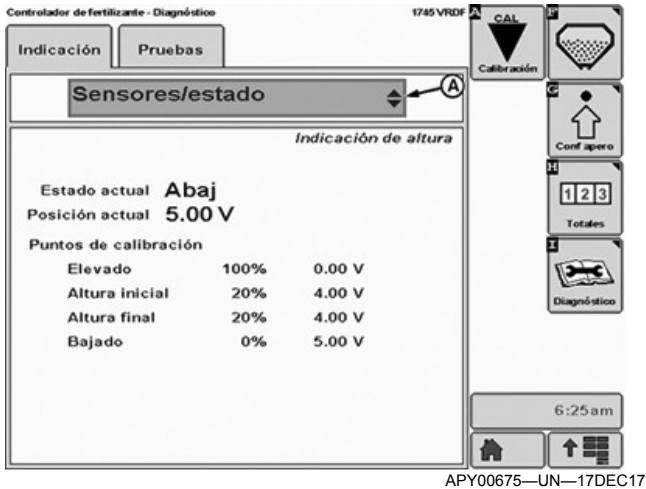
- Working Width
- Speed
- Speed Source
- Implement Wheel Motion Sensor



APY00674—UN—15DEC17

A—Switches

Select Switches option (A) to consult information about RHS and LHS motors.



A—Sensor

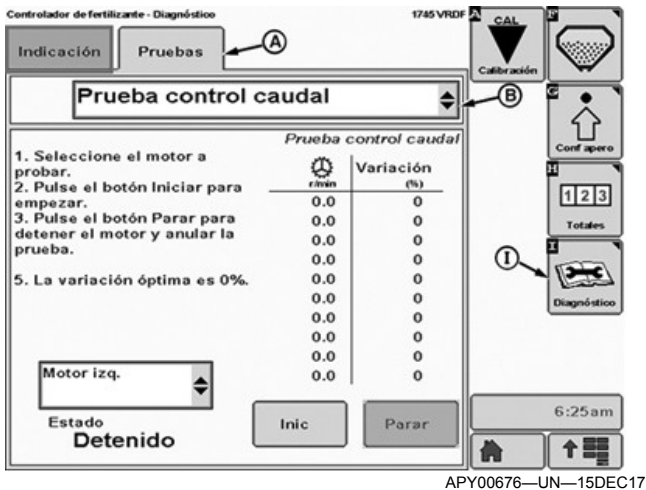
Select Sensor option (A) to consult information about wheel set height sensor.

CN80434,000070D-19-15DEC17

Fertilizer Controller Tests

NOTE: Perform these procedures with Tractor switched ON.

Flow Control Test



A—Tests

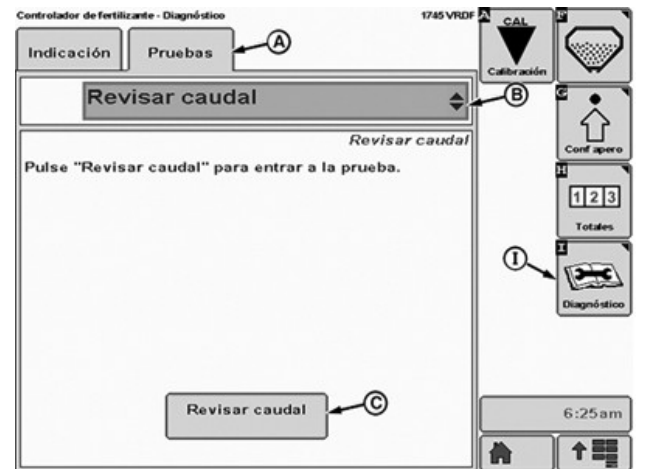
B—Flow control test

I—Diagnosis

1. Select Diagnosis icon (I) and open Tests tab (A).
2. Select Flow Control Test option (B).
3. Follow the procedure described on the screen to perform the test.

APY00676—UN—15DEC17

Flow Rate Test



APY00677—UN—15DEC17

A—Tests

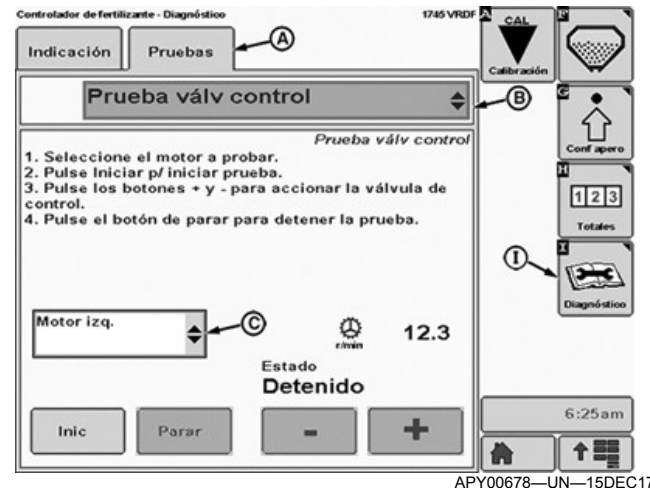
B—Flow Rate Test

C—Flow Rate Test Icon

I—Diagnosis

1. Select Diagnosis icon (I) and open Tests tab (A).
2. Select Flow Rate Test option (B).
3. Select Flow Rate Test icon (C) and follow the procedure described on the screen to perform the test.

Control Valve Test



APY00678—UN—15DEC17

A—Tests

B—Control valve test

C—Motor Selection

I—Diagnosis

1. Select Diagnosis icon (I) and open Tests tab (A).
2. Select Control Valve Test option (B).
3. Select Motor (C) and follow the procedure described on the screen to perform the test.

CN80434,000070E-19-18DEC17

Approximate Dry Fertilizer Application Rates (kg/hectare)

NOTE: RATE BASED ON DRY FERTILIZER WITH A DENSITY OF 0.96 kg/dm³

Sprocket Combinations									
Drive	Driven	38-cm Rows		45-cm Rows		52.5-cm Rows		76-cm Rows	
16	36	70	184	59	155	50	133	35	92
16	33	75	199	63	168	54	144	38	100
16	30	81	213	68	180	58	154	41	107
21	36	86	230	73	194	62	166	43	115
21	33	94	248	79	210	68	180	47	124
21	30	101	270	85	228	73	196	51	135
26	36	105	278	88	234	76	201	53	139
28	36	110	294	93	248	80	213	55	147
26	33	111	296	94	250	80	214	56	148
28	33	117	315	99	266	85	228	59	158
26	30	119	320	101	270	86	232	60	160
16	18	123	327	104	276	89	237	62	164
28	30	127	340	107	287	92	246	64	170
16	16	136	361	115	304	98	261	68	181
36	36	136	361	115	304	98	261	68	181
36	33	147	390	124	329	106	282	74	195
21	18	154	414	130	350	112	300	77	207
36	30	160	425	135	359	116	308	80	213
21	16	173	460	146	388	125	333	87	230
26	18	191	508	161	429	138	368	96	254
28	18	204	547	172	462	148	396	102	274
26	16	215	576	182	486	156	417	108	288
28	16	235	578	199	488	170	418	118	289
36	18	276	738	233	623	200	534	138	369
36	16	318	849	269	717	230	614	159	425

PX03972,0001252-19-09JUN15

Fertilizer Application Rates for Variable Rate Drive

Fertilizer Rate

	Row Spacing for Planting (m)				
	0.38	0.45	0.525	0.70	0.76
Minimum Rate (kg/ha)	30	25.7	22	16.5	15
Maximum Rate (kg/ha)	1520	1283.3	1100	825	760

NOTE: Fertilizer Rates for Variable Rate Drive calculated for planting speed of 12 km/h. Higher rates can be achieved with lower planting speeds.

PX03972,000125D-19-09JUN15

Storing Dry Fertilizer

Keep fertilizer dry. Do not store in a moist environment.

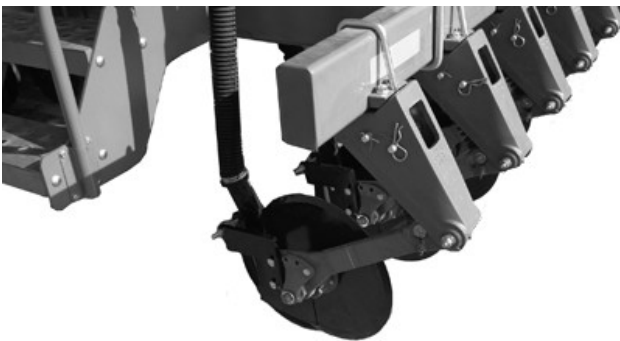
Most fertilizers accumulate humidity quickly and will corrode metal. This corrosion will not only reduce the life of metals, but also leads to unnecessary expenses for parts broken by seizure and blockage. Fertilizer will

settle in the hopper and block moving parts. For this reason, it is recommended that the hoppers be cleaned out after every shift when using the planter.

CAUTION: Agricultural chemicals are hazardous. Improper selection or use can cause injury to people, animals, plants, soil or other properties. TO AVOID INJURY, choose the right chemical for each job. Handle and apply chemicals carefully. Follow the instructions of the chemical manufacturer.

PX03972,0001253-19-10MAR15

Single-Disk Fertilizer Opener



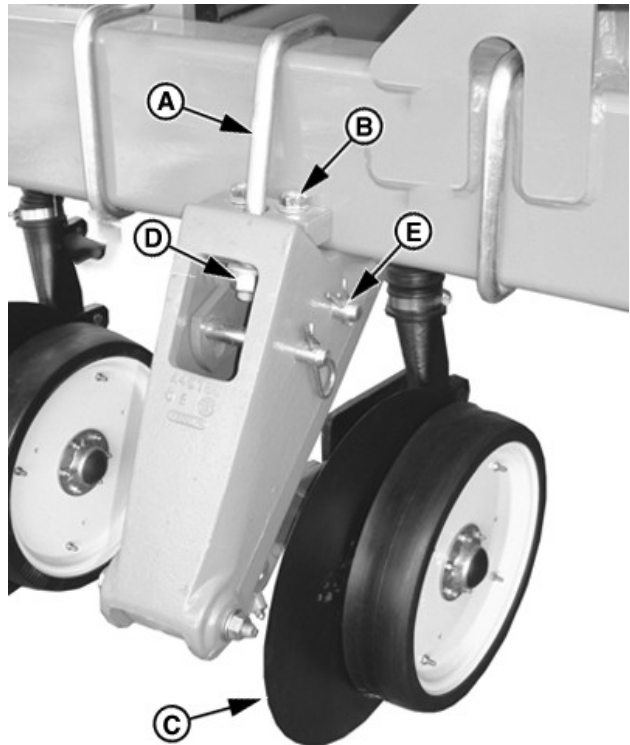
P16599—UN—22AUG12

Single-disk fertilizer openers have been designed specifically for applying bands of liquid or dry fertilizer in soil that is difficult to penetrate and that has a large amount of trash. The single blade and gauge wheel configuration reduces seed zone disturbances under these conditions and helps to preserve humidity in these types of soils. The gauge wheel helps to maintain a uniform fertilizer depth.

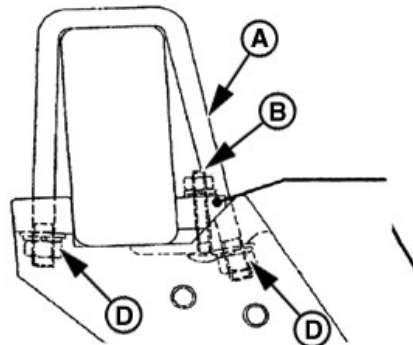
PX03972,0001254-19-10MAR15

Position Fertilizer Opener

In most cases, the opener can be positioned a 0 to 125 mm from the sides of the row. However, some frame structures may restrict this range or limit the location of the opener to one side of the row.



APY00679—UN—15DEC17



APY00680—UN—15DEC17

A—U-Bolt
B—Wedge Cap Screw
C—Disk
D—U-Bolt Nuts
E—Locking Pin

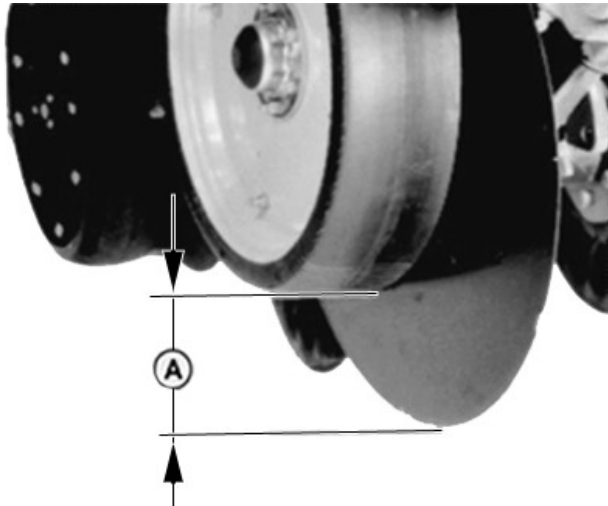
To change the position of the fertilizer opener, loosen opener U-bolt (A), wedge cap screws (B) and slide the opener to the left or right until disk (C) is in the desired position.

Attach the opener to the frame in the following manner:

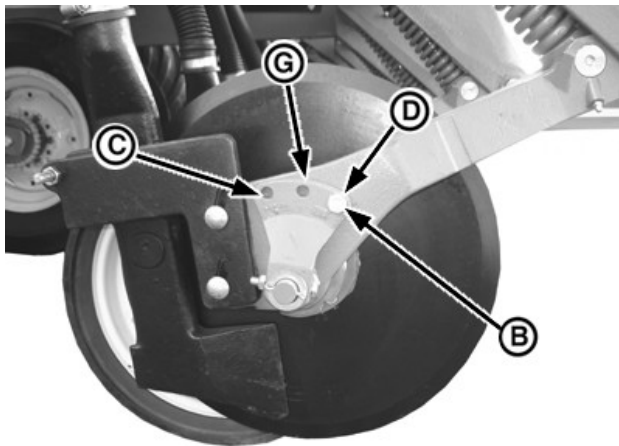
1. Adjust U-bolt nuts (D) until the opener is at a right angle to and touching the bottom of the beam.
2. Tighten wedge cap screws (B) to 70 Nm (52 lb-ft).
3. Tighten U-clamp nuts (D) to 135 Nm (100 lb-ft).
4. Install locking pin (E) along with its spring pin.

CN80434,000070F-19-08JAN18

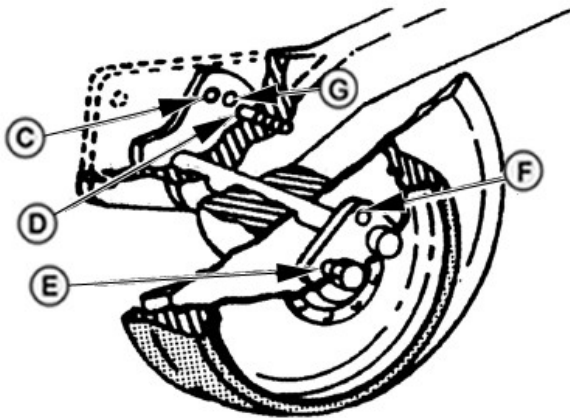
Position Gauge Wheel



PUM2414—UN—05MAY08



PUM3083—UN—02FEB09



PUM2416—UN—05MAY08

A—Depth Dimension
B—Bolt
C—Hole
D—Hole
E—Bolt
F—Hole
G—Hole

The gauge wheel can be positioned for three different

application depths: normal, intermediate and shallow or low. Soil condition will determine the optimal position for maintaining the most uniform fertilizer application. The normal position should be used in most conditions except where insufficient opener penetration or rocks are a problem.

Depending on soil conditions, the shallow or low position will apply fertilizer at a depth of up to approximately 50 mm, the intermediate position will allow a depth of approximately 75 mm and the normal position will be 100 mm.

NOTE: The fertilizer concentration pattern will vary according to soil conditions. Dry, loose ground will slightly fill the furrow causing fertilizer to be distributed in a narrow vertical band. Wet or firm soil will result in a better-defined furrow and fertilizer will be concentrated more near the bottom of the furrow.

To adjust dimension (A) place depth adjustment bolt (B) in the corresponding hole.

For maximum depth place adjusting bolt (B) in hole (C); for an intermediate depth place it in hole (G); for a minimum depth place it in hole (D).

In most conditions, the gauge wheel should be attached to the lever arm at (E).

NOTE: On the left-side openers, bolt (E) has left-hand threads and the right-side ones have right-hand threads. The bolt should be tightened in the direction of wheel rotation.

PX03972,0000E41-19-22AUG12

Setting Down Force

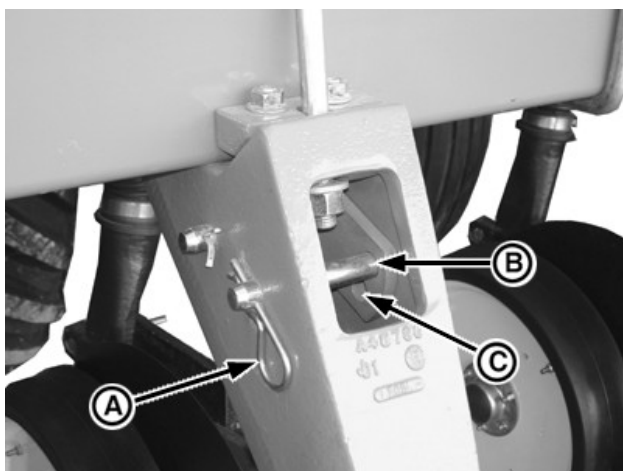
Opener down force can be adjusted to provide effective penetration in changing field conditions. Apply the following criterion to determine the proper opener down force setting:

1. Apply only the amount of down force needed for the working conditions.
2. Observe the gauge wheel operating depth:
 - a. If the wheel is too deep in the soil, use the minimum spring load setting.
 - b. If the disk is not penetrating enough for the gauge wheel to be in constant contact with the soil surface, use the maximum spring load setting.

NOTE: Excessive opener down force can cause the planter frame to be higher than needed, which can reduce planter drive wheel traction. Reduce spring force to maintain adequate traction.

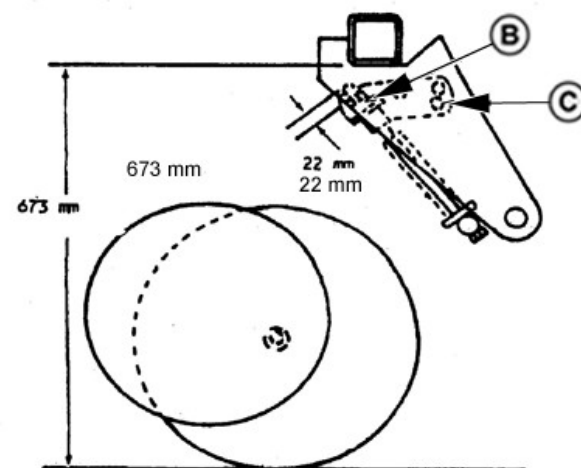
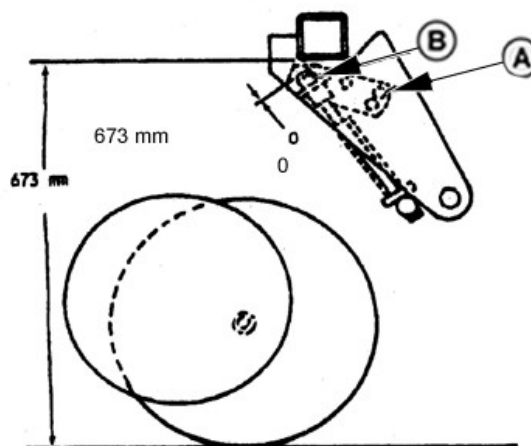
To adjust down force, proceed as follows:

1. Raise the planter and install the safety locks (not shown).



PUM3084—UN—02FEB09

2. Remove spring locking pin (A) and remove the pin from the spring housing.
3. Insert the pin through the inner plate and hole (C) to obtain maximum spring pressure. Insert the pin through the inner plate and hole (B) to obtain minimum spring pressure.
4. Secure with the spring pin.

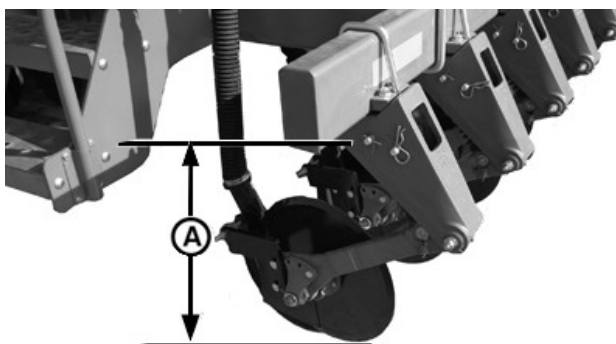


PUM2418—UN—05MAY08

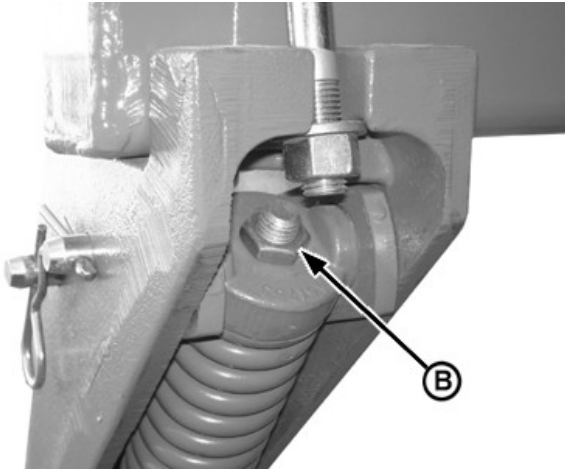
When the openers are in the minimum load setting (A), tighten lock nut (B) so that no threads are visible.

When the openers are in the maximum load setting (C), tighten lock nut (B) so that 22-mm of threads are visible.

IMPORTANT: When the openers are in the minimum load setting (A), tighten lock nut (B) so that no threads are visible. When the openers are in the maximum load setting (C), tighten lock nut (B) so that 22-mm of threads are visible.



P16607—UN—22AUG12

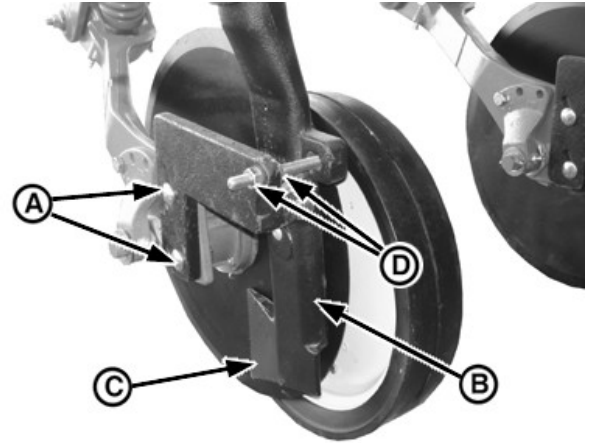


PUM3086—UN—02FEB09

After adjusting down force, check that dimension (A) does not exceed 711 mm, otherwise the fertilizer tube can clog with dirt when the opener penetrates the ground.

If necessary, loosen lock nut (B) and turn the spring bolt clockwise to raise the opener or counterclockwise to lower it. Retighten the lock nut.

CN80434,000072C-19-08JAN18



PUM3087—UN—02FEB09

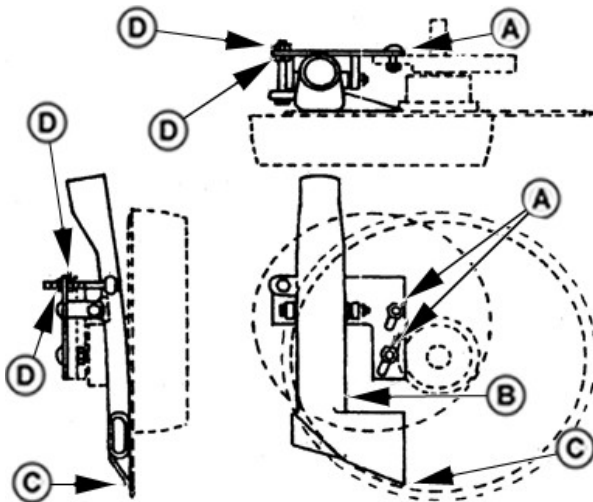
A—Bolt
B—Outlet Tube
C—Boot
D—Nuts

2. Set the boot preload against the opener blade with the two nuts (D).

IMPORTANT: The boot should "drag" on the opener disk at (C).

PX03972,0000E43-19-22AUG12

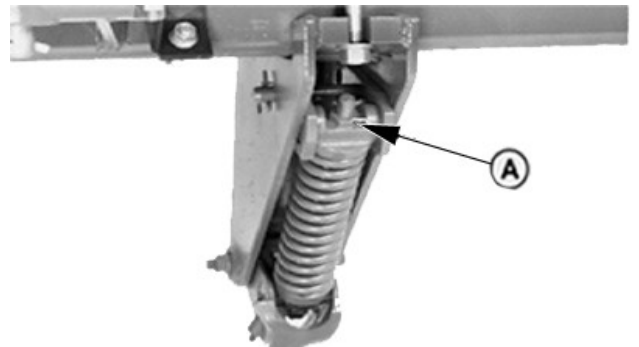
Adjust Outlet Tube



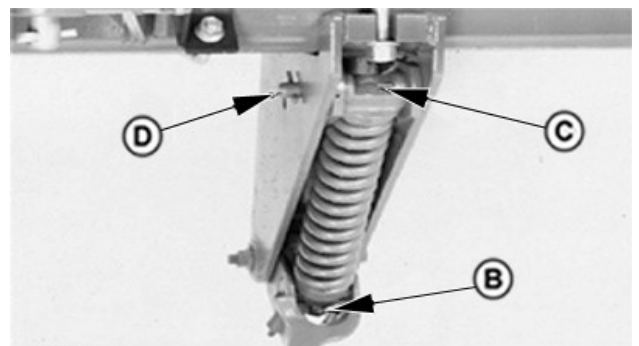
PUM2421—UN—16JUN08

1. Adjust the arm pivot so that boot tip (C) is within the inner diameter of the beveled edge of the disk as shown. Tighten cap screws (A).

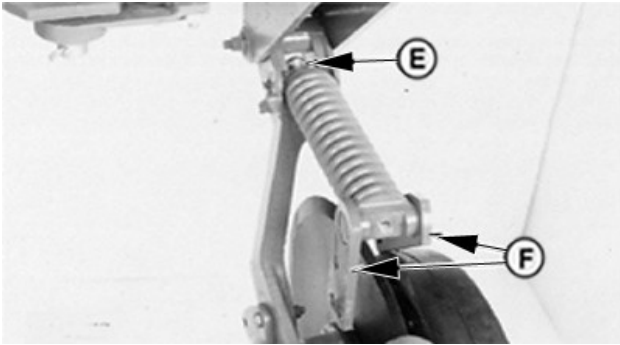
Replace Compression Spring



PUM2423—UN—05MAY08



PUM2424—UN—05MAY08

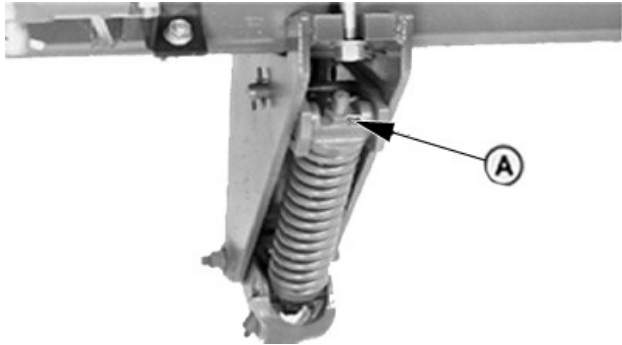


PUM2425—UN—05MAY08

A—Nut
B—Bolt
C—Casting
D—Pin
E—Bolt
F—Plates

Another two types of spring are available:

- A48975 light-duty compression spring.
 - CQ17270 extra heavy-duty compression spring.
1. Remove nut (A) from the spring to be replaced.
 2. Unscrew bolt (B) from casting until the bolt (E) is almost free of the casting.
 3. Remove pin (D).
 4. Unscrew bolt (E) that secures the spring to the casting and remove the spring.
 5. Save plates (F) to reinstall the spring.



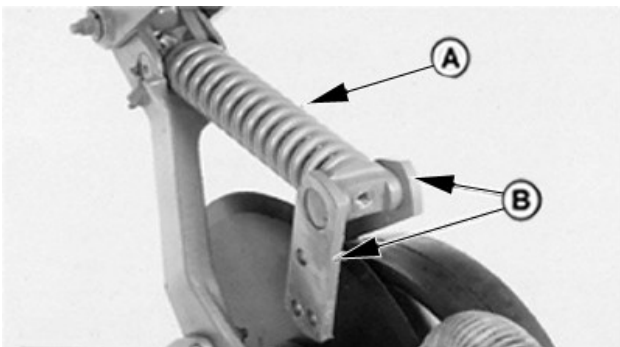
PUM2423—UN—05MAY08

The opener can be locked in the raised position when the fertilizer attachment is not in use or when stored.

To lock the opener, proceed as follows:

Raise the planter and turn lock nut (A) until the blade is at a distance of less than 673 mm between the bottom of the frame and the lower edge of the disk.

CN80434,000072D-19-08JAN18



PUM2426—UN—05MAY08

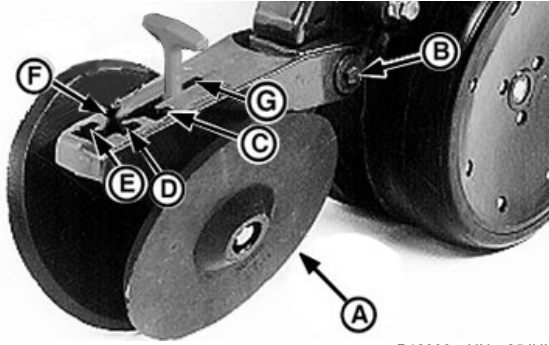
6. Install new spring (A) on the bolt.
7. If installing the CQ17270 spring replace plates (B) removed with plates J58208 (right side) and J58209 (left side). If installing the A48975 spring use plates (B) supplied with the machine.

NOTE: Verify the flat surfaces of the plates are facing up.

If fertilizer is not being applied at the desired depth, before changing the depth setting, verify the gauge wheel is touching the ground by pushing on it. Readjust the down force spring as needed.

General Attachments

Heavy-Duty Closing Wheels



P16999—UN—25JUN13

- A—Closing Wheels
- B—Bolt
- C—Slot C
- D—Slot D
- E—Slot E
- F—Slot F
- G—Slot G

In hard ground or fields with excessive residue, it may be difficult to completely close the furrow with regular closing wheels. Heavy-duty closing wheels are made of cast material and have an aggressive edge to more effectively close the furrow in severe conditions.

NOTE: Heavy-duty closing wheels are not recommended for normal planting conditions.

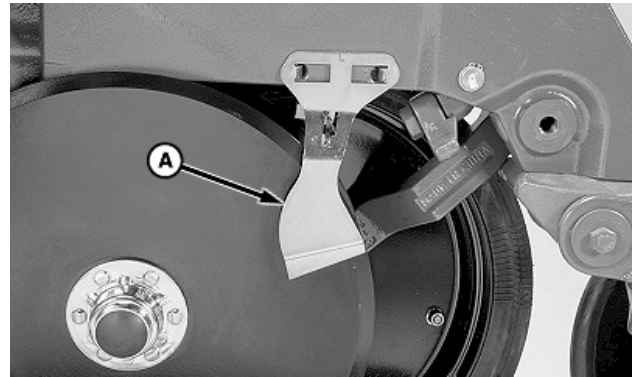
Adjustable spring force permits proper closing of the seed furrow by compacting the soil on each side of the seed, not directly over the seed. Closing wheel down force can be adjusted by placing the lever in slots (C), (D), (E) or (F), depending on varying soil conditions. Placing the lever in the center slot (G) will allow the closing wheels (A) to FLOAT and apply only the weight of the closing wheel system to the soil surface. Moving the lever back increases the closing wheel down force.

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

1. Raise the planter.
2. Loosen bolts (B) and adjust the closing wheels to the right or left. Center them visually as needed.
3. Tighten bolts (B) and adjust the closing wheels to the right or left. Center them visually as needed.
4. Tighten bolts (B).

PX03972,00001F6-19-25JUN13

Rigid Scraper



A71644—UN—26MAY11

A—Rigid Scraper

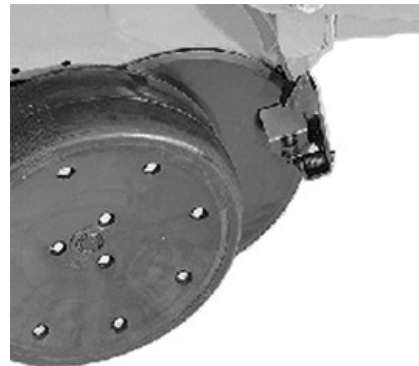
The rigid scraper (A) is recommended for use in only moist and sticky soil conditions.

Inspect scraper insert for wear at beginning of season and periodically during season.

IMPORTANT: Avoid disk wear. Only use scraper in moist and sticky soil conditions. Remove in all other conditions.

OUO6074,00009D8-19-26MAY11

Heavy-duty Scrapers

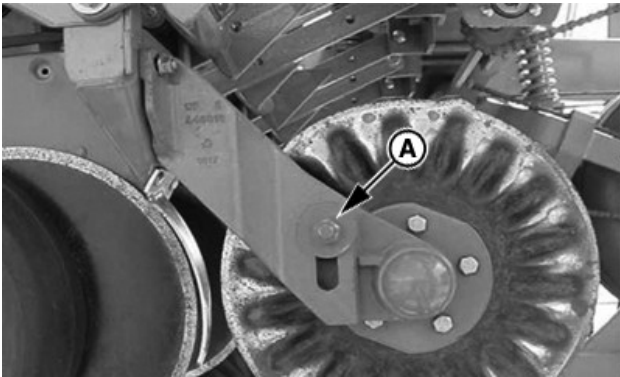


APY00683—UN—15DEC17

Recommended for very sticky soils where even steel scrapers have problems keeping Tru-Vee disks clean. Heavy-duty scrapers are compatible with row-unit-mounted liquid fertilizer openers, but fertilizer placement is limited to 3 in. from seed furrow.

CN80434,0000710-19-15DEC17

Planting Unit Mounted Coulter



APY00681—UN—15DEC17

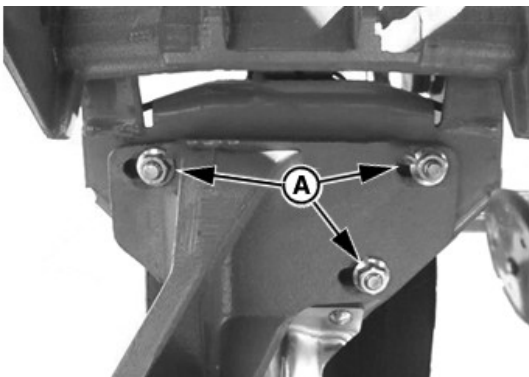
The planting unit mounted coulter is used to help the Tru-Vee opener to penetrate and cut through the residue commonly found in direct planting conditions.

Coulter blade depth is controlled by the opener gauge wheels and the weight adjustment.

IMPORTANT: The lower edge of the coulter blade must be about 10 mm above the lower edge of the seed opener. (Check this dimension with the planter in the planting position on any level surface.) This dimension will minimize the force required for penetration and will help maintain a constant planting depth. In case of heavy trash, the penetrating and cutting effect can be improved by placing the coulter blade's lower edge slightly below the lower edge of the seed opener.

As the coulter blade wears, loosen nut (A), lower the arm to the next slot and tighten the nut.

NOTE: Do not place the coulter blade lower than the seed opener when soil penetration is the limiting factor.



APY00682—UN—15DEC17

The coulter blade should be adjusted to align with the Tru-Vee opener.

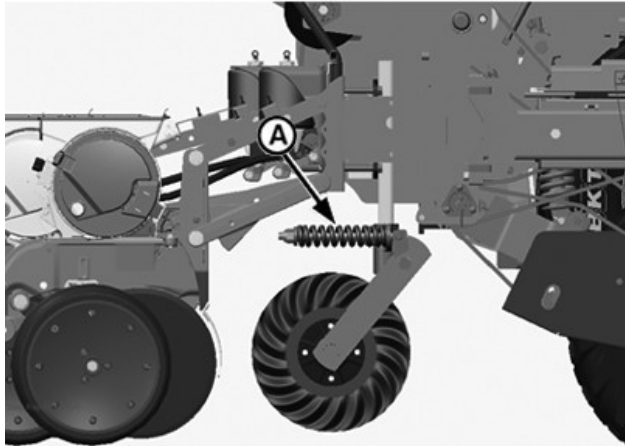
Adjust the coulter blade so that it is directly ahead of the Tru-Vee opener and aligned with the direction of travel.

To align the coulter blade side-to-side, loosen cap screws (A) and slide the coulter blade.

If the coulter blade is at an angle to the direction of travel, remove cap screws (A) and install washers as needed between the rear face of the coulter blade casting and the front of the planting unit.

CN80434,0000711-19-15DEC17

Frame Mounted Coulter Blade



P17592—UN—06MAR15

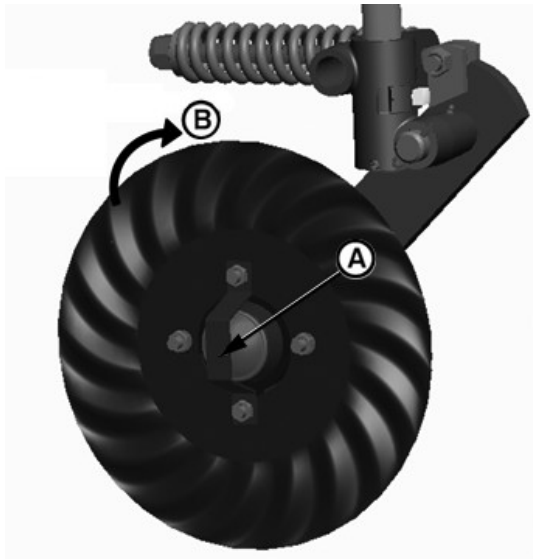
A—Compressing Spring

The planter frame mounted coulter is used to help the Tru-Vee opener to penetrate very hard soil and cut through high amounts of residue commonly found in direct planting conditions.

Coulter blade working depth is controlled by compressing spring (A).

NOTE: This kit is available from your John Deere Dealer.

The installation steps are described below.

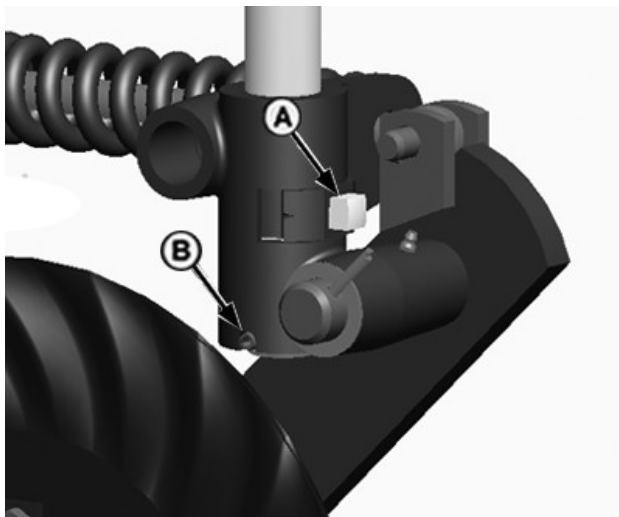


P17602—UN—16APR15

A—Hub Cap
B—Direction of Blade

1. Remove hub cap (A).
2. Install the coultter blade paying attention to the direction of rotation (B).
3. Reinstall the cap and secure it to the hub with the coultter blade using the 4 cap screws.

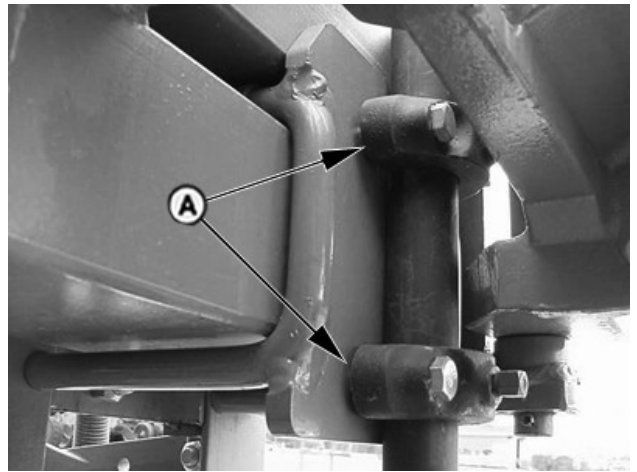
IMPORTANT: The maximum permissible coultter blade diameter is 16 in. (406.4 mm).



P17594—UN—06MAR15

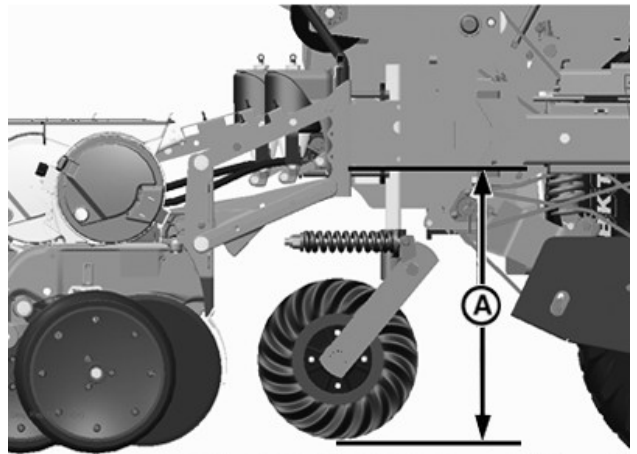
A—Retaining Ring
B—Spring Pin

4. Place retaining ring (A) and spring pin (B) in the shank.
5. Lower the retainer module until it contacts spring pin (B) and tighten the retaining ring stud (A).



PUM2317—UN—30APR08

6. Install snap rings (A) that secure the shaft to the planting unit retainer.
7. Move the shank past the snap rings and align it with the planting unit disk.

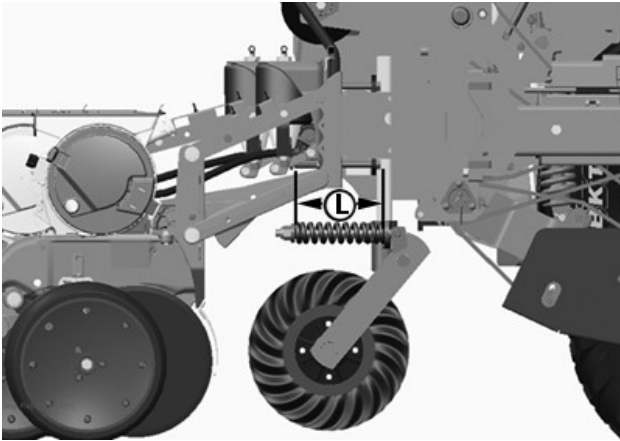


P17591—UN—06MAR15

A—Reference Height

8. Adjust the height of the assembly relative to the main beam, using the rear blade rank as the reference. The reference height (A) should be 725 mm.

IMPORTANT: On planters with 400/60 15.5 tires (low pressure), the coultter blades behind the transport wheels should have a reference dimension of 627 mm.



P17595—UN—06MAR15

L—Load Values

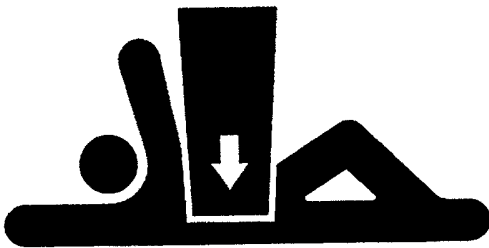
NOTE: Penetration depth is adjusted by tensioning the spring with the nut. Never change the working height of the coulter blade.

The load values for various spring lengths are:

L (mm)	245	240	235	230	225	220	215	210
F (kg)	150	160	170	180	190	200	220	230

CN80434,000092F-19-03OCT18

Unit-Mounted Coulter



A44347—UN—16DEC97

CAUTION: Avoid crushing injury or death from a falling implement. Install the service locks before performing any service or adjustments under a raised planter:

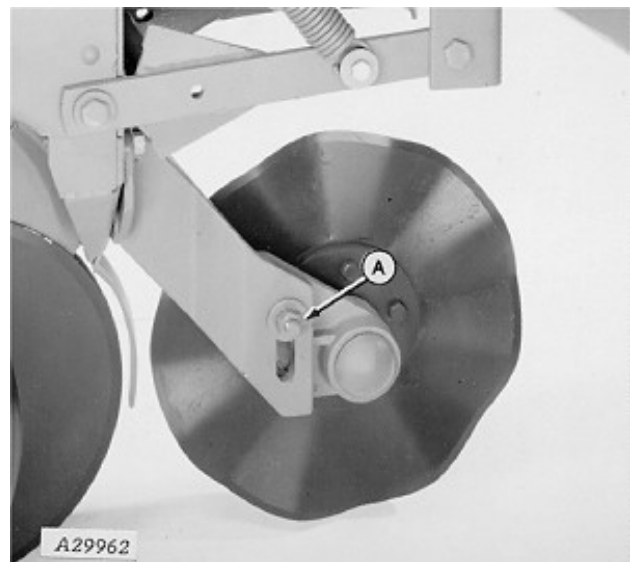
Shift the tractor to Park or set the parking brake, stop the engine, and remove the key.

CAUTION: The coulter blades are sharp. Use gloves when handling the blades.

IMPORTANT: The bottom edge of the coulter blade is placed approximately 10 mm (3/8 in) up from the bottom edge of the seed openers in normal conditions. (Check this dimension with the planter in the plant position on any level surface.) The force required for penetration and the help to maintain a constant seed depth is minimized.

As the coulter blade wears, adjust the coulter depth.

IMPORTANT: An option in heavy straw is to position the bottom edge of the coulter blade under the bottom edge of the seed openers, but doing so can affect the seed depth.



A29962—UN—06OCT88

A—Cap Screw

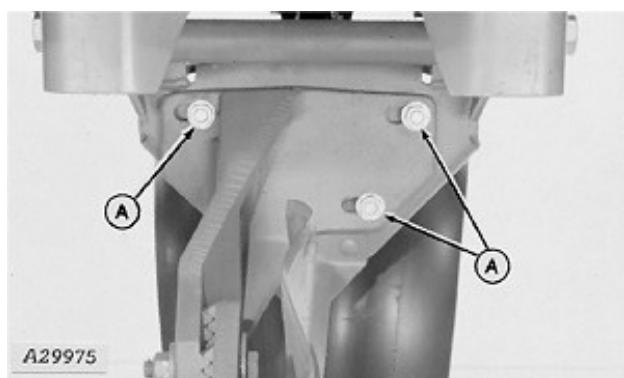
The unit-mounted coulter can be used to assist the Tru-Vee™ opener to penetrate tough soil conditions and to cut or displace residue commonly found in reduced tillage conditions.

The coulter blade depth is controlled with the opener gauge wheels, weight adjustment, and cap screw (A). As blade wear occurs, loosen the cap screw (A), lower the arm to the next notch and tighten the nut.

If the soil is dry on top but moist underneath and the coulter blade is lifting mud to the surface, mud can accumulate on the gauge wheels and alter the seed depth. Either raise the coulter slightly, use a less aggressive blade, or remove the coulter in these soil conditions.

Use of an additional down force system is recommended with this attachment.

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A29975—UN—06OCT88

A—Cap Screws

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.

To align side-to-side, loosen the cap screws (A) and slide the coulter.

If the coulter blade is running at an angle different from the direction of travel do the following:

- Remove the cap screws (A).
- Add washers, as required, between the back surface of the coulter casting and the front of the row unit.
- Reinstall the cap screws (A).

CN80434,000071A-19-03OCT18

Seed Monitor

P16046—UN—28APR10

The Computer-Track 350 seed monitor gives you the information that makes your planting as accurate as possible. Among other values, the monitor instantaneously provides planting speed, area planted, seed spacing and seed population.

The radar unit and wiring harness needed for its use is also available for your planter. See your John Deere Dealer to order it.

PX03972,0000E47-19-22AUG12

SeedStar™ Variable Rate Drive System

The variable rate drive system uses hydraulic motors to drive seed meters. The speed of each motor can be changed as needed using a SeedStar™ monitor from the tractor cab.

- Operator can match seed population to different soil types or match irrigated versus dry soils.
- Multiple rate selections can be programmed and applied as required.

For more information, see SeedStar™ XP Monitor Operator's Manual.

PX03972,0000E9B-19-11JUN14

SeedStar™ Integrated Pneumatic Down Force System

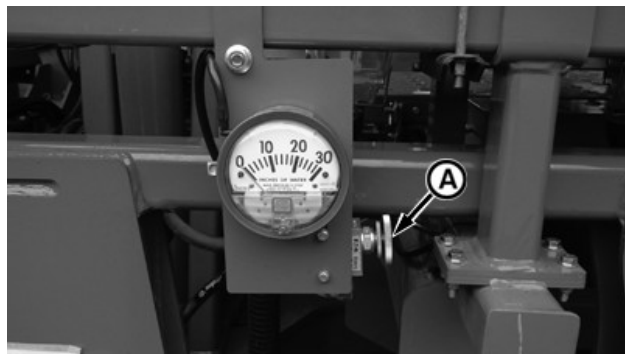
SeedStar™ Integrated Pneumatic Down Force system provides “on-the-go” down force pressure changes to the planting row units. The system air compressor supplies pressurized air to an air storage tank. The air storage tank provides extra air capacity for fast down force changes.

With SeedStar™ integrated pneumatic down force:

- Operator can manually make “on-the-go” down force changes from the tractor cab.
- Operator can change down force pressure for differing soil types or for irrigated versus dry land soils.

For more information, see your SeedStar™ XP Monitor Operators Manual.

PX03972,0000E9C-19-11JUN14

Install Hopper Extensions (Mini-Hopper Only)

P16929—UN—22MAY13

A—CCS Solenoid Harness

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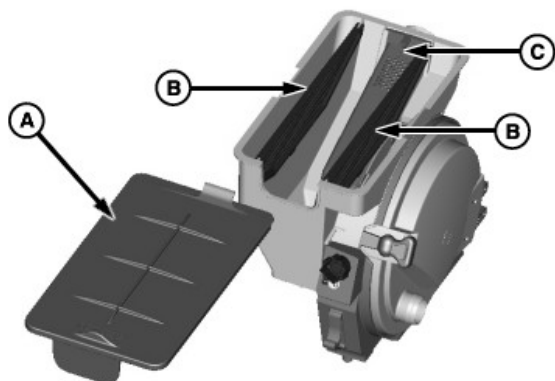
NOTE: When sugar beets are used or when using seed not approved for CCS bulk tank delivery, the seed must be added to the hoppers not the CCS tanks. The extensions allow for more seeds to be planted. Extensions can be used when planting seed plots.

Disable CCS fan when using mini-hopper extensions.

Do not install more than one extension onto a mini-hopper.

When filling mini-hopper extension, do not fill with seed above screen vent holes.

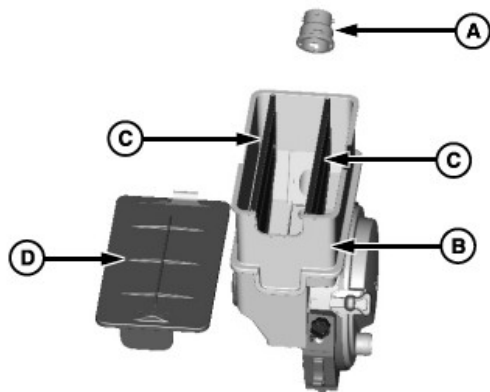
1. Disconnect harness (A) to disable CCS fan.



A78492—UN—31JUL13

A—Lid
B—Screened Dividers
C—Discharge Tube

2. Remove lid (A), screened dividers (B), and discharge tube (C).



A78493—UN—31JUL13

A—Cap
B—Mini-Hopper Extension
C—Non-Screened Dividers
D—Lid
E—Discharge Tube

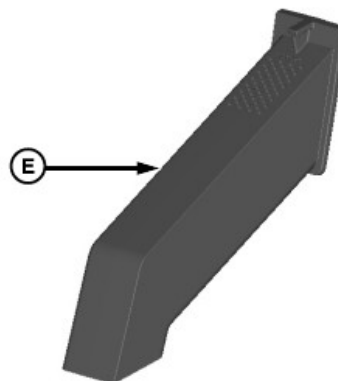
3. Install cap (A) between CCS tube and hose.

NOTE: Mini-hopper extensions can be left on the mini-hopper when using CCS delivery system. To return to CCS system use, install discharge tube (E) removed in step 2, reconnect CCS fan harness, and remove cap (A) (if used).

NOTE: DO NOT fill mini hopper above bottom of screens. If seeds cover airflow of screens meter performance will suffer do to lower makeup air.

4. Install extension (B) onto mini-hopper.
5. Install dividers (C) into mini-hopper and extension (B).
6. Reinstall lid (D).

PX03972,00002DB-19-03MAR14



A78494—UN—31JUL13

Troubleshooting

Troubleshooting

Symptom	Problem	Solution
Planter will not lower.	Pressure and return hoses not fully connected to SCV outlets.	Verify connections
Planter frame slow to raise or lower.	Low hydraulic pressure on tractor.	Check the tractor hydraulic system.
	SCV not in fast (rabbit) position.	Adjust the SCV speed (faster)
Erratic or jerky lifting.	Air in hydraulic system.	Bleed the air from the system.
	Tractor oil level is low.	Add hydraulic oil.
Planter will not raise.	Tractor SCV is bypassing oil.	Readjust SCV lever linkage. (See tractor operator's manual.)
Frame will not rotate.	Tractor SCV is bypassing oil.	Readjust SCV lever linkage (See tractor operator's manual)
	Frame interferences.	Extend elevation cylinder to fully raise to transport position and then rotate planter.
	Tilt blocking lever in closed position.	Release tilt blocking lever right next to the bypass valve to the open position.
Frame rotate too fast.	SCV flow setting too high.	Adjust the SCV speed (slower).
Frame will not lift to maximum transport height.	Headland lever activated.	Release headland lever to allow planter to fully raise.
	Weight on planter exceed.	Remove any extra weight on machine. Planter max capacity is 5.5 tons. Check fertilizer and seed density.
	Solenoid valve and/or trigger switches malfunctioning.	Check the lift cylinder solenoid valve and trigger switches for damage. Adjust or replace if needed.
Markers will not alternate.	Marker hoses not connected to marker valve correctly.	Connect marker hoses correctly
	Air in marker valve.	Bleed the marker hydraulic system.
	Defective marker sequence valve.	Replace the valve. See your John Deere dealer.
Planter right side planting units will not plant.	Right side lower drive shaft cotter pin failed.	Repair the seizure that caused the pin to fail and replace the pin.

Troubleshooting

Symptom	Problem	Solution
	Drive chains broken or loose.	Check the drive chains and reinstall (chain from wheel to lower shaft; chain from lower shaft to drive housing; drive housing chain, chain from drive housing to upper shaft; chain from upper shaft to planting units).
Planter left side planting units will not plant.	Left side lower drive shaft cotter pin failed.	Repair the seizure that caused the pin to fail and replace the pin.
	Drive chains broken or loose.	Check the drive chains and reinstall (chain from wheel to lower shaft; chain from lower shaft to drive housing; drive housing chain, chain from drive housing to upper shaft; chain from upper shaft to planting units).
One row not planting.	Foreign matter in seed hopper.	Check seed hopper.
	Seed hopper is empty.	Foreign material is lodged in hose or manifold. Locate and remove foreign material blockage.
Seed population higher on one half of the planter (Mechanical Drive Only).	The drive ratio selected on one half of the planter different from the ratio on the other half.	Select the same drive ratio for both halves.
		Verify the dual HIGH/LOW gear is correctly position on both halves of the planter.
Closing wheels leave a deep track on ground.	Spring pressure too high.	Adjust closing wheel spring force.
Closing wheels not compacting soil around seed.	Spring force too low.	Adjust closing wheel spring force.
Closing wheel runs on top of seed furrow.	Not properly centered.	Realign.
Closing wheels not applying even force.		Relevel planter.
Drive wheel chain consistently falls off.	Chain may be too long.	Remove a link.
	Stiff chain links.	Oil or change the chain.
Fertilizer opener not operating correctly.	Improper pressure adjustment.	Move pin to lower position.
Excessive fertilizer opener penetration.	Improper pressure adjustment.	Move pin to upper position and adjust spring pin.
One opener not distributing fertilizer.	Opener fertilizer spout plugged.	Inspect, clean and remove obstruction.

Symptom	Problem	Solution
Dry fertilizer not distributed evenly.	Metering wheel incorrectly positioned.	Disassemble and reassemble metering wheel in correct position.
Gauge wheels will not turn.	Too tight against opener disks.	Adjust gauge wheel arm.
No fertilizer delivered.	Hopper is empty.	Add fertilizer.
	Shutoff lid installed.	Remove the lid.
	Product clumping.	Use a screen when loading.
	Chain off sprocket.	Place on sprocket.
	Metering wheel installed backward.	Install correctly.
Transmission shaft will not turn.	Broken cotter pin.	Replace after finding cause of breakage.
	Chain off sprocket.	Place on sprocket.
Plastic bushing excessively worn.	Drive shaft out of alignment.	Align correctly.
Metering wheel or meter failure.	Foreign matter in hopper.	Use a screen while loading.
Marker floats high above ground.	Air in hydraulic system.	Bleed the marker lift cylinder.
	Sequencing valve defective.	Replace the valve. (See your John Deere dealer.)
	Tractor SCV leaking.	Repair valve or connections.

PX03972,00011DB-19-15APR15

Row Units

Symptom	Problem	Solution
The row units on the right-hand side of the planter are not planting.	The cotter pin for the right-hand driveshaft is sheared.	Repair the cause of the pin shearing then replace the cotter pin.
	The half width drive disconnect is enabled.	Move the switch to the middle position.
The row units on the left-hand side of the planter are not planting.	The cotter pin for the left-hand driveshaft is sheared.	Repair the cause of pin shearing then replace the cotter pin.
	The half width drive disconnect is enabled.	Move the switch to the middle position.
The closing wheels are plugging with crop residue.	The clearance for residue flow is insufficient.	Stagger the closing wheels on the row units (See Stagger the Closing Wheels).

Symptom	Problem	Solution
The closing wheels are leaving a severe imprint in the soil.	There is too much downforce on the closing wheels.	Decrease the downforce on the closing wheels.
The closing wheels are not firming the soil around the seed.	The downforce for the closing wheels is insufficient.	Increase the downforce on the closing wheels.
The closing wheels are running on the top of the seed furrow.	The closing wheels are improperly centered.	Center the closing wheels on the row units (See Center the Closing Wheels).
	The arm casting or pivot bushings for the closing wheels are worn.	Replace the arm casting bushings or the pivot bushings or the entire closing wheel arm.
The monitor does not count the seeds.	The seed tube sensor has collected dirt or debris.	Clean the seed tube and the sensor with a cleaning brush.

OUO6023.00013C3-19-09MAY17

Mechanical Seed Drives

NOTE: For issues related to Variable Rate Drive, see the SeedStar™ XP Monitor Operators Manual.

Symptom	Problem	Solution
Meters stop driving on one-half or the entire machine.	Binding in a section of the drive system can cause a shear pin to fail, thus protecting the rest of the drive components.	<p>Note: When turning the drive system by hand to check for binding, rotate all drill shafts in their normal direction of rotation. Compare the torque values required to drive given sections of the machine against similar sections on the opposite side.</p> <p>Shear pins can become deformed after extended use. In this condition, it is possible for the shear pin to fail without a machine malfunction. Replace all shear pins annually.</p> <p>Verify that drives can be turned by hand before replacing pin and resuming planting.</p> <p>Common causes for binding include the following:</p> <ul style="list-style-type: none"> Improper care and lubrication of drive components and meters. Debris caught in row unit chains. Jammed chemical or seed meters. <p>For shear pin locations on this machine see REPLACE SHEAR PROTECTION PINS in Service and Adjustments section.</p>

Symptom	Problem	Solution
	Half width disconnect failure due to overload.	Inspect half width clutch and repair as needed.
Meters stop driving on the entire machine or drive erratically.	Failed or worn sprockets, chains, or chain idlers within the transmission.	Inspect chains, sprockets, and idlers within the transmission. Repair, align, or replace as necessary.
	Improper contact drive tire adjustment.	Adjust contact drive tire to proper specification. See ADJUST SEED AND FERTILIZER TRANSMISSION WHEEL ENGAGEMENT POINT in Service and Adjustments section.
	Build-up of mud and residue around transmission engagement tire.	Remove obstructions from around contact drive tire and proceed. If the machine is not equipped with mud scrapers on the chassis tire which drives the transmission tire, consider seeing your John Deere dealer about obtaining one.
	Excessive down force setting on row units.	Decrease row unit down force.
Meters stop driving on a section of the machine or drive erratically.	Failed or worn sprockets, chains, chain idlers, or misaligned drive couplers.	Examine chains, sprockets, and idlers associated with failing section of the machine and fix, align, or replace as necessary. For proper drive coupler alignment, see ADJUST METER CHAIN DRIVE in Service and Adjustments section.
	Failed or disconnected Pro-Shaft™ drive.	Reconnect, or replace PRO-SHAFT drive as necessary. For proper drive coupler alignment, see ADJUST METER PRO-SHAFT DRIVE in Service and Adjustments section.

PX03972,00011DC-19-15APR15

CCS Fan Assembly

Symptom	Problem	Solution
CCS fan motor leaks.	Case drain line crimped, not connected to low-pressure port, or connected to wrong port with high backpressure.	Repair fan motor. To avoid future failures, verify drain line is connected 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 fan motor seal leaking.	Replace seal. See your John Deere dealer.

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Symptom	Problem	Solution
	Case drain line pulled out of coupler on tractor.	Check hose routing of hydraulic hoses across hitch. Verify that case drain is properly attached to tractor. Repair fan motor.
CCS fan 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.
	CCS fan motor seal leaking.	Replace seal. See your John Deere dealer.
	Faulty CCS fan motor.	Repair or replace motor. See your John Deere dealer.
	Faulty CCS flow control valve.	Repair or replace valve. See your John Deere dealer.
	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.	Fully engage hoses in SCV outlet.
CCS fan vibrates.	Dirty fan blades.	Clean fan.
	Broken fan blades; fan out of balance.	Replace fan assembly.
CCS fan surges.	Flow control valve incorrectly set.	Adjust flow control valve or replace.
Premature CCS fan 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.	Connect or replace hose.
	Tractor flow control set too low.	Increase valve setting.
	Faulty CCS control valve.	Repair or replace valve. See your John Deere dealer.
	Machine flow control valve set incorrect.	Increase valve setting.

Symptom	Problem	Solution
	Tractor pressure too low.	Check and repair tractor hydraulic system. See your John Deere dealer.
	CCS fan motor seal leaking.	Replace seal. See your John Deere dealer.
	Faulty CCS fan motor.	Repair or replace motor. See your John Deere dealer.
	Excessive air leakage from tank.	Correctly install tank lids.
	Pressure gauge broken.	Repair or replace gauge.
Pressure gauge does not zero.	Gauge not adjusted.	Zero gauge. See ZERO PRESSURE GAUGE in Service and Adjustments section.
	Gauge damaged.	Replace gauge.
	Moisture in gauge.	Dry out gauge.
CCS fan turning on and off while going through the field.	Row unit fan switch misadjusted.	Adjust switch. See SET CCS ROW UNIT FAN SWITCH in Service and Adjustments section.
CCS Fan-Agitator does not engage when planter lowered.	Check pins 1 and 7 on tractor to planter 7 pin connector for 12 volts.	See your John Deere dealer.
	Check CCS row unit switch (left center row unit on parallel arms).	Adjust switch. See SET CCS ROW UNIT FAN SWITCH in Service and Adjustments section.

PX03972,00001F1-19-29APR14

CCS Product Delivery

Symptom	Problem	Solution
Plugged delivery hoses.	Foreign material in seed.	Clean seed or use lid screen.
	Tank lids were opened with CCS fan running.	Wait until CCS fan stops before opening lids.
	Excessive CCS fan pressure.	Reduce pressure.
	Tank lid open or leaking excessively.	Close lid, empty hose line.
	Hose pinched or crushed.	Replace or repair hose.
	Air volume too low.	Increase CCS fan speed. See SET CCS TANK PRESSURE in Central Commodity System section.

Symptom	Problem	Solution
	Foreign material blocking air system.	Remove hose by pulling straight off (do not twist) from nozzle to remove material causing plug.
	Hoses routed flat or uphill or have large droops.	Route hoses correctly.
	High humidity.	Use more talc and mix thoroughly or wait for drier conditions.
	CCS fan running while not planting for excessive period of time.	Turn off fan when not planting for more than a few minutes.
Uneven product distribution between row units.	Product level too low for accurate delivery.	CCS nozzle must be covered to deliver seed.
	Hopper screen plugged.	Remove screen and tap until clear.
	Discharge elbow plugged.	Remove elbow and clean.
	Air volume too low.	Increase CCS tank pressure. See SET CCS TANK PRESSURE in Central Commodity System section.
	Blockage in air hose.	Clear air hose.
	Blockage in nozzle.	Shut off CCS fan. Remove delivery hose by pulling straight off (do not twist) nozzle and remove material.
	Seed compacted in tank nozzles.	See BRIDGED AND BLOCKED CCS SYSTEM in Central Commodity System section.
	Nozzle inserts installed on nozzles for planting small seed.	Remove nozzle inserts when not planting small seed.
	Agitator not running.	Check fuse, power connector, and ground lead.
No seed in meter.	Air volume too low.	Verify tank pressure is set to recommended pressure.
	Blockage in air hose.	Cleanout meter using tray. Reinstall seed disc and close vacuum dome. Start CCS fan and shake hose vigorously near meter. Continue shaking hose closer and closer to tank. Increase tank pressure, if necessary to blow seed out easier. If meter fills with seed, repeat process until no more seed is in hose. Check that both tank lids are securely closed.

Symptom	Problem	Solution
	Blockage in nozzle inside tank.	Engage tractor parking brake, put transmission in "Park", shut off tractor, and remove outlet delivery hose from CCS tank. Check for obstruction. Remove any obstruction. Reconnect seed delivery hose.
	Seed compacted in tank nozzles.	Engage tractor parking brake, put transmission in "Park", shut off tractor, and remove outlet delivery hose from CCS tank. Loosen and remove seed stuck in nozzle. Whenever planter is lowered and stationary for more than a few minutes with seed in CCS tank, shut off tractor and turn key off. Agitators run anytime planter is lowered and key is "On". This causes seed to pack into nozzles.
	High humidity.	Use more talc and mix thoroughly or wait for drier conditions.
	CCS tank lid open.	Close lid.
	Cleanout doors on bottom of tank are open or leaking air.	Close doors.
	Discharge elbow plugged in hopper.	Clear plug and decrease CCS tank pressure.
	Seed bridging in CCS tank.	Check if agitator is running. Check fuse, power connection, and ground lead. Increase CCS tank pressure. Add more talc and mix thoroughly.
	CCS tanks empty.	Fill CCS tanks.
	Nozzle inserts installed on nozzles for planting small seed.	Remove nozzle inserts when planting other crops.
Seed damage.	Air volume too high.	Reduce CCS tank pressure. Add talc.
	Old, dry seeds.	Use fresh seeds.
Individual rows overpopulating.	Meter vacuum level too high.	Decrease vacuum level.
	Vacuum hopper vent plugged.	Clean vent.
	Discharge elbow vent plugged.	Clean vent holes in elbow.

Symptom	Problem	Solution
Uneven or inaccurate metering or product delivery.	CCS tanks running empty.	Fill or redistribute seed in CCS tanks.
	Product level in seed meter too low for accurate delivery.	Increase CCS tank pressure.
	Foreign material blocking product passages.	Remove blockage. Use screens when filling tanks. Engage tractor parking brake, put transmission in "Park", shut off tractor, and remove outlet delivery hose from CCS tank. Check for obstruction. Remove any obstruction. Reconnect seed delivery hose.
	Hopper screen plugged.	Remove screen and tap until clear.
	Lumps in seed.	Use clean seed. Use screens when filling tanks.
	Seed bridging in tank.	Check if agitator is running. Check fuse, power connection, and ground lead. Increase CCS tank pressure. Add more talc and mix thoroughly.
No seed flow.	Rubber flap on meter not covering the seed tube opening in the shank.	Realign rubber flap to sit flat on row unit when meter is installed.
	Plugged seed delivery hose.	Do not raise and lower machine continuously without planting seed. Excessive fan stopping and starting without planting, plugs seed delivery hoses. Do not operate machine with nearly all meters out of seed as the seed hoses to rows with seed can plug. Stop and fill machine once the first row runs out of seed.
		Adjust CCS fan pressure to recommended level.
	Cold hydraulic oil.	Allow tractor to warm before setting tank pressure.
CCS fan surges.	Faulty flow control valve.	Replace valve.
CCS fan turns on and off while going through the field.	Frame height is too high causing fan switch on row unit between left-hand main frame wheels to open and close.	Adjust row unit fan switch.

Symptom	Problem	Solution
Machine raises slowly.	CCS fan is running during raise cycle.	Row unit fan switch not functioning.
CCS seed delivery flow is low.	Seed hose is pinched.	Straighten or repair hose. Keep hoses as horizontal as possible.
	Foreign material is lodged in hose or manifold.	Locate and remove foreign material blockage.
	Improper tank pressure.	Ensure tank lids are installed correctly. Readjust SCV. Increase CCS tank pressure by 2 in. of pressure.

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Vacuum Meter

Symptom	Problem	Solution
False monitor reading.	Dirty seed tube sensors.	Clean sensors. See CLEAN SEED SENSOR in Service and Adjustments section.
	Dust and dirt being drawn up seed tube.	Clean vacuum meter vent window. Meters only
No seed being planted.	Row unit hoppers empty.	See CCS™ PRODUCT DELIVERY in this section for meter.
	No vacuum.	See Low Vacuum under VACUUM METER in Troubleshoot section.
	Seed tubes plugged or damaged.	Inspect seed tubes. Ensure that seed tubes are hooked properly in unit shank. Replace if damaged. Clean off mud with cleaning brush.
	Meter drive not engaged.	Engage meter drive.
Poor seed spacing.	Seed disk vacuum holes plugged.	Clean seed disks. Install knockout wheel assembly if using a Flat Seed Disk.
	Farmer-applied seed treatment causes buildup, seeds stick.	Follow recommended talc usage and application procedure. Clean meter and disks.
	Worn meter brushes.	Replace brushes.

Symptom	Problem	Solution
	Low vacuum.	See Low Vacuum under VACUUM METER in Troubleshoot section.
	Rusty planting unit or seed drive chains.	Lubricate chains.
	Worn meter seals.	Replace seals.
	Seed disk hubs misadjusted.	Readjust hubs.
	Incorrect vacuum for the seed being planted.	Adjust vacuum level to recommended setting.
	Faulty vacuum gauge.	Check air line to gauge. Clean if plugged. Replace if cut.
	Worn seed disks.	Replace disks.
	Seed tubes improperly installed or worn.	Reinstall or replace seed tubes. Verify that seed tube hook is properly positioned in unit shank.
	Mud inside seed tubes.	Clean off mud with cleaning brush. Do not allow planter to roll backwards when stopped in the field in the lowered position.
	Worn seed tube guard.	Replace guard.
	Treated seed sticking in cell.	Clean disks. Increase application rate of John Deere Talc Lubricant.
	Seed disks have not been sprayed with Graphite Lubricant.	Spray seed disks with Spray on Graphite Lubricant TY25797.
	Excessive ground speed.	Plant at speed recommended in planting rate chart.
Low seed population.	If low population displays on monitor and field counts are accurate, sensors are dirty.	Clean seed tubes and sensors.
	Seed disk vacuum holes plugged.	Clean seed disks. Flat-Type Disk: Install knockout wheel assembly or replace worn knockout wheel assembly.
	Vacuum holes plugged with dirty seed.	Use clean seed.

Symptom	Problem	Solution
		Flat-Type Disk: Install knockout wheel assembly or replace worn knockout wheel assembly.
	Seed disk wiper or knock out wheel missing. .	Replace wiper or knock out wheel for seed disk being used.
	Low seed level in CCS tank.	Add seed.
	Low seed level in meter.	See NO SEED IN METER in CCS™ Product Delivery Troubleshoot in this section.
	“Treated” seed sticking in cells.	Run CCS fan 10 minutes before planting (to warm air).
		Inspect planting unit seed meter disks; clean if buildup is present.
		Add John Deere Talc Lubricant to CCS tanks Generously.
	Farmer-applied seed treatment causes buildup, seeds stick.	Discontinue use of treatments or increase use of talc.
	Low vacuum.	Increase vacuum level.
		See Low Vacuum under VACUUM METER in Troubleshoot section.
	Foreign material (chaff) built up in vacuum dome.	Inspect and clean dome .
	Worn meter seals.	Replace seals.
	Worn seed disks.	Replace seed disks.
	Seed “bridging” in hopper or meter.	Increase rate of talc used. Clean vacuum meter and hopper.
	Inadequate seed delivery.	Increase CCS tank pressure.
	Plugged inlet or discharge elbows.	Clean elbows.
	Seed size not compatible with seed disks.	Use correct seed disks.

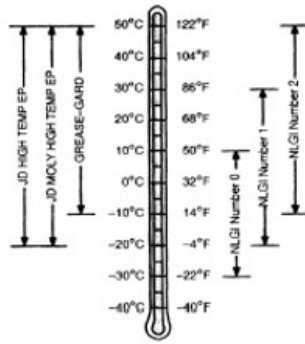
Symptom	Problem	Solution
	Excessive drive slippage.	<p>Reduce unit downforce.</p> <p>Check drives for binding or misalignment.</p> <p>Check mechanical transmission down force spring at the drive wheel for damage. Replace if necessary.</p> <p>Readjust seed transmission.</p>
	Planting too fast for rough field conditions.	<p>Plant at speed recommended in planting rate chart.</p> <p>Increase vacuum.</p> <p>Increase unit downforce.</p>
	Vacuum level too low.	Increase vacuum level.
	Meter brush improperly installed or worn.	Install brush properly or replace.
	Using incorrect transmission sprocket combination.	Use sprocket combination recommended in planting rate chart or adjust upward due to excess drive slippage.
	Incorrect drive tire or contact tire pressure.	Inflate to proper pressure. See CHECK TIRE INFLATION in Prepare Machine section.
	Double eliminator set incorrectly.	See USE DOUBLE ELIMINATOR.
	High vacuum.	Adjust vacuum setting.
	Faulty vacuum gauge.	Check air line to gauge. Clean if plugged. Replace if cut.
	Worn seed disks.	Replace seed disks.
High seed population.	Seed size not compatible with seed disks.	Use correct seed disks.
	Planting too slow.	Plant at speed recommended in planting rate charts.
	Meter brush improperly installed.	Install brush properly.
	Seed disk hubs loose.	Adjust hubs. See ADJUST METER HUB.
	Using incorrect transmission sprocket combination.	Use sprocket combination recommended in planting rate charts or adjust downward due to low drive wheel slippage.

Symptom	Problem	Solution
Seed sensor tubes plugging.	Mini hopper screens plugged, meter overfilled.	Clean mini hopper screens.
	Incorrect drive tire or contact tire pressure.	Inflate to proper pressure. See CHECK TIRE INFLATION in Prepare Machine section.
	CCS tanks running empty.	Fill or redistribute seed in CCS tanks.
	Double eliminator set incorrectly.	See USE DOUBLE ELIMINATOR.
	Machine rolling backward when lowering.	Lower machine while moving forward.
	Mud inside seed tubes.	Clean off mud with cleaning brush.
Inconsistent seed depth.	Turning tractor steering wheel when machine is down and stationary. (Four Wheel Drive or Track tractors only.)	Avoid turning tractor when machine is down and stationary.
	Planting in rough seed bed.	Increase row unit down force.
	Mud building up on gauge wheel tires.	Remove mud from gauge wheel tires. Avoid muddy planting conditions.
	Excessive row unit bounce.	Reduce ground speed.
		Increase row unit down force.
	Seed tubes partially plugged or improperly installed.	Inspect seed tubes. Ensure that seed tubes are hooked properly in unit shank.
Too many skips.		Clean off mud with cleaning brush.
	Low vacuum setting.	Increase vacuum.
	Holes in vacuum disk plugged with debris.	Remove debris. Install knockout wheel if using flat disk.
	Planting too fast.	Reduce planting speed.
	Low seed level in hopper.	Increase CCS tank pressure.
Premature blower motor seal failure.	Incorrect hydraulic connections.	Verify hose connections.
	SCV control not being moved to "Float" position to stop hydraulic motors.	Move SCV control to "Float" position when stopping hydraulic motors.
	High case drain pressure.	Check for 25 psi or less back pressure at motor.

Symptom	Problem	Solution
		Verify case drain line is connected and hose not kinked.
Low vacuum.	Incorrect hydraulic connections.	Verify hose connections.
	Planting unit vacuum hoses not connected to meter.	Connect vacuum hoses to meter.
	Flow control valve misadjusted.	Adjust control valve knob.
	Air manifold system clogged with dust.	Clean air manifold system.
	Manifold hoses kinked or pinched.	Reposition hoses.
	Blower guard clogged with dust or seed treatments.	Clean blower guard.
	Meter housing retaining strap not engaged.	Attach housing retaining strap to chamber.
	Meter seals worn or flipped.	Inspect seals. Reposition or replace.
	Air manifold system assembled without O-rings.	Add O-rings.
	Vacuum dome not closed properly.	Verify vacuum dome closes properly.
Erratic vacuum.	Foreign material (chaff) built up in vacuum dome.	Inspect and clean dome.
	Air manifold system clogged with dust.	Clean air manifold system.
	Control valve failed.	Replace control valve.
	Tractor oil level low.	Add oil.
Vacuum gauge does not zero.	Tractor not stabilizing flow (when controlled with tractor SCV).	See your John Deere dealer.
	Not adjusted.	Zero adjustment. See ZERO VACUUM GAUGE.

Lubrication and Maintenance

Grease



PUM2513—UN—10MAY08

Select the most appropriate grease based on NLGI consistency numbers and expected air temperatures during the interval between grease changes.

The following types of grease are recommended:

- John Deere EP Grease (for high temperature)
- John Deere Moly EP Grease (for high temperature)
- John Deere GREASE-GARD™

Other greases may be used if they meet the following standard:

- NLGI Consistency Classification GC-LB

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Multiluber Grease

John Deere MULTILUBER GREASE is recommended.

You may also use SAE Multipurpose Grease meeting NLGI Consistency Number 000.

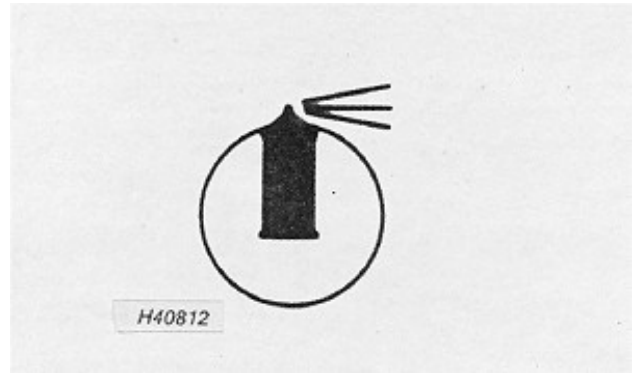
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Lubrication Symbols

- ◆ Lubricate with grease at hourly interval indicated on symbol.
- ◆ Pack wheel bearings with axle bearing grease at hourly interval indicated on symbol.
- ◆ Lubricate with SAE 10W oil at hourly interval indicated on symbol.

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Multi-Purpose Grease



H40812—UN—20APR89

Lubricate with John Deere TY6350 multipurpose spray lubricant as needed.

NOTE: Use of non-spray lubricant may increase chain wear.

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Alternative Lubricants

Conditions in some geographic regions may require the use of special lubricants or lubrication practices not covered in this operator's manual. If you have any questions, see your John Deere dealer to obtain the latest information and recommendations.

PX03972,0000E4D-19-22AUG12

Use of Talc Lubricant



A34471

A34471—UN—11OCT88

CAUTION: Avoid chemical injury to eyes, skin, or lungs. If using seed treatments, use caution when handling parts coated with seed treatment. Read and follow safety instructions on the chemical treatment label.

IMPORTANT: Only use approved talc lubricant. (See your John Deere™ dealer.)

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At the beginning of each season, add the talc lubricant to the empty CCS™ tanks. Also, add 9 mL (0.6 tbsp) or (0.3 oz) to each empty row unit mini-hopper.

Use of either a talc or wax-based lubricant improves the vacuum seed meter and CCS™ system performance. Wax-based lubricant typically has lower levels of inert and seed treatment dust in the vacuum blower exhaust.

A lubricant (fluency agent) is required for optimum performance of the vacuum meter and CCS™ system. To obtain a consistent seed release from the seed disk and improve spacing accuracy, properly lubricate the seed.

FARMER-APPLIED SEED TREATMENT:

Farmer-applied seed treatments are Not recommended.

IMPORTANT: Avoid sticky seeds and meter components. It is possible for seeds to become sticky 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 carefully. Avoid treatments with high oil content. Certain temperature and humidity levels also complicate material compatibility.

If farmer-applied treatment is used, apply seed treatment to seed before the lubricant and allow seed treatment to dry before placing seed in tanks. If seed treatment accumulates in the meter while using the following lubricant application rates, contact the treatment manufacturer for assistance.

COMMERCIALY TREATED SEED:

Mixes of seed and seed treatment must be free of clumps.

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 poor seed flow. Thoroughly incorporate the lubricant in tanks and hoppers, so all seeds are evenly coated.

NOTE: Any additives other than John Deere™ powdered lubricants leave a residue on parts that affect planting rates.

When using CCS™ system to deliver seed to seed meters, use this table:

Application Rate of Talc in CCS™ Tanks	
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 Talc
1233 L (35 bu) Bulk Tank	2.6 L (11 cups)
1762 L (50 bu) Bulk Tank	3.8 L (16 cups)
Per 80 000 kernel seed corn unit	74 mL (5 tbsp) (2.5 oz)

When using 1.6, 2.0, or 3.0 bushel hoppers (without CCS™ tanks) to deliver seed to the meters, use this table:

Application Rate of Talc in Row Unit Hoppers	
Thoroughly incorporate the lubricant until all seeds are coated.	
Hopper Size	Amount of Talc
58 L (1.6 bu)	120 mL (1/2 cup)
70 L (2 bu)	177 mL (3/4 cup)
106 L (3 bu)	240 mL (1 cup)

NOTE: If the lubricant builds up in the bottom of hopper, reduce the quantity.

Adjust these rates as necessary so all seeds become coated with lubricant, while avoiding an accumulation of lubricant in the bottom of tank.

Double the talc recommendation when planting small seed, large seed, seeds with heavy treatment, or humid planting conditions.

In situations with a combination of sticky seed treatments, large or small seed, and high humidity, add up to 2—3 times the amount of talc shown in the tables.

IMPORTANT: Avoid the formation of lubricant clumps. Clean buildup of seed treatments and talc lubricant out of hoppers between fills.

If the lubricant builds up in the bottom of hopper and vacuum tubes require frequent cleanout, reduce lubricant rate. If a coating of seed treatment is found on seed disks, increase the amount of lubricant.

When using seed treatments, clean the meters and seed disks as needed. Clean the seed disks with warm, soapy water. Spray a graphite solution on the vacuum seal side of disk as needed.

OUC6045,00006CD-19-02MAR17

Use of Wax-Based Lubricant



A34471

A34471—UN—11OCT88

Meter lubricants improve the vacuum seed meter and CCS™ system performance. Wax-based lubricant typically has lower levels of inert dust and seed treatment dust in the vacuum blower exhaust.

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.

IMPORTANT: Only use approved wax-based lubricants. (See your John Deere dealer or qualified service provider.)

At the beginning of each season, add meter lubricant to the empty CCS™ tanks. Also add 9 mL (0.6 tbsp) (0.3 oz) to each empty row-unit hopper.

A lubricant (fluency agent) is required for optimum performance of the seed meter and CCS™ system. To obtain a consistent seed release from the seed disk and to improve spacing accuracy, properly lubricate the seed.

Lubricant and Farmer-Applied Seed Treatment:

Farmer-applied seed treatments are Not recommended.

IMPORTANT: Avoid sticky seeds and meter components. Chemical reactions between farmer-applied seed treatments and commercially applied treatments can cause sticky seeds. If farmer-applied treatments are used, carefully follow the recommendations of the chemical manufacturer. Avoid seed treatments with a high oil content. Certain temperature and humidity levels also complicate the material compatibility.

If a farmer-applied treatment is used, apply the treatment to the seed before applying the lubricant. Allow the seed treatment to dry before applying the

lubricant or placing seed in the tanks or hoppers. If the seed treatment accumulates in the meter, contact the treatment manufacturer for assistance.

Lubricant and Commercially Treated Seed:

Seed and seed treatment mixtures must be free of clumps.

Some treated seed is coated with commercially applied lubricant. Apply the recommended amount of lubricant, in addition to the commercial application.

IMPORTANT: Avoid poor seed flow. Thoroughly incorporate the lubricant, until the seeds are evenly coated.

Avoid lubricant buildup. Do not over apply the lubricant.

NOTE: Any additives other than John Deere powdered lubricants leave a residue on components that negatively affects the metering accuracy.

If necessary, adjust the following rates so that all the seeds become coated with lubricant.

Application Rate of Approved Fluency Agent in CCS™ Tanks	
Apply fluency agent to the seed as it enters the tank. All the seeds must be coated. Mix the seed and fluency agent as necessary.	
CCS™ Tank Size	Quantity of Fluency Agent
1233 L (35 bu) Bulk Tank	1.05 L (4-3/8 cups)
1762 L (50 bu) Bulk Tank	1.5 L (6-1/4 cups)
Per 80 000 kernel seed unit	30 mL (1/8 cup)

Application Rate of Approved Fluency Agent in Row Unit Hoppers	
Thoroughly incorporate the fluency agent until all the seeds are coated.	
Hopper Size	Quantity of Fluency Agent
58 L (1.6 bu)	48 mL (1/5 cup)
70 L (2 bu)	60 mL (1/4 cup)
106 L (3 bu)	90 mL (3/8 cup)
Per 80 000 kernel seed unit	30 mL (1/8 cup)

IMPORTANT: Avoid the formation of lubricant clumps. Remove the accumulated seed treatment and lubricant (fluency agent) from the hoppers between fills.

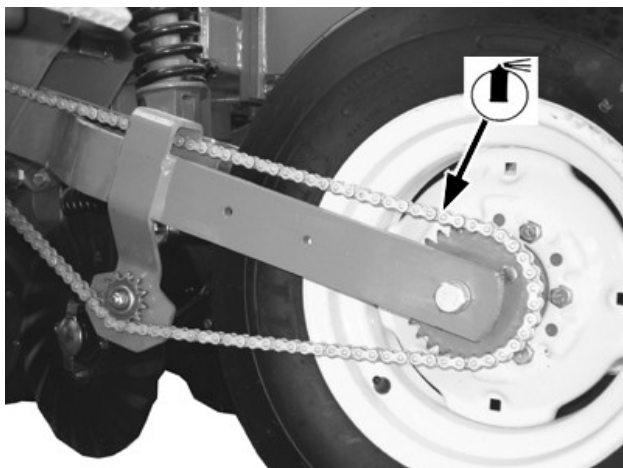
If the lubricant frequently accumulates in the hoppers and the vacuum system, reduce the lubricant rate. If a coating of seed treatment forms on the seed disks, increase the amount of lubricant.

When using seed treatments, clean the seed meters and seed disks as needed. Remove seed treatments using

warm, soapy water. Spray a graphite solution on the vacuum seal side of the disk as needed.

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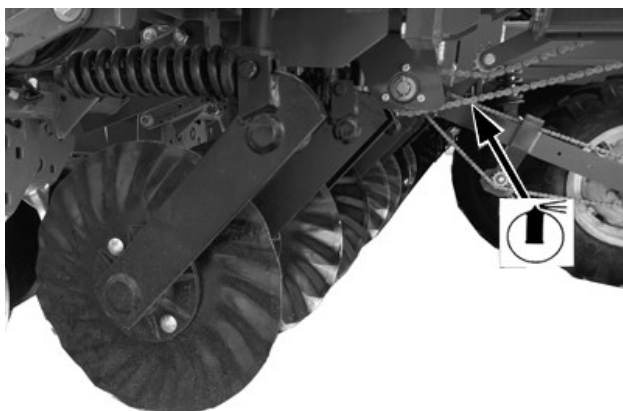
Service Interval



PUM3090—UN—02FEB09

Service Interval: Weekly

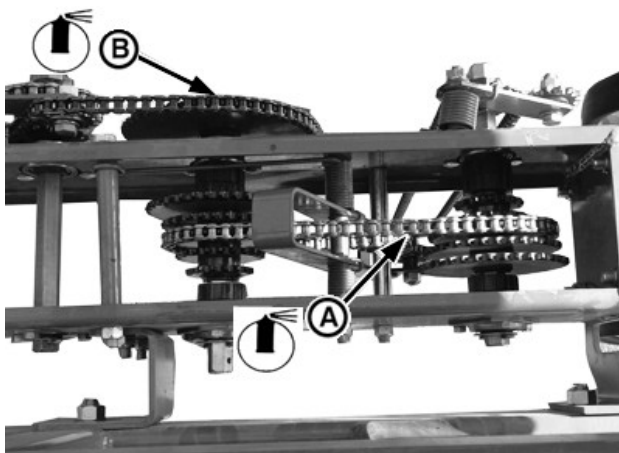
Drive Wheel Chain



P16601—UN—22AUG12

Service Interval: Weekly

Drive Chain Between Lower Shaft and Seed Housing.

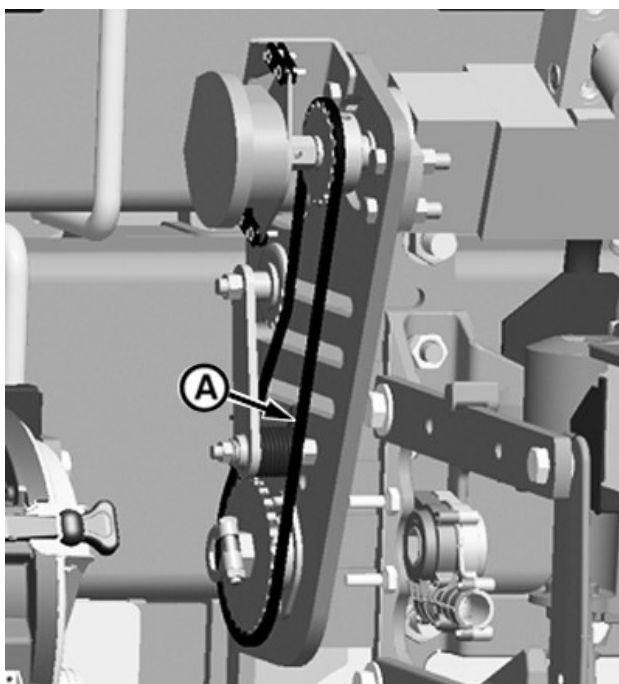


P16602—UN—22AUG12

A—Housing Chain
B—Chain

Service Interval: Weekly

Seed Drive Housing Chain (A) and Chain (B) Between Transmission Housing and High/Low Sprockets.

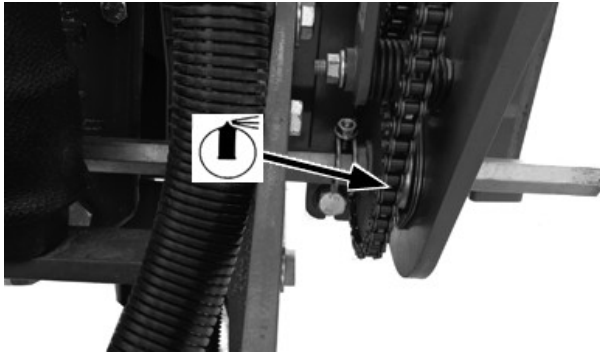


P17002—UN—26JUN13

A—Chain

Service Interval: Weekly

Seed VRD Chain (A).



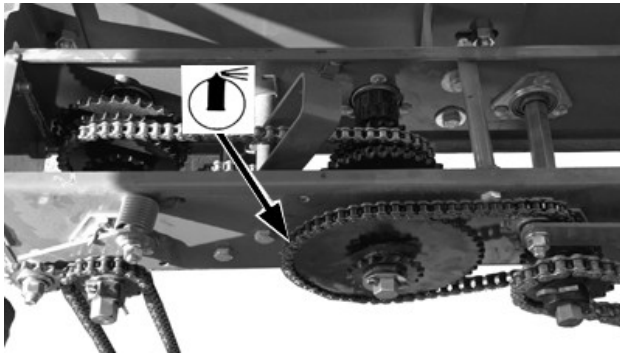
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Service Interval: Weekly

Planting Unit Upper Shaft Chain.



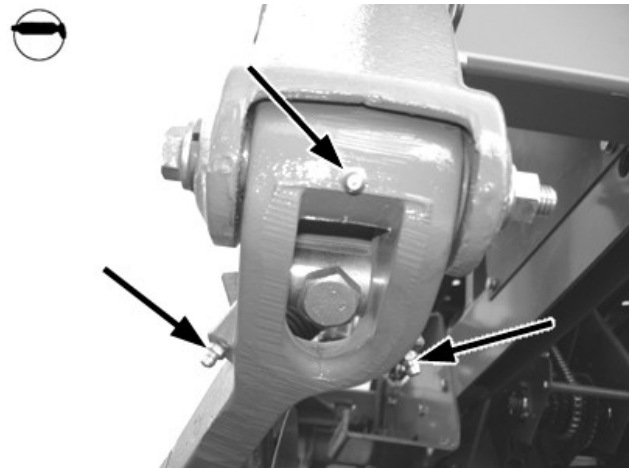
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P16608—UN—22AUG12

Service Interval: Weekly

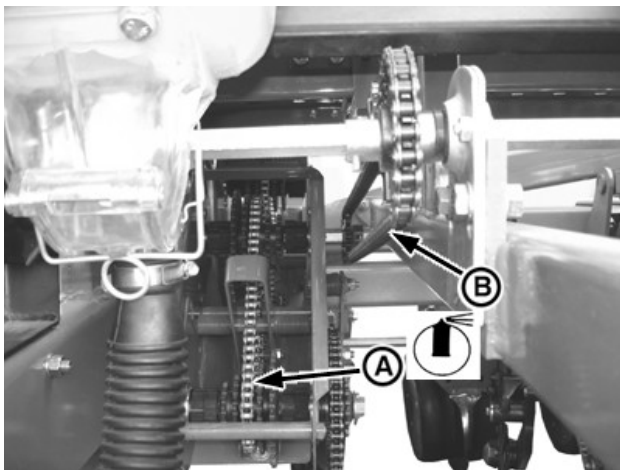
Chain Between Seed Housing and Fertilizer Housing



PUM3097—UN—02FEB09

Service Interval: Weekly

Fertilizer Opener Support Arm

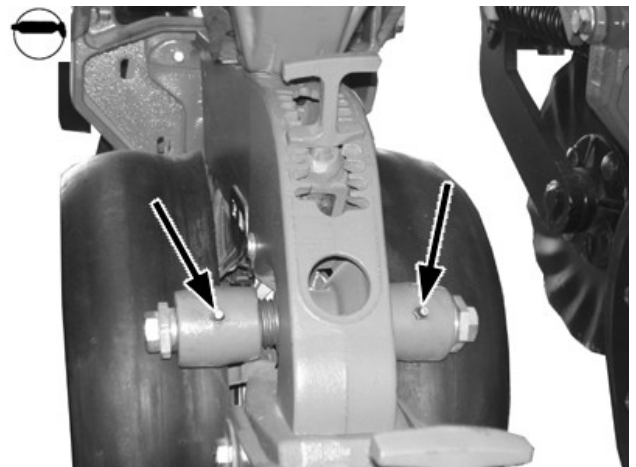


PUM3095—UN—02FEB09

A—Housing Chain
B—Chain

Service Interval: Weekly

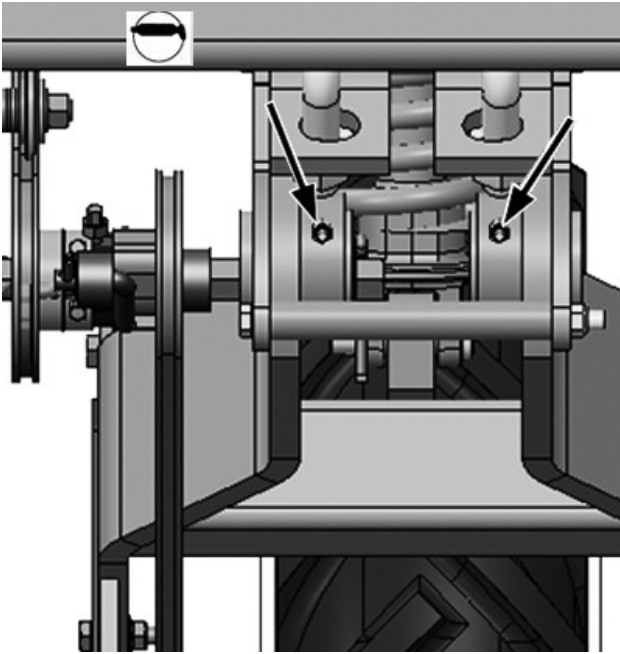
Fertilizer Housing Chain (A) and Chain (B) Between Fertilizer Housing and Reverser Housing.



PUM3098—UN—02FEB09

Service Interval: Weekly

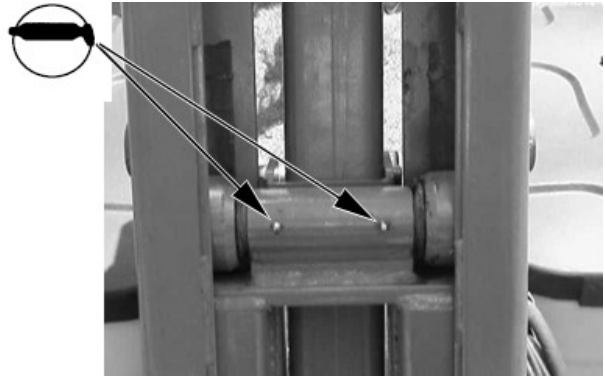
Gauge Wheel Arms



P17590—UN—27FEB15

Service Interval: Weekly

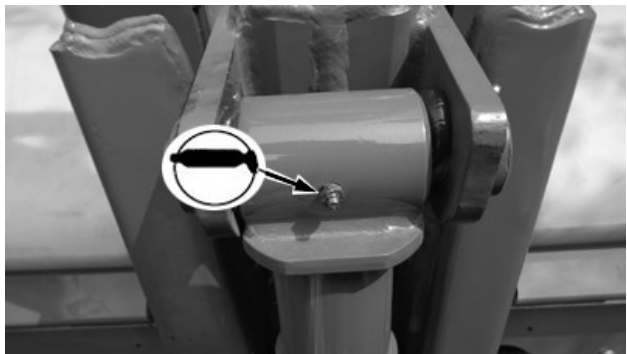
Drive Wheel Support



PUM3104—UN—02FEB09

Service Interval: Weekly

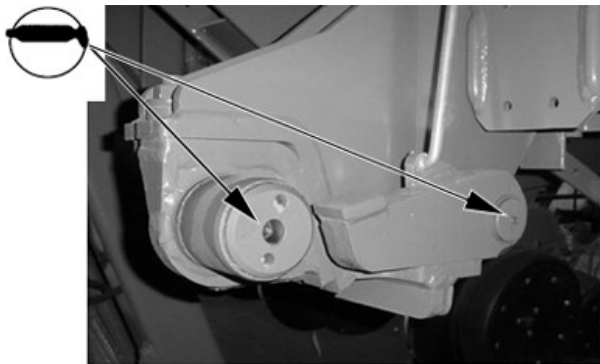
Upper Carriage Wheels



P16939—UN—22MAY13

Service Interval: Weekly

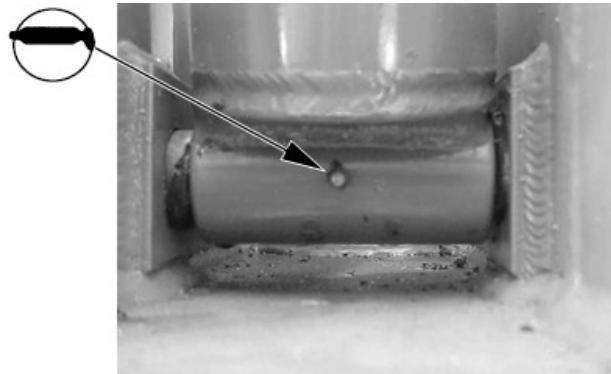
Lift Cylinder (Upper End)



PUM3102—UN—02FEB09

Service Interval: Weekly

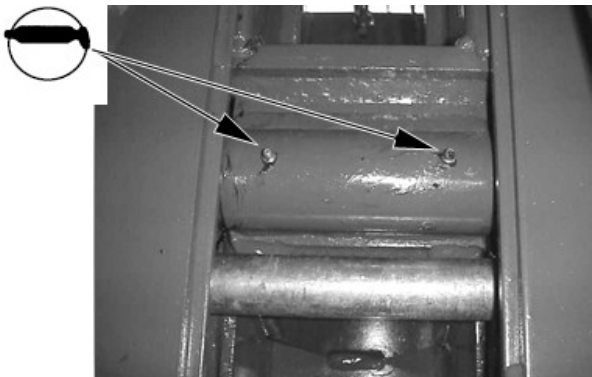
Localizer Wheel and Triggers



PUM3106—UN—02FEB09

Service Interval: Weekly

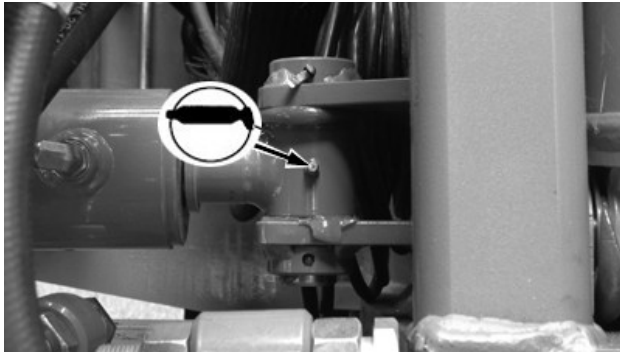
Lift Cylinder (Lower End)



PUM3103—UN—02FEB09

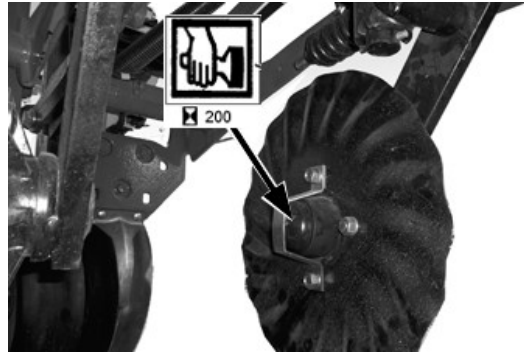
Service Interval: Weekly

Lower Carriage Wheels



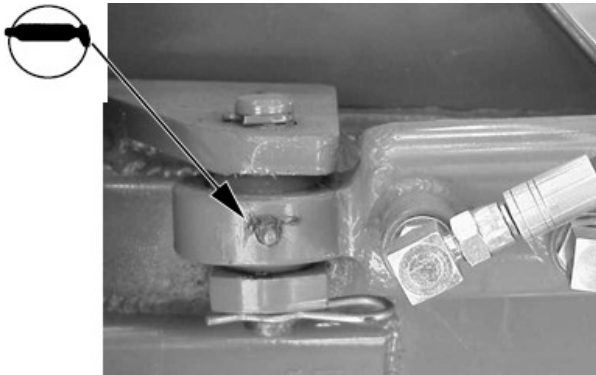
P16940—UN—22MAY13

Service Interval: Weekly
Swivel Cylinder (Right End)



P16610—UN—22AUG12

Service Interval: Every 200 Hours
Planting Unit Cutter Blade



PUM3108—UN—02FEB09

Service Interval: Weekly
Swivel Cylinder (Left End)

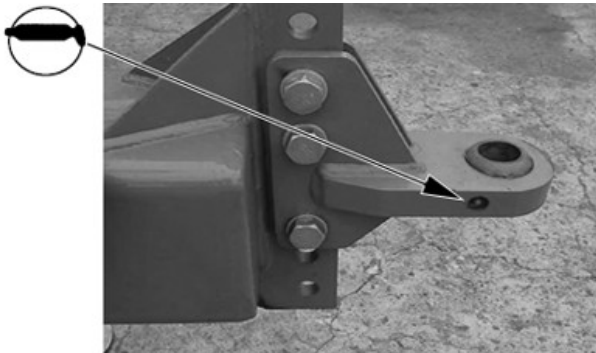


PUM2458—UN—05MAY08

Service Interval: Every 50 Hours
Single-Disk Fertilizer Opener

NOTE: Oil the spring lower pivot pins every 50 hours and at the start and end of each season. Oil will prevent the upper spring from rusting.

PX03972,0001243-19-27FEB15



PUM3110—UN—02FEB09

Service Interval: Weekly
Platform Hitch Ball Joint

Service and Adjustments

Practice Safe Maintenance

Service Tires Safely



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 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.

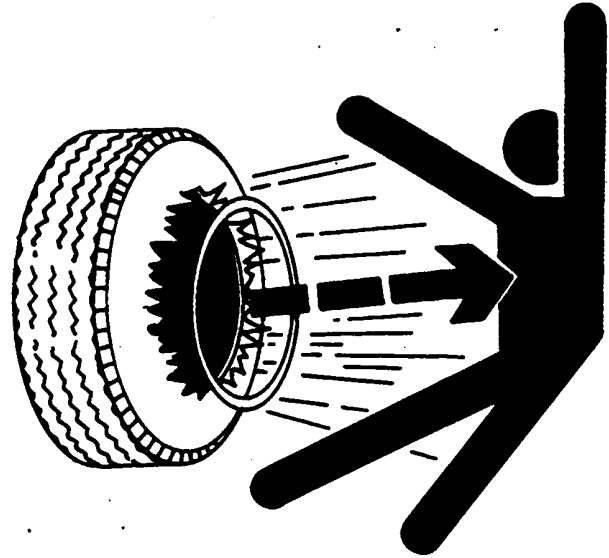
Securely support any machine elements that must be raised for service work.

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.

DX,SERV-19-17FEB99



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.

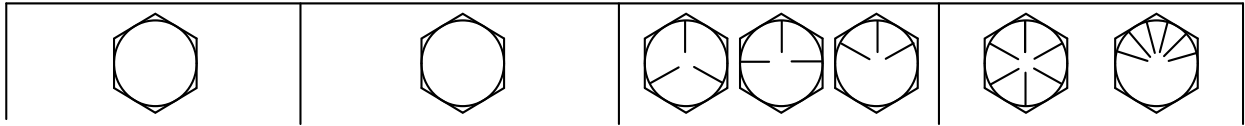
Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

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

Unified Inch Bolt and Screw Torque Values



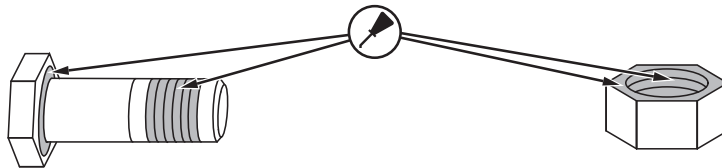
TS1671—UN—01MAY03

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.

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

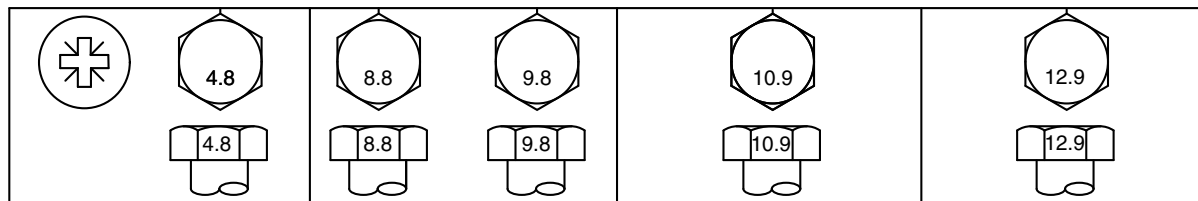
^aGrade 1 applies for hex cap screws over 6 in (152 mm) long, and for all other types of bolts and screws of any length.

^bGrade 2 applies for hex cap screws (not hex bolts) up to 6 in (152 mm) long.

^cHex head column values are valid for ISO 4014 and ISO 4017 hex head, ISO 4162 hex socket head, and ISO 4032 hex nuts.

^dHex flange column values are valid for ASME B18.2.3.9M, ISO 4161, or EN 1665 hex flange products.

Metric Bolt and Screw Torque Values



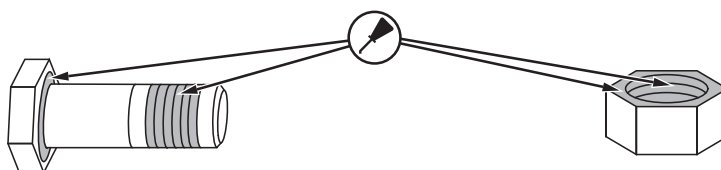
TS1742—UN—31MAY18

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

^aHex head column values are valid for ISO 4014 and ISO 4017 hex head, ISO 4162 hex socket head, and ISO 4032 hex nuts.

^bHex flange column values are valid for ASME B18.2.3.9M, ISO 4161, or EN 1665 hex flange products.

DX,TORQ2-19-30MAY18

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,VW,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. (See your John Deere dealer.)
5. The wiring harness terminals and connectors for electronic control units are repairable.

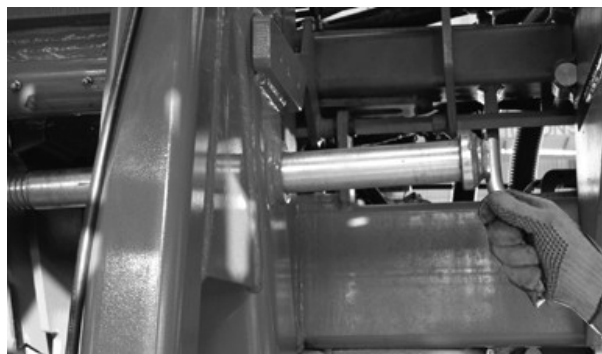
CN80434,000071D-19-26DEC17

Service Intervals

Service	Intervals						
	As Required	Beginning of Season	10 Hours or Daily	50 Hours	100 Hours	200 Hours	End of Season
Install and Remove Flush Face Seed Tubes	•						
Install and Remove optional Seed Tubes	•						
Clean Seed Tube Sensor	•						
Install New Vacuum Seal	•						
Adjust Meter Chain Drive	•						
Adjust Meter Pro Shaft Drive	•						
High Residue Chain Idler	•						
Inspect and Adjust Seed Opener Blades	•						
Replace Seed Opener Blades and Seed Tube Guard	•						
Adjust Gauge Wheels	•						
Fill Marker Hydraulic Cylinders	•						
Replace Marker Breakaway Bolt	•						
Replace Marker Breakaway Bolt	•						
Replace Shear Protection Pins	•						
Replace Shear Protection Pins	•						
Service 6-Bolt Wheel Bearing	•	•					
Service 8-Bolt Wheel Bearing	•	•					
Inspect Row Unit Drive Chains and Sprockets					•		
Coulter Maintenance	•	•			•	•	
Disk Closing Attachment	•						
Replace Fertilizer Tubes	•						
Single Disk Fertilizer Opener Maintenance	•						
Inspect and Clean Vacuum Impeller and Housing	•						
Clean Meter Drive		•					
Inspect Vacuum Motor			•				
Clean Vacuum Manifold System				•			
Tighten 6 and 8 Bolt Wheel Bolts				•			
Vacuum Meter Inspection and Service							•
Drain the Oil Reservoir on CCS Fan							•
Tighten Bolts on Center Frame Rollers					•		

PX03972,00011DE-19-09JUN15

Install Service Lock



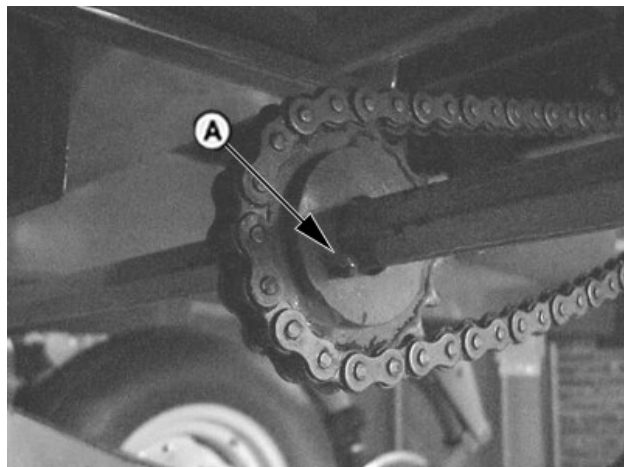
P16575—UN—22AUG12

CAUTION: Always install the locking pin in the tower before working under or near the planter.

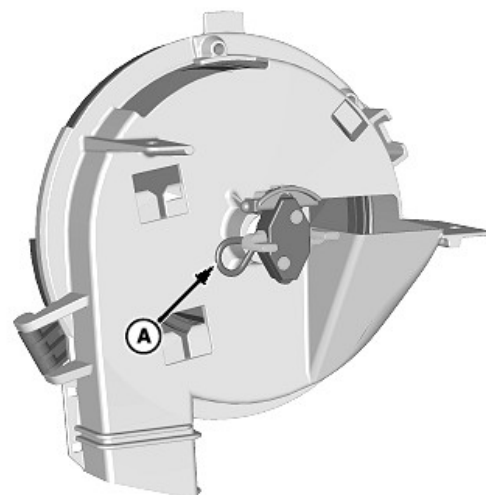
See Planter Positions section for instructions on installing the locking pin.

PX03972,0000E53-19-22AUG12

Replace Shear Pins



PUM2461—UN—05MAY08



A53593—UN—08JAN04

MaxEmerge™ 5 Meter Unit

A—Shear Pin

IMPORTANT: All shear protection pins should be replaced annually.

Shear pin (A) retains the lower shaft sprocket and will fail when an excessive load is applied to the lower shaft.

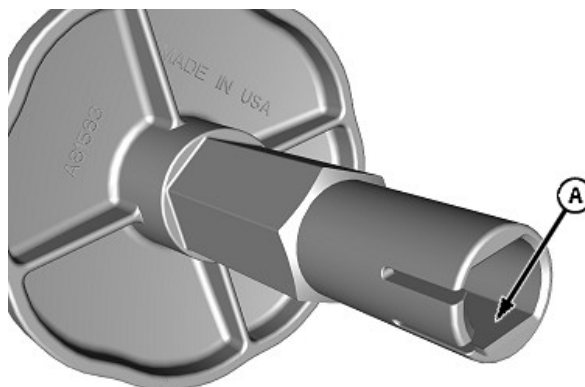
Infrequent or inadequate lubrication will cause moving parts to seize on the planter. This seizure will cause the shear pins to break in order to avoid damage to other planter components.

If any of the shear pins fail, rotate the lower shaft by hand to locate the point of seizure. When the lower shaft turns freely by hand, install the shear pin.

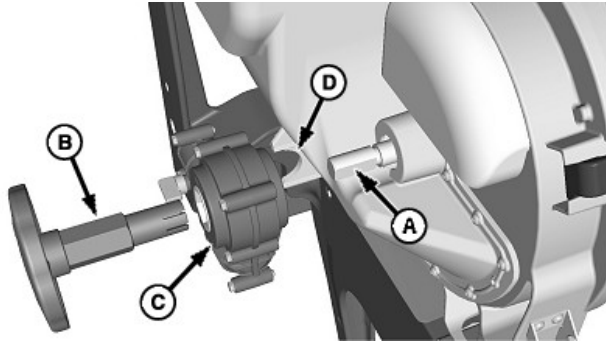
NOTE: Always replace shear pins with identical pins of the same size. Do not substitute other types of pins.

PX03972,0000207-19-08MAY14

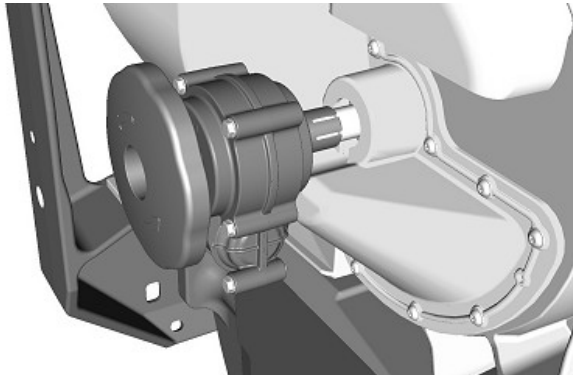
Cable Drive Meter Shear Handle



A57648—UN—13MAR06

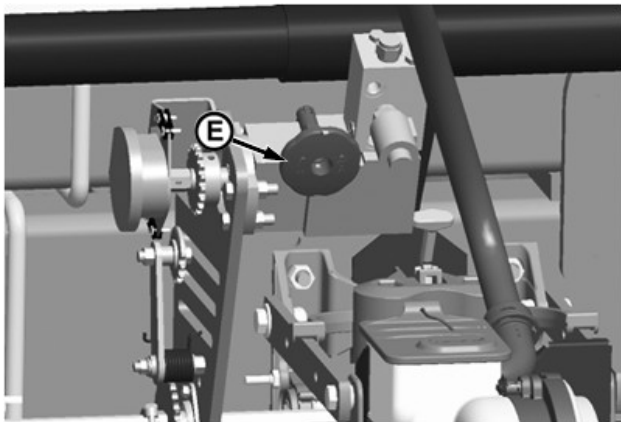


A57649—UN—13MAR06



A57650—UN—13MAR06

Assembled



P17000—UN—25JUN13

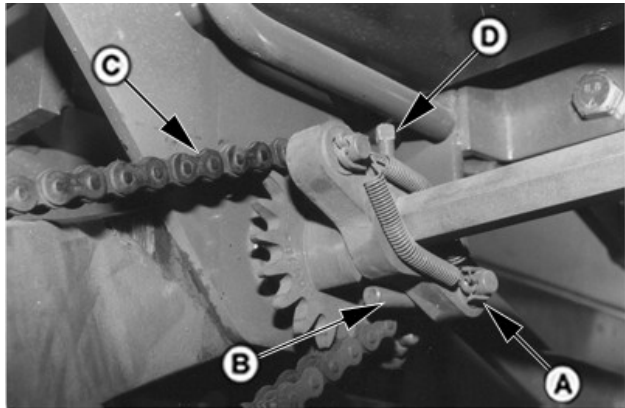
F (Location with Variable Rate Drive)

- A—Flat Surfaces, Aligned
- B—New Handle
- C—Gearbox
- D—Cutout
- E—Pro Meter Replacement Handle
- F—For no VRD version, handle is placed near to frame at seed mechanical transmission

If meter handle breaks; remove broken pieces, align flat surfaces (A) and insert new handle (B) through gearbox (C) until handle snaps into groove on shaft. Gearbox must seat into cutout (D).

PX03972,000020F-19-03MAR14

Ratchet Drive



PUM2462—UN—05MAY08

- A—Springs
- B—Pawls
- C—Chain
- D—Cap Screws

The ratchet assembly should operate freely and springs (A), should pull pawls (B) back against the ratchet.

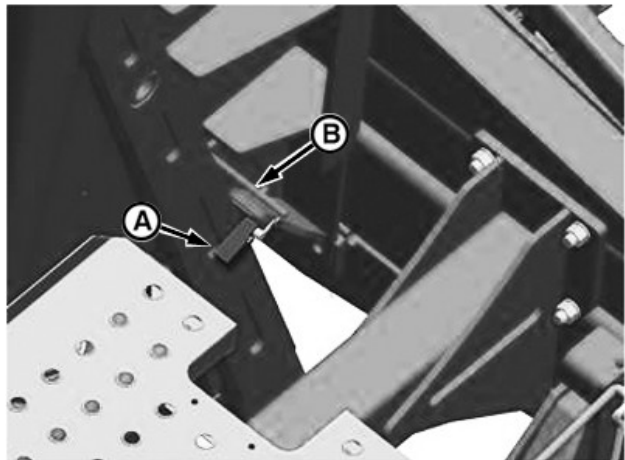
To align chain (C), loosen cap screws (D) and slide the ratchet assembly along the shaft.

Tighten cap screws (D).

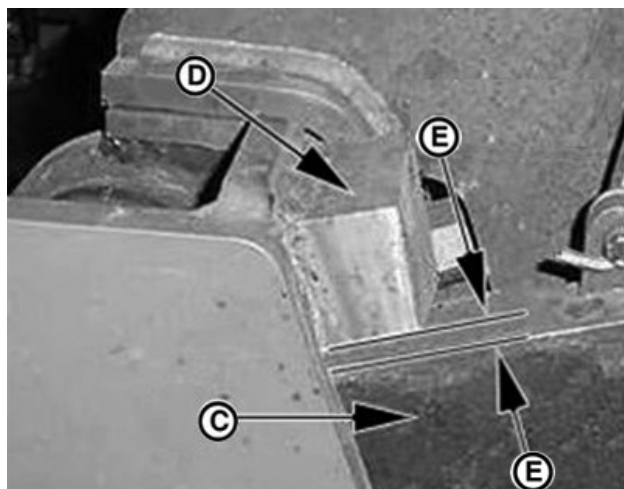
NOTE: The chains must be aligned in order to prevent them from jumping off the sprockets or damage.

PX03972,0000E55-19-22APR14

Trigger Adjustment



P17009—UN—05JUL13



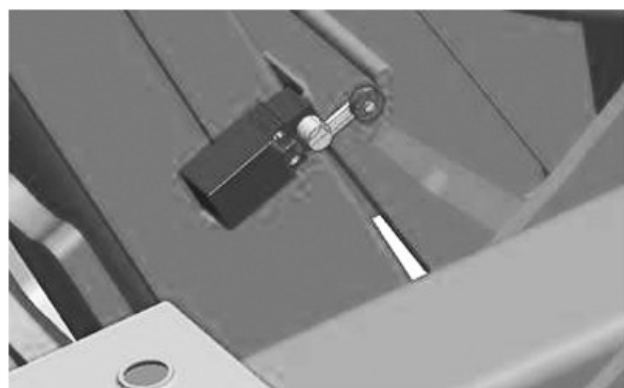
P17066—UN—06AUG13

A—Limit Switch
B—Rod
C—Gap
D—Stop
E—Shim Thickness

1. Raise the carriage until limit switch (A) contact frame rod (B).
2. Measure the gap (C) between trigger and stop (D).

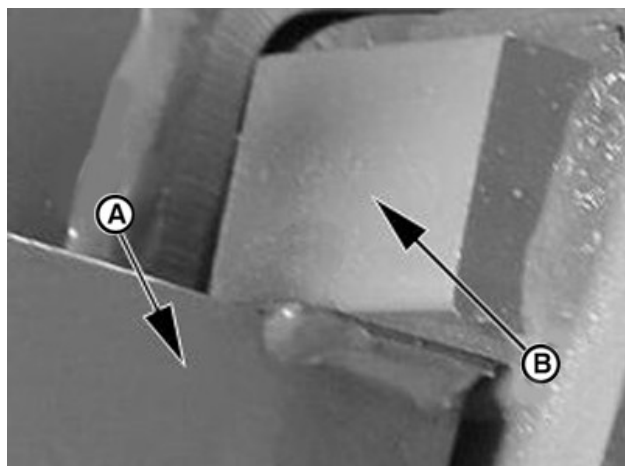
IMPORTANT: Check this gap every 100 hours to maintain correct position and prevent frame lift structure stress.

IMPORTANT: Raise the planter platforms and place a mechanical lock at each end before measuring this gap.

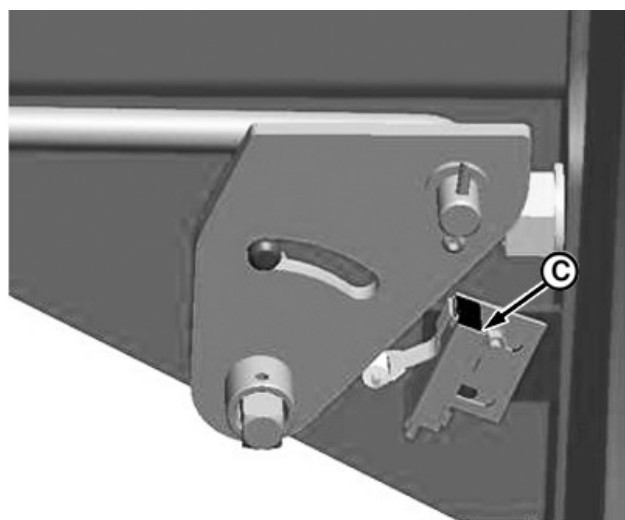


P17010—UN—05JUL13

3. If the gap is greater than the specification (25 mm), adjust the limit switch at the slotted plate.



P17016—UN—05JUL13



P17011—UN—05JUL13

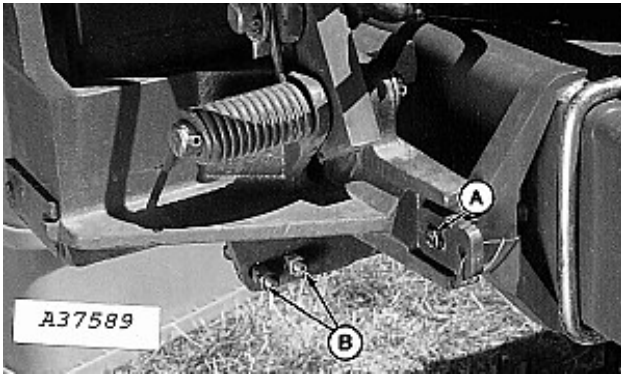
A—Gap
B—Stop
C—Switch

4. Position the planter as indicated in step 1.
5. Verify there is a gap between trigger (A) and stop (B).
6. If trigger (A) contacts pin (B), look for damage at the limit switch (C) attached to the lever mechanism in the front frame below the fertilizer hoppers.

NOTE: The maximum dimension for this gap is 25 mm.

PX03972.0000252-19-29APR14

Replacing Marker Breakaway Bolt



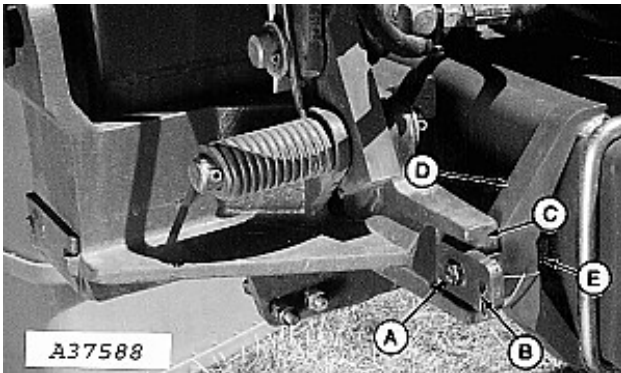
A37589—UN—24JUL95

- A—Breakaway Bolt**
B—Extra Breakaway Bolts

Marker breakaway bolt (A) provides breakaway protection when marker hits an obstacle.

NOTE: Extra (8.8 strength) breakaway bolts are located on lower side of marker frame at (B).

To replace breakaway bolt, proceed as follows:



A37588—UN—24JUL95

- A—Breakaway Bolt**
B—Plate
C—Marker Frame
D—Machine Frame
E—Nut, M10

Return marker arm to operating position and insert M10 x 80 mm breakaway bolt (A) through plate (B), slot in marker frame (C), and hole in machine frame (D).

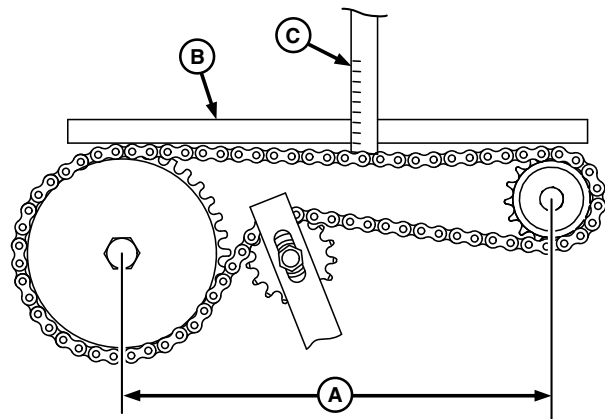
Install one M10 nut (E) and second M10 nut and tighten to specification.

Specification

M10 Nut—Torque. 55 N·m
(40 lb.-ft.)

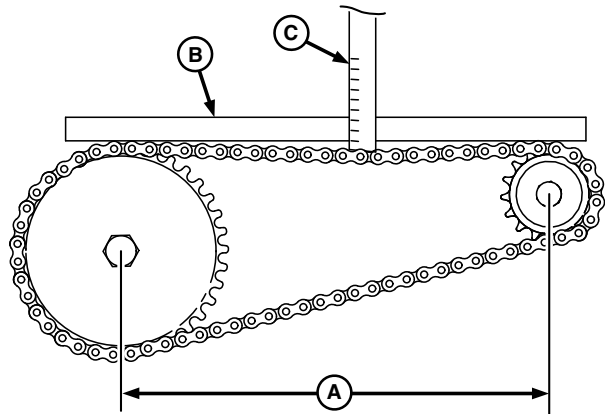
PX03972,00011DF-19-23FEB15

Tighten 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 chain deflection, perform the following procedures:

1. Rotate drive to tighten chain.
2. Place straight edge (B) over the slack span of chain.

NOTE: Verify that one side of the chain is taut during measurement.

3. At center of shaft distance (A), use a ruler (C) to measure deflection from the top of the chain to the underside of the straight edge.

IMPORTANT: Do not over tighten chains or rapid chain wear, shaft, and bearing damage can result.

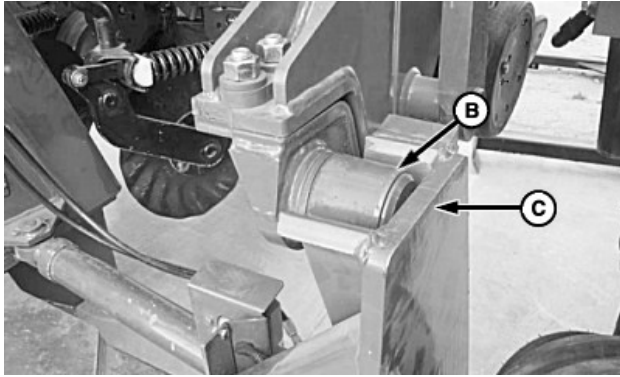
4. Adjust shaft centers or chain tighteners to specification.

Specification

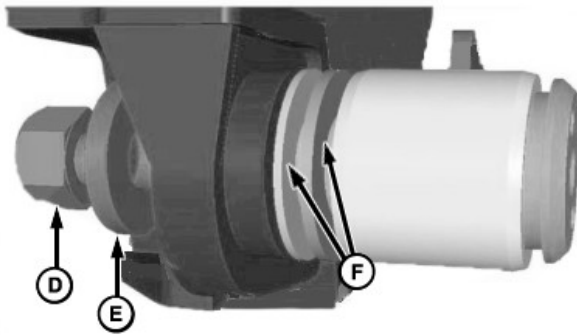
Chain—Deflection. . . . 6.4 mm (1/4 in.) of chain deflection per 31 cm (12 in.)

PX03972,00002EF-19-29APR14

Rollers Tight Verification



A82754—UN—11JUN14



A82755—UN—11JUN14

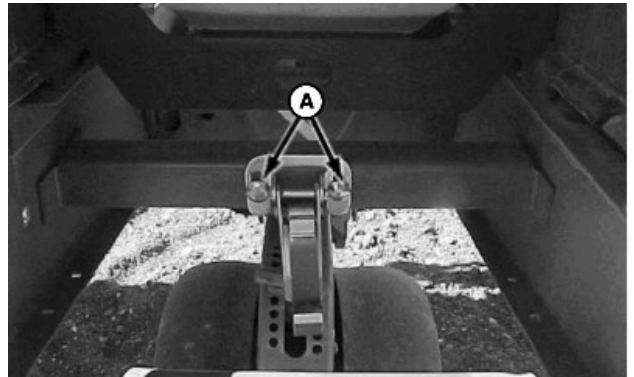
B—Roller
C—Side Plate
D—Nut
E—Washer
F—Shims

Specification

Nut—Torque. 678 N·m (500 lb·ft)

CN80434,000071C-19-05JAN18

Row Unit Meter Latch Adjustment



A48635—UN—01FEB02

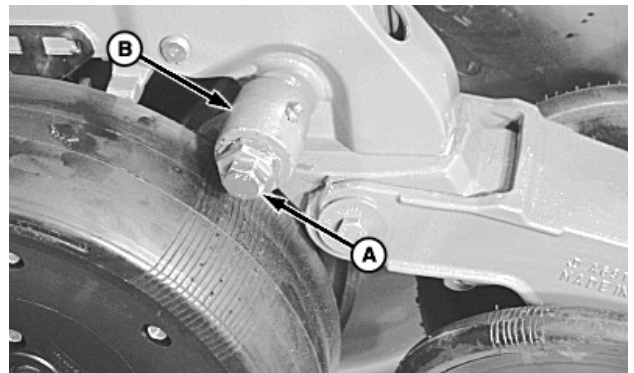
Meter Latch

A—Cap Screws

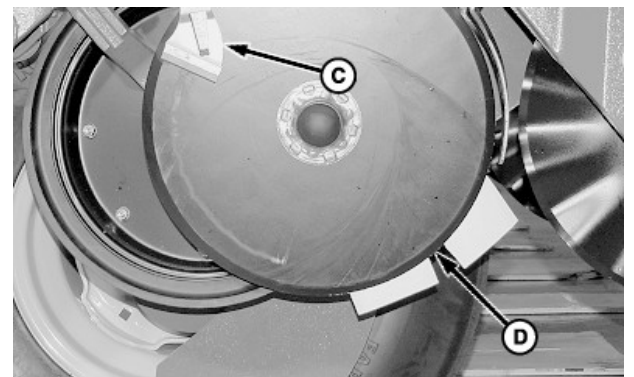
Check latches on meters to verify that they are tight. If latches are loose, loosen cap screws (A) and adjust latch.

PX03972,00002E0-19-29APR14

Inspect and Adjust the Furrow Opener Disks



A53246—UN—29OCT03



A53250—UN—29OCT03

A—Cap Screw
B—Pivot Shaft
C—Scraper
D—Contact Point

CAUTION: Avoid injury from sharp edged disks. Wear protective gloves and handle the disks carefully.

1. Inspect the disk edge (D) as follows:

NOTE: Use business cards or other material with 0.3 mm (0.012 in) thickness.

- a. Insert two small business cards in the disk opening and gently slide the cards together until the disk contact point is reached.
- b. Measure the distance between the business cards and compare it to the specification.

Specification

Disk Edge Contact—Disk Edge
Contact Length. 38—63.5 mm
(1.5—2.5 in)

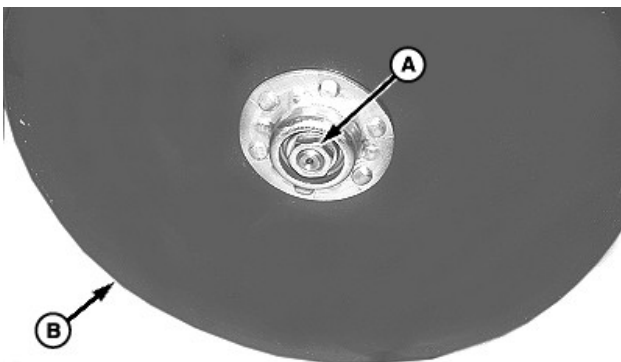
- c. If the distance does not fall within the specifications, proceed as follows:

2. Remove the cap screw (A), the pivot shaft (B), and the gauge wheel from the row unit.
3. Inspect the scrapers (C) for excessive wear and replace the as needed.
4. Inspect the disks for wear or damage.

Measure the disk diameter and compare it to specification. If the diameter is below specification, if the beveled edge is worn off, or if significant damage is apparent, replace the disks. (See Replace the Furrow Opener Disks and Seed Tube Guards in this section.)

Specification

Opener Disks—Minimum
Diameter. 356 mm
(14 in)



A51112—UN—20NOV02

A—Nut and Washer
B—Disk

CAUTION: Avoid injury from sharp edged disks. Wear protective gloves and handle the disks carefully.

IMPORTANT: Avoid spindle damage. The nut on the left-hand side of the shank has left-hand threads.

NOTE: If the opener disks are centered on the row unit shank, remove only one disk to adjust the contact point. If one opener disk contacts the row unit shank, move the shims from one side of the shank to the other.

5. Remove the hub cap, the nut, the flat washer (A), and the hardened shims.
6. Remove the disk (B).
7. While the disk is off, inspect the seed tube guard. Replace the guard as needed. (See Replace the Furrow Opener Disks and the Seed Tube Guards in this section.)

NOTE: Do not discard the shims. The shims are needed at the time of disk replacement.

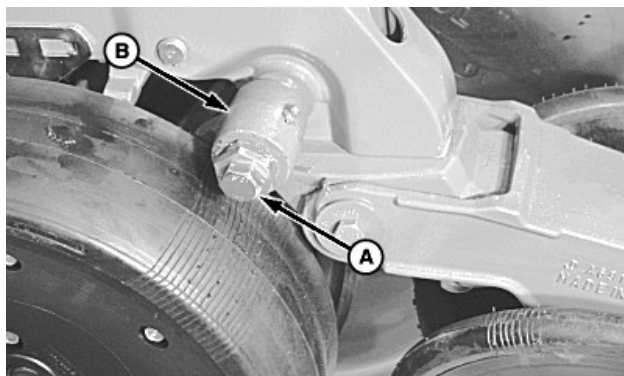
8. To increase or decrease the contact point when assembled, move the shims from one side of the disk to the other side. Inspect the adjustment and repeat as needed.
9. During the final reassembly, tighten the disk nut and the cap screw to specification.

Specification

Disk Nut—Torque. 122 N·m
(90 lb·ft)
Gauge Wheel Arm Cap
Screw—Torque. 271 N·m
(200 lb·ft)

OJ06074,0000E6A-19-23MAY16

Replace the Furrow Opener Disks and the Seed Tube Guard



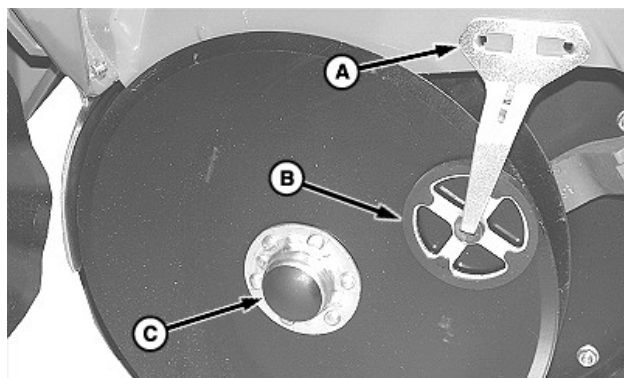
A53246—UN—29OCT03

A—Cap Screw
B—Pivot Arm

IMPORTANT: Avoid premature wear. Do not use a new disk with a used disk. Install the new disks in pairs.

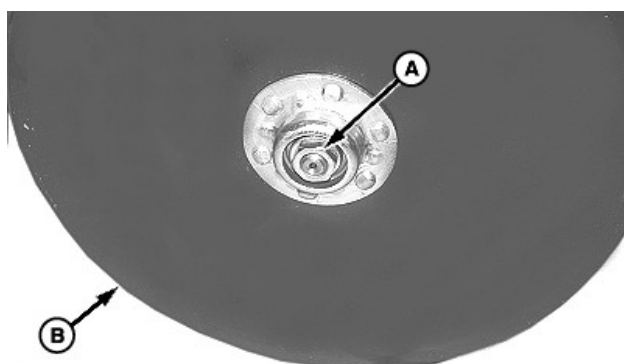
NOTE: To replace the seed tube guard only, remove the left-hand disk.

1. Remove the cap screw (A), the pivot arm (B), and the depth gauge wheel from the row unit.



A—Engagement Pin
B—Scraper
C—Hub Cap

2. On planting units equipped with a rotary or a rigid scraper: Pull the front engagement pin (A) outward and disengage the scraper assembly (B) from the shank panels.
3. Remove the hub cap (C).



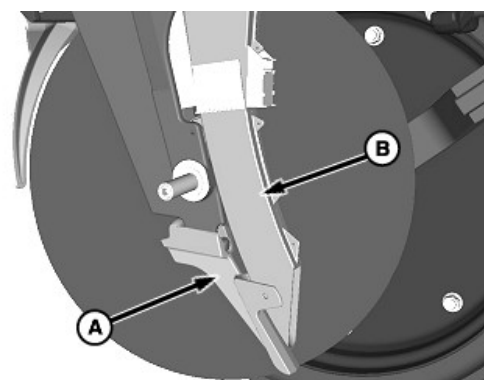
A—Nut and Washer
B—Disk

CAUTION: Avoid injury from sharp edged disks. Wear protective gloves and handle disks carefully.

IMPORTANT: Avoid spindle damage. The nut (A) on the left-hand disk has left-hand threads. Loosen and tighten the nut in the proper direction.

NOTE: Do not discard the spacer shims.

4. Remove the nut and the flat washer (A).
5. Remove the disk (B).
6. Remove the hardened shims.
7. If replacing the disks, remove the opposite disk.



A—Seed Tube Guard
B—Seed Tube

NOTE: Replace the seed tube guard as needed.

8. To remove the seed tube guard (A), rotate the guard clockwise while sliding it forward.
9. Install the seed tube guard (if removed). Install the new disks.
10. Adjust the disk contact point during reassembly.
11. During reassembly, tighten the opener disk nut and the cap screw to specification.

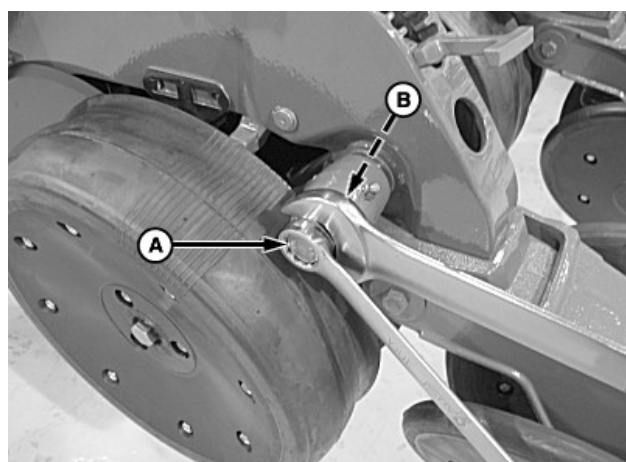
Specification

Opener Disk Nut—Torque (dry).	122 N·m (90 lb·ft)
Gauge Wheel Arm Cap Screw—Torque (dry).	271 N·m (200 lb·ft)

12. Adjust the depth gauge wheels (See Adjust the Depth Gauge Wheels).

OUC6435,0001A4E-19-22AUG18

Adjust the Depth Gauge Wheels



A—Cap Screw
B—Nut

A99981—UN—05MAR18

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:

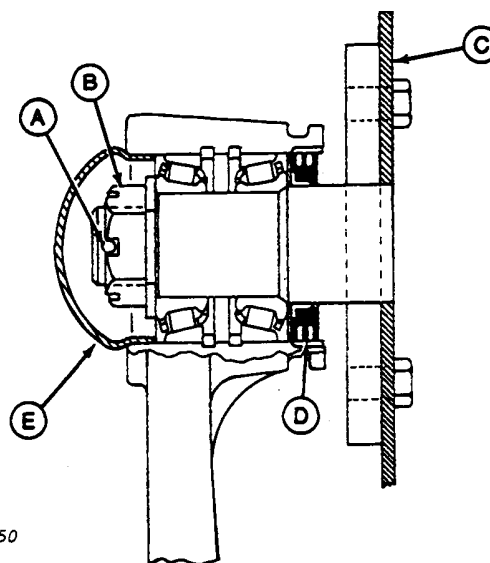
1. Hold the cap screw (A) with one wrench and turn the adjustment nut (B) with another wrench (A).
 - To move the wheel closer to the disk, turn the nut counterclockwise.
 - To move the wheel away from the disk, turn the nut clockwise.
2. Tighten the cap screw to specification and recheck the wheel adjustment.

Specification

Cap Screw—Torque (dry). 271 N·m
(200 lb·ft)

AG, OUC6074, 1369-19-22AUG18

Coulter Maintenance



A22350

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:

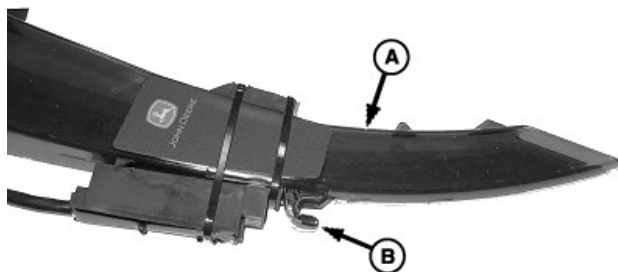
- Clamp the coulter disk (C) in a vise.
- Disassemble and clean the coulter components.
- Repack with the John Deere TY6341 SD Polyurea grease or an equivalent SAE multipurpose type grease.
- Tighten the nut (B) until there is a drag on the bearing.

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.

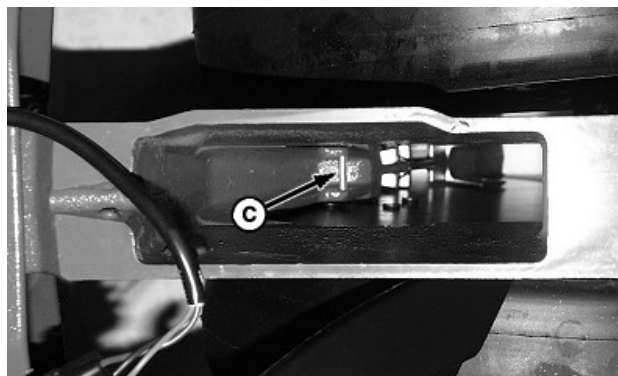
The bearings are packed with grease at the factory. Every 100 hours, inspect the bearing and adjust if necessary. Every 200 hours or before each planting season, disassemble the bearing then clean and repack as previously outlined. Do not use a chassis lubricant in the bearings.

AG, OUC6074, 1381-19-17APR18

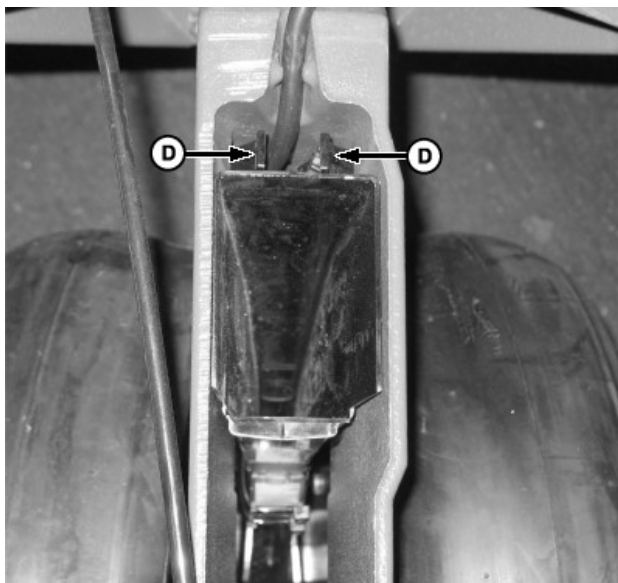
Install and Remove Standard Flush Face Seed Tubes



A59900—UN—02APR07



A53298—UN—03NOV03



A59901—UN—02APR07

A—Seed Tube
B—Hook
C—Pin

D—Tabs

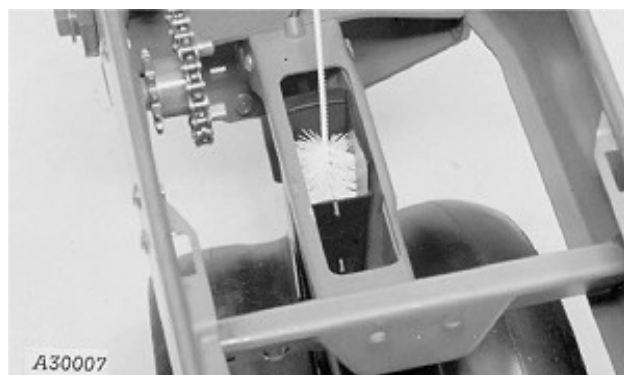
1. Connect monitor harness to sensor harness.

NOTE: Place harness connector inside planting unit at same time as seed tube.

2. Insert seed tube (A) into planting unit so the hook (B) locks on alignment pin (C).
3. Position seed tube so tabs (D) lock into holes.
4. To remove seed tube, squeeze tabs with fingers until they release from casting. Pull upward.

OOU6074,0000FE4-19-04APR13

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.

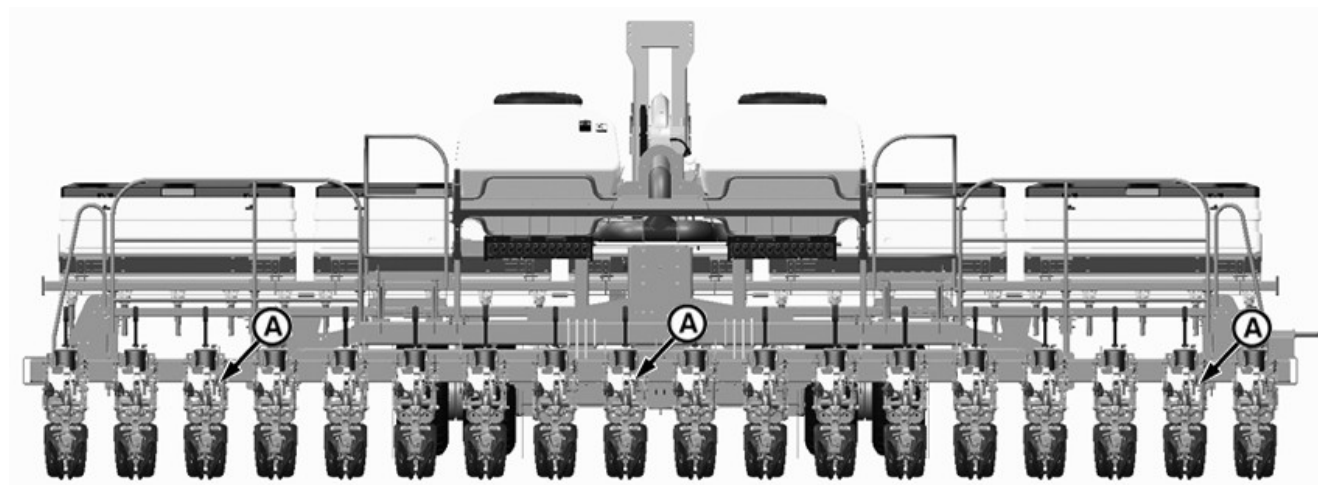
Periodically clean the seed sensor area inside the seed tube with the dry brush provided.

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.

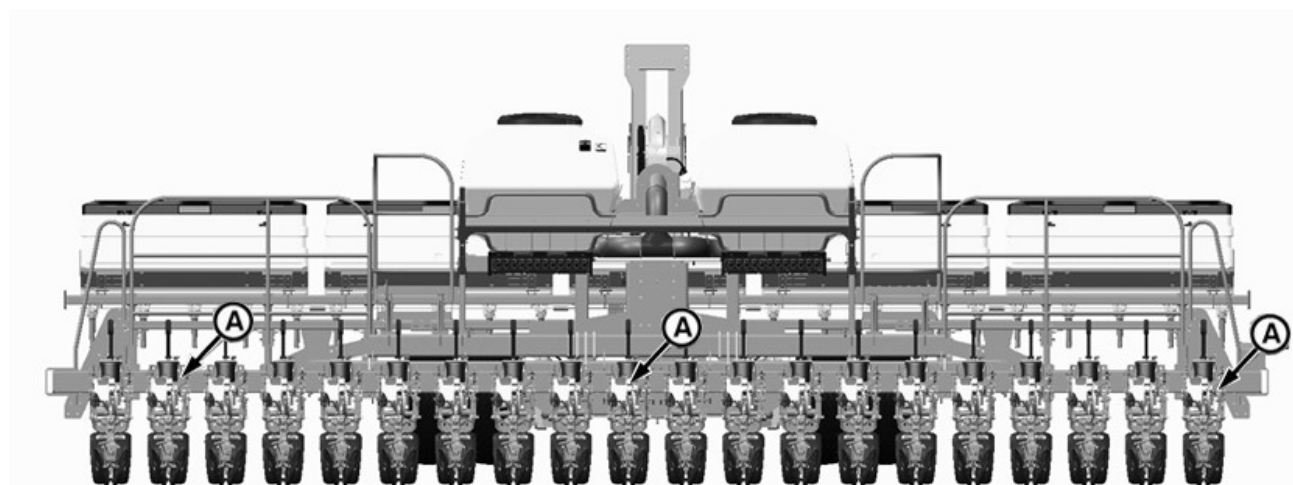
AG,OOU1074,849-19-16APR18

Setting CCS Row Unit Fan Switch



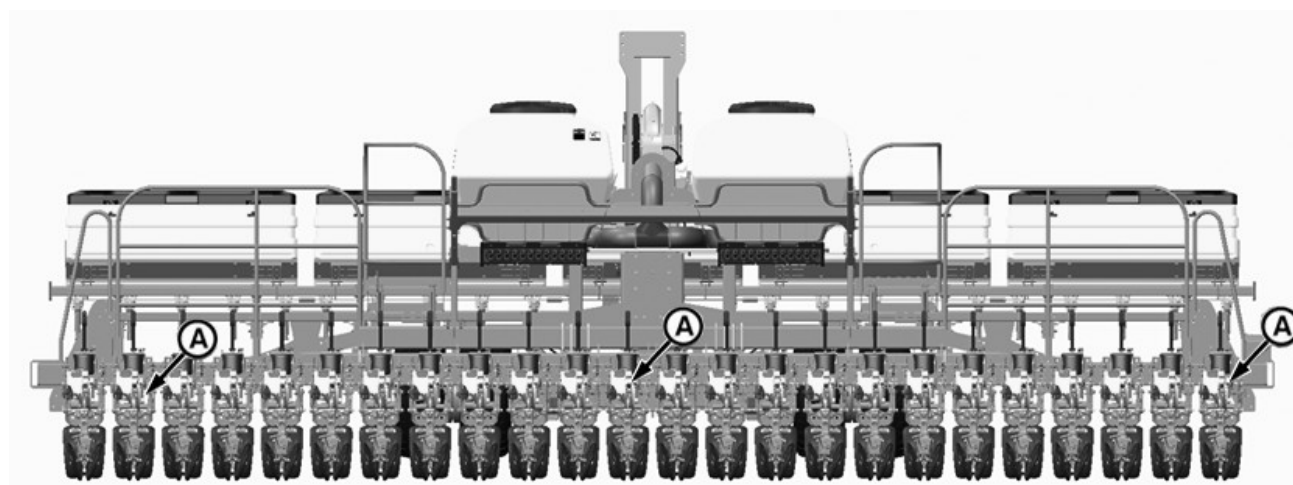
P17583—UN—24FEB15

18 Rows



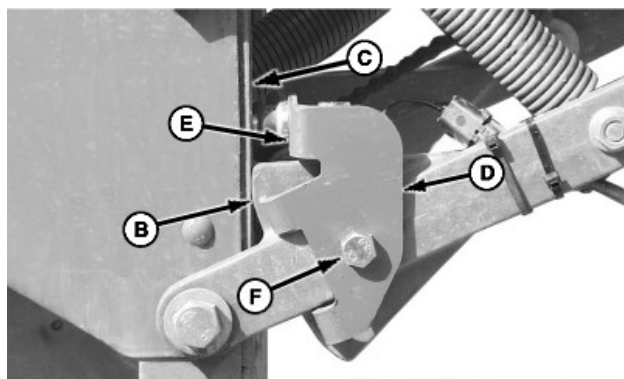
P17584—UN—24FEB15

20 Rows



P17585—UN—24FEB15

24 Rows



A53433—UN—02DEC03

The CCS row unit switch (A) turns the CCS fan on and off as machine is raised and lowered.

1. Lower machine so lower parallel arm stop (B) touches planting unit frame (C).
2. Rotate sensor bracket (D) until flat surface (E) is 20 mm (3/4 in.) from planting unit frame.
3. Tighten cap screw (F).

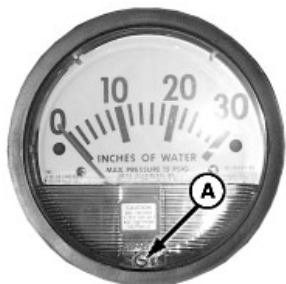
IMPORTANT: Avoid machine damage. Agitator will continue to run as long as tractor power is provided, if switch is not adjusted to deactivate when frame is raised.

NOTE: Tractor electrical power must be supplied when adjusting.

4. Observe agitator on CCS tank and adjust switch so agitator will shut off when frame obtains this fully raised position. This adjustment also ensures the CCS fan and agitator will engage the moment this row unit contacts the ground when lowered.

PX03972,00011E1-19-24FEB15

Zero The CCS Blower Pressure Gauge



A51170—UN—18NOV02

A—Zero Adjusting Screw

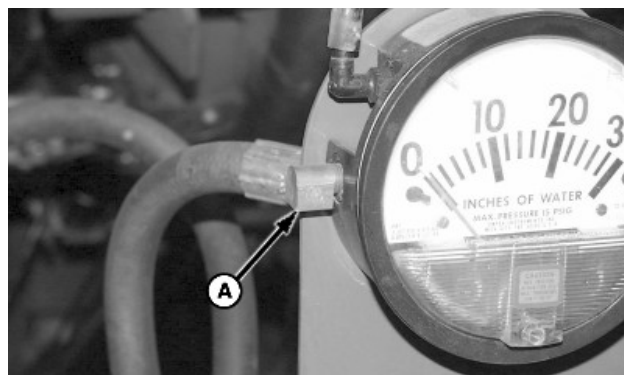
With the CCS blower shut off and the CCS gauge in a vertical position, disconnect the CCS blower monitor line to vent the gauge to the atmosphere. Use the zero

A—Row Unit Switch
B—Stop
C—Frame
D—Bracket
E—Flat Surface
F—Cap Screw

adjusting screw (A) to set the gauge pointer exactly on the zero mark. Connect the monitor line.

OUC1074,00014B4-19-03MAR16

Inspect and Replace The CCS™ Blower Gauge Filter



A51173—UN—19NOV02

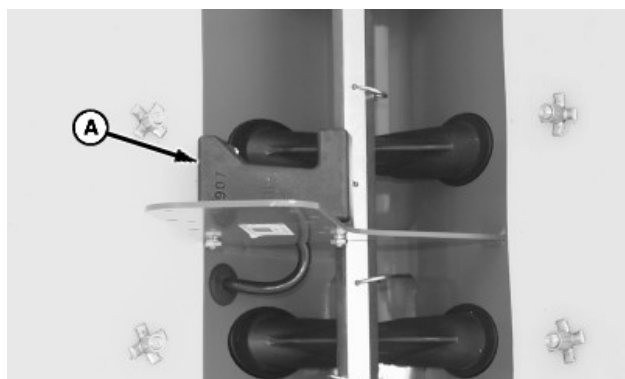
CCS Blower Filter

A—Filter

The CCS blower gauge filter (A) may become clogged with dust. Annually inspect the CCS blower gauge filter and replace it if needed.

OUC1074,000142B-19-15MAR17

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.

OUC1074,0001427-19-11JUL18

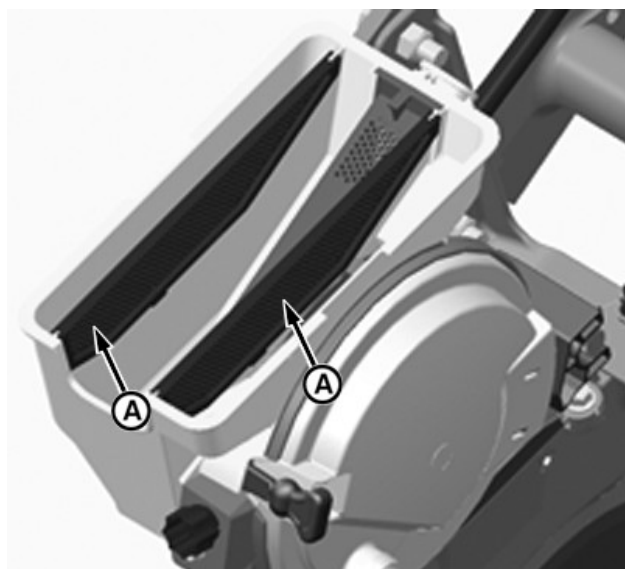
Inspect and Service Vacuum Meter



A34471

A34471—UN—11OCT88

Cleaning Unit Hopper Screen



P17601—UN—15APR15

A—Hopper Screen

Remove hopper screen (A), tap until clear and replace.

PX03972,00011E3-19-15APR15



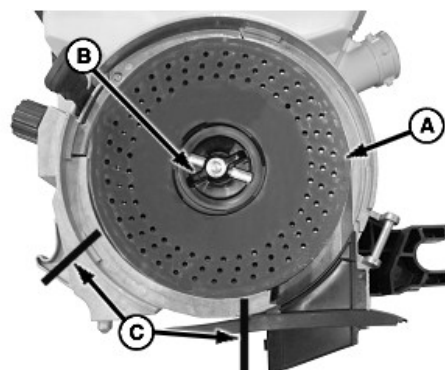
A78513—UN—02AUG13

A—Plastic

CAUTION: If seed treatments are used, use caution when opening meter domes. Seed treatments can cause eye, skin, or breathing problems. Read and follow safety instructions on the chemical manufactures label.

Annually inspect seed meter for wear and seed treatment buildup.

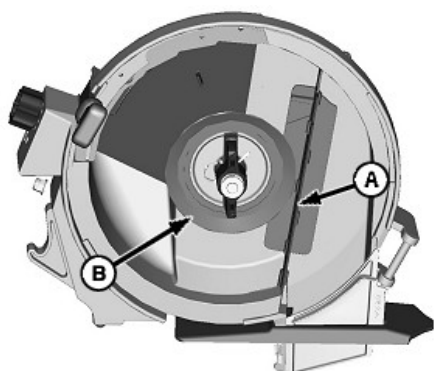
1. Annual cleaning of vacuum meters and seed disks is recommended. Use mild detergent and a soft brush to remove seed treatment buildup. Clean behind plastic (A) in vacuum meter housing.



A77666—UN—15OCT13

A—Seed Disk
B—Hub
C—Inspection Area

2. Install disk (A). Spin hub (B) rapidly by hand and quickly release hub. If disk rotates approximately one revolution after released, hub is properly adjusted. (If adjustments are needed, see ADJUST METER HUB in this section.)
3. With hub properly adjusted, view edge of disk in inspection area. Rotate hub slowly by hand. If gaps intermittently appear as disk is rotated (indication of a warped disk), replace disk.
4. With hub properly adjusted, hold meter upright with seed in meter. Rotate meter to verify that no seed loss occurs in inspection area (C). If seed loss occurs, replace disk.
5. Remove disk.



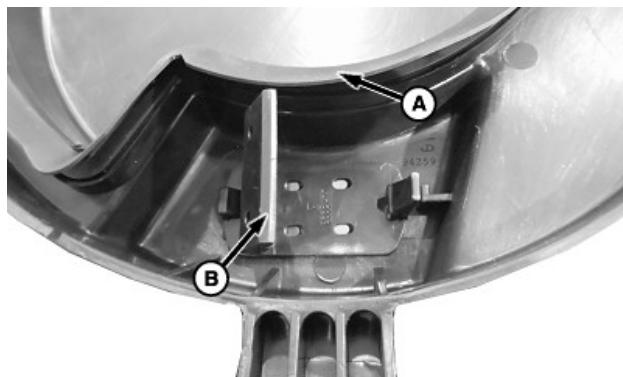
All Other Planters

A80237—UN—01MAY14

A—Brush
B—Hub Seal

6. Check brush (A) bristles for separations and gaps. If brush is worn enough to allow seed to pass through, replace brush. (See CHANGE VACUUM METER BRUSH in this section.)
7. Replace hub seal (B) if cracked or weathered.

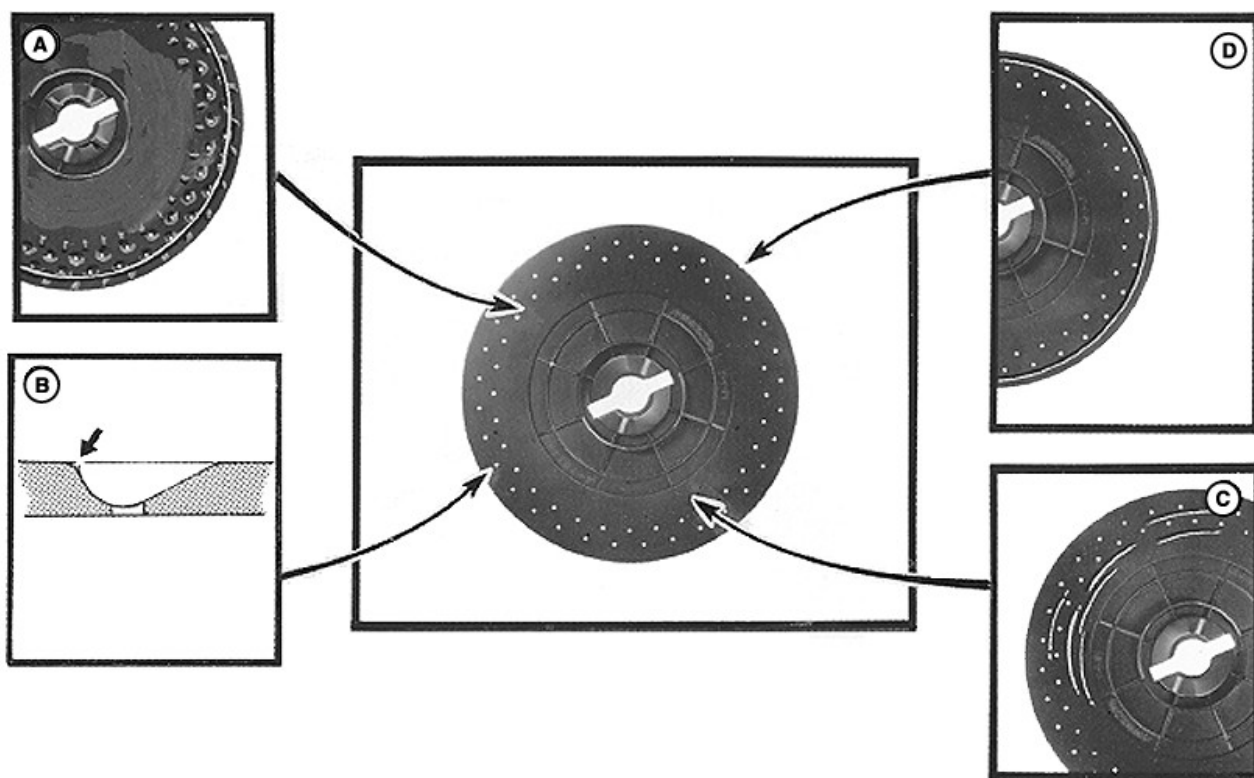
NOTE: If vacuum seals are replaced, apply Graphite Spray TY25797 on vacuum side of used seed disks. New seed disks are factory lubricated.



A78514—UN—02AUG13

A—Seals
B—Wiper

8. Replace vacuum seals (A) if seed disks are replaced or when large cracks or wear areas are visible in seal.
9. Replace disk wiper (B) if edge of wiper is grooved or excessively worn.



A55426—UN—22NOV04

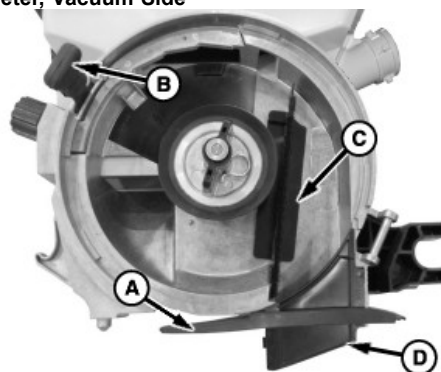
A—Perimeter, Seed Side
B—Worn Edge (Seed Cell Side View)

C—Grooves on Vacuum Side
D—Perimeter, Vacuum Side

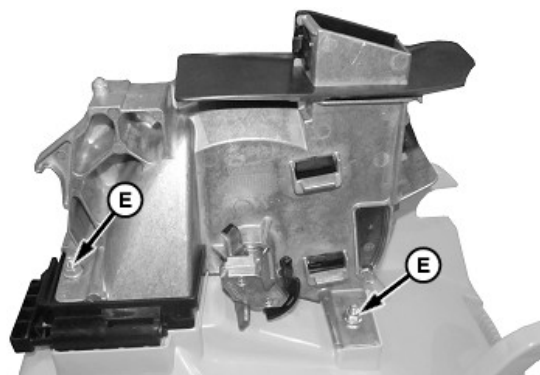
NOTE: Perform a field check to verify meter performance before purchasing new disks. (See Check Seed Population section.)

10. Inspect seed disks for wear in following areas and replace disks as needed.

- Perimeter on Seed Side (A): A small amount of wear is acceptable. Check for seed loss through gap between disk and housing.
- Edge (B) of Seed Cell: Seed abrasion can remove edges on seed cells and increase cell size. Increased cell size can cause overpopulation when planting small seed and cause under-population when planting large seed).
- Grooves (C) on Vacuum Side: Small grooves or scratches are acceptable. Large grooves can effect performance.
- Perimeter on Vacuum Side (D): A wear depth less than 1.0 mm (3/64 in.) is acceptable.



A78515—UN—15OCT13



A78516—UN—07AUG13

A—Dust Cover
B—Handle
C—Brush Holder

D—Chute Cover
E—Nuts

11. Replace vacuum meter dust cover (A), if it does not fit properly, is cracked, or is weathered.
12. Replace rubber handle (B), if cracked or broken.
13. Replace brush holders (C), if worn.
14. Replace chute cover (D), if worn.
15. Verify that drive coupler pivots freely. Disassemble, clean, and lubricate with grease if flex drive does not pivot freely.
16. Place vacuum meter assembly on hopper and attach with nuts (E).

PX03972,00002E3-19-04MAR14

A—Vacuum Gauge

The vacuum gauge filter (A) can become clogged with dust. Inspect the vacuum gauge annually and replace the filter as necessary.

NOTE: To prevent the entry of water, dust or foreign particles, verify the filter points downward.

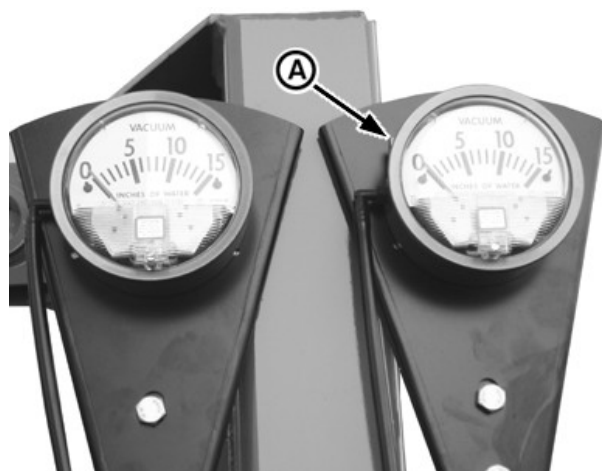
PX03972,0000E5C-19-29APR14

Clean Vacuum Lines

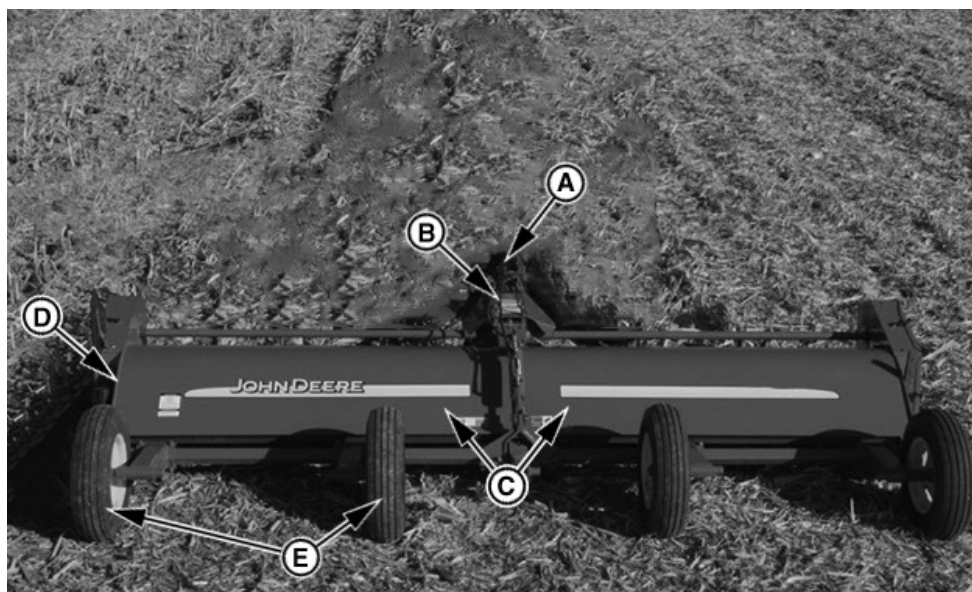
Dirt, inoculants or seed additives can accumulate in the vacuum lines and lower the vacuum level of the meters. This could cause the loss of seed metering accuracy.

Clean the vacuum manifold system at least once a week during operation or more frequently in dusty conditions.

Vacuum Gauge Filter



PUM3111—UN—02FEB09



APY00695—UN—22MAR18

A—Vacuum Hoses

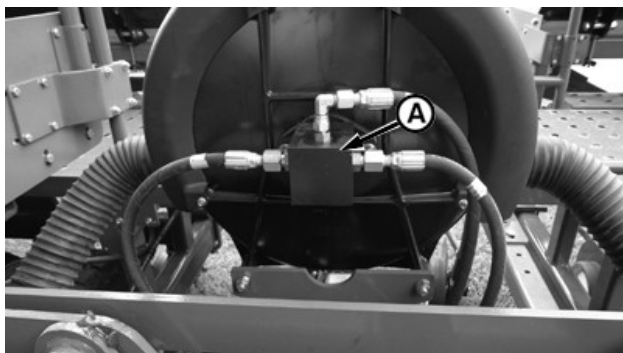
B—Cap End

Clean as follows:

1. Start the tractor and operate the lever of the SCV that controls the vacuum hydraulic system.
2. Disconnect the vacuum hoses (A) from the meters, one at a time. Shake the hose for several seconds and reconnect it to the meter.
3. Remove the end cap (B) from each end of the vacuum manifold tube and clean it.

CN80434,000071B-19-26DEC17

Vacuum Fan Inspection



A—Motor

P16982—UN—10JUN13

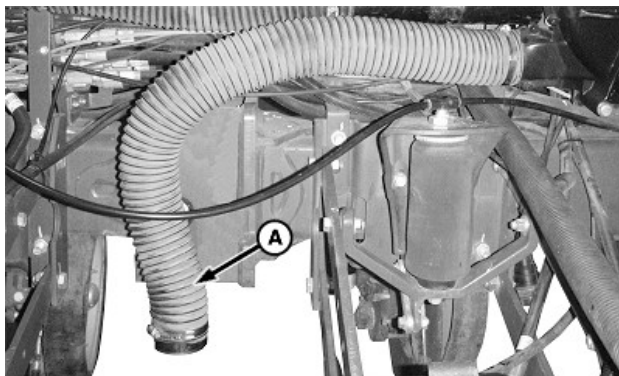
Check motor (A) for oil leaks.

A small amount of oil leakage is acceptable, but if leakage is excessive or if the required vacuum level cannot be achieved, order the vacuum motor repair kit from your John Deere dealer. Installation instructions are provided with the kit. If leakage occurs at point (A) on the motor housing, check for loose hardware on motor or loose fittings.

NOTE: Excessive oil leakage can cause the fan guard to become clogged. This can cause a loss of vacuum. If necessary, clean the fan guard. (See Clean Fan Guard in this section.)

PX03972,00001B4-19-22APR14

Inspect and Clean the Vacuum Impeller and Housing



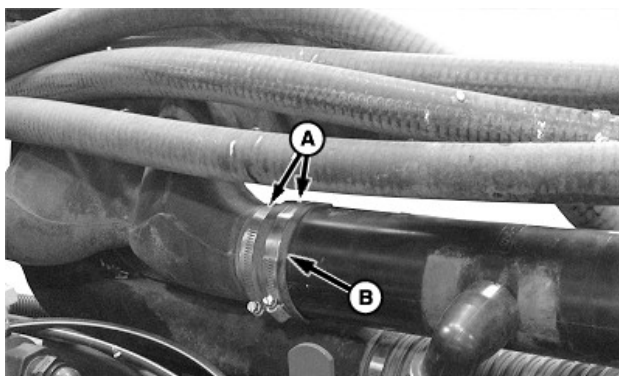
A85120—UN—03FEB15

A—Exhaust Hose

CAUTION: Avoid injury from impeller contact or discharged material. Do not operate the blower with the exhaust hose (A) removed. Follow the chemical manufacturer's precautions when handling parts coated with seed treatments. Use the proper skin, eye, and respiratory protection.

IMPORTANT: Maintain proper vacuum operation and reduce the drift of discharged seed treatment dust. Do not operate the blower with the exhaust hoses removed.

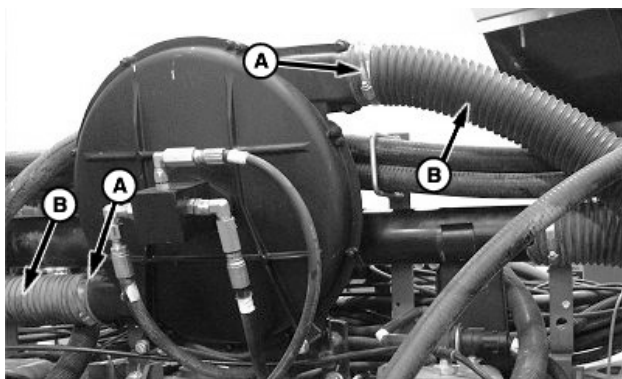
Perform the steps on all the vacuum blowers.



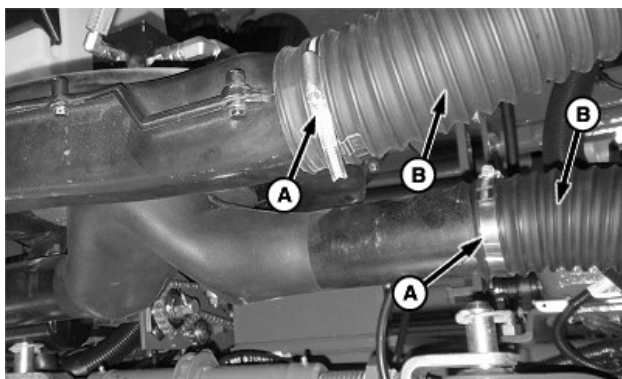
A85117—UN—12FEB15

A—Hose Clamps (2 used per side)
B—Rubber Sleeve (1 used per side)

1. Loosen and retract the hose clamps (A) and rubber sleeve (B) from the vacuum blower.



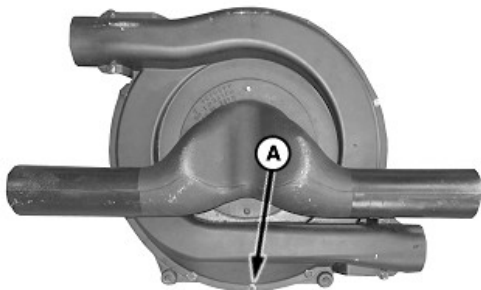
A85199—UN—12FEB15



A85196—UN—12FEB15

A—Hose clamps
B—Flex Hoses

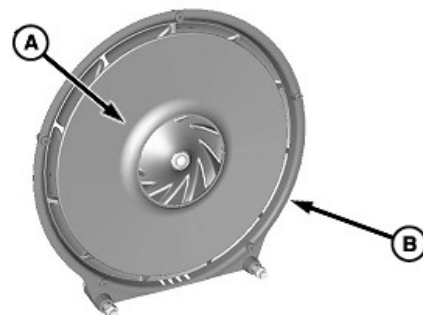
2. Loosen and retract the hose clamps (A) and flex hoses (B) from the vacuum blower.



A85118—UN—03FEB15

A—Cap Screws (13 used)

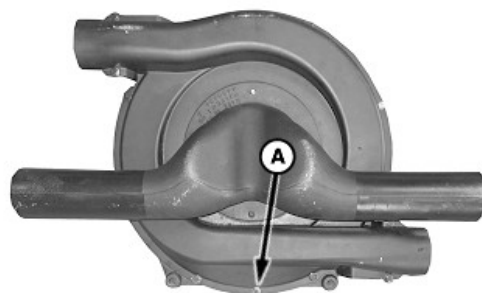
3. Remove the cap screws (A).



A70792—UN—23FEB11

A—Impeller
B—Housing

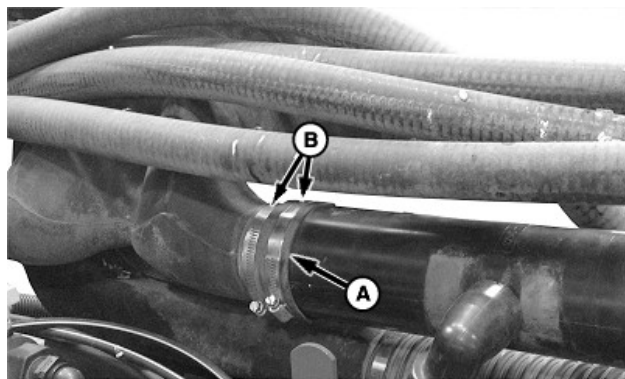
4. Clean the impeller and housing.
5. Inspect the impeller (A) for chips or cracks. If damage is found, replace the impeller. (See your John Deere dealer or qualified service provider.)
6. Inspect the blower housing (B) for signs of impeller contact. If contact is evident, replace the housing and impeller. (See your John Deere dealer or qualified service provider.)



A85118—UN—03FEB15

A—Cap Screws (13 used)

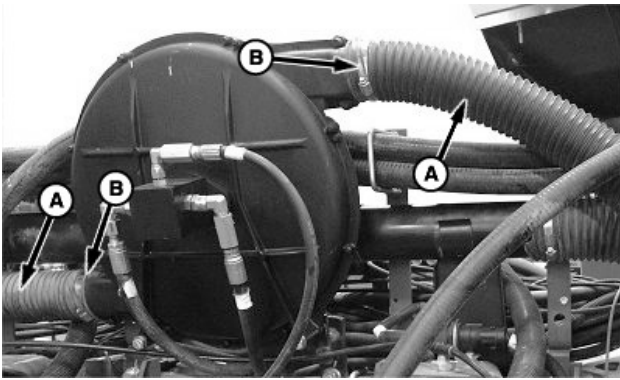
7. Install the cap screws (A).



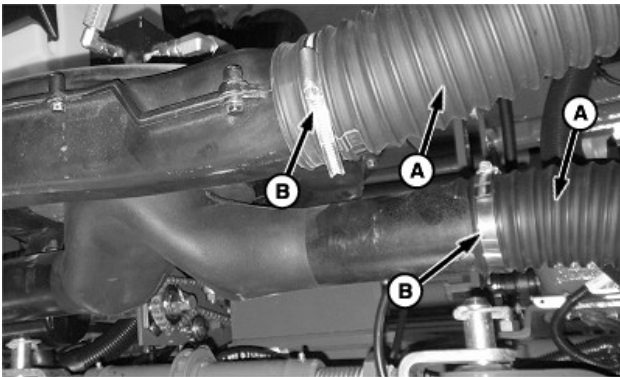
A85119—UN—12FEB15

A—Rubber Sleeve (1 used per side)
B—Hose Clamps (2 used per side)

8. Install the rubber sleeve (A) and hose clamps (B) onto the vacuum blower. Tighten the clamps.



A85197—UN—12FEB15



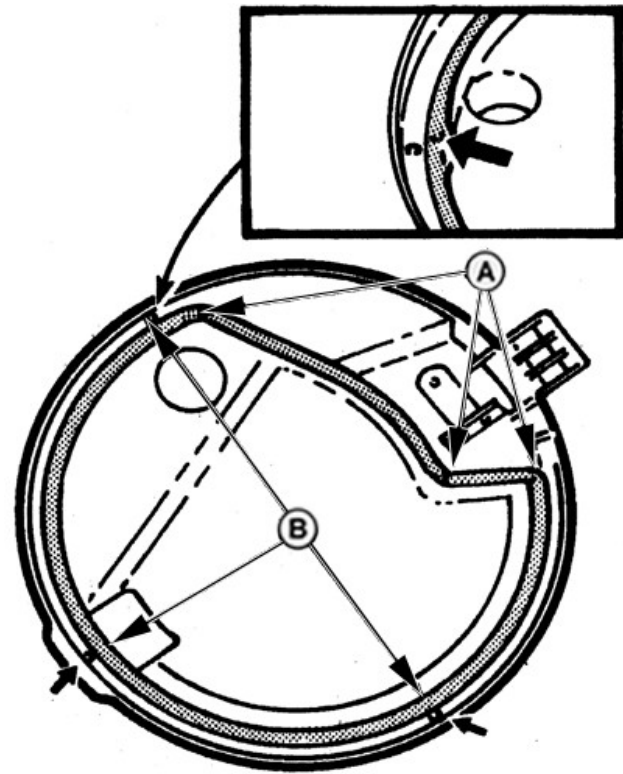
A85198—UN—12FEB15

A—Flex Hoses
B—Hose Clamps

9. Install the flex hoses (A) and hose clamps (B) onto the vacuum blower. Tighten the clamps.

OUC6064,00003AE-19-18APR18

Install New Vacuum Meter Seal



PUM2486—UN—05MAY08

A—Corners
B—Housing

1. Unlatch the handle and open the vacuum chamber.
2. Remove the old seal and scrape off the residue.
3. Install the new seal by first inserting corners (A). Next, insert three points of the seal, aligning the holes in the seal with those in the housing (B). Finally, insert the rest of the seal. NOTE: This procedure prevents excessive seal looseness.
4. Close the vacuum chamber and latch the handle. Install the seed bin on the planting unit.
5. If the seed disk has been used, respray the vacuum seal side with John Deere Slip Plate TY25797.

PX03972,0000E63-19-29APR14

Clean Fertilizer Hoppers



PUM2493—UN—05MAY08



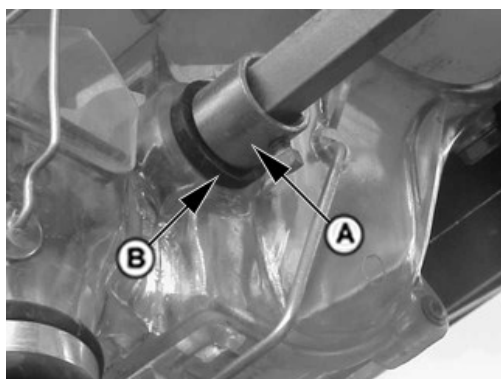
PUM2494—UN—05MAY08

A—Fertilizer Hoses

1. Remove the clamps and disconnect fertilizer hoses (A) from the hoppers.
2. Open the meter lower lid located at the bottom of the hopper. Clean the hoppers.

PX03972.0000E66-19-22APR14

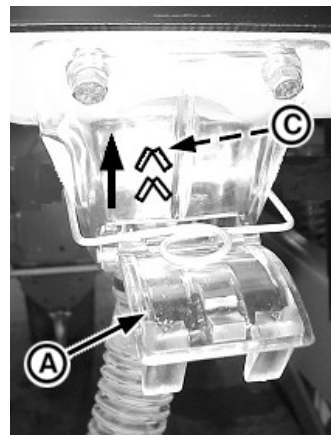
Replace Metering Wheel or Meter Housing



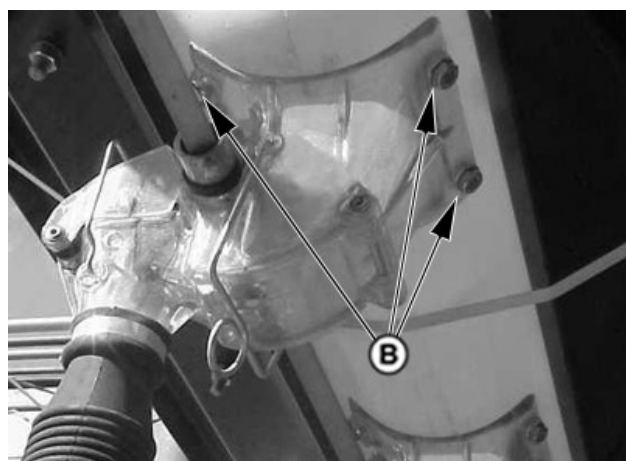
P16048—UN—27MAY10

A—Retaining bushings B—Plastic guide bushing

1. Loosen retaining bushings (A) along the entire section of the shaft on which the metering wheel or meter housing is located. Slid plastic guide bushing (B) on the shaft.
2. Remove the drive shaft section on which the damaged part is located.



P16047—UN—24MAY10



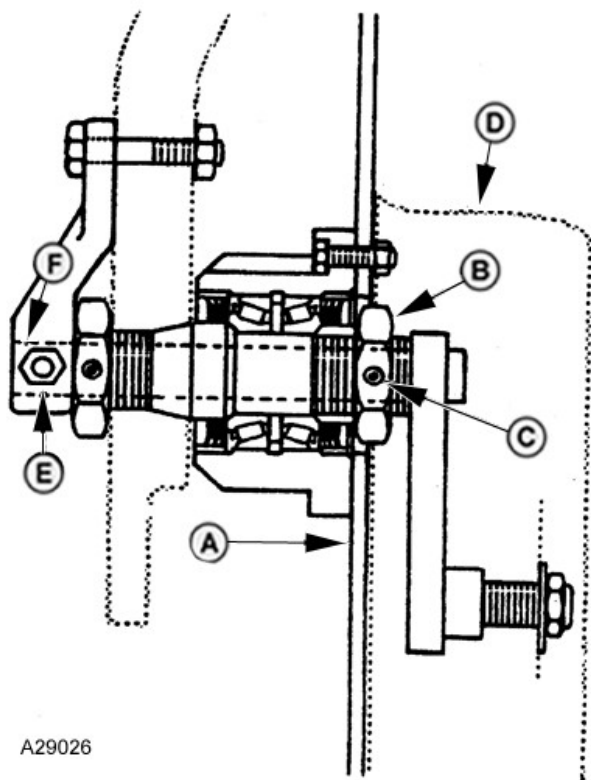
PUM2498—UN—05MAY08

A—Cap B—Cap screws C—Metering wheel

3. To remove the metering wheel (C), open cap (A) and replace it using only John Deere original parts obtained from the normal parts distribution channel. Install metering wheel (C) so that the tooth direction is the same as the shown in the illustration.
4. To remove the meter housing, remove the 4 cap screws (B) that attach it to the bottom of the hopper and replace it using only John Deere original parts.
5. When reassembling, verify the drive shaft is aligned to avoid unnecessary stress that results in premature wear or failure of drive system parts. Check the plastic guide bushings for wear. Verify the retainer bushings are correctly placed and tighten the attaching studs.

PX03972.0000E67-19-29APR14

Single-Disk Fertilizer Opener Maintenance



A29026

PUM2472—UN—05MAY08

- A—Blade Assembly
- B—Nut
- C—Set Screw
- D—Wheel
- E—Shear Pin
- F—Pin

The friction bearing has a face seal. Grease is retained and dirt is kept out by contact between the seal and the machined surface. The seal will not be effective if the bearing is not tight. If a bearing is loose, remove the wheel (D) and shaft by removing shear pin (E). Loosen set screw (C) and remove nut (B). Disassemble the opener and clean and grease the bearings with John Deere Multipurpose Lubricant or an equivalent SAE multipurpose grease. Tighten nut (B) until seal drag is felt.

NOTE: During assembly, tighten nut (B) to 1.6-2.8 Nm (14-25 lb-in.) to turn the blade and bearing housing assembly (A). This drag or rolling torque results in an effective seal. Once the adjustment is complete, be sure to tighten set screw (C). These friction bearings are greased at the factory. After the first 10 hours, inspect the bearings and adjust as necessary.

Every 100 hours, inspect the bearings and adjust as necessary. Every 200 hours or prior to each planting season, whichever comes first, disassemble, clean and grease the bearing as described above. Do not use frame lube on friction bearings.

Lubricate the surface of pin (F) that engages the spindle to prevent rust and verify the depth control adjustment mechanism works freely.

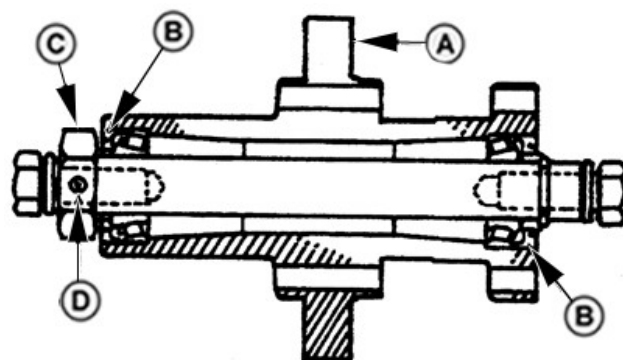
PX03972,0000E5A-19-29APR14

Fertilizer Meter Maintenance

The metering type wheel on the meter wears during operation. To maintain metering accuracy perform a visual inspection for damage to these meters at the start of each season. If any damage is found, replace with a new one. See the instructions in CLEAN FERTILIZER HOPPERS in this section.

PX03972,0000E5B-19-22AUG12

Drive Wheels



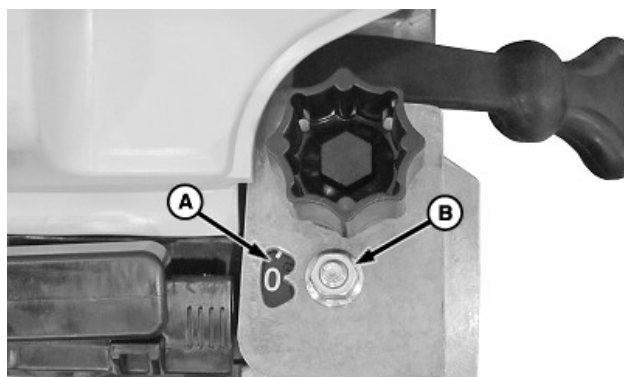
PUM2470—UN—05MAY08

- A—Hub
- B—Seals
- C—Lock Nut
- D—Set Screw

If for any reason the wheel hub (A) needs to be disassembled, clean the bearing, pack it with wheel bearing grease and install it on the shaft. Be careful not to damage the seals (B). Install the special lock nut (C) on the rear axle. Turn the hub and tighten the lock nut until slight drag is felt. Once this drag is established, tighten the set screw (D) on the lock nut.

PX03972,0000E5B-19-22AUG12

Establish the Zero Position on Double Eliminator

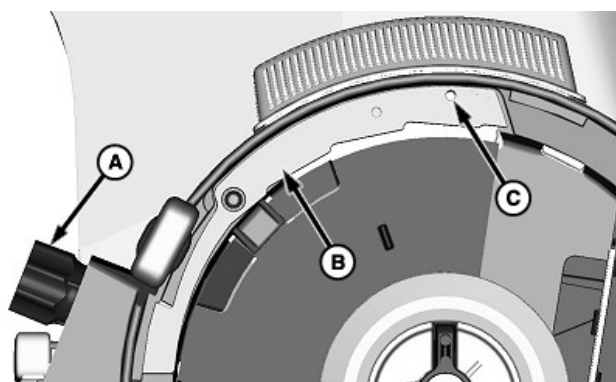


A—Dial
B—Nut

A79066—UN—13NOV13

NOTE: “Zero” procedure shown with meter attached to hopper. To provide more clearance, remove hopper.

1. Remove nut (B), cap screw, and dial (A).

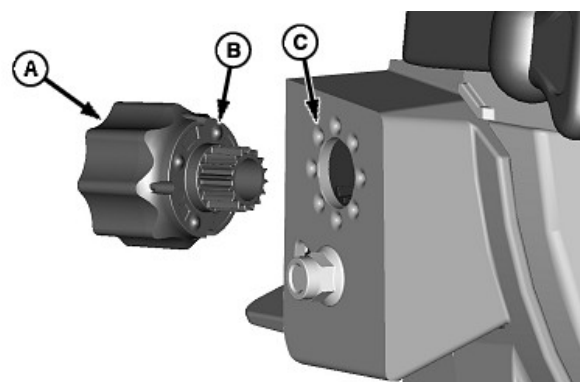


A—Adjustment Knob
B—Double Eliminator Plate
C—Alignment Hole

A79058—UN—07NOV13

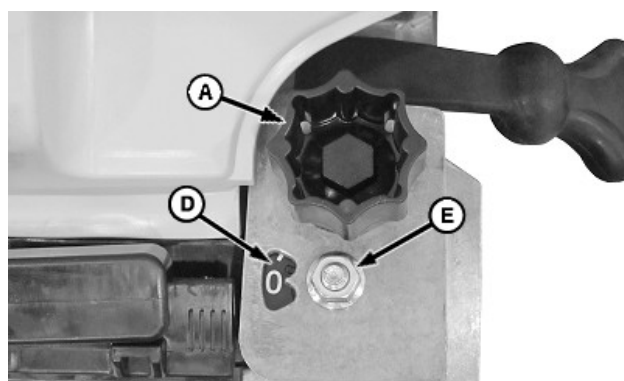
2. Turn adjustment knob (A) until alignment hole (C) in double eliminator plate (B) is aligned with hole in meter housing.
3. To maintain position of plate, insert a number 26 (3 mm) (5/32 in.) drill bit, or similar tool, into alignment hole.

IMPORTANT: Avoid a misaligned dial. Do not remove knob (A). Verify that detents (B) and detent pockets (C) align during assembly.



A82364—UN—16APR14

Knob Shown Removed for Clarity



A82365—UN—16APR14

A—Knob
B—Detent
C—Detent Pocket
D—Dial
E—Nut

4. Install dial (D) so “0” is centered with indicator.
5. Install cap screw and nut (E).
6. Remove drill bit.

OOU6074,0000DAD-19-16APR14

Storage

Beginning of Season Service

Before using the planter after it has been stored, inspect the seed hoppers for cleanliness and verify seed will flow freely from the hoppers.

Thoroughly inspect the planter unit for loose parts and tighten as necessary.

Clean any dirt or grease that may have accumulated on moving parts, gears and chains before operating the planter. This will prevent any abrasive action that causes excessive wear.

When roller chains remain unused for several days, moisture in the air will accumulate on them, causing rust. This can be serious enough to cause the link joints to become stiff, restricting their free movement. While very difficult to detect, this stiffness can cause the chains to operate abnormally and disturb the smooth rotation of important metering components, reducing their performance.

If the planter is not going to be used for several days, or if the oil has been removed from chains, etc. while cleaning the planter, thoroughly lubricate chains with John Deere TY6350 Multipurpose Spray Lube.

IMPORTANT: Do not use chain lube or thick oil-based lubricants that can lead to the accumulation of dust and dirt on sprocket and gear teeth.



PUM2500—UN—05MAY08

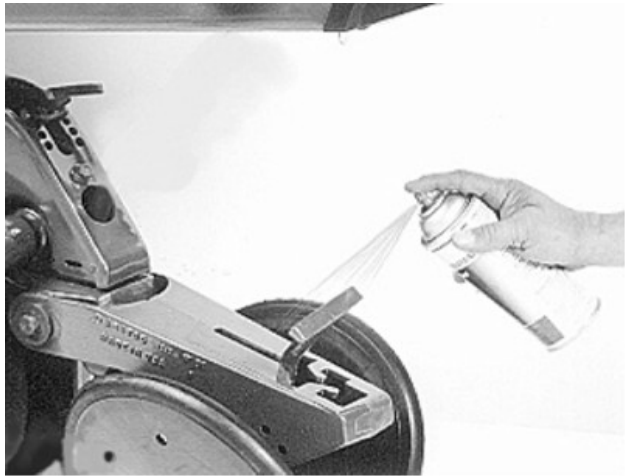
Rotate the meter unit drive shaft by hand to verify the shaft and meters turn freely. Turn them only in the forward direction since the units are not designed to turn backwards.

Verify all adjustments are correct for planting conditions.

Lubricate the planter as described in the Lubrication section.

PX03972,0001255-19-10MAR15

End of Season Service



PUM2501—UN—05MAY08

When the planting is over, store the planter under cover with all components ready for the next season.

Paint all surfaces that are chipped or worn.

Thoroughly clean the planter to remove dirt and trash that can attract moisture and cause rust.

Lubricate the planter as described in the Lubrication section and grease all exposed cylinder rods.

Thoroughly lubricate chains with John Deere TY6350 Multipurpose Spray Lube at the start of the idle period.

Empty and clean the seed hoppers.

Thoroughly clean the fertilizer hoppers, since various chemicals can damage system components.

Inspect the planter for worn or damaged parts. After the season, when the planter is not needed in the field, see your John Deere dealer to order any required spare parts.

Store the planter in a clean and dry area with the planting unit gauge wheels and closing wheels out of the sun.

Place the closing wheel down force lever in the center slot to relieve the tension on the wheels.

Clean the vacuum system lines as indicated in CLEANING VACUUM LINES in the Service section.



PUM2502—UN—05MAY08

IMPORTANT: Do not store seed disks in an area exposed to extreme heat or direct sunlight. Do not leave the disks in the meters during the off season. Do not store them under heavy components.

If seed disk has been used, respray the vacuum seal side of the seed disk with John Deere Slip Plate TY25797.

Clean the vacuum lines. (See CLEANING VACUUM LINES in the Service section.)

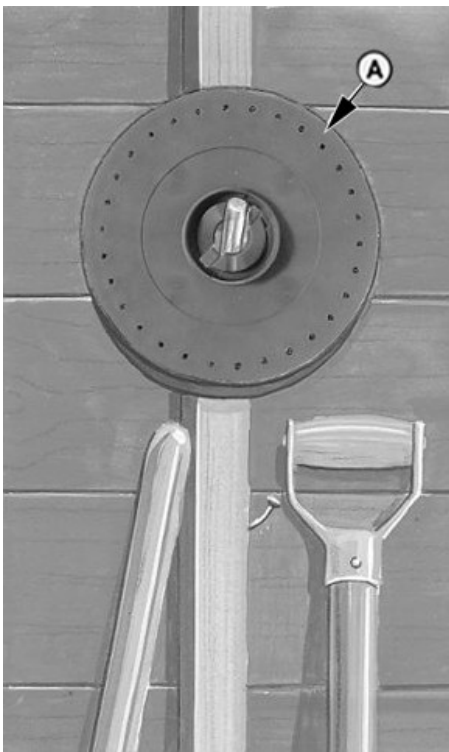
Check for hydraulic fluid leaks.

Check and clean the manifolds.

Check and clean the vacuum meters.

Check and replace vacuum meters seals as needed.

PX03972,0001256-19-10MAR15



PUM2503—UN—05MAY08

A—Disks

Remove the seed disks from the meters. (See VACUUM METER INSPECTION AND MAINTENANCE in the Service section.)

1. Clean the meter housing, meter chamber and seed disk with mild detergent and a soft brush.
2. Store the disks (A) in their original containers or hang them on the wall.

Specifications

Specifications

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

The maximum static vertical load for the implement is achieved with the implement unfolded and fully raised position and equipped with authorized attachments.

Specifications	
Air System	Hydraulic Drive Horsepower Required: 4.5—10.4 kW (6—14 hp)
Planting Meter Type	Vacuum Meter
Seed Opener	Tru-Vee™ Double Disk
Fertilizer Hopper Capacity	(4) 600 liters & (1) 480 liters
Row Spacing	24R 38cm, 20R 45cm, 18R 52.5cm, 12R 76cm
Type of Lift	Center frame lift with hydraulic cylinder
Drive Type	Ground Driven Mechanical Transmission or SEEDSTAR™ Variable Rate Drive
Transport Wheels	440/55R18 503 kPa (5.03 bar) (73 psi)
Drive Wheels	7.6 x 15 -6PR 206 kPa(2.1 bar)(30 psi)
Row Unit Seed Hoppers Capacity	Vacuum Meter: 2.2 L (1/16 bu)
Seed Tanks	(2) 1233 L (35 bushel) bulk tanks
Markers	Hydraulic, Triple-Articulated Automatic Sequencing
Hydraulic Oil Required To Operate Planter	18R52.5cm - 108 kW (144 hp) Engine hp
	20R45cm - 120kW (160 hp) Engine hp
	24R38cm - 144kW (192 hp) Engine hp
	30 L (8 U.S. gal)
Tractor Standby Pressure	15 513 kPa (2250 psi)
Tractor Pressure	18616 kPa (186.16 bar) (2700 psi)
Seed Monitoring	COMPUTER TRAK™ 350 or SEEDSTAR™
Hitch Category	Category 3 (base machine)
	Category 4 (optional)

Tru-Vee is a trademark of Deere & Company

Maximum Static Vertical Load on Tractor Drawbar — Specification	
18 Row—Weight	1581 kg (3485 lb)
20 Row—Weight	1604 kg (3536 lb)
24 Row—Weight	1651 kg (3639 lb)

NOTE: *Tractors with additional horsepower can be required when operating with additional machine attachments or when planting in soft seedbeds and rolling ground.*

The vacuum metering system should be operated with tractors that have the capability of controlling hydraulic flow rates from the cab.

In line flow-control valves are needed when:

- Vacuum system is connected to the power beyond circuit.

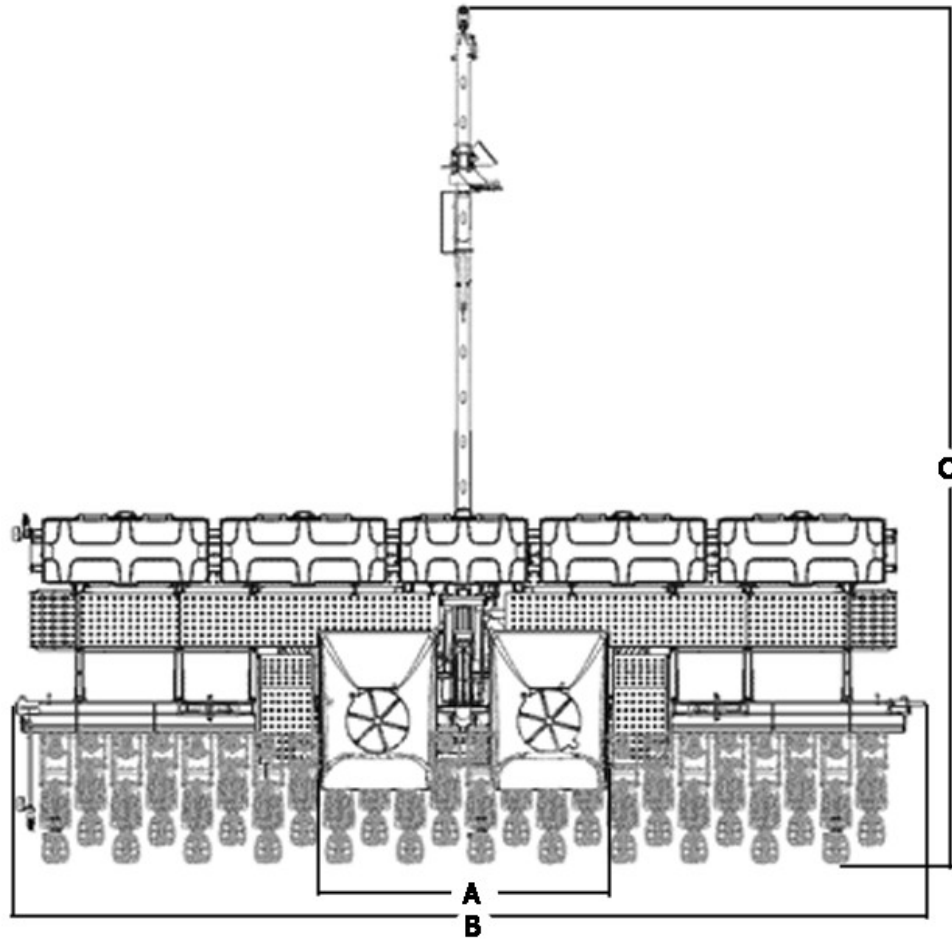
- Dual vacuum motors are installed and controlled with one SCV.
- Vacuum system is connected to a tractor without the capability of controlling hydraulic flow rates from the cab.

See your John Deere™ dealer for more information.

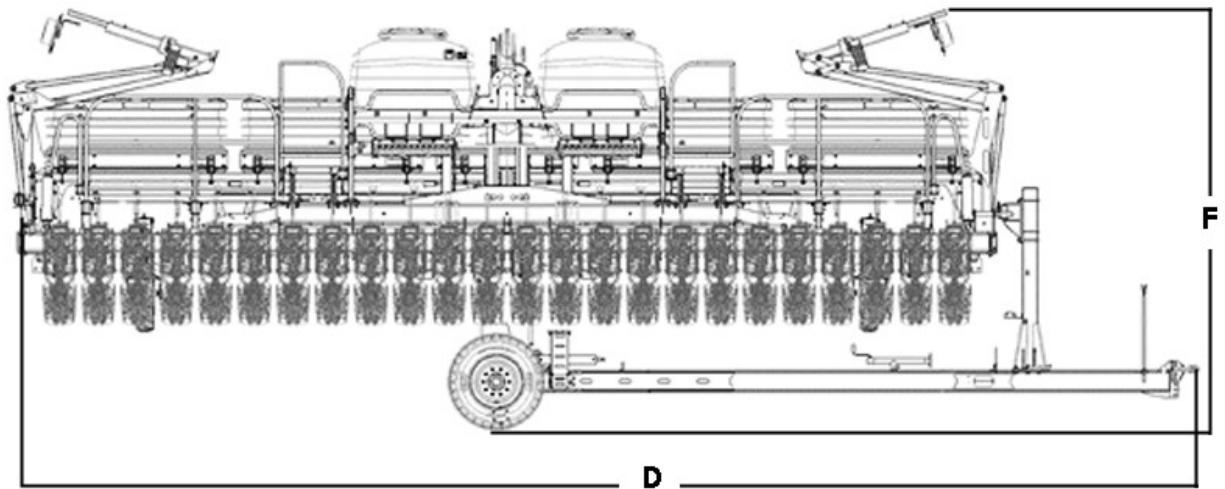
PX03972,00011E4-19-25JUN15

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Machine Dimensions



P17587—UN—24FEB15



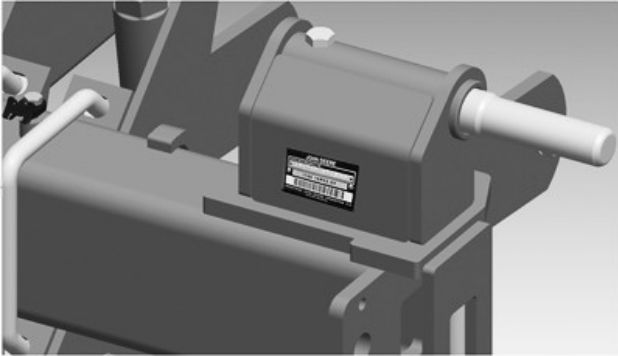
P17588—UN—24FEB15

Specifications

WORKING POSITION			TRANSPORT POSITION	
A	B	C	D	F
3.944 m	9.570 m	9.870 m	11.484 m	3.770 m

PX03972,00011E5-19-24FEB15

Record Serial Number



P16708—UN—05APR13

The serial number of your John Deere planter is stamped on an identification plate located on the planter structure. Record the serial number and date of purchase of your planter in the space below:

Serial Number:

Purchase Date:

Furnish the serial number when requesting that your John Deere dealer order spare parts.

PX03972,00000CA-19-05APR13

Keep Proof of Ownership



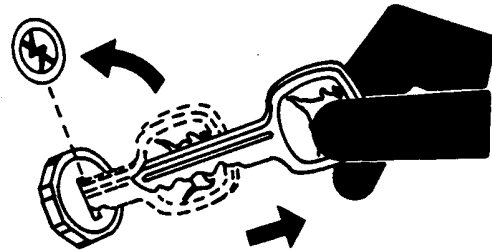
TS1680—UN—09DEC03

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

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