7200 Flex-Fold MaxEmerge® 2 Drawn Conservation Planter 8-Row Wide and 12-Row Narrow

JOHN DEERE

OPERATORS MANUAL

7200 Flex-Fold MaxEmerge® 2 Drawn Conservation
Planter 8-Row Wide and 12-Row Narrow

OMA51905 Issue G0 English

John Deere Harvester Works
OMA51905 Issue G0
(This manual replaces OMH139534-F9)

LITHO IN U.S.A.
ENGLISH

Precision Exhibit 1016

Introduction

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

RIGHT-HAND AND LEFT-HAND sides are determined by facing in the direction the implement will travel when going forward.



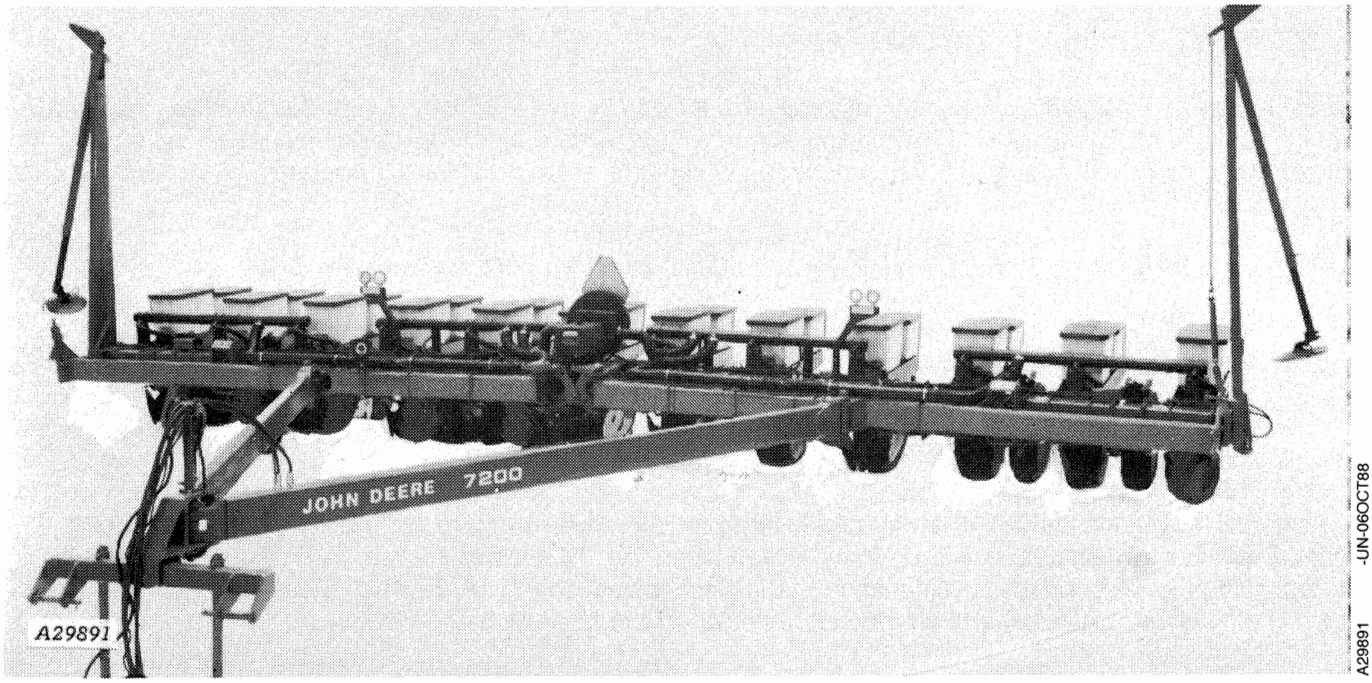
THIS MACHINE is of metric design. Measurements in this manual are metric with the customary U.S. measurement following. Use only metric hardware and tools as specified.

WRITE PRODUCT IDENTIFICATION NUMBERS in the space provided in the Specifications 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. If this manual is kept on the machine, also file the identification numbers in a secure place off the machine.

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

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

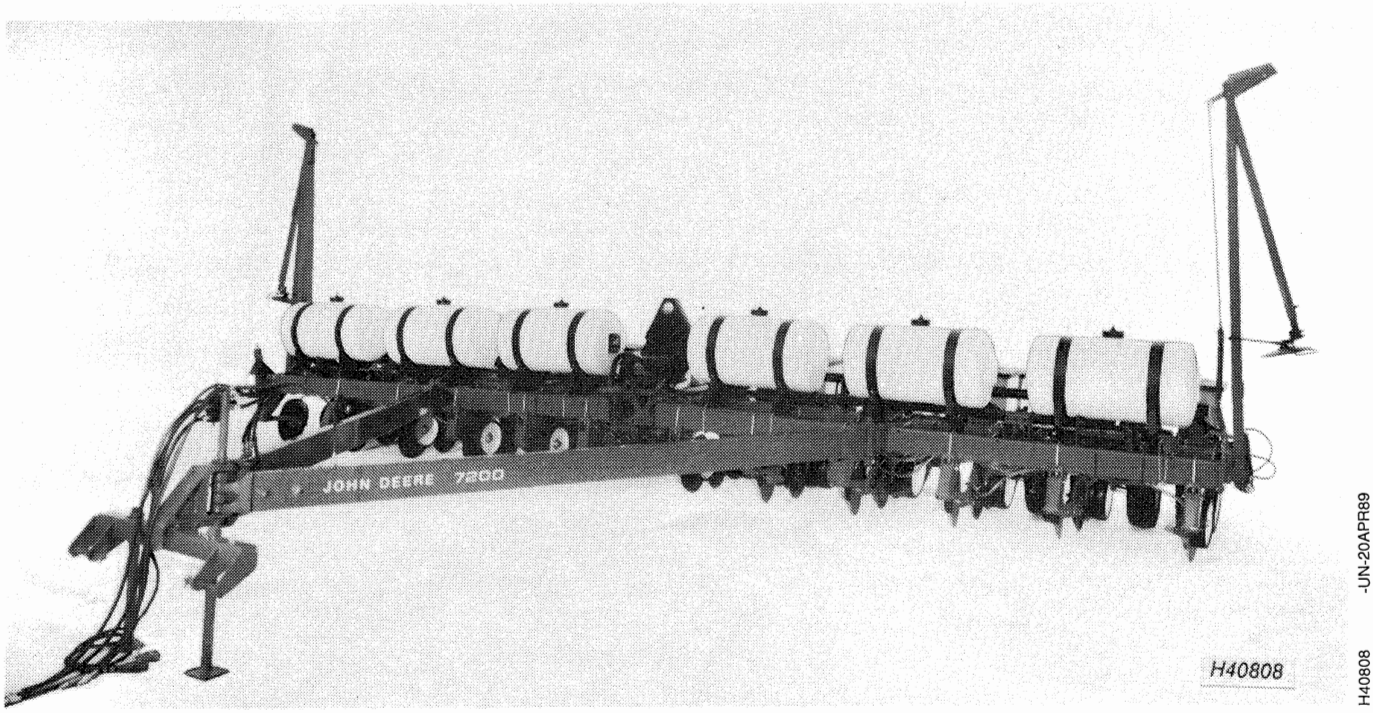
THE TIRE MANUFACTURER'S warranty supplied with your machine may not apply outside the U.S.



A29891 -UN-06OCT88

7200 Flex-Fold 12-Row Narrow Drawn Max-Emerge Planter with Vacuum Seed Metering System

B21,7ID,A -19-28JUN90



H40808 -UN-20APR89

7200 Flex-Fold 12-Row Narrow Drawn Max-Emerge Planter with Vacuum Seed Metering System and Liquid Fertilizer Attachment

B21,7ID,B -19-28JUN90

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.

Refer to your John Deere dealer's Predelivery Instruction for attachment assembly information.

Information in this manual is divided into sections. These sections are identified at the top of each page. Two-part page numbers identify both the section and page of that section.

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.

By reviewing this manual often, one will quickly learn which section to go to for specific information. For instance, planter adjustments would be found in the Operating the Planter section, lubrication intervals in the Lubrication section, 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.

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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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Previous Editions
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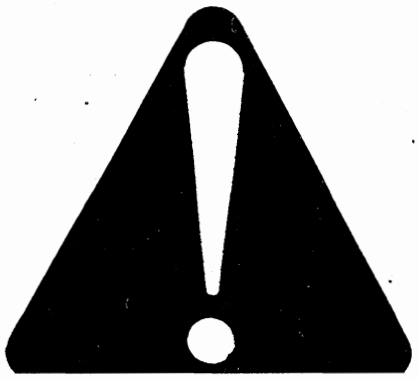
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RECOGNIZE SAFETY INFORMATION

This is the 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.



T81389 -UN-07DEC88

DX,ALERT -19-04JUN90

UNDERSTAND SIGNAL WORDS

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

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



TS187 -19-30SEP88

DX,SIGNAL -19-04JUN90

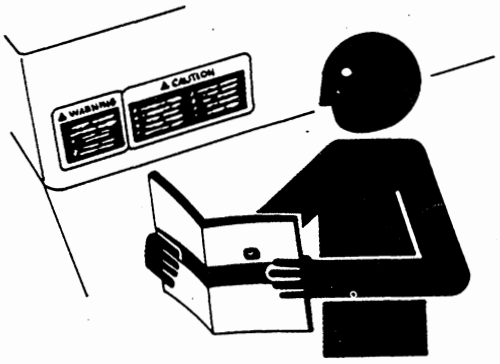
FOLLOW SAFETY INSTRUCTIONS

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

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.



TS201 -UN-23AUG88

DX,READ -19-04JUN90

DISPOSE OF SPRAY CANS SAFELY

If spray can paint is used for protecting the machine to be put in storage, be careful when discarding empty cans. Do not incinerate or puncture can.

B21,3SA,A -19-18MAY90

OPERATE THE PLANTER SAFELY

Be careful when operating planter to avoid injury.

If the planter must be in a raised position while working on or near it, be certain service locks are installed.

Serious injury or death can result from contact with electric lines. Use care when moving or operating this machine near electric lines to avoid contact.

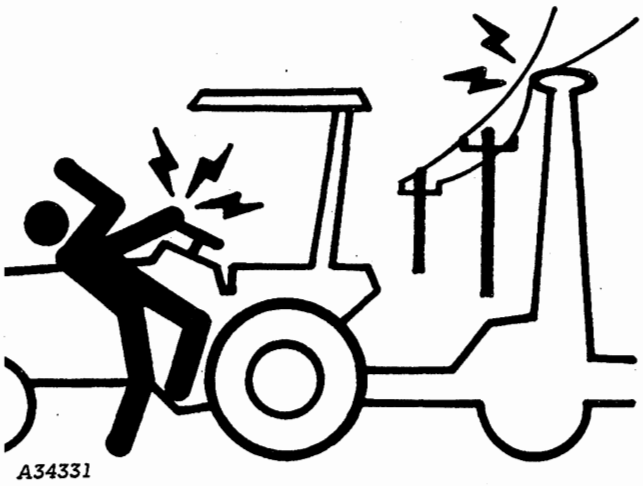
Stand clear of machine when wings are being folded or unfolded. Mechanical or hydraulic failure can allow wings to move rapidly.

Be sure cylinder and attaching hoses are fully charged with oil before operating system.

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

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

Lower planter completely to the ground before unhitching from the tractor. Be sure planter is on a level and firm surface.

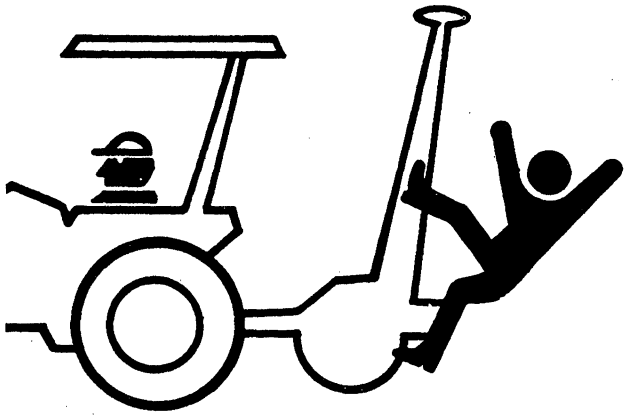


B21,5SA,A -19-28JUN90

KEEP RIDERS OFF MACHINE

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.



A34332

A34332 -UN-13OCT88

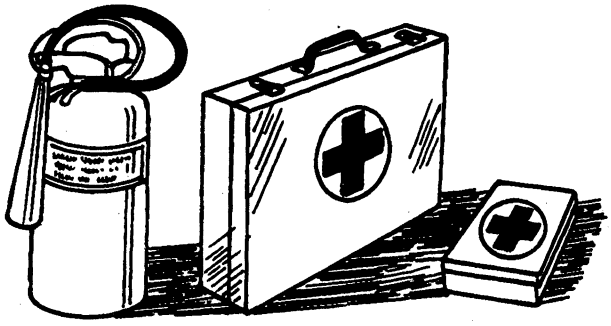
B21,1SA,F -19-28JUN90

PREPARE FOR EMERGENCIES

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.



TS291 -UN-23AUG88

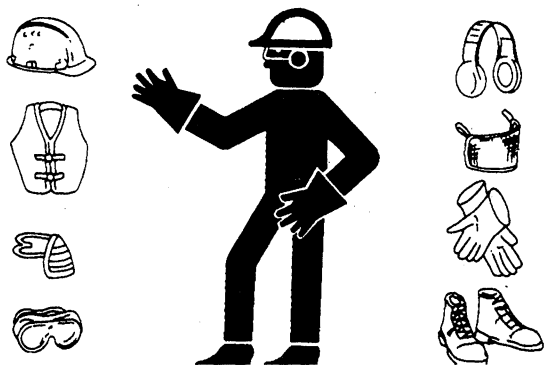
DX,FIRE2 -19-04JUN90

WEAR PROTECTIVE CLOTHING

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

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

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



TS206 -UN-23AUG88

DX,WEAR -19-04JUN90

HANDLE CHEMICALS PROPERLY

Agricultural chemicals can be dangerous. Improper selection or use can injure persons and animals. BE SAFE; handle and apply with care. Follow instructions of the chemical manufacturer.



A34471 -UN-11OCT88

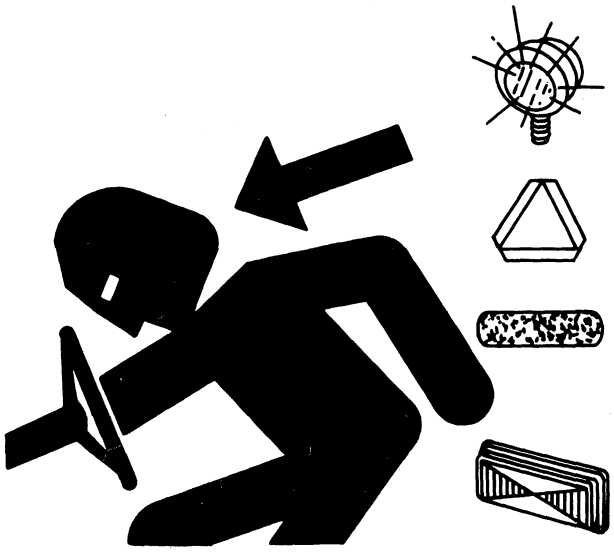
B21,1SA,D -19-28JUN90

USE SAFETY LIGHTS AND DEVICES

Slow moving tractors, self-propelled equipment and towed implements or attachments can create a hazard when driven on public roads. They are difficult to see, especially at night. Avoid personal injury or death resulting from collision with a vehicle.

Flashing warning lights and turn signals are recommended whenever driving on public roads. To increase visiblility, use the lights and devices provided with your machine. For some equipment, install extra flashing warning lights.

Keep safety items in good condition. Replace missing or damaged items. An implement safety lighting kit is available from your John Deere dealer.



TS951 -UN-12APR90

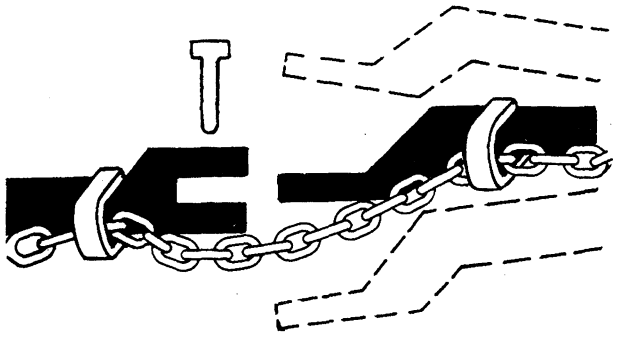
DX,FLASH -19-04JUN90

USE A SAFETY CHAIN

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.



TS217 -UN-23AUG88

DX,CHAIN -19-04JUN90

TRANSPORT SAFELY

Install marker lockup straps to prevent injury from lowered marker.

The maximum transport speed for this planter is 20 mph (32 km/h). DO NOT EXCEED. Never travel at any speed which does not permit adequate control of steering and stopping.

Reduce speed over rough ground.



A34333 -UN-13OCT88

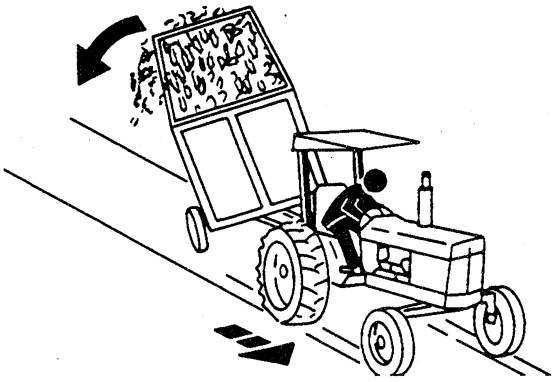
B21,1SA,G -19-28JUN90

REDUCE SPEED WHEN TOWING LOADS

Braking to stop towed loads from transport speeds can cause the towed load to swerve and upset. Reduce speed if towed load weighs more than the tractor and is not equipped with brakes.

Follow recommended speed-weight ratio guidelines:

- Maximum speed is 20 mph (32 km/h) when towing load equal to or less in weight than the tractor.
- Reduce speed to 10 mph (16 km/h) when towing load up to double the tractor weight.
- Do not tow loads exceeding double the tractor weight.
- Use additional caution when towing loads under adverse surface conditions, when turning, and on inclines.



TS216 -UN-23AUG88

DX,TOW -19-04JUN90

PRACTICE SAFE MAINTENANCE

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

Never lubricate or service 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.

Disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.



TS218 -UN-23AUG88

DX,SERV -19-04JUN90

REMOVE PAINT BEFORE WELDING OR HEATING

Avoid potentially toxic fumes and dust.

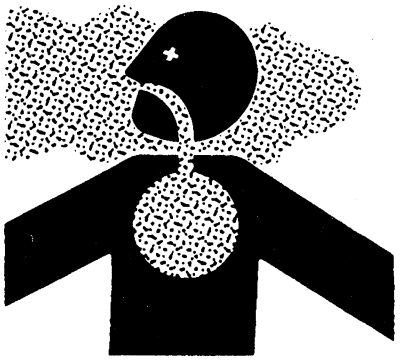
Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

Remove paint before welding or heating:

- 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.



TS220 -UN-23AUG88

DX,PAINT -19-04JUN90

AVOID HEATING NEAR PRESSURIZED FLUID LINES

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 be accidentally cut when heat goes beyond the immediate flame area. Install fire resisting guards to protect hoses or other materials.



TS953 -UN-15MAY90

DX,TORCH -19-04JUN90

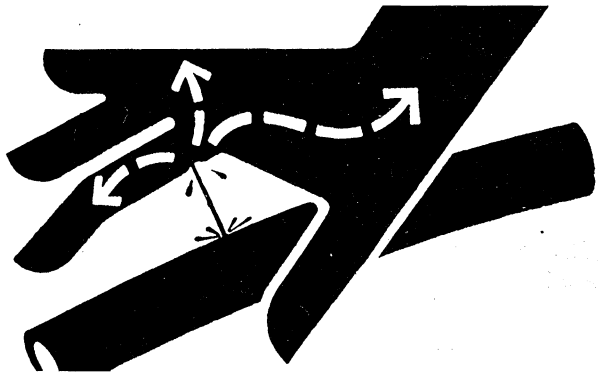
AVOID HIGH-PRESSURE FLUIDS

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 may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.



X9811 -UN-23AUG88

DX,FLUID,NA -19-11JUN90

RELEASING FERTILIZER AUGERS SAFELY

Do not use welding torch to remove build-up of dry fertilizer from auger shaft.

Fertilizers trapped inside augers can cause gas to form and, when heated, can cause augers to explode.

HX,B21,5SA,A -19-28JUN90

STORE ATTACHMENTS SAFELY

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.



TS219 -UN-23AUG88

DX,STORE -19-04JUN90

PREVENT MACHINE RUNAWAY

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.



TS177 -UN-11JAN89

DX,BYPAS1 -19-04JUN90

Do not connect auxiliary equipment to starter terminals. Doing so can cause tractor to start in gear and move.

Connect directly to tractor battery only.

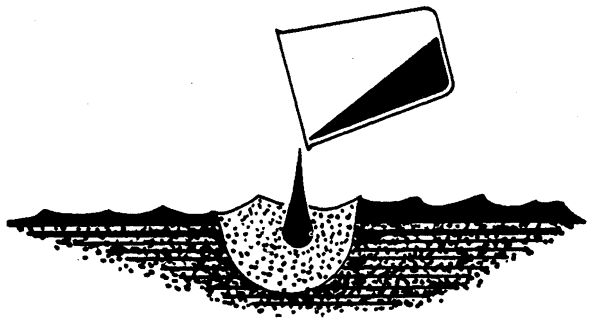
B05,15SA,C -19-18MAY90

OBSERVE ENVIRONMENTAL PROTECTION REGULATIONS

Be mindful of the environment and ecology.

Before draining any fluids, find out the correct way of disposing of them.

Observe the relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters and batteries.



TS222 -UN-23AUG88

H01,9000SA,L -19-15JUN90

Safety Signs



H40819 -19-24APR89

Markers

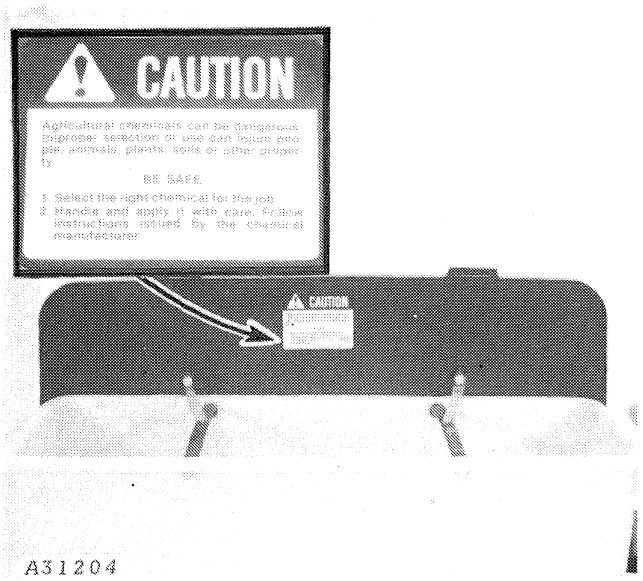
B21,5SS,A -19-28JUN90



A29888 -19-30JAN89

Insecticide and/or Herbicide Hoppers

B21,7SS,D -19-28JUN90



Dry Fertilizer Hoppers

B21,3SS,B -19-28JUN90



Control Console

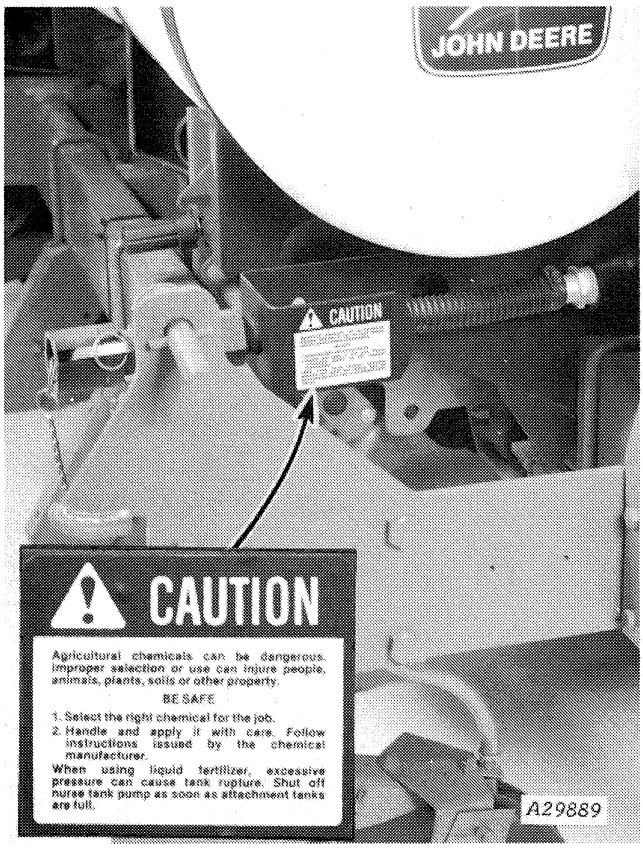
B21,7SS,A -19-28JUN90



H40820 -19-24APR89

Hydraulic Manifold Cover

B21,7SS,B -19-28JUN90



A29889 -19-20APR89

Liquid Fertilizer Bracket

B21,7SS,E -19-28JUN90

HYDRAULIC PRESSURE

IMPORTANT: The maximum operating pressure for the planter hydraulic system is 18 961 kPa (189.6 bar) (2750 psi). Exceeding this pressure is not recommended.

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

B21,7PT,A -19-28JUN90

CHECK TRACTOR HYDRAULIC SYSTEM

The vacuum meter pump hydraulic system is 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.

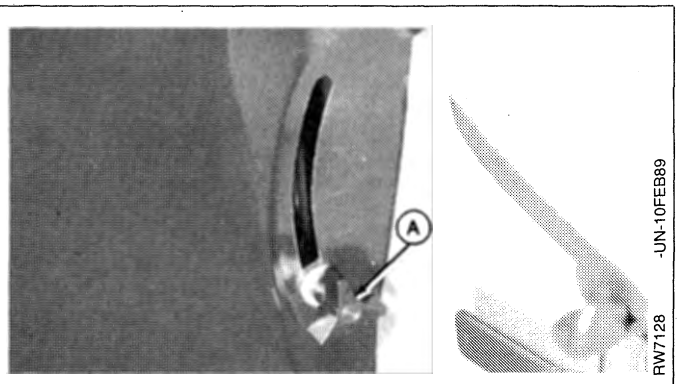
Minimum tractor standby pressure required to operate the vacuum meter pump hydraulic system is approximately 12 411 kPa (142 bar) (1800 psi) depending on frame configuration, planting speed and number of rows on planter.

IMPORTANT: Do not use open center tractor hydraulic system to operate vacuum pump. Permanent damage to tractor pump may result.

B22,9PU,S -19-28JUN90

ROCKSHAFT SELECTOR LEVER

Set the rockshaft lever (A) in the "MIN" position to prevent unexpected hitch movement.



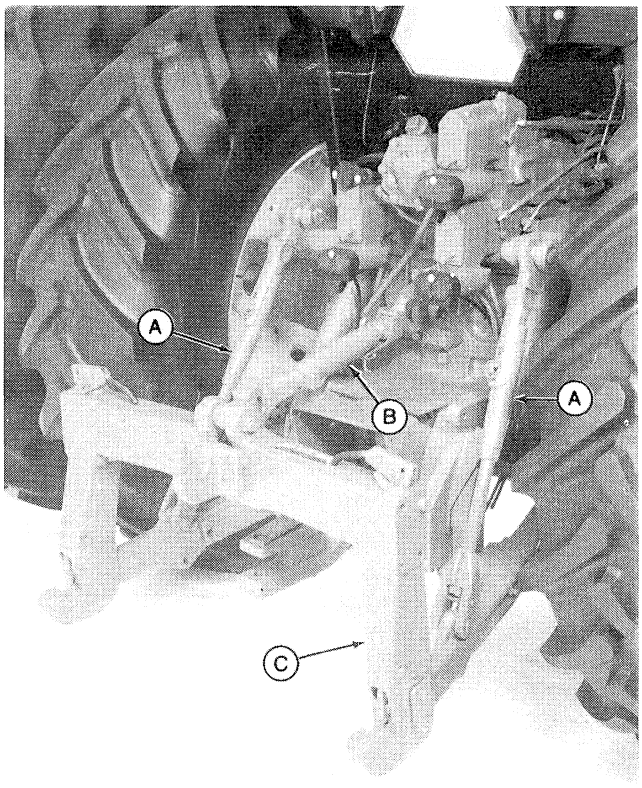
B05,13PT,I -19-28JUN90

LINK LENGTHS

Set the lift links (A) as short as possible to provide maximum transport clearance.

Adjust the center link (B) until the quick-coupler (C) is vertical when in planting position.

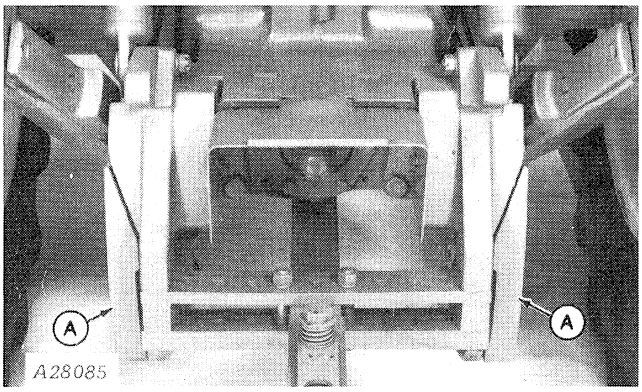
IMPORTANT: For added safety, always use a quick-coupler to make attaching and detaching a one-man operation.



B05,13PT,H -19-28JUN90

SWAY BLOCKS

Set the sway blocks (A) in the down position to prevent side sway.



B05,13PT,G -19-28JUN90

TIRE SIZE

20.8-34 x 8 ply-rated rear tractor tires minimum, or duals, are required for use with 12-row narrow flex-fold planters not equipped with fertilizer attachment or ballast.

Dual rear tractor tires are required for use with 12-row narrow flex-fold planters equipped with fertilizer attachment or ballast.

20.8-38 x 8 ply-rated rear tractor tires (singles) minimum are required for use with the 8-row wide flex-fold equipped with fertilizer attachment or ballast. 18.4-38 8 ply-rated rear tractor tires minimum are required for use with the 8-row wide flex-fold not equipped with fertilizer attachment or ballast.

B21,7PT,B -19-28JUN90

CHECK TIRE INFLATION

Inflate front and rear tires to proper pressure as recommended in the tractor operator's manual.

B03,2PT,X -19-28JUN90

REAR WHEEL WEIGHTING

Do not use liquid or wheel weights on the rear tractor tires. This decreases the tire load carrying capacity which is needed to carry the planter when it is folded for transporting.

B05,13PT,F -19-28JUN90

SETTING WHEEL TREAD

(Two-Wheel Drive Tractors) Set tires (center-to-center of tread) at twice the row spacing.

(Two-Wheel Drive Tractors with Dual Wheels) Set outer wheels as close as possible to four times the row spacing.

(Four-Wheel Drive Tractors) Set tractor tires (center-to-center of tread) as close as possible to twice the row spacing.

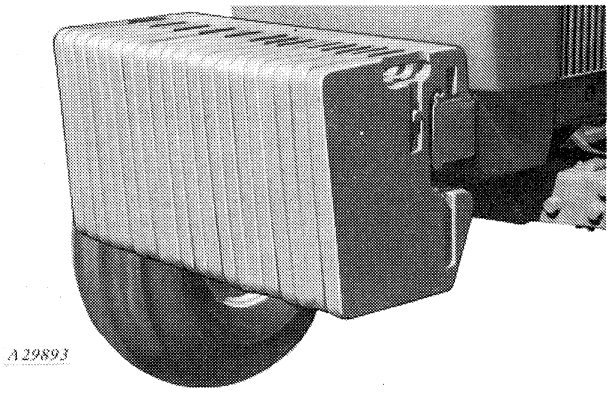
NOTE: Certain tire combinations may require Category 3N quick-coupler to obtain 1524 mm (60 in.) wheel tread setting.

B05,13PT,C -19-28JUN90

FRONT END WEIGHTING

Install the proper amount of weight on the front of the tractor as recommended in your tractor operator's manual. For proper front end weighting, see the following implement code table.

Planter	Implement Code
8-Row Wide w/o Fertilizer or Ballast Attachment	193
8-Row Wide w/Fertilizer or Ballast Attachment	245
12-Row Narrow w/o Fertilizer or Ballast Attachment	233
12-Row Narrow w/Fertilizer or Ballast Attachment	305

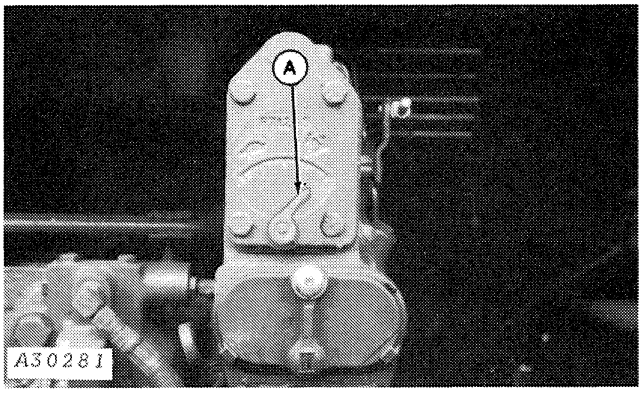


B21,7PT,C -19-28JUN90

SET TRACTOR SELECTIVE CONTROL VALVE LEVER

Position tractor SCV control lever (A) which is to be used to operate pump motor (recommend using right-hand SCV Lever [II or III]), in the fast (RABBIT) setting.

NOTE: For tractors with pressure-on-demand hydraulic systems, the tractor variable flow control valve should be used to control flow to the pump motor. The flow control valve on the planter should be fully open.



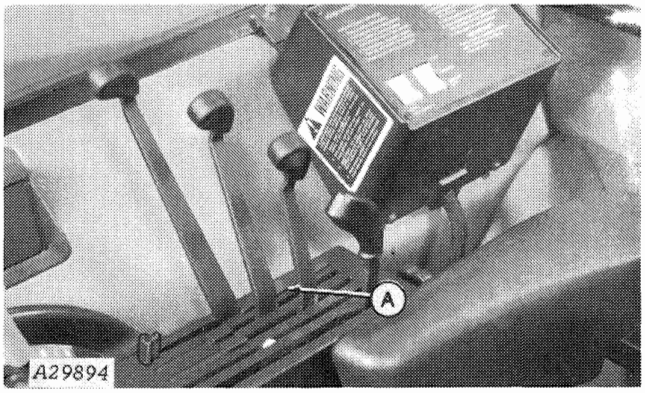
B22,9PU,J -19-28JUN90

SELECTIVE CONTROL VALVE LEVER STOP

Operation of the vacuum meter hydraulic system requires continuous hydraulic system flow. A selective control valve lever stop must be used to avoid damaging the pump motor seals when shutting off hydraulic oil flow. The stop will prevent the selective control valve lever from returning to the neutral position.

IMPORTANT: Damage to the vacuum pump motor may occur if operated before installation of tractor SCV lever stop (A). Install SCV lever stop in tractor SCV console before operating vacuum meter system.

The pump motor will operate when SCV lever is in forward detent position (shown in photo). To shut off pump motor, move lever forward into FLOAT position.

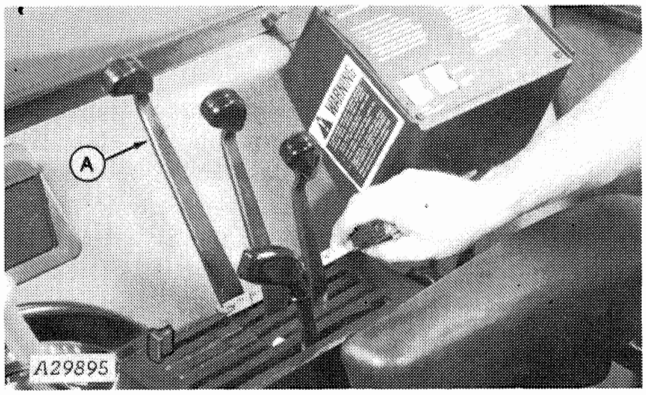


-UN-06OCT88 A29894

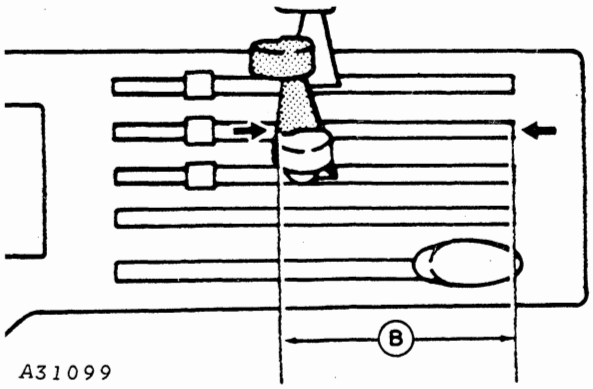
B21,7PT,D -19-28JUN90

To install the selective control valve lever stop, proceed as follows:

1. With the selective control valve lever (A) in the neutral position, lightly hold the lever forward to remove any play in the linkage. Then, measure the distance (B) from the front edge of the control lever to the rear end of the lever guide slot.



-UN-06OCT88 A29895

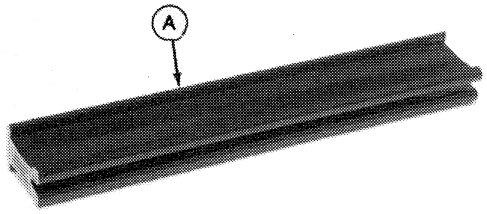


-UN-12OCT88 A31099

B21,7PT,E -19-28JUN90

2. Cut the 150 mm (6 in.) length of rubber stop material to this measured length plus 6 mm (1/4 in.).

3. Insert rubber stop (A) in slot with "V" groove side down behind the selective control lever.



-UN-14OCT88
A29670

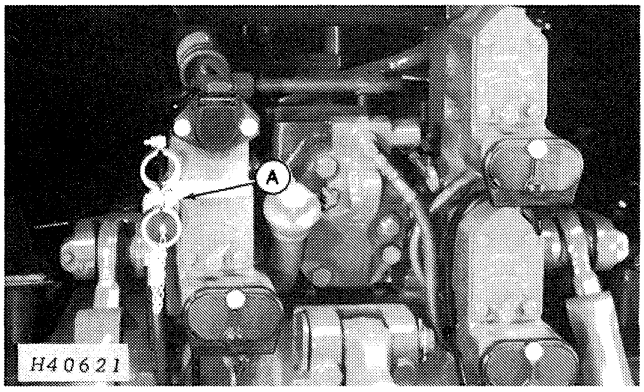


-UN-06OCT88
A29896

B21,7PT,F -19-28JUN90

AUXILIARY RETURN LINE COUPLER ATTACHMENT

If planter is equipped with vacuum meters, the Auxiliary Return Line Coupler Attachment (A) must be installed on John Deere 50, 55, and 60 Series Row Crop Tractors or any John Deere Utility Tractors to eliminate possible damage to the pump motor seals from SCV flow checking and improper operation of the SCV lever.

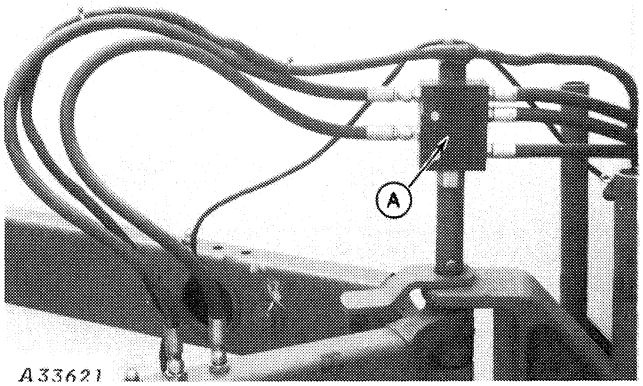


-UN-20MAR89
H40621

B21,5PT,A -19-28JUN90

DIRECTIONAL VALVE

A directional valve (A) is available for 30 and 40 Series Tractors to eliminate tractor system back pressure and can also reduce planter lowering time.



-UN-31JAN89
A33621

B21,7PT,G -19-28JUN90

TIGHTENING HARDWARE

Make sure cap screws and nuts are tight. (See Bolt Torque Chart in Service section.)

B03,13PI,B -19-28JUN90

TIRE INFLATION

Inflate 7.60-15 8PR planter tires to 359 kPa (3.6 bar) (52 psi) of air pressure.

B21,7PI,A -19-28JUN90

ROW WIDTHS

Your planter is available in the following row widths:

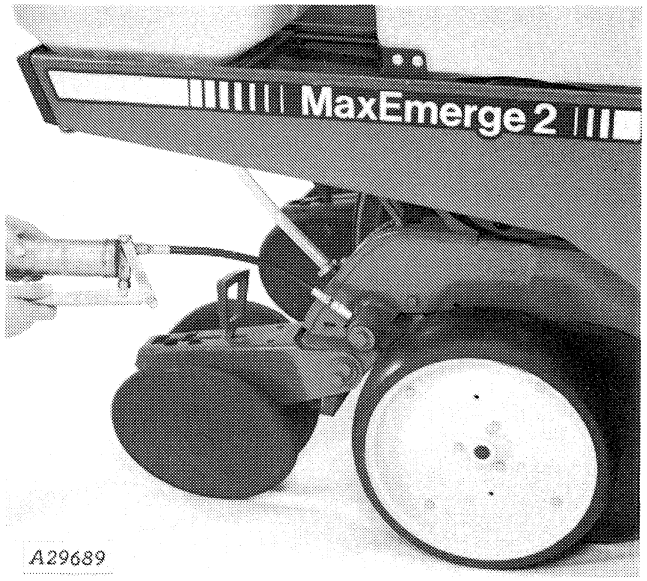
8-Row - 36 in. and 38 in. row widths.

12-Row Narrow - 30 in. row width.

B21,7PI,D -19-28JUN90

LUBRICATION

Be sure your planter and planting units have been properly lubricated. (See Lubrication section.)



B22,7PU,B -19-28JUN90

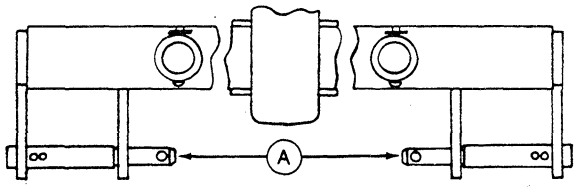
SELECTING SEED PLATES (PLATE SEED METERS ONLY)

Consult your copy of the "Plate Metering Units" Operator's Manual for information on selecting the desired seed plate.

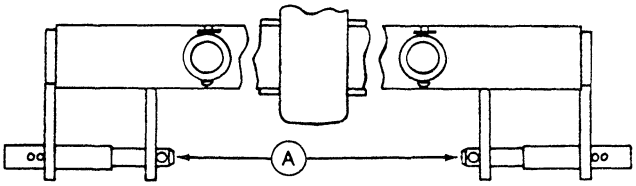
B21,1PI,I -19-28JUN90

ATTACHING PLANTER TO TRACTOR

Position hitch pins (A) for your model tractor.

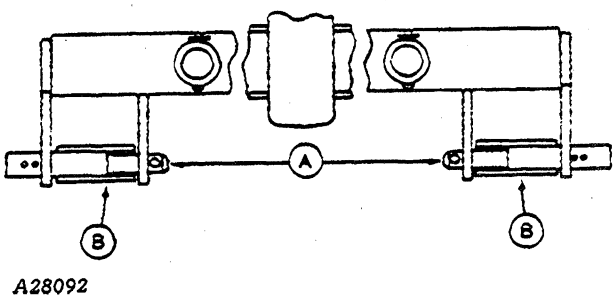


Hitch Pins (Category 2 w/Quick-Coupler)



Hitch Pins (Category 3A w/Quick-Coupler)

Bushings (B) (A30302) are required when attaching planter to 8850 Tractor. For parts, see your John Deere dealer.



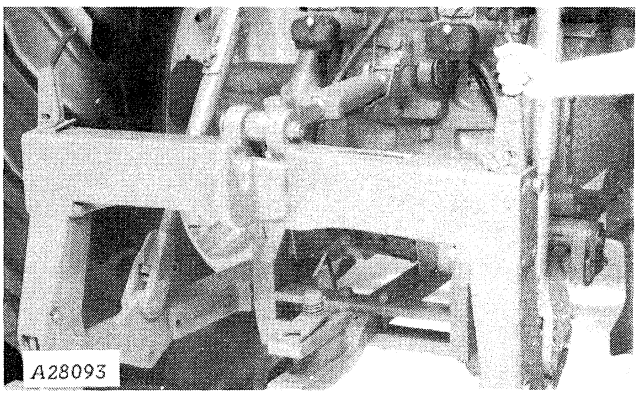
Hitch Pins/Bushings (Cat. 4N w/Quick-Coupler)

B05,13AD,A -19-28JUN90

CAUTION: Do not stand between tractor and the planter unless the tractor transmission is in PARK.

Raise both latch control levers.

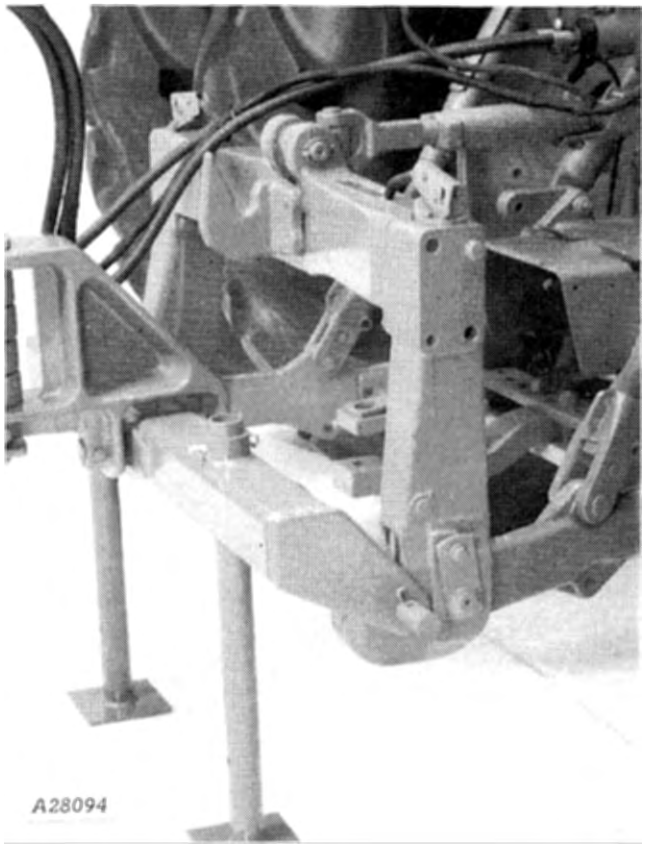
Lower the rockshaft until the quick-coupler hooks are lower than the planter hitch pins and slowly back the tractor up to the planter.



B05,13AD,B -19-28JUN90

Raise the rockshaft enough to engage the planter hitch pins in the quick-coupler hooks. Push both latch control levers down to lock the planter to the quick-coupler.

CAUTION: When latches are properly locked, handles will be horizontal and against coupler frame.



B05,13AD,C -19-28JUN90

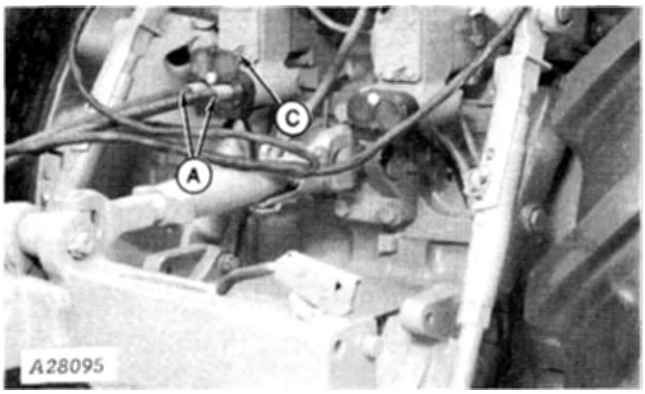
CAUTION: To avoid injury from escaping hydraulic oil under pressure, relieve the pressure in the system by shutting off tractor and moving remote cylinder operating levers in both directions before attaching hoses to or detaching hoses from the breakaway couplers.

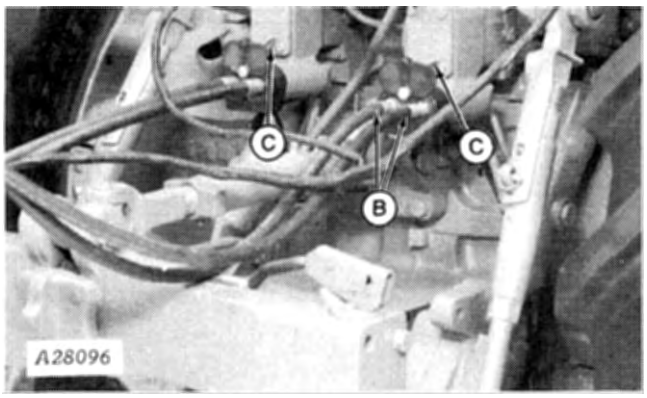
NOTE: Not necessary to turn off tractor if attaching planter to John Deere 50 Series Tractor.

Connect hydraulic hoses (A) to breakaway coupler number 1.

If planter is equipped with independent markers, connect marker hoses (B) to breakaway coupler number 2.

IMPORTANT: Set the flow control valve (C) on the tractor to full open.





B05,13AD,D -19-28JUN90

VACUUM METERING SYSTEM

If planter is equipped with vacuum metering system and automatic alternating markers, insert planter hydraulic hoses (A) into breakaway coupler number 1.

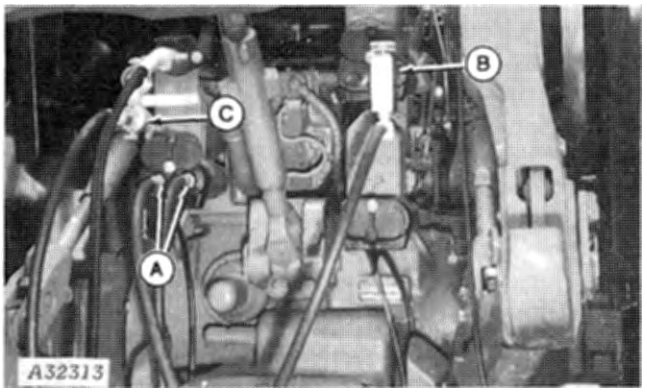
Insert flow control valve (or cab mounted valve pressure hose) into pressure side of breakaway coupler as illustrated at (B).

If John Deere 50, 55 or 60 Series Row Crop Tractors or John Deere Utility Tractor is being used, install hydraulic motor return hose into auxiliary return coupler (C).

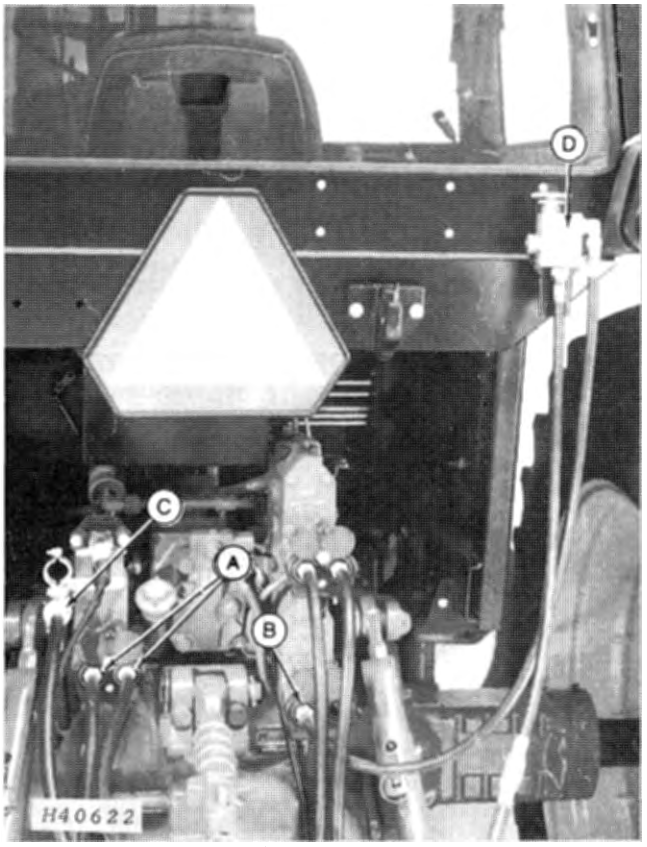
NOTE: The auxiliary return line coupler kit must be ordered when using the Vacuum Metering System with John Deere 50, 55 or 60 Series Row Crop Tractors and all John Deere Utility Tractors.

If using any other John Deere Tractor, install hydraulic motor return hose into left-hand side of tractor.

Attach cab mounted flow control valve to bracket outside of tractor cab at (D).



A32313 -UN-07OCT88



H40622 -UN-17MAY89

Cab Mounted

B21,5AD,D -19-28JUN90

If planter is equipped with vacuum metering system and independent markers, insert planter hydraulic hoses (A) into breakaway coupler number 1.

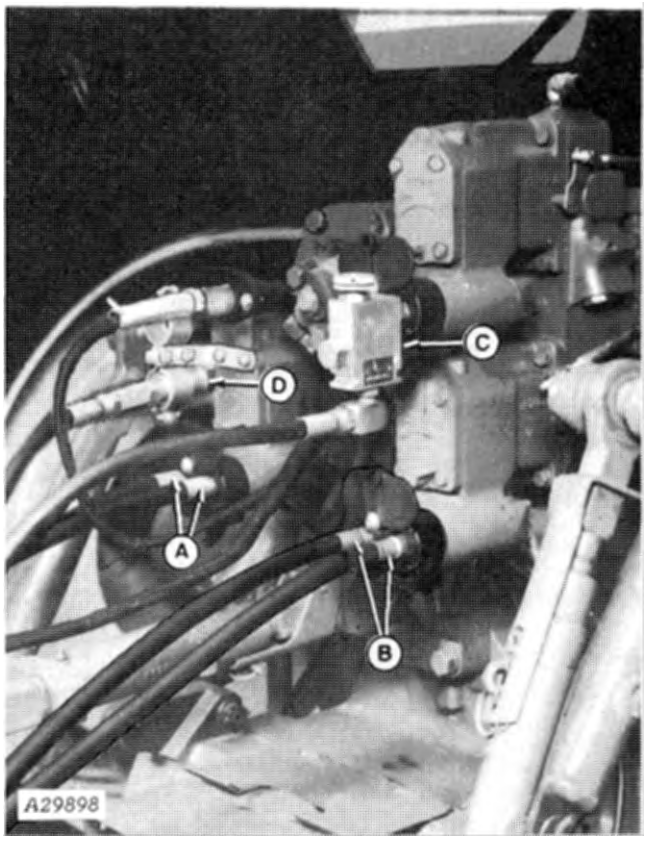
Insert planter lift hoses (B) into breakaway coupler number 2 or 3.

Insert flow control valve (or cab mounted valve pressure hose) into pressure side of breakaway coupler as illustrated at (C). Attach cab mounted flow control valve to bracket outside of tractor cab at (E).

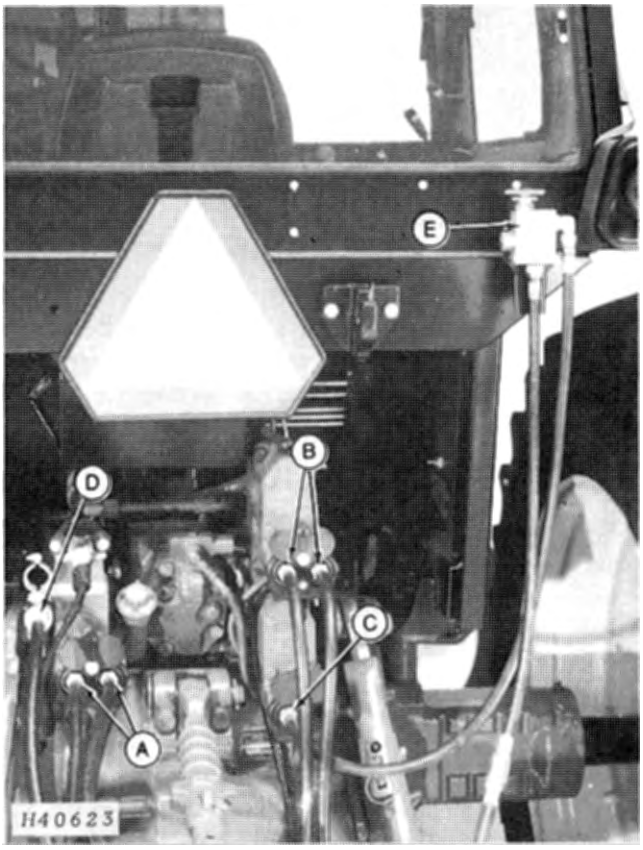
If John Deere 50, 55 or 60 Series Row Crop Tractors or John Deere Utility Tractor is being used, install hydraulic motor return hose into auxiliary return coupler (D).

NOTE: The auxiliary return line coupler kit must be ordered when using the Vacuum Metering System with John Deere 50, 55 or 60 Series Row Crop Tractors or John Deere Utility Tractors.

If using any other John Deere tractor, install hydraulic motor return hose into left-hand side of coupler.



A29898 -UN-06OCT88



H40623 -UN-17APR89

Cab Mounted

B21,5AD,E -19-28JUN90

CAUTION: Avoid possible injury or death from machine 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.

Do not connect auxiliary equipment to starter terminals. Doing so can cause tractor to start in gear and move. Connect directly to tractor battery only.

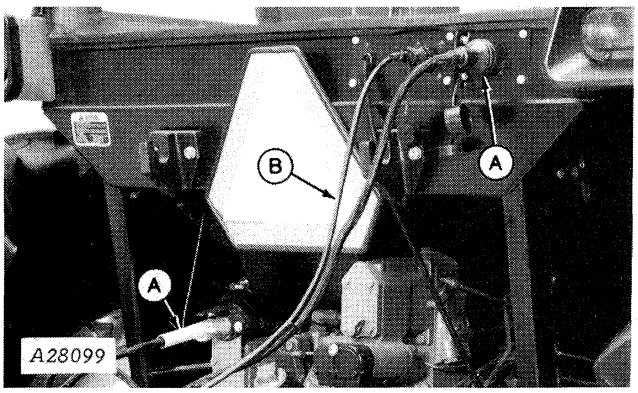


TS177 -UN-11JAN89

Connect the planter warning lamp harness to the seven-pin connector and 20-pin connector (A).

Connect monitor wiring harness (B) to rear of console power lead.

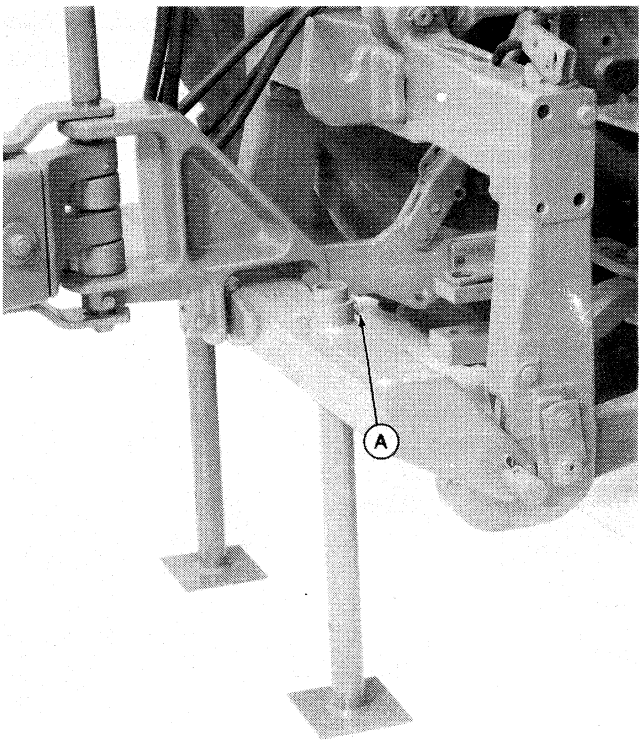
Line up grooves and tabs between connectors. Push monitor harness connector into console power lead connector and turn collar clockwise.



A28099 -UN-13OCT88

B21,3AD,G -19-28JUN90

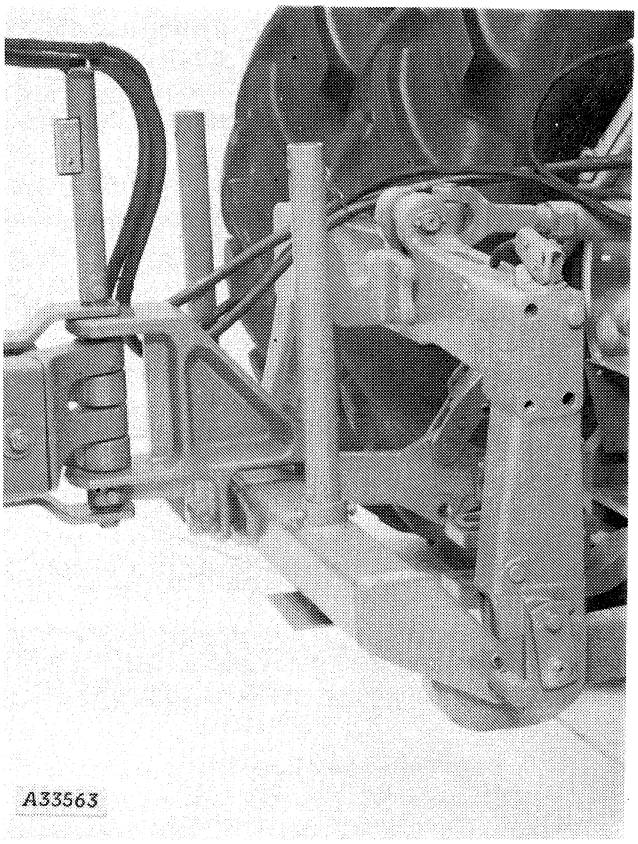
Raise 3-point hitch. Remove spring locking pin and drilled pin (A) securing stands to hitch crossbar.



A28097 -UN-13OCT88

B05,13AD,E -19-28JUN90

Raise and secure stands to hitch crossbar with drilled pin and spring locking pin.

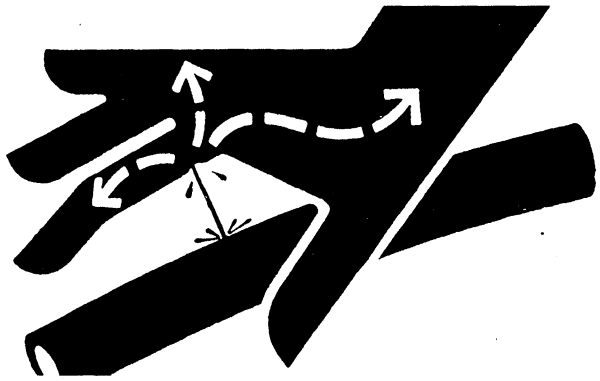


-UN-12OCT88 A33563

B05,13AD,I -19-28JUN90

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.

If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result.



-UN-23AUG88 X9811

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

IMPORTANT: Be certain to check tractor hydraulic oil level after filling cylinders with oil for the first time.

B21,1AD,F -19-28JUN90

The planter and the markers should raise and lower smoothly. If necessary, bleed air from hydraulic cylinders and hoses. (See Troubleshooting section.)

Before servicing hoses or marker valve, relieve trapped high pressure oil by slowly loosening marker hose end fittings.

B21,1AD,G -19-28JUN90

If planter is equipped with liquid herbicide attachment, connect planter system feeder hoses to tractor mounted liquid herbicide pressure supply system (customer supplied).

B21,7AD,C -19-28JUN90

ATTACHING MONITOR TO TRACTOR

CAUTION: Avoid possible injury or death from machine 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.

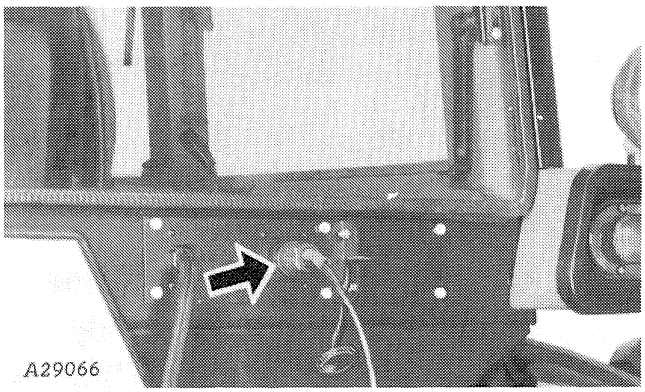


TS177 -UN-11JAN89

Do not connect auxiliary equipment to starter terminals. Doing so can cause tractor to start in gear and move. Connect directly to tractor battery only.

Remove dust covers.

Line up grooves and tabs between connectors. Carefully push planter harness connector onto monitor console connector and turn collar clockwise.



A29066 -UN-14OCT88

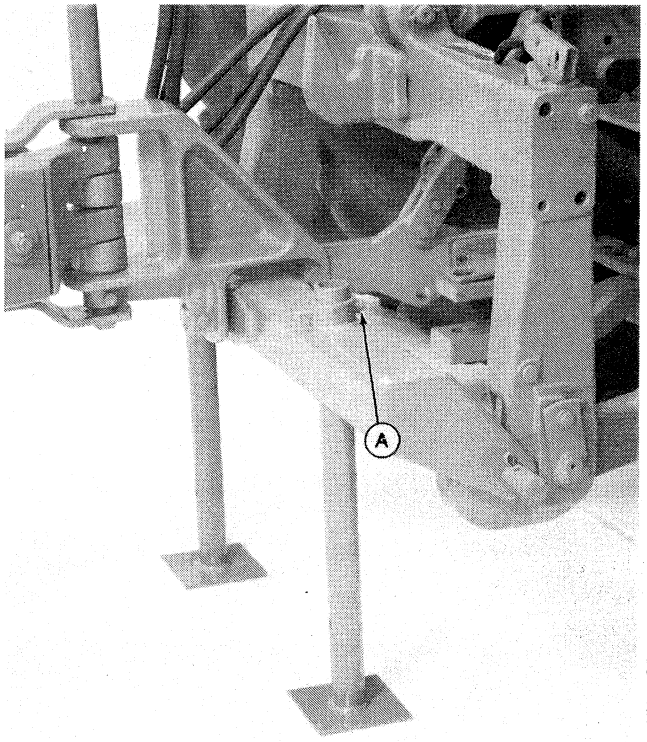
B05,15AD,A -19-28JUN90

DETACHING PLANTER FROM TRACTOR

Remove spring locking pins and drilled pins (A) and lower hitch stands.

Secure stands with drilled pins and spring locking pins.

Lower planter to the ground.



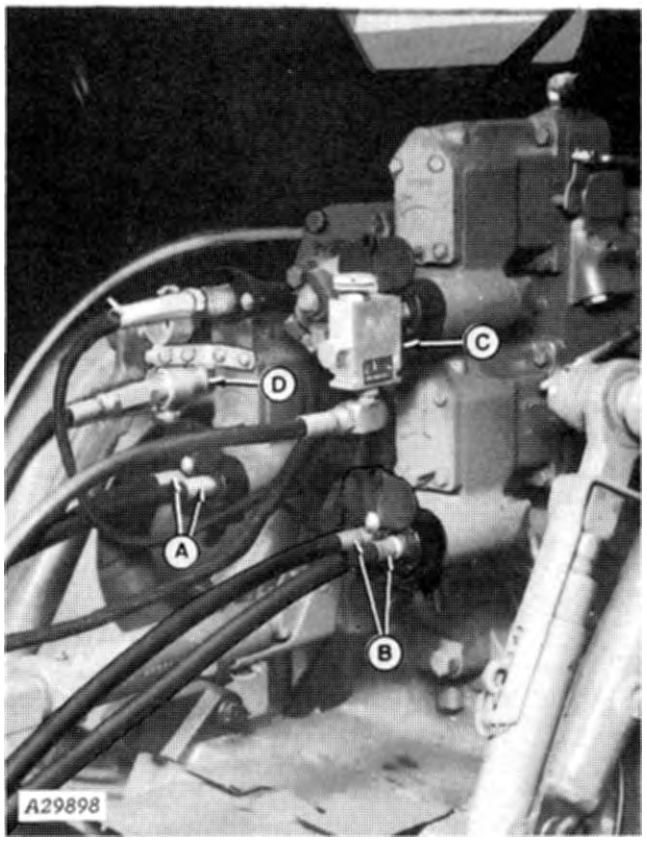
B05,13AD,F -19-28JUN90

CAUTION: To avoid injury from escaping hydraulic oil under pressure, relieve the pressure in the system by shutting off tractor engine and moving remote cylinder operating levers in both directions before removing hoses from breakaway couplers.

NOTE: Not necessary to turn off tractor if planter is attached to John Deere 50 Series Tractor.

Disconnect planter hydraulic hoses (A).

Disconnect marker hoses (B) and vacuum meter hoses (C) and (D) (if so equipped).



B21,7AD,E -19-28JUN90

Disconnect liquid herbicide hoses (if so equipped).

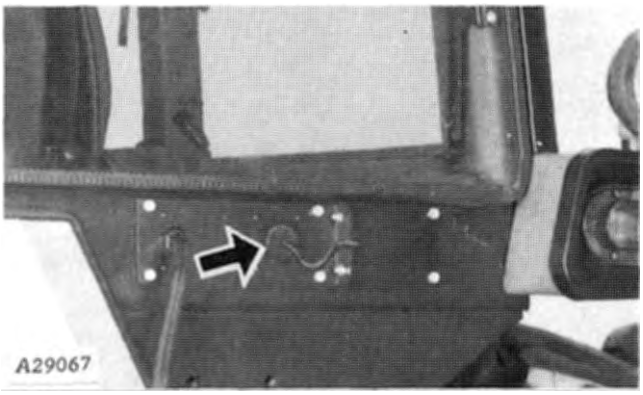
Raise handles on tractor quick-coupler and lower the tractor rockshaft until the quick-coupler is below the planter hitch pins. Drive tractor away slowly.

B21,7AD,F -19-28JUN90

DETACHING MONITOR FROM TRACTOR

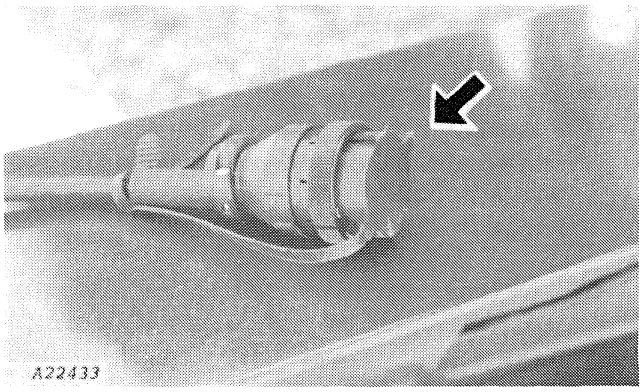
(Not Illustrated) Turn collar clockwise. Pull connector straight back.

Secure dust cover onto monitor console connector.



-UN-14OCT88 A29067

Secure dust cover onto planter harness connector.



-UN-14OCT88 A22433

B05,15AD,B -19-28JUN90

Transporting

TRANSPORT SAFELY

CAUTION: When transporting the planter on a road or highway at night or during the day, use accessory lamps and devices for adequate warning to operators of other vehicles. In this regard, and for maximum permissible transport widths, check local governmental regulations. Various safety lamps and devices are available from your John Deere dealer.

Do not transport the planter faster than 20 mph (32 km/h) on a smooth surface road.

Reduce speed when traveling over rough ground.

Be certain everyone is clear of planter.

Serious injury or death can result from contact with electric lines. Use care when moving or operating this machine near electric lines to avoid contact.

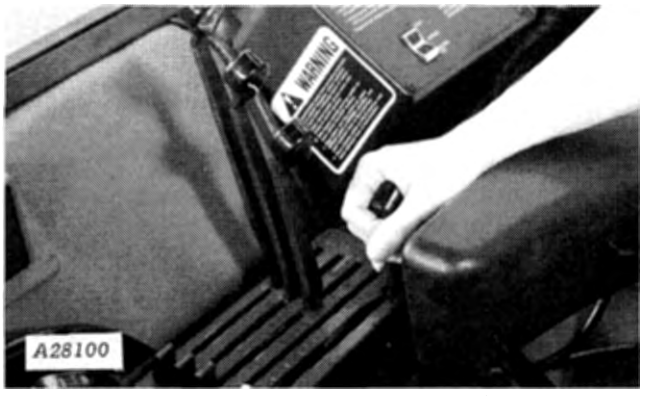
B21,7TR,D -19-28JUN90

FOLDING THE PLANTER

IMPORTANT: Be certain hitch stands are in the raised position. (See Attaching and Detaching section of this manual.)

CAUTION: Be certain everyone is clear of planter.

CAUTION: Serious injury or death can result from contact with electric lines. Use care when moving or operating this machine near electric lines to avoid contact.



A28100 -UN-13OCT88

Use firm, LEVEL ground when possible to make folding easier. Tractor must be in neutral to allow the tractor to roll slightly when folding planter.

Raise the tractor rockshaft to approximately 1/2 raised position.

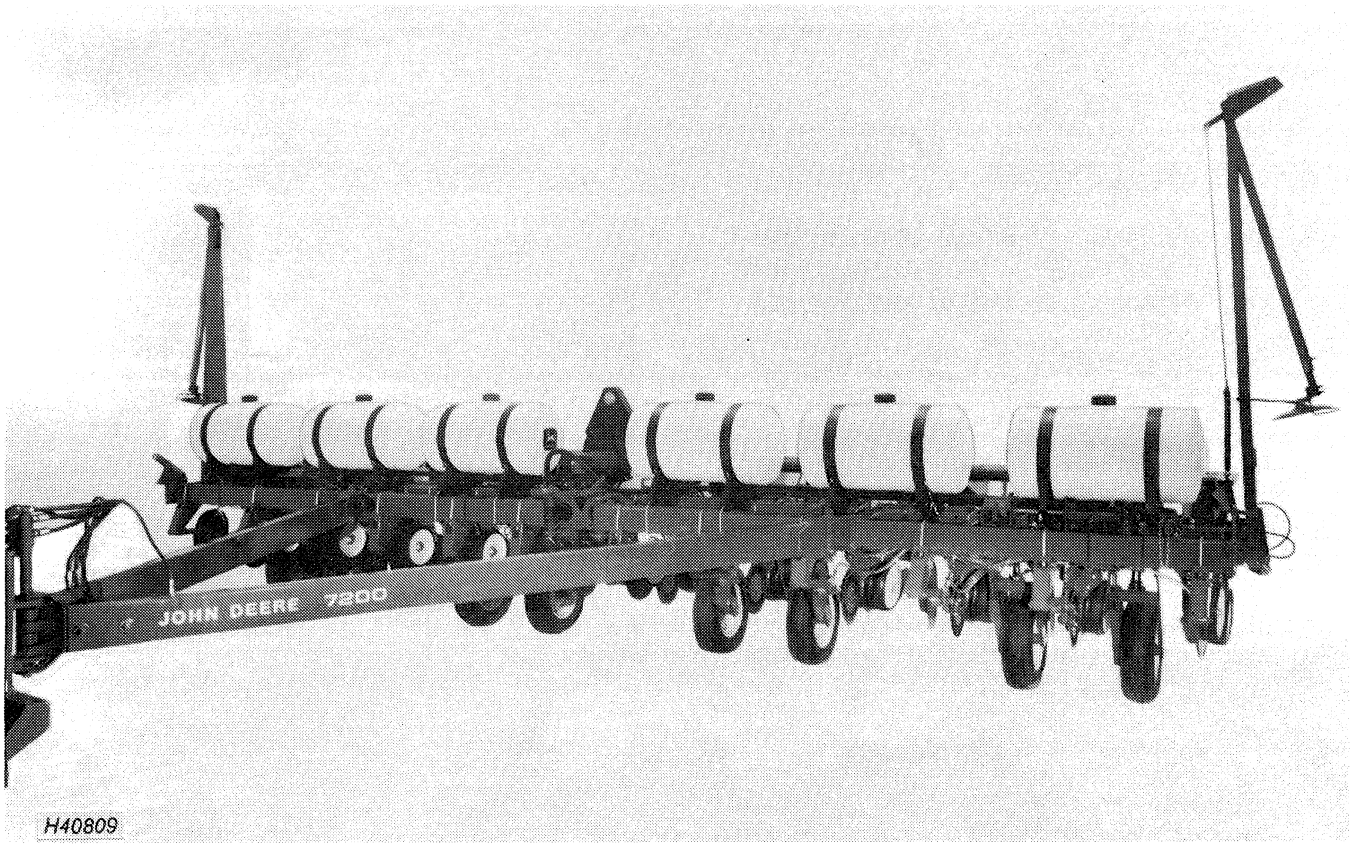
IMPORTANT: Do not fully raise rockshaft for folding or structural damage to planter may result.

B21,7TR,A -19-28JUN90



-UN-13MAR89
A28101

Pull back on the number one remote cylinder operating lever and fully raise the planter.



-UN-20APR89
H40809

B21,7TR,B -19-28JUN90



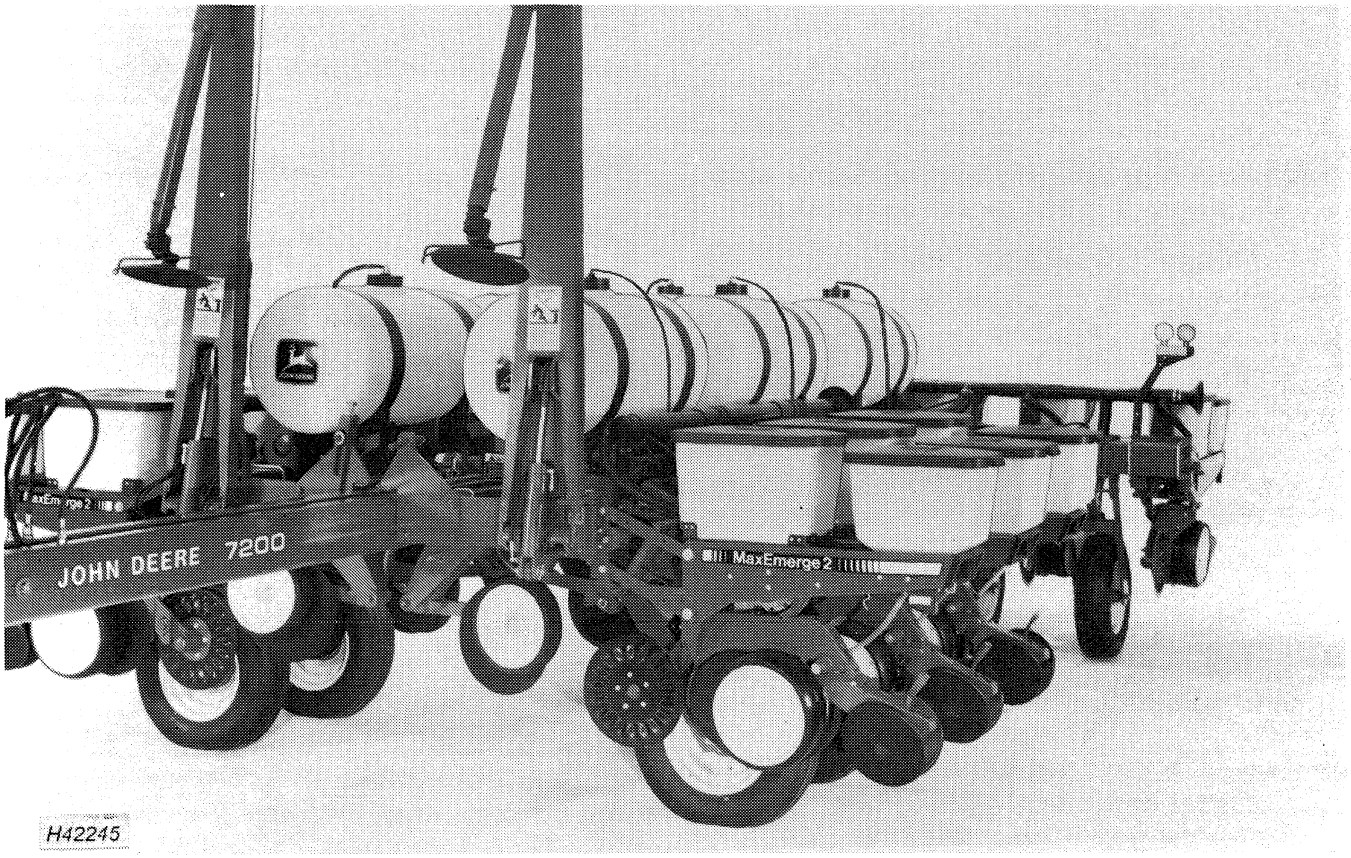
-UN-13MAR89
A28103

Press the FOLD switch and hold.

Fold the planter by pulling the number one remote cylinder operating lever rearward.

NOTE: The rockshaft should be low enough to allow the planter wing supports to rest on the top of the hitch tubes.

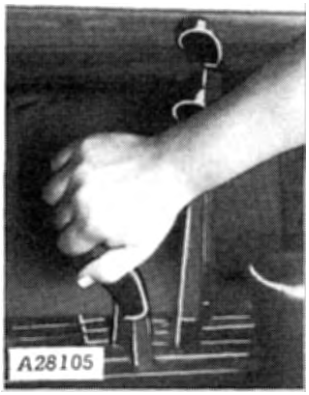
When planter is completely folded, release fold switch and remote cylinder operating lever.



-UN-29JUN90
H42245

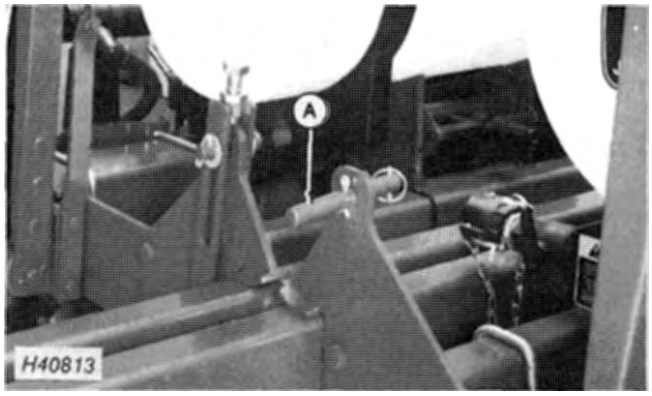
B21,7TR,C -19-28JUN90

Lower the planter to the ground completely by pushing the number 1 remote cylinder operating lever and rockshaft control lever forward simultaneously.



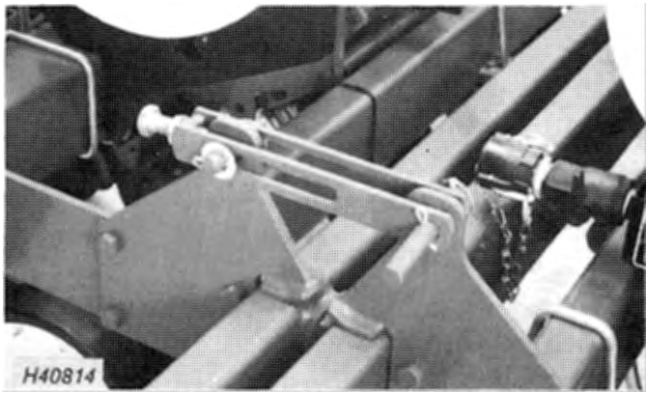
B05,13TR,D -19-28JUN90

Remove quick-lock pin and drilled pin (A).



B21,7TR,E -19-28JUN90

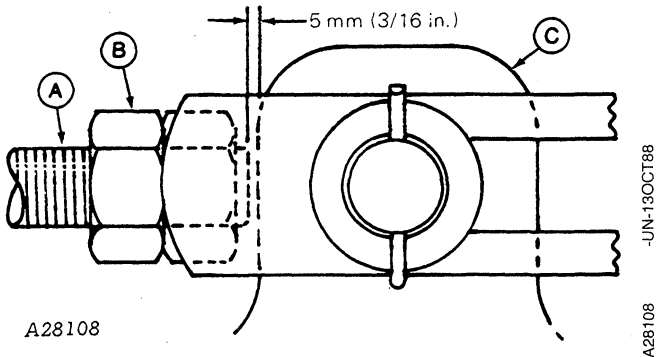
Be certain both hitch tubes are touching. Secure wing frames with wing lock, drilled pin and quick-lock pin.



B21,7TR,F -19-28JUN90

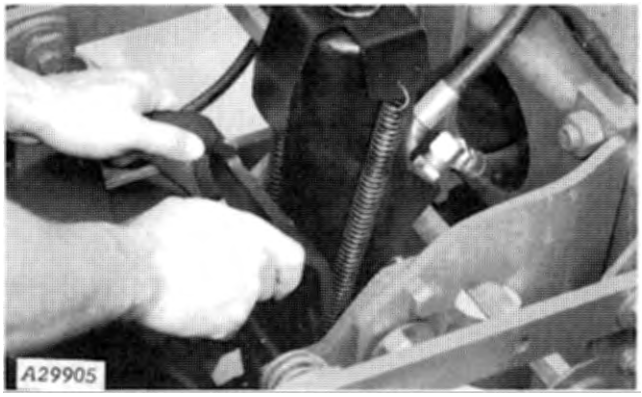
Properly set the latch length so the planter wings are supported in transport position and that clearance is provided for easy removal and installation.

Loosen nut (B) and turn cap screw (A) until there is approximately 5 mm (3/16 in.) clearance between end of cap screw and latch plate (C). Tighten nut.



B21,7TR,G -19-28JUN90

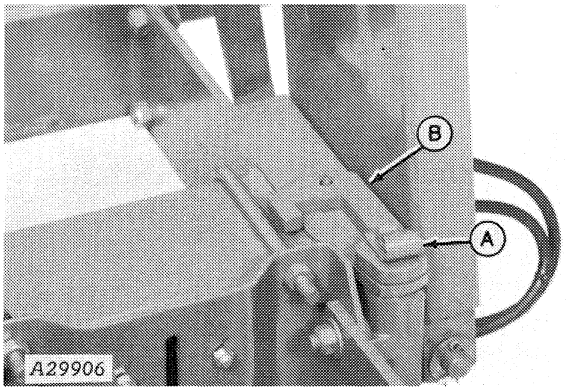
Lock the wing wheels for transport by pushing down on the wing wheel locks and make certain they engage the hooks on the cylinder supports.



-UN-06OCT88
A29905

B21,7TR,H -19-28JUN90

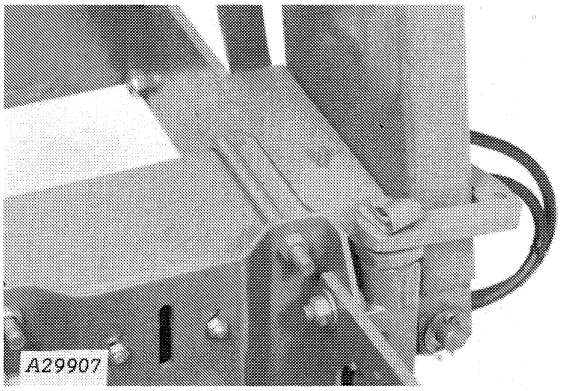
Remove clip (A) from pin and remove marker lock (B) from storage position.



-UN-12OCT88
A29906

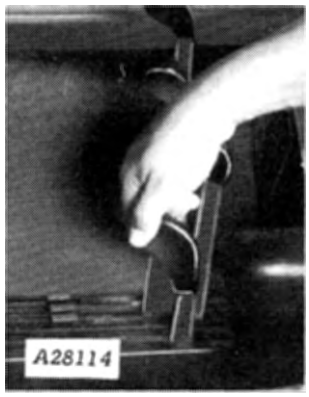
B21,7TR,I -19-28JUN90

Lock markers for transport with marker lock and clip.



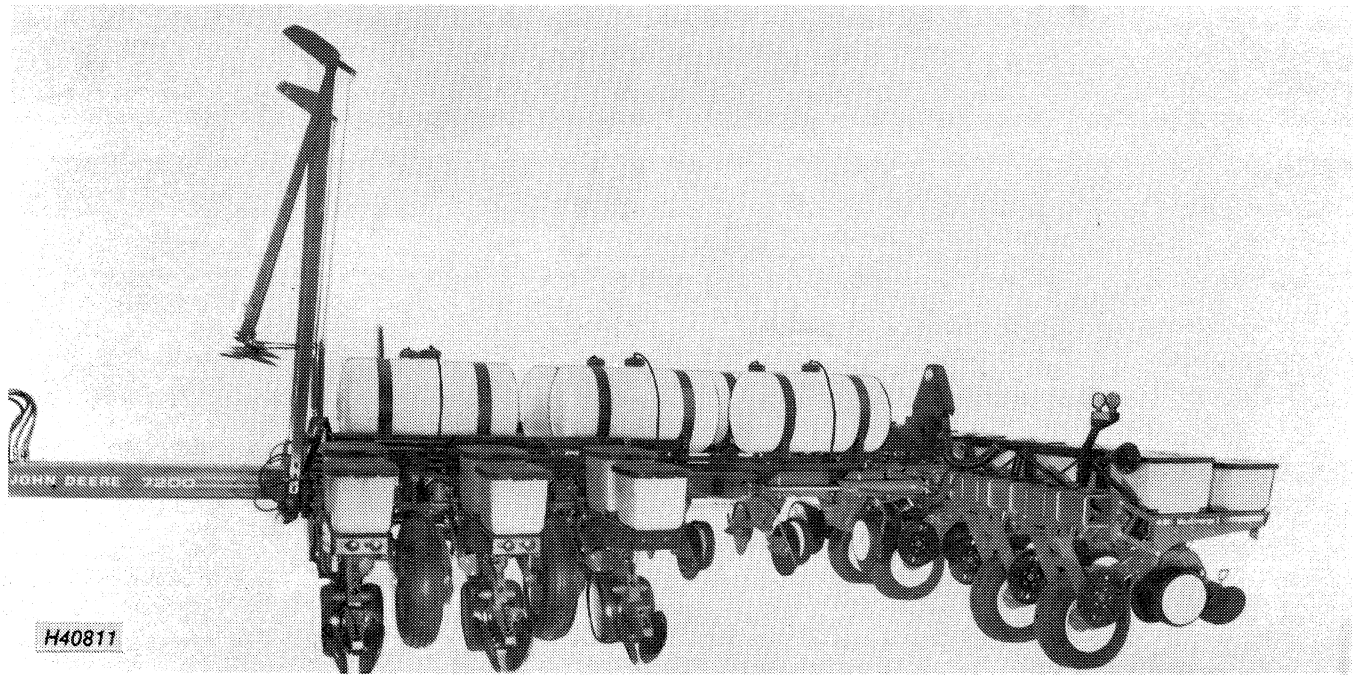
-UN-06OCT88
A29907

B21,7TR,J -19-28JUN90



Raise the planter by pulling the number 1 remote cylinder operating lever and rockshaft control lever rearward simultaneously.

The planter is now ready for transport.



CAUTION: Serious injury or death can result from contact with electric lines. Use care when moving or operating this machine near electric lines to avoid contact.

CAUTION: Fertilizer tanks, seed and pesticide hoppers should be half full or less when transporting the planter with fertilizer. For two-wheel drive tractors, exceeding this weight will mean poor front end stability and possible front end raising. For four-wheel drive tractors, this will prevent excessive frame loading. When transporting the 12-row planters with fertilizer or ballast, do not exceed 16.1 km/h (10 mph).

The planter is towed like a two-wheel cart in the folded transport position. Use caution in learning the tracking path of the planter behind the tractor when turning corners. The long wheelbase of the planter will make rear planter wheels "cut the corner".

CAUTION: When transporting the planter on a smooth surface road, do not exceed 32 km/h (20 mph) tractor speed. Reduce speed considerably when traveling over rough ground.

B21,7TR,L -19-28JUN90

UNFOLDING THE PLANTER

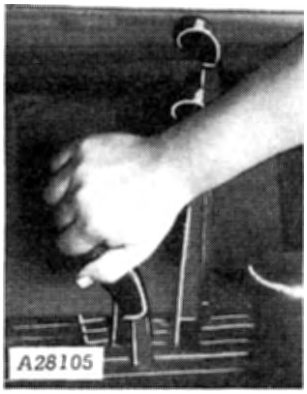
CAUTION: Be certain everyone is clear of the planter.

CAUTION: Serious injury or death can result from contact with electric lines. Use care when moving or operating this machine near electric lines to avoid contact.

Use firm level ground, when possible, to make unfolding easier. Tractor must be in neutral to allow the tractor to roll slightly when unfolding the planter.

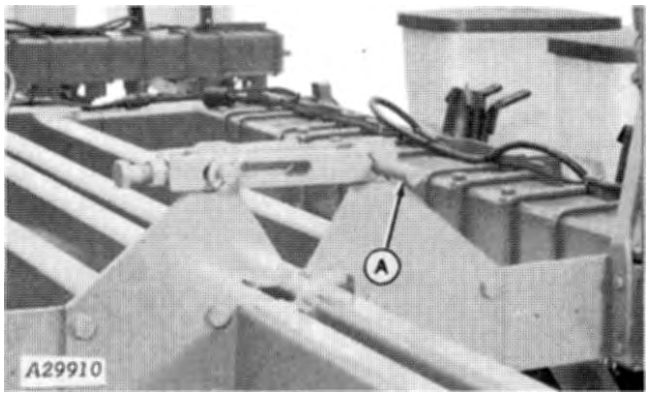
B05,13TR,N -19-28JUN90

Lower the planter to the ground by pushing the number 1 remote cylinder operating lever and rockshaft control lever forward simultaneously.



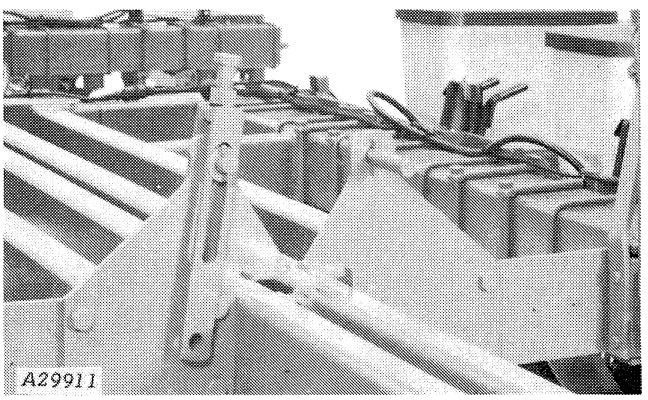
B05,13TR,O -19-28JUN90

Unlatch wings by removing quick-lock pin and drilled pin (A).



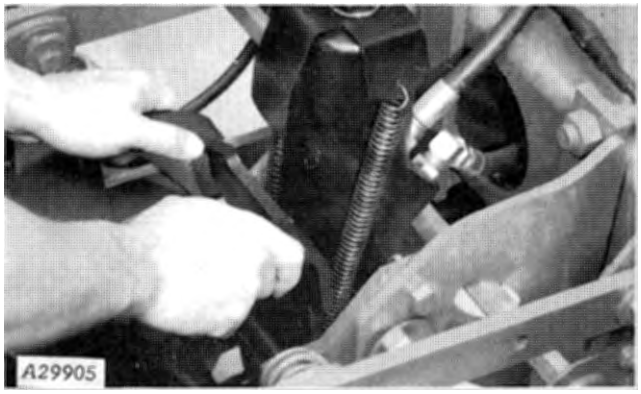
B21,7TR,M -19-28JUN90

Slide wing lock rearward on drilled pin until connection end of lock can be positioned as shown. Replace drilled pin and quick-lock pin in storage position.



B21,7TR,N -19-28JUN90

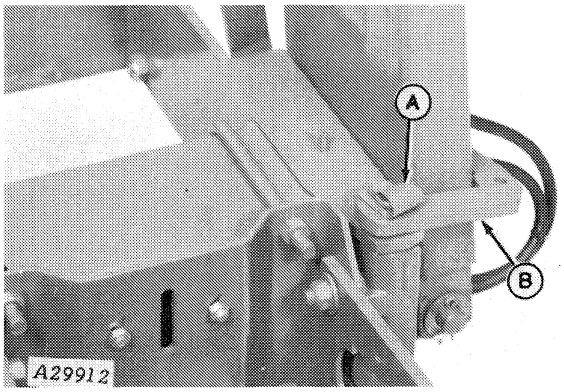
Unlock the wing wheels by pushing in and down on the wheel locks until the locks disengage from the cylinder support hooks.



A29905 -UN-06OCT88

B21,7TR,O -19-28JUN90

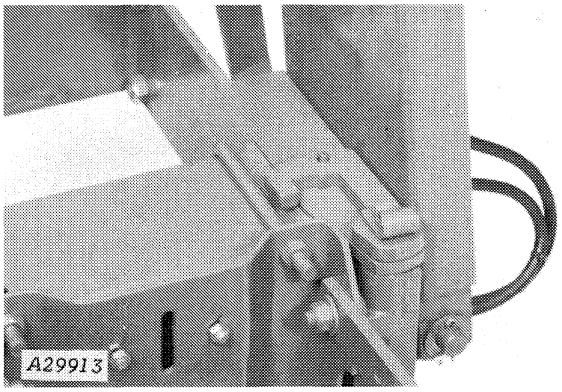
Remove clip (A) and marker lock (B) from pin.



A29912 -UN-06OCT88

B21,7TR,P -19-28JUN90

Place marker lock in storage position on pins. Secure marker lock with clip.



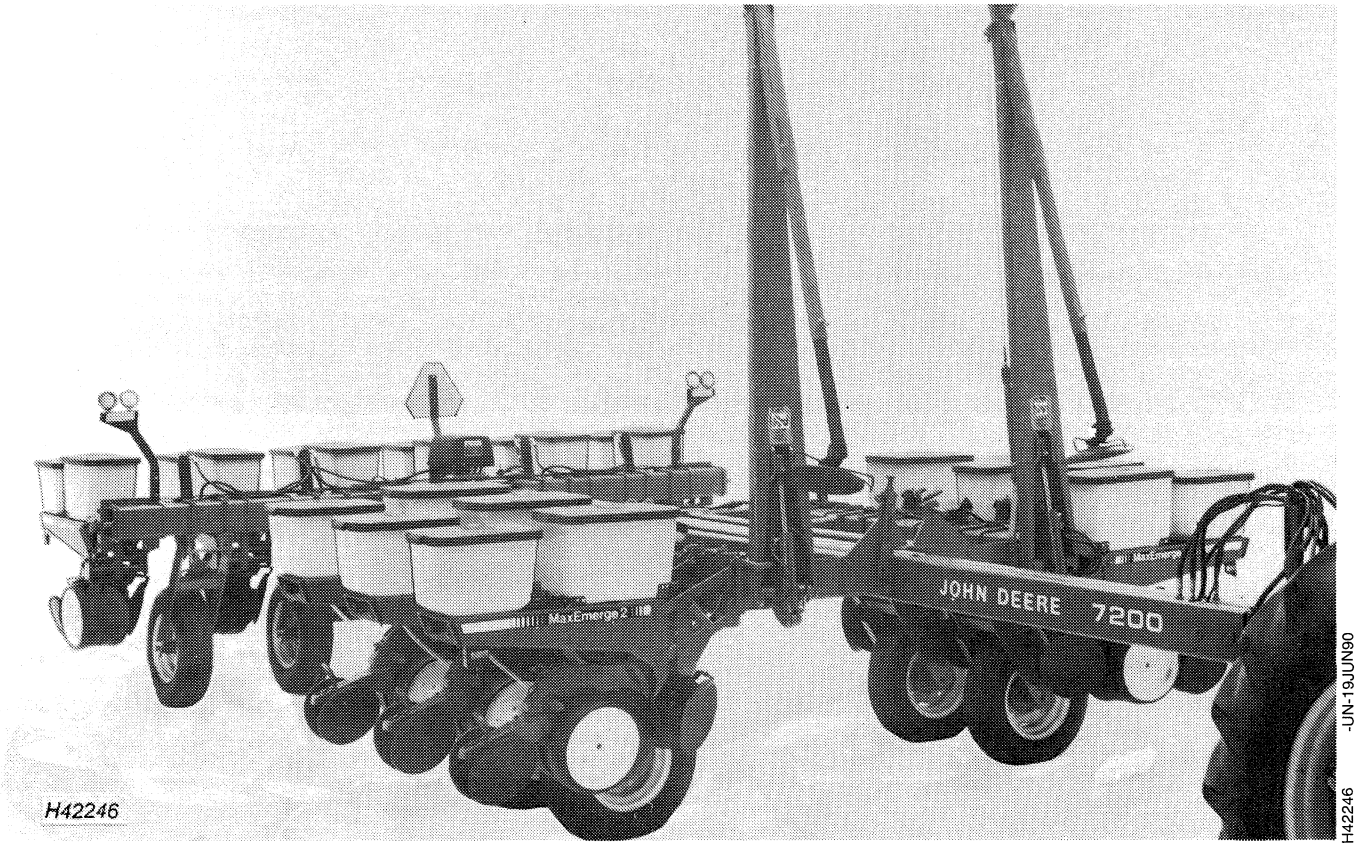
A29913 -UN-06OCT88

B21,7TR,Q -19-28JUN90



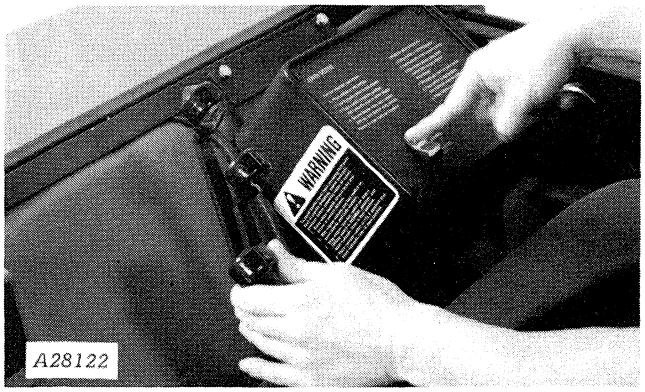
-UN-13MAR89
A28101

Pull back on the number 1 remote cylinder operating lever and raise tractor rockshaft simultaneously to fully raise the planter. Lower rockshaft until wing supports are not resting on hitch tubes.



-UN-19JUN90
H42246

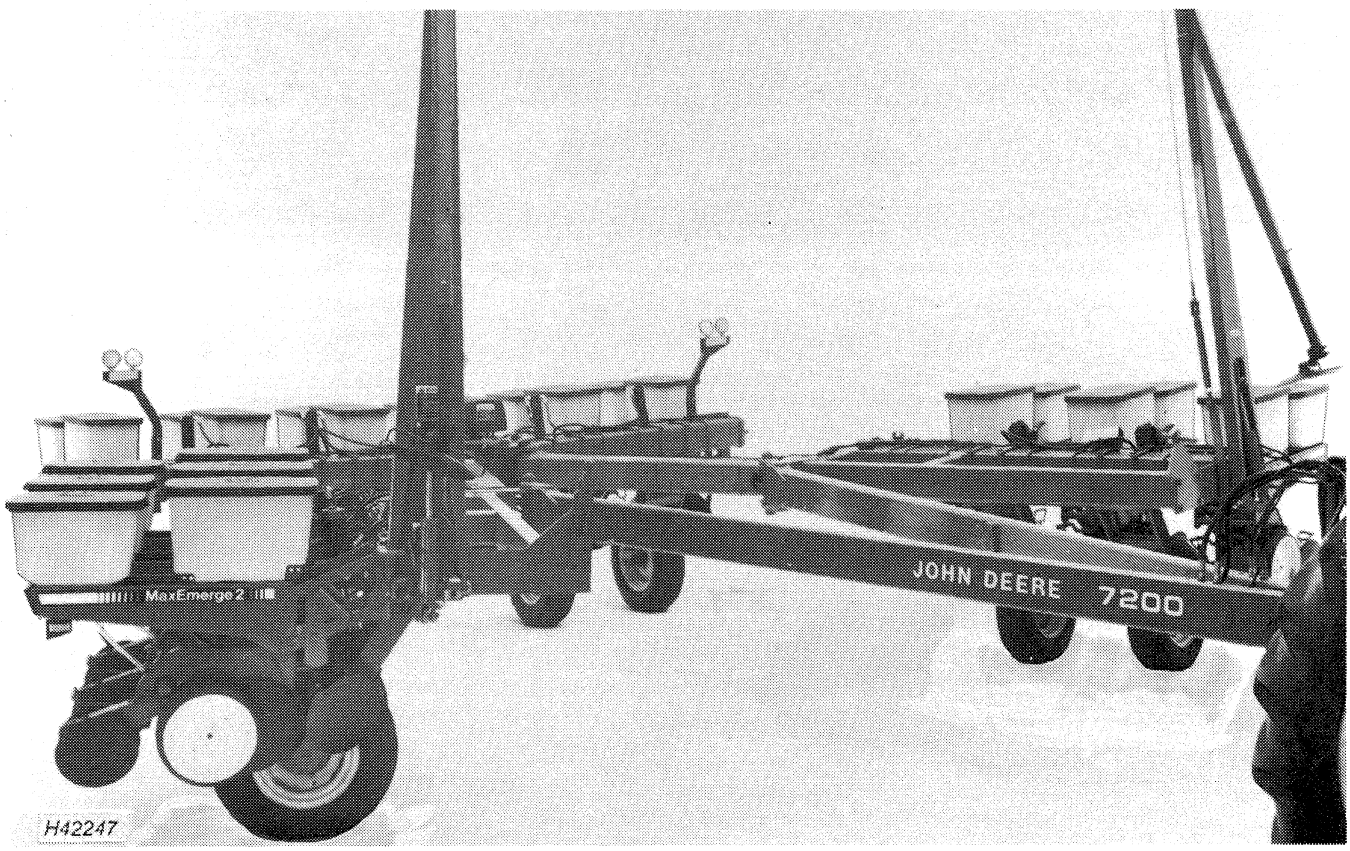
B21,7TR,T -19-28JUN90



-UN-13MAR89
A28122

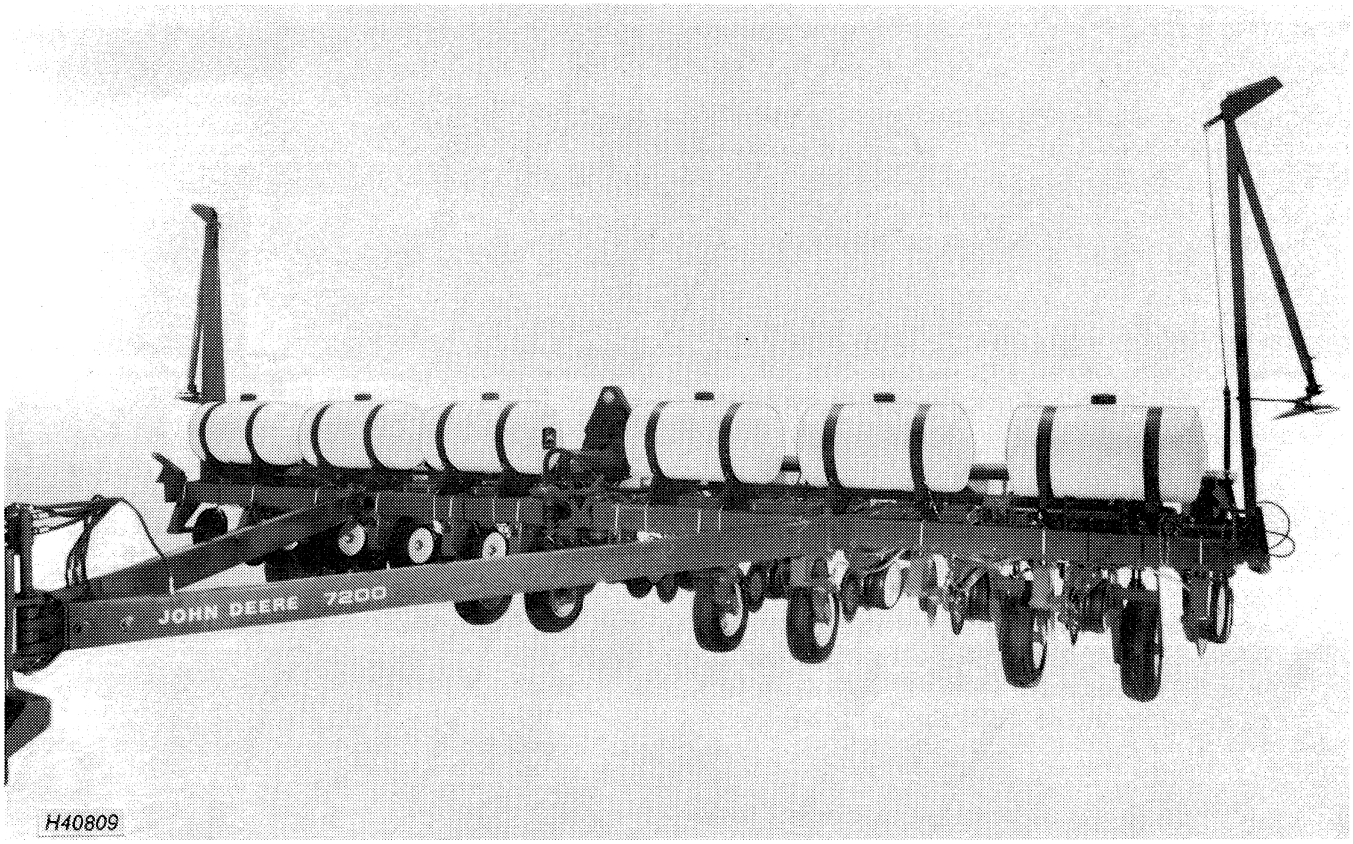
Press the FOLD switch and hold.

Unfold the planter by pushing the number one remote cylinder operating lever forward.



-UN-19JUN90
H42247

B21,7TR,U -19-28JUN90

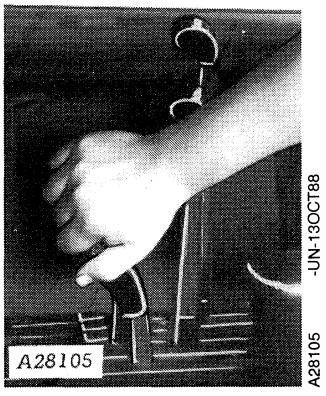


When planter is completely unfolded, release FOLD switch and remote cylinder operating lever.

B21,7TR,V -19-28JUN90

NOTE: Before lowering the planter, be certain planter is moving forward to avoid plugging the seed openers and fertilizer openers.

Lower the planter to the ground by pushing the number one remote cylinder operating lever and rockshaft control lever forward simultaneously.



B21,7TR,W -19-28JUN90

Raise planter with tractor hydraulic system.

If equipped with single-disk fertilizer openers, check to be sure there is adequate ground clearance between the blade and the ground.

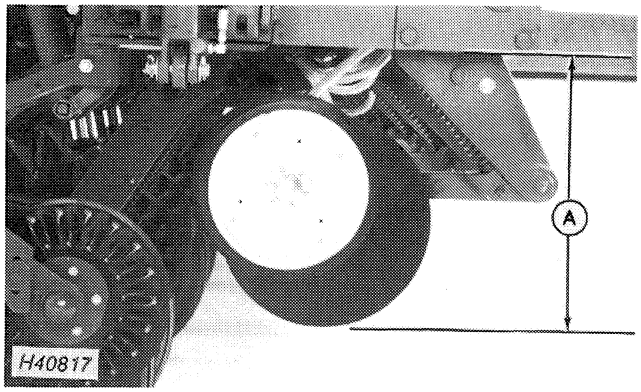
If necessary, loosen jam nut (C) and tighten spring adjusting bolt (B) until adequate ground clearance is achieved. Retighten jam nut.

NOTE: Do not tighten spring bolt so dimension (A) is less than 635 mm (25 in.). Opener may not achieve full depth if dimension is less than 635 mm (25 in.).

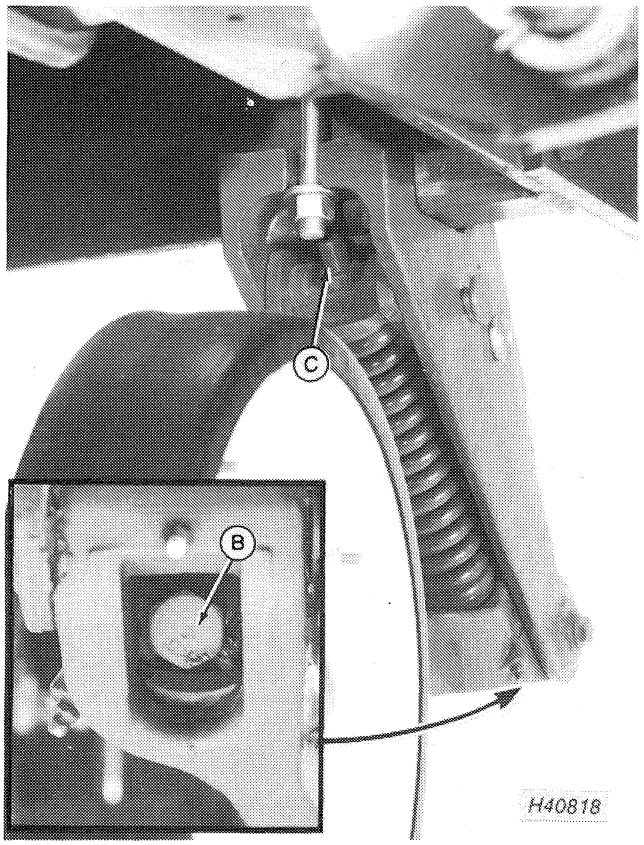
CAUTION: When transporting, never travel at any speed which would not permit adequate control of steering and stopping.

Check local governmental regulations for maximum permissible transport widths and use appropriate accessory lamps and devices for adequate warning to operators of other vehicles.

See your John Deere dealer for the various safety lamps and devices available for your planter.



-UN-25APR89
H40817



-UN-25APR89
H40818

B21,3TR,D -19-28JUN90

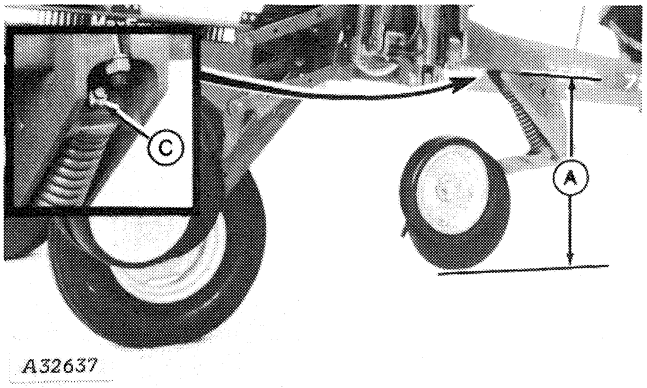
PLANTERS EQUIPPED WITH SINGLE-DISK FERTILIZER OPENER

Raise planter with tractor hydraulic system.

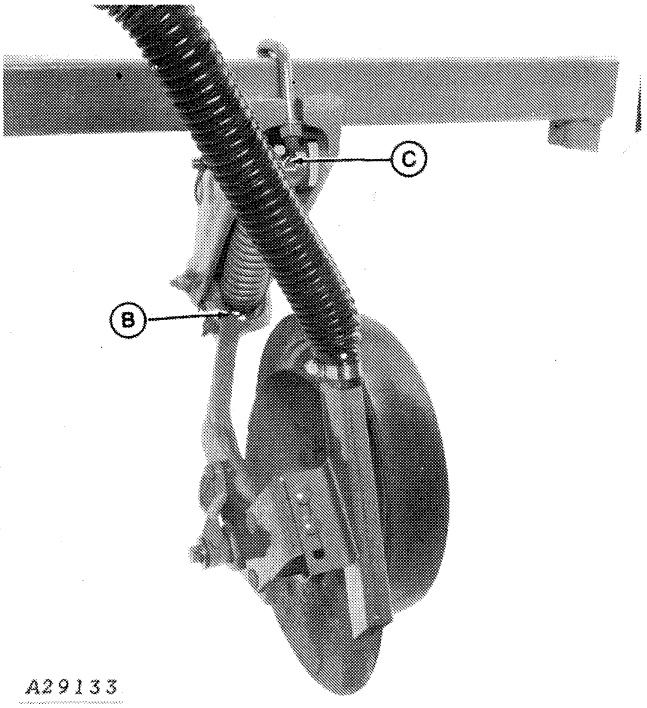
If equipped with single-disk fertilizer openers, check to be sure there is adequate ground clearance between the blade and the ground.

If necessary, loosen jam nut (C) and tighten spring adjusting bolt (B) until adequate ground clearance is achieved. Retighten jam nut.

NOTE: Do not tighten spring bolt so dimension (A) is less than 635 mm (25 in.). Opener may not achieve full depth if dimension is less than 635 mm (25 in.).



A32637 -UN-07OCT88



A29133 -UN-14OCT88

B21,5TR,O -19-28JUN90

Preparing the Vacuum Meter Unit

CHOOSING SEED DISKS

The vacuum seed meter will accurately plant most sizes of corn, acid-delinted cotton, sorghum, soybeans, edible beans, sugar beets, sunflowers, and popcorn.

Use the following guidelines to select the seed disk and the seed size that will optimize vacuum meter performance.

CORN

A - STANDARD CORN SEED DISK - Part No. A50617

B - SMALL CORN SEED DISK - Part No. A43215

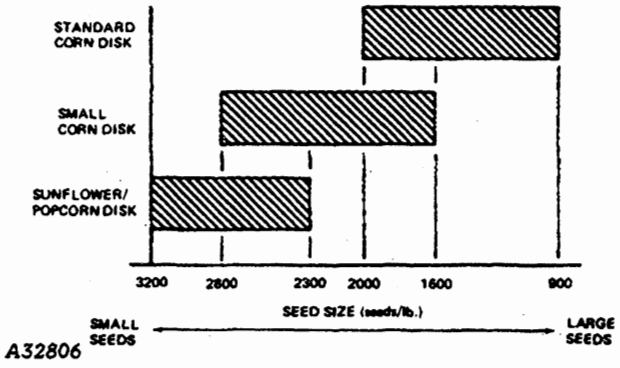
C - SUNFLOWER/POPCORN DISK - Part No. H136478

Corn seed size and shape varies widely. The vacuum seed meter corn disks can individually handle a large portion of the full size range.

The chart illustrates the range of seed sizes best suited for use with the respective seed disks.

The chart represents the seed size range where optimum performance can be expected with each seed disk. Select the disk which best handles the seed to be planted or best represents the majority of seed sizes to be planted.

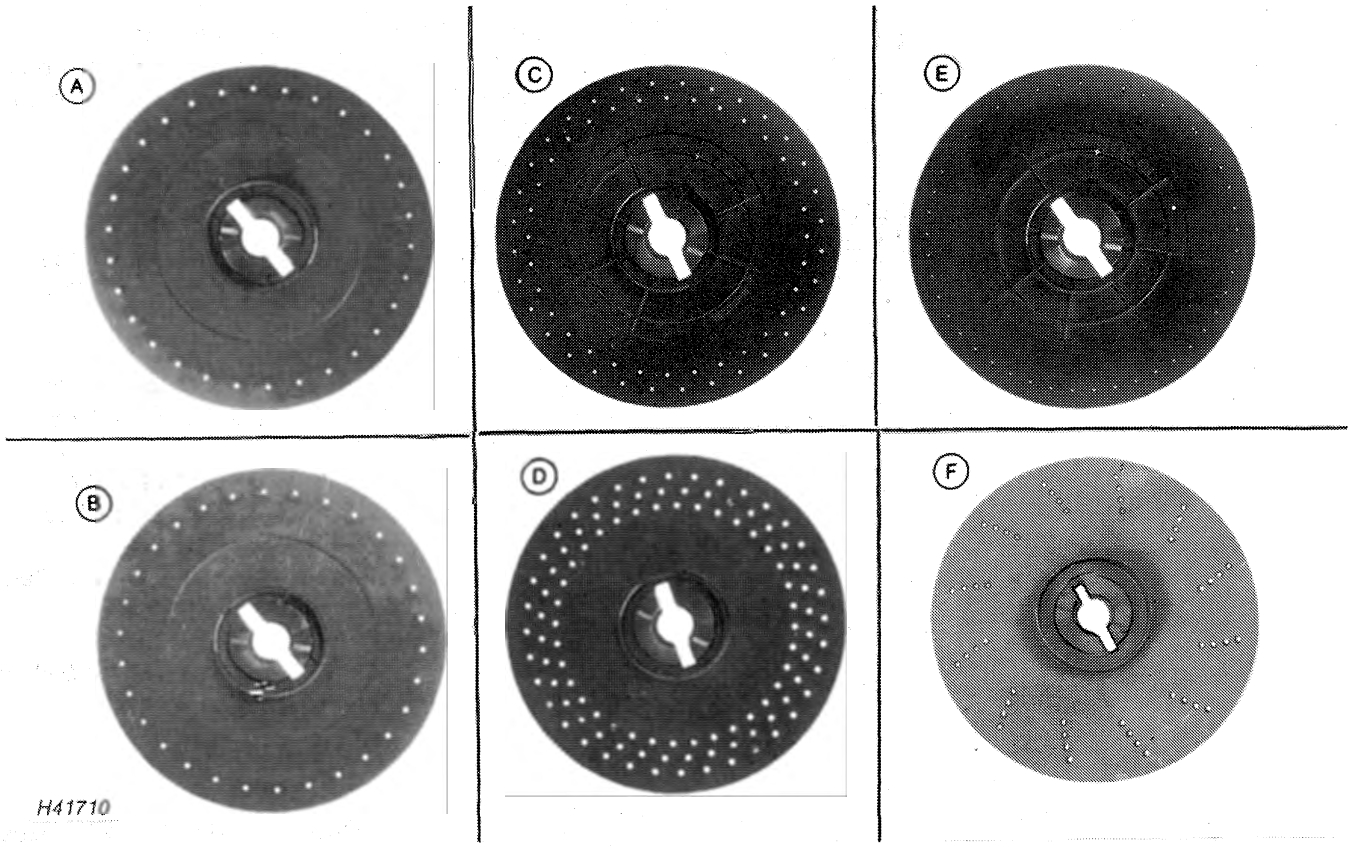
If several seed sizes are to be planted and their seed size falls within the overlapping areas of the two seed disks, it is recommended that BOTH seed disks be ordered to optimize performance to the individual seed shape.



A32806 -19-29MAR89

B22,9PU,A -19-28JUN90

SELECTING SEED DISKS



B22,9PU,Q -19-18MAY90

IMPORTANT: If hopper box treatments are used, be sure to follow the chemical manufacturer's recommendations carefully. Dry powder or fast drying liquid treatments are generally recommended. HIGH OIL CONTENT TREATMENTS ARE NOT RECOMMENDED.

Chemical reactions between hopper box treatments and treatments commercially applied to seed can cause the additive to become sticky. Certain temperature and humidity levels can further complicate material compatibility. Check with your chemical and seed supplier for treatment compatibility. Treatments adhering to vacuum meter components can cause reduced population and spacing control.

SUNFLOWER

A - Part No. H136478. Recommended for oil sunflower seed sizes 4 (small), 3 (medium) and 2 (large). Size 1 (extra large) and size 5 (extra small) and confectionary sunflower seeds are not recommended for the disk.

ACID-DELINTED COTTON

B - Part No. A44026. All sizes.

SOYBEAN

E - Part No. A42586. All sizes.

SORGHUM

C - Part No. A43066. Recommended for dry land and irrigated planting of sorghum seed ranging in size from 10,000 to 16,000 seeds per pound.

Use of smaller seeds may result in some over-population.

COTTON HILLDROP

F - Part No. H136587. Recommended for acid-delinted cotton seed. Groups four cotton seeds per hill. The distance between hills can be selected within a range of 8 to 18 in. centers.

SUGAR BEETS

C - Mono-germ. Part No. H136445. Recommended for seed in small to medium size, 6.5/64 to 9/64 inches.

Mono-germ. Part No. A51713. Recommended for seeds in large size, from 8.5/64 to 10/64 inches.

Pelleted. Part No. H136445. Recommended for pellets ranging in size from 8/64 to 10/64 inches.

Pelleted. Part No. A51713. Recommended for pellets ranging in size from 9/64 to 11.5/64 inches.

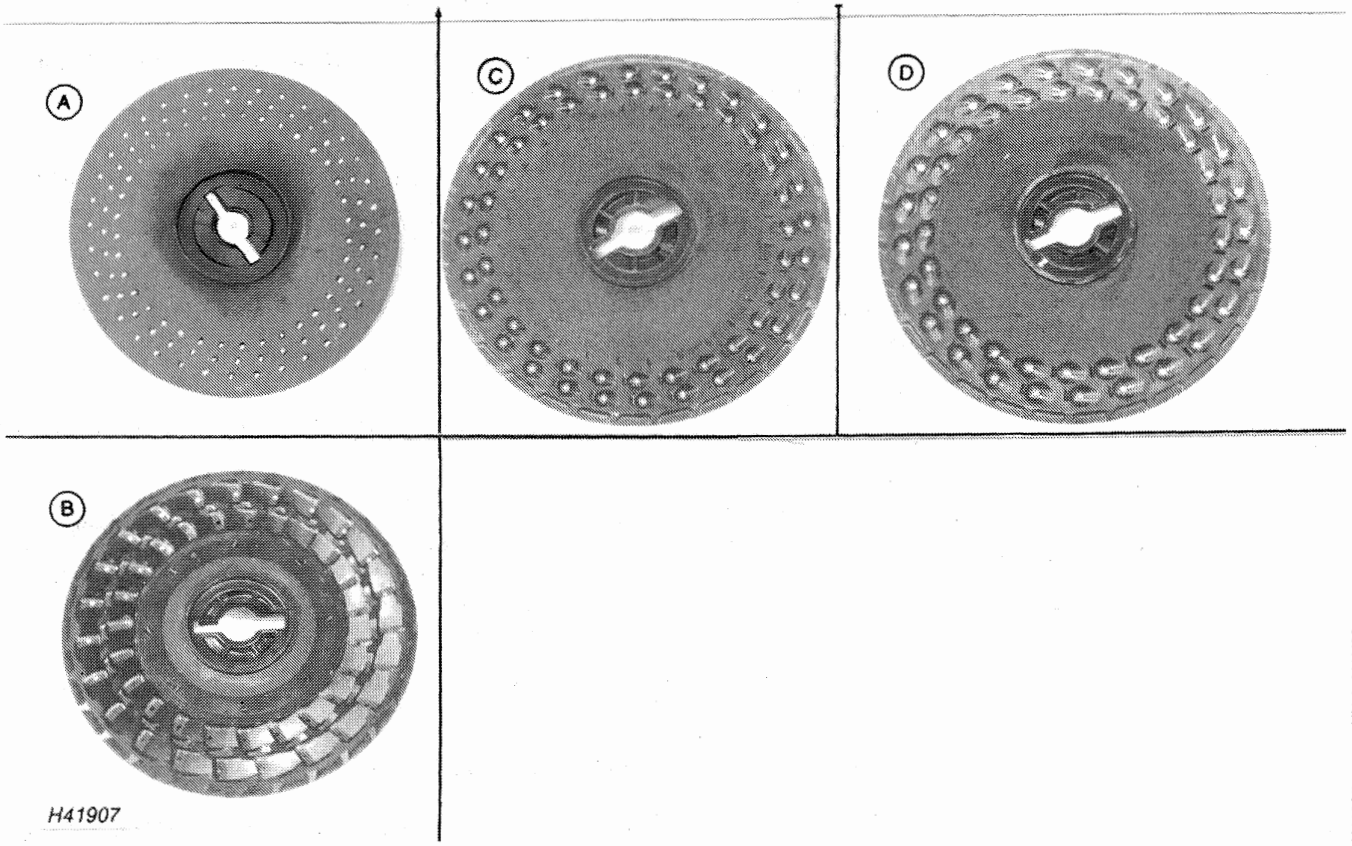
Pelleted. Part No. A43066. Recommended for pellets ranging in size from 9/64 to 11.5/64 inches.

POPCORN

A - Part No. H136478. Recommended for seed sizes from 2500 to 4500 seeds per pound.

C - Part No. A43066. Recommended for seed sizes with more than 4500 seeds per pound.

SELECTING SEED DISKS



B22,9PU,W -19-18MAY90

IMPORTANT: If hopper box treatments are used, be sure to follow the chemical manufacturer's recommendations carefully. Dry powder or fast drying liquid treatments are generally recommended. HIGH OIL CONTENT TREATMENTS ARE NOT RECOMMENDED.

Chemical reactions between hopper box treatments and treatments commercially applied to seed can cause the additive to become sticky. Certain temperature and humidity levels can further complicate material compatibility. Check with your chemical and seed supplier for treatment compatibility. Treatments adhering to vacuum meter components can cause reduced population and spacing control.

SMALL EDIBLE BEAN

A - Part No. H136468. Seed size recommendations are as follows:

Seed	Size Range Seeds Per Pound
Black Turtle	1900 to 2600
Navy	1800 to 2500
Pink Viva	1700 to 1950
Small White	2400 to 3000
Smooth Pea	2800 to 3200

MEDIUM EDIBLE BEAN

C - Part No. A51696. Seed size recommendations are as follows:

Seed	Size Range Seeds Per Pound
Blackeyed Pea	1600 to 2000
Green Beans (Garden)	1000 to 2200
Kidney (Small)	1150 to 1400
Pinto	800 to 1400
Red Mexican (Small)	1200 to 1500
Wrinkle Pea	1800 to 2300

LARGE EDIBLE BEAN

D - Part No. H136092. Seed size recommendations are as follows:

Seed	Size Range Seeds Per Pound
Cranberry Bean	800-1200
Kidney (Medium)	950-1150
Great Northern	900-1300
Garbanzo	750-900
Peanuts (Runner)	650-800
Peanuts (Spanish)	1000-1250

VIRGINIA PEANUT

B - Part No. H138722. Recommended for seed sizes from 500 to 800 seeds per pound.

ADJUSTING VACUUM METER BAFFLE

Move tab (A).

Lower position (B) is recommended for sugar beets, sorghum, sunflowers and popcorn.

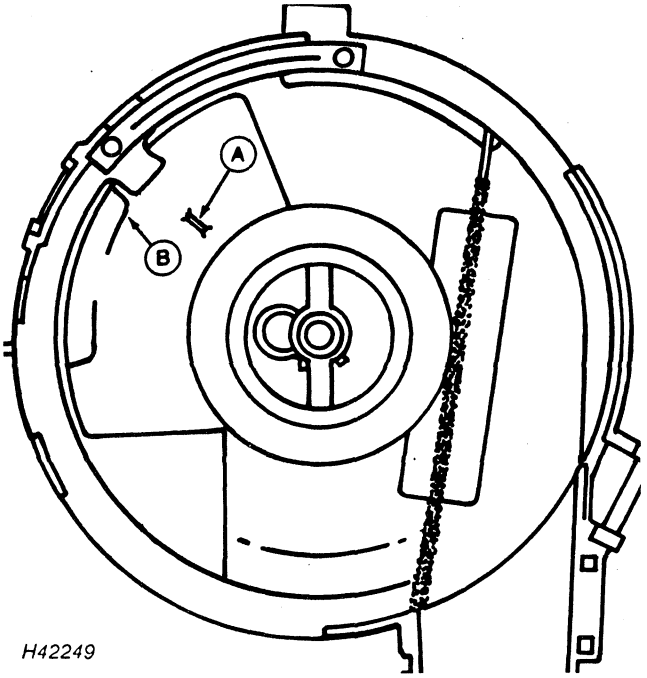
Upper position (C) is recommended for corn, soybeans, cotton, edible beans and peanuts.

Seed bridging at the meter inlet can result in long skips when planting. If this condition should occur, adjust baffle to the upper position (C) and add talc generously.

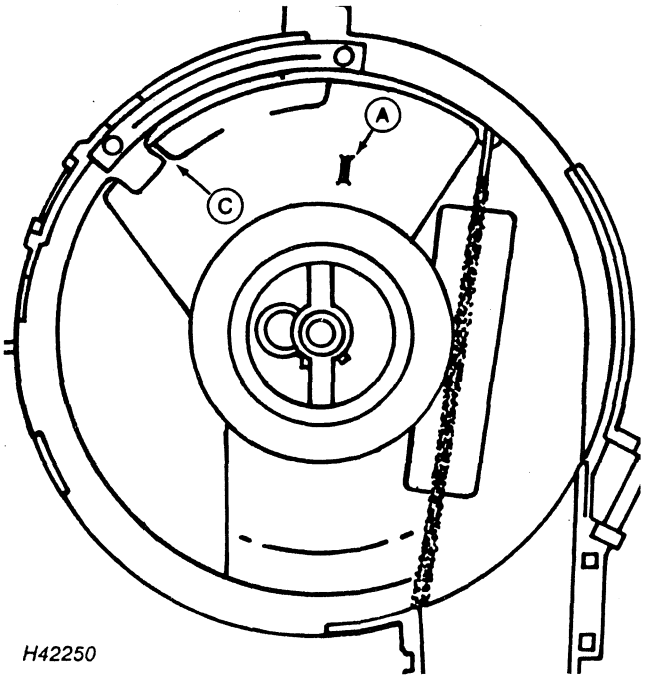
Overfilling of the meter may occur if planting on hillsides. This may cause seed disk fins to carry seed over the brush into the seed tube and result in high population. If these conditions should occur, adjust baffle to the lower position (B).

NOTE: Overfilling of the vacuum meter caused by extremely rough field conditions CANNOT be eliminated by lowering the baffle.

Increase down force on the row unit and reduce planting speed.



Lower Baffle Position

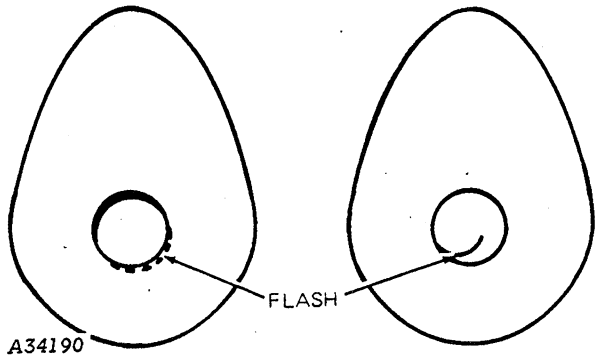


Upper Baffle Position

HX,B22,9OM,AQ -19-28JUN90

Check the seed cell and hole for flash (particles of material left behind in the molding process). Remove any flash before installing seed disk. If flash cannot be easily removed, the disk should be replaced.

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



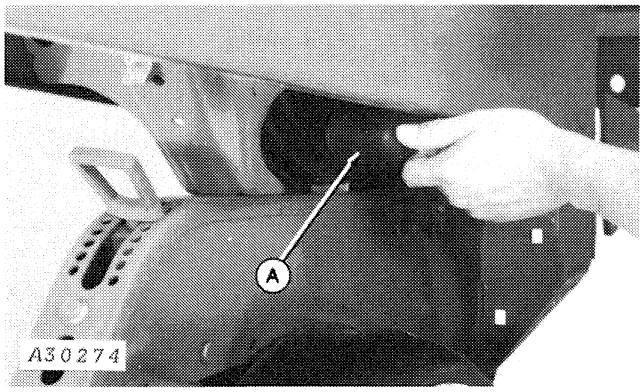
-19-30JAN89 A34190

B22,9PU,U -19-28JUN90

INSTALLING SEED DISK

To install seed disk in vacuum metering unit:

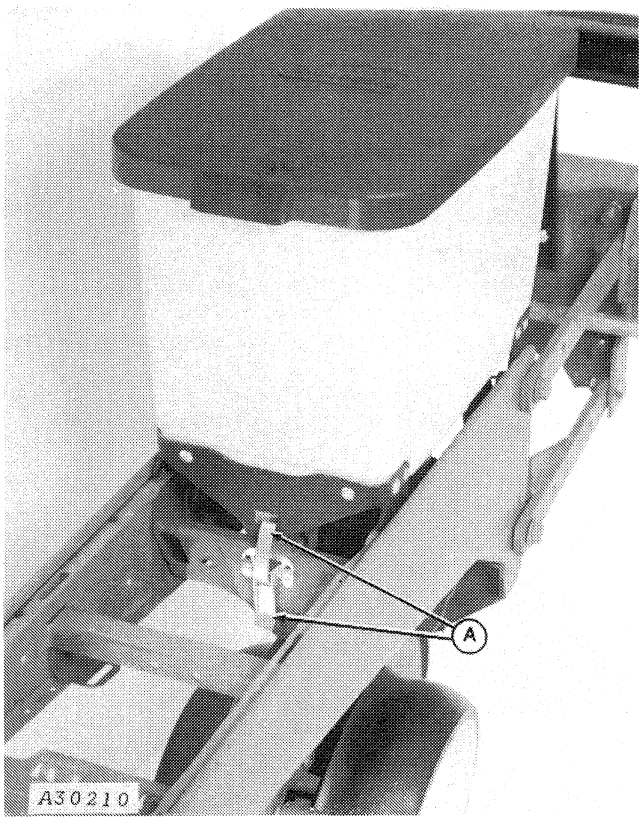
1. Remove vacuum hose (A) from metering unit.



-UN-13OCT88 A30274

B22,9PU,C -19-28JUN90

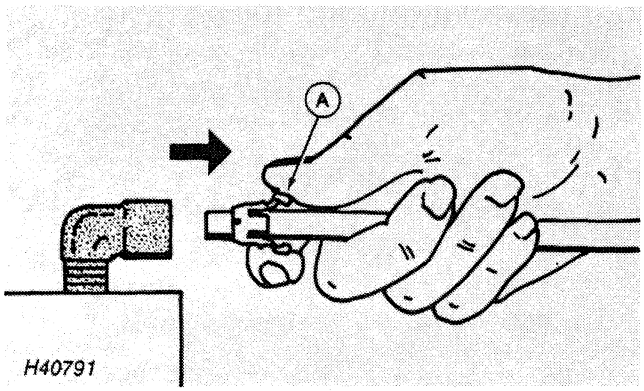
2. Remove seed hopper from planting unit by disengaging hopper latch (A) and lifting hopper upward and rearward.



-UN-13OCT88 A30210

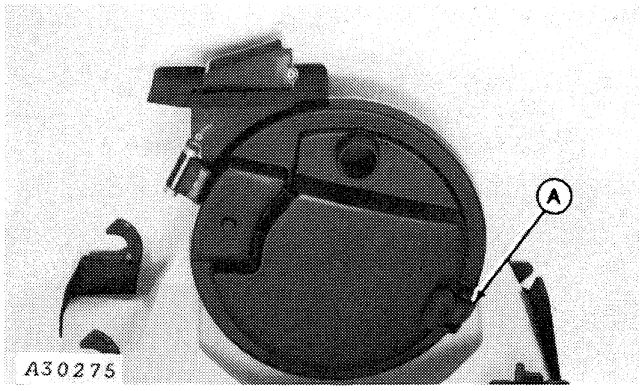
B22,9PU,D -19-28JUN90

3. Squeeze retainer (A) and pull hose out of connector on units equipped with vacuum monitoring hose.



B22,9PU,V -19-28JUN90

4. Disengage handle (A) and swing vacuum chamber open.



B22,9PU,E -19-28JUN90

5. Fit seed disk (A) into housing and secure with hub handle (B) by holding seed disk stationary and rotating hub handle.

6. Inspect gap between seed disk and housing, then spin disk in housing.

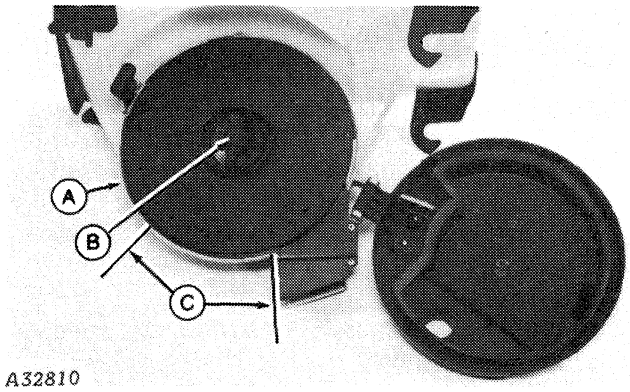
NOTE: Seed disk should turn smoothly with light contact or a small gap between seed disk (A) and meter housing. Turn seed disk by hand and check gap between seed disk and meter housing in section (C). Seed should not leak around circumference of meter. When planting small seed, such as sorghum or sugar beets, seed disk must lightly contact housing to prevent seed leakage.

If disk turns too hard, or if seed leaks through gap, readjust hub position. (See ADJUSTING METER HUB in Preparing for Use section.)

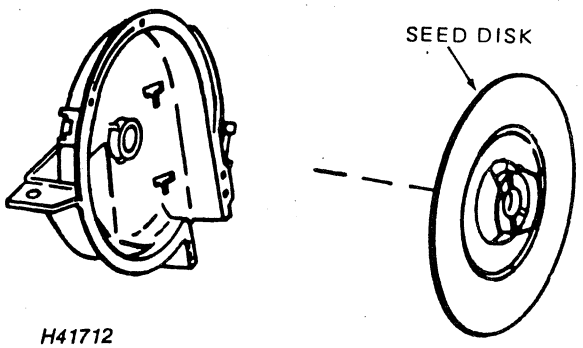
7. Close vacuum chamber and secure with handle (see step 3.)

8. Replace hopper on unit and secure with latch (see step 2).

9. Reposition vacuum hose on vacuum meter (see step 1).



A32810 -UN-11OCT88



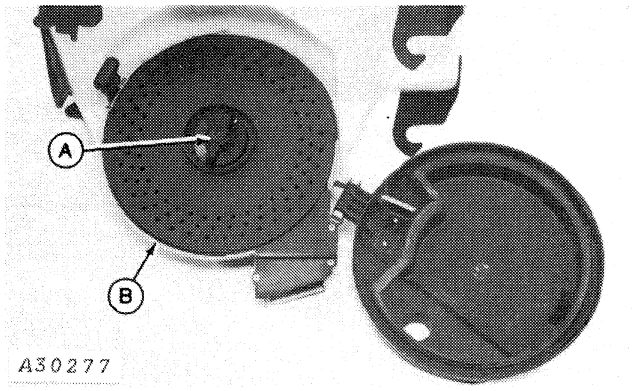
H41712 -19-18MAY90

B22,9PU,F -19-18MAY90

ADJUSTING METER HUB

If gap too large or disk turns too hard, adjust meter hub as follows:

1. Unlock hub handle (A) by turning counterclockwise. Remove seed disk (B) from housing.



A30277 -UN-13OCT88

B22,9PU,G -19-28JUN90

2. Remove spring locking pin (A).

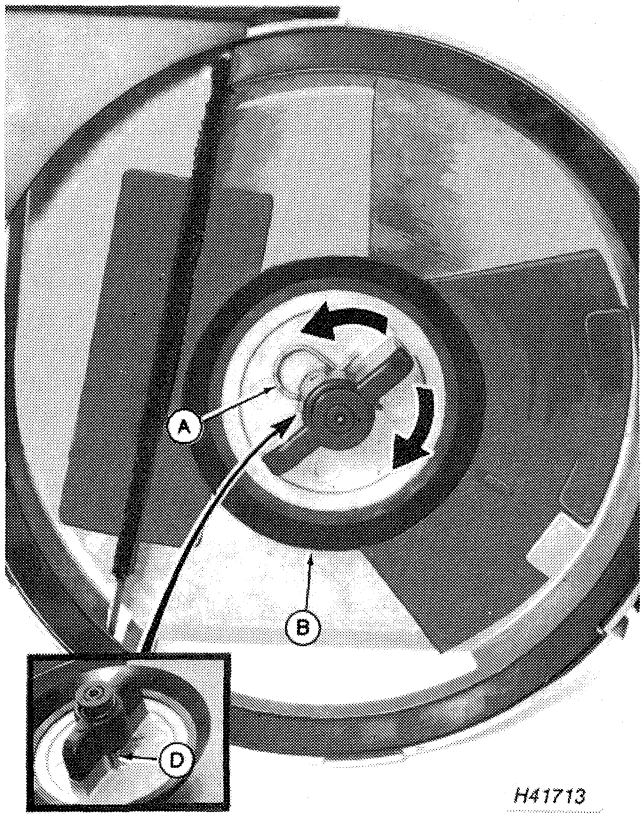
3. Adjust hub (B) as follows:

   a. Hold meter flex-drive (C).

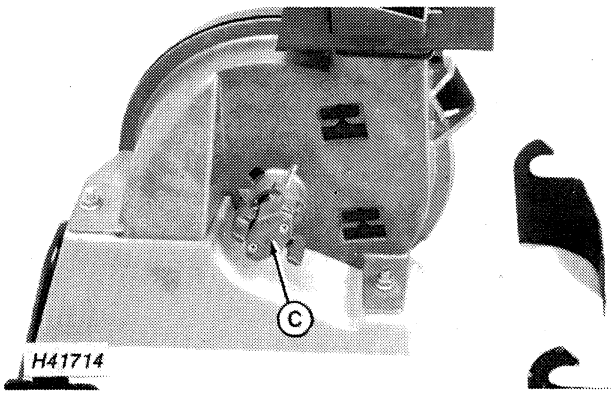
   b. Turn hub clockwise to move seed disk closer to meter housing.

   c. Turn hub counterclockwise to move seed disk further from meter housing.

4. Turn hub until slot (D) aligns with hole in shaft. Replace spring locking pin.



-UN-03MAY90
H41713



-UN-03MAY90
H41714

B22,9PU,H -19-18MAY90

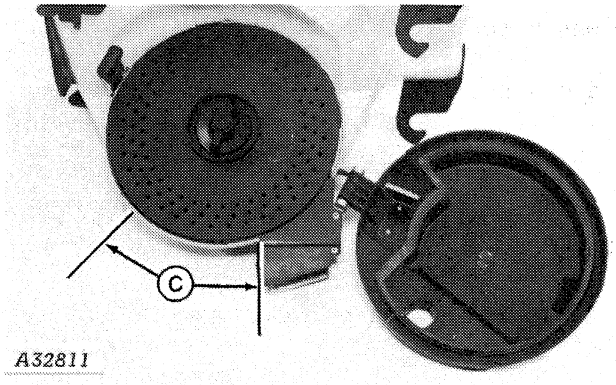
5. Replace seed disk and secure with hub handle.

6. Inspect gap between seed disk and meter housing at (C); then spin disk in housing.

NOTE: The seed disk should turn smoothly with light contact or a small gap between the seed disk and the meter housing. Turn seed disk by hand and check gap between seed disk and housing. Seed should not leak around circumference of meter.

When planting small seed such as sorghum or sugar beets, the seed disk must lightly contact housing to prevent seed leakage.

7. Readjust hub, if necessary.



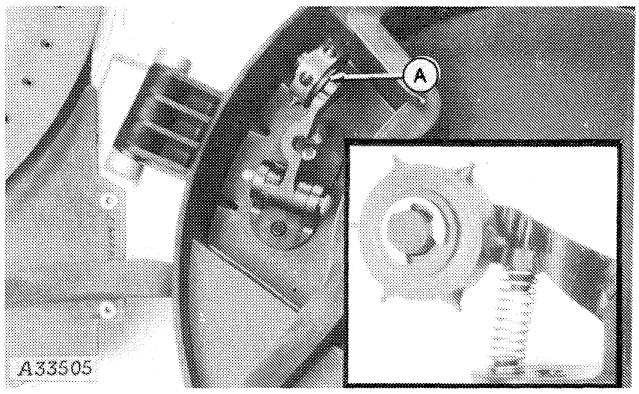
A32811 -UN-11OCT88

B22,9PU,I -19-18MAY90

SUGAR BEET AND SORGHUM SEED KNOCKOUT WHEEL

The seed knockout wheel (A) is used to insure that certain seed types are fully released from the seed cell. The wheel projections engage the seed cell holes, forcing all seeds and foreign material to be ejected.

The seed knockout wheel is required when planting sorghum and mono-germ sugar beet seed. Sugar beet seed can have sharp edges and is typically irregular in shape, creating the potential for the seeds to become lodged in the seed cell. Some sorghum seed contains large amounts of foreign material which can also become trapped in the cell or cell holes.

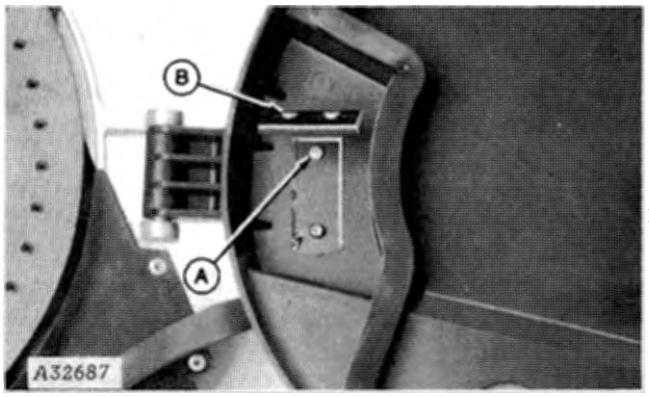


A33505 -UN-12OCT88

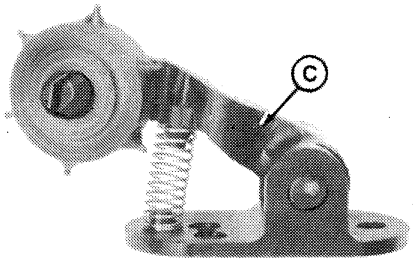
B21,7OM,D -19-28JUN90

INSTALLING KNOCKOUT ASSEMBLY (SUGAR BEETS AND SORGHUM)

1. Loosen screw (A) and remove wiper assembly (B).



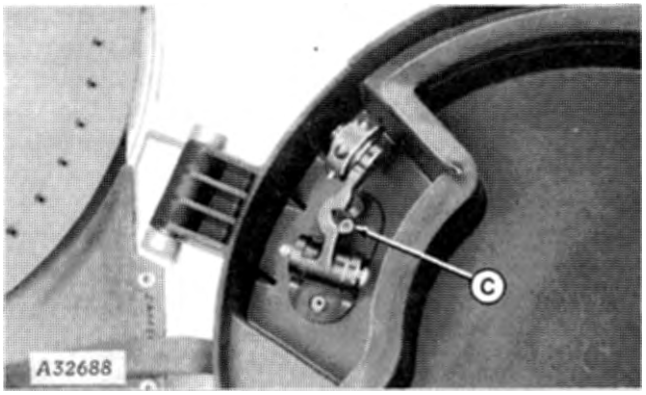
-UN-11OCT88 A32687



A32686

-UN-11OCT88 A32686

2. Install knockout assembly (C) with hardware (A) used in Step 1, as shown.



-UN-11OCT88 A32688

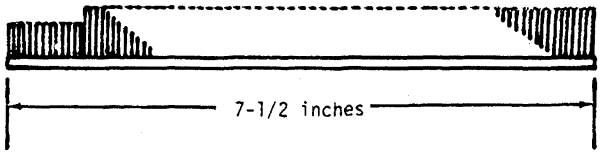
B22,9PU,R -19-28JUN90

SELECTING CORRECT VACUUM METER BRUSH

Incorrect vacuum meter brush causes underpopulation of edible beans, peanuts and hilldrop cotton.

Two vacuum meter brushes are available:

Use the regular (long) brush for all crops except medium and large edible beans, peanuts and hilldrop cotton.

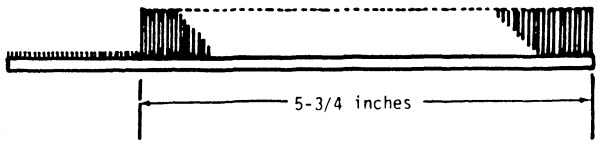


H34704 -19-27APR89

H34704

Regular (Long) Brush

Use the short brush with the seed disk for medium and large edible beans, peanuts and hilldrop cotton.



H41715 -UN-03MAY90

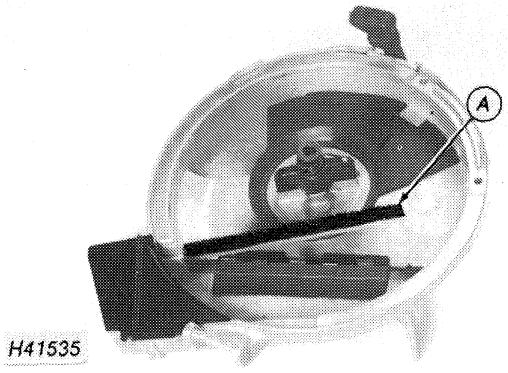
H41715

Short Brush

HX,B22,9PU,A -19-18MAY90

HOW TO CHANGE BRUSH

Remove existing long brush with notch (A).



H41535 -UN-04MAY90

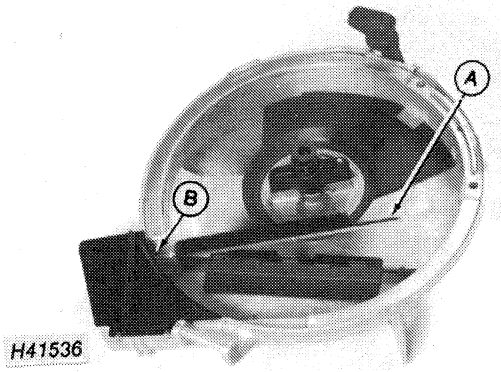
H41535

B22,9PU,Y -19-18MAY90

INSTALLING BRUSH

Install short brush (A).

Snap brush into slot until it contacts side of meter housing (B).



H41536 -UN-04MAY90

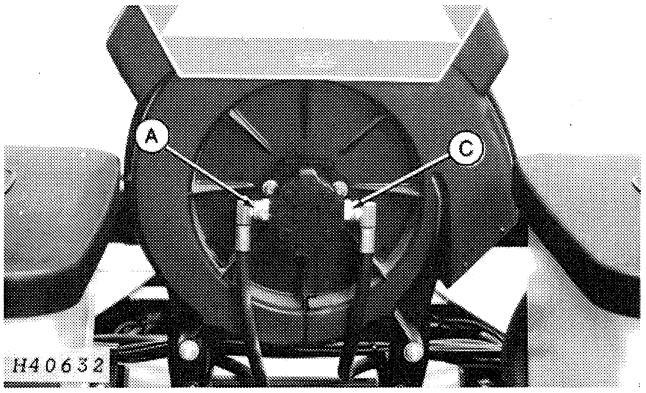
B22,9PU,Z -19-18MAY90

CHECK HYDRAULIC CONNECTIONS

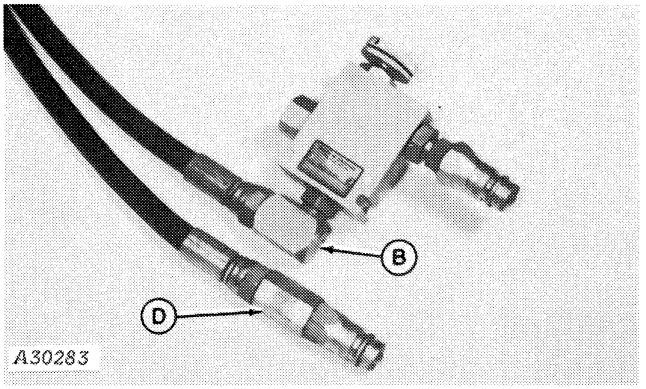
IMPORTANT: Damage to the pump motor may occur if hydraulic hoses are assembled incorrectly. Check the following hydraulic connections before operating the vacuum motor.

1. Be sure hose (A) connected to left-hand (inlet) side of motor is connected to elbow fitting (B) in control valve.

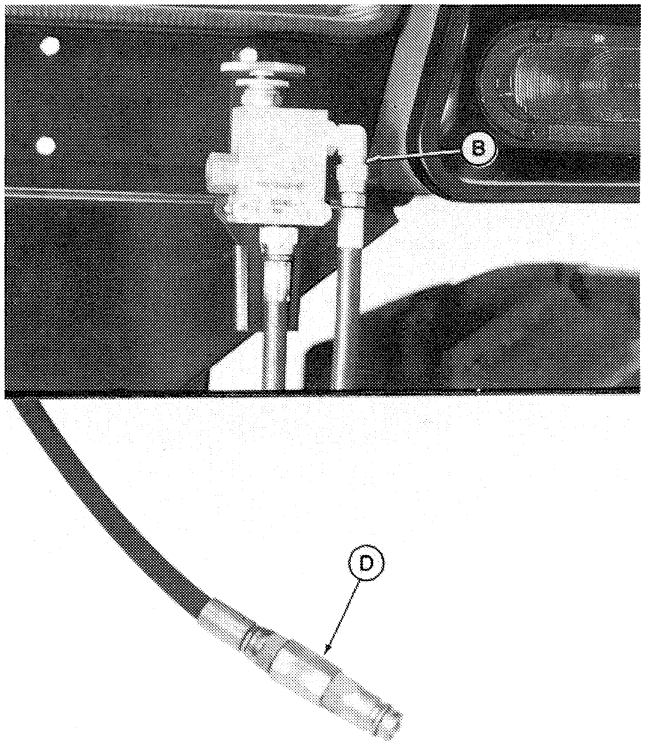
2. Be sure hose (C) connected to right-hand outlet side of motor is connected to check valve (D).



-UN-20MAR89 H40632



-UN-13OCT88 A30283



-UN-15MAY89 H40807

Cab Mounted

B22,9PU,K -19-28JUN90

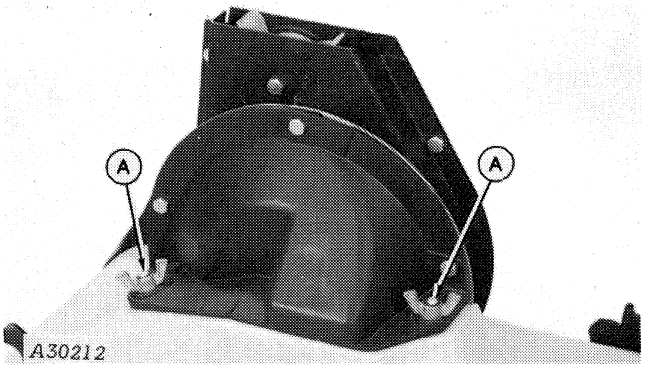
Preparing the Plateless Meter Unit

PLATELESS SEED HOPPERS

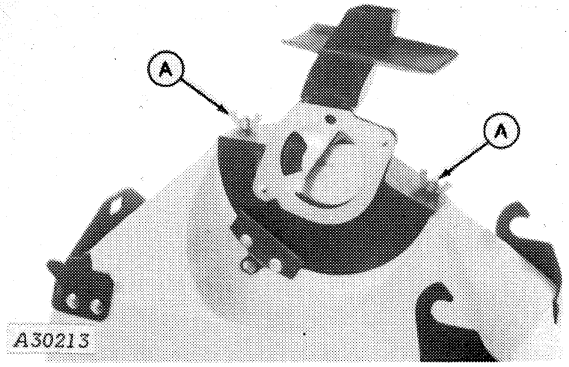
Plateless seed hoppers are for drill planting only.

The metering unit is attached directly to the bottom of the fiber glass seed hopper by two wing nuts (A).

IMPORTANT: Always keep lids on seed hoppers when planting. If lids are left off, dust and dirt can accumulate in the seed metering mechanism, causing excessive wear.



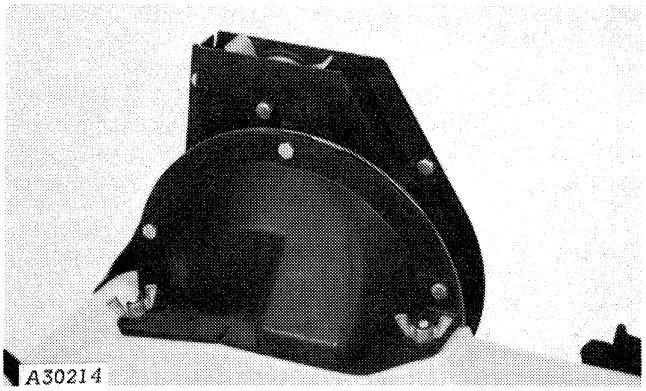
Finger Pickup Seed Metering Unit



Feed Cup Seed Metering Unit

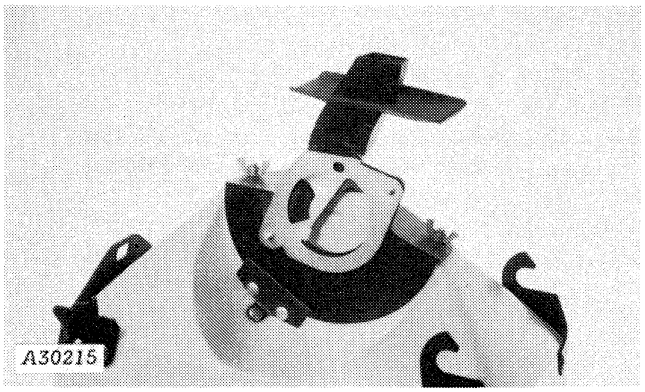
B22,8OM,A -19-28JUN90

Equip your planter with finger pickup metering units to plant all sizes (or mixed sizes) of corn and sunflower seeds.



Finger Pickup Seed Metering Unit

Equip your planter with feed cup metering units to plant soybeans, edible beans or sorghum or acid delinted cotton.



Feed Cup Seed Metering Unit

B22,8OM,B -19-28JUN90

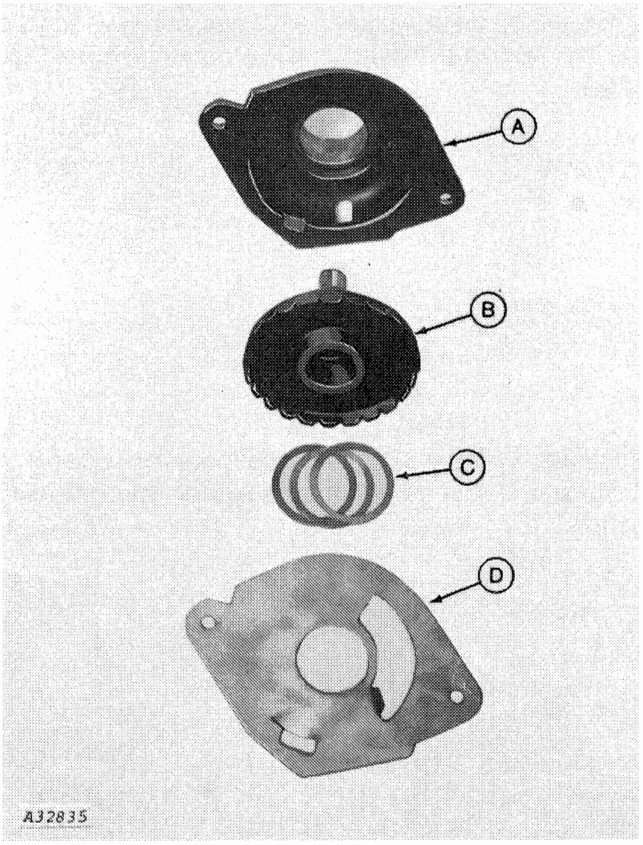
FEED CUP METERING UNIT

The feed cup metering unit consists of a feed cup housing (A), feed cup (B), washer shims (C) (used with low-rate sorghum metering units only) and corresponding seed guide (D).

Use feed cup metering units to plant the following types of feed:

Soybeans
Sorghum, Regular Rate
Sorghum, Low-Rate
Edible Beans
Acid Delinted Cotton
Small Soybeans

A—Feed Cup Housing
B—Feed Cup
C—Washer Shims
D—Seed Guide

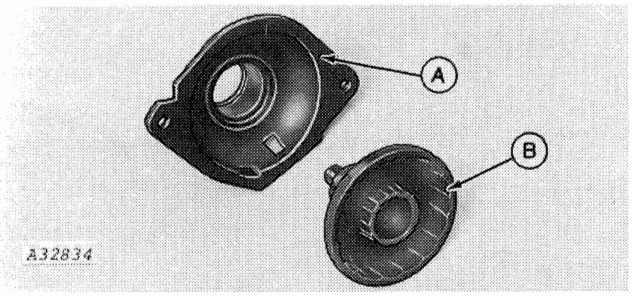


A32835 -UN-11OCT88

B22,8OM,C -19-28JUN90

SOYBEANS, EDIBLE BEANS AND REGULAR-RATE SORGHUM/MILO FEED CUP

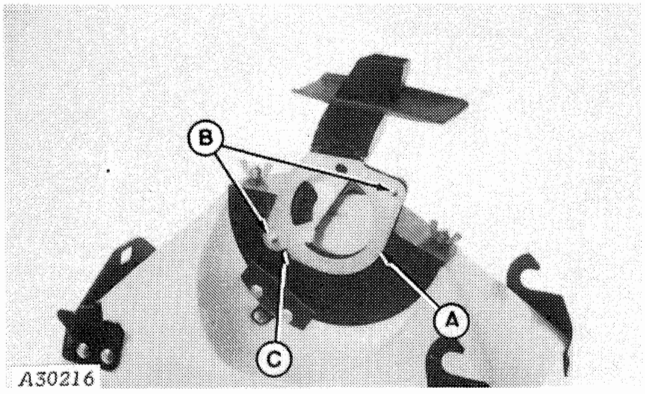
Assemble the feed cup housing (A) with the desired feed cup (B).



A32834 -UN-11OCT88

B05,13OI,AC -19-28JUN90

Install seed guide (A) on feed cup adapter so it seats properly on the mounting studs (B). Align notch (C) in seed guide with projection on adapter.



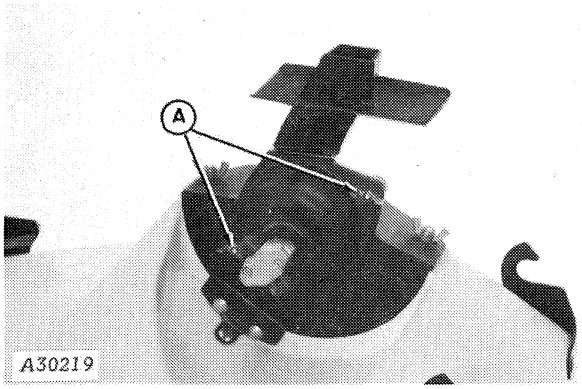
A30216 -UN-13OCT88

B22,8OM,D -19-28JUN90

Secure feed cup and housing to adapter with wing nuts (A). Be certain aligning notch is located so feed cup housing seats properly.

Wipe off feed cup bushings periodically to help reduce wear.

IMPORTANT: Store the feed cup metering assemblies in a clean, dry place while they are not in use.



-UN-13OCT88
A30219

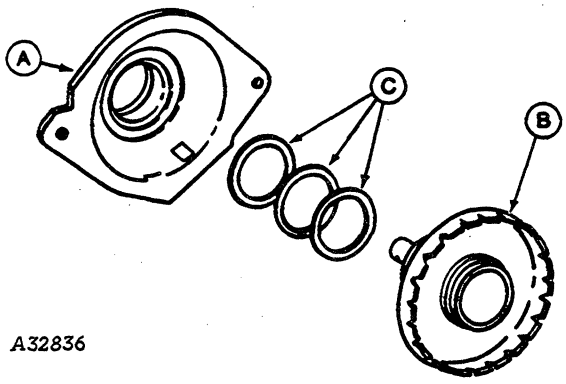
B22,8OM,E -19-28JUN90

LOW-RATE SORGHUM*

Before assembling the low-rate sorghum metering unit, you must determine the size of the seed. You can accomplish this by using a seed sizing kit, available from your John Deere dealer.

NOTE: The three washer shims must be used with the low-rate feed cup. Do not operate without all three shims.

If the seed being planted will pass through the 3 mm (9/64 in.) screen by shaking vigorously, use three washer shims (C) between feed cup (B) and housing (A) only.

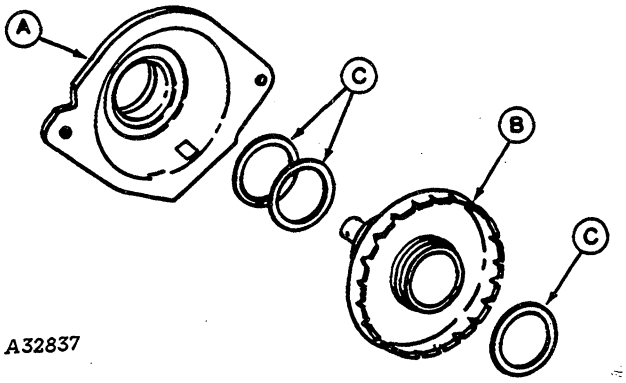


-UN-11OCT88
A32836

Available through service parts only.

B05,13OI,AF -19-28JUN90

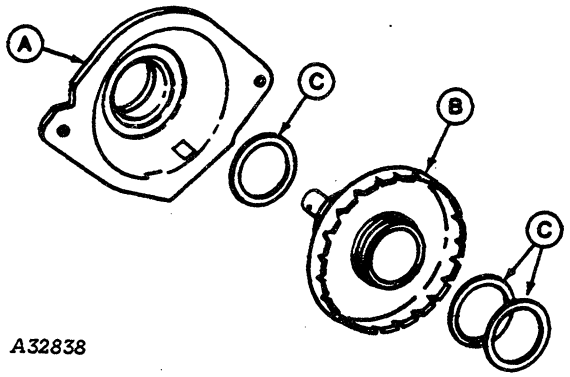
If the seed being planted will pass through the 4 mm (10/64 in.) screen and not the 3 mm (9/64 in.) screen, use two washer shims (C) between feed cup (B) and housing (A) and one washer shim (C) between feed cup and seed guide.



-UN-11OCT88
A32837

B05,13OI,AG -19-28JUN90

If the seed being planted will pass through the 5 mm (11/64 in.) screen and not the 4 mm (10/64 in.) screen, use one washer shim (C) between feed cup (B) and housing (A) and two washer shims (C) between feed cup and seed guide.



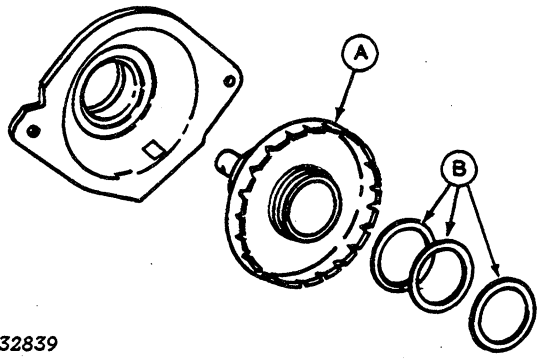
A32838

-UN-11OCT88

A32838

B05,13OI,AH -19-28JUN90

If the seed being planted will not pass through the 5 mm (11/64 in.) screen, use the three washer shims (B) between feed cup (A) and seed guide.



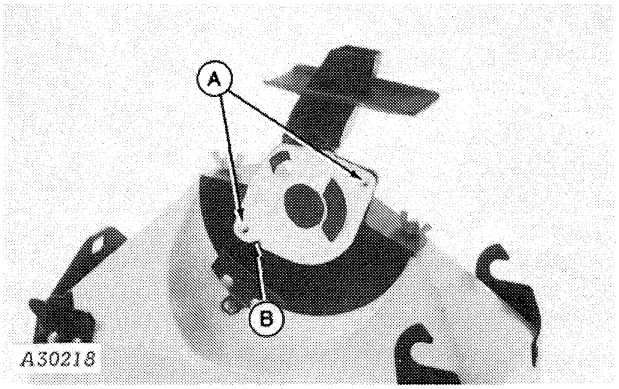
A32839

-UN-11OCT88

A32839

B05,13OI,AI -19-28JUN90

Assemble the feed cup housing with the low-rate sorghum feed cup and correct number of washer shims. Install seed guide on feed cup adapter so it seats properly on the mounting studs (A). Align notch (B) in seed guide with projection on adapter.



-UN-13OCT88

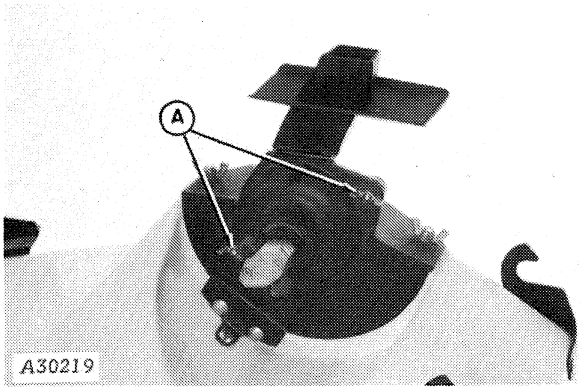
A30218

B22,8OM,F -19-28JUN90

Secure feed cup and housing to adapter with wing nuts (A). Be certain aligning notch is located so feed cup housing seats properly.

Wipe off feed cup bushings periodically to help reduce wear.

IMPORTANT: Store the feed cup metering assemblies in a clean, dry place while they are not in use.



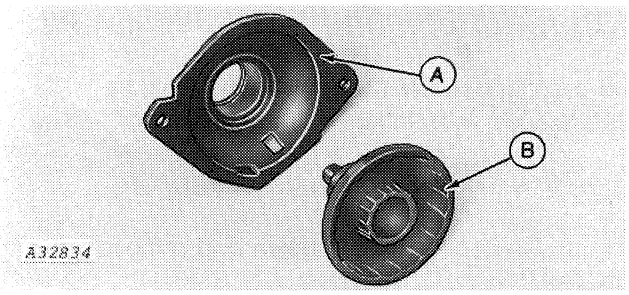
-UN-13OCT88

A30219

B22,8OM,E -19-28JUN90

ACID DELINTED COTTON AND SMALL SOYBEANS

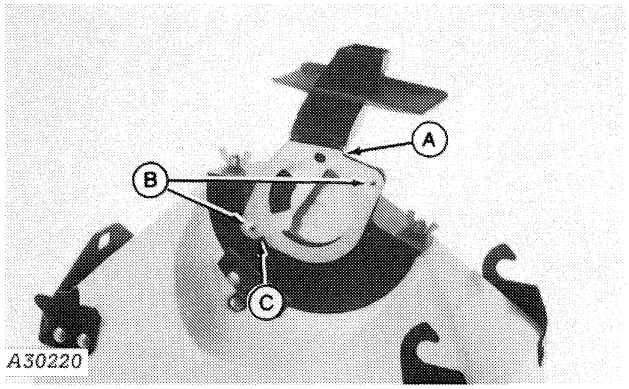
Assemble feed cup housing (A) with desired feed cup (B).



-UN-11OCT88
A32834

B22,8OM,H -19-28JUN90

Install the seed guide (A) on feed cup adapter so it seats properly on the mounting studs (B). Align notch (C) in seed guide with projection on adapter.



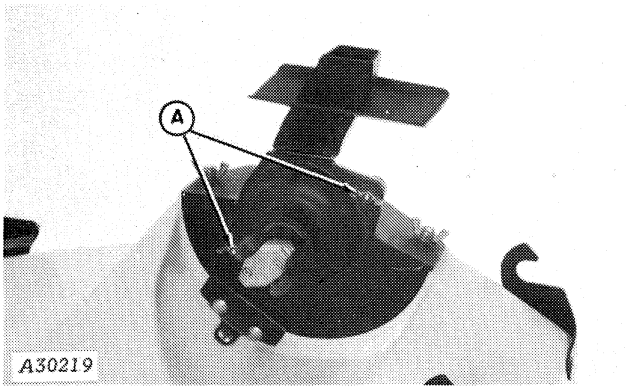
-UN-13OCT88
A30220

B22,8OM,I -19-28JUN90

Secure feed cup and housing to adapter with wing nuts (A). Be certain aligning notch is located so feed cup housing seats properly.

Wipe off feed cup bushings periodically to help reduce wear.

IMPORTANT: Store the feed cup metering assemblies in a clean, dry place while they are not in use.



-UN-13OCT88
A30219

B22,8OM,E -19-28JUN90

REPLACE FEED CUP WITH FINGER PICKUP

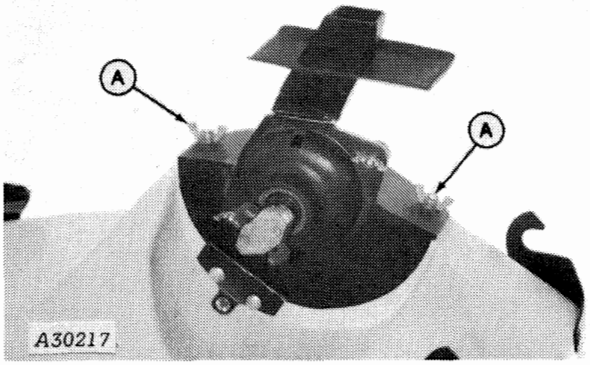
The cup seed meter assembly can easily be interchanged with finger pickup seed meter.

To replace feed cup with finger pickup:

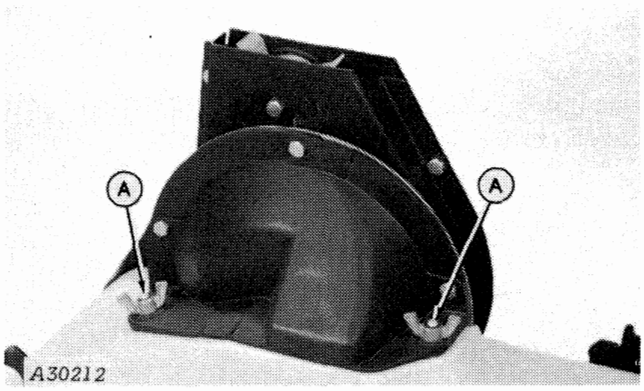
1. Turn the hopper upside down and remove two wing nuts (A).

2. Pull feed cup assembly straight up.

3. Position finger pickup on hopper and secure with wing nuts removed in step 1.



-UN-13OCT88 A30217



-UN-13OCT88 A30212

B22,8OM,BA -19-28JUN90

GENERAL

IMPORTANT: For proper planter operation, it is important that the planter frame be fully lowered into the correct planting position. Achieving this position can be difficult with some attachment combinations, especially when planting in hard to penetrate soil conditions. If this situation is encountered, the following action may be warranted:

Reduce attachment down force levels. Avoid using more attachment down force than is required.

Add frame ballast when conditions warrant. This may be particularly important if the frame mounted coulter is being used.

If using fertilizer, it may be necessary to NOT completely empty the fertilizer hoppers to maintain sufficient frame weight to achieve the proper frame planting height.

IMPORTANT: DO NOT put SCV lever into FLOAT when raising and lowering the planter. The correct procedure for raising and lowering the planter is to POWER completely UP or DOWN.

B21,70I,X -19-28JUN90

RAISING AND LOWERING THE PLANTER

NOTE: Due to the high hydraulic pressure requirements of large planters, the remote cylinder operating lever used to raise and lower the planter will not function in the automatic retract or automatic extend position.

After raising or lowering the planter, hold the remote cylinder operating lever for approximately five seconds to be certain the planter raises and lowers completely.

Be certain the planter is moving forward when raising or lowering the planter in the unfolded position to avoid plugging the seed openers and fertilizer openers.

When raising or lowering the planter in the folded position, push or pull the remote cylinder operating lever and rockshaft control lever simultaneously. This allows the planter to raise or lower evenly, preventing damage to the seed openers and fertilizer openers.



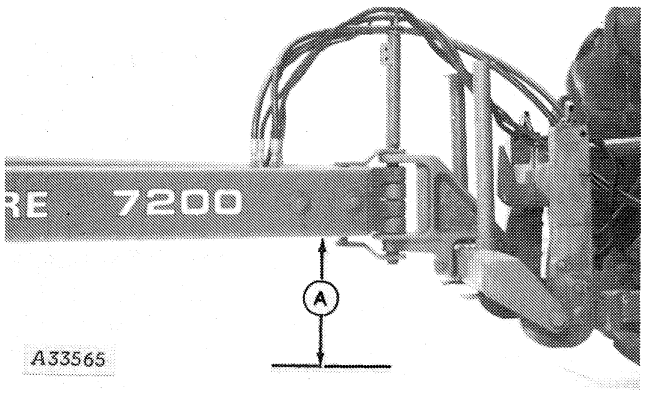
-UN-06OCT88
A29918

B21,7OI,A -19-28JUN90

LEVELING THE PLANTER

Periodically check the planter to be certain the planting units are running level.

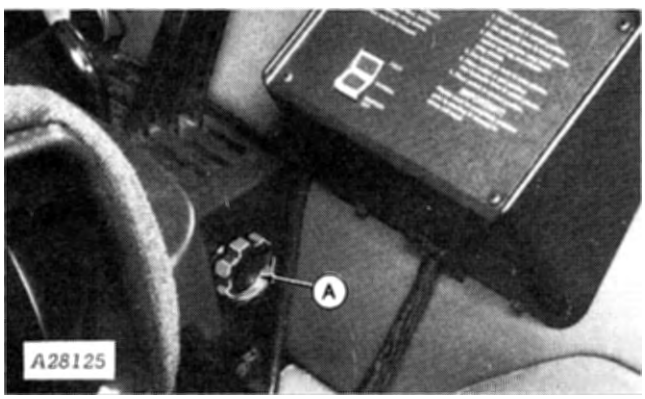
Lower the planter on level ground until the planter frame and hitch (A) are approximately parallel to the ground when in planting position.



-UN-12OCT88
A33565

B21,7OI,B -19-28JUN90

Set the rockshaft adjustable depth stop (A) to control or limit proper rockshaft operating height.

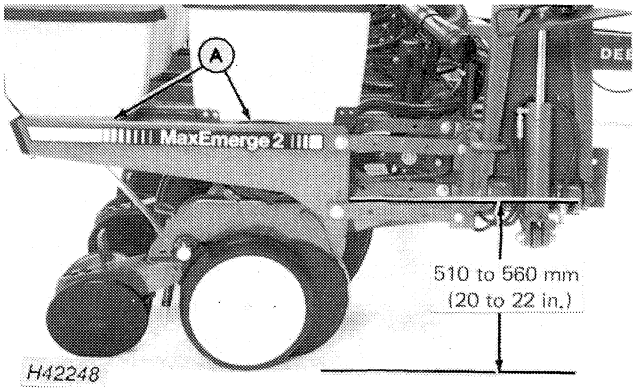


-UN-13OCT88
A28125

B21,7OI,Y -19-28JUN90

Lower planter to planting position with the bottom of main frame tube approximately 510 to 560 mm (20 to 22 in.) above the ground.

When planting, the top of hopper support (A) should be parallel to the ground.

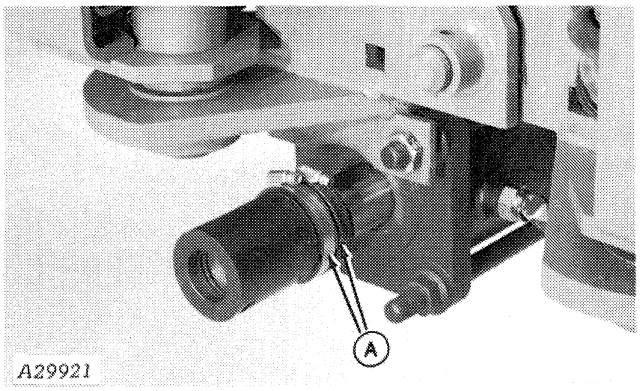


B21,7OI,AA -19-28JUN90

If the center of the planter is too high or low, it may be necessary to rephase the hydraulic wheel lift system.

To rephase your planter wheel system, proceed as follows:

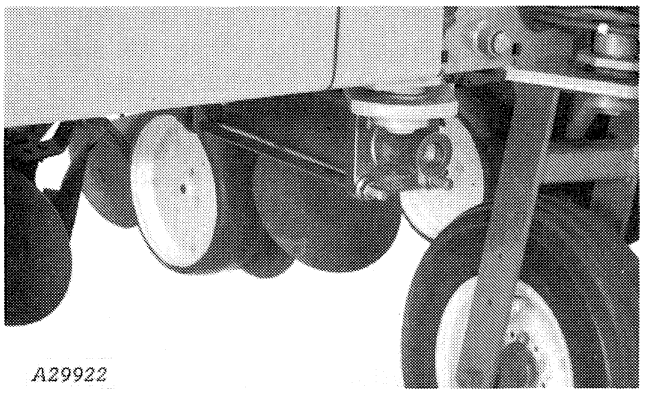
Lower the planter on level ground and remove clamps and collars (A) from front of master cylinder rod.



B21,7OI,D -19-28JUN90

Fully raise planter. (Hold the remote cylinder operating lever rearward approximately five seconds.) The stop on the front of the master cylinder rod should come in contact with the cylinder end cap. If the stop is not in contact with the end cap, bleed sufficient oil from the wheel module cylinders to achieve contact.

To bleed the wheel module cylinders, proceed as follows:



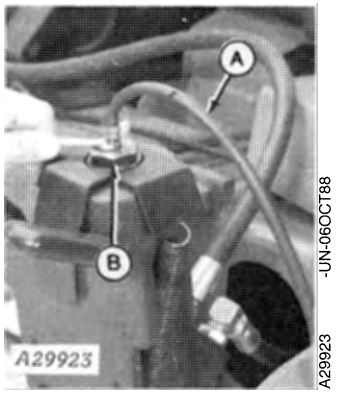
B21,7OI,E -19-28JUN90

With planter in raised position and tractor engine shut off, place remote cylinder operating lever in neutral, install bleeder hose (A) on bleeder valve. Bleed trapped air from each wheel module cylinder (alternating sides of planter), allowing planter to lower and oil to flow until it is free of air foam. Repeat as required.

IMPORTANT: Be certain to alternate sides of planter when bleeding wheel module cylinders to prevent row units from dragging sideways on the ground.

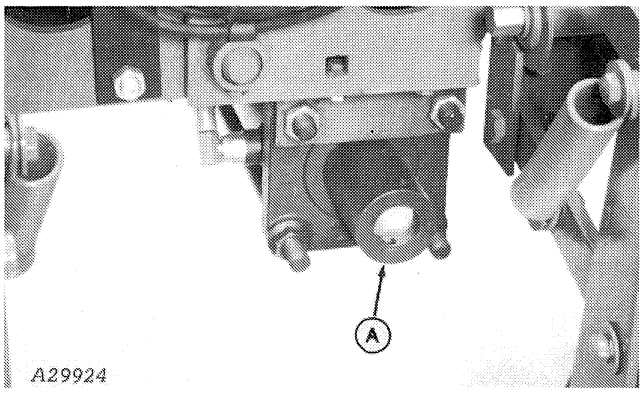
The wheel modules on each end of the planter have a large plug fitting (B). Do not loosen this fitting. Loosen only the bleeder valve.

When all the trapped air has been removed from the wheel module cylinders, fully raise the planter and hold the remote cylinder operating lever rearward approximately five seconds. Master cylinder front stop must contact cylinder body. Lower the planter and replace the collars.



B21,7OI,F -19-28JUN90

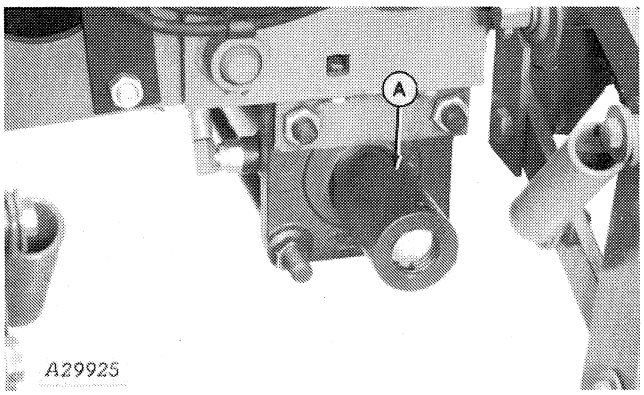
If the planting unit parallel arms still are not uniform across the length of the planter after rephasing the planter wheel hydraulic system, it may be necessary to turn the adjusting collar (A) on the rear of the master cylinder to raise or lower the center frame.



B21,7OI,G -19-28JUN90

To turn the adjusting collar, raise the planter part way to take the pressure off the adjusting collar.

Loosen set screw (A) and turn adjusting collar one quarter turn (turning the collar clockwise will raise the main frame and turning the collar counterclockwise will lower the main frame). Tighten set screw. Repeat if necessary.



B21,7OI,H -19-28JUN90

MARKER LENGTH

Loosen jam nuts and set screws (A) on marker and adjust to length shown below with the marker in the down position. Dimension (B) is measured from the center line of the planting unit to the marker disk. This is an approximate dimension and should be checked in the field.

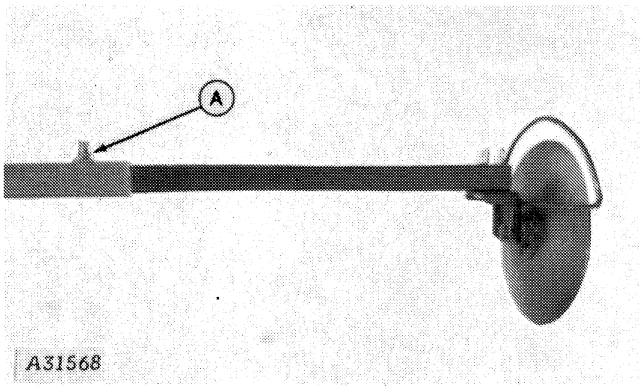
For 8-Row Planter:

914 mm (36 in.) rows, B = 3200 mm (126 in.)
965 mm (38 in.) rows, B = 3378 mm (133 in.)
1016 mm (40 in.) rows, B = 4572 mm (180 in.)

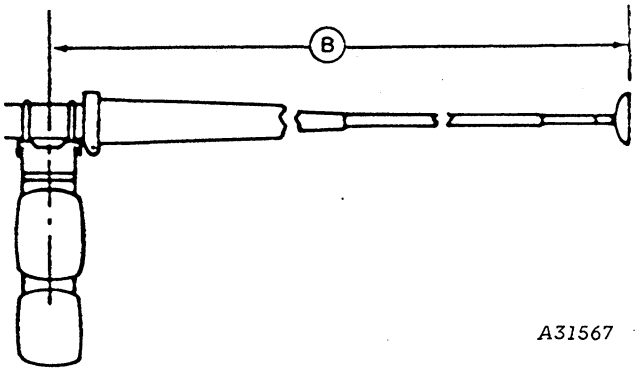
For 12-Row Planter:

762 mm (30 in.) rows, B = 4953 mm (195 in.)

Tighten cap screws and jam nuts.



-UN-13OCT88
A31568



-UN-12OCT88
A31567

B22,1OI,R -19-28JUN90

RAISING AND LOWERING MARKERS

IMPORTANT: DO NOT put SCV lever into FLOAT when raising and lowering the planter. The correct procedure for raising and lowering the planter is to POWER completely UP or DOWN.

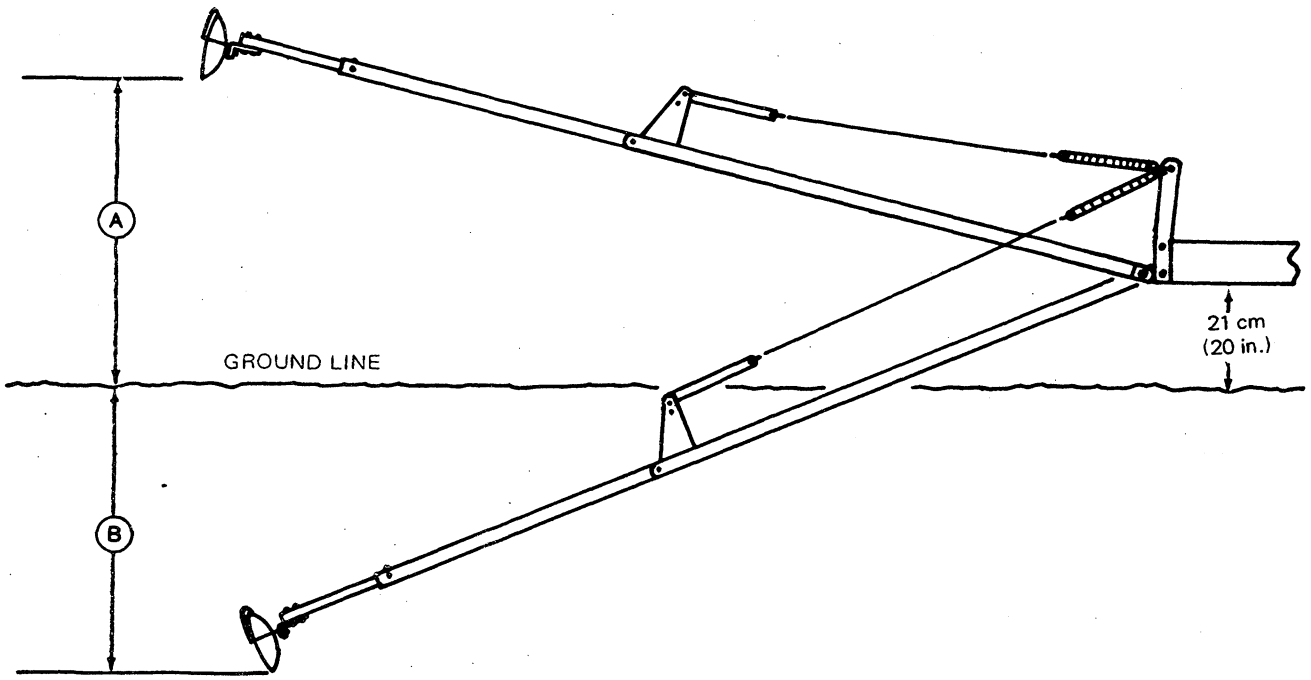
The markers will raise and lower alternately each time the planter is raised and lowered.

This procedure will allow the opposite marker to lower. Both markers will raise when the planter is raised.

To lower both markers with independent marker control, see INDEPENDENT MARKER CONTROL in this section.

B21,7OI,J -19-28JUN90

MARKER FLOAT RANGE



A31040

-19-01MAR89

A31040

The marker has an approximate float range (see chart below) which should not be exceeded (e.g., when planting near drainage ditches or hillsides).

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

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

Planter	Row Spacing	Dimension "A"	Dimension "B"
8-Row Wide	91 cm (36")	480 mm (19")	1190 mm (47")
	97 cm (38")	560 mm (22")	1345 mm (53")
12-Row Narrow	76 cm (30")	760 mm (30")	1725 mm (68")

B21,7OI,K -19-28JUN90

MARKER LENGTH

Loosen jam nuts and set screws (A) on marker and adjust to length shown below with the marker in the down position. Dimension (B) is measured from the center line of the planting unit to the marker disk. This is an approximate dimension and should be checked in the field.

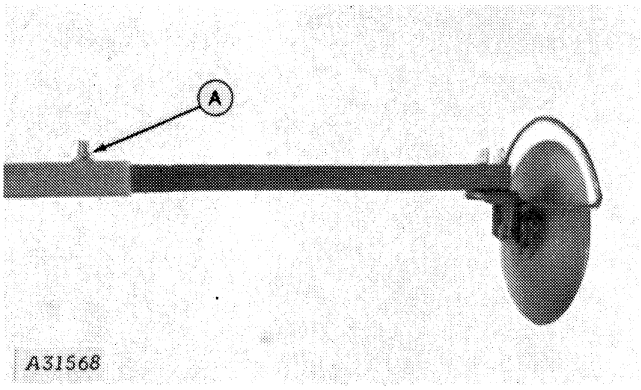
For 8-Row Planter:

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1016 mm (40 in.) rows, B = 4572 mm (180 in.)

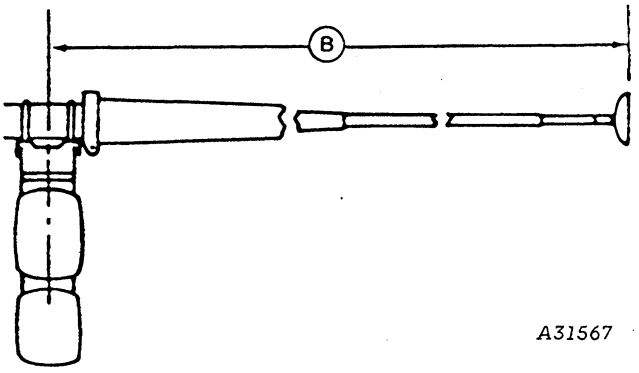
For 12-Row Planter:

762 mm (30 in.) rows, B = 4953 mm (195 in.)

Tighten cap screws and jam nuts.



-UN-13OCT88
A31568



-UN-12OCT88
A31567

B22,1OI,R -19-28JUN90

RAISING AND LOWERING MARKERS

IMPORTANT: DO NOT put SCV lever into FLOAT when raising and lowering the planter. The correct procedure for raising and lowering the planter is to POWER completely UP or DOWN.

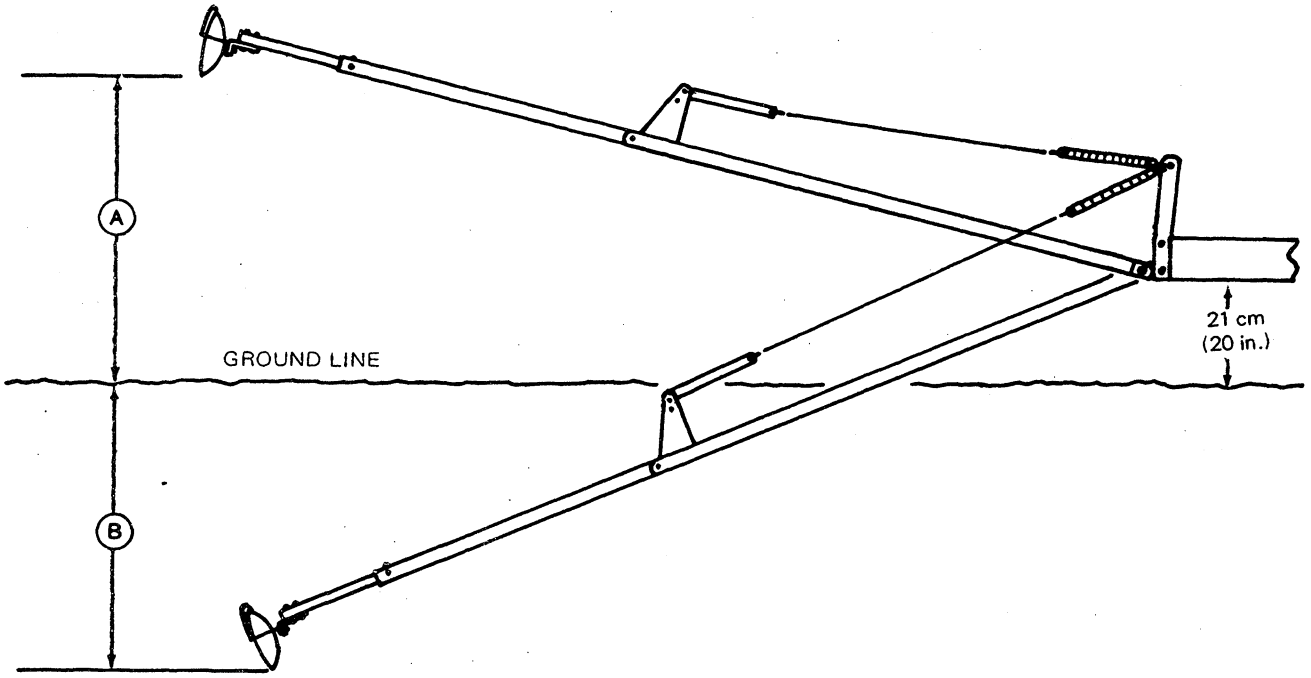
The markers will raise and lower alternately each time the planter is raised and lowered.

This procedure will allow the opposite marker to lower. Both markers will raise when the planter is raised.

To lower both markers with independent marker control, see INDEPENDENT MARKER CONTROL in this section.

B21,7OI,J -19-28JUN90

MARKER FLOAT RANGE



A31040

-19-01MAR89

A31040

The marker has an approximate float range (see chart below) which should not be exceeded (e.g., when planting near drainage ditches or hillsides).

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

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

Planter	Row Spacing	Dimension "A"	Dimension "B"
8-Row Wide	91 cm (36")	480 mm (19")	1190 mm (47")
	97 cm (38")	560 mm (22")	1345 mm (53")
12-Row Narrow	76 cm (30")	760 mm (30")	1725 mm (68")

B21,7OI,K -19-28JUN90

MARKER OFF SWITCH

The MARKER OFF switch allows you to turn off the markers in any position. This allows you to:

Raise the planter frame, but not the markers, when approaching a waterway or an obstacle.

Plant with both markers raised without the need to manually lock the markers up.

To turn off the markers, press the MARKER OFF switch. The markers will stay off until the switch is pressed back to the NORMAL position.

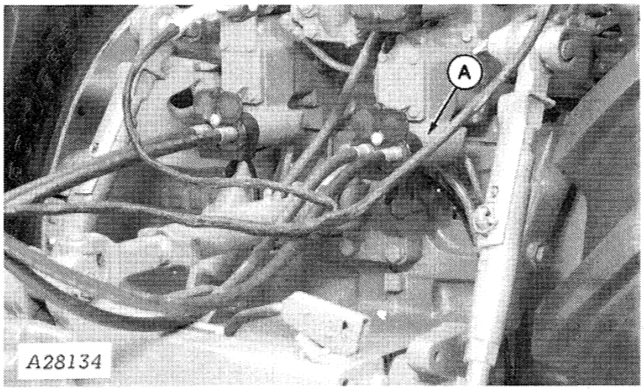


A28133 -UN-13OCT88

B05,13OI,J -19-28JUN90

INDEPENDENT MARKER CONTROL (OPTIONAL)

Allows you to operate the marker independent of the planter lift system. The independent marker control requires an additional SCV (A) on the tractor.



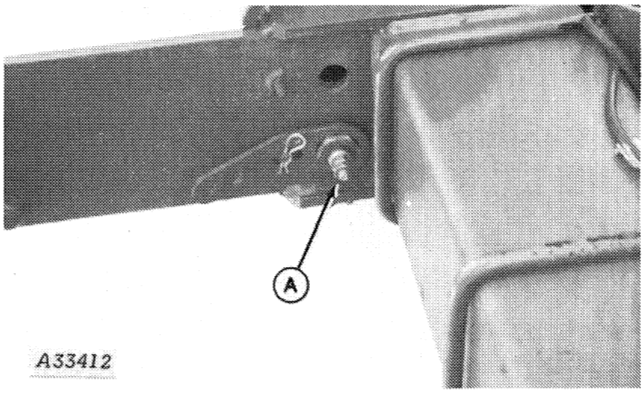
A28134 -UN-13OCT88

B05,13OI,K -19-28JUN90

MARKER BREAKAWAY BOLT

The marker breakaway bolt (A) provides breakaway protection when the marker hits an obstacle.

To replace breakaway bolt, see "Replacing Breakaway Bolt" in Service section.



A33412 -UN-12OCT88

B21,7OI,M -19-28JUN90

HALF-WIDTH PLANTING DRIVE DISCONNECT (OPTIONAL)

Allows you to turn off either half of the planter while on-the-go to plant point, end, or fence rows.

To disengage the left-hand side of the planting drive, press the "L" side of the DRIVE DISCONNECT switch.

To disengage the right-hand side of the planting drive, press the "R" side of the DRIVE DISCONNECT switch.

To resume planting with both sides of the planter, push DRIVE DISCONNECT switch to neutral position.

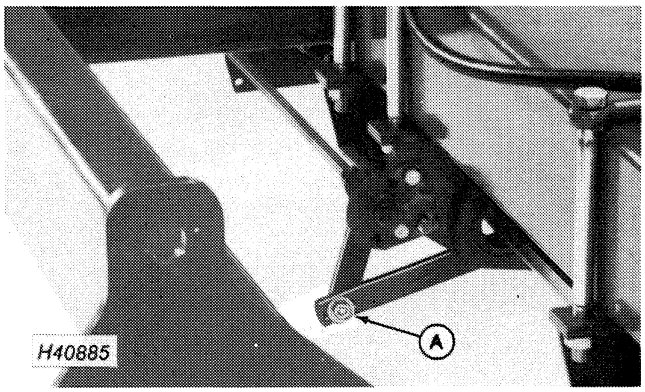


-UN-13OCT88 A28136

B21,7OI,N -19-28JUN90

CLUTCH ACTUATOR

1. The clutch actuator strap has slot for adjustment. Bolt (A) must not be free to move in slot. It must be held tight to a specific position so the clutch will disengage and reengage at the desired planter height. Moving the bolt rearward in the slot will make the drive engage sooner.



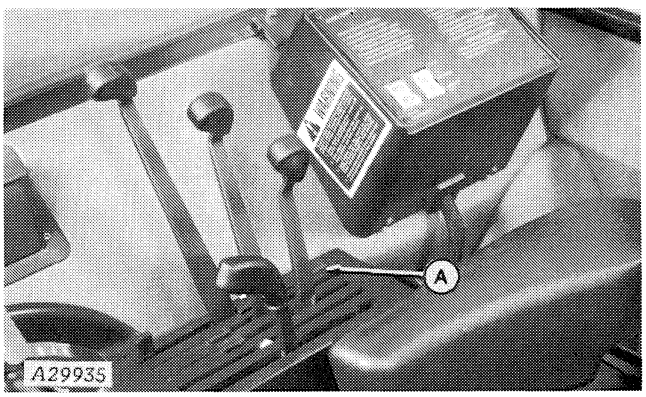
-UN-25APR89 H40885

12-Row Planter (illustrated)

B21,7OI,V -19-28JUN90

VACUUM METER PUMP

Operate the vacuum meter pump with the SCV lever lock (A) installed. This prevents the SCV lever from returning to the neutral position, which could cause damage to the pump motor.



-UN-06OCT88 A29935

B21,7OI,O -19-28JUN90

Stop the vacuum meter pump by putting the SCV lever in the "float" position.

IMPORTANT: Do not return lever to "Neutral" position to shut off the pump.



A29936 -UN-06OCT88

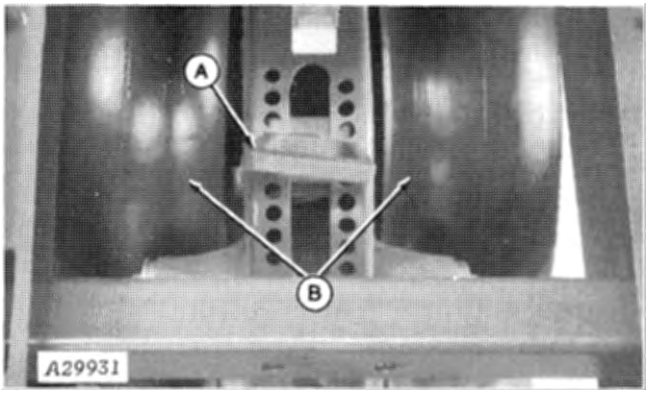
B21,7OI,P -19-28JUN90

VACUUM METER PUMP PRESSURE

For operation and service, see Vacuum Meter section of this operator's manual.

B22,1OI,X -19-28JUN90

CHANGING PLANTING DEPTH



-UN-12OCT88
A29931

Planting depth is controlled by the planting unit gauge wheels (B). Adjust planting depth as follows:

Raise planter to remove weight from unit gauge wheels. Lift depth adjusting handle (A) and move it forward to decrease planting depth. Move the handle rearward to increase planting depth.

If small increments are desired, "walk" the handle from side to side. Adjust all rows to the same setting as a starting point.

NOTE: When operating in the field, lower the planter only when the tractor is moving forward. This will prevent the planter openers and seed tubes from clogging in moist soil conditions.

Lower planter and drive at normal planting speed. Check the planting depth of all rows.

Manufacturing variations in the planting units may require that the depth adjusting handles be positioned differently from row to row to achieve the same planting depth.

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

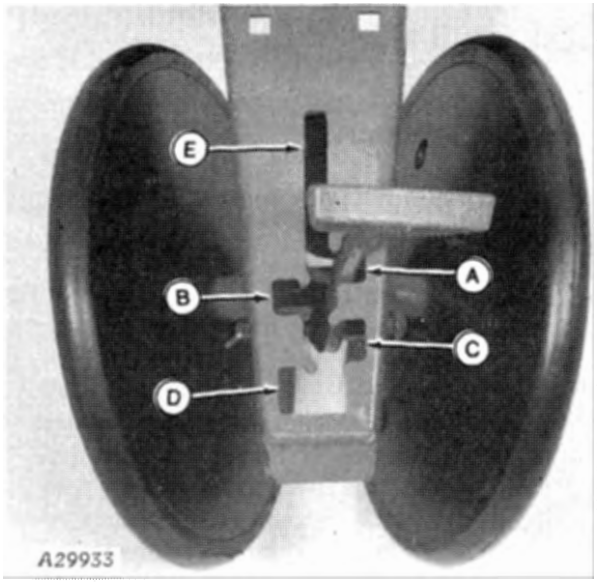
Do not consider the entire center ridge left by the closing wheels as part of the seed depth. The loose soil in this ridge serves as mulch.

B21,7OI,S -19-28JUN90

ADJUSTING CLOSING WHEEL DOWN FORCE

Angled closing wheels (A) trail behind the seed opener and close the seed trench left by the opener. Adjustable spring force permits proper closing of the seed trench by firming soil on each side of the seed, not directly over the seed.

The closing wheel down force can be adjusted by placing the handle in slots (A), (B), (C) and (D) for varying ground conditions. Placing the handle in the middle slot (E) will allow the closing wheels to "FLOAT" with only the weight of the closing wheel system on the soil surface.



A29933 -UN-12OCT88

B21,7OI,U -19-28JUN90

CENTERING (ALIGN) CLOSING WHEELS

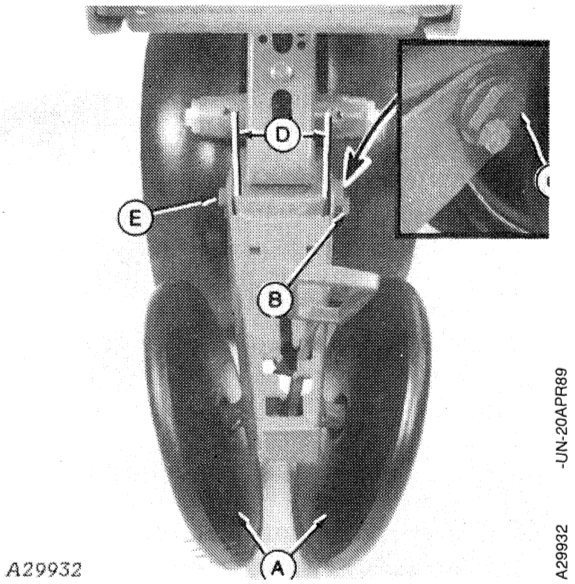
If closing wheels (A) are not centered (aligned) over the seed trench or furrow, proceed as follows:

Raise the planter.

Loosen cap screw (B). Turn adjusting cam (C) clockwise to move the closing wheels to the right or counterclockwise to move the closing wheels to the left. Visually center as required.

NOTE: After centering closing wheels, make sure top front edge of closing wheel frame (D) contacts top of casting all the way across top surface so both wheels contact soil at the same time and apply same amount of force. The casting is slotted so cam (C) and bolt (B) can slide vertically. If frame (D) does not contact evenly, slide cam (C) and bolt (B) in this slot. Loosen bolt (E) for additional adjustment.

Tighten bolts.



A29932 -UN-20APR89

B22,1OI,AA -19-28JUN90

FILLING SEED HOPPERS

If using 58L (1.6 bu.) hoppers, remove lid and snap on front of hopper with latch.

If using 106L (3 bu.) hoppers, remove lid and snap on side of hopper with latch.

If using seed treatment, remove any build-up that may occur on bottom of hopper or meter before filling seed hoppers.

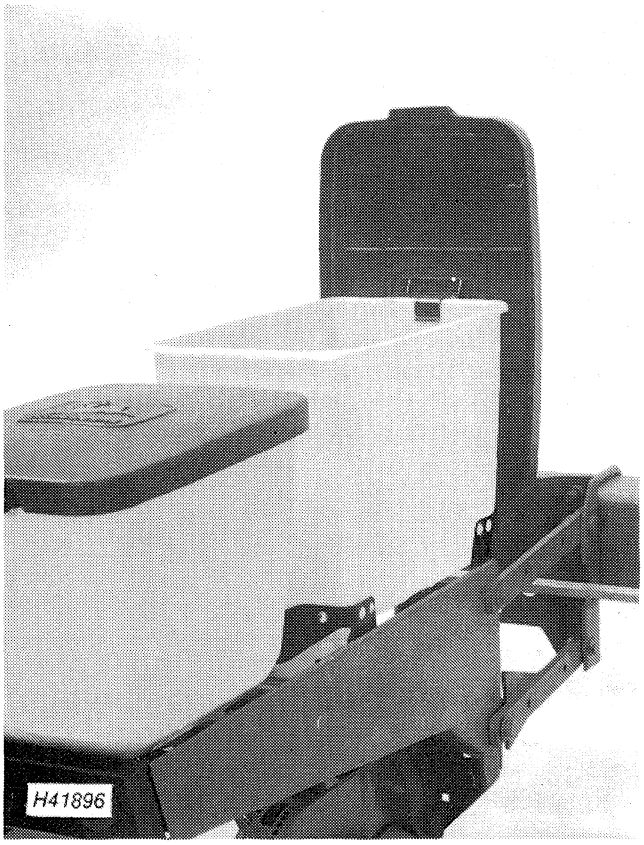
Seed treatments can cause a deterioration in seed singling, spacing accuracy and seed flow into the vacuum seed meter. To minimize the effect seed treatments may have on vacuum meter performance, A51237 Talc Lubricant should be used whenever treated seed is being planted.

Spread 1/2 cup of talc over the top of each hopper full of seeds to be planted. Adjust the rate as necessary so all seeds become coated with talc, while avoiding an accumulation of talc settling in the bottom of the seed hopper.

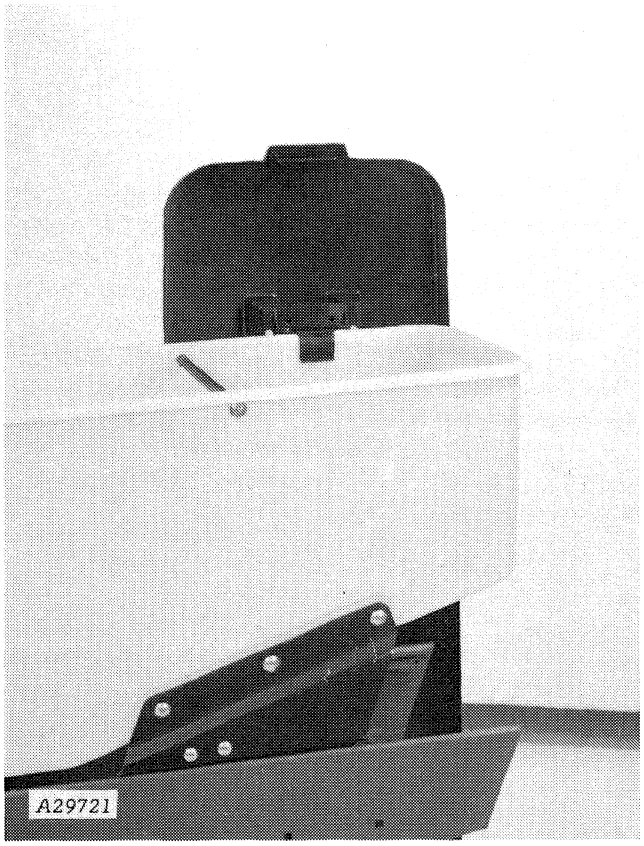
For small seed sizes, seed types with excessive treatment, or for humid planting environments (all commonly associated with cotton or sorghum planting), increasing the rate to one cup per hopper full of seed and mixing thoroughly may be required.

NOTE: Using liquid hopper applied seed treatments which leave a wet coating on the seed is not recommended.

IMPORTANT: Replace hopper lids after hoppers have been filled. If lids are left off, dust and dirt can accumulate in the seed metering mechanism, causing excessive wear.



58L (1.6 bu.) Seed Hopper

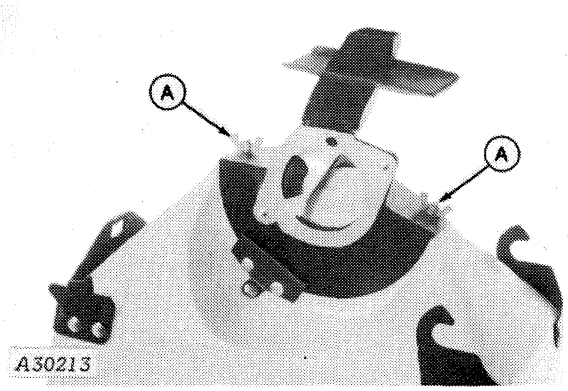


106L (3 Bu.) Seed Hopper

B22,9OM,T -19-28JUN90

Empty feed cup metering units by inverting hopper.

Wipe off feed cup bushings periodically to help reduce wear. To inspect bushings, remove wing nuts (A) and remove feed cup housing and feed cup.



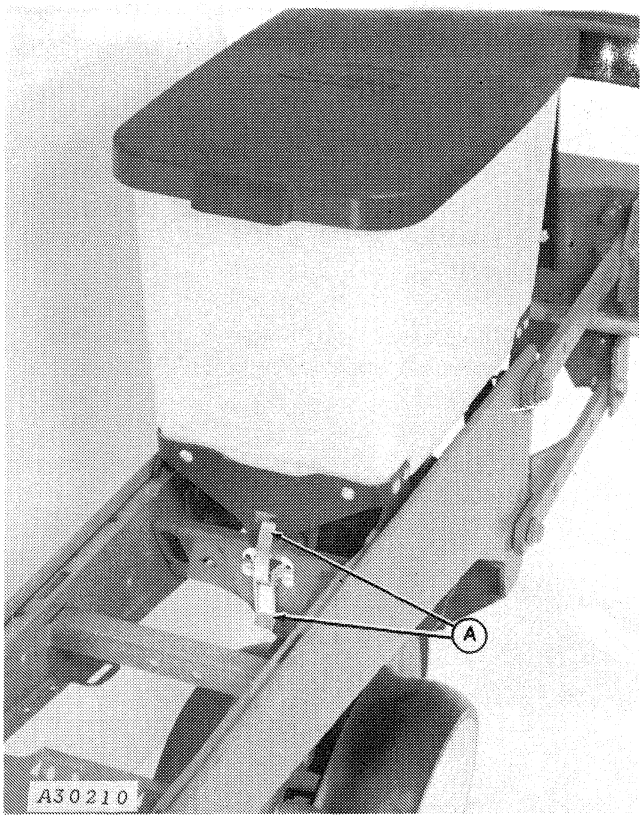
A30213 -UN-13OCT88

B22,8OM,AZ -19-28JUN90

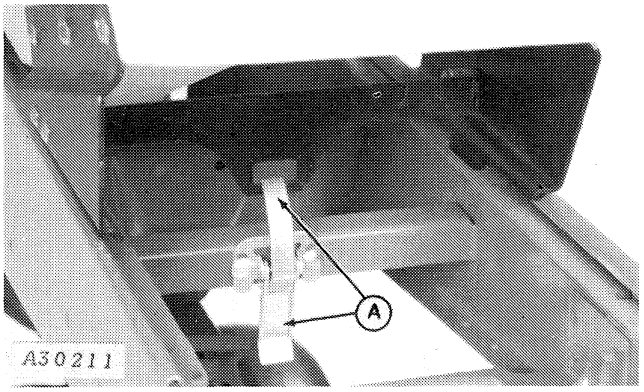
INSPECTION AND CLEANOUT OF SEED HOPPERS AND METERING UNITS

For best operation, empty hoppers thoroughly after each day's use to remove chaff, dust and other foreign material.

To remove seed hopper from planting unit, disengage hopper latch (A) and lift hopper upward and rearward.



58L (1.6 Bu.) Seed Hopper



106L (3 Bu.) Seed Hopper

B22,9OM,U -19-28JUN90

HOW TO USE PLANTING RATE CHARTS

1. Select the desired row spacing or seed population under the proper column.

2. Choose the proper input sprocket:

A higher population will require you to use the high range input sprocket and "HIGH RANGE" chart for that particular seed.

A lower population will require you to use the low range input sprocket and "LOW RANGE" chart for that particular seed.

3. Determine the correct seed drive transmission sprocket combination.

4. Determine the recommended planting speed range. The faster speed in the speed range is for optimum field conditions. Reduce speed and increase unit down force if planting in rough conditions.

NOTE: All rates in the following charts are based on typical drive wheel slippage. Drive wheel slippage is affected by crop residue, unit down force, tire pressure and/or soil conditions.

IMPORTANT: You must check the actual planting rate in the field. See CHECKING SEED POPULATION in this section.

U.S. UNITS OF MEASURE

SUGAR BEETS

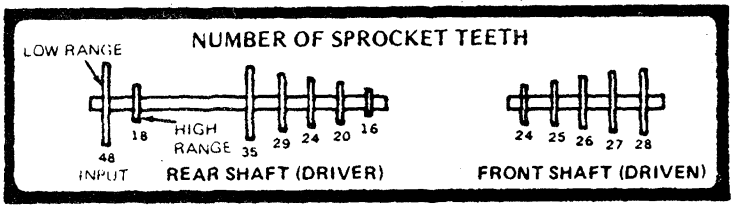
HIGH RANGE INPUT SPROCKET

AVERAGE SEED SPACING, AVERAGE SEEDS PER FT., AND/OR APPROXIMATE SEED POPULATION PER ACRE OF SUGAR BEETS PLANTED WITH VACUUM METER WHEN OPERATING PLANTER WITH HIGH RANGE INPUT SPROCKET

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS" at the beginning of this section.

(3) Sprocket Combinations (Number of Teeth) Driver	Driven	(1) Average Seed Spacing in In.	Approximate Seed Population Per Acre 22 In. Rows	30 In. Rows	38 In. Rows	(4) Recommended Speed Range in mph
24	28	2-1/2	114,557	83,971	66,293	2 to 5
20	24	2-1/2	111,375	81,675	64,480	2 to 5
20	25	2-9/16	106,920	78,310	61,824	2 to 5-1/2
20	26	2-3/4	102,808	75,483	59,592	2 to 5-1/2
20	27	2-7/8	99,000	72,600	57,316	2 to 6
20	28	3	95,464	69,929	55,207	2 to 6
16	24	3-3/16	89,100	65,340	51,584	3 to 6-1/2
16	25	3-5/16	85,536	62,789	49,570	3 to 6-1/2
16	26	3-1/2	82,246	60,256	47,570	3 to 7
16	27	3-5/8	79,200	58,080	45,853	3 to 7-1/2
16	28	3-3/4	76,272	56,056	44,255	3 to 7-1/2

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at the desired rate.



A33616

A33616 -19-31JAN89

CHANGING INPUT SPROCKET COMBINATIONS

Consult appropriate planting rate chart to determine desired sprocket combinations.

1. Remove spring (A) from chain tightener (B).

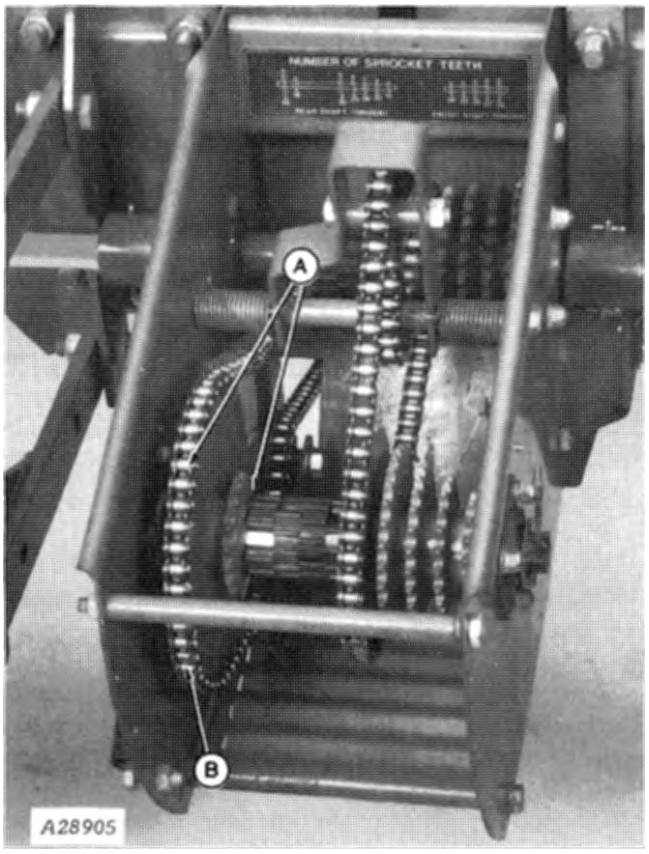


A28904 -UN-14OCT88

B22,9OM,AI -19-18MAY90

2. Remove required number of rubber sprocket spacers (A).

3. Remove chain from input sprocket (B).

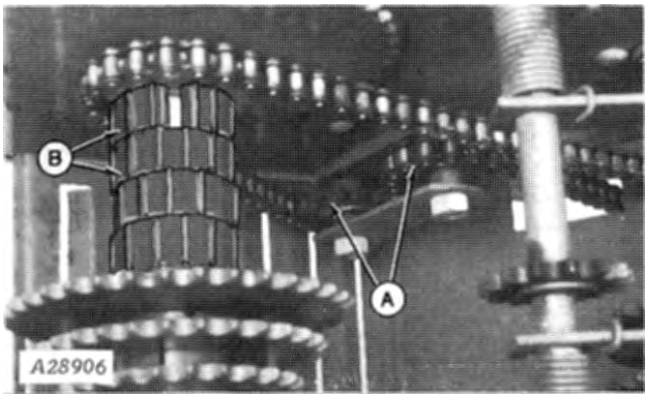


A28905 -UN-14OCT88

B22,9OM,AJ -19-18MAY90

4. Locate input sprocket until desired sprocket is aligned with chain tightener sprockets (A).

5. Replace chain on sprocket. Replace rubber sprocket spacers (B).

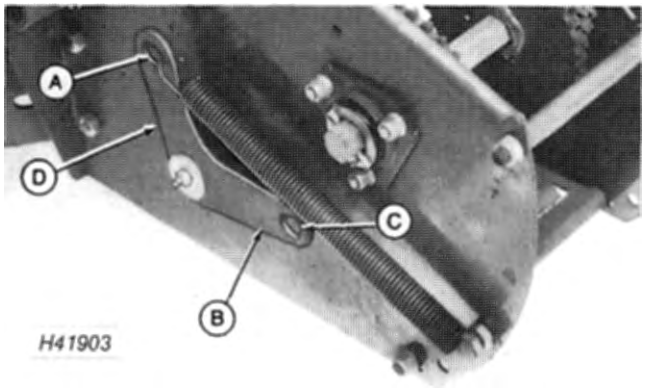


A28906 -UN-14OCT88

B22,9OM,AK -19-18MAY90

6. If chain is aligned on high-range input sprocket, locate spring in hole (A) of chain tightener. Arm (B) must point rearward as shown.

7. If chain is installed on low-range input sprocket, locate spring in hole (C) of chain tightener. Arm (D) must point forward.

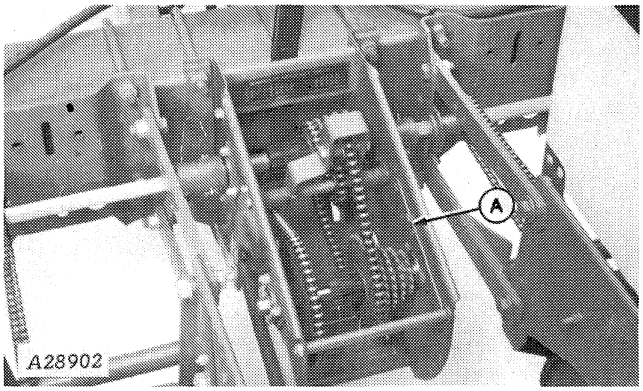


B22,9OM,AL -19-18MAY90

CHANGING PLANTING RATE SPROCKET COMBINATIONS

Consult appropriate planting rate chart to determine desired sprocket combinations.

1. Remove retaining hook (A) from storage position.



B22,9OM,AO -19-18MAY90

2. Pull chain tightener (A) downward and secure hook (B) on tightener.

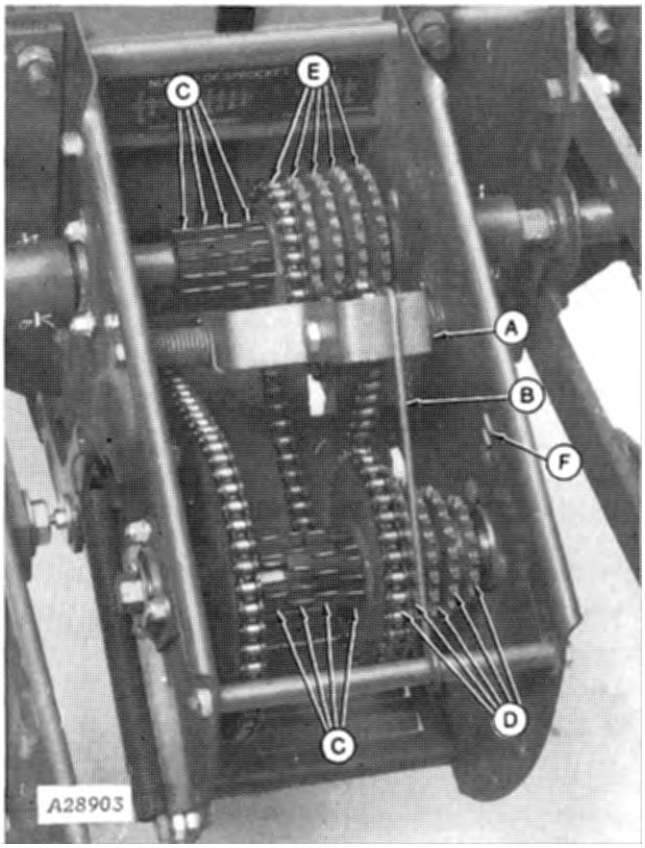
3. Remove required number of rubber sprocket spacers (C).

4. Remove chain from sprockets. Slide desired driver and driven sprockets (D) and (E) into alignment with chain tightener and replace chain.

5. Remove hook from chain tightener. Reposition hook in storage position by pressing it into clip (F).

6. Replace rubber sprocket spacers on upper and lower shafts.

A—Chain Tightener
B—Retaining Hook
C—Rubber Sprocket Spacers
D—Driver Sprockets
E—Driven Sprockets
F—Clip



B22,7OM,D -19-28JUN90

Operating the Vacuum Meter

VACUUM METER OPERATING CHARACTERISTICS

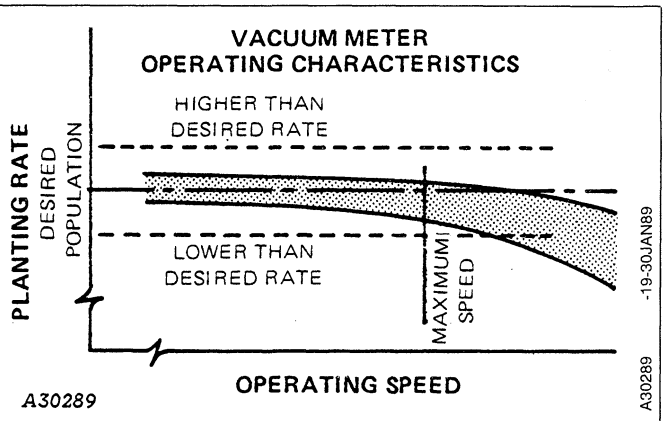
The operating band (gray area) illustrates how the vacuum meter performs in relation to the desired population (indicated by horizontal line).

The width of the band is due to:

a. Various sizes and shapes of seeds.

b. Planting rate variations.

In most cases, the planting accuracy of the vacuum meter does not decline unless you exceed maximum planting speed.



B22,90M,A -19-17JAN86

USE OF TALC LUBRICANT

Seed treatments can cause a deterioration in seed singling, spacing accuracy, and seed flow into the vacuum seed meter. To minimize the effect seed treatments may have on vacuum meter performance, A51237 Talc Lubricant should be used whenever treated seed is being planted.

Spread 1/2 cup of talc over the top of each hopper full of seeds to be planted. Adjust this rate as necessary so all seeds become coated with talc, while avoiding an accumulation of talc settling in the bottom of the seed hopper.

For small seed sizes, seed types with excessive treatment, or for humid planting environments (all commonly associated with cotton or sorghum planting), increasing the rate to one cup per hopper full of seed and mixing thoroughly may be required.

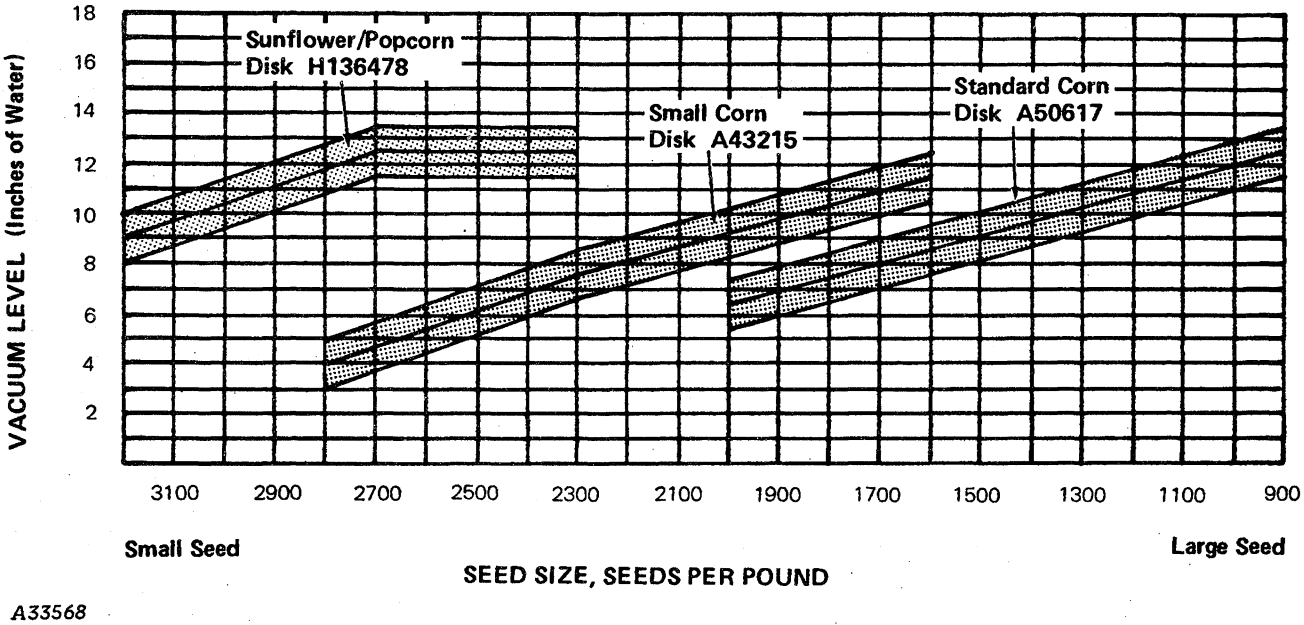
B22,9OM,AR -19-18MAY90

IMPORTANT: If hopper box treatments are used, be sure to follow the chemical manufacturer's recommendations carefully. Dry powder or fast drying liquid treatments are generally recommended. HIGH OIL CONTENT TREATMENTS ARE NOT RECOMMENDED.

Chemical reactions between hopper box treatments and treatments commercially applied to seed can cause the additive to become sticky. Certain temperature and humidity levels can further complicate material compatibility. Check with your chemical and seed supplier for treatment compatibility. Treatments adhering to vacuum meter components can cause reduced population and spacing control.

HX,B22,9OM,A -19-18MAY90

VACUUM LEVEL FOR CORN



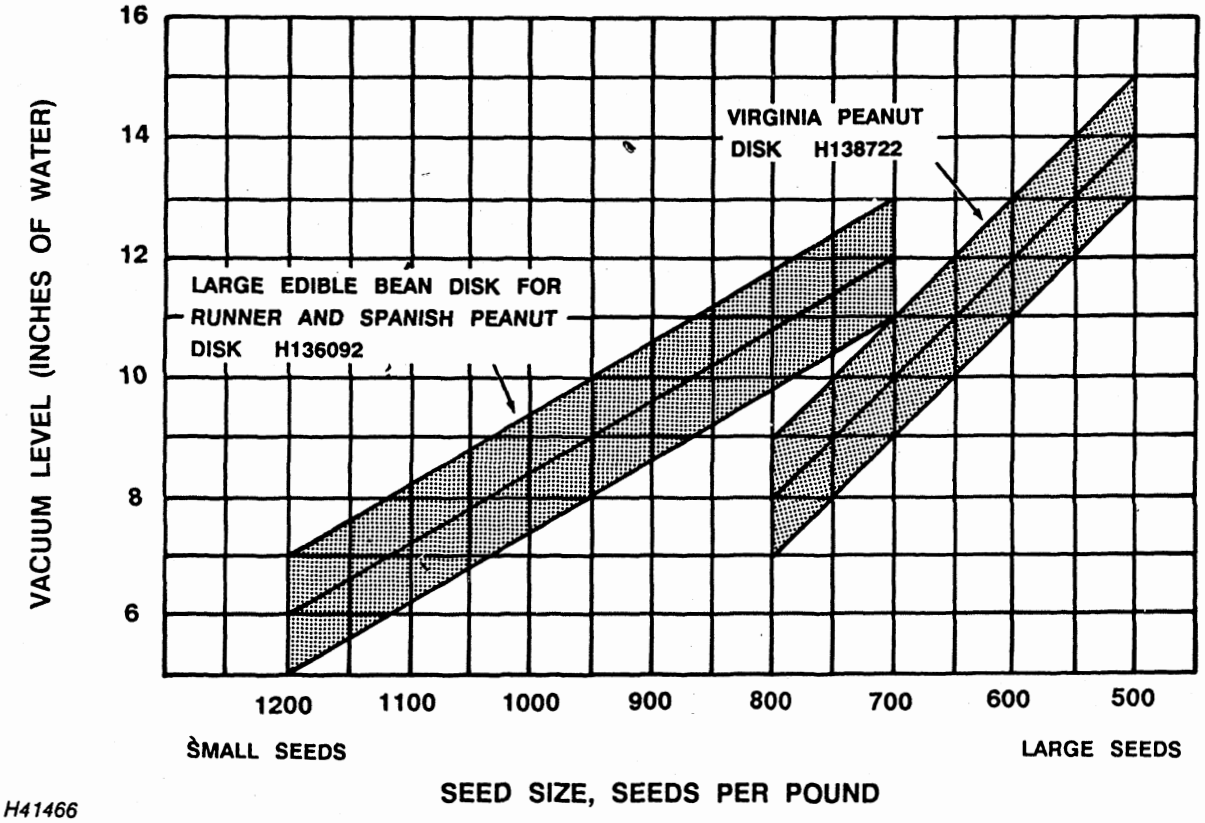
Use the seed corn supplier's information to calculate the seed size in seeds per pound.

EXAMPLE: If the bag label indicates that there are 85,000 kernels in the bag and bag weight is 45 lbs., the seed size is 1889 seeds per pound (85,000 divided by 45). Referring to the chart, the vacuum level should be set at 7 in. when using the Standard Corn Disk or 10 in. when using the Small Corn Disk for a seed size of 1889 seeds per pound.

IMPORTANT: The 7 in. or 10 in. vacuum level above is an example on how to use the chart. You must calculate the proper vacuum level for each corn variety.

B22,9OM,AS -19-18MAY90

VACUUM LEVEL FOR PEANUTS

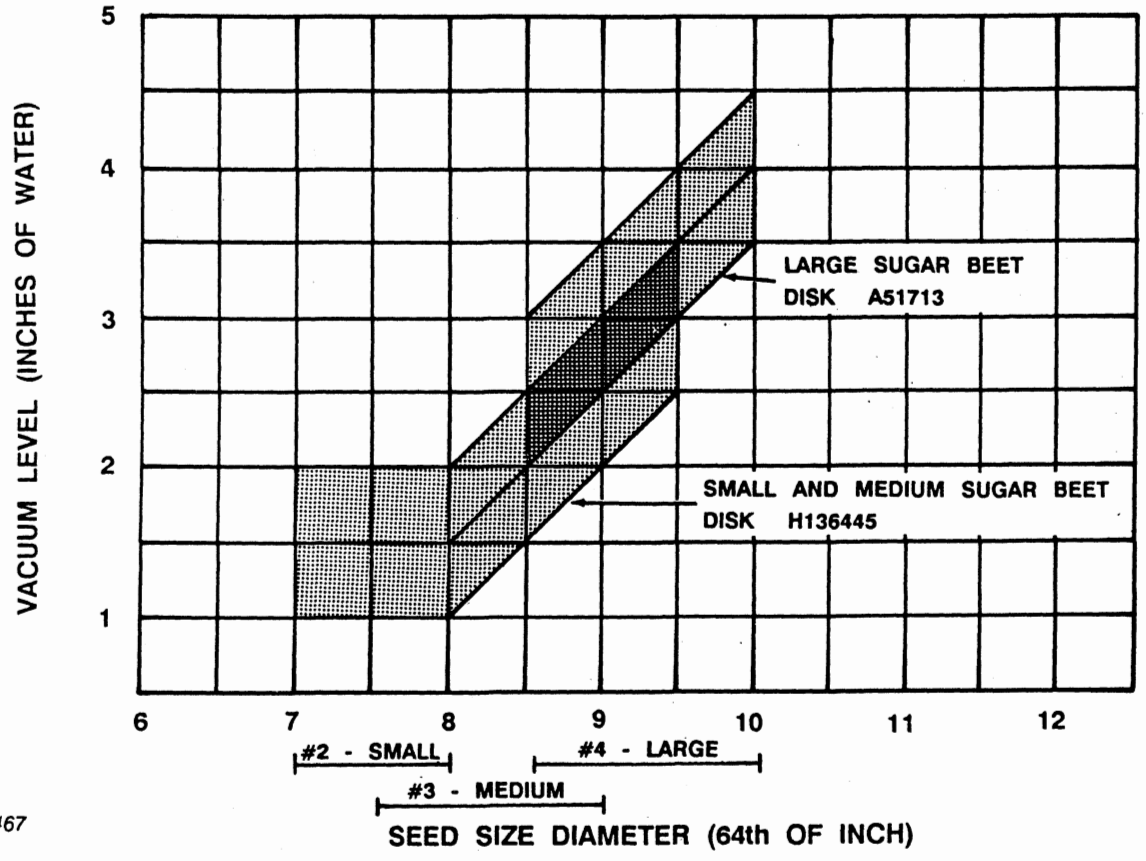


EXAMPLE: If seeds per pound is 800. Referring to the chart, the vacuum level should be set at 11 in. when using the Large Edible Bean Disk for Runner Peanuts or 8 in. when using the Virginia Peanut Disk.

IMPORTANT: The 11 in. or 8 in. vacuum level above is an example on how to use the chart. Obtain size in seeds per pound. You must calculate the proper vacuum level for each peanut variety.

B22,9OM,AU -19-18MAY90

VACUUM LEVEL FOR SUGAR BEET SEED



EXAMPLE: If the bag label indicates medium seed (size 7-1/2 to 9/64 in. diameter). The vacuum level should be a range of between 1-1/2 to 2-1/2 in. when using Sugar Beet Disk.

IMPORTANT: The 1-1/2 to 2-1/2 in. vacuum level above is an example on how to use the chart. Obtain size in seeds per pound. You must calculate the proper vacuum level for each sugar beet seed size.

B22,9OM,AV -19-28JUN90

Vacuum Meter Seed Charts

DECAL SEED CHARTS

Seed Charts can be ordered through the Distribution Service Center. The order number is listed in the top left-hand corner of each seed chart. To order see "Service Literature Section" in the back of this manual.

B22,9OM,AT -19-28JUN90

{Decal No. DB1083}

CORN AND SUNFLOWER

AVERAGE SEED SPACING AND/OR APPROXIMATE SEED POPULATION PER ACRE OF CORN AND SUNFLOWER SEED PLANTED WITH VACUUM METER

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Average	Approximate Seed Population Per Acre				Recommended
Driver	Driven	Seed Spacing in In.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	2-3/16	95,288	79,406	75,227	71,466	2 to 3
35	25	2-5/16	91,476	76,230	72,218	68,607	2 to 3
35	26	2-3/8	87,958	73,298	69,440	65,968	2 to 3
35	27	2-1/2	84,700	70,583	66,868	63,525	2 to 3-1/2
35	28	2-9/16	81,675	68,063	64,480	61,256	2 to 3-1/2
29	24	2-5/8	78,593	65,794	62,331	59,214	2 to 3-1/2
29	25	2-3/4	75,794	63,162	59,383	56,846	2 to 3-1/2
29	26	2-7/8	72,879	60,733	57,536	54,659	2 to 4
29	27	3-1/16	70,180	58,483	55,405	52,635	2 to 4
29	28	3-1/8	67,674	56,395	53,427	50,755	2 to 4
24	24	3-1/4	65,340	54,450	51,584	49,005	2 to 4-1/2
24	25	3-5/16	62,726	52,272	49,521	47,045	2 to 4-1/2
24	26	3-1/2	60,314	50,262	47,616	45,235	2 to 4-1/2
24	27	3-5/8	58,080	48,400	45,853	43,560	2 to 5
24	28	3-3/4	56,006	46,671	44,215	42,004	2 to 5
20	24	3-13/16	54,450	45,375	42,987	40,838	2 to 5-1/2
20	25	4	52,272	43,560	41,267	39,204	2 to 5-1/2
20	26	4-3/16	50,262	41,885	39,680	37,696	2 to 6
20	27	4-5/16	48,400	40,333	38,211	36,300	2 to 6
20	28	4-1/2	46,671	38,893	36,846	35,004	2 to 6-1/2
16	24	4-7/8	43,560	36,300	34,389	32,670	2 to 6-1/2
16	25	5	41,818	34,484	33,014	31,363	2 to 7
16	26	5-3/16	40,209	33,508	31,744	30,157	2 to 7
16	27	5-3/8	38,720	32,267	30,568	29,040	2 to 7-1/2
16	28	5-5/8	37,337	31,114	29,477	28,003	2 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Average	Approximate Seed Population Per Acre				Recommended
Driver	Driven	Seed Spacing in In.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	5-13/16	35,733	29,777	28,210	26,800	3 to 8
35	25	6-1/8	34,304	28,586	27,082	25,728	3 to 8
35	26	6-3/8	32,984	27,487	26,040	24,738	3 to 8
35	27	6-9/16	31,763	26,469	25,076	23,822	3 to 8
35	28	6-13/16	30,628	25,523	24,180	22,971	3 to 8
29	24	7-1/16	29,607	24,673	23,374	22,205	4 to 8
29	25	7-3/8	28,425	23,686	22,439	21,317	4 to 8
29	26	7-5/8	27,330	22,775	21,576	20,497	4 to 8
29	27	7-15/16	26,318	21,931	20,777	19,738	4 to 8
29	28	8-1/4	25,378	21,148	20,035	19,033	4 to 8
24	24	8-9/16	24,503	20,419	19,344	18,377	4 to 8
24	25	8-7/8	23,522	19,602	18,570	17,642	4 to 8
24	26	9-1/4	22,618	18,848	17,856	16,963	4 to 8
24	27	9-5/8	21,780	18,150	17,195	16,335	4 to 8
24	28	9-15/16	21,002	17,502	16,581	15,752	4 to 8
20	24	10-1/4	20,419	17,016	16,120	15,314	4 to 8
20	25	10-11/16	19,602	16,335	15,475	14,702	4 to 8
20	26	11-1/16	18,848	15,707	14,880	14,136	4 to 8
20	27	11-1/2	18,150	15,125	14,329	13,613	4 to 8
20	28	11-15/16	17,502	14,585	13,817	13,126	4 to 8
16	24	12-13/16	16,335	13,613	12,896	12,251	4 to 8
16	25	13-5/16	15,682	13,068	12,380	11,761	4 to 8
16	26	13-7/8	15,078	12,565	11,904	11,309	4 to 8
16	27	14-3/8	14,520	12,100	11,463	10,890	4 to 8
16	28	14-15/16	14,001	11,668	11,054	10,501	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41773*

H41773 -19-20JUN90

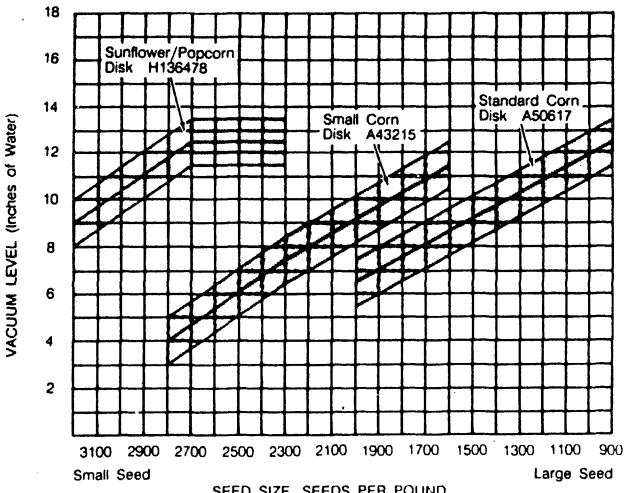
B22,9OM,E -19-28JUN90

VACUUM LEVEL, BAFFLE POSITION AND VACUUM METER BRUSH FOR CORN AND SUNFLOWER SEED

For Corn, use the seed corn supplier's information to calculate the seed size in seeds per pound.

EXAMPLE: If the bag label indicates that there are 85,000 kernels in the bag and bag weight is 45 lbs., the seed size is 1889 seeds per pound (85,000 divided by 45). Referring to the chart, the vacuum level should be set at 7 in. when using the Standard Corn Disk or 10 in. when using the Small Corn Disk for a seed size of 1889 seeds per pound.

IMPORTANT: The 7 in. or 10 in. vacuum level above is an example on how to use the chart. You must calculate the proper vacuum level for each corn variety.



H42253

-19-26JUN90

H42253

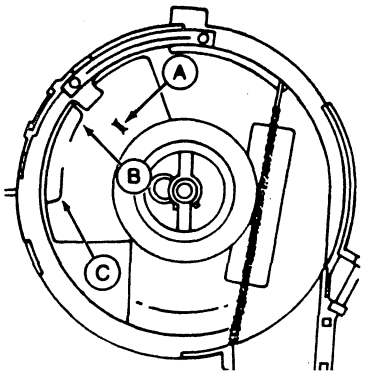
Vacuum level for Sunflower is set at 8 in.

VACUUM METER BAFFLE

Move tab (A).

Sunflower, lower position (B).

Corn, upper position (C).



H42259

-UN-26JUN90

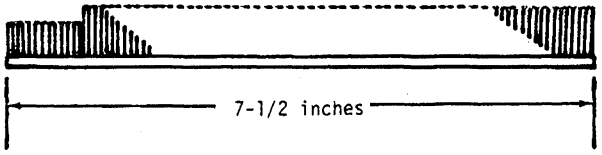
H42259

Upper and Lower Baffle Position

VACUUM METER BRUSH

Use the regular (long) brush.

Talc lubricant, 1/2 cup.



H34704

-19-27APR89

H34704

Regular (long) Brush

HX,B22,9OM,I -19-28JUN90

{Decal No. DB1084}

COTTON

AVERAGE SEED SPACING AND/OR APPROXIMATE SEED POPULATION PER ACRE OF COTTON PLANTED WITH VACUUM METER

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Average Seed Spacing	Approximate Seed Population Per Acre				Recommended Speed Range
Driver	Driven	in In.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	in mph
35	24	1	203,280	169,400	160,484	152,460	2 to 5-1/2
35	25	1-1/16	195,149	162,624	154,065	146,362	2 to 5-1/2
35	26	1-1/8	187,643	156,369	148,139	140,732	2 to 6
35	27	1-1/8	180,693	150,578	142,653	135,520	2 to 6
35	28	1-3/16	174,240	145,200	137,558	130,680	2 to 6-1/2
29	24	1-1/4	168,432	140,360	132,973	126,324	2 to 6-1/2
29	25	1-5/16	161,695	134,746	127,654	121,271	2 to 7
29	26	1-3/8	155,476	129,563	122,744	116,607	2 to 7
29	27	1-7/16	149,717	124,764	118,198	112,288	2 to 7-1/2
29	28	1-7/16	144,370	120,309	113,977	108,278	2 to 7-1/2
24	24	1-1/2	139,392	116,160	110,046	104,544	2 to 8
24	25	1-9/16	133,816	111,514	105,644	100,362	2 to 8
24	26	1-5/8	128,670	107,225	101,581	96,502	2 to 8
24	27	1-11/16	123,904	103,253	97,819	92,928	2 to 8
24	28	1-3/4	119,479	99,566	94,325	89,609	2 to 8
20	24	1-13/16	116,160	96,800	91,705	87,120	2 to 8
20	25	1-7/8	111,514	92,928	88,037	83,635	2 to 8
20	26	1-15/16	107,225	89,354	84,651	80,418	2 to 8
20	27	2	103,253	86,044	81,516	77,440	2 to 8
20	28	2-1/8	99,566	82,971	78,605	74,674	2 to 8
16	24	2-1/4	92,928	77,440	73,364	69,696	3 to 8
16	25	2-5/16	89,211	74,342	70,430	66,908	3 to 8
16	26	2-7/16	85,780	71,483	67,721	64,335	3 to 8
16	27	2-1/2	82,603	68,836	65,213	61,952	3 to 8
16	28	2-5/8	79,653	66,377	62,884	59,739	3 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Average Seed Spacing	Approximate Seed Population Per Acre				Recommended Speed Range
Driver	Driven	in In.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	in mph
35	24	2-3/4	76,230	63,525	60,182	57,173	3 to 8
35	25	2-7/8	73,181	60,984	57,774	54,886	3 to 8
35	26	2-15/16	70,366	58,638	55,552	52,775	3 to 8
35	27	3-1/16	67,760	56,467	53,495	50,820	3 to 8
35	28	3-3/16	65,340	54,450	51,584	49,005	3 to 8
29	24	3-5/16	63,162	52,635	49,865	47,372	3 to 8
29	25	3-7/16	60,636	50,530	47,870	45,477	4 to 8
29	26	3-9/16	58,303	48,586	46,029	43,728	4 to 8
29	27	3-3/4	56,144	46,787	44,324	42,108	4 to 8
29	28	3-7/8	54,139	45,116	42,741	40,604	4 to 8
24	24	4	52,272	43,560	41,267	39,204	4 to 8
24	25	4-3/16	50,181	41,818	39,617	37,636	4 to 8
24	26	4-5/16	48,251	40,209	38,093	36,188	4 to 8
24	27	4-1/2	46,464	38,720	36,682	34,848	4 to 8
24	28	4-11/16	44,805	37,337	35,372	33,603	4 to 8
20	24	4-13/16	43,560	36,300	34,389	32,670	4 to 8
20	25	5	41,818	34,848	33,014	31,363	4 to 8
20	26	5-3/16	40,209	33,508	31,744	30,157	4 to 8
20	27	5-7/16	38,720	32,267	30,568	29,040	4 to 8
20	28	5-5/8	37,337	31,114	29,477	28,003	4 to 8
16	24	6	34,848	29,040	27,512	26,136	4 to 8
16	25	6-1/4	33,454	27,878	26,411	25,091	4 to 8
16	26	6-1/2	32,167	26,806	25,395	24,126	4 to 8
16	27	6-3/4	30,976	25,813	24,455	23,232	4 to 8
16	28	7	29,870	24,891	23,581	22,402	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate.

H41774

H41774 -19-25APR90

B22,9OM,I -19-18MAY90

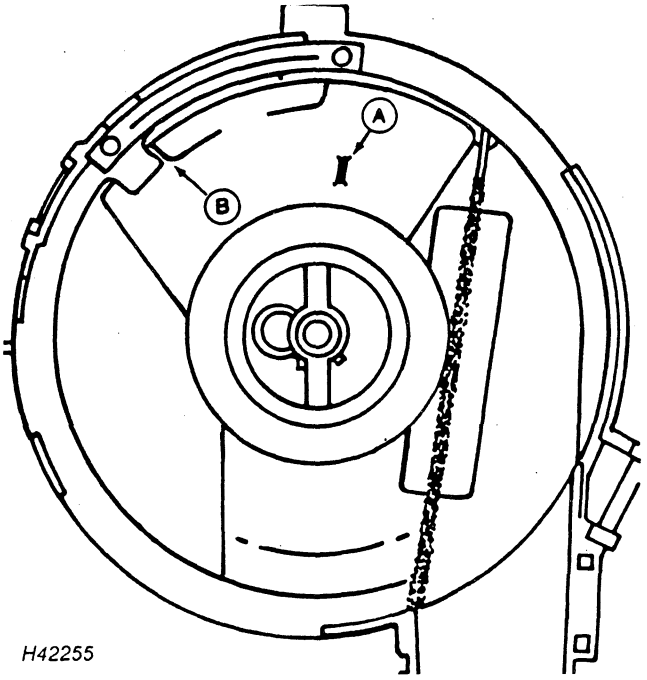
VACUUM LEVEL, BAFFLE POSITION AND VACUUM METER BRUSH FOR COTTON

Vacuum level for cotton is set at 8 in.

VACUUM METER BAFFLE

Move tab (A).

Cotton, upper position (B).

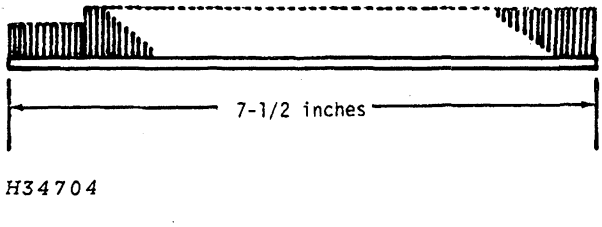


Upper Baffle Position

VACUUM METER BRUSH

Use the (regular) long brush.

Talc lubricant, 1 cup.



Regular (Long) Brush

HX,B22,9OM,J -19-28JUN90

{Decal No. DB1085}

COTTON HILLDROP

HILL SPACING IN IN. AND/OR APPROXIMATE SEED POPULATION PER ACRE OF COTTON HILLDROP PLANTED WITH VACUUM METER

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)			Approximate Seed Population Per Acre				
Driver	Driven	Hill Spacing in In.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Recommended Speed Range in mph
24	24	8.00	104,544	87,120	82,535	78,408	4 to 5
24	25	8.33	100,362	83,635	79,233	75,272	4 to 5
24	26	8.67	96,502	80,418	76,186	72,377	4 to 5
24	27	9.00	92,928	77,440	73,364	69,696	4-1/2 to 5-1/2
24	28	9.33	89,609	74,674	70,744	67,207	4-1/2 to 5-1/2
20	24	9.60	87,120	72,600	68,779	65,340	5 to 6
20	25	10.00	83,635	69,696	66,028	62,726	5 to 6
20	26	10.40	80,418	67,015	63,488	60,314	5 to 6-1/2
20	27	10.80	77,440	64,533	61,137	58,080	5 to 6-1/2
20	28	11.20	74,674	62,229	58,953	56,006	5 to 6-1/2
16	24	12.00	69,696	58,080	55,023	52,272	5 to 6-1/2
16	25	12.50	66,908	55,757	52,822	50,181	5 to 6-1/2
16	26	13.00	64,335	53,612	50,791	48,251	5 to 6-1/2
16	27	13.50	61,952	51,627	48,909	46,464	5 to 6-1/2
16	28	14.00	59,739	49,783	47,163	44,805	5 to 6-1/2

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)			Approximate Seed Population Per Acre				
Driver	Driven	Hill Spacing in In.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Recommended Speed Range in mph
35	24	14.63	57,173	47,644	45,136	42,879	5 to 6-1/2
35	25	15.24	54,886	45,738	43,331	41,164	5 to 6-1/2
35	26	15.85	52,775	43,979	41,664	39,581	5 to 6-1/2
35	27	16.46	50,820	42,350	40,121	38,115	5 to 6-1/2
35	28	17.07	49,005	40,838	38,688	36,754	5 to 6-1/2
29	24	17.66	47,372	39,476	37,399	35,529	5 to 6-1/2
29	25	18.39	45,477	37,897	35,903	34,107	5 to 6-1/2
29	26	19.13	43,728	36,440	34,522	32,796	5 to 6-1/2
29	27	19.86	42,108	35,090	33,243	31,581	5 to 6-1/2
29	28	20.60	40,604	33,837	32,056	30,453	5 to 6-1/2
24	24	21.33	39,204	32,670	30,951	29,403	5 to 6-1/2
24	25	22.22	37,636	31,363	29,713	28,227	5 to 6-1/2

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate.

H41775

H41775 -19-25APR90

B21,9OM,F -19-18MAY90

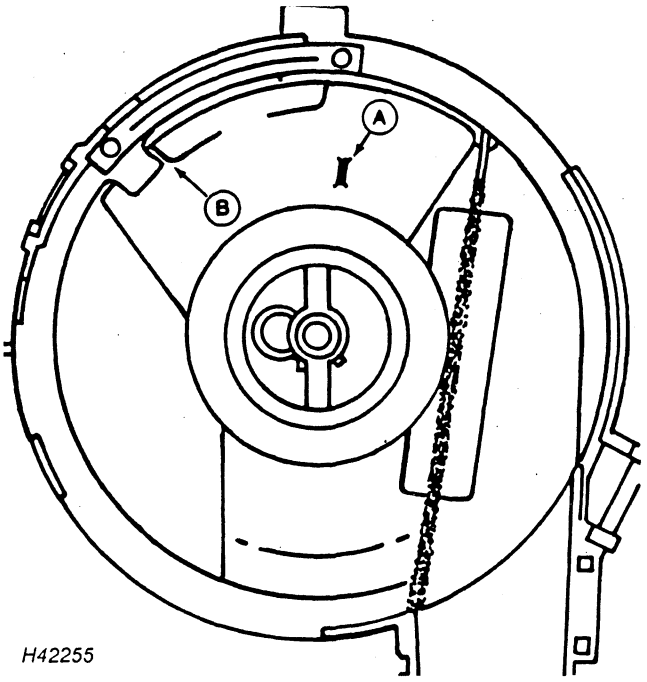
VACUUM LEVEL, BAFFLE POSITION AND VACUUM METER BRUSH FOR COTTON HILLDROP

Vacuum level for cotton hilldrop is set at 8 in.

VACUUM METER BAFFLE

Move tab (A).

Cotton hilldrop, upper position (B).

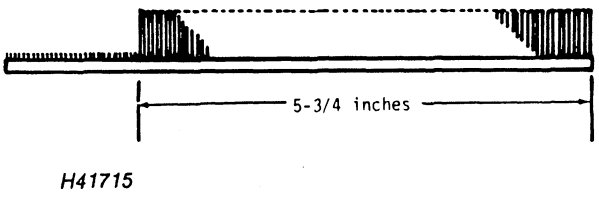


Upper Baffle Position

VACUUM METER BRUSH

Use the short brush.

Talc lubricant, 1 cup.



Short Brush

HX,B22,9OM,E -19-28JUN90

{Decal No. DB1086}

SORGHUM

AVERAGE SEED SPACING, AVERAGE SEEDS PER FT. AND/OR APPROXIMATE SEED POPULATION PER ACRE OF SORGHUM PLANTED WITH VACUUM METER

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth) Driver	Driven	Average Seed Spacing in In.	Average Seeds Per Ft.	Approximate Seed Population Per Acre 30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Recommended Speed Range in mph
35	24	1-1/2	8.2	142,931	119,109	112,840	107,198	2 to 5-1/2
35	25	1-1/2	7.9	137,214	114,345	108,327	102,911	2 to 5-1/2
35	26	1-9/16	7.6	131,937	109,947	104,160	98,952	2 to 6
35	27	1-11/16	7.2	127,050	105,875	100,303	95,288	2 to 6
35	28	1-3/4	7.0	122,512	102,094	96,720	91,884	2 to 6-1/2
29	24	1-3/4	6.8	118,429	98,691	93,496	88,822	2 to 6-1/2
29	25	1-13/16	6.5	113,692	94,743	89,757	85,269	2 to 7
29	26	1-7/8	6.3	109,319	91,099	86,304	81,989	2 to 7
29	27	2	6.0	105,270	87,725	83,108	78,953	2 to 7-1/2
29	28	2	5.8	101,510	84,592	80,140	76,133	2 to 7-1/2
24	24	2-1/8	5.6	98,010	81,675	77,376	73,508	2 to 8
24	25	2-1/4	5.4	94,090	78,408	74,281	70,567	2 to 8
24	26	2-3/8	5.2	90,471	75,392	71,424	67,853	2 to 8
24	27	2-7/16	5.0	87,120	72,600	68,779	65,340	2 to 8
24	28	2-1/2	4.8	84,009	70,007	66,323	63,006	2 to 8
20	24	2-1/2	4.7	81,675	68,063	64,480	61,256	2 to 8
20	25	2-9/16	4.5	78,408	65,340	61,901	58,806	2 to 8
20	26	2-3/4	4.3	75,392	62,827	59,520	56,544	2 to 8
20	27	2-7/8	4.2	72,600	60,500	57,316	54,450	2 to 8
20	28	3	4.0	70,007	58,339	55,269	52,505	2 to 8
16	24	3-3/16	3.8	65,340	54,450	51,584	49,005	3 to 8
16	25	3-5/16	3.6	62,726	52,272	49,521	47,045	3 to 8
16	26	3-1/2	3.5	60,314	50,262	47,616	45,235	3 to 8
16	27	3-5/8	3.3	58,080	48,400	45,853	43,560	3 to 8
16	28	3-3/4	3.2	56,006	46,671	44,215	42,004	3 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth) Driver	Driven	Average Seed Spacing in In.	Average Seeds Per Ft.	Approximate Seed Population Per Acre 30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Recommended Speed Range in mph
35	24	3-15/16	3.1	53,599	44,666	42,315	40,199	3 to 8
35	25	4-1/16	3.0	51,455	42,879	40,623	38,591	3 to 8
35	26	4-1/4	2.8	49,476	41,230	39,060	37,107	3 to 8
35	27	4-3/8	2.7	47,644	39,703	37,613	35,733	3 to 8
35	28	4-9/16	2.6	45,942	38,285	36,270	34,457	3 to 8
29	24	4-3/4	2.5	44,411	37,009	35,061	33,308	4 to 8
29	25	4-15/16	2.4	42,634	35,529	33,659	31,976	4 to 8
29	26	5-1/8	2.3	40,995	34,162	32,364	30,746	4 to 8
29	27	5-5/16	2.3	39,476	32,897	31,165	29,607	4 to 8
29	28	5-1/2	2.2	38,066	31,722	30,052	28,550	4 to 8
24	24	5-11/16	2.1	36,754	30,628	29,016	27,565	4 to 8
24	25	5-15/16	2.0	35,284	29,403	27,855	26,463	4 to 8
24	26	6-3/16	1.9	33,927	28,272	26,784	25,445	4 to 8
24	27	6-3/8	1.9	32,670	27,225	25,792	24,503	4 to 8
24	28	6-5/8	1.8	31,503	26,253	24,871	23,627	4 to 8
20	24	6-13/16	1.8	30,628	25,523	24,180	22,971	4 to 8
20	25	7-1/8	1.7	29,403	24,503	23,213	22,052	4 to 8
20	26	7-3/8	1.6	28,272	23,560	22,320	21,204	4 to 8
20	27	7-11/16	1.6	27,225	22,688	21,493	20,419	4 to 8
20	28	8-15/16	1.5	26,253	21,877	20,726	19,690	4 to 8
16	24	8-9/16	1.4	24,503	20,419	19,344	18,377	4 to 8
16	25	8-7/8	1.3	23,522	19,602	18,570	17,642	4 to 8
16	26	9-1/4	1.3	22,618	18,848	17,856	16,963	4 to 8
16	27	9-5/8	1.2	21,780	18,150	17,195	16,335	4 to 8
16	28	10	1.2	21,002	17,502	16,581	15,752	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41776*

H41776 -19-28JUN90

B22,9OM,M -19-28JUN90

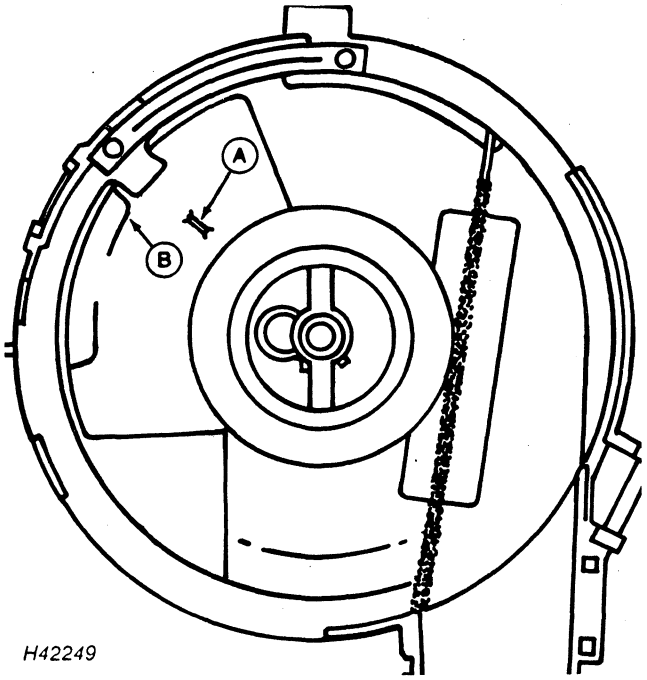
VACUUM LEVEL, BAFFLE POSITION AND VACUUM METER BRUSH FOR SORGHUM

Vacuum level for sorghum is set at 8 in.

VACUUM METER BAFFLE

Move tab (A).

Sorghum, lower position (B).

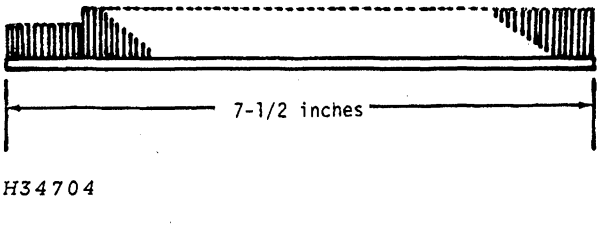


Lower Baffle Position

VACUUM METER BRUSH

Use the (regular) long brush.

Talc lubricant, 1 cup.



Regular (long) Brush

HX,B22,9OM,H -19-28JUN90

{Decal No. DB1087}

SOYBEANS

AVERAGE SEEDS PER FT. AND/OR APPROXIMATE SEED POPULATION PER ACRE OF SOYBEANS PLANTED WITH VACUUM METER

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth) Driver	Driven	Average Seeds Per Ft.	Approximate Seed Population Per Acre 15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	Recommended Speed Range in mph
35	24	19.6	686,070	571,725	541,634	514,552	2 to 8
35	25	19.0	658,627	548,856	519,969	493,970	2 to 8
35	26	18.2	633,295	527,746	499,970	474,972	2 to 8
35	27	17.4	609,840	508,200	481,453	457,380	2 to 8
35	28	16.9	588,060	490,050	464,258	441,045	2 to 8
29	24	16.2	568,458	473,715	448,783	426,344	2 to 8
29	25	15.6	545,720	454,766	430,831	409,290	2 to 8
29	26	15.0	524,730	437,275	414,261	393,548	2 to 8
29	27	14.5	505,296	421,080	398,918	378,972	2 to 8
29	28	14.0	487,250	406,041	384,671	365,437	2 to 8
24	24	13.5	470,448	392,040	371,406	352,836	2 to 8
24	25	12.9	451,630	376,358	356,550	338,723	2 to 8
24	26	12.5	434,260	361,883	342,837	325,695	2 to 8
24	27	12.0	418,176	348,480	330,139	313,632	2 to 8
24	28	11.5	403,241	336,034	318,348	302,431	2 to 8
20	24	11.2	392,040	326,700	309,505	294,030	2 to 8
20	25	10.8	376,358	313,632	297,125	282,269	2 to 8
20	26	10.4	361,883	301,569	285,697	271,412	2 to 8
20	27	10.0	348,480	290,400	275,116	261,360	2 to 8
20	28	9.7	336,034	280,029	265,290	252,026	2 to 8
16	24	9.0	313,632	261,360	247,604	235,224	3 to 8
16	25	8.6	301,087	250,906	237,700	225,815	3 to 8
16	26	8.3	289,506	241,255	228,558	217,130	3 to 8
16	27	8.0	278,784	232,320	220,093	209,088	3 to 8
16	28	7.7	268,827	224,023	212,232	201,621	3 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth) Driver	Driven	Average Seeds Per Ft.	Approximate Seed Population Per Acre 15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	Recommended Speed Range in mph
35	24	7.4	257,276	214,397	203,113	192,957	3 to 8
35	25	7.1	246,985	205,821	194,988	185,239	3 to 8
35	26	6.8	237,486	197,905	187,489	178,114	3 to 8
35	27	6.6	228,690	190,575	180,545	171,518	3 to 8
35	28	6.3	220,523	183,769	174,097	165,392	4 to 8
29	24	6.1	213,172	177,643	168,293	159,879	4 to 8
29	25	5.9	204,645	170,537	161,562	153,484	4 to 8
29	26	5.6	196,774	163,978	155,348	147,580	4 to 8
29	27	5.4	189,486	157,905	149,594	142,115	4 to 8
29	28	5.2	182,719	152,266	144,252	137,039	4 to 8
24	24	5.1	176,418	147,015	139,277	132,314	4 to 8
24	25	4.9	169,361	141,134	133,706	127,021	4 to 8
24	26	4.7	162,847	135,706	128,564	122,136	4 to 8
24	27	4.5	156,816	130,680	123,802	117,612	4 to 8
24	28	4.3	151,215	126,013	119,381	113,412	4 to 8
20	24	4.2	147,015	122,513	116,064	110,261	4 to 8
20	25	4.1	141,134	117,612	111,422	105,851	4 to 8
20	26	3.9	135,706	113,088	107,136	101,780	4 to 8
20	27	3.8	130,680	108,900	103,168	98,010	4 to 8
20	28	3.6	126,013	105,011	99,484	94,510	4 to 8
16	24	3.4	117,612	98,010	92,852	88,209	4 to 8
16	25	3.2	112,908	94,090	89,138	84,681	4 to 8
16	26	3.1	108,565	90,471	85,709	81,424	4 to 8
16	27	3.0	104,544	87,120	82,535	78,408	4 to 8
16	28	2.9	100,810	84,009	79,587	75,608	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41777*

-19-25APR90

H41777

B22,9OM,Y -19-18MAY90

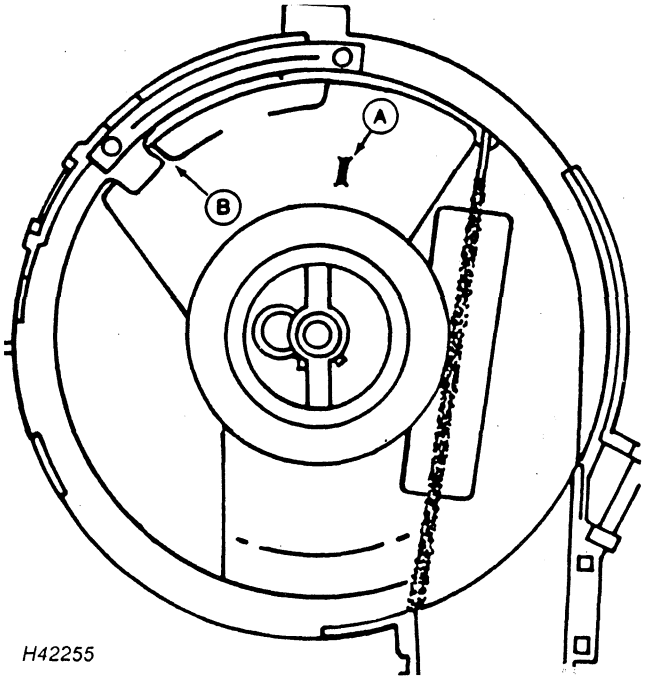
VACUUM LEVEL, BAFFLE POSITION AND VACUUM METER BRUSH FOR SOYBEANS

Vacuum level for soybeans is set at 8 in.

VACUUM METER BAFFLE

Move tab (A).

Soybeans, upper position (B).

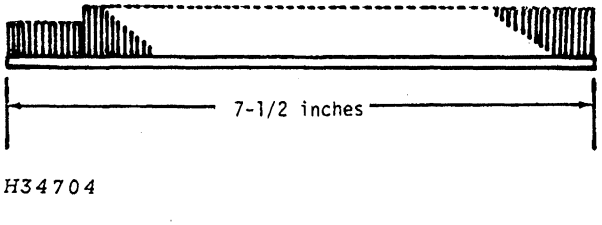


Upper Baffle Position

VACUUM METER BRUSH

Use the (regular) long brush.

Talc lubricant, 1/2 cup, if treated.



Regular (Long) Brush

HX,B22,9OM,F -19-28JUN90

{Decal No. DB1088}

SOYBEANS

AVERAGE SEEDS PER FT. AND/OR APPROXIMATE SEED POPULATION PER ACRE OF SOYBEANS PLANTED WITH VACUUM METER

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Average	Approximate Seed Population Per Acre				Recommended
Driver	Driven	Seeds Per Ft.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	19.6	343,035	285,863	270,817	257,276	2 to 8
35	25	19.0	329,314	274,428	259,984	246,985	2 to 8
35	26	18.2	316,648	263,873	249,985	237,486	2 to 8
35	27	17.4	304,920	254,100	240,726	228,690	2 to 8
35	28	16.9	294,030	245,025	232,129	220,523	2 to 8
29	24	16.2	284,229	236,858	224,391	213,172	2 to 8
29	25	15.6	272,860	227,383	215,416	204,645	2 to 8
29	26	15.0	262,365	218,638	207,130	196,774	2 to 8
29	27	14.5	252,648	210,540	199,459	189,486	2 to 8
29	28	14.0	243,625	203,021	192,335	182,719	2 to 8
24	24	13.5	235,224	196,020	185,703	176,418	2 to 8
24	25	12.9	225,815	188,179	178,275	169,361	2 to 8
24	26	12.5	217,130	180,942	171,418	162,847	2 to 8
24	27	12.0	209,088	174,240	165,069	156,816	2 to 8
24	28	11.5	201,621	168,017	159,174	151,215	2 to 8
20	24	11.2	196,020	163,350	154,753	147,015	2 to 8
20	25	10.8	188,179	156,816	148,563	141,134	2 to 8
20	26	10.4	180,942	150,785	142,849	135,706	2 to 8
20	27	10.0	174,240	145,200	137,558	130,680	2 to 8
20	28	9.7	168,017	140,014	132,645	126,013	2 to 8
16	24	9.0	156,816	130,680	123,802	117,612	3 to 8
16	25	8.6	150,543	125,453	118,850	112,908	3 to 8
16	26	8.3	144,753	120,628	114,279	108,565	3 to 8
16	27	8.0	139,392	116,160	110,046	104,544	3 to 8
16	28	7.7	134,414	112,011	106,116	100,810	3 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Average	Approximate Seed Population Per Acre				Recommended
Driver	Driven	Seeds Per Ft.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	7.4	128,638	107,198	101,556	96,479	3 to 8
35	25	7.1	123,493	102,911	97,494	92,619	3 to 8
35	26	6.8	118,743	98,952	93,744	89,057	3 to 8
35	27	6.6	114,345	95,288	90,272	85,759	3 to 8
35	28	6.3	110,261	91,884	87,048	82,696	4 to 8
29	24	6.1	106,586	88,822	84,147	79,939	4 to 8
29	25	5.9	102,322	85,269	80,781	76,742	4 to 8
29	26	5.6	98,387	81,989	77,674	73,790	4 to 8
29	27	5.4	94,743	78,953	74,797	71,057	4 to 8
29	28	5.2	91,359	76,133	72,126	68,519	4 to 8
24	24	5.1	88,209	73,508	69,639	66,157	4 to 8
24	25	4.9	84,681	70,567	66,853	63,510	4 to 8
24	26	4.7	81,424	67,853	64,282	61,068	4 to 8
24	27	4.5	78,408	65,340	61,901	58,806	4 to 8
24	28	4.3	75,608	63,006	59,690	56,706	4 to 8
20	24	4.2	73,508	61,256	58,032	55,131	4 to 8
20	25	4.1	70,567	58,806	55,711	52,925	4 to 8
20	26	3.9	67,853	56,544	53,568	50,890	4 to 8
20	27	3.8	65,340	54,450	51,584	49,005	4 to 8
20	28	3.6	63,006	52,505	49,742	47,255	4 to 8
16	24	3.4	58,806	49,005	46,426	44,105	4 to 8
16	25	3.2	56,454	47,045	44,569	42,340	4 to 8
16	26	3.1	54,282	45,235	42,855	40,712	4 to 8
16	27	3.0	52,272	43,560	41,267	39,204	4 to 8
16	28	2.9	50,405	42,004	39,794	37,804	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41778*

H41778 -19-25APR90

B22,9OM,Q -19-18MAY90

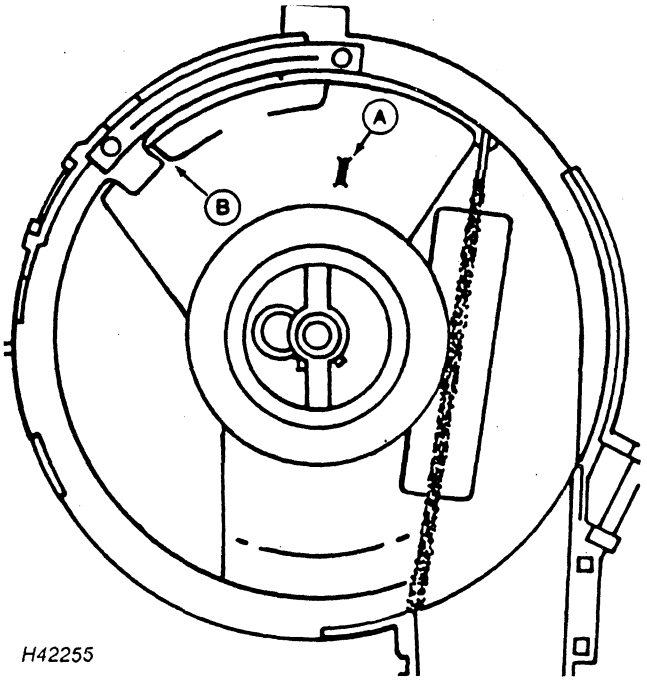
VACUUM LEVEL, BAFFLE POSITION AND VACUUM METER BRUSH FOR SOYBEANS

Vacuum level for soybeans is set at 8 in.

VACUUM METER BAFFLE

Move tab (A).

Soybeans, upper position (B).

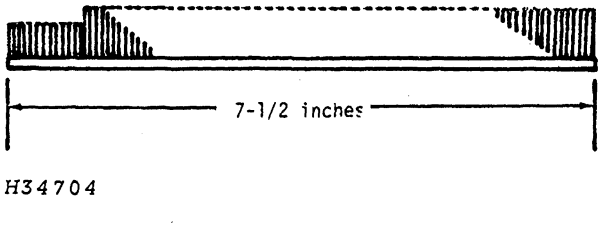


Upper Baffle Position

VACUUM METER BRUSH

Use the (regular) long brush.

Talc lubricant, 1/2 cup, if treated.



Regular (Long) Brush

HX,B22,9OM,F -19-28JUN90

{Decal No. DB1089}

SUGAR BEETS

AVERAGE SEED SPACING, AND/OR APPROXIMATE SEED POPULATION PER ACRE OF SUGAR BEETS PLANTED WITH VACUUM METER

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth) Driver	Driven	Average Seed Spacing in In.	Approximate Seed Population Per Acre 22 In. Rows	30 In. Rows	38 In. Rows	Recommended Speed Range in mph
24	28	2-1/2	114,557	83,971	66,293	2 to 5
20	24	2-1/2	111,375	81,675	64,480	2 to 5
20	25	2-9/16	106,920	78,310	61,824	2 to 5-1/2
20	26	2-3/4	102,808	75,483	59,592	2 to 5-1/2
20	27	2-7/8	99,000	72,600	57,316	2 to 6
20	28	3	95,464	69,929	55,207	2 to 6
16	24	3-3/16	89,100	65,340	51,584	3 to 6-1/2
16	25	3-5/16	85,536	62,789	49,570	3 to 6-1/2
16	26	3-1/2	82,246	60,256	47,570	3 to 7
16	27	3-5/8	79,200	58,080	45,853	3 to 7-1/2
16	28	3-3/4	76,272	56,056	44,255	3 to 7-1/2

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth) Driver	Driven	Average Seed Spacing in In.	Approximate Seed Population Per Acre 22 In. Rows	30 In. Rows	38 In. Rows	Recommended Speed Range in mph
35	24	3-15/16	73,090	53,612	42,326	3 to 8
35	25	4-1/16	70,166	51,500	40,658	3 to 8
35	26	4-1/4	67,468	49,430	39,024	3 to 8
35	27	4-3/8	64,969	47,628	37,601	3 to 8
35	28	4-9/16	62,649	45,953	36,279	3 to 8
29	24	4-3/4	60,560	44,392	35,047	3-1/2 to 8
29	25	4-15/16	58,138	42,671	33,688	3-1/2 to 8
29	26	5-1/8	55,902	40,998	32,367	3-1/2 to 8
29	27	5-5/16	53,831	39,451	31,145	3-1/2 to 8
29	28	5-1/2	51,909	38,085	30,067	3-1/2 to 8
24	24	5-11/16	50,119	36,747	29,010	3-1/2 to 8
24	25	5-15/16	48,114	35,259	27,836	3-1/2 to 8
24	26	6-3/16	46,264	33,943	26,797	4 to 8
24	27	6-3/8	44,550	32,670	25,792	4 to 8
24	28	6-5/8	42,959	31,489	24,860	4 to 8
20	24	6-13/16	41,766	30,613	24,168	4-1/2 to 8
20	25	7-1/8	40,095	29,408	23,217	4-1/2 to 8
20	26	7-3/8	38,553	28,255	22,307	4-1/2 to 8
20	27	7-11/16	37,125	27,225	21,493	5 to 8
20	28	7-15/16	35,799	26,267	20,737	5 to 8
16	24	8-9/16	33,413	24,512	19,352	5-1/2 to 8
16	25	8-7/8	32,076	23,519	18,568	5-1/2 to 8
16	26	9-1/4	30,842	22,629	17,865	6 to 8
16	27	9-5/8	29,700	21,780	17,195	6 to 8
16	28	10	28,639	20,993	16,573	6 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate.

H41779

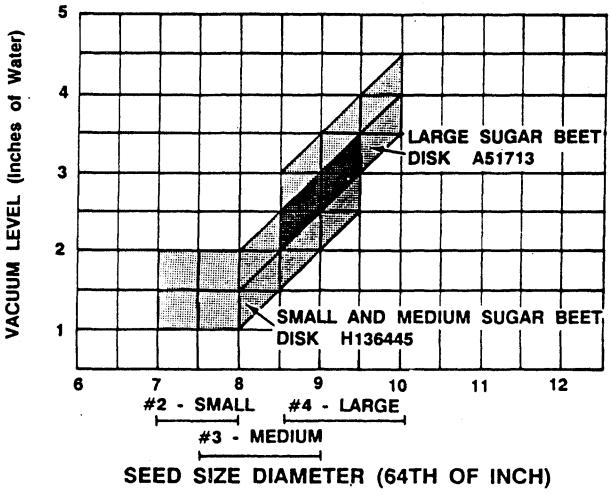
H41779 -19-25APR90

B22,9OM,AC -19-18MAY90

VACUUM LEVEL, BAFFLE POSITION AND VACUUM METER BRUSH FOR SUGAR BEET SEED

EXAMPLE: If the bag label indicates medium seed (size 7-1/2 to 9/64 in. diameter). The vacuum level should be a range of between 1-1/2 to 2-1/2 in. when using Sugar Beet Disk.

IMPORTANT: The 1-1/2 to 2-1/2 in. vacuum level above is an example on how to use the chart. Obtain size in seeds per pound. You must calculate the proper vacuum level for each sugar beet seed size.



H42258 -19-26JUN90

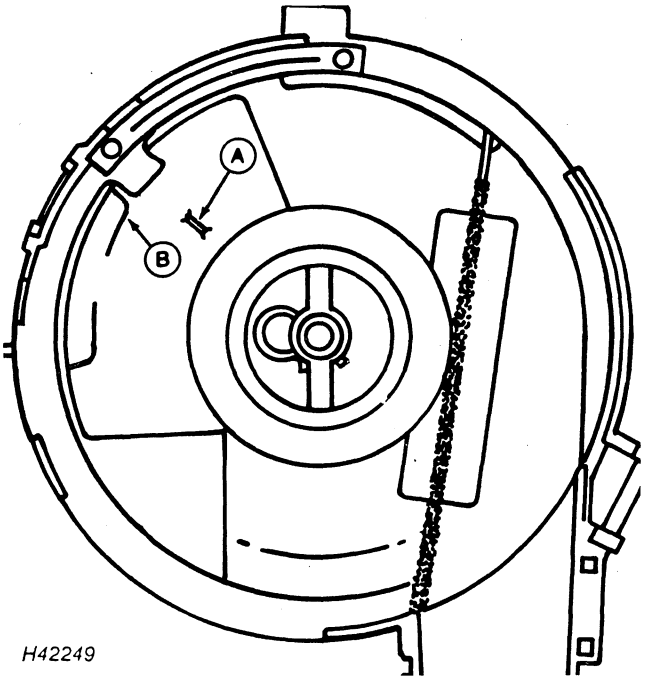
H42258

VACUUM METER BAFFLE

Move tab (A).

Sugar beets, lower position (B).

Talc lubricant, 1/2 cup.



H42249 -UN-19JUN90

H42249

Lower Baffle Position

HX,B22,9OM,G -19-28JUN90

{Decal No. DB1090}

SMALL EDIBLE BEANS - 108 CELLS

AVERAGE SEEDS PER FT. AND/OR APPROXIMATE SEED POPULATION PER ACRE OF SMALL EDIBLE BEANS PLANTED WITH VACUUM METER

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth) Driver	Driven	Average Seeds Per Ft.	Approximate Seed Population Per Acre 30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Recommended Speed Range in mph
35	24	19.6	343,035	285,863	270,817	257,276	2 to 4
35	25	19.0	329,314	274,428	259,984	246,985	2 to 4
35	26	18.2	316,648	263,873	249,985	237,486	2 to 4
35	27	17.4	304,920	254,100	240,726	228,690	2 to 4
35	28	16.9	294,030	245,025	232,129	220,523	2 to 4
29	24	16.2	284,229	236,858	224,391	213,172	2 to 4-1/2
29	25	15.6	272,860	227,383	215,416	204,645	2 to 4-1/2
29	26	15.0	262,365	218,638	207,130	196,774	2 to 5
29	27	14.5	252,648	210,540	199,459	189,486	2 to 5
29	28	14.0	243,625	203,021	192,335	182,719	2 to 5-1/2
24	24	13.5	235,224	196,020	185,703	176,418	2 to 5-1/2
24	25	12.9	225,815	188,179	178,275	169,361	3 to 6
24	26	12.5	217,130	180,942	171,418	162,847	3 to 6
24	27	12.0	209,088	174,240	165,069	156,816	3 to 6
24	28	11.5	201,621	168,017	159,174	151,215	3 to 6-1/2
20	24	11.2	196,020	163,350	154,753	147,015	3 to 6-1/2
20	25	10.8	188,179	156,816	148,563	141,134	4 to 7
20	26	10.4	180,942	150,785	142,849	135,706	4 to 7
20	27	10.0	174,240	145,200	137,558	130,680	4 to 7-1/2
20	28	9.7	168,017	140,014	132,645	126,013	4 to 7-1/2
16	24	9.0	156,816	130,680	123,802	117,612	4 to 8
16	25	8.6	150,543	125,453	118,850	112,908	4 to 8
16	26	8.3	144,753	120,628	114,279	108,565	4 to 8
16	27	8.0	139,392	116,160	110,046	104,544	4 to 8
16	28	7.7	134,414	112,011	106,116	100,810	4 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth) Driver	Driven	Average Seeds Per Ft.	Approximate Seed Population Per Acre 30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Recommended Speed Range in mph
35	24	7.4	128,638	107,198	101,556	96,479	4 to 8
35	25	7.1	123,493	102,911	97,494	92,619	4 to 8
35	26	6.8	118,743	98,952	93,744	89,057	4 to 8
35	27	6.6	114,345	95,288	90,272	85,759	4 to 8
35	28	6.3	110,261	91,884	87,048	82,696	4 to 8
29	24	6.1	106,586	88,822	84,147	79,939	4 to 8
29	25	5.9	102,322	85,269	80,781	76,742	4 to 8
29	26	5.6	98,387	81,989	77,674	73,790	4 to 8
29	27	5.4	94,743	78,953	74,797	71,057	4 to 8
29	28	5.2	91,359	76,133	72,126	68,519	4 to 8
24	24	5.1	88,209	73,508	69,639	66,157	4 to 8
24	25	4.9	84,681	70,567	66,853	63,510	4 to 8
24	26	4.7	81,424	67,853	64,282	61,068	4 to 8
24	27	4.5	78,408	65,340	61,901	58,806	4 to 8
24	28	4.3	75,608	63,006	59,690	56,706	4 to 8
20	24	4.2	73,508	61,256	58,032	55,131	4 to 8
20	25	4.1	70,567	58,806	55,711	52,925	4 to 8
20	26	3.9	67,853	56,544	53,568	50,890	4 to 8
20	27	3.8	65,340	54,450	51,584	49,005	4 to 8
20	28	3.6	63,006	52,505	49,742	47,255	4 to 8
16	24	3.4	58,806	49,005	46,426	44,105	4 to 8
16	25	3.2	56,454	47,045	44,569	42,340	4 to 8
16	26	3.1	54,282	45,235	42,855	40,712	4 to 8
16	27	3.0	52,272	43,560	41,267	39,204	4 to 8
16	28	2.9	50,405	42,004	39,794	37,804	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41780*

H41780 -19-20JUN90

B21,9OM,D -19-28JUN90

VACUUM LEVEL, BAFFLE POSITION AND VACUUM METER BRUSH FOR SMALL EDIBLE BEANS

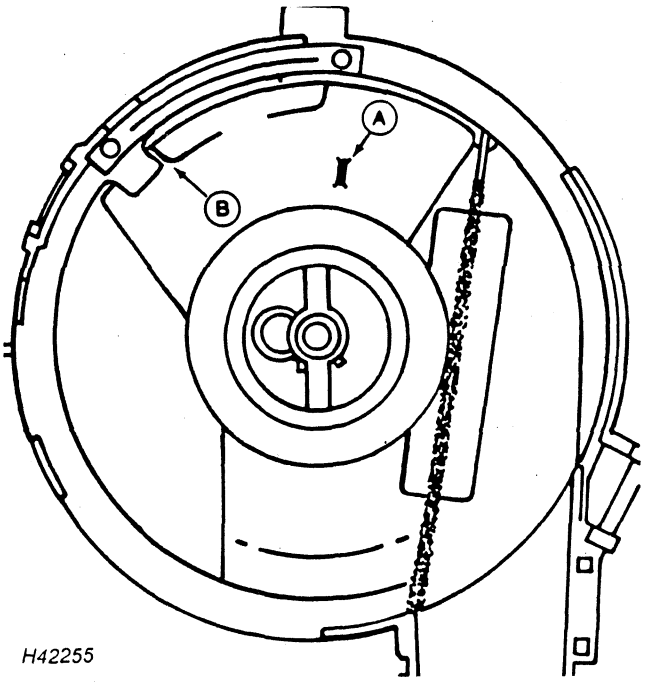
Vacuum level for small edible beans 8 in.

NOTE: Small edible beans, for seeds that have 2800 or more seeds per pound, set vacuum level at 6 in.

VACUUM METER BAFFLE

Move tab (A).

Small edible beans, upper position (B).

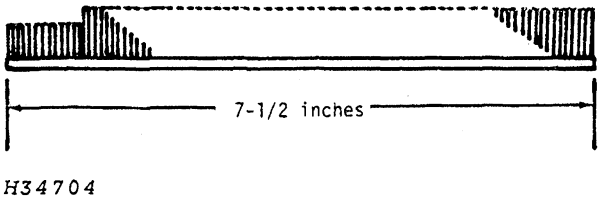


Upper Baffle Position

VACUUM METER BRUSH

Use the (regular) long brush.

Talc lubricant, 1/2 cup, if treated.



Regular (Long) Brush

HX,B22,9OM,M -19-28JUN90

{Decal No. DB1091}

MEDIUM EDIBLE BEANS - 56 CELLS

AVERAGE SEEDS PER FT. AND/OR APPROXIMATE SEED POPULATION PER ACRE OF MEDIUM EDIBLE BEANS PLANTED WITH VACUUM METER AND USING AH132233 BRUSH

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Average	Approximate Seed Population Per Acre				Recommended
Driver	Driven	Seeds Per Ft.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	10.21	177,870	148,225	140,424	133,403	4 to 4.5
35	25	9.80	170,755	142,296	134,807	128,066	4 to 4.5
35	26	9.42	164,188	136,823	129,622	123,141	4 to 5
35	27	9.07	158,107	131,756	124,821	118,580	4 to 5
35	28	8.75	152,460	127,050	120,363	114,345	4 to 5
29	24	8.46	147,378	122,815	116,351	110,534	4 to 5
29	25	8.12	141,483	117,902	111,697	106,112	4 to 5.5
29	26	7.31	136,041	113,368	107,401	102,031	4 to 5.5
29	27	7.52	131,003	109,169	103,423	98,252	4 to 6
29	28	7.25	126,324	105,270	99,729	94,743	4 to 6
24	24	7.00	121,968	101,640	96,291	91,476	4 to 6.5
24	25	6.72	117,089	97,574	92,439	87,817	4 to 6.5
24	26	6.46	112,586	93,822	88,884	84,439	4 to 7
24	27	6.22	108,416	90,347	85,592	81,312	4 to 7
24	28	6.00	104,544	87,120	82,535	78,408	4 to 7.5
20	24	5.83	101,640	84,700	80,242	76,230	4 to 8
20	25	5.60	97,574	81,312	77,032	73,181	4 to 8
20	26	5.38	93,822	78,185	74,070	70,366	4 to 8
20	27	5.19	90,347	75,289	71,326	67,760	4 to 8
20	28	5.00	87,120	72,600	68,779	65,340	4 to 8
16	24	4.67	81,312	67,760	64,194	60,984	4 to 8
16	25	4.48	78,060	65,050	61,626	58,545	4 to 8
16	26	4.31	75,057	62,548	59,256	56,293	4 to 8
16	27	4.15	72,277	60,231	57,061	54,208	4 to 8
16	28	4.00	69,696	58,080	55,023	52,272	4 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Average	Approximate Seed Population Per Acre				Recommended
Driver	Driven	Seeds Per Ft.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	3.83	66,701	55,584	52,659	50,026	4 to 8
35	25	3.68	64,033	53,361	50,553	48,025	4 to 8
35	26	3.53	61,570	51,309	48,608	46,178	4 to 8
35	27	3.40	59,290	49,408	46,808	44,468	4 to 8
35	28	3.28	57,173	47,644	45,136	42,879	4 to 8
29	24	3.17	55,265	46,056	43,632	41,450	4 to 8
29	25	3.05	53,056	44,213	41,886	39,792	4 to 8
29	26	2.93	51,015	42,513	40,275	38,262	4 to 8
29	27	2.82	49,126	40,938	38,784	36,845	4 to 8
29	28	2.72	47,372	39,476	37,399	35,529	4 to 8
24	24	2.63	45,738	38,115	36,109	34,304	4 to 8
24	25	2.52	43,908	36,590	34,665	32,931	4 to 8
24	26	2.42	42,220	35,183	33,331	31,665	4 to 8
24	27	2.33	40,656	33,880	32,097	30,492	4 to 8
24	28	2.25	39,204	32,670	30,951	29,403	4 to 8
20	24	2.19	38,115	31,763	30,091	28,586	4 to 8
20	25	2.10	36,590	30,492	28,887	27,443	4 to 8
20	26	2.02	35,183	29,319	27,776	26,387	4 to 8
20	27	1.94	33,880	28,233	26,747	25,410	4 to 8
20	28	1.88	32,670	27,225	25,792	24,503	4 to 8
16	24	1.75	30,492	25,410	24,073	22,869	4 to 8
16	25	1.68	29,272	24,394	23,110	21,954	4 to 8
16	26	1.62	28,146	23,455	22,221	21,110	4 to 8
16	27	1.56	27,104	22,587	21,398	20,328	4 to 8
16	28	1.50	26,136	21,780	20,634	19,602	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41781*

-19-20JUN90

H41781

B21,9OM,B -19-28JUN90

VACUUM LEVEL, BAFFLE POSITION AND VACUUM METER BRUSH FOR MEDIUM EDIBLE BEANS

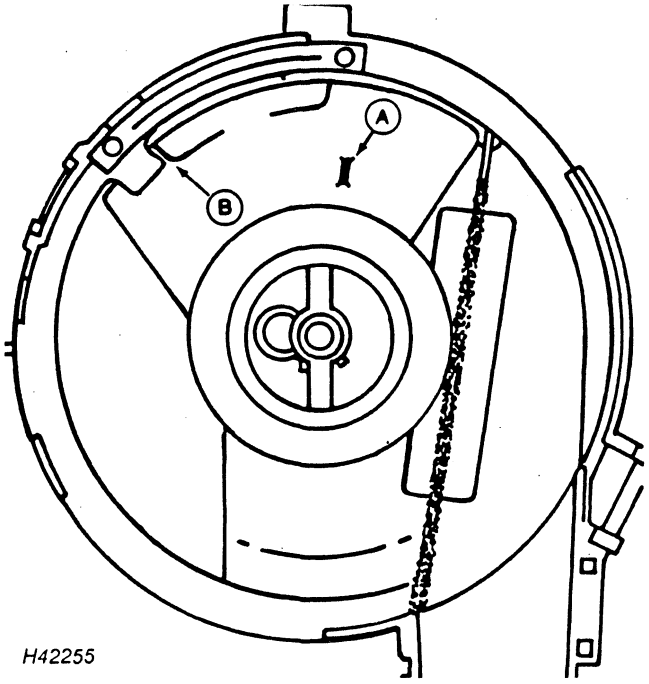
Vacuum level for medium edible beans is set at 8 in.

NOTE: Medium edible beans, for garden beans that have 1800 or more seeds per pound, set vacuum level at 6 in.

VACUUM METER BAFFLE

Move tab (A).

Medium edible beans, upper position (B).

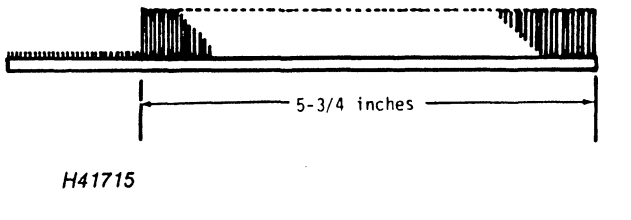


Upper Baffle Position

VACUUM METER BRUSH

Use the short brush.

Talc lubricant, 1/2 cup, if treated.



Short Brush

HX,B22,9OM,N -19-28JUN90

{Decal No. DB1092}

LARGE EDIBLE BEANS - 50 CELLS

AVERAGE SEEDS PER FT. AND/OR APPROXIMATE SEED POPULATION PER ACRE OF LARGE EDIBLE BEANS PLANTED WITH VACUUM METER AND USING AH132233 BRUSH

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Average Seeds	Approximate Seed Population Per Acre				Recommended Speed Range
Driver	Driven	Per Ft.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	in mph
35	24	9.11	158,813	132,344	125,378	119,109	4 to 4.5
35	25	8.75	152,460	127,050	120,363	114,345	4 to 4.5
35	26	8.41	146,596	122,163	115,734	109,947	4 to 4.5
35	27	8.10	141,167	117,639	111,447	105,875	4 to 4.5
35	28	7.81	136,125	113,438	107,467	102,094	4 to 4.5
29	24	7.55	131,588	109,656	103,885	98,691	4 to 5
29	25	7.25	126,324	105,270	99,729	94,743	4 to 5.5
29	26	6.97	121,465	101,221	95,894	91,099	4 to 5.5
29	27	6.71	116,967	97,472	92,342	87,725	4 to 5.5
29	28	6.47	112,789	93,991	89,044	84,592	4 to 6
24	24	6.25	108,900	90,750	85,974	81,675	4 to 6
24	25	6.00	104,544	87,120	82,535	78,408	4 to 6.5
24	26	5.77	100,523	83,769	79,360	75,392	4 to 6.5
24	27	5.56	96,800	80,667	76,421	72,600	4 to 7
24	28	5.36	93,343	77,786	73,692	70,007	4 to 7
20	24	5.21	90,750	75,625	71,645	68,063	4 to 7.5
20	25	5.00	87,120	72,600	68,779	65,340	4 to 7.5
20	26	4.81	83,769	69,808	66,134	62,827	4 to 8
20	27	4.63	80,667	67,222	63,684	60,500	4 to 8
20	28	4.46	77,786	64,821	61,410	58,339	4 to 8
16	24	4.17	72,600	60,500	57,316	54,450	4 to 8
16	25	4.00	69,696	58,080	55,023	52,272	4 to 8
16	26	3.85	67,015	55,846	52,907	50,262	4 to 8
16	27	3.70	64,533	53,778	50,947	48,400	4 to 8
16	28	3.57	62,229	51,857	49,128	46,671	4 to 8

Sprocket Combinations (Number of Teeth)		Average Seeds	Approximate Seed Population Per Acre				Recommended Speed Range
Driver	Driven	Per Ft.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	in mph
35	24	3.42	59,555	49,629	47,017	44,666	4 to 8
35	25	3.28	57,173	47,644	45,136	42,879	4 to 8
35	26	3.16	54,974	45,811	43,400	41,230	4 to 8
35	27	3.04	52,938	44,115	41,793	39,703	4 to 8
35	28	2.93	51,047	42,539	40,300	38,285	4 to 8
29	24	2.83	49,345	41,121	38,957	37,009	4 to 8
29	25	2.72	47,372	39,476	37,399	35,529	4 to 8
29	26	2.61	45,550	37,958	35,960	34,162	4 to 8
29	27	2.52	43,863	36,552	34,638	32,897	4 to 8
29	28	2.43	42,296	35,247	33,392	31,722	4 to 8
24	24	2.34	40,838	34,031	32,240	30,628	4 to 8
24	25	2.25	39,204	32,670	30,951	29,403	4 to 8
24	26	2.16	37,696	31,413	29,760	28,272	4 to 8
24	27	2.08	36,300	30,250	28,658	27,225	4 to 8
24	28	2.01	35,004	29,170	27,634	26,253	4 to 8
20	24	1.95	34,031	28,359	26,867	25,523	4 to 8
20	25	1.88	32,670	27,225	25,792	24,503	4 to 8
20	26	1.80	31,413	26,178	24,800	23,560	4 to 8
20	27	1.74	30,250	25,208	23,882	22,688	4 to 8
20	28	1.67	29,170	24,308	23,029	21,877	4 to 8
16	24	1.56	27,225	22,688	21,493	20,419	4 to 8
16	25	1.50	26,136	21,780	20,634	19,602	4 to 8
16	26	1.44	25,131	20,942	19,840	18,848	4 to 8
16	27	1.39	24,200	20,167	19,105	18,150	4 to 8
16	28	1.34	23,336	19,446	18,423	17,502	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41782*

H41782 -19-20JUN90

HX,B21,9OM,A -19-28JUN90

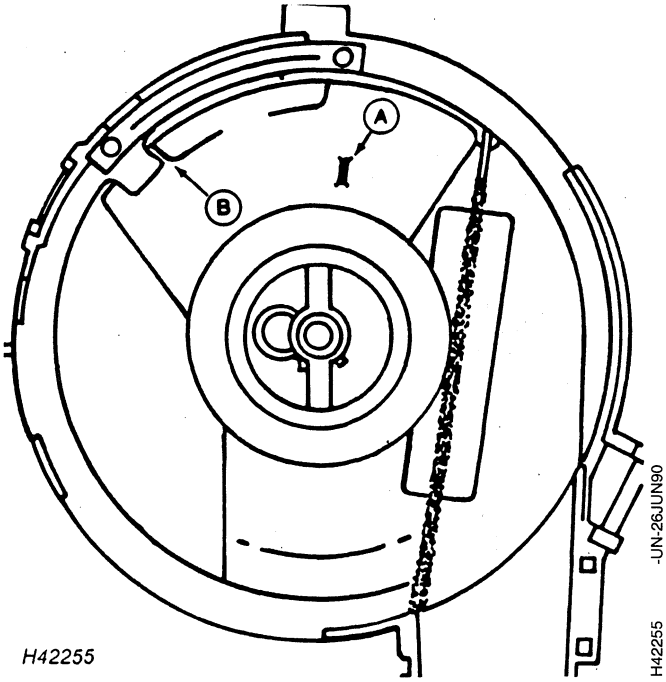
VACUUM LEVEL, BAFFLE POSITION AND VACUUM METER BRUSH FOR LARGE EDIBLE BEANS

Vacuum level for large edible beans is set at 8 in.

VACUUM METER BAFFLE

Move tab (A).

Large edible beans, upper position (B).

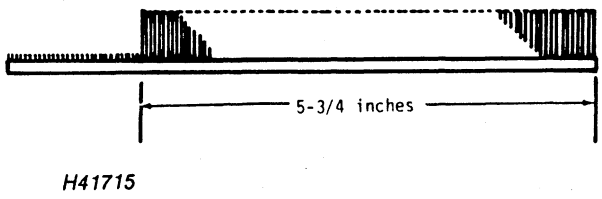


Upper Baffle Position

VACUUM METER BRUSH

Use the short brush.

Talc lubricant, 1/2 cup, if treated.



Short Brush

HX,B22,9OM,O -19-28JUN90

RUNNER AND SPANISH PEANUTS

{Decal No. DB1093} LARGE EDIBLE BEAN SEED DISK, PART NUMBER H136092

AVERAGE SEEDS PER FT. AND/OR APPROXIMATE SEED POPULATION PER ACRE OF RUNNER PEANUTS PLANTED WITH VACUUM METER AND USING AA32706 BRUSH

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Average	Approximate Seed Population Per Acre				Recommended
Driver	Driven	Seeds Per Ft.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	9.11	158,813	132,344	125,378	119,109	3-1/2
35	25	8.75	152,460	127,050	120,363	114,345	3-1/2
35	26	8.41	146,596	122,163	115,734	109,947	3-1/2
35	27	8.10	141,167	117,639	111,447	105,875	3-1/2 to 4
35	28	7.81	136,125	113,438	107,467	102,094	3-1/2 to 4
29	24	7.55	131,588	109,656	103,885	98,691	3-1/2 to 4
29	25	7.25	126,324	105,270	99,729	94,743	3-1/2 to 4-1/2
29	26	6.97	121,465	101,221	95,894	91,099	3-1/2 to 4-1/2
29	27	6.71	116,967	97,472	92,342	87,725	3-1/2 to 4-1/2
29	28	6.47	112,789	93,991	89,044	84,592	3-1/2 to 5
24	24	6.25	108,900	90,750	85,974	81,675	3-1/2 to 5
24	25	6.00	104,544	87,120	82,535	78,408	3-1/2 to 5-1/2
24	26	5.77	100,523	83,769	79,360	75,392	3-1/2 to 5-1/2
24	27	5.56	96,800	80,667	76,421	72,600	3-1/2 to 5-1/2
24	28	5.36	93,343	77,786	73,692	70,007	3-1/2 to 6
20	24	5.21	90,750	75,625	71,645	68,063	3-1/2 to 6
20	25	5.00	87,120	72,600	68,779	65,340	3-1/2 to 6-1/2
20	26	4.81	83,769	69,808	66,134	62,827	3-1/2 to 6-1/2
20	27	4.63	80,667	67,222	63,684	60,500	3-1/2 to 7
20	28	4.46	77,786	64,821	61,410	58,339	3-1/2 to 7
16	24	4.17	72,600	60,500	57,316	54,450	4 to 7-1/2
16	25	4.00	69,696	58,080	55,023	52,272	4 to 8
16	26	3.85	67,015	55,846	52,907	50,262	4 to 8
16	27	3.70	64,533	53,778	50,947	48,400	4 to 8
16	28	3.57	62,229	51,857	49,128	46,671	4 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Average	Approximate Seed Population Per Acre				Recommended
Driver	Driven	Seeds Per Ft.	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	3.42	59,555	49,629	47,017	44,666	4 to 8
35	25	3.28	57,173	47,644	45,136	42,879	4 to 8
35	26	3.16	54,974	45,811	43,400	41,230	4 to 8
35	27	3.04	52,938	44,115	41,793	39,703	4 to 8
35	28	2.93	51,047	42,539	40,300	38,285	4 to 8
29	24	2.83	49,345	41,121	38,957	37,009	4 to 8
29	25	2.72	47,372	39,476	37,399	35,529	4 to 8
29	26	2.61	45,550	37,958	35,960	34,162	4 to 8
29	27	2.52	43,863	36,552	34,638	32,897	4 to 8
29	28	2.43	42,296	35,247	33,392	31,722	4 to 8
24	24	2.34	40,838	34,031	32,240	30,628	4 to 8
24	25	2.25	39,204	32,670	30,951	29,403	4 to 8
24	26	2.16	37,696	31,413	29,760	28,272	4 to 8
24	27	2.08	36,300	30,250	28,658	27,225	4 to 8
24	28	2.01	35,004	29,170	27,634	26,253	4 to 8
20	24	1.95	34,031	28,359	26,867	25,523	4 to 8
20	25	1.88	32,670	27,225	25,792	24,503	4 to 8
20	26	1.80	31,413	26,178	24,800	23,560	4 to 8
20	27	1.74	30,250	25,208	23,882	22,688	4 to 8
20	28	1.67	29,170	24,308	23,029	21,877	4 to 8
16	24	1.56	27,225	22,688	21,493	20,419	4 to 8
16	25	1.50	26,136	21,780	20,634	19,602	4 to 8
16	26	1.44	25,131	20,942	19,840	18,848	4 to 8
16	27	1.39	24,200	20,167	19,105	18,150	4 to 8
16	28	1.34	23,336	19,446	18,423	17,502	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate.

H41783

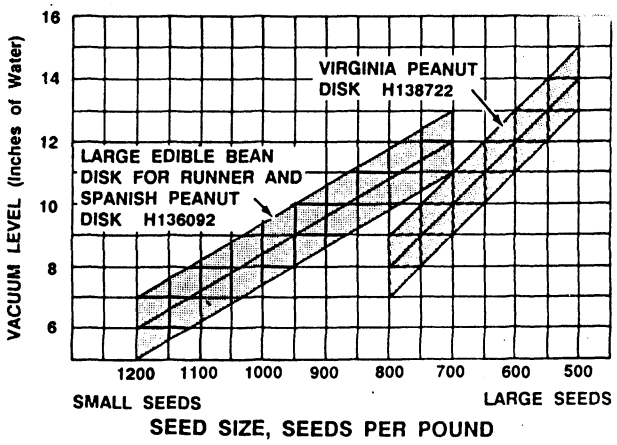
H41783 -19-25APR90

HX,B22,9OM,B -19-18MAY90

VACUUM LEVEL, BAFFLE POSITION AND VACUUM METER BRUSH FOR PEANUTS

EXAMPLE: If seeds per pound is 800. Referring to the chart, the vacuum level should be set at 11 in., when using the Large Edible Bean Disk for Runner Peanuts or 8 in. when using the Virginia Peanut Disk.

IMPORTANT: The 11 in. or 8 in. vacuum level above is an example on how to use the chart. Obtain size in seeds per pound. You must calculate the proper vacuum level for each peanut variety.



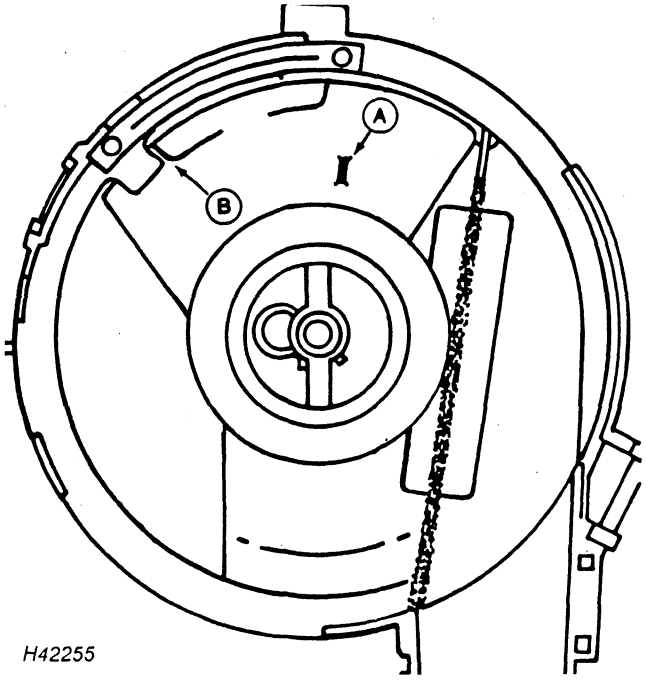
H42254 -19-26JUN90

H42254

VACUUM METER BAFFLE

Move tab (A).

Peanuts, upper position (B).



H42255 -UN-26JUN90

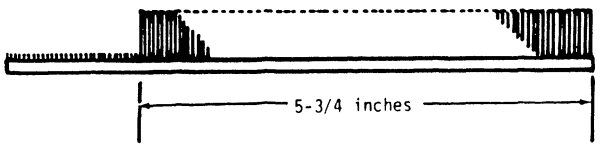
H42255

Upper Baffle Position

VACUUM METER BRUSH

Use the short brush.

Talc lubricant, 2 cups.



H41715 -UN-03MAY90

H41715

Short Brush

HX,B22,9OM,L -19-28JUN90

VIRGINIA PEANUTS

{Decal No. DB1094} **VIRGINIA PEANUT SEED DISK, PART NUMBER H138722**

AVERAGE SEEDS PER FT. AND/OR APPROXIMATE SEED POPULATION PER ACRE OF VIRGINIA PEANUTS PLANTED WITH VACUUM METER AND USING AA32706 BRUSH

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth) Driver	Driven	Average Seeds Per Ft.	Approximate Seed Population Per Acre 30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Recommended Speed Range in mph
35	24	8.4	146,108	121,756	115,348	109,581	3
35	25	8.1	140,263	116,886	110,734	105,197	3
35	26	7.7	134,868	112,390	106,475	101,151	3
35	27	7.5	129,873	108,228	102,532	97,405	3
35	28	7.2	125,235	104,363	98,870	93,926	3
29	24	6.9	121,061	100,884	95,574	90,795	3
29	25	6.7	116,218	96,848	91,751	87,164	3 to 3-1/2
29	26	6.4	111,748	93,123	88,222	83,811	3 to 3-1/2
29	27	6.2	107,609	89,674	84,955	80,707	3 to 4
29	28	6.0	103,766	86,472	81,921	77,825	3 to 4
24	24	5.8	100,188	83,490	79,096	75,141	3 to 4
24	25	5.5	96,180	80,150	75,932	72,135	3 to 4
24	26	5.3	92,481	77,068	73,011	69,361	3 to 4-1/2
24	27	5.1	89,056	74,213	70,307	66,792	3 to 4-1/2
24	28	4.9	85,875	71,563	67,796	64,407	3 to 4-1/2
20	24	4.8	83,490	69,575	65,913	62,618	3 to 5
20	25	4.6	80,150	66,792	63,277	60,113	3 to 5
20	26	4.4	77,068	64,223	60,843	57,801	3 to 5
20	27	4.3	74,213	61,844	58,589	55,660	3 to 5-1/2
20	28	4.1	71,563	59,636	56,497	53,672	3 to 6
16	24	3.8	66,792	55,660	52,731	50,094	3 to 6
16	25	3.7	64,120	53,434	50,621	48,090	3 to 6-1/2
16	26	3.5	61,654	51,378	48,674	46,241	3 to 6-1/2
16	27	3.4	59,371	49,476	46,872	44,528	3 to 7
16	28	3.3	57,250	47,709	45,198	42,938	3 to 7-1/2

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth) Driver	Driven	Average Seeds Per Ft.	Approximate Seed Population Per Acre 30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Recommended Speed Range in mph
35	24	3.1	54,790	45,659	43,256	41,093	3 to 7-1/2
35	25	3.0	52,599	43,832	41,525	39,449	3 to 8
35	26	2.9	50,576	42,146	39,928	37,932	3 to 8
35	27	2.8	48,703	40,585	38,449	36,527	3 to 8
35	28	2.7	46,963	39,136	37,076	35,222	3 to 8
29	24	2.6	45,398	37,831	35,840	34,048	4 to 8
29	25	2.5	43,582	36,318	34,407	32,686	4 to 8
29	26	2.4	41,906	34,921	33,083	31,429	4 to 8
29	27	2.3	40,354	33,628	31,858	30,265	4 to 8
29	28	2.2	38,912	32,427	30,720	29,184	4 to 8
24	24	2.2	37,571	31,309	29,661	28,178	4 to 8
24	25	2.1	36,068	30,056	28,474	27,051	4 to 8
24	26	2.0	34,680	28,900	27,379	26,010	4 to 8
24	27	1.9	33,396	27,830	26,365	25,047	4 to 8
24	28	1.8	32,203	26,836	25,424	24,152	4 to 8
20	24	1.8	31,309	26,091	24,717	23,482	4 to 8
20	25	1.7	30,056	25,047	23,729	22,542	4 to 8
20	26	1.7	28,900	24,084	22,816	21,675	4 to 8
20	27	1.6	27,830	23,192	21,971	20,873	4 to 8
20	28	1.5	26,836	22,363	21,186	20,127	4 to 8
16	24	1.4	25,047	20,873	19,774	18,785	4 to 8
16	25	1.4	24,045	20,038	18,983	18,034	4 to 8
16	26	1.3	23,120	19,267	18,253	17,340	4 to 8
16	27	1.3	22,265	18,553	17,577	16,698	4 to 8
16	28	1.2	21,469	17,891	16,949	16,102	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate.

H41784

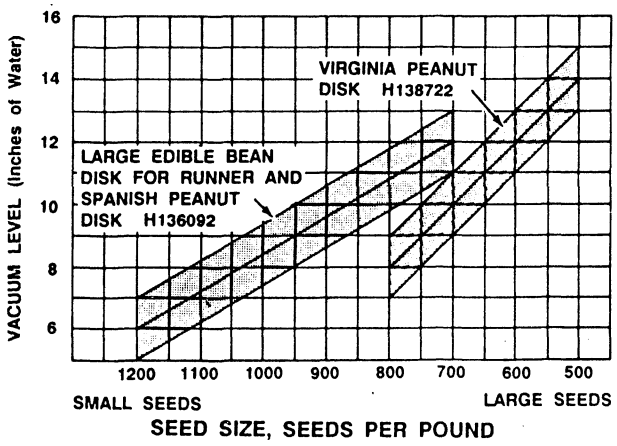
H41784 -19-25APR90

HX,B22,9OM,C -19-18MAY90

VACUUM LEVEL, BAFFLE POSITION AND VACUUM METER BRUSH FOR PEANUTS

EXAMPLE: If seeds per pound is 800. Referring to the chart, the vacuum level should be set at 11 in., when using the Large Edible Bean Disk for Runner Peanuts or 8 in. when using the Virginia Peanut Disk.

IMPORTANT: The 11 in. or 8 in. vacuum level above is an example on how to use the chart. Obtain size in seeds per pound. You must calculate the proper vacuum level for each peanut variety.



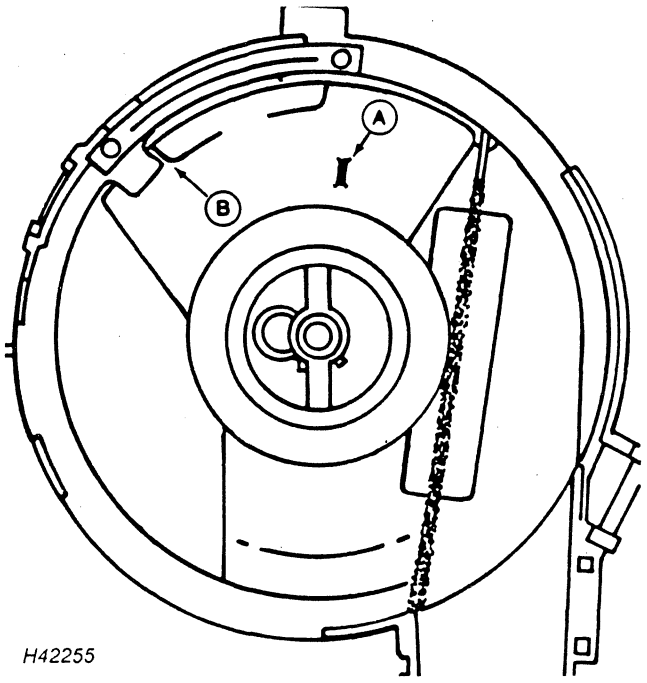
H42254 -19-26JUN90

H42254

VACUUM METER BAFFLE

Move tab (A).

Peanuts, upper position (B).



H42255 -UN-26JUN90

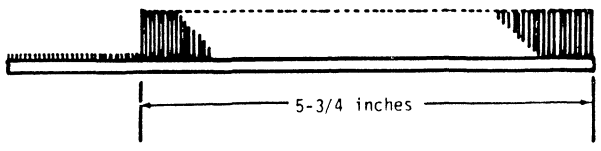
H42255

Upper Baffle Position

VACUUM METER BRUSH

Use the short brush.

Talc lubricant, 2 cups.



H41715 -UN-03MAY90

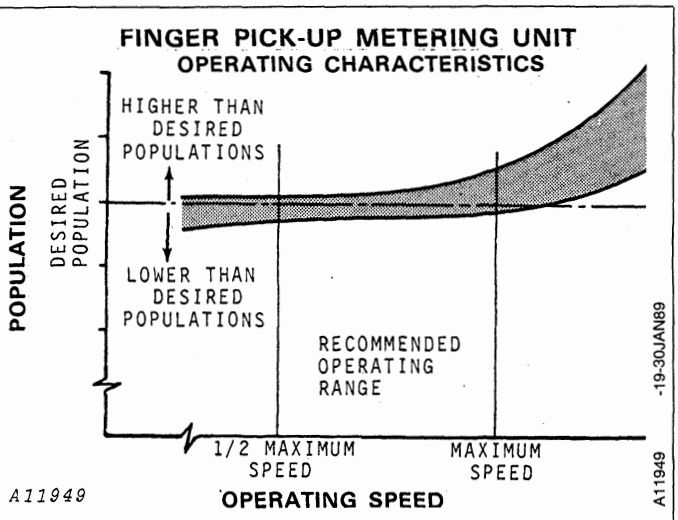
H41715

Short Brush

HX,B22,9OM,L -19-28JUN90

FINGER PICKUP METERING UNIT OPERATING CHARACTERISTICS

IMPORTANT: The graph shows the performance characteristics of the Finger Pickup Metering Unit relative to operating speed. An increase in operating speed above the maximum speed will cause an increase in the population. The population is shown as a band on the graph since slight variations in population may result from differences in seed size and shape.



The most accurate population will be obtained when the planter is operated between one-half the maximum speed and full maximum speed. Planting too fast may result in doubles and triples and planting too slow may result in skips.

The maximum speeds shown in the planting rate charts are for optimum conditions. Slower speeds should always be used when planting in rough seedbeds to insure satisfactory planter performance. Poor depth control and erratic seed spacing may result from planting too fast for conditions.

See CHANGING PLANTING RATE SPROCKET COMBINATIONS in this section for instructions on setting sprockets for the desired planting rate.

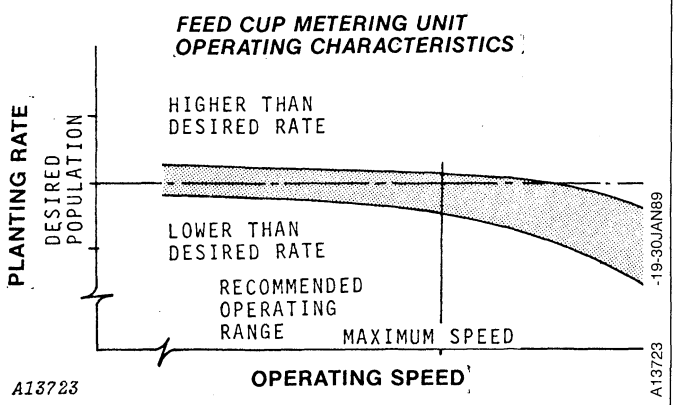
B22,8OM,K -19-18MAY90

FEED CUP OPERATING CHARACTERISTICS

IMPORTANT: The graph shows the operating characteristics of the feed cup metering unit.

The operating band illustrates how the feed cup metering unit performs with regard to the desired population (indicated by the horizontal line). The width of the band is due to various sizes and shapes of seeds.

Best results are obtained when the planter is operated below the full maximum speed.



B05,13PR,E -19-18MAY90

IMPORTANT: Soybeans vary in size from about 815 seeds/kg to about 1600 seeds/kg (from about 1800 seeds per lb. to about 3500 seeds per lb.). Consequently, the planting rates can vary widely. The following charts were developed using uniform soybeans sized to 1600 seeds/kg (2600 seeds per lb.) and should be used only as a guide for initial planter settings.

Large beans will generally result in lower rates than those in the chart and small beans will give somewhat higher rates. Actual rates MUST be checked in the field at planting speed and planter settings changed accordingly.

If the desired rate cannot be obtained when planting large soybeans, the edible bean cup may be used.

Refer to the Edible Bean Feed Cup chart. The Medium Size Beans section of the chart should be used as a guide for initial planter settings.

Sprocket combinations directly affect the number of revolutions per minute (rpm) of the feed cup. If the feed cup rpm is increased by changing the sprocket combination, your planting speed may have to be reduced accordingly to keep feed cup rpm within a satisfactory range.

After determining the correct sprocket combination for your desired planting rate, be certain to plant at a speed no greater than the maximum speed shown for your sprocket combination. This will help insure accurate planting rates.

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at the desired rate.

B22,8OM,P -19-18MAY90

{Decal No. DB1095}

FINGER PICK-UP

AVERAGE SEED POPULATION PER ACRE AND AVERAGE SEED SPACING PLANTED WITH FINGER PICK-UP METERING UNIT

NOTE: For information on using planting rate charts, see 'HOW TO USE PLANTING RATE CHARTS'.

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth) Driver	Driven	Average Seed Spacing in In.	Approximate Seed Population Per Acre 30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Recommended Speed Range in mph
35	24	3-3/4	56,169	46,808	44,344	42,127	2 to 3
35	25	3-7/8	53,923	44,936	42,571	40,442	2 to 3
35	26	4	51,849	43,207	40,933	38,887	2 to 3
35	27	4-1/4	49,928	41,607	39,417	37,446	2 to 4
35	28	4-3/8	48,145	40,121	39,009	36,109	2 to 4
29	24	4-1/2	46,540	38,784	36,742	34,905	3 to 4
29	25	4-5/8	44,679	37,232	35,273	33,509	3 to 4
29	26	4-7/8	42,960	35,800	33,916	32,220	3 to 4
29	27	5	41,369	34,474	32,660	31,027	3 to 4
29	28	5-1/4	39,892	33,243	31,494	29,919	3 to 4
24	24	5-1/2	38,516	32,097	30,408	28,887	3 to 5
24	25	5-5/8	36,976	30,813	29,191	27,732	3 to 5
24	26	5-7/8	35,553	29,628	28,068	26,665	3 to 5
24	27	6-1/8	34,237	28,531	27,029	25,677	3 to 5
24	28	6-3/8	33,014	27,512	26,064	24,760	3 to 5
20	24	6-1/2	32,097	26,747	25,340	24,073	4 to 6
20	25	6-3/4	30,813	25,677	24,326	23,110	4 to 6
20	26	7	29,628	24,690	23,390	22,221	4 to 6
20	27	7-3/8	28,531	23,775	22,524	21,398	4 to 7
20	28	7-5/8	27,512	22,926	21,720	20,634	4 to 7
16	24	8-1/8	25,677	21,398	20,272	19,258	4 to 7
16	25	8-1/2	24,650	20,542	19,461	18,488	5 to 8
16	26	8-7/8	23,702	19,752	18,712	17,777	5 to 8
16	27	9-1/8	22,824	19,020	18,019	17,118	5 to 8
16	28	9-1/2	22,009	18,341	17,376	16,507	5 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth) Driver	Driven	Average Seed Spacing in In.	Approximate Seed Population Per Acre 30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Recommended Speed Range in mph
35	24	9-7/8	21,064	17,553	16,629	15,798	5 to 8
35	25	10-3/8	20,221	16,851	15,964	15,166	5 to 8
35	26	10-3/4	19,443	16,203	15,350	14,582	5 to 8
35	27	11-1/8	18,723	15,603	14,781	14,042	6 to 8
35	28	11-5/8	18,054	15,045	14,254	13,541	6 to 8
29	24	12	17,453	14,544	13,778	13,089	6 to 8
29	25	12-1/2	16,755	13,962	13,227	12,566	6 to 8
29	26	13	16,110	13,425	12,719	12,083	6 to 8
29	27	13-1/2	15,513	12,928	12,247	11,635	7 to 8
29	28	14	14,959	12,466	11,810	11,220	7 to 8
24	24	14-1/2	14,444	12,036	11,403	10,833	7 to 8
24	25	15	13,866	11,555	10,947	10,399	7 to 8
24	26	15-5/8	13,333	11,110	10,526	9,999	8
24	27	16-1/4	12,839	10,699	10,136	9,629	8
24	28	16-7/8	12,380	10,317	9,774	9,285	8
20	24	17-3/8	12,036	10,030	9,502	9,027	8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate.

H41785

-19-25APR90

H41785

B22,8OM,M -19-18MAY90

{Decal No. DB1096}

SOYBEAN FEED CUP (SOYBEANS)

APPROXIMATE LB. PER ACRE OF SOYBEANS PLANTED WITH FINGER PICKUP WHEN USING SOYBEAN FEED CUP

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Approximate Seed Population Per Acre				Recommended Speed Range
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	in mph
35	24	268	224	206	201	2 to 4
35	25	258	214	204	194	2 to 4
35	26	248	206	196	186	2 to 4
35	27	238	200	188	178	2 to 4
35	28	230	192	182	172	2 to 4
29	24	222	186	176	166	2 to 5
29	25	214	178	168	160	2 to 5
29	26	206	172	162	154	2 to 5
29	27	198	164	156	148	2 to 5
29	28	190	160	150	142	2 to 5
24	24	184	154	146	138	2 to 6
24	25	176	148	140	132	2 to 6
24	26	170	142	134	128	2 to 6
24	27	164	136	130	123	2 to 6
24	28	158	132	124	118	2 to 7
20	24	154	128	122	116	2 to 7
20	25	148	122	116	111	2 to 7
20	26	142	118	112	106	2 to 8
20	27	136	114	108	102	2 to 8
20	28	132	110	104	99	2 to 8
16	24	122	102	96	92	2 to 8
16	25	118	98	94	88	2 to 8
16	26	114	94	90	86	2 to 8
16	27	110	90	86	82	2 to 8
16	28	106	88	84	80	2 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Approximate Seed Population Per Acre				Recommended Speed Range
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	in mph
35	24	100	84	80	75	2 to 8
35	25	96	80	76	72	2 to 8
35	26	94	78	74	70	2 to 8
35	27	90	74	70	68	2 to 8
35	28	86	72	68	64	2 to 8
29	24	84	70	66	63	2 to 8
29	25	80	66	64	60	2 to 8
29	26	78	64	60	58	2 to 8
29	27	74	62	58	56	2 to 8
29	28	72	60	56	54	2 to 8
24	24	70	58	54	52	2 to 8
24	25	66	56	52	50	2 to 8
24	26	64	54	50	48	2 to 8
24	27	62	52	48	46	2 to 8
24	28	60	50	46	45	2 to 8
20	24	58	48	46	44	2 to 8
20	25	56	46	44	42	2 to 8
20	26	54	44	42	40	2 to 8
20	27	52	42	40	39	2 to 8
20	28	50	42	38	38	2 to 8
16	24	46	38	36	34	2 to 8
16	25	44	36	34	33	2 to 8
16	26	42	36	34	32	2 to 8
16	27	40	34	32	30	2 to 8
16	28	40	32	32	30	2 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate.

H41786

-19-25APR90

H41786

B22,8OM,BD -19-18MAY90

{Decal No. DB1097}

SOYBEAN FEED CUP (SOYBEANS)

APPROXIMATE LB. PER ACRE OF SOYBEANS PLANTED WITH FINGER PICKUP WHEN USING SOYBEAN FEED CUP

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Approximate Seed Population Per Acre				Recommended Speed Range
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	in mph
35	24	134	112	106	101	2 to 4
35	25	129	107	102	97	2 to 4
35	26	124	103	98	93	2 to 4
35	27	119	100	94	89	2 to 4
35	28	115	96	91	86	2 to 4
29	24	111	93	88	83	2 to 5
29	25	107	89	84	80	2 to 5
29	26	103	86	81	77	2 to 5
29	27	99	82	78	74	2 to 5
29	28	95	80	75	71	2 to 5
24	24	92	77	73	69	2 to 6
24	25	88	74	70	66	2 to 6
24	26	85	71	67	64	2 to 6
24	27	82	68	65	62	2 to 6
24	28	79	66	62	59	2 to 7
20	24	77	64	61	58	2 to 7
20	25	74	61	58	56	2 to 7
20	26	71	59	56	53	2 to 8
20	27	68	57	54	51	2 to 8
20	28	66	55	52	50	2 to 8
16	24	61	51	48	46	2 to 8
16	25	59	49	47	44	2 to 8
16	26	57	47	45	43	2 to 8
16	27	55	45	43	41	2 to 8
16	28	53	44	42	40	2 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Approximate Seed Population Per Acre				Recommended Speed Range
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	in mph
35	24	50	42	40	38	2 to 8
35	25	48	40	38	36	2 to 8
35	26	47	39	37	35	2 to 8
35	27	45	37	35	34	2 to 8
35	28	43	36	34	32	2 to 8
29	24	42	35	33	32	2 to 8
29	25	40	33	32	30	2 to 8
29	26	39	32	30	29	2 to 8
29	27	37	31	29	28	2 to 8
29	28	36	30	28	27	2 to 8
24	24	35	29	27	26	2 to 8
24	25	33	28	26	25	2 to 8
24	26	32	27	25	24	2 to 8
24	27	31	26	24	23	2 to 8
24	28	30	25	23	23	2 to 8
20	24	29	24	23	22	2 to 8
20	25	28	23	22	21	2 to 8
20	26	27	22	21	20	2 to 8
20	27	26	21	20	20	2 to 8
20	28	25	21	19	19	2 to 8
16	24	23	19	18	17	2 to 8
16	25	22	18	17	17	2 to 8
16	26	21	18	17	16	2 to 8
16	27	20	17	16	15	2 to 8
16	28	20	16	16	15	2 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate.

H41787

H41787 -19-25APR90

B22,8OM,R -19-18MAY90

BEANS PER FT—LB. PER ACRE

APPROXIMATE NUMBER OF LB. PER ACRE FOR VARIOUS SOYBEAN SEED SIZES												
	15 In. Rows			18 In. Rows			19 In. Rows			20 In. Rows		
	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Seeds per Ft.	Approx. 3200 per Lb.	Approx. 2600 per Lb.	Approx. 2200 per Lb.	Approx. 3200 per Lb.	Approx. 2600 per Lb.	Approx. 2200 per Lb.	Approx. 3200 per Lb.	Approx. 2600 per Lb.	Approx. 2200 per Lb.	Approx. 3200 per Lb.	Approx. 2600 per Lb.	Approx. 2200 per Lb.
5	54	68	80	46	56	66	42	52	62	40	51	60
6	66	80	96	54	68	80	52	64	74	50	60	72
7	76	94	110	64	78	92	60	74	88	57	70	82
8	88	108	126	72	90	106	64	84	100	66	81	94
9	98	120	144	82	100	118	78	96	112	74	90	108
10	108	134	158	90	112	132	86	106	126	81	100	118
11	120	148	174	100	122	146	94	116	138	90	111	130
12	130	160	190	108	134	158	104	126	150	98	120	142
13	142	174	206	118	146	172	112	138	162	106	130	154
14	152	188	222	128	156	184	120	148	176	114	141	166
15	164	202	238	136	168	198	128	158	188	123	152	178
16	174	214	254	146	178	212	138	170	200	130	160	190
17	186	228	270	154	190	224	146	180	212	140	171	202
18	196	242	286	164	202	238	154	190	226	147	182	214
19	206	254	300	172	112	250	164	202	238	154	190	225
20	218	268	316	182	224	264	172	212	250	164	201	237

A32845

-19-31JAN89

A32845

To determine the approximate lb. per acre for a given number of beans per ft., refer to the chart.

Example:

Suppose you wish to plant an average of approximately 11 beans per ft. on 19 in. rows. Your soybean seed is determined to be about 2600 seeds per lb. (medium size).

Checking the chart, under 19 in. rows and medium size soybeans, 11 beans per ft. will require a rate of approximately 116 lb. per acre.

Refer to SOYBEAN FEED CUP (EDIBLE BEANS)—HIGH RANGE chart. For 19 in. rows, a 16-tooth driver and 25-tooth driven sprocket will give you approximately 116 lb. per acre.

The rates in the chart are based on a uniform seed size sample of approximately 2600 seeds per lb. and should only be used as a starting point for determining the actual planting rate. The actual rate must be checked in the field at the desired planting speed. (See CHECKING SEED POPULATION in this section.)

B22,8OM,BG -19-18MAY90

BEANS PER FT.—LB. PER ACRE

APPROXIMATE NUMBER OF LB. PER ACRE FOR VARIOUS SOYBEAN SEED SIZES

	30 In. Rows			36 In. Rows			38 In. Rows			40 In. Rows		
	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Seeds per Ft.	Approx. 3200 per Lb.	Approx. 2600 per Lb.	Approx. 2200 per Lb.	Approx. 3200 per Lb.	Approx. 2600 per Lb.	Approx. 2200 per Lb.	Approx. 3200 per Lb.	Approx. 2600 per Lb.	Approx. 2200 per Lb.	Approx. 3200 per Lb.	Approx. 2600 per Lb.	Approx 2200 per Lb.
5	27	34	40	23	28	33	21	26	31	20	26	30
6	33	40	48	27	34	40	26	32	38	25	30	36
7	38	47	55	32	39	46	30	37	44	29	35	41
8	44	54	63	36	45	53	34	42	50	33	41	47
9	49	60	72	41	50	59	39	48	56	37	45	34
10	54	67	79	45	56	66	43	53	63	40	50	59
11	60	74	87	50	61	73	47	58	69	45	56	65
12	65	80	95	54	67	79	52	63	75	49	60	71
13	71	87	103	59	73	86	56	69	81	53	65	77
14	76	94	111	64	78	92	60	74	88	57	71	83
15	82	101	119	68	84	99	64	79	94	62	76	89
16	87	107	127	73	89	106	69	85	100	65	80	95
17	93	114	135	77	95	112	73	90	106	70	86	101
18	98	121	143	82	101	119	77	95	113	74	91	107
19	103	127	150	86	106	125	82	101	119	77	95	113
20	109	134	158	91	112	132	86	106	125	82	100	118

A28571

-19-31JAN89

A28571

To determine the approximate lb. per acre for a given number of beans per ft., refer to the chart.

Example:

Suppose you wish to plant an average of approximately 11 beans per ft. on 38 in. rows. Your soybean seed is determined to be about 2600 seeds per lb. (medium size).

Checking the chart, under 38 in. rows and medium size soybeans, 11 beans per ft. will require a rate of approximately 58 lb. per acre.

Refer to SOYBEAN FEED CUP (EDIBLE BEANS)—HIGH RANGE chart. For 38 in. rows, a 16-tooth driver and 25-tooth driven sprocket will give you approximately 58 lb. per acre.

The rates in the chart are based on a uniform seed size sample of approximately 2600 seeds per lb. and should only be used as a starting point for determining the actual planting rate. The actual rate must be checked in the field at the desired planting speed. (See CHECKING SEED POPULATION in this section).

B22,8OM,V -19-18MAY90

{Decal No. DB1098}

SOYBEAN FEED CUP (EDIBLE BEANS)

APPROXIMATE LB. PER ACRE OF EDIBLE BEANS PLANTED WITH FINGER PICKUP WHEN USING SOYBEAN FEED CUP

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Lb. of Small Beans* Per Acre				Lb. of Medium Beans** Per Acre				Recommended Speed Range in mph
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	
35	24	428	356	338	321	336	280	264	252	2 to 4
35	25	410	342	324	308	322	268	254	242	2 to 4
35	26	394	330	312	296	310	258	244	232	2 to 4
35	27	380	316	300	285	298	248	236	224	2 to 4
35	28	366	306	290	274	288	240	226	216	2 to 4
29	24	354	296	280	266	278	232	220	208	2 to 5
29	25	340	284	268	255	266	222	210	200	2 to 5
29	26	328	272	258	246	256	214	202	192	2 to 5
29	27	316	262	248	237	246	206	194	184	2 to 5
29	28	304	254	240	228	238	198	188	178	2 to 5
24	24	297	244	232	223	230	192	182	172	2 to 6
24	25	282	234	222	212	220	184	174	165	2 to 6
24	26	270	226	214	202	212	176	168	159	2 to 6
24	27	260	218	206	195	204	170	162	153	2 to 6
24	28	252	210	198	189	196	164	156	147	2 to 7
20	24	244	204	194	183	192	160	152	144	2 to 7
20	25	234	196	186	176	184	154	146	138	2 to 7
20	26	226	188	178	170	176	148	140	132	2 to 8
20	27	219	182	172	164	170	142	134	128	2 to 8
20	28	210	174	166	158	164	136	130	123	2 to 8
16	24	196	162	154	147	154	128	120	116	2 to 8
16	25	188	156	148	141	148	122	116	111	2 to 8
16	26	180	150	142	135	142	118	112	106	2 to 8
16	27	174	144	138	130	136	114	108	102	2 to 8
16	28	168	140	132	126	132	110	104	99	2 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Lb. of Small Beans* Per Acre				Lb. of Medium Beans** Per Acre				Recommended Speed Range in mph
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	
35	24	160	134	126	120	126	104	100	94	2 to 8
35	25	154	128	122	116	120	100	96	90	2 to 8
35	26	148	124	116	111	116	96	92	87	2 to 8
35	27	142	118	112	106	112	94	88	84	2 to 8
35	28	138	114	108	104	108	90	86	81	2 to 8
29	24	132	110	104	99	104	86	82	78	2 to 8
29	25	128	106	100	96	100	84	78	75	2 to 8
29	26	122	102	96	92	96	80	76	72	2 to 8
29	27	118	98	94	88	92	78	74	69	2 to 8
29	28	114	94	90	86	90	74	70	68	2 to 8
24	24	110	92	86	82	86	72	68	64	2 to 8
24	25	106	88	84	80	82	68	66	62	2 to 8
24	26	102	84	80	76	80	66	62	60	2 to 8
24	27	98	82	78	74	76	64	60	57	2 to 8
24	28	94	78	74	70	74	62	58	56	2 to 8
20	24	92	76	72	69	72	60	56	54	2 to 8
20	25	88	74	70	66	68	58	54	51	2 to 8
20	26	84	70	66	63	66	56	52	50	2 to 8
20	27	82	68	64	62	64	54	50	48	2 to 8
20	28	78	66	62	58	62	52	48	46	2 to 8
16	24	74	62	58	56	58	48	46	44	2 to 8
16	25	70	58	56	52	56	46	44	42	2 to 8
16	26	68	56	54	51	54	44	42	40	2 to 8
16	27	66	54	52	50	52	42	40	39	2 to 8
16	28	62	52	50	46	50	42	38	38	2 to 8

* *Small beans include varieties which run approximately 2500 seeds/lb., such as navy beans.*

** *Medium beans include kidney beans at approximately 1000 seeds/lb., pinto beans at approximately 1100 seeds/lb., pink beans at approximately 1400 seeds/lb., or other beans of similar size and shape.*

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate.

H41788

H41788 -19-25APR90

B22,8OM,BJ -19-18MAY90

{Decal No. DB1099}

SOYBEAN FEED CUP (EDIBLE BEANS)

APPROXIMATE LB. PER ACRE OF EDIBLE BEANS PLANTED WITH FINGER PICKUP WHEN USING SOYBEAN FEED CUP

NOTE: For information on using planting rate charts, see 'HOW TO USE PLANTING RATE CHARTS'.

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Lb. of Small Beans* Per Acre				Lb. of Medium Beans** Per Acre				Recommended Speed Range
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	in mph
35	24	214	178	169	161	168	140	132	126	2 to 4
35	25	205	171	162	154	161	134	127	121	2 to 4
35	26	197	165	156	148	155	129	122	116	2 to 4
35	27	190	158	150	143	149	124	118	112	2 to 4
35	28	183	153	145	137	144	120	113	108	2 to 4
29	24	177	148	140	133	139	116	110	104	2 to 5
29	25	170	142	134	128	133	111	105	100	2 to 5
29	26	164	136	129	123	128	107	101	96	2 to 5
29	27	158	131	124	118	123	103	97	92	2 to 5
29	28	152	127	120	114	119	99	94	89	2 to 5
24	24	147	122	116	110	115	96	91	86	2 to 6
24	25	141	117	111	106	110	92	87	83	2 to 6
24	26	135	113	107	101	106	88	84	80	2 to 6
24	27	130	109	103	98	102	85	81	77	2 to 6
24	28	126	105	99	95	98	82	78	74	2 to 7
20	24	122	102	97	92	96	80	76	72	2 to 7
20	25	117	198	93	88	92	77	73	69	2 to 7
20	26	113	94	89	85	88	74	70	66	2 to 8
20	27	109	91	86	82	85	71	67	64	2 to 8
20	28	105	87	83	79	82	68	65	62	2 to 8
16	24	98	81	77	74	77	64	60	58	2 to 8
16	25	94	78	74	70	74	61	58	56	2 to 8
16	26	90	75	71	68	71	59	56	53	2 to 8
16	27	87	72	69	65	68	57	54	51	2 to 8
16	28	84	70	66	63	66	55	52	50	2 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Lb. of Small Beans* Per Acre				Lb. of Medium Beans** Per Acre				Recommended Speed Range
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	in mph
35	24	80	67	63	60	63	52	50	47	2 to 8
35	25	77	64	61	58	60	50	48	45	2 to 8
35	26	74	62	58	56	58	48	46	44	2 to 8
35	27	71	59	56	53	56	47	44	42	2 to 8
35	28	69	57	54	52	54	45	43	40	2 to 8
29	24	66	55	52	50	52	43	41	39	2 to 8
29	25	64	53	50	48	50	42	39	38	2 to 8
29	26	61	51	48	46	48	40	38	36	2 to 8
29	27	59	49	47	44	46	39	37	35	2 to 8
29	28	57	47	45	43	45	37	35	34	2 to 8
24	24	55	46	43	41	43	36	34	32	2 to 8
24	25	53	44	42	40	41	34	33	31	2 to 8
24	26	51	42	40	38	40	33	31	30	2 to 8
24	27	49	41	39	37	38	32	30	28	2 to 8
24	28	47	39	37	35	37	31	29	28	2 to 8
20	24	46	38	36	35	36	30	28	27	2 to 8
20	25	44	37	35	33	34	29	27	26	2 to 8
20	26	42	35	33	32	33	28	26	25	2 to 8
20	27	41	34	32	31	32	27	25	24	2 to 8
20	28	39	33	31	29	31	26	24	23	2 to 8
16	24	37	31	29	28	29	24	23	22	2 to 8
16	25	35	29	28	26	28	23	22	21	2 to 8
16	26	34	28	27	26	27	22	21	20	2 to 8
16	27	33	27	26	25	26	21	20	20	2 to 8
16	28	31	26	25	23	25	21	19	19	2 to 8

** Small beans include varieties which run approximately 2500 seeds/lb., such as navy beans.*

*** Medium beans include kidney beans at approximately 1000 seeds/lb., pinto beans at approximately 1100 seeds/lb., pink beans at approximately 1400 seeds/lb., or other beans of similar size and shape.*

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate.

H41789

H41789 -19-25APR90

B22,8OM,X -19-18MAY90

SOYBEAN FEED CUP EQUIPPED WITH SEED GUIDE A48005 (SMALL SOYBEANS)

{Decal No. DB1100}

APPROXIMATE LB. PER ACRE OF SMALL SOYBEANS PLANTED WITH FINGER PICKUP WHEN USING SOYBEAN FEED CUP EQUIPPED WITH SEED GUIDE A48005

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 4,200 Seeds Per Lb.) Lb. Per Acre				Recommended
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	Speed Range in mph
35	24	172	144	138	129	3 to 5
35	25	166	138	132	124	3 to 5
35	26	158	132	128	118	3 to 5
35	27	154	128	122	116	3 to 5
35	28	148	124	118	111	3 to 5
29	24	142	118	114	106	3 to 5
29	25	136	114	110	102	3 to 5-1/2
29	26	132	110	106	99	3 to 6
29	27	126	106	102	94	3 to 6
29	28	122	102	100	92	3 to 6
24	24	118	98	94	88	4 to 6-1/2
24	25	114	94	90	86	4 to 7
24	26	110	90	88	82	4 to 7-1/2
24	27	104	88	84	78	4 to 8
24	28	102	84	82	76	4 to 8
20	24	98	82	78	74	4 to 8
20	25	94	78	76	70	4 to 8
20	26	90	76	72	68	4 to 8
20	27	88	72	70	66	4 to 8
20	28	84	70	68	63	4 to 8
16	24	78	66	64	58	4 to 8
16	25	76	64	60	57	4 to 8
16	26	72	60	58	54	4 to 8
16	27	70	58	56	52	4 to 8
16	28	68	56	54	51	4 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 4,200 Seeds Per Lb.) Lb. Per Acre				Recommended
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	Speed Range in mph
35	24	64	54	52	48	3 to 5
35	25	62	52	50	46	3 to 5
35	26	60	50	48	45	3 to 5
35	27	58	48	46	44	3 to 5
35	28	56	46	44	42	3 to 5
29	24	54	44	42	40	3 to 5
29	25	52	42	42	39	3 to 5-1/2
29	26	50	42	40	38	3 to 6
29	27	48	40	38	36	3 to 6
29	28	46	38	36	34	3 to 6
24	24	44	36	36	33	4 to 6-1/2
24	25	42	36	34	32	4 to 7
24	26	40	34	32	30	4 to 7-1/2
24	27	40	32	32	30	4 to 8
24	28	38	32	30	28	4 to 8
20	24	36	30	30	27	4 to 8
20	25	36	30	28	27	4 to 8
20	26	34	28	28	26	4 to 8
20	27	32	28	26	24	4 to 8
20	28	30	26	26	22	4 to 8
16	24	30	24	24	22	4 to 8
16	25	28	24	22	21	4 to 8
16	26	28	22	22	21	4 to 8
16	27	26	22	22	20	4 to 8
16	28	26	22	20	20	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41790*

H41790 -19-25APR90

B22,8OM,BN -19-18MAY90

SOYBEAN FEED CUP EQUIPPED WITH SEED GUIDE A48005 (SMALL SOYBEANS)

{Decal No. DB1101} APPROXIMATE LB. PER ACRE OF SMALL SOYBEANS PLANTED WITH FINGER PICKUP WHEN USING SOYBEAN FEED CUP EQUIPPED WITH SEED GUIDE A48005

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 4,200 Seeds Per Lb.) Lb. Per Acre				Recommended
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	86	72	69	65	3 to 5
35	25	83	69	66	62	3 to 5
35	26	79	66	64	59	3 to 5
35	27	77	64	61	58	3 to 5
35	28	74	62	59	56	3 to 5
29	24	71	59	57	53	3 to 5
29	25	68	57	55	51	3 to 5-1/2
29	26	66	55	53	50	3 to 6
29	27	63	53	51	47	3 to 6
29	28	61	51	50	46	3 to 6
24	24	59	49	47	44	4 to 6-1/2
24	25	57	47	45	43	4 to 7
24	26	55	45	44	41	4 to 7-1/2
24	27	52	44	42	39	4 to 8
24	28	51	42	41	38	4 to 8
20	24	49	41	39	37	4 to 8
20	25	47	39	38	35	4 to 8
20	26	45	38	36	34	4 to 8
20	27	44	36	35	33	4 to 8
20	28	42	35	34	32	4 to 8
16	24	39	33	32	29	4 to 8
16	25	38	32	30	28	4 to 8
16	26	36	30	29	27	4 to 8
16	27	35	29	28	26	4 to 8
16	28	34	28	27	26	4 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 4,200 Seeds Per Lb.) Lb. Per Acre				Recommended
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	32	27	26	24	3 to 5
35	25	31	26	25	23	3 to 5
35	26	30	25	24	23	3 to 5
35	27	29	24	23	22	3 to 5
35	28	28	23	22	21	3 to 5
29	24	27	22	21	20	3 to 5
29	25	26	21	21	20	3 to 5-1/2
29	26	25	21	20	19	3 to 6
29	27	24	20	19	18	3 to 6
29	28	23	19	18	17	3 to 6
24	24	22	18	18	17	4 to 6-1/2
24	25	21	18	17	16	4 to 7
24	26	20	17	16	15	4 to 7-1/2
24	27	20	16	16	15	4 to 8
24	28	19	16	15	14	4 to 8
20	24	18	15	15	14	4 to 8
20	25	18	15	14	14	4 to 8
20	26	17	14	14	13	4 to 8
20	27	16	14	13	12	4 to 8
20	28	15	13	13	11	4 to 8
16	24	15	12	12	11	4 to 8
16	25	14	12	11	10	4 to 8
16	26	14	11	11	10	4 to 8
16	27	13	11	11	10	4 to 8
16	28	13	11	10	10	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41791*

H41791 -19-25APR90

B22,8OM,AB -19-18MAY90

PLANTING SMALL SOYBEANS WITH SOYBEAN FEED CUP

IMPORTANT: Extra small soybeans vary in size from about 9000 to 12 000 seeds/kg (4100 to 5400 seeds per lb.). Consequently, planting rates may vary widely.

The following charts were developed using uniform soybeans sized to 9300 seeds/kg (4200 seeds per lb.). Use the charts as a guide for initial planter settings only.

Large beans will generally result in lower rates than those in the charts.

Actual rates MUST be checked in the field at planting speed. See CHECKING SEED POPULATION in this section.

B22,8OM,AE -19-18MAY90

SMALL SOYBEANS—BEANS PER FT.—LB. PER ACRE

APPROXIMATE NUMBER OF LB. PER ACRE FOR EXTRA SMALL SOYBEAN SEEDS

Seeds per Ft.	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows
	Approximately 4200 Seeds per Lb.	Approximately 4200 Seeds per Lb.	Approximately 4200 Seeds per Lb.	Approximately 4200 Seeds per Lb.
5	42	34	32	31
6	50	42	40	38
7	58	48	46	44
8	66	56	52	50
9	74	62	58	56
10	82	70	66	62
11	92	76	72	69
12	100	82	78	75
13	108	90	86	81
14	116	96	92	87
15	124	104	98	93
16	132	110	104	99
17	142	118	112	106
18	150	124	118	112
19	158	132	124	118
20	166	138	132	124

A32855

-19-31JAN89

A32855

To determine the approximate lb. per acre for a given number of beans per ft., refer to the chart.

Example:

Suppose you wish to plant an average of approximately 10 beans per ft. on 19 in. rows. Your soybean seed is determined to be about 4200 seeds per lb.

Checking the chart under 19 in. rows, 10 beans per ft. will require a rate of approximately 66 lb. per acre.

Refer to the SMALL SOYBEANS—HIGH RANGE chart. For 19 in. rows, a 20-tooth driver and 28-tooth driven sprocket will give you approximately 68 lb. per acre.

Remember that the rates in the chart are based on a uniform seed size sample of approximately 4200 seeds per lb. and should only be used as a starting point for determining the actual planting rate.

The actual rate MUST be checked in the field at the desired planting speed.(See CHECKING SEED POPULATION in this section.)

B22,8OM,BQ -19-18MAY90

SMALL SOYBEANS—BEANS PER FT.—LB. PER ACRE

APPROXIMATE NUMBER OF LB. PER ACRE FOR EXTRA SMALL SOYBEAN SEEDS

Seeds per Ft.	30 In. Rows Approximately 4200 Seeds per Lb.	36 In. Rows Approximately 4200 Seeds per Lb.	38 In. Rows Approximately 4200 Seeds per Lb.	40 In. Rows Approximately 4200 Seeds per Lb.
5	21	17	16	15
6	25	21	20	19
7	29	24	23	22
8	33	28	26	25
9	37	31	29	28
10	41	35	33	31
11	46	38	36	34
12	50	41	39	38
13	54	45	43	40
14	58	48	46	44
15	62	52	49	46
16	66	55	52	50
17	71	59	56	53
18	75	62	59	56
19	79	66	62	59
20	83	69	66	62

A30239

-19-02FEB89

A30239

To determine the approximate lb. per acre rate for a given number of beans per ft., refer to the chart.

Example:

Suppose you wish to plant an average of approximately 10 beans per ft. on 38 in. rows. Your soybean seed is determined to be about 4200 seeds per lb.

Checking the chart under 38 in. rows, 10 beans per ft. will require a rate of approximately 33 lb. per acre.

Refer to the SMALL SOYBEANS—HIGH RANGE chart. For 38 in. rows, a 20-tooth driver and 28-tooth driven sprocket will give you approximately 34 lb. per acre.

Remember that the rates in the chart are based on a uniform seed size sample of approximately 4200 seeds per lb. and should be used only as a starting point for determining the actual planting rate.

The actual rate MUST be checked in the field at the desired planting speed. (See CHECKING SEED POPULATION in this section.)

B22,8OM,AG -19-18MAY90

SOYBEAN FEED CUP EQUIPPED WITH SEED GUIDE A48005 (ACID DELINTED COTTON)

APPROXIMATE LB. PER ACRE OF ACID DELINTED COTTON PLANTED WITH FINGER PICKUP WHEN USING SOYBEAN FEED CUP EQUIPPED WITH SEED GUIDE A48005

{Decal No. DB1102}

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 4,500 Seeds Per Lb.) Lb. Per Acre				Recommended
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	Speed Range in mph
35	24	126	108	98	94	3 to 5
35	25	120	104	96	90	3 to 5
35	26	116	100	92	87	3 to 5
35	27	112	96	88	84	3 to 5
35	28	108	94	84	81	3 to 5
29	24	104	90	82	78	3 to 5
29	25	100	86	78	75	3 to 5-1/2
29	26	96	84	76	72	3 to 6
29	27	92	80	72	69	3 to 6
29	28	90	78	70	68	3 to 6
24	24	86	76	68	64	4 to 6-1/2
24	25	82	72	66	62	4 to 7
24	26	80	68	62	60	4 to 7-1/2
24	27	76	66	60	57	4 to 8
24	28	74	64	58	56	4 to 8
20	24	72	62	56	54	4 to 8
20	25	68	60	54	51	4 to 8
20	26	66	58	52	50	4 to 8
20	27	64	54	50	48	4 to 8
20	28	62	54	48	46	4 to 8
16	24	58	50	46	44	4 to 8
16	25	56	48	44	42	4 to 8
16	26	54	46	42	40	4 to 8
16	27	52	44	40	39	4 to 8
16	28	50	42	38	38	4 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 4,500 Seeds Per Lb.) Lb. Per Acre				Recommended
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	Speed Range in mph
35	24	46	38	36	34	3 to 5
35	25	46	38	36	34	3 to 5
35	26	44	36	34	33	3 to 5
35	27	42	34	34	32	3 to 5
35	28	40	34	32	30	3 to 5
29	24	40	32	30	30	3 to 5
29	25	38	32	30	28	3 to 5-1/2
29	26	36	30	28	27	3 to 6
29	27	34	28	28	26	3 to 6
29	28	34	28	26	26	3 to 6
24	24	32	26	26	24	4 to 6-1/2
24	25	32	26	24	24	4 to 7
24	26	30	24	24	22	4 to 7-1/2
24	27	28	24	22	21	4 to 8
24	28	28	24	22	21	4 to 8
20	24	26	22	22	20	4 to 8
20	25	26	22	20	20	4 to 8
20	26	24	20	20	18	4 to 8
20	27	24	20	18	18	4 to 8
20	28	24	20	18	18	4 to 8
16	24	22	18	18	16	4 to 8
16	25	20	18	16	15	4 to 8
16	26	20	16	16	15	4 to 8
16	27	20	16	16	15	4 to 8
16	28	18	16	14	14	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41792*

H41792 -19-25APR90

B22,8OM,BT -19-18MAY90

SOYBEAN FEED CUP EQUIPPED WITH SEED GUIDE A48005 (ACID DELINTED COTTON)

APPROXIMATE LB. PER ACRE OF ACID DELINTED COTTON PLANTED WITH FINGER PICKUP
WHEN USING SOYBEAN FEED CUP EQUIPPED WITH SEED GUIDE A48005

{Decal No. DB1103}

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 4,500 Seeds Per Lb.) Lb. Per Acre				Recommended Speed Range
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	in mph
35	24	63	54	49	47	3 to 5
35	25	60	52	48	45	3 to 5
35	26	58	50	46	44	3 to 5
35	27	56	48	44	42	3 to 5
35	28	54	47	42	40	3 to 5
29	24	52	45	41	39	3 to 5
29	25	50	43	39	38	3 to 5-1/2
29	26	48	42	38	36	3 to 6
29	27	46	40	36	34	3 to 6
29	28	45	39	35	34	3 to 6
24	24	43	38	34	32	4 to 6-1/2
24	25	41	36	33	31	4 to 7
24	26	40	34	31	30	4 to 7-1/2
24	27	38	33	30	28	4 to 8
24	28	37	32	29	28	4 to 8
20	24	36	31	28	27	4 to 8
20	25	34	30	27	26	4 to 8
20	26	33	29	26	25	4 to 8
20	27	32	27	25	24	4 to 8
20	28	31	27	24	23	4 to 8
16	24	29	25	23	22	4 to 8
16	25	28	24	22	21	4 to 8
16	26	27	23	21	20	4 to 8
16	27	26	22	20	20	4 to 8
16	28	25	21	19	19	4 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 4,500 Seeds Per Lb.) Lb. Per Acre				Recommended Speed Range
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	in mph
35	24	23	19	18	17	3 to 5
35	25	23	19	18	17	3 to 5
35	26	22	18	17	16	3 to 5
35	27	21	17	17	16	3 to 5
35	28	20	17	16	15	3 to 5
29	24	20	16	15	15	3 to 5
29	25	19	16	15	14	3 to 5-1/2
29	26	18	15	14	14	3 to 6
29	27	17	14	14	13	3 to 6
29	28	17	14	13	13	3 to 6
24	24	16	13	13	12	4 to 6-1/2
24	25	16	13	12	12	4 to 7
24	26	15	12	12	11	4 to 7-1/2
24	27	14	12	11	10	4 to 8
24	28	14	12	11	10	4 to 8
20	24	13	11	11	10	4 to 8
20	25	13	11	10	10	4 to 8
20	26	12	10	10	9	4 to 8
20	27	12	10	9	9	4 to 8
20	28	12	10	9	9	4 to 8
16	24	11	9	9	8	4 to 8
16	25	10	9	8	8	4 to 8
16	26	10	8	8	8	4 to 8
16	27	10	8	8	8	4 to 8
16	28	9	8	7	7	4 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41793*

H41793 -19-25APR90

B22,8OM,AI -19-18MAY90

PLANTING ACID-DELINTED COTTON WITH SOYBEAN FEED CUP

IMPORTANT: Acid delinted cotton seeds vary in size from about 9000 to 12 000 seeds/kg (4100 to 5400 seeds per lb). Consequently, planting rates can vary widely.

The above chart was developed using uniform cotton seed sized to 10 000 seeds/kg (4500 seeds per lb.). Use the chart as a guide for initial planter settings only.

Large cotton seed will generally result in lower rates than those in the chart. Small cotton seed will give somewhat higher rates than those in the chart.

Actual rates MUST be checked in the field at planting speed. See CHECKING SEED POPULATION in this section.

B22,8OM,AL -19-18MAY90

{Decal No. DB1104}

LOW-RATE SORGHUM FEED CUP (SORGHUM)

APPROXIMATE LB. PER ACRE OF SORGHUM PLANTED WITH FINGER PICKUP WHEN USING SORGHUM FEED CUP

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 18,000 Seeds Per Pound) Lb. Per Acre				Recommended
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	Speed Range in mph
35	24	12.2	10.2	9.6	9.2	2 to 4
35	25	11.6	9.8	9.2	8.7	2 to 4
35	26	11.2	9.4	8.8	8.4	2 to 4
35	27	10.8	9.0	8.6	8.1	2 to 4
35	28	10.4	8.6	8.2	7.8	2 to 4
29	24	10.0	8.4	8.0	7.5	2 to 5
29	25	9.6	8.0	7.6	7.2	2 to 5
29	26	9.4	7.8	7.4	7.0	2 to 5
29	27	9.0	7.4	7.0	6.8	2 to 5
29	28	8.8	7.2	6.8	6.4	2 to 5
24	24	8.4	7.0	6.6	6.3	2 to 6
24	25	8.0	6.6	6.4	6.0	2 to 6
24	26	7.8	6.4	6.0	5.8	2 to 6
24	27	7.4	6.2	5.8	5.6	2 to 6
24	28	7.2	6.0	5.6	5.4	2 to 7
20	24	7.0	5.8	5.4	5.2	2 to 7
20	25	6.6	5.6	5.2	5.0	2 to 7
20	26	6.4	5.4	5.0	4.8	2 to 8
20	27	6.2	5.2	4.8	4.6	2 to 8
20	28	6.0	5.0	4.8	4.5	2 to 8
16	24	5.6	4.6	4.4	4.2	2 to 8
16	25	5.4	4.4	4.2	4.0	2 to 8
16	26	5.2	4.2	4.0	3.9	2 to 8
16	27	5.0	4.2	4.0	3.8	2 to 8
16	28	4.8	4.0	3.8	3.6	2 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 18,000 Seeds Per Pound) Lb. Per Acre				Recommended
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	Speed Range in mph
35	24	4.6	3.8	3.6	3.4	2 to 8
35	25	4.4	3.6	3.4	3.3	2 to 8
35	26	4.2	3.6	3.4	3.2	2 to 8
35	27	4.0	3.4	3.2	3.0	2 to 8
35	28	4.0	3.2	3.0	3.0	2 to 8
29	24	3.8	3.2	3.0	2.8	2 to 8
29	25	3.6	3.0	2.8	2.7	2 to 8
29	26	3.4	3.0	2.8	2.6	2 to 8
29	27	3.4	2.8	2.6	2.6	2 to 8
29	28	3.2	2.8	2.6	2.4	2 to 8
24	24	3.2	2.6	2.4	2.4	2 to 8
24	25	3.0	2.6	2.4	2.2	2 to 8
24	26	2.8	2.4	2.2	2.1	2 to 8
24	27	2.8	2.4	2.2	2.1	2 to 8
24	28	2.6	2.2	2.2	2.0	2 to 8
20	24	2.6	2.2	2.0	2.0	2 to 8
20	25	2.6	2.0	2.0	2.0	2 to 8
20	26	2.4	2.0	2.0	1.8	2 to 8
20	27	2.4	2.0	1.8	1.8	2 to 8
20	28	2.2	1.8	1.8	1.6	2 to 8
16	24	2.0	1.8	1.6	1.5	2 to 8
16	25	2.0	1.6	1.6	1.5	2 to 8
16	26	2.0	1.6	1.6	1.5	2 to 8
16	27	1.8	1.6	1.4	1.4	2 to 8
16	28	1.8	1.4	1.4	1.4	2 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41794*

H41794 -19-25APR90

B22,8OM,BX -19-18MAY90

{Decal No. DB1105}

LOW-RATE SORGHUM FEED CUP (SORGHUM)

APPROXIMATE LB. PER ACRE OF SORGHUM PLANTED WITH FINGER PICKUP WHEN USING SORGHUM FEED CUP

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 18,000 Seeds Per Pound) Lb. Per Acre				Recommended
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	6.1	5.1	4.8	4.6	2 to 4
35	25	5.8	4.9	4.6	4.4	2 to 4
35	26	5.6	4.7	4.4	4.2	2 to 4
35	27	5.4	4.5	4.3	4.1	2 to 4
35	28	5.2	4.3	4.1	3.9	2 to 4
29	24	5.0	4.2	4.0	3.8	2 to 5
29	25	4.8	4.0	3.8	3.6	2 to 5
29	26	4.7	3.9	3.7	3.5	2 to 5
29	27	4.5	3.7	3.5	3.4	2 to 5
29	28	4.3	3.6	3.4	3.2	2 to 5
24	24	4.2	3.5	3.3	3.2	2 to 6
24	25	4.0	3.3	3.2	3.0	2 to 6
24	26	3.9	3.2	3.0	2.9	2 to 6
24	27	3.7	3.1	2.9	2.8	2 to 6
24	28	3.6	3.0	2.8	2.7	2 to 7
20	24	3.5	2.9	2.7	2.6	2 to 7
20	25	3.3	2.8	2.6	2.5	2 to 7
20	26	3.2	2.7	2.5	2.4	2 to 8
20	27	3.1	2.6	2.4	2.3	2 to 8
20	28	3.0	2.5	2.4	2.2	2 to 8
16	24	2.8	2.3	2.2	2.1	2 to 8
16	25	2.7	2.2	2.1	2.0	2 to 8
16	26	2.6	2.1	2.1	2.0	2 to 8
16	27	2.5	2.1	2.0	1.9	2 to 8
16	28	2.4	2.0	1.9	1.8	2 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 18,000 Seeds Per Pound) Lb. Per Acre				Recommended
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	2.3	1.9	1.8	1.7	2 to 8
35	25	2.2	1.8	1.7	1.6	2 to 8
35	26	2.1	1.8	1.7	1.6	2 to 8
35	27	2.0	1.7	1.6	1.5	2 to 8
35	28	2.0	1.6	1.5	1.5	2 to 8
29	24	1.9	1.6	1.5	1.4	2 to 8
29	25	1.8	1.5	1.4	1.4	2 to 8
29	26	1.7	1.5	1.4	1.3	2 to 8
29	27	1.7	1.4	1.3	1.3	2 to 8
29	28	1.6	1.4	1.3	1.2	2 to 8
24	24	1.6	1.3	1.2	1.2	2 to 8
24	25	1.5	1.3	1.2	1.1	2 to 8
24	26	1.4	1.2	1.1	1.1	2 to 8
24	27	1.4	1.2	1.1	1.1	2 to 8
24	28	1.3	1.1	1.1	1.0	2 to 8
20	24	1.3	1.1	1.0	1.0	2 to 8
20	25	1.3	1.0	1.0	1.0	2 to 8
20	26	1.2	1.0	1.0	.9	2 to 8
20	27	1.2	1.0	.9	.9	2 to 8
20	28	1.1	.9	.9	.8	2 to 8
16	24	1.0	.9	.8	.8	2 to 8
16	25	1.0	.8	.8	.8	2 to 8
16	26	1.0	.8	.8	.8	2 to 8
16	27	.9	.8	.7	.7	2 to 8
16	28	.9	.7	.7	.7	2 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41795*

H41795 -19-25APR90

B22,8OM,AN -19-18MAY90

{Decal No. DB1106} **REGULAR-RATE SORGHUM FEED CUP (SORGHUM)**

APPROXIMATE LB. PER ACRE OF SORGHUM PLANTED WITH FINGER PICKUP WHEN USING SORGHUM FEED CUP

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 15,000 Seeds Per Pound) Lb. Per Acre				Recommended
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	Speed Range in mph
35	24	65.0	54.2	51.2	48.8	2 to 4
35	25	62.4	52.0	49.2	46.8	2 to 4
35	26	60.0	50.0	47.4	45.0	2 to 4
35	27	57.8	48.2	45.6	43.4	2 to 4
35	28	55.6	46.4	44.0	41.7	2 to 4
29	24	53.8	44.8	42.4	40.4	2 to 5
29	25	51.6	43.0	40.8	38.7	2 to 5
29	26	49.6	41.4	39.2	37.2	2 to 5
29	27	47.8	39.8	37.8	35.8	2 to 5
29	28	46.2	38.4	36.4	34.6	2 to 5
24	24	44.3	37.2	35.2	33.2	2 to 6
24	25	42.8	35.6	33.8	32.1	2 to 6
24	26	41.2	34.2	32.4	30.9	2 to 6
24	27	39.6	33.0	31.2	29.7	2 to 6
24	28	38.2	31.8	30.2	28.6	2 to 7
20	24	37.2	31.0	29.4	27.9	2 to 7
20	25	35.6	29.8	28.2	26.7	2 to 7
20	26	34.2	28.6	27.0	25.6	2 to 8
20	27	33.0	27.6	26.0	24.8	2 to 8
20	28	31.8	26.6	25.2	23.8	2 to 8
16	24	29.8	24.8	23.4	22.4	2 to 8
16	25	28.6	23.8	22.6	21.4	2 to 8
16	26	27.4	22.8	21.6	20.6	2 to 8
16	27	26.4	22.0	20.8	19.8	2 to 8
16	28	25.4	21.2	20.0	19.0	2 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		(Based on 15,000 Seeds Per Pound) Lb. Per Acre				Recommended
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	Speed Range in mph
35	24	24.4	20.4	19.2	18.3	2 to 8
35	25	23.4	19.4	18.4	17.6	2 to 8
35	26	22.4	18.8	17.8	16.8	2 to 8
35	27	21.6	18.0	17.0	16.2	2 to 8
35	28	20.8	17.4	16.4	15.6	2 to 8
29	24	20.2	16.8	16.0	15.2	2 to 8
29	25	19.4	16.2	15.2	14.6	2 to 8
29	26	18.6	15.6	14.8	14.0	2 to 8
29	27	18.0	15.0	14.2	13.5	2 to 8
29	28	17.4	14.4	13.6	13.0	2 to 8
24	24	16.8	14.0	13.2	12.6	2 to 8
24	25	16.0	13.4	12.6	12.0	2 to 8
24	26	15.4	12.8	12.2	11.6	2 to 8
24	27	14.8	12.4	11.8	11.1	2 to 8
24	28	14.4	12.0	11.4	10.8	2 to 8
20	24	14.0	11.6	11.0	10.5	2 to 8
20	25	13.4	11.2	10.6	10.0	2 to 8
20	26	12.8	10.8	10.2	9.6	2 to 8
20	27	12.4	10.4	9.8	9.3	2 to 8
20	28	12.0	10.0	9.4	9.0	2 to 8
16	24	11.2	9.2	8.8	8.4	2 to 8
16	25	10.6	9.0	8.4	8.0	2 to 8
16	26	10.2	8.6	8.2	7.6	2 to 8
16	27	10.0	8.2	7.8	7.5	2 to 8
16	28	9.6	8.0	7.6	7.2	2 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41796*

H41796 -19-25APR90

B22,8OM,CB -19-18MAY90

{Decal No. DB1107}

REGULAR-RATE SORGHUM FEED CUP (SORGHUM)

APPROXIMATE LB. PER ACRE OF SORGHUM PLANTED WITH FINGER PICKUP WHEN USING SORGHUM FEED CUP

NOTE: For information on using planting rate charts, see 'HOW TO USE PLANTING RATE CHARTS'.

HIGH RANGE INPUT SPROCKET

(Based on 15,000 Seeds Per Pound)

Sprocket Combinations (Number of Teeth)		Lb. Per Acre				Recommended
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	65.0	54.2	51.2	48.8	2 to 4
35	25	62.4	52.0	49.2	46.8	2 to 4
35	26	60.0	50.0	47.4	45.0	2 to 4
35	27	57.8	48.2	45.6	43.4	2 to 4
35	28	55.6	46.4	44.0	41.7	2 to 4
29	24	53.8	44.8	42.4	40.4	2 to 5
29	25	51.6	43.0	40.8	38.7	2 to 5
29	26	49.6	41.4	39.2	37.2	2 to 5
29	27	47.8	39.8	37.8	35.8	2 to 5
29	28	46.2	38.4	36.4	34.6	2 to 5
24	24	44.3	37.2	35.2	33.2	2 to 6
24	25	42.8	35.6	33.8	32.1	2 to 6
24	26	41.2	34.2	32.4	30.9	2 to 6
24	27	39.6	33.0	31.2	29.7	2 to 6
24	28	38.2	31.8	30.2	28.6	2 to 7
20	24	37.2	31.0	29.4	27.9	2 to 7
20	25	35.6	29.8	28.2	26.7	2 to 7
20	26	34.2	28.6	27.0	25.6	2 to 8
20	27	33.0	27.6	26.0	24.8	2 to 8
20	28	31.8	26.6	25.2	23.8	2 to 8
16	24	29.8	24.8	23.4	22.4	2 to 8
16	25	28.6	23.8	22.6	21.4	2 to 8
16	26	27.4	22.8	21.6	20.6	2 to 8
16	27	26.4	22.0	20.8	19.8	2 to 8
16	28	25.4	21.2	20.0	19.0	2 to 8

LOW RANGE INPUT SPROCKET

(Based on 15,000 Seeds Per Pound)

Sprocket Combinations (Number of Teeth)		Lb. Per Acre				Recommended
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	Speed Range in mph
35	24	12.2	10.2	9.6	9.2	2 to 8
35	25	11.7	9.7	9.2	8.8	2 to 8
35	26	11.2	9.4	8.9	8.4	2 to 8
35	27	10.8	9.0	8.5	8.1	2 to 8
35	28	10.4	8.7	8.2	7.8	2 to 8
29	24	10.1	8.4	8.0	7.6	2 to 8
29	25	9.7	8.1	7.6	7.3	2 to 8
29	26	9.3	7.8	7.4	6.8	2 to 8
29	27	9.0	7.5	7.1	6.8	2 to 8
29	28	8.7	7.2	6.8	6.5	2 to 8
24	24	8.4	7.0	6.6	6.3	2 to 8
24	25	8.0	6.7	6.3	6.0	2 to 8
24	26	7.7	6.4	6.1	5.8	2 to 8
24	27	7.4	6.2	5.9	5.6	2 to 8
24	28	7.2	6.0	5.7	5.4	2 to 8
20	24	7.0	5.8	5.5	5.2	2 to 8
20	25	6.7	5.6	5.3	5.0	2 to 8
20	26	6.4	5.4	5.1	4.8	2 to 8
20	27	6.2	5.2	4.9	4.6	2 to 8
20	28	6.0	5.0	4.7	4.5	2 to 8
16	24	5.6	4.6	4.4	4.2	2 to 8
16	25	5.3	4.5	4.2	4.0	2 to 8
16	26	5.1	4.3	4.1	3.8	2 to 8
16	27	5.0	4.1	3.9	3.8	2 to 8
16	28	4.8	4.0	3.8	3.6	2 to 8

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate. *H41797*

H41797 -19-25APR90

B22,8OM,AR -19-18MAY90

{Decal No. DB1108} EDIBLE BEAN FEED CUP (EDIBLE BEANS OR LARGE SOYBEANS)

APPROXIMATE LB. PER ACRE OF EDIBLE BEANS OR LARGE SOYBEANS PLANTED WITH FINGER PICKUP WHEN USING EDIBLE BEAN FEED CUP

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Lb. of Medium Beans* Per Acre				Lb. of Large Beans** Per Acre				Recommended Speed Range in mph
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	
35	24	708	590	558	531	548	456	432	411	2 to 4
35	25	680	566	536	510	526	438	416	395	2 to 4
35	26	654	544	576	491	506	422	400	368	2 to 4
35	27	630	524	496	473	486	406	384	365	2 to 4
35	28	606	506	478	455	470	392	370	353	2 to 4
29	24	586	488	462	440	454	378	358	341	2 to 5
29	25	562	470	444	422	436	364	344	327	2 to 5
29	26	542	452	428	407	418	350	330	314	2 to 5
29	27	522	434	412	392	404	336	318	303	2 to 5
29	28	502	418	396	377	388	324	308	291	2 to 5
24	24	486	404	384	365	376	312	296	282	2 to 6
24	25	466	388	368	350	360	300	284	270	2 to 6
24	26	448	374	354	336	346	288	274	260	2 to 6
24	27	432	360	340	324	334	278	264	251	2 to 6
24	28	416	346	328	312	322	268	254	242	2 to 7
20	24	404	338	320	303	312	260	248	234	2 to 7
20	25	388	324	306	291	300	250	238	225	2 to 7
20	26	374	312	294	281	288	240	228	216	2 to 8
20	27	360	300	284	270	278	232	220	209	2 to 8
20	28	346	288	274	260	268	224	212	201	2 to 8
16	24	334	270	256	251	250	208	198	188	2 to 8
16	25	310	258	246	233	240	200	190	180	2 to 8
16	26	298	248	236	224	232	192	182	174	2 to 8
16	27	288	240	228	216	222	186	176	167	2 to 8
16	28	278	232	218	208	214	178	170	161	2 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Lb. of Medium Beans* Per Acre				Lb. of Large Beans** Per Acre				Recommended Speed Range in mph
Driver	Driven	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	15 In. Rows	18 In. Rows	19 In. Rows	20 In. Rows	
35	24	266	222	210	200	206	172	162	155	2 to 4
35	25	254	212	202	191	198	164	156	149	2 to 4
35	26	244	204	194	183	190	158	150	119	2 to 4
35	27	236	196	186	177	182	152	144	137	2 to 4
35	28	228	190	180	171	176	146	138	132	2 to 4
29	24	220	184	174	165	170	142	134	128	2 to 5
29	25	212	176	166	159	164	136	128	123	2 to 5
29	26	202	170	160	152	158	130	122	119	2 to 5
29	27	196	162	154	147	152	126	120	114	2 to 5
29	28	188	158	148	141	146	122	116	110	2 to 5
24	24	182	152	144	137	140	118	112	105	2 to 6
24	25	174	146	138	131	136	112	106	102	2 to 6
24	26	168	140	132	126	130	108	102	98	2 to 6
24	27	162	134	128	122	126	104	98	95	2 to 6
24	28	156	130	124	117	120	100	96	90	2 to 7
20	24	152	126	120	114	118	98	92	89	2 to 7
20	25	146	122	114	110	112	94	88	84	2 to 7
20	26	140	116	111	105	108	90	86	81	2 to 8
20	27	134	112	106	101	104	86	82	78	2 to 8
20	28	130	108	102	98	100	84	80	75	2 to 8
16	24	122	102	96	92	94	78	74	71	2 to 8
16	25	116	98	92	87	90	76	72	68	2 to 8
16	26	112	94	88	84	86	72	68	65	2 to 8
16	27	108	90	86	81	84	70	66	63	2 to 8
16	28	104	86	82	78	80	68	64	60	2 to 8

* *Medium beans include kidney beans at approximately 1000 seeds/lb., pinto beans at approximately 1100 seeds/lb., pink beans at approximately 1400 seeds/lb., or other beans of similar size and shape.*

** *Large beans include varieties which run approximately 400 seeds per lb., such as lima beans.*

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate.

H41798

-19-25APR90

H41798

B22,8OM,CF -19-18MAY90

{Decal No. DB1109} EDIBLE BEAN FEED CUP (EDIBLE BEANS OR LARGE SOYBEANS)

APPROXIMATE LB. PER ACRE OF EDIBLE BEANS OR LARGE SOYBEANS PLANTED WITH FINGER PICKUP WHEN USING EDIBLE BEAN FEED CUP

NOTE: For information on using planting rate charts, see "HOW TO USE PLANTING RATE CHARTS".

HIGH RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Lb. of Medium Beans* Per Acre				Lb. of Large Beans** Per Acre				Recommended Speed Range
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	in mph
35	24	354	295	279	266	274	228	216	206	2 to 4
35	25	340	283	268	255	263	219	208	197	2 to 4
35	26	327	272	258	245	253	211	200	190	2 to 4
35	27	315	262	248	236	243	203	192	182	2 to 4
35	28	303	253	239	227	235	196	185	176	2 to 4
29	24	293	244	231	220	227	189	179	170	2 to 5
29	25	281	235	222	211	218	182	172	164	2 to 5
29	26	271	226	214	203	209	175	165	157	2 to 5
29	27	261	217	206	196	202	168	159	152	2 to 5
29	28	251	209	198	188	194	162	154	146	2 to 5
24	24	243	202	192	182	188	156	148	141	2 to 6
24	25	233	194	184	175	180	150	142	135	2 to 6
24	26	224	187	177	168	173	144	137	130	2 to 6
24	27	216	180	170	162	167	139	132	125	2 to 6
24	28	208	173	164	156	161	134	127	121	2 to 7
20	24	202	169	160	152	156	130	124	117	2 to 7
20	25	194	162	153	146	150	125	119	113	2 to 7
20	26	187	156	147	140	144	120	114	108	2 to 8
20	27	180	150	142	135	139	116	110	104	2 to 8
20	28	173	144	137	130	134	112	106	100	2 to 8
16	24	162	135	128	122	125	104	99	94	2 to 8
16	25	155	129	123	116	120	100	95	90	2 to 8
16	26	149	124	118	112	116	96	91	87	2 to 8
16	27	144	120	114	108	111	93	88	83	2 to 8
16	28	139	116	109	104	107	89	85	80	2 to 8

LOW RANGE INPUT SPROCKET

Sprocket Combinations (Number of Teeth)		Lb. of Medium Beans* Per Acre				Lb. of Large Beans** Per Acre				Recommended Speed Range
Driver	Driven	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	30 In. Rows	36 In. Rows	38 In. Rows	40 In. Rows	in mph
35	24	133	111	105	100	103	86	81	77	2 to 4
35	25	127	106	101	95	99	82	78	74	2 to 4
35	26	122	102	97	92	95	79	75	71	2 to 4
35	27	118	98	93	89	91	76	72	68	2 to 4
35	28	114	95	90	86	88	73	69	66	2 to 4
29	24	110	92	87	82	85	71	67	64	2 to 5
29	25	106	88	83	80	82	68	64	62	2 to 5
29	26	101	85	80	76	79	65	62	59	2 to 5
29	27	98	81	77	74	76	63	60	57	2 to 5
29	28	94	79	74	70	73	61	58	55	2 to 5
24	24	91	76	72	68	70	59	56	52	2 to 6
24	25	87	73	69	65	68	56	53	51	2 to 6
24	26	84	70	66	63	65	54	51	49	2 to 6
24	27	81	67	64	61	63	52	49	47	2 to 6
24	28	78	65	62	58	60	50	48	45	2 to 7
20	24	76	63	60	57	59	49	46	44	2 to 7
20	25	73	61	57	55	56	47	44	42	2 to 7
20	26	70	58	55	52	54	45	43	40	2 to 8
20	27	67	56	53	50	52	43	41	39	2 to 8
20	28	65	54	51	49	50	42	40	38	2 to 8
16	24	61	51	48	46	47	39	37	35	2 to 8
16	25	58	49	46	44	45	38	36	34	2 to 8
16	26	56	47	44	42	43	36	34	32	2 to 8
16	27	54	45	43	41	42	35	33	32	2 to 8
16	28	52	43	41	39	40	34	32	30	2 to 8

* *Medium beans include kidney beans at approximately 1000 seeds/lb., pinto beans at approximately 1100 seeds/lb., pink beans at approximately 1400 seeds/lb., or other beans of similar size and shape.*

** *Large beans include varieties which run approximately 400 seeds per lb., such as lima beans.*

IMPORTANT: To prevent planting miscalculations, make field checks to be sure you are planting at desired rate.

H41799

H41799 -19-25APR90

B22,8OM,AX -19-18MAY90

Checking Seed Population

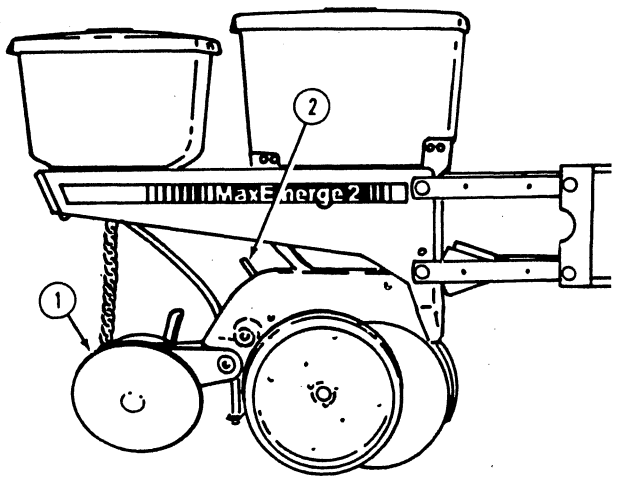
CHECKING SEED POPULATION

1. Chain up one or more sets of closing wheels so they will allow the seed trench to remain open.

2. Set the depth adjusting handle two settings from the minimum setting as shown.

3. Plant a short distance and check to see if seeds are visible in the trench. Readjust depth adjusting handle if necessary.

4. Plant approximately 90 m (100 yd).



H41898

-UN-03MAY90

H41898

B22,7OM,AL -19-28JUN90

LENGTH OF ROW IN FT.									
Fraction of Acre	Row Width								
	15"	18"	19"	20"	22"	30"	36"	38"	40"
1/100	348	240	276	261	238	174	145	138	131
1/200	174	145	138	131	119	87	72-1/2	69	66

A32803

-19-31JAN89

A32803

LENGTH OF ROW IN M									
Fraction of Hectare	Row Width								
	38 cm	46 cm	48 cm	51 cm	56 cm	76 cm	91 cm	97 cm	102 cm
1/1000	26.24	21.88	20.72	19.68	17.90	13.12	10.94	10.36	9.84

A32804

-19-31JAN89

A32804

5. Consult charts and determine what distance equals 1/1000 of a hectare, 1/100 of an acre, or 1/200 of an acre as it relates to the row width you are planting.

B22,7OM,AN -19-28JUN90

6. Mark distance selected with flags.

7. Count the seeds between flags.

8. If you marked off 1/100 of an acre, multiply the number of seeds counted by 100.

If you marked off 1/200 of an acre, multiply the number of seeds counted by 200.

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



B22,7OM,AO -19-28JUN90

If in-field checks indicate that the planter is planting at a rate significantly different than the seed transmission rate chart indicates, investigate the following in the order listed:

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

— Excessive unit bounce can cause low population and reduced spacing control. Reduce excessive unit bounce by increasing unit down force, or drive slower.

— Ensure that the planter drive wheel slippage is close to normal. Variations in drive wheel slippage can be caused by crop residue, tire inflation pressure, soil conditions and unit down force. The amount of tire slippage can be checked by measuring the rolling circumference of the drive tire 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	93 - 99 in.	52 psi

If your average measured rolling circumference does not fall 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 results in the desired population.

FOR CORN SEED PLANTING ONLY (VACUUM METER)

— If all other settings are correct and if the population is too high, the vacuum level can be reduced in one inch increments until the correct population is achieved. If the actual population is too low, the vacuum level can be increased in one inch increments until the correct population is achieved.

B22,7OM,BZ -19-28JUN90

DRIVE WHEEL SLIPPAGE

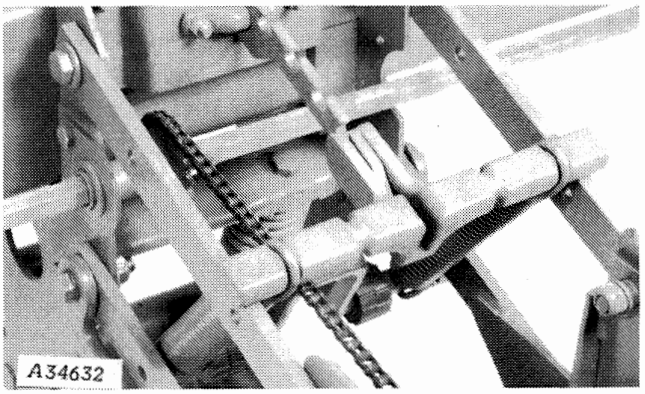
Another item that may cause the actual rates of seed or fertilizer to differ from the delivery rates shown in the operator's manual is the amount of drive wheel slippage.

While a certain amount of wheel slippage is normal, excessive drive wheel slippage may cause undesirable changes in the actual rates.

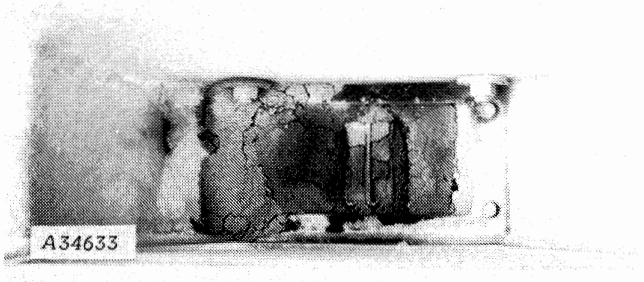
The rates shown in the operator's manual are based on approximately 15 per cent drive wheel slippage. Excessive drive wheel slippage may be caused by binding or poorly lubricated parts, misaligned bearings or caked material in the pesticide or fertilizer hoppers.

In addition, down pressure springs, coulters, tine tooth attachments, or any other attachment that removed frame weight from the drive wheels, may contribute to drive wheel slippage and lower than expected rates.

The effective circumference of the drive wheels is 96 inches. This means the drive wheels make one revolution for approximately each 96 inches of forward travel.



A34632 -UN-10OCT88



A34633 -UN-10OCT88

B22,5OM,B -19-18MAY90

The amount of excessive drive wheel slippage can be determined by marking a length of field that would normally represent 30 drive wheel revolutions. This would be:

30 x 96 in. = 2880 in. or 240 ft.

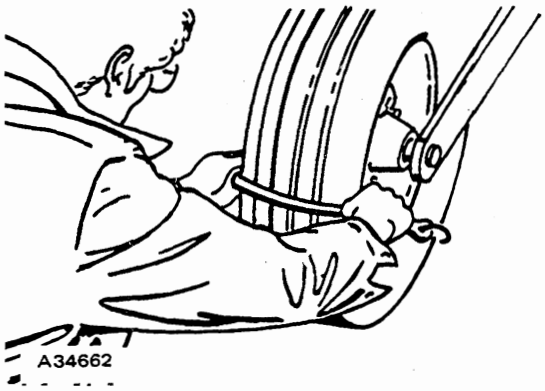
Next, mark the drive wheel by attaching rubber hold down strap, reflective tape or duct tape. This will make the wheel revolutions easier to count.

With all rows planting under normal field conditions, have the customer drive through the 240 ft. course at normal planting speed while you count the drive wheel revolutions.

Subtract the number of revolutions observed over the 240 ft. length from 30. Then divide this difference by 30. For example, if 28 wheel revolutions are observed, then:

30 - 28 = 2 2 ÷ 30 = .066,

or 6.6 per cent excessive drive wheel slippage. This excessive slippage will cause a 6.6 per cent lower than expected seeding rate.



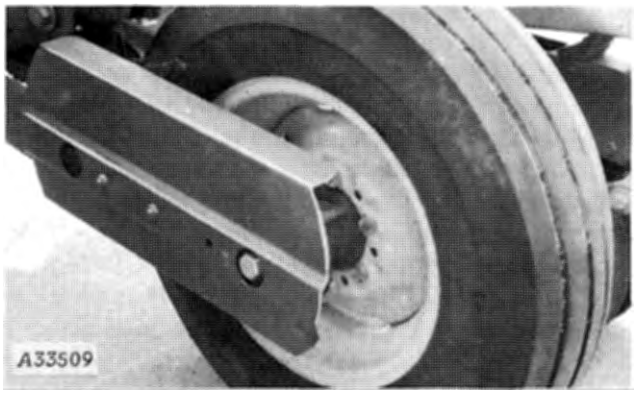
A34662 -UN-10OCT88

B22,5OM,C -19-18MAY90

WHEEL CHAIN TRASH DEFLECTOR

The wheel chain trash deflector protects the chain and spring loaded idlers from damage caused by trash, stones and clods.

For assembly instructions, see Attachment Assembly section in your John Deere dealer's Predelivery Instruction.



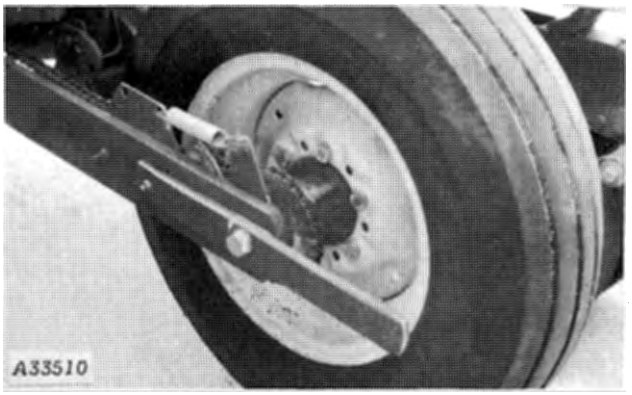
A33509 -UN-12OCT88

B21,7AT,CK -19-28JUN90

DRIVE WHEEL ROCK GUARD

The drive wheel rock guard reduces possibility of larger rocks and clods from wedging between Tru-Vee Gauge Wheel and carrying wheels and flipping onto the chain and idler.

For assembly instructions, see Attachment Assembly section in your John Deere dealer's Predelivery Instruction.



A33510 -UN-12OCT88

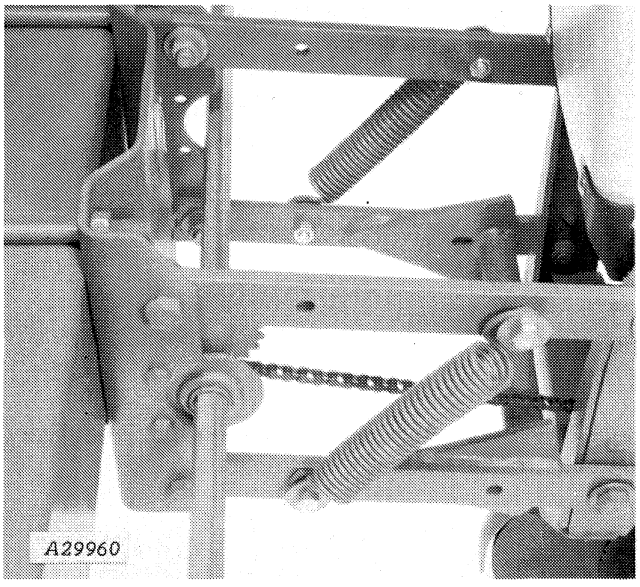
B21,7AT,CL -19-28JUN90

UNIT DOWN FORCE SPRINGS

The unit down force springs transfer weight from the main frame to planting unit to increase opener penetration and help to minimize bounce in rough soil surface conditions.

The springs are non-adjustable with 400 N (90 lbs.) of down force when the parallel arms are in the horizontal position. Two sets per row may be used for 800 N (180 lbs.) of down force.

See Attachment Assembly section in the Predelivery Instructions for assembly instructions.

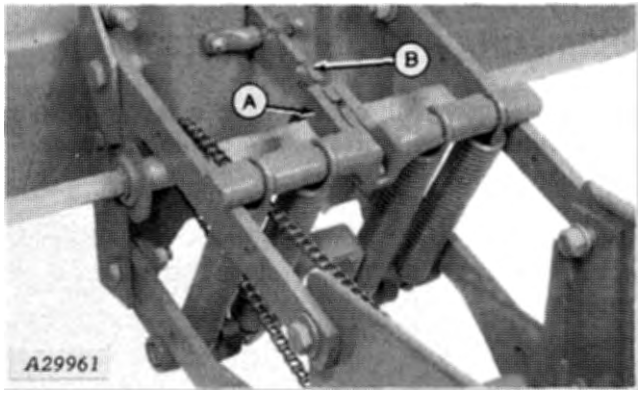


A29960 -UN-06OCT88

B21,7AT,BS -19-28JUN90

HEAVY-DUTY DOWN FORCE SPRINGS

The heavy duty adjustable down force spring system is recommended when planting in rough field conditions and when the soil or soil residue is difficult to penetrate. The spring system will transfer main frame weight to the planting unit to minimize bounce and to assist the opener to penetrate heavy soil conditions. The amount of force transfer is adjustable from 0 to 1335 N (0 to 300 lbs.) of down force. Never use more down force than is necessary to prevent excessive drive wheel slip.

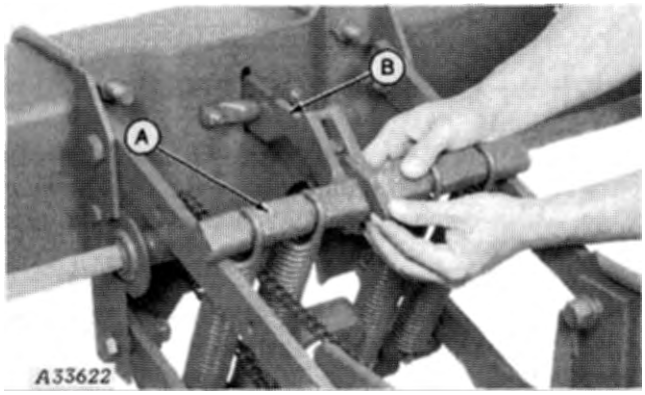


A29961 -UN-06OCT88

To adjust the down force springs, proceed as follows:

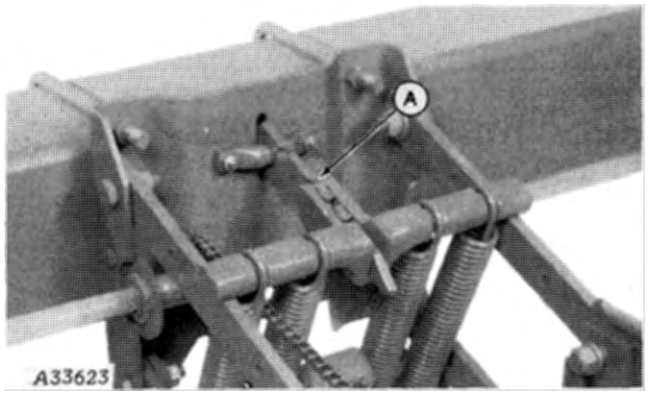
Raise the planter.

Lift the spring support (A) off the strap (B).



A33622 -UN-31JAN89

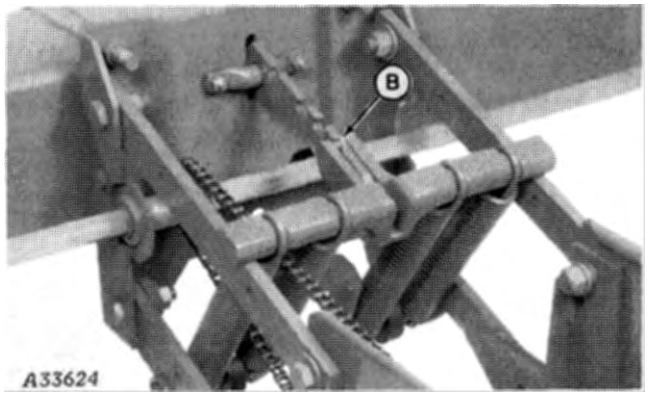
Place the spring support in front slot (A) for MINIMUM down force.



A33623 -UN-31JAN89

Place the spring support in the rear slot (B) for MAXIMUM down force.

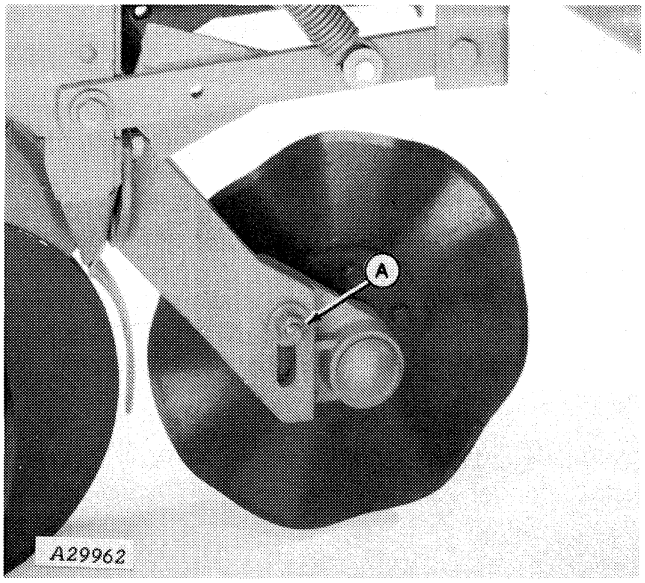
See Attachment Assembly section in the Predelivery Instructions for assembly instructions.



A33624 -UN-31JAN89

B21,7AT,BT -19-28JUN90

UNIT MOUNTED COULTER



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

This penetration depth of the coulter blade is controlled by the opener gauge wheels and weight adjustment.

Planting unit down force springs are recommended with this attachment.

IMPORTANT: The bottom edge of the coulter blade should be approximately 10 mm (3/8 in.) above the bottom edge of the seed openers. (Check this dimension with planter in planting position on any level surface.) This dimension will minimize the force required for penetration and help maintain a constant seed depth. In heavy straw, penetration and cutting action may be improved by running the bottom edge of the coulter blade slightly below the bottom edge of the seed openers.

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

NOTE: Do not operate coulter deeper than the seed opener when soil penetration is the limiting factor.

B21,7AT,BU -19-28JUN90

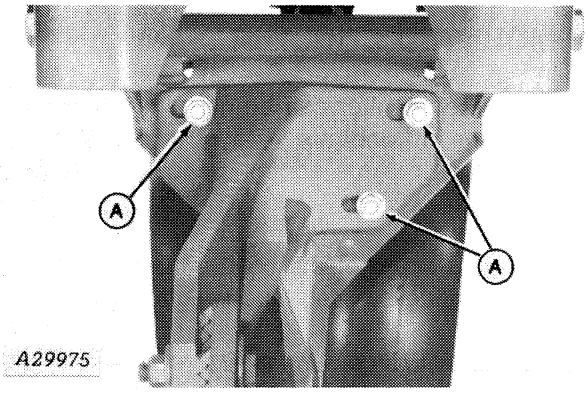
The coulter blade should be adjusted to align with the Tru-Vee opener.

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 bolts (A) and slide coulter.

If coulter blade is running at an angle relative to direction of travel, remove bolts (A) and add washers as required between back surface of coulter casting and front of planting unit.

See Attachment Assembly section in the Predelivery Instructions for assembly instructions.

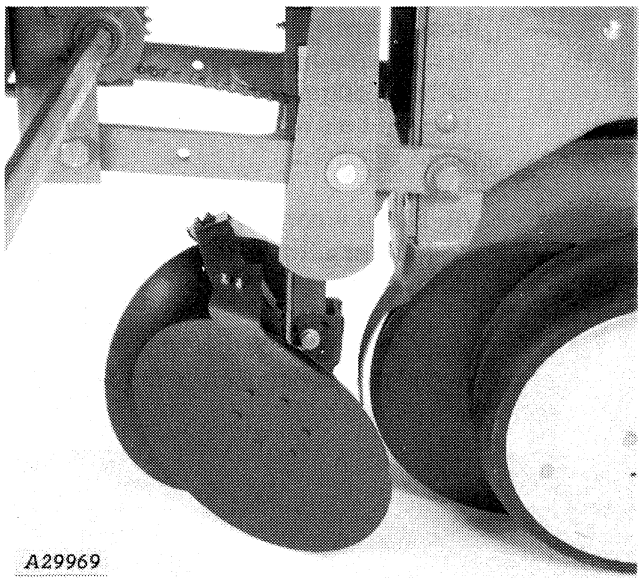


A29975 -UN-06OCT88

B21,7AT,BV -19-28JUN90

CONSERVATION FURROWERS

The furrower can be equipped with smooth or cut-out edges. The smooth edged blades are recommended in dry soil or clod conditions. The cut-out blades are recommended in reduced tillage conditions with surface residue.

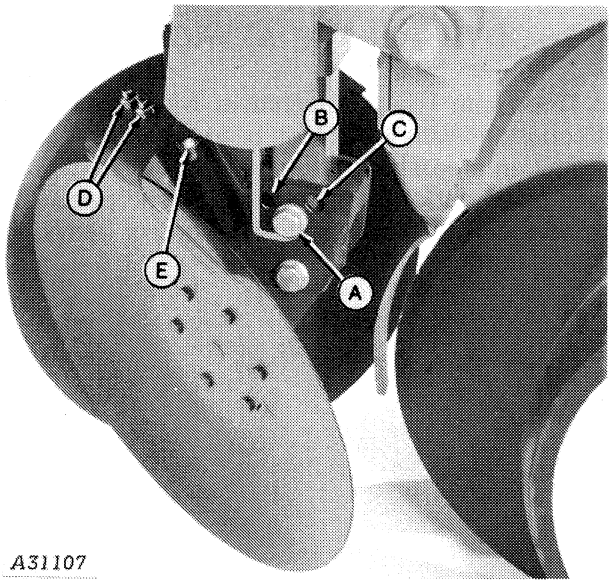


A29969 -UN-06OCT88

B21,7AT,CB -19-28JUN90

Adjust scrapers with cap screws (D) and (E) so they lightly contact the furrower blades.

Blade pitch affects lateral displacement, width of area cleared and soil profile. To obtain a sharper V-shaped soil profile, install cap screw (A) in hole (B). To obtain a flatter soil profile, place cap screw in hole (C).



-UN-12OCT88
A31107

B21,7AT,CC -19-28JUN90

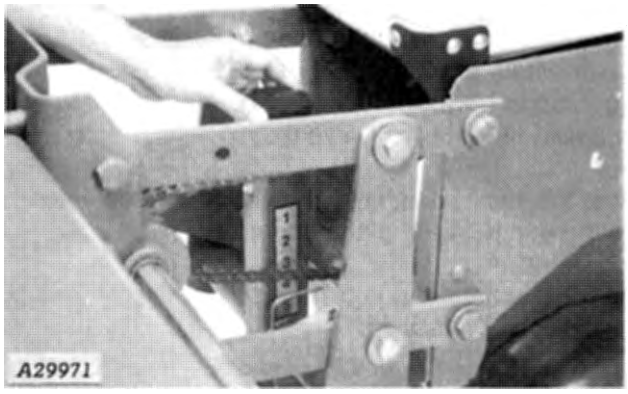
Height affects width and depth of area cleared. To adjust the height of the furrower blades, raise and turn the adjustment knob on the tillage support bracket.

The tillage support bracket has a scale and pointer to help you adjust all the furrowers evenly.

For most conditions, adjust furrower to lightly contact soil surface when planting unit is in the planting position.

When adjustment is complete, back handle up and push down to lock in position.

See Attachment Assembly section in the Predelivery Instructions for assembly instructions.

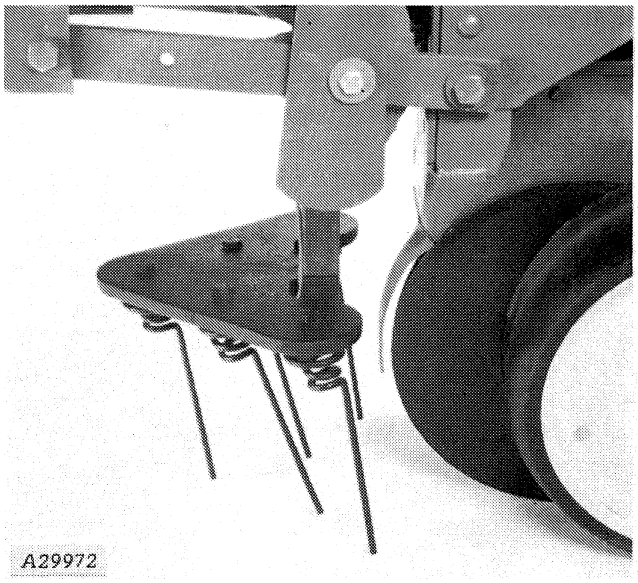


-UN-12OCT88
A29971

B21,7AT,CD -19-28JUN90

TINE-TOOTH TILLAGE ATTACHMENT

The Tine-Tooth Tillage Attachment is recommended for soil conditions with light clods or to break light crust. It smooths an area ahead of the unit and breaks up and moves clods out of the path of the seed opener. It is not recommended for trashy soil conditions or heavy tillage.



A29972 -UN-06OCT88

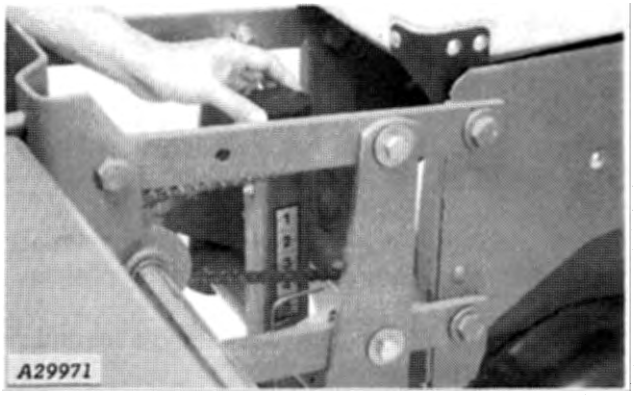
B21,7AT,CE -19-28JUN90

To adjust the height of the tine-teeth, raise and turn the adjustment knob on the tillage support bracket. The tillage support bracket has a scale and pointer to help you adjust the tine teeth evenly.

Adjust the teeth to lightly contact soil surface when planting unit is in the planting position.

When adjustment is complete, back handle up and push down to lock in position.

See Attachment Assembly section in the Predelivery Instructions for assembly instructions.



A29971 -UN-12OCT88

B21,7AT,CF -19-28JUN90

HEAVY-DUTY CLOSING WHEELS

In hard to penetrate soils or seed beds with considerable residue, it may be difficult to completely close the seed furrow with the regular closing wheels. Heavy-duty closing wheels are made of heavy cast material and have an aggressive edge to more effectively close the seed furrow in more severe soil conditions.

NOTE: The heavy-duty closing wheels are not recommended for conventional planting conditions.

Adjustable spring force permits proper closing of the seed trench by firming soil on each side of the seed, not directly over the seed. The closing wheel down force can be adjusted by placing the handle in slots (C), (D), (E) or (F) for varying soil conditions. Placing the handle in the middle slot (G) will allow the closing wheels to FLOAT with only the weight of the closing wheel system on the soil surface. Closing wheel down force increases as the handle is moved rearward.

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

Raise the planter.

Loosen cap screw (A). Turn adjusting cam (B) clockwise to move the closing wheels to the right or counterclockwise to move the closing wheels to the left. Visually center as required.

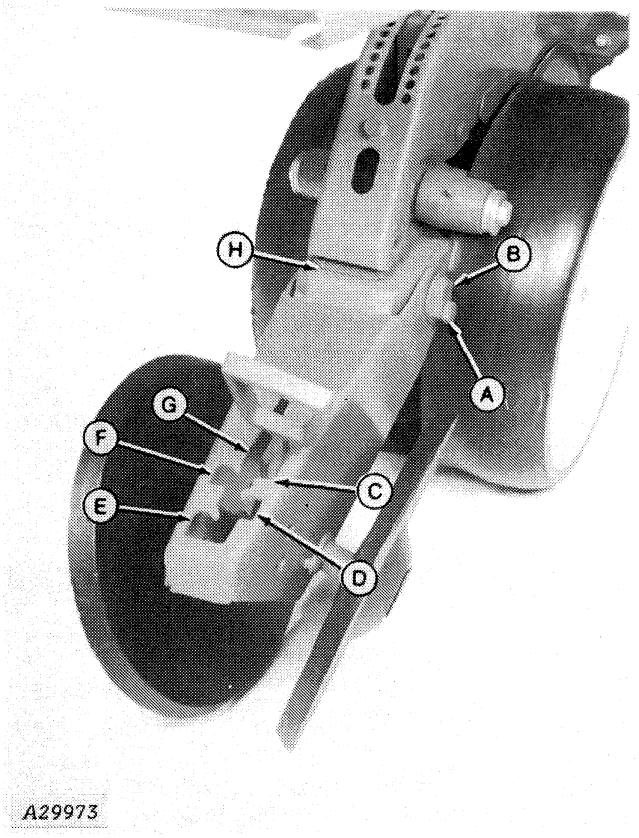
NOTE: After centering closing wheels, make sure top front edge of closing wheel frame (H) contacts top of casting all the way across top surface so both wheels contact soil at the same time and apply same amount of force.

The casting is slotted so cam (B) and bolt (A) can slide vertically.

If closing wheel frame does NOT contact top of casting properly, slide adjusting cam and bolt up or down until contact is made.

Tighten screws.

See Attachment Assembly section in the Predelivery Instructions for assembly instructions.



-UN-06OCT88

A29973

B21,7AT,CG -19-28JUN90

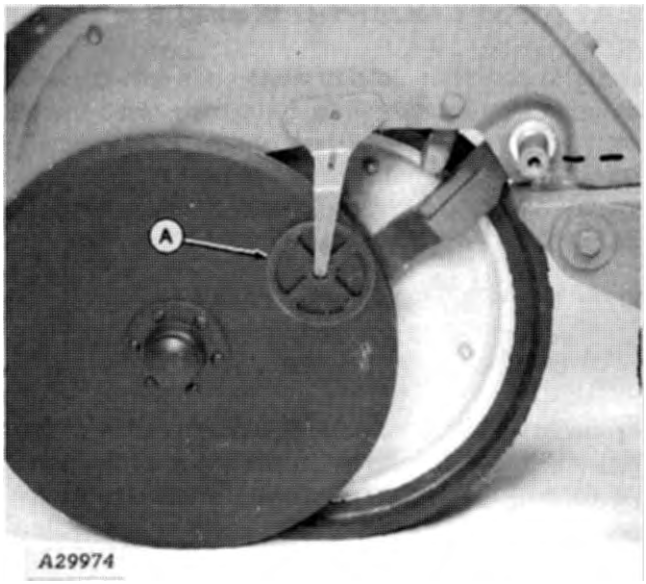
ROTARY SCRAPER

The spring-loaded rotary scraper (A) is recommended for moist, sticky soils to assist the depth gauging wheels in keeping the Tru-Vee opener blades clean.

NOTE: The scraper is not recommended in dry abrasive soil conditions.

At the start of the season and periodically during the season, inspect the scraper insert for wear.

See Attachment Assembly section in the Predelivery Instructions for assembly instructions.



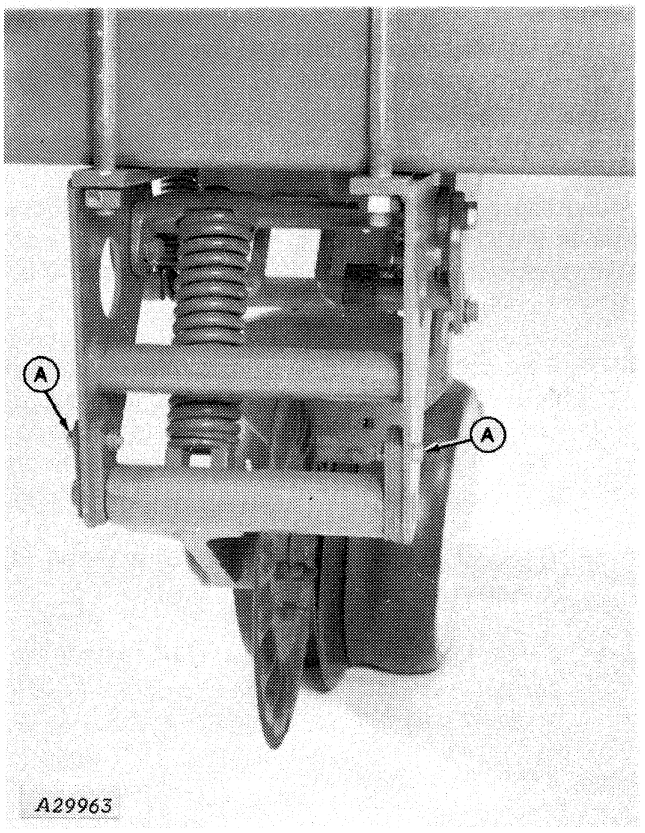
Gauge Wheel Removed for Clarity

B21,7AT,CH -19-28JUN90

FRAME MOUNTED COULTER

The frame mounted coulter can be used to assist the Tru-Vee opener in penetrating tough soil conditions and to cut or displace residue commonly found in severe "double-cropping" or light to moderate "no-till" planting conditions. The frame mounted coulter is not compatible with rocky field conditions.

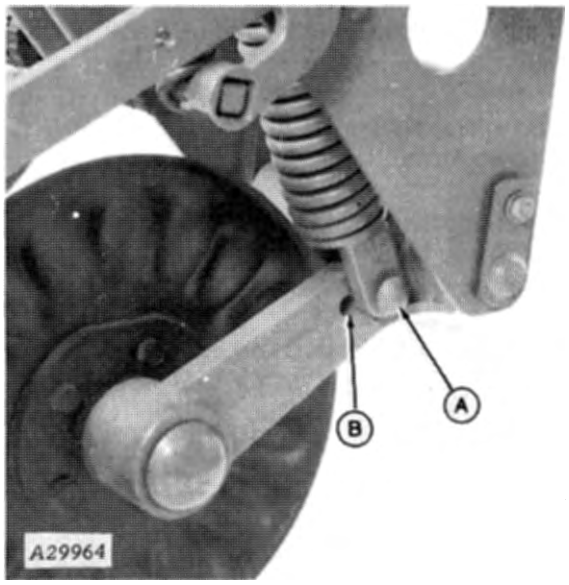
The frame mounted coulter blade should be directly in front of the seed opener. To adjust the coulter blade laterally, remove cap screws (A), add or remove spacers to either side as required. Secure spacers with cap screws.



B21,7AT,BW -19-28JUN90

In light field conditions, use the lightest setting to avoid over penetration and disturbing the seed bed in lighter soils.

In heavier field conditions found in severe "double-cropping" or light to moderate "no-till" install pin (A) in down force setting (B) for increased penetrating force.



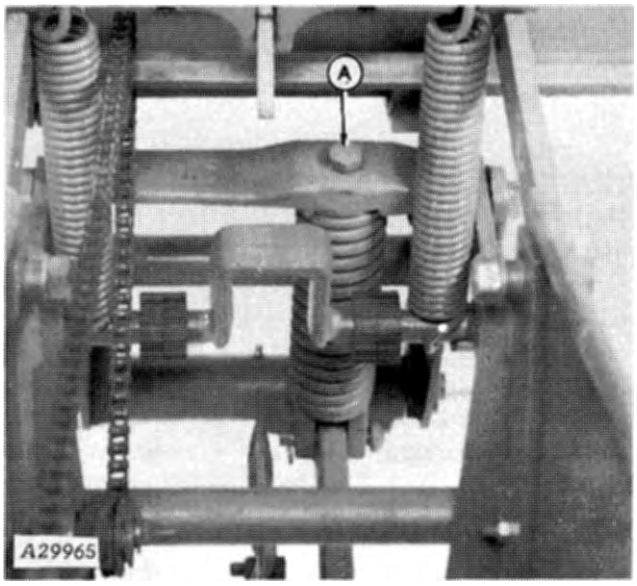
-UN-06OCT88
A29964

B21,7AT,BX -19-28JUN90

IMPORTANT: For best results, the coulter blade should not penetrate deeper than the opener blades. Adjust the coulter force and height to optimize the operation.

To adjust the depth of the coulter blade, turn cap screw (A) clockwise to raise the blade or counterclockwise to lower the blade.

See Attachment Assembly section of Predelivery Instructions.



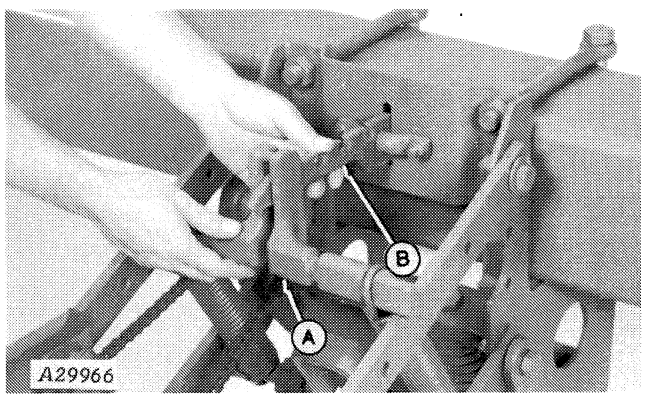
-UN-06OCT88
A29965

B21,7AT,BY -19-28JUN90

To adjust the down force springs, proceed as follows:

Raise the planter.

Lift the spring support (A) off the strap (B).



-UN-06OCT88
A29966

B21,7AT,BZ -19-28JUN90

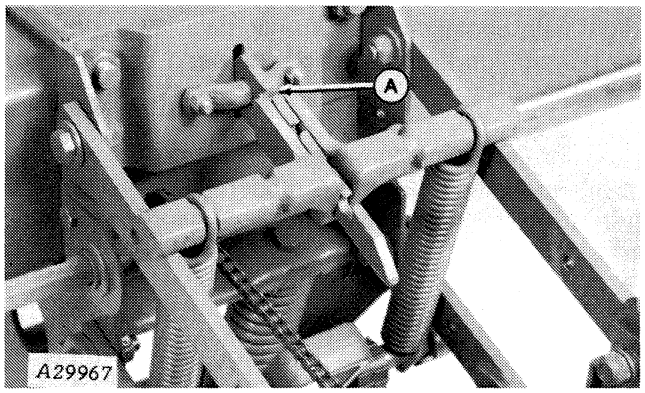
Place the spring support in front slot (A) for minimum down force.

Replace the spring support in the rear slot (B) for maximum down force.

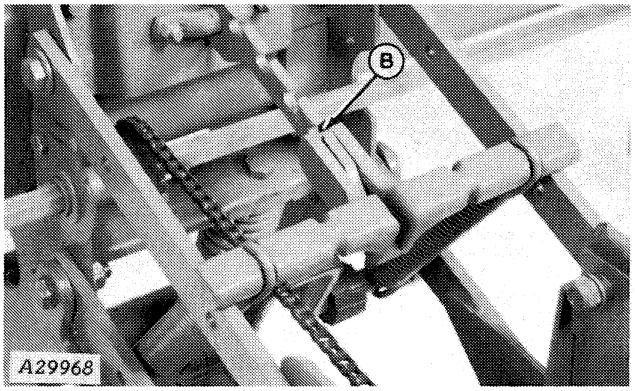
Adjust down force as required for proper blade penetration. Try to leave some fertilizer in hoppers or tanks for ballast.

NOTE: When using frame mounted coulters, to reduce drive wheel slippage, only a single set of springs are used on each row.

See Attachment Assembly in the Predelivery Instructions for assembly instructions.



-UN-06OCT88 A29967



-UN-06OCT88 A29968

B21,7AT,CA -19-28JUN90

ROW LEVELER CHAIN

The row leveler chain smooths the slight "W" effect left by the firming wheels and reduces the tendency of some soils to crust.

If is not recommended for use with granular herbicide, rear mounted insecticide spreader, and liquid herbicide attachments.

See Attachment Assembly section in the Predelivery Instructions for assembly instructions.



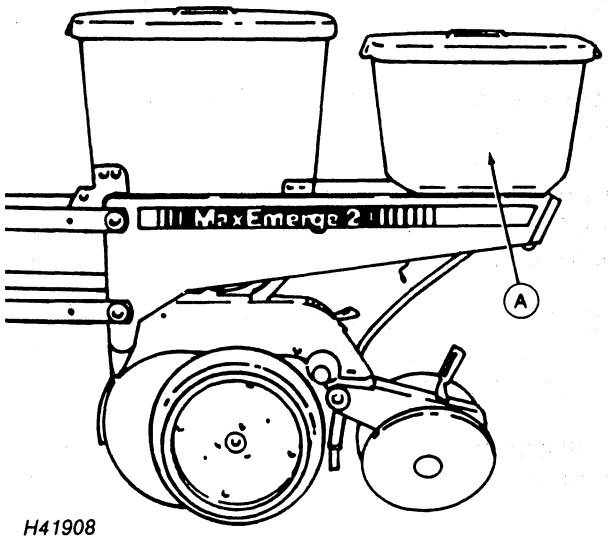
-UN-06OCT88 A29959

B21,7AT,BH -19-28JUN90

GRANULAR CHEMICAL ATTACHMENT

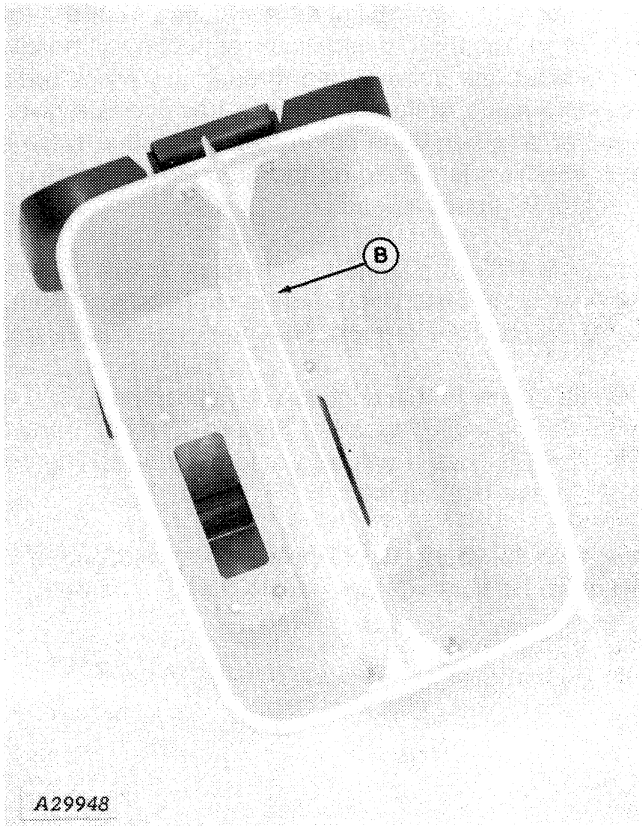
The granular chemical attachment can be used to deliver one or two different granular chemicals.

The granular hopper (A) holds 32 kg (70 lb) of one type of chemical or 16 kg (35 lb) each of both insecticide and herbicide by using the special hopper divider (B).



H41908

H41908 -UN-04MAY90



A29948

A29948 -UN-06OCT88

B21,7AT,AN -19-28JUN90

The application rate is determined by:

1. The size of the opening of the meter housing assembly.

2. The travel speed.

The size of the opening is adjustable by turning the knobs on the rear of the granular hoppers. There are 80 increments which indicate the relative application rate. The delivery rate will increase from 1 through 79. Setting 00 closes the opening completely. A fluted roller delivers the granular chemical to the adjustable opening.

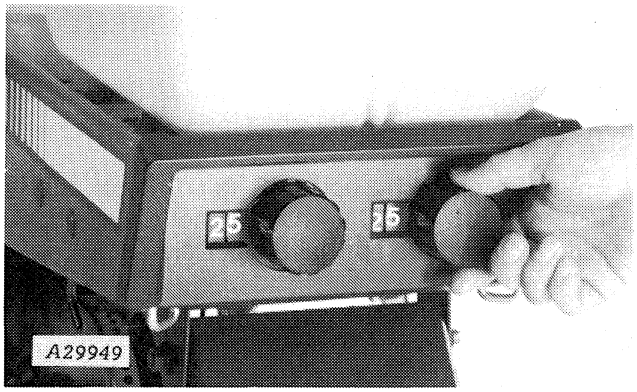
The granular chemical flows through a given opening size at a nearly uniform rate regardless of rotor rpm. Therefore, SPEED has the greatest impact on application rate and resulting chemical concentration in the row.

For example, if planting speed is reduced from 9.7 to 4.8 km/h (6 to 3 mph), chemical concentration will nearly double since the delivery rate through the orifice remains nearly the same while the distance traveled in a given period of time has been cut in half. Therefore, twice as much chemical is placed on the ground due to the decrease in ground speed.

Rotor rpm will not change the chemical meter delivery rate unless the seed population is changed significantly (i.e. ± 25 per cent or more from the original setting.)

The rate charts in this section are approximate, and are based on a planting speed of 8 km/h (5 mph). They are to be used only as a guide to determine a starting point for the meter dial setting.

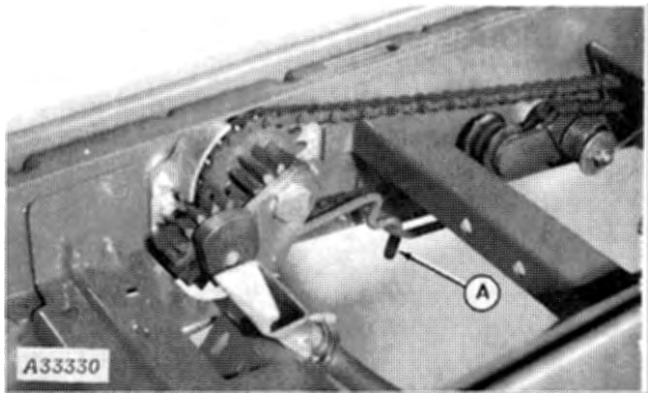
Always check your rate of application as outlined in this section to be sure you are getting the desired rate.



A29949 -UN-06OCT88

B21,7AT,AO -19-28JUN90

To engage the insecticide and/or herbicide drive, push handle (A) upward until handle is resting in the slot as shown.



B21,3AT,AD -19-28JUN90

CAUTION: Agricultural chemicals can be dangerous. Improper selection or use can injure persons, animals, plants, soils, or other property. BE SAFE: Select the right chemical for the job. Use rubber gloves and respirator and apply the chemical with care. Follow instructions of the chemical manufacturer.

Most insecticides and herbicides readily accumulate moisture and may damage the granular attachment if allowed to remain in the hopper when the planter is not in use. Even during periods of operation, deposits of insecticide may build up in the hopper and interfere with working parts. Therefore, the hoppers should be checked every day for any material buildup and thoroughly cleaned if the planter is not to be used for a period greater than two days.

See Service section for cleaning instructions.

B05,13AT,AM -19-28JUN90

Use the application rate and meter setting recommended by the chemical manufacturer as a starting point for the meter dial setting.

If the meter setting is not available from the chemical manufacturer, use the charts in this section as a starting point for the meter dial setting.

IMPORTANT: Because the available chemical materials vary widely in consistency and composition, their "flow-ability" is affected by temperature and humidity conditions. It is important to calibrate each individual meter to the particular chemical being used.

To determine the application rate and starting meter setting, proceed as follows:

B21,7AT,AU -19-28JUN90

U.S. MEASUREMENT

The chemical manufacturer may recommend the rate of application for granular chemicals in the following ways:

1. Ounces per 1000 linear row feet.

2. Pounds per acre for a given band width and row spacing.

3. Pounds per acre for complete (broadcast) coverage.

When the chemical manufacturer recommends ounces per 1000 linear row feet or pounds per acre for a given band width and row spacing, proceed to the chemical manufacturer's recommended meter setting or to the meter setting recommended in the rate charts in this section.

When the chemical manufacturer recommends pounds per acre for complete (broadcast) coverage only, it is necessary to reduce the pounds per acre to apply for your band width and row spacing. This will give you the same chemical concentration in the band area as the chemical manufacturer recommends for complete (broadcast) coverage.

Use the following formula to find the pounds per acre for your band width and row spacing.

NOTE: We recommend you actually measure the band width applied in your conditions and use this width in your application rate calculations.

$\frac{A \times B}{C}$ = Delivery rate per acre for a given band width and row spacing.

A—Chemical manufacturers recommended rate in pounds per acre for complete (broadcast) coverage.

B—Band width in inches.

C—Row spacing in inches.

Example: The chemical manufacturer recommends 20 lb/acre for complete broadcast coverage. The band width is 14 in. The row spacing is 30 in.

$\frac{20 \times 14}{30}$ = 9.3 lb. per acre.

The required delivery rate for 14 in. bands and 30 in. row spacing would be 9.3 lb/acre. Set meter setting recommended for 9.3 lb/acre broadcast coverage.

Delivery of 9.3 lb/acre of chemical in a 14 in. band will provide the same chemical concentration on the soil surface as delivery of 20 lb/acre broadcast coverage.

Proceed to chemical manufacturer's recommended meter setting or to the meter setting recommended in the rate charts in this section which will deliver 9.3 lb/acre.

B21,7AT,AX -19-28JUN90

To check the exact number of lb/acre of chemical that will be delivered, attach a plastic bag to each chemical diffuser, lower the planter, and proceed as follows:

Drive 500 feet at planting speed. Weigh the chemical in oz. that was caught in one bag. Multiply that amount by the factor shown to determine lb. per acre.

Check the chemical caught in each bag in the same manner.

Lb. Per Acre Factor for Given Row Width

Row Width	Factor
38 In.	1.7
36 In.	1.8
30 In.	2.2

Example: Assume you are planting 38 in. rows and you caught 5.6 oz. in one bag (one row). 5.6 oz. times 1.7 (factor for 38 in. rows) equals 9.5 lb. per acre.

If the desired amount is not obtained for each unit with the first setting, turn the metering knob and repeat the check until desired amount is delivered.

NOTE: If a significant difference in rate is observed between rows, the meter dial mechanism may require recalibration. See your John Deere dealer.

B21,7AT,AY -19-28JUN90

U.S. UNITS OF MEASURE -- METER SETTING
INSECTICIDE APPLICATION RATES (Clay Granules)

Approximate Rate in Lbs/Acre

METER SETTING	30 INCH ROWS MPH 4	6	8	36 INCH ROWS MPH 4	6	8	38 INCH ROWS MPH 4	6	8	OUNCES PER 1000 ROW FT. MPH 4	6	8
10	2.5	1.7	1.3	2.1	1.4	1.0	2.0	1.3	1.0	2.3	1.5	1.1
11	3.0	2.0	1.5	2.5	1.7	1.3	2.4	1.6	1.2	2.8	1.8	1.4
12	3.6	2.4	1.8	3.0	2.0	1.5	2.9	1.9	1.4	3.3	2.2	1.7
13	4.4	2.9	2.2	3.6	2.4	1.8	3.5	2.3	1.7	4.0	2.7	2.0
14	5.3	3.5	2.6	4.4	2.9	2.2	4.1	2.8	2.1	4.8	3.2	2.4
15	6.0	4.0	3.0	5.0	3.3	2.5	4.7	3.2	2.4	5.5	3.7	2.8
16	6.8	4.5	3.4	5.7	3.8	2.8	5.4	3.6	2.7	6.3	4.2	3.1
17	7.6	5.1	3.8	6.3	4.2	3.2	6.0	4.0	3.0	7.0	4.7	3.5
18	8.2	5.5	4.1	6.8	4.6	3.4	6.5	4.3	3.2	7.5	5.0	3.8
19	8.7	5.8	4.4	7.3	4.8	3.6	6.9	4.6	3.4	8.0	5.3	4.0
20	9.3	6.2	4.7	7.8	5.2	3.9	7.4	4.9	3.7	8.6	5.7	4.3
21	9.8	6.5	4.9	8.2	5.4	4.1	7.7	5.2	3.9	9.0	6.0	4.5
22	10.3	6.8	5.1	8.6	5.7	4.3	8.1	5.4	4.1	9.4	6.3	4.7
23	10.7	7.1	5.4	8.9	6.0	4.5	8.5	5.6	4.2	9.8	6.6	4.9
24	11.2	7.5	5.6	9.3	6.2	4.7	8.8	5.9	4.4	10.3	6.8	5.1
25	11.6	7.7	5.8	9.6	6.4	4.8	9.1	6.1	4.6	10.6	7.1	5.3
26	11.9	7.9	6.0	9.9	6.6	5.0	9.4	6.3	4.7	10.9	7.3	5.5
27	12.4	8.3	6.2	10.3	6.9	5.2	9.8	6.5	4.9	11.4	7.6	5.7
28	12.7	8.5	6.4	10.6	7.1	5.3	10.1	6.7	5.0	11.7	7.8	5.8
29	13.2	8.8	6.6	11.0	7.3	5.5	10.4	6.9	5.2	12.1	8.1	6.1
30	13.5	9.0	6.8	11.3	7.5	5.6	10.7	7.1	5.3	12.4	8.3	6.2
31	13.8	9.2	6.9	11.5	7.6	5.7	10.9	7.2	5.4	12.6	8.4	6.3
32	14.2	9.5	7.1	11.9	7.9	5.9	11.2	7.5	5.6	13.1	8.7	6.5
33	14.6	9.7	7.3	12.2	8.1	6.1	11.5	7.7	5.8	13.4	8.9	6.7
34	15.1	10.1	7.6	12.6	8.4	6.3	11.9	7.9	6.0	13.9	9.2	6.9
35	15.6	10.4	7.8	13.0	8.7	6.5	12.3	8.2	6.2	14.3	9.6	7.2
36	16.1	10.7	8.0	13.4	8.9	6.7	12.7	8.5	6.3	14.8	9.8	7.4
37	16.5	11.0	8.2	13.7	9.2	6.9	13.0	8.7	6.5	15.1	10.1	7.6
38	17.0	11.3	8.5	14.2	9.4	7.1	13.4	8.9	6.7	15.6	10.4	7.8
39	17.5	11.7	8.7	14.6	9.7	7.3	13.8	9.2	6.9	16.1	10.7	8.0
40	18.0	12.0	9.0	15.0	10.0	7.5	14.2	9.5	7.1	16.5	11.0	8.2
41	18.4	12.3	9.2	15.3	10.2	7.7	14.5	9.7	7.3	16.9	11.3	8.4
42	19.1	12.7	9.6	15.9	10.6	8.0	15.1	10.1	7.5	17.6	11.7	8.8
43	20.0	13.3	10.0	16.7	11.1	8.3	15.8	10.5	7.9	18.4	12.2	9.2
44	21.0	14.0	10.5	17.5	11.7	8.8	16.6	11.1	8.3	19.3	12.9	9.6
45	22.1	14.8	11.1	18.4	12.3	9.2	17.5	11.6	8.7	20.3	13.5	10.2
46	23.4	15.6	11.7	19.5	13.0	9.7	18.5	12.3	9.2	21.5	14.3	10.7
47	24.5	16.3	12.3	20.4	13.6	10.2	19.3	12.9	9.7	22.5	15.0	11.2
48	25.6	17.1	12.8	21.4	14.2	10.7	20.2	13.5	10.1	23.5	15.7	11.8
49	26.8	17.8	13.4	22.3	14.9	11.1	21.1	14.1	10.6	24.6	16.4	12.3
50	27.9	18.6	13.9	23.2	15.5	11.6	22.0	14.7	11.0	25.6	17.1	12.8
51	29.0	19.3	14.5	24.2	16.1	12.1	22.9	15.3	11.4	26.6	17.8	13.3
52	30.3	20.2	15.1	25.2	16.8	12.6	23.9	15.9	11.9	27.8	18.5	13.9
53	31.6	21.1	15.8	26.4	17.6	13.2	25.0	16.6	12.5	29.0	19.4	14.5
54	33.0	22.0	16.5	27.5	18.3	13.8	26.1	17.4	13.0	30.3	20.2	15.2
55	34.5	23.0	17.3	28.8	19.2	14.4	27.2	18.2	13.6	31.7	21.1	15.8
56	36.0	24.0	18.0	30.0	20.0	15.0	28.4	18.9	14.2	33.1	22.0	16.5
57	37.4	24.9	18.7	31.1	20.8	15.6	29.5	19.7	14.8	34.3	22.9	17.2
58	38.9	25.9	19.4	32.4	21.6	16.2	30.7	20.5	15.3	35.7	23.8	17.8
59	40.4	26.9	20.2	33.6	22.4	16.8	31.9	21.2	15.9	37.1	24.7	18.5
60	41.6	27.8	20.8	34.7	23.1	17.3	32.9	21.9	16.4	38.2	25.5	19.1

-19-31JAN89

A31101

A31101

B21,7AT,BA -19-28JUN90

U.S. UNITS OF MEASURE – METER SETTING
INSECTICIDE APPLICATION RATES (Sand Granules)

Approximate Rate in Lbs/Acre

METER SETTING	30 INCH ROWS MPH 4	30 INCH ROWS MPH 6	30 INCH ROWS MPH 8	36 INCH ROWS MPH 4	36 INCH ROWS MPH 6	36 INCH ROWS MPH 8	38 INCH ROWS MPH 4	38 INCH ROWS MPH 6	38 INCH ROWS MPH 8	OUNCES PER 1000 ROW FT. MPH 4	OUNCES PER 1000 ROW FT. MPH 6	OUNCES PER 1000 ROW FT. MPH 8
6	1.6	1.1	0.8	1.3	0.9	0.7	1.3	0.8	0.6	1.5	1.0	0.7
7	2.3	1.5	1.2	1.9	1.3	1.0	1.8	1.2	0.9	2.1	1.4	1.1
8	3.1	2.1	1.6	2.6	1.7	1.3	2.4	1.6	1.2	2.8	1.9	1.4
9	3.9	2.6	2.0	3.3	2.2	1.6	3.1	2.1	1.5	3.6	2.4	1.8
10	4.8	3.2	2.4	4.0	2.7	2.0	3.8	2.5	1.9	4.4	2.9	2.2
11	5.7	3.8	2.9	4.8	3.2	2.4	4.5	3.0	2.3	5.2	3.5	2.6
12	6.7	4.5	3.4	5.6	3.7	2.8	5.3	3.5	2.6	6.2	4.1	3.1
13	7.7	5.1	3.9	6.4	4.3	3.2	6.1	4.1	3.0	7.1	4.7	3.5
14	8.8	5.9	4.4	7.3	4.9	3.7	6.9	4.6	3.5	8.1	5.4	4.0
15	9.8	6.5	4.9	8.2	5.4	4.1	7.7	5.2	3.9	9.0	6.0	4.5
16	10.7	7.1	5.4	8.9	5.9	4.5	8.4	5.6	4.2	9.8	6.6	4.9
17	11.6	7.7	5.8	9.7	6.4	4.8	9.2	6.1	4.6	10.7	7.1	5.3
18	12.5	8.3	6.3	10.4	6.9	5.2	9.9	6.6	4.9	11.5	7.7	5.7
19	13.3	8.9	6.7	11.1	7.4	5.5	10.5	7.0	5.3	12.2	8.1	6.1
20	14.2	9.5	7.1	11.8	7.9	5.9	11.2	7.5	5.6	13.0	8.7	6.5
21	15.1	10.1	7.6	12.6	8.4	6.3	11.9	7.9	6.0	13.9	9.2	6.9
22	16.0	10.7	8.0	13.3	8.9	6.7	12.6	8.4	6.3	14.7	9.8	7.3
23	16.9	11.3	8.5	14.1	9.4	7.0	13.3	8.9	6.7	15.5	10.3	7.8
24	17.8	11.9	8.9	14.8	9.9	7.4	14.1	9.4	7.0	16.3	10.9	8.2
25	18.7	12.5	9.4	15.6	10.4	7.8	14.8	9.8	7.4	17.2	11.4	8.6
26	19.7	13.1	9.9	16.4	10.9	8.2	15.6	10.4	7.8	18.1	12.1	9.0
27	20.6	13.7	10.3	17.2	11.4	8.6	16.3	10.8	8.1	18.9	12.6	9.5
28	21.6	14.4	10.8	18.0	12.0	9.0	17.1	11.4	8.5	19.8	13.2	9.9
29	22.6	15.1	11.3	18.8	12.6	9.4	17.8	11.9	8.9	20.8	13.8	10.4
30	23.6	15.7	11.8	19.7	13.1	9.8	18.6	12.4	9.3	21.7	14.4	10.8
31	24.7	16.5	12.4	20.6	13.7	10.3	19.5	13.0	9.8	22.7	15.1	11.3
32	25.7	17.1	12.9	21.4	14.3	10.7	20.3	13.5	10.1	23.6	15.7	11.8
33	26.8	17.9	13.4	22.3	14.9	11.2	21.2	14.1	10.6	24.6	16.4	12.3
34	27.9	18.6	14.0	23.3	15.5	11.6	22.0	14.7	11.0	25.6	17.1	12.8
35	29.0	19.3	14.5	24.2	16.1	12.1	22.9	15.3	11.4	26.6	17.8	13.3
36	30.2	20.1	15.1	25.2	16.8	12.6	23.8	15.9	11.9	27.7	18.5	13.9
37	31.4	20.9	15.7	26.2	17.4	13.1	24.8	16.5	12.4	28.8	19.2	14.4
38	32.6	21.7	16.3	27.2	18.1	13.6	25.7	17.2	12.9	29.9	20.0	15.0
39	33.8	22.5	16.9	28.2	18.8	14.1	26.7	17.8	13.3	31.0	20.7	15.5
40	35.0	23.3	17.5	29.2	19.4	14.6	27.6	18.4	13.8	32.1	21.4	16.1
41	36.3	24.2	18.2	30.3	20.2	15.1	28.7	19.1	14.3	33.3	22.2	16.7
42	37.6	25.1	18.8	31.3	20.9	15.7	29.7	19.8	14.8	34.5	23.0	17.3
43	38.9	25.9	19.5	32.4	21.6	16.2	30.7	20.5	15.4	35.7	23.8	17.9
44	40.2	26.8	20.1	33.5	22.3	16.8	31.7	21.2	15.9	36.9	24.6	18.5
45	41.6	27.7	20.8	34.7	23.1	17.3	32.8	21.9	16.4	38.2	25.5	19.1
46	43.0	28.7	21.5	35.8	23.9	17.9	33.9	22.6	17.0	39.5	26.3	19.7
47	44.4	29.6	22.2	37.0	24.7	18.5	35.1	23.4	17.5	40.8	27.2	20.4
48	45.9	30.6	23.0	38.3	25.5	19.1	36.2	24.2	18.1	42.1	28.1	21.1
49	47.3	31.5	23.7	39.4	26.3	19.7	37.3	24.9	18.7	43.4	29.0	21.7
50	48.9	32.6	24.5	40.8	27.2	20.4	38.6	25.7	19.3	44.9	29.9	22.5

A31103

-19-31JAN89

A31103

B21,7AT,BC -19-28JUN90

U.S. UNITS OF MEASURE – METER SETTING
HERBICIDE APPLICATION RATES (Clay Granules)

Approximate Rate in Lbs/Acre

METER SETTING	30 INCH ROWS MPH			36 INCH ROWS MPH			38 INCH ROWS MPH		
	4	6	8	4	6	8	4	6	8
10	2.1	1.4	1.1	1.7	1.2	0.9	1.7	1.1	0.9
11	2.5	1.6	1.2	2.1	1.4	1.0	2.0	1.3	1.0
12	3.0	1.9	1.4	2.5	1.6	1.2	2.3	1.5	1.1
13	3.5	2.3	1.7	2.9	1.9	1.4	2.8	1.8	1.3
14	4.0	2.6	2.0	3.3	2.2	1.6	3.2	2.1	1.5
15	4.8	3.1	2.3	4.0	2.6	1.9	3.8	2.4	1.8
16	5.5	3.6	2.6	4.6	3.0	2.2	4.4	2.8	2.1
17	6.2	4.0	2.9	5.1	3.3	2.4	4.9	3.2	2.3
18	6.7	4.4	3.2	5.6	3.6	2.7	5.3	3.4	2.5
19	7.2	4.7	3.4	6.0	3.9	2.8	5.7	3.7	2.7
20	7.9	5.1	3.7	6.6	4.2	3.1	6.2	4.0	2.9
21	8.4	5.4	4.0	7.0	4.5	3.3	6.6	4.3	3.1
22	9.0	5.8	4.2	7.5	4.8	3.5	7.1	4.6	3.4
23	9.5	6.1	4.5	7.9	5.1	3.7	7.5	4.8	3.5
24	10.1	6.5	4.7	8.4	5.4	3.9	8.0	5.1	3.7
25	10.6	6.7	4.9	8.8	5.6	4.1	8.4	5.3	3.9
26	11.1	7.1	5.2	9.2	5.9	4.3	8.7	5.6	4.1
27	11.7	7.4	5.4	9.8	6.2	4.5	9.2	5.9	4.3
29	12.8	8.1	5.8	10.7	6.7	4.8	10.1	6.4	4.6
30	13.2	8.4	6.1	11.0	7.0	5.1	10.4	6.6	4.8
31	13.5	8.6	6.3	11.3	7.2	5.2	10.7	6.8	4.9
32	14.1	8.9	6.5	11.7	7.5	5.4	11.1	7.1	5.1
33	14.6	9.2	6.7	12.1	7.7	5.6	11.5	7.3	5.3
34	15.1	9.6	6.9	12.6	8.0	5.8	11.9	7.6	5.5
35	15.7	9.9	7.1	13.1	8.3	6.0	12.4	7.8	5.6
36	16.2	10.2	7.4	13.5	8.5	6.2	12.8	8.1	5.8
37	16.6	10.5	7.7	13.9	8.7	6.4	13.1	8.3	6.0
38	17.3	10.9	7.9	14.4	9.0	6.5	13.7	8.6	6.2
39	17.6	11.1	8.0	14.7	9.2	6.7	13.9	8.7	6.3
40	18.0	11.4	8.2	15.0	9.5	6.9	14.2	9.0	6.5
41	18.4	11.5	8.4	15.4	9.6	7.0	14.5	9.1	6.6
42	19.0	11.9	8.7	15.8	9.9	7.2	15.0	9.4	6.8
43	19.8	12.4	9.0	16.5	10.4	7.5	15.6	9.8	7.1
44	20.3	12.8	9.3	16.9	10.6	7.7	16.0	10.1	7.3
45	21.5	13.5	9.7	17.9	11.2	8.1	16.9	10.7	7.7
46	22.4	14.2	10.3	18.7	11.8	8.6	17.7	11.2	8.2
47	23.9	15.2	11.0	19.9	12.7	9.2	18.9	12.0	8.7
48	25.1	16.0	11.7	20.9	13.3	9.7	19.8	12.6	9.2
49	26.5	17.0	12.3	22.1	14.2	10.3	20.9	13.5	9.7
50	28.1	18.3	13.4	23.5	15.3	11.2	22.2	14.4	10.6
51	29.7	19.5	14.4	24.7	16.3	12.0	23.4	15.4	11.3
52	31.4	20.8	15.4	26.2	17.3	12.9	24.8	16.4	12.2
53	33.0	22.0	16.5	27.5	18.4	13.7	26.0	17.4	13.0
54	34.9	23.4	17.6	29.1	19.5	14.7	27.6	18.5	13.9
55	36.8	24.8	19.0	30.7	20.7	15.9	29.1	19.6	15.0
56	38.0	25.9	20.2	31.7	21.6	16.8	30.0	20.5	15.9
57	40.0	27.4	21.5	33.4	22.8	17.9	31.6	21.6	17.0
58	41.7	28.7	22.5	34.7	24.0	18.7	32.9	22.7	17.7
59	43.0	29.7	23.5	35.8	24.8	19.6	33.9	23.4	18.6
60	44.6	31.0	24.7	37.1	25.9	20.6	35.2	24.5	19.5

A31105

-19-31JAN89

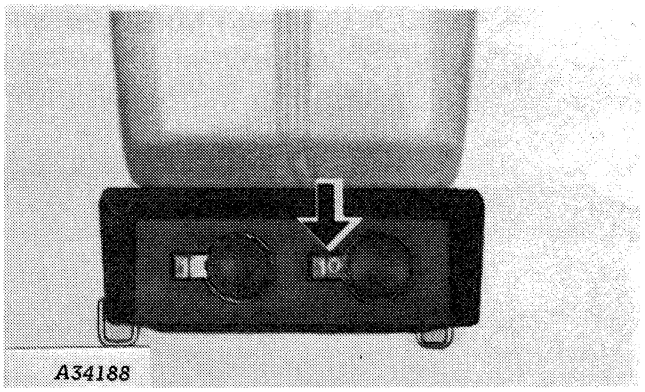
A31105

B21,7AT,BE -19-28JUN90

CALIBRATING INSECTICIDE/HERBICIDE METER

If it should ever become necessary to recalibrate the granular meter on the insecticide/herbicide hopper, proceed as follows:

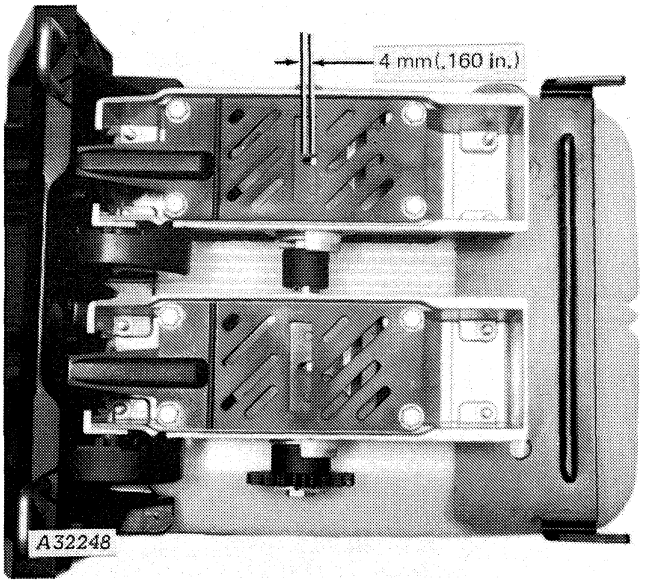
1. Turn the knob on the rear of the hopper to a setting of "10".



B23,C5020,B -19-28JUN90

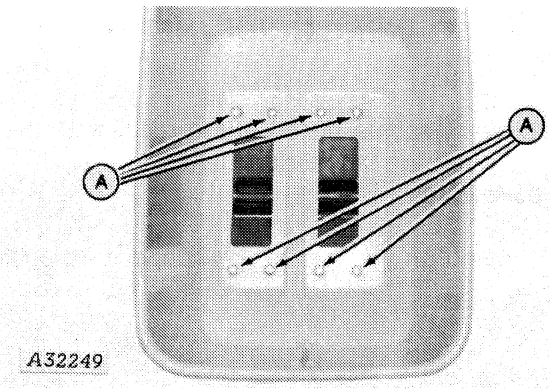
2. Remove the hopper and turn it upside down on a flat surface.

3. Check the opening of the "V" notch on the meter gate. The opening should be .160 in. (4 mm). If it is, the meter is calibrated correctly. If it is not, adjustment must be made.



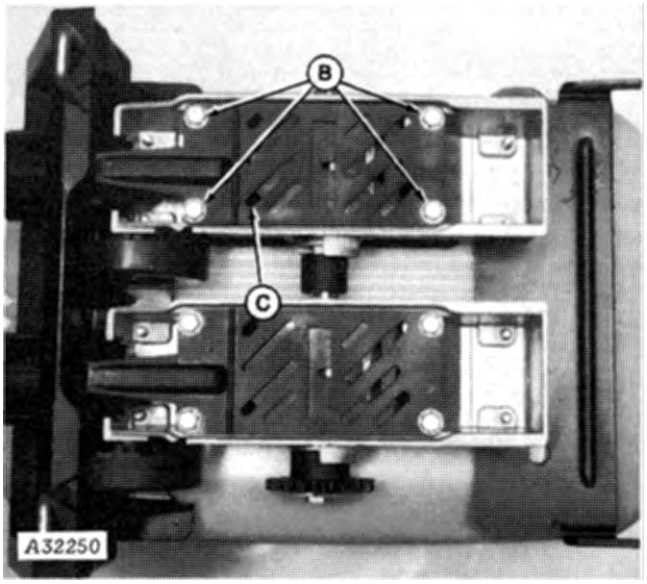
B23,C5020,C -19-28JUN90

4. Remove four M6 x 20 cap screws (A) securing the meter to the hopper (eight cap screws if two meters are used) and remove the meter(s) from the hopper bottom.



-UN-12OCT88
A32249

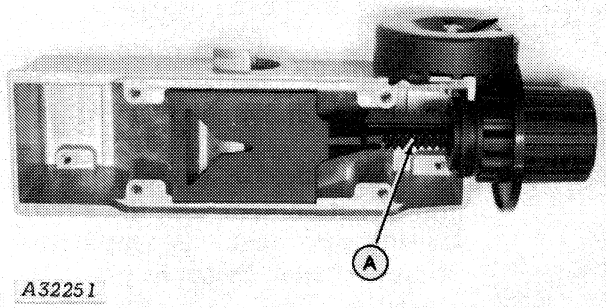
5. Remove four M6 x 16 cap screws (B) from the gate cover and remove the cover (C).



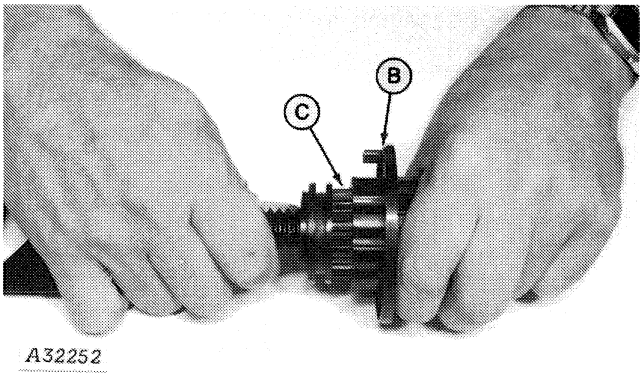
-UN-12OCT88
A32250

B23,C5020,D -19-28JUN90

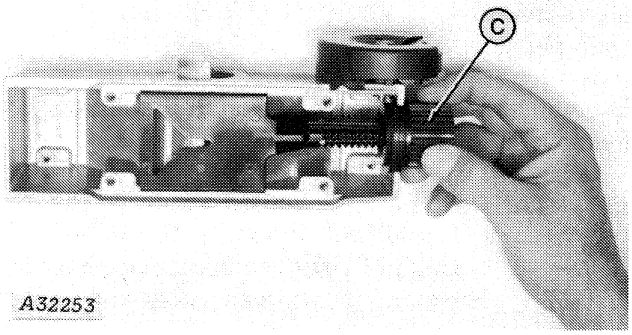
6. Remove the entire plastic gate assembly (A) from the aluminum housing.



7. Remove the knob (B) from the splined nut (C) by working the knob back and forth while pulling apart.



8. Turn the nut (C) until the opening in the "V" on the gate is .160 in. (4 mm).



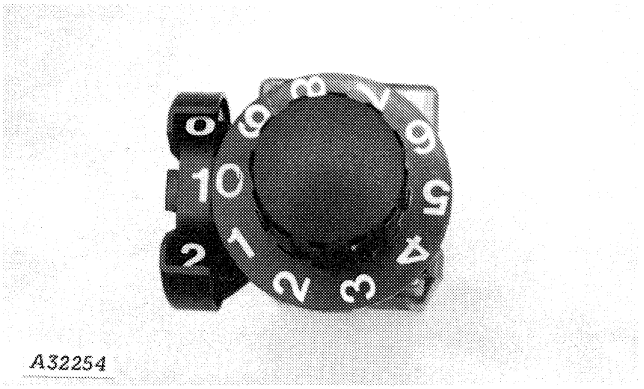
B23,C5020,E -19-28JUN90

9. Replace the knob on the nut so the number "0" lines up with the number "1" on the cam follower. The meter should have a setting of "10".

Seat knob to the flange on the nut.

10. Replace gate cover and secure with cap screws removed in step 5.

11. Replace meter on hopper bottom and secure with cap screws removed in step 4.



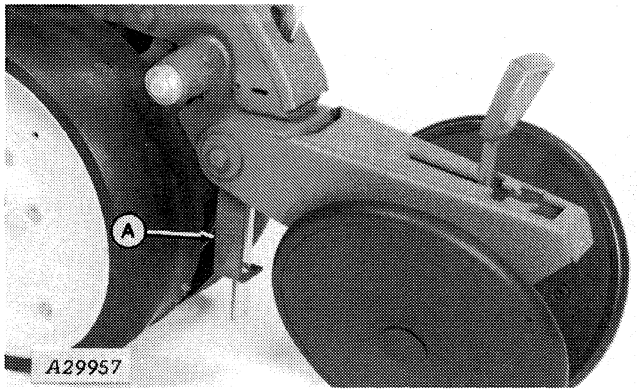
B23,C5020,F -19-28JUN90

SEED FURROW INSECTICIDE PLACEMENT BRACKET

The seed furrow insecticide placement bracket (A) places granular insecticide in the seed furrow.

IMPORTANT: Some insecticides are toxic if it comes into direct contact with the seed. Consult your chemical supplier for the proper location to apply your chemical.

See Attachment Assembly section in the Predelivery Instructions for assembly instructions.



A29957 -UN-06OCT88

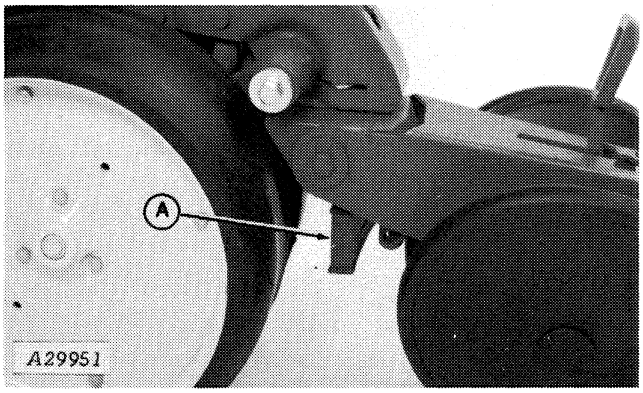
B21,7AT,AQ -19-28JUN90

175 MM (7 IN.) INSECTICIDE BAND SPREADER (FRONT MOUNTED)

The 175 mm (7 in.) insecticide band spreader (A) is designed to apply a band of granular insecticide approximately 175 mm (7 in.) wide on top of the ground when planting.

See Attachment Assembly section in Predelivery Instructions for assembly instructions.

IMPORTANT: Some insecticides are toxic if it comes into direct contact with the seed. Consult your chemical supplier for the proper location to apply your chemical.



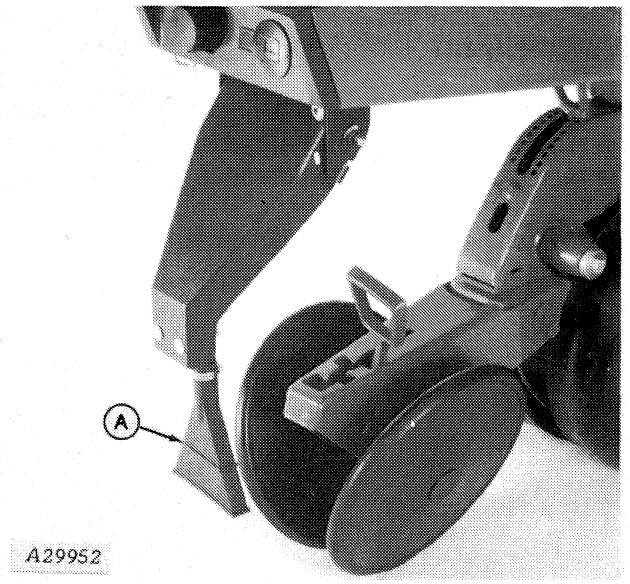
A29951 -UN-06OCT88

B21,7AT,AR -19-28JUN90

REAR MOUNT INSECTICIDE SPREADER

The 175 mm (7 in.) rear mount insecticide band spreader (A) is designed to apply a band of granular insecticide approximately 175 mm (7 in.) wide behind the closing wheels.

See Attachment Assembly section in the Predelivery Instructions for assembly instructions.



B21,7AT,AS -19-28JUN90

HERBICIDE DIFFUSER

The 355 mm (14 in.) herbicide diffuser is designed to, under normal conditions, apply a band of granular herbicide approximately 355 mm (14 in.) wide behind the closing wheels.

NOTE: We recommend you actually measure the band width applied in your conditions and use this width in your application rate calculations.

See Attachment Assembly section in the Predelivery Instructions for assembly instructions.

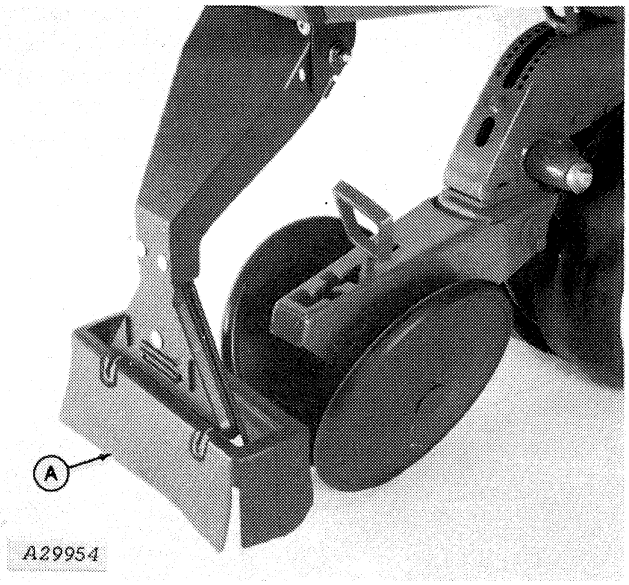


B21,7AT,AT -19-28JUN90

WINDSHIELD

The windshield (A) helps, in windy conditions, maintain the distribution pattern of the herbicide diffuser and/or the rear mount insecticide spreader.

See Attachment Assembly section in the Predelivery Instructions for assembly instructions.



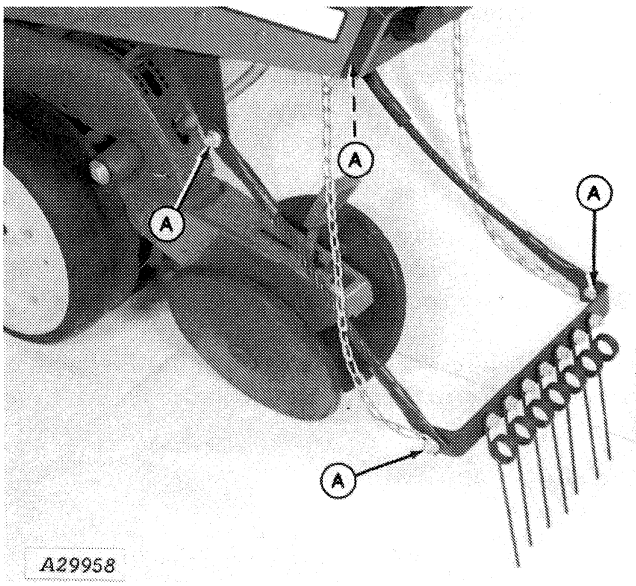
B21,7AT,BF -19-28JUN90

SPRING-TOOTH INCORPORATOR

The spring-tooth incorporator attachment provides an efficient means of mixing insecticide and/or herbicide into the soil and leaves a smooth ground surface behind the planting unit.

The spring pressure can be adjusted by loosening nuts (A) and raising or lowering cable supports. Tighten nuts.

See Attachment Assembly section in the Predelivery Instructions for assembly instructions.



B21,7AT,BG -19-28JUN90

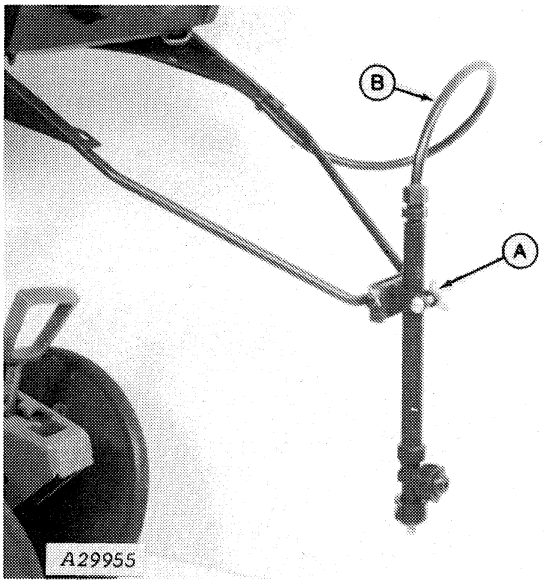
LIQUID HERBICIDE PRE-EMERGE SPRAY ATTACHMENT

The planter sprayer attachment provides the necessary equipment to mount and position the spray nozzles (not provided) behind the planter unit and the hoses and manifolds to connect to a tractor mounted sprayer system. The planter sprayer system may be used with the John Deere 220 Tractor-Mounted Sprayer or similar sprayers.

Adjust plastic tubing (B) to provide tension on the nozzle holder. Tension will aid in keeping nozzle in operating position when it is hit by an obstruction.

To adjust the height of the nozzle, loosen wing nut (A).

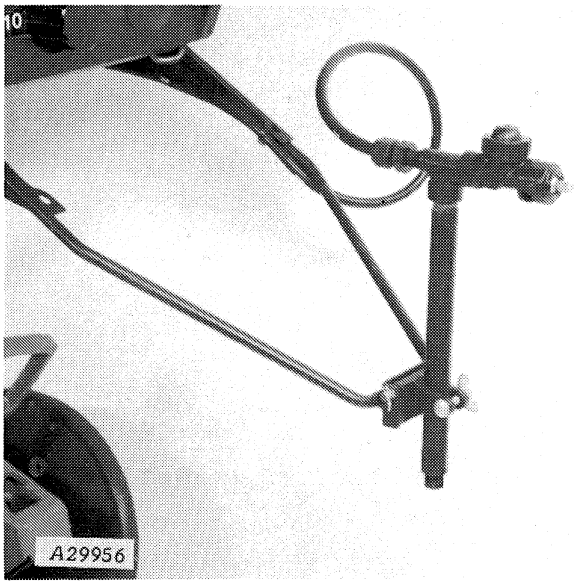
"Even" type spray tips are recommended for spraying in bands from 180 to 430 mm (7 to 17 in.) with the nozzle in the lower position as shown at right.



A29955 -UN-06OCT88

B21,7AT,BI -19-28JUN90

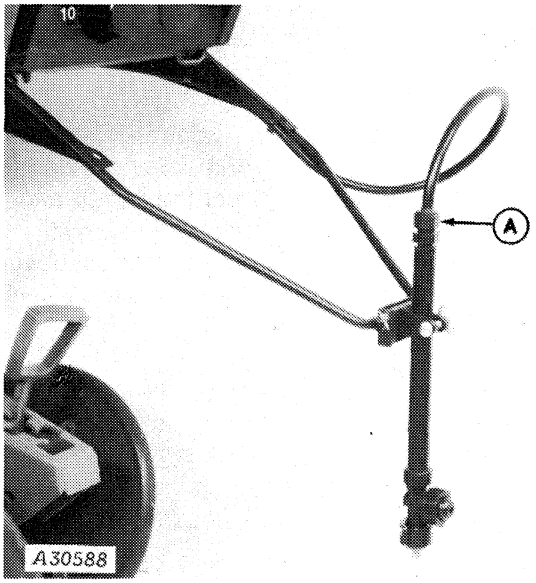
The support tube may be inverted, placing the nozzle in the "up" position. Coverage in this position is from 1270 to 2285 mm (50 to 90 in.) wide when using flood type spray tips. This type of coverage is not recommended for less than 1/2 gallon per minute flow. To invert the spray assembly for flood spray, proceed as follows:



A29956 -UN-06OCT88

B21,7AT,BJ -19-28JUN90

1. Unscrew delivery hose (A) from union fitting.

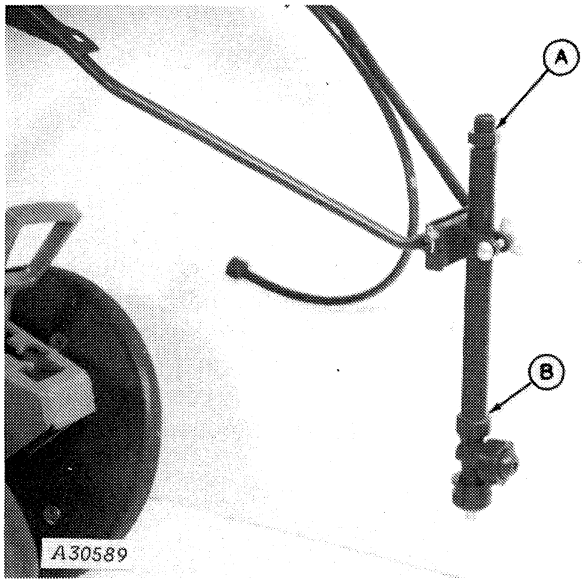


A30588 -UN-06OCT88

B21,7AT,BK -19-28JUN90

2. Unscrew union fitting (A) from tube.

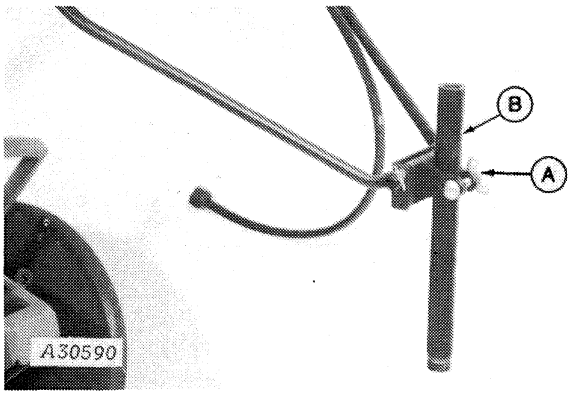
3. Unscrew nozzle assembly (B) from tube.



A30589 -UN-06OCT88

B21,7AT,BL -19-28JUN90

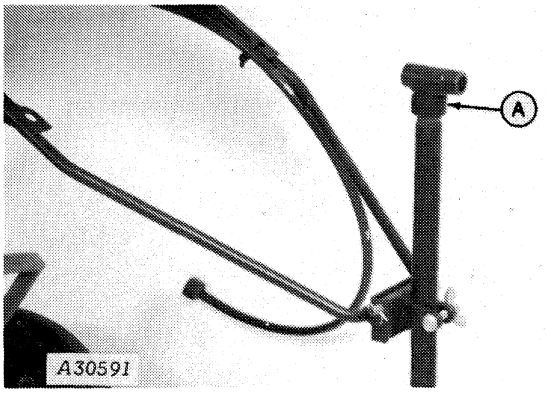
4. Loosen wing nut (A) and remove invert tube (B).



A30590 -UN-06OCT88

B21,7AT,BM -19-28JUN90

5. Screw fitting (A) onto tube. (Hand tighten tube plus one-half turn only.)

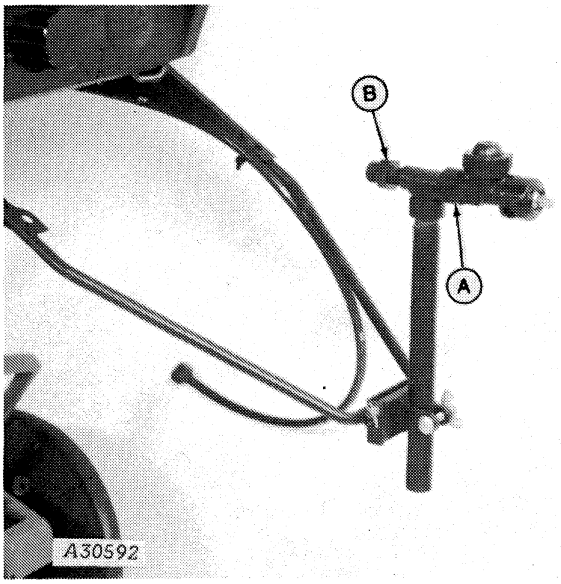


-UN-06OCT88
A30591

B21,7AT,BN -19-28JUN90

6. Screw nozzle assembly (A) onto tee fitting.

7. Screw union fitting (B) onto fitting. (Hand tighten fitting plus one-half turn only.)



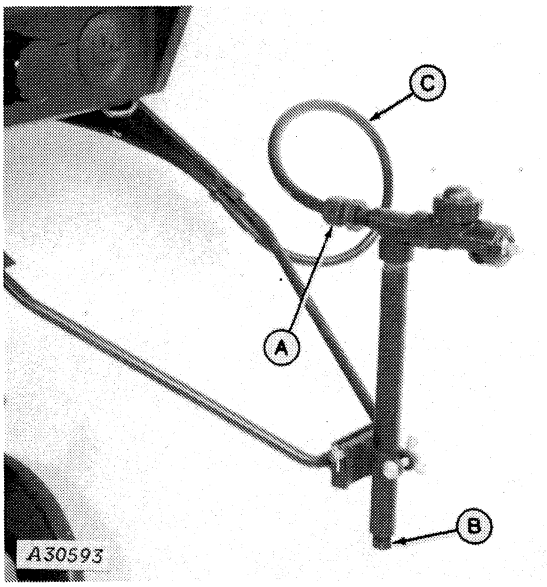
-UN-06OCT88
A30592

B21,7AT,BO -19-28JUN90

8. Screw delivery hose (A) onto union fitting. (Hand tighten fitting plus one-half turn only.)

9. Screw plug (B) into bottom of tube.

Adjust plastic tubing (C) to provide spring tension on the nozzle holder. Tension will aid in keeping nozzle in operating position when it is hit by an obstruction.



-UN-12OCT88
A30593

B21,7AT,BP -19-28JUN90

To help you select the correct nozzle, proceed as follows:

1. Refer to the chemical label for recommended application rate.

2. Select the speed you wish to plant.

3. Select the spray band width you desire.

Use the formula below for obtaining the gallons per minute per nozzle.

IMPORTANT: Gallons per acre refers to gallons per acre of band width, not acres of ground planted.

$$\frac{\text{Gallons per acre} \times \text{miles per hour} \times \text{spray band width}}{5940} = \text{gal. per min. per nozzle.}$$

Example: Suppose the chemical manufacturer recommended application rate is 10 gal. per acre and you wish to plant at 6 miles per hour using a spray band width of 10 in.

$$\frac{10 \times 6 \times 10}{5940} = \frac{600}{5940} = .10 \text{ gal./min./nozzle.}$$

See your John Deere dealer for the desired nozzle.

Because delivery rate (gallons per minute) is a function of pressure, it is recommended the following application rate check be used.

B21,7AT,BQ -19-28JUN90

Check application rate at the beginning of the season and periodically during the season because nozzle tips wear and change their flow rate.

Partially fill spray tanks with water.

Place a quart container under a nozzle.

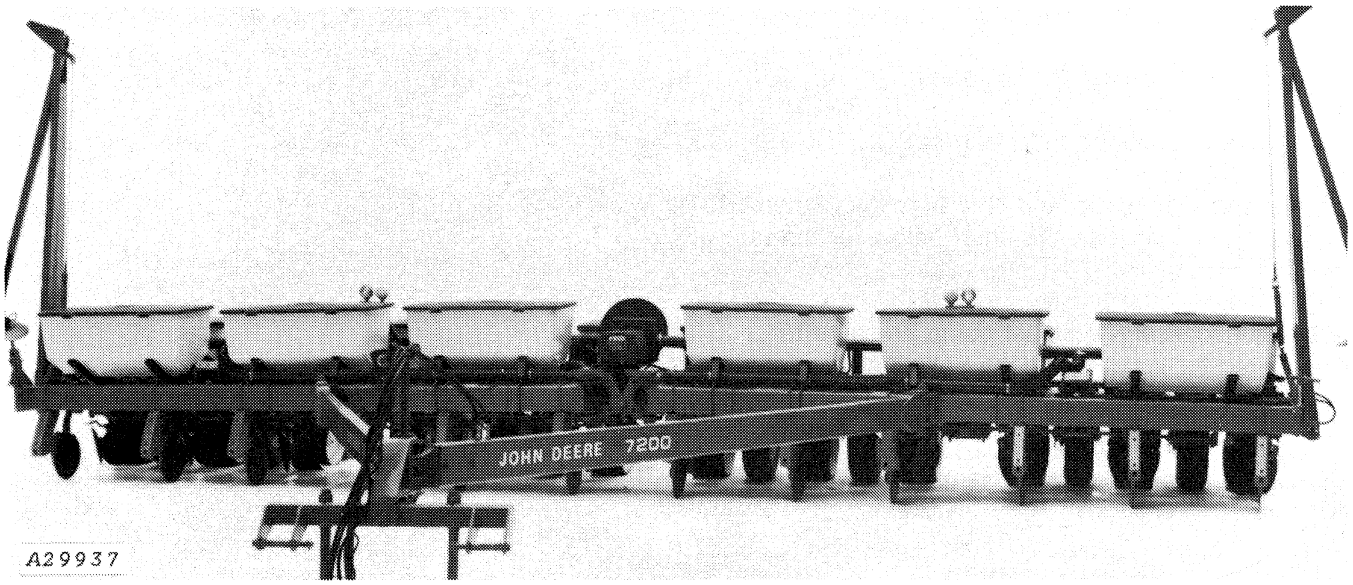
Turn the spray pump on and time how long it takes to fill the quart container. See the chart below for the rate of flow.

It may be necessary to adjust pump pressure to compensate for small variations between calculated and actual flow.

Seconds to Collect One Quart	**Gallons Per Minute**	**Seconds to Collect One Quart**	**Gallons Per Minute**
300	.05	75	.20
250	.06	67	.225
214	.07	60	.25
188	.08	50	.30
167	.09	43	.35
150	.10	38	.40
136	.11	30	.50
125	.12	25	.60
115	.13	21	.70
107	.14	19	.80
100	.15	17	.90
88	.17	15	1.0

B21,7AT,BR -19-28JUN90

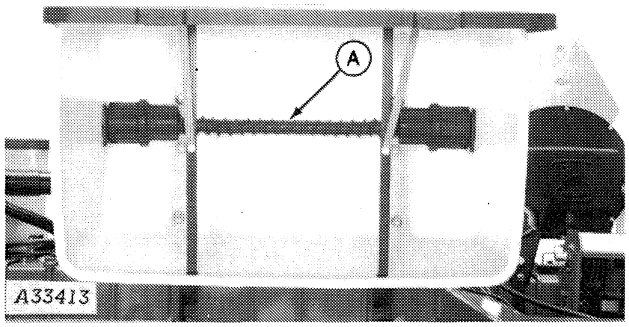
DRY FERTILIZER



-UN-06OCT88
A29937

Each fertilizer hopper holds approximately 249 kg (550 lb.).

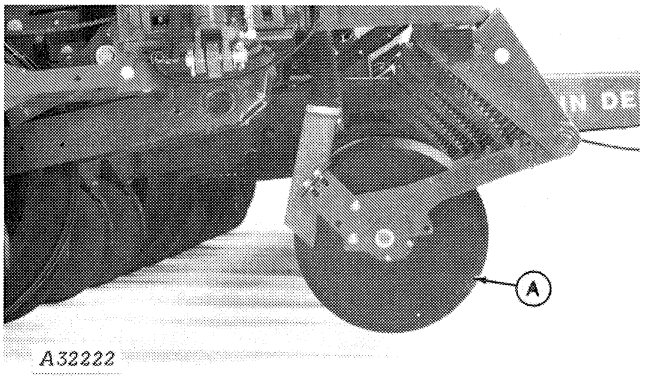
The fertilizer is distributed by an auger (A) in the bottom of each hopper.



-UN-12OCT88
A33413

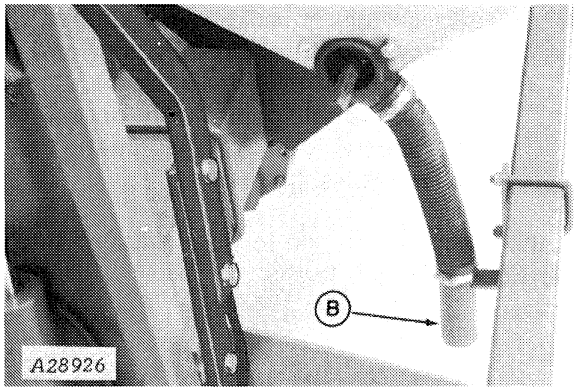
B21,7AT,A -19-28JUN90

The fertilizer is applied to the ground by a fertilizer opener (A) or a surface applicator (B).



-UN-13OCT88
A32222

Single-Disk Fertilizer Opener

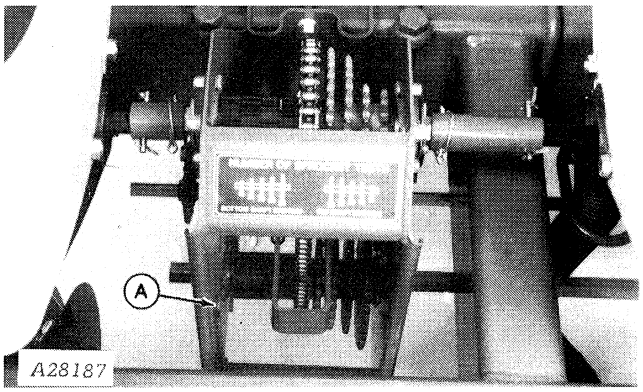


-UN-14OCT88
A28926

B21,5AT,L -19-28JUN90

The rate of fertilizer is determined by the type of augers (low-rate, regular-rate or high-rate) installed in the hoppers, and the driver and driven sprocket combinations.

To change the sprocket combinations, remove retaining hook (A) from storage position.



-UN-13OCT88
A28187

B05,13AT,B -19-28JUN90

Pull down on chain tightener (A) and secure with retaining hook.

Remove chain (B) from driver and driven sprockets.

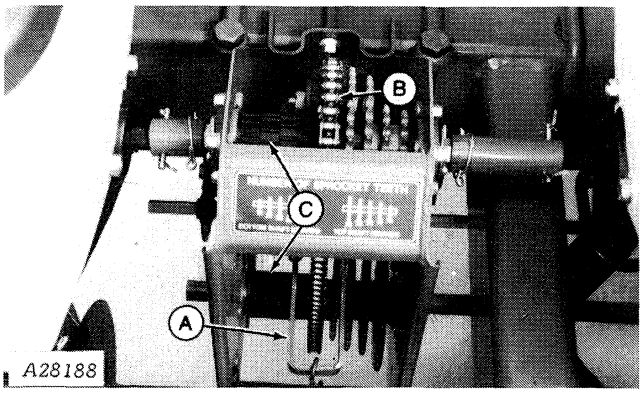
Remove rubber sprocket spacers (C).

Slide desired driver and driven sprockets into alignment with chain tightener and replace chain.

Replace rubber sprocket spacers between sprockets as required.

IMPORTANT: Be certain sprockets are aligned properly with chain tightener and secured with rubber spacers. Check to be sure chain runs freely on selected sprockets; improper alignment can cause drive failures.

Repeat the procedure for the fertilizer drive on the opposite side of the planter.



-UN-13OCT88

A28188

B21,7AT,B -19-28JUN90

Because the dry fertilizer attachment meters volume and not weight, and because of the differences between the many brands, analysis of fertilizer, temperature and humidity, the weight metered out can vary as much as 100 per cent from the weight calculated in the fertilizer rate chart.

B21,7AT,C -19-28JUN90

CHECKING DRY FERTILIZER RATES

(U.S. MEASUREMENTS)

To check the exact number of lb. of fertilizer that will actually be delivered for 30 in. row spacing, proceed as follows:

Remove one hose from either fertilizer hopper and attach a plastic bag, or other suitable container, under the opening in the hopper. Engage the fertilizer attachment and drive forward for 174 ft. Weigh the amount of fertilizer caught in the container (in lb.) and multiply that amount by 100. The result will be the lb. of fertilizer delivered per acre when planting in 30 in. rows.

NOTE: For 36 in. rows, drive 145 ft. For 38 in. rows, drive 138 ft.

B21,7AT,E -19-28JUN90

DRY FERTILIZER APPROXIMATE DELIVERY RATES IN LB./ACRE

(RATES BASED ON DRY FERTILIZER WITH A BULK DENSITY OF 65 LB./FT^3) (U.S. MEASURE)

30 in. Rows			36 in. Rows			38 in. Rows			Sprocket Combination (No. of Teeth)	
Low	Regular	High	Low	Regular	High	Low	Regular	High	Driver Sprocket	Driven Sprocket
253	505	758	211	421	632	199	399	598	36	18
225	499	674	187	374	512	177	355	532	36	18
197	393	590	164	328	491	155	310	465	28	16
182	365	547	152	304	456	144	288	432	26	16
175	349	524	146	291	437	138	276	414	28	18
162	324	487	135	270	406	128	256	384	26	18
147	295	442	123	246	368	116	233	349	21	16
135	270	404	112	225	337	106	213	319	36	30
131	262	393	109	218	328	103	207	213	21	18
123	245	368	102	204	306	97	193	290	36	33
112	225	337	94	187	281	89	177	266	36	36
112	225	337	94	187	281	89	177	266	16	16
105	210	314	87	175	262	83	165	248	28	30
100	200	299	83	166	250	79	158	236	16	18
97	195	292	81	162	243	77	154	231	26	30
95	191	286	79	159	238	75	150	226	28	33
88	177	265	74	147	221	70	140	210	26	33
87	175	262	73	146	218	69	138	207	28	36
81	162	243	68	135	203	64	128	192	26	36
79	157	236	66	131	197	62	124	186	21	30
71	143	214	60	119	179	56	113	169	21	33
66	131	197	55	109	164	52	103	155	21	36
60	120	180	50	100	150	47	95	142	16	30
54	109	163	45	91	136	43	86	129	16	33
50	100	150	42	83	125	39	79	118	16	36

B21,7AT,G -19-28JUN90

STORING DRY FERTILIZER

Keep fertilizer dry. Do not store in a damp place.

Most fertilizers readily accumulate moisture and cause metal to corrode. The corrosion not only shortens metal life, but leads to unnecessary expense for parts broken because of binding or "freezing". Deposits of fertilizer will build up in the hopper and interfere with working parts. Therefore, the hoppers should be cleaned every day of use.

CAUTION: Agricultural chemicals can be dangerous. Improper selection or use can injure persons, animals, soils, or other property. TO AVOID INJURY, select the right chemicals for the job. Handle and apply it with care. Follow instructions of the chemical manufacturer.

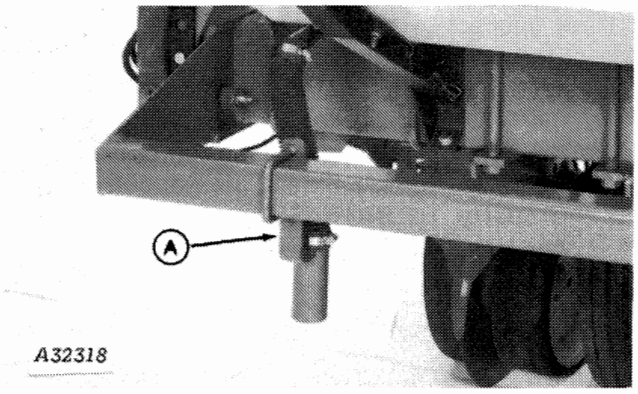
B21,7AT,H -19-28JUN90

SURFACE APPLICATOR BRACKET

The Surface Applicator Bracket (A) is for granular fertilizer only and is used to apply fertilizer on the soil surface in fields which do not permit adequate fertilizer opener penetration, or which have a significant number of large rocks.

Position bracket so fertilizer will be distributed from 50 mm to 125 mm (2 in. to 5 in.) off row center.

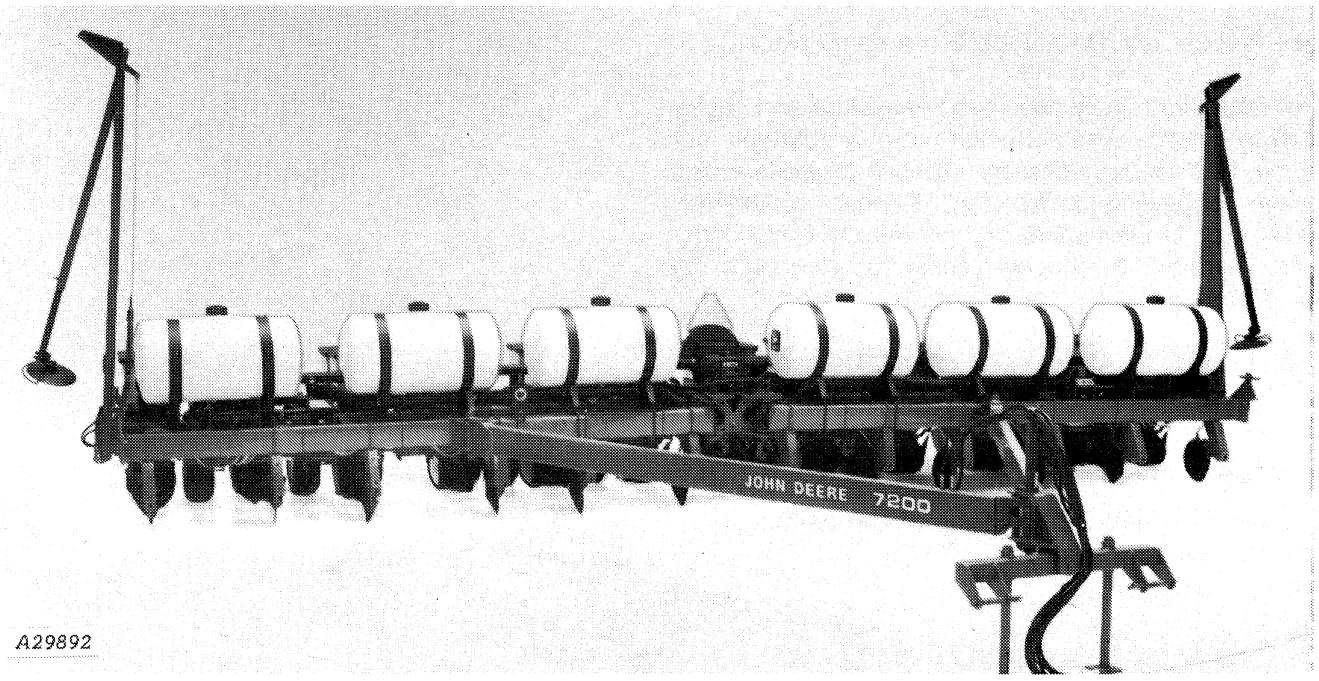
NOTE: Fertilizer hopper spouts are positioned forward for this application.



B21,3AT,AG -19-28JUN90

Liquid Fertilizer Attachment

QUIK-FILL™ LIQUID FERTILIZER SYSTEM



-UN-06OCT88 A29892

The Quik-Fill Liquid Fertilizer System allows one-point filling instead of filling individual tanks.

The fertilizer tanks each hold approximately 264L (70 U.S. gal.) per tank. The fertilizer is distributed to the fertilizer openers by metering pumps, one on each side of the planter.

CAUTION: Agricultural chemicals can be dangerous. Improper selection or use can injure persons, animals, plants, soil or other property. BE SAFE. Select the right chemical for the job. Handle and apply it with care. Follow instructions of the chemical manufacturer. Check all valves, fittings, hose clamps, plugs, and caps for tightness and soundness before admitting liquid fertilizer to the system. Check again at regular intervals and replace pipe and hoses when worn, cracked, or leaking.

When using liquid fertilizer, excessive pressure can cause tank rupture. Shut off nurse tank pump as soon as attachment tanks are full.

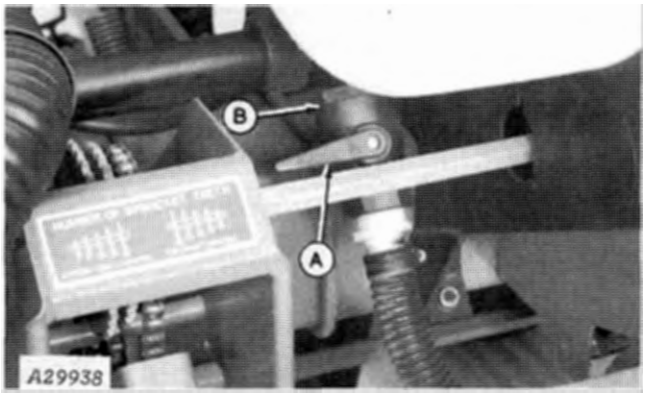
B21,7AT,I -19-28JUN90

To fill liquid fertilizer tanks, proceed as follows:

Close shut-off valves (A) to metering pumps when filling tanks.

NOTE: If shut-off valve lever is hard to operate, proceed as follows:

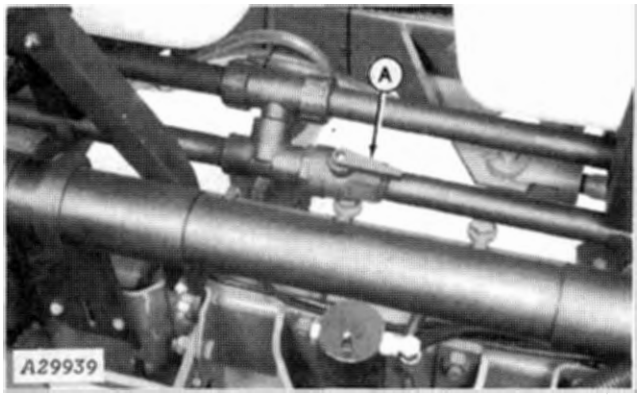
Internal: O-rings located in the valve prevent valve leakage. The "preload" on these O-rings can be adjusted to allow both leak-free operation and easy operation of valve lever. Turn large nut (B) until lever moves smoothly without overtighten, which can cause damage to the O-rings.



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A29938

B21,7AT,J -19-28JUN90

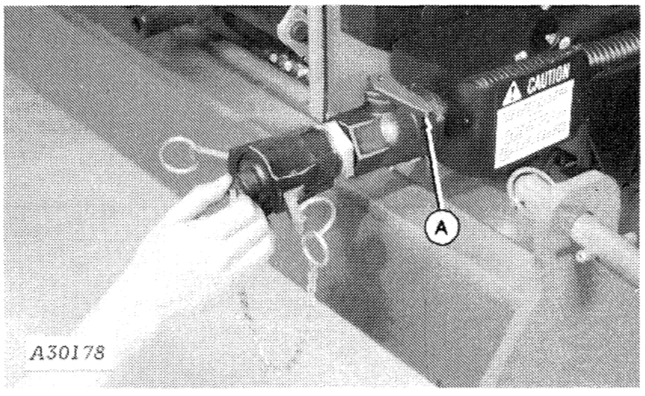
Open shut-off valve (A) on fill pipe.



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A29939

B21,7AT,K -19-28JUN90

Close valve (A) and remove dust cover from quick-attaching coupler.

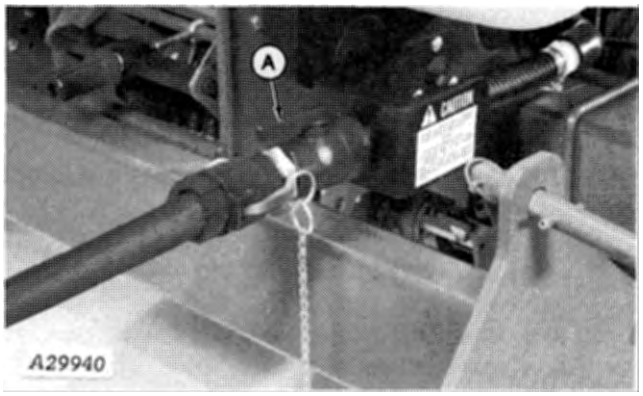


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A30178

B21,7AT,L -19-28JUN90

Secure nurse tank to quick-attaching coupler.

Open shut-off valve (A).



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A29940

B21,7AT,M -19-28JUN90

IMPORTANT: It is recommended that the nurse tank pump be no larger than a 40 mm (1-1/2 in.) centrifugal pump with a 2.2 kW (3 to 5 hp) gasoline engine. If a 50 mm (2 in.) centrifugal pump is used with a 3.7 to 5.5 kW (5 to 7-1/2 hp) gasoline engine, it is recommended that the engine be run at half throttle. It is not recommended that a 75 mm (3 in.) centrifugal pump be used. These larger pumps may exceed the liquid fertilizer attachment pressure limit, resulting in damage to liquid tanks. Signs of excessive pressure will be leakage through the seals of the tank caps and bottom fittings. Another sign would be swelling of the tanks, which could cause possible cracking or bursting of tanks.

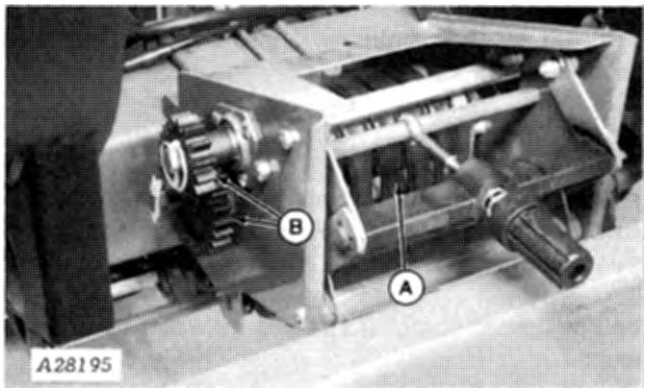
B21,7AT,N -19-28JUN90

The rate of liquid fertilizer application is determined by:

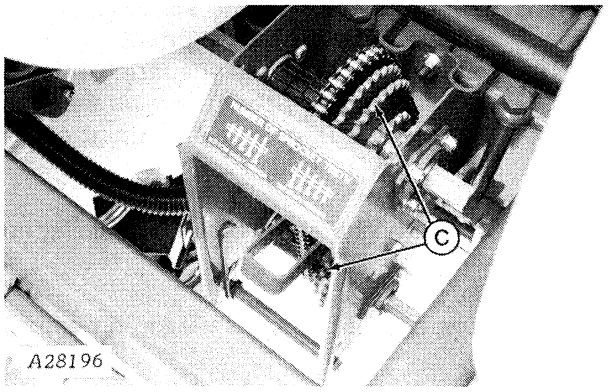
Regular or low-rate metering pump hoses (A).

Position of the driver and driven gears (B).

Fertilizer transmission sprocket combination (C).



-UN-14OCT88
A28195



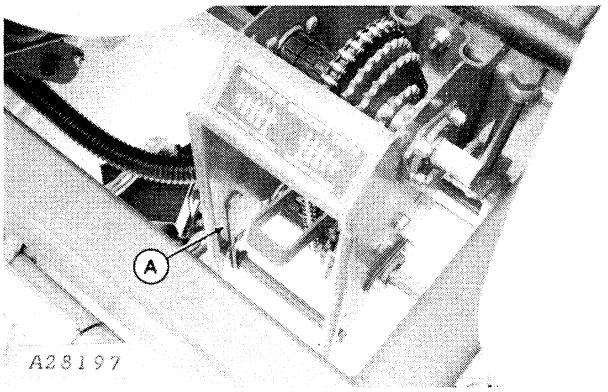
-UN-13OCT88
A28196

B05,13AT,M -19-28JUN90

CHANGING FERTILIZER TRANSMISSION SPROCKET COMBINATIONS

To change fertilizer transmission sprocket combination, proceed as follows:

Raise retainer hook (A) from storage position.



-UN-13OCT88
A28197

B05,13AT,N -19-28JUN90

Pull down on chain tightener (A) and secure with retaining hook.

Remove rubber spacers (B).

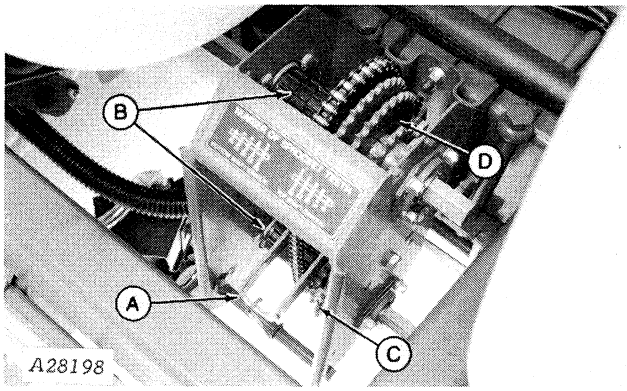
Remove chain from sprockets and slide desired driver and driven sprockets (C) and (D) into alignment with chain tightener and replace chain.

Replace rubber sprocket spacers between sprockets as required.

IMPORTANT: Be certain sprockets are aligned properly with chain tightener and secure with rubber spacers. Check to be sure chain runs freely on selected sprockets. Improper alignment can cause drive failures.

Press down on chain tightener and place retaining hook in storage position.

Repeat procedure on fertilizer transmission on opposite side of planter.



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A28198

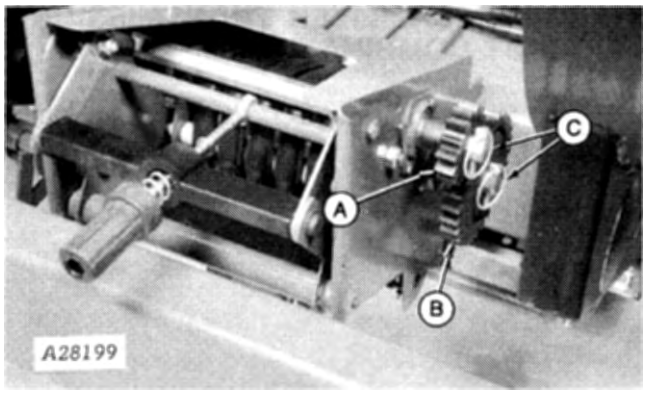
A—Chain Tightener
B—Rubber Spacers
C—Driver Sprockets
D—Driven Sprockets

B05,13AT,O -19-28JUN90

CHANGING DRIVER AND DRIVEN GEAR COMBINATIONS

The 14-tooth gear (A) and the 28-tooth gear (B) are interchangeable, depending on your desired rate.

Remove quick-lock pins (C) and remove gears.



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A28199

B05,13AT,P -19-28JUN90

Install the desired driven gear on the upper front shaft (A) and the desired driven gear on the lower rear shaft (B). Secure gears with quick-lock pins.



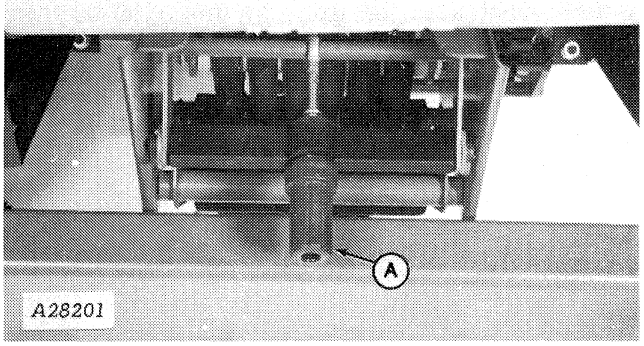
-UN-13OCT88
A28200

B21,7AT,O -19-28JUN90

OPERATING THE METERING PUMP

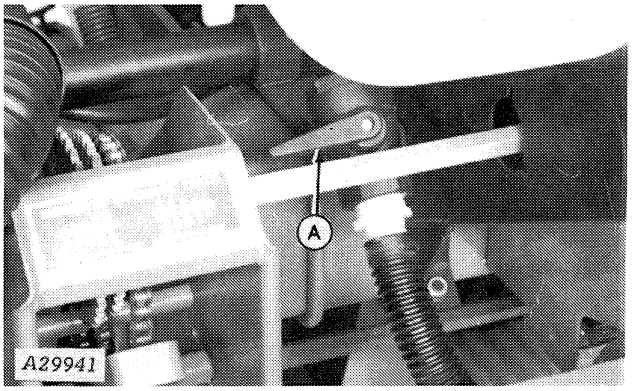
To operate the metering pump, turn the handle (A) all the way in until handle tab contacts the cross tab, restricting further handle rotation.

When not in use, turn the handle out until there is approximately 25 mm (1 in.) between the handle and groove.



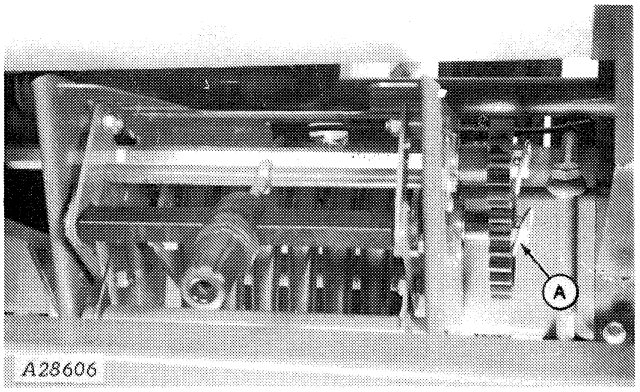
B21,7AT,P -19-28JUN90

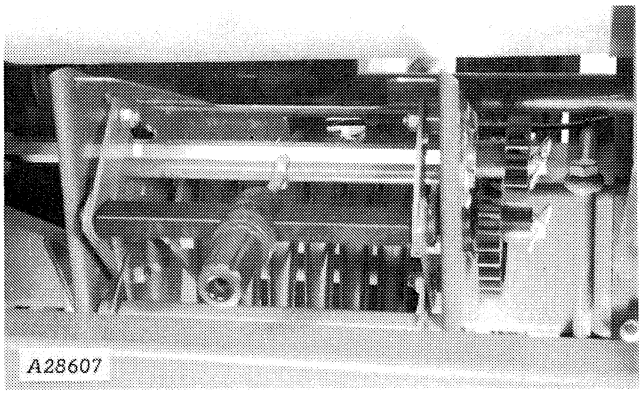
If planting without applying liquid fertilizer is desired, close shut-off valves (A) to metering pumps and disengage pump drive as follows:



B21,7AT,Q -19-28JUN90

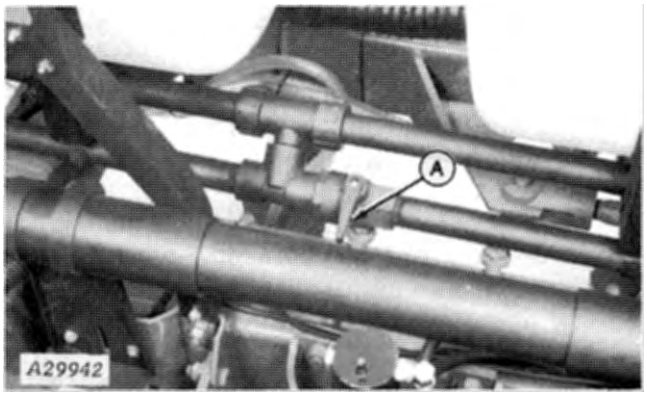
Remove the quick-lock pin (A), remove and reverse the lower gear to prevent wear on the gears and metering pump. Secure lower gear with quick-lock pin.





B21,7AT,R -19-28JUN90

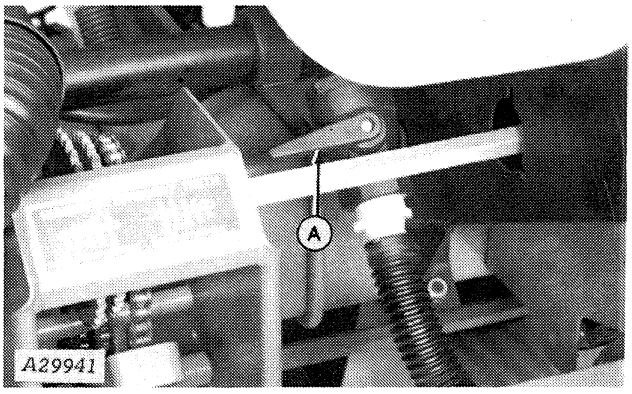
When planting on hillsides, close shut-off valve (A) on fill pipe to prevent liquid fertilizer from flowing to downside tanks.



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A29942

B21,7AT,S -19-28JUN90

If planter is to sit overnight with liquid fertilizer in the tanks, close shut-off valves (A) to metering pumps to eliminate possible fertilizer flow through pump due to siphoning.



-UN-06OCT88
A29941

B21,7AT,T -19-28JUN90

CHECKING FERTILIZER RATES

To check fertilizer rates:

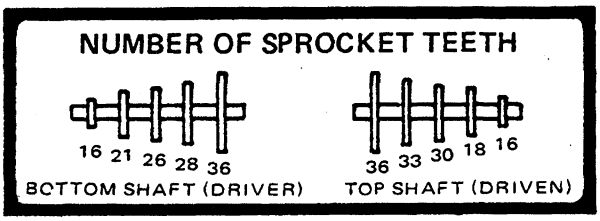
Tie a one gallon container to the planter frame next to a fertilizer opener. Remove the delivery hose from the opener and insert hose into the gallon container.

To obtain gal/acre that will actually be delivered for 30 in. row spacing, drive forward at planting speed 300 ft. Measure fluid oz. caught in the container and multiply that amount by 0.454.

For 36 in. row spacing, multiply by 0.378.
For 38 in. row spacing, multiply by 0.358.

B21,7AT,U -19-28JUN90

HOW TO USE LIQUID FERTILIZER RATE CHARTS



A33620

-19-07FEB89

A33620

1. Select the chart with the desired row spacing, hose size and rate range.

The REGULAR RATE hoses are standard on the metering pump. LOW RATE hoses may be purchased through your John Deere dealer.

A LOWER RATE will require you to use the LOW RANGE CHART. The driver gear must be the 14-tooth gear and the driven gear must be the 28-tooth gear.

A HIGHER RATE will require you to use the HIGH RANGE CHART. The driver gear must be the 28-tooth gear and the driven gear must be the 14-tooth gear.

Refer to CHANGING FERTILIZER DRIVER AND DRIVEN GEAR COMBINATIONS for location of these gears.

2. Locate the desired rate under the TRAVEL SPEED column at the expected planting speed.

Determine the correct fertilizer transmission sprocket combination. Refer to CHANGING FERTILIZER SPROCKET COMBINATION.

NOTE: The rate charts are affected by many factors. Drive wheel slippage, the material that is being used and it's temperature, travel speed and pump hose tension are a few of the many factors which can affect this rate and, therefore, these charts should only be used as a guide. To be certain you are getting the desired rate, you must do a field check. Refer to CHECKING FERTILIZER RATES for instructions on how to check fertilizer rates.

B21,7AT,CM -19-28JUN90

30 IN. ROWS - REGULAR RATE HOSES (STANDARD)
LOW RANGE

NOTE: The following delivery rates are approximate and will vary with changes in temperature and the specific fertilizer being used.

Approximate Delivery Rates Using a 14-Tooth Driver Gear and 28-Tooth Driven Gear with Regular Rate Pump Hoses 30 In. Row Spacing

Transmission Combination		Travel Speed in mph Gallons per Acre					
Driver	Driven	3.0	4.0	5.0	6.0	7.0	8.0
36	16	20.9	20.4	19.9	19.4	18.9	18.4
36	18	18.7	18.3	17.9	17.6	17.2	16.8
28	16	16.5	16.2	15.9	15.6	15.3	15.0
26	16	15.4	15.1	14.9	14.6	14.4	14.1
28	18	14.8	14.5	14.3	14.1	13.8	13.6
26	18	13.8	13.6	13.4	13.1	12.9	12.7
21	16	12.6	12.4	12.2	12.0	11.9	11.7
36	30	11.5	11.4	11.2	11.1	11.0	10.8
21	18	11.2	11.1	10.9	10.8	10.7	10.5
36	33	10.5	10.4	10.3	10.2	10.0	9.9
36	36	9.7	9.6	9.5	9.4	9.3	9.2
16	16	9.7	9.6	9.5	9.4	9.3	9.2
28	30	9.0	8.9	8.9	8.8	8.7	8.6
16	18	8.6	8.5	8.5	8.4	8.3	8.2
26	30	8.4	8.3	8.3	8.2	8.1	8.0
28	33	8.2	8.2	8.1	8.0	7.9	7.9
26	33	7.7	7.6	7.5	7.5	7.4	7.4
28	36	7.6	7.5	7.4	7.4	7.3	7.3
26	36	7.0	7.0	6.9	6.9	6.8	6.8
21	30	6.8	6.8	6.7	6.7	6.6	6.6
21	33	6.2	6.2	6.1	6.1	6.1	6.0
21	36	5.7	5.7	5.6	5.6	5.6	5.5
16	30	5.2	5.2	5.2	5.1	5.1	5.1
16	33	4.8	4.7	4.7	4.7	4.7	4.6
16	36	4.4	4.3	4.3	4.3	4.3	4.3

A30815

A30815 -19-31JAN89

B21,7AT,Y -19-28JUN90

30 IN. ROWS - REGULAR RATE HOSES
HIGH RANGE

NOTE: The following delivery rates are approximate and will vary with changes in temperature and the specific fertilizer being used.

Approximate Delivery Rates Using a 28-Tooth Driver Gear and 14-Tooth Driven Gear with Regular Rate Pump Hoses 30 In. Row Spacing

Transmission Combination		Travel Speed in mph Gallons per Acre					
Driver	Driven	3.0	4.0	5.0	6.0	7.0	8.0
36	16	65.8	57.9	50.0	42.0	34.1	26.2
36	18	60.8	54.6	48.3	42.1	35.8	29.5
28	16	55.3	50.5	45.7	40.9	36.1	31.3
26	16	52.3	48.2	44.0	39.9	35.8	31.6
28	18	50.6	46.8	43.0	39.2	35.4	31.6
26	18	47.7	44.4	41.2	37.9	34.6	31.4
21	16	44.2	41.5	38.8	36.1	33.4	30.7
36	30	41.0	38.7	36.5	34.2	32.0	29.7
21	18	40.0	37.9	35.8	33.7	31.5	29.4
36	33	37.8	36.0	34.1	32.2	30.4	28.5
36	36	35.1	33.5	32.0	30.4	28.8	27.3
16	16	35.1	33.5	32.0	30.4	28.8	27.3
28	30	33.1	31.7	30.3	29.0	27.6	26.2
16	18	31.7	30.4	29.2	28.0	26.7	25.5
26	30	31.0	29.8	28.6	27.4	26.3	25.1
28	33	30.4	29.3	28.1	27.0	25.9	24.8
26	33	28.4	27.5	26.5	25.5	24.6	23.6
28	36	28.1	27.2	26.2	25.3	24.3	23.4
26	36	26.3	25.5	24.7	23.8	23.0	22.2
21	30	25.6	24.8	24.0	23.3	22.5	21.7
21	33	23.4	22.8	22.2	21.5	20.9	20.3
21	36	21.6	21.1	20.6	20.0	19.5	19.0
16	30	19.9	19.4	19.0	18.6	18.1	17.7
16	33	18.2	17.8	17.5	17.1	16.7	16.4
16	36	16.8	16.5	16.1	15.8	15.5	15.2

A30821

A30821 -19-31JAN89

B21,7AT,AE -19-28JUN90

30 IN. ROWS - LOW RATE HOSES
LOW RANGE

NOTE: The following delivery rates are approximate and will vary with changes in temperature and the specific fertilizer being used.

Approximate Delivery Rates Using a 14-Tooth Driver Gear and 28-Tooth Driven Gear with Low Rate Pump Hoses
30 In. Row Spacing

Transmission Combination		Travel Speed in mph Gallons per Acre					
Driver	Driven	3.0	4.0	5.0	6.0	7.0	8.0
36	16	12.0	11.8	11.7	11.5	11.3	11.2
36	18	10.7	10.6	10.5	10.3	10.2	10.1
28	16	9.4	9.3	9.2	9.1	9.0	8.9
26	16	8.8	8.7	8.6	8.5	8.4	8.3
28	18	8.4	8.3	8.3	8.2	8.1	8.0
26	18	7.8	7.8	7.7	7.6	7.6	7.5
21	16	7.1	7.1	7.0	7.0	6.9	6.8
36	30	6.5	6.5	6.4	6.4	6.3	6.3
21	18	6.4	6.3	6.3	6.2	6.2	6.1
36	33	6.0	5.9	5.9	5.8	5.8	5.8
36	36	5.5	5.4	5.4	5.4	5.3	5.3
16	16	5.5	5.4	5.4	5.4	5.3	5.3
28	30	5.1	5.1	5.1	5.0	5.0	5.0
16	18	4.9	4.8	4.8	4.8	4.8	4.7
26	30	4.8	4.7	4.7	4.7	4.6	4.6
28	33	4.7	4.6	4.6	4.6	4.6	4.5
26	33	4.3	4.3	4.3	4.3	4.2	4.2
28	36	4.3	4.2	4.2	4.2	4.2	4.2
26	36	4.0	4.0	3.9	3.9	3.9	3.9
21	30	3.8	3.8	3.8	3.8	3.8	3.8
21	33	3.5	3.5	3.5	3.5	3.4	3.4
21	36	3.2	3.2	3.2	3.2	3.2	3.2
16	30	2.9	2.9	2.9	2.9	2.9	2.9
16	33	2.7	2.7	2.7	2.7	2.6	2.6
16	36	2.5	2.4	2.4	2.4	2.4	2.4

A30812

A30812 -19-31JAN89

B21,7AT,V -19-28JUN90

30 IN. ROWS - LOW RATE HOSES
HIGH RANGE

NOTE: The following delivery rates are approximate and will vary with changes in temperature and the specific fertilizer being used.

Approximate Delivery Rates Using a 28-Tooth Driver Gear and 14-Tooth Driven Gear with Low Rate Pump Hoses 30 In. Row Spacing

Transmission Combination		Travel Speed in mph Gallons per Acre					
Driver	Driven	3.0	4.0	5.0	6.0	7.0	8.0
36	16	41.9	39.2	36.4	33.7	31.0	28.2
36	18	38.1	35.9	33.7	31.6	29.4	27.3
28	16	34.0	32.4	30.7	29.0	27.4	25.7
26	16	31.9	30.5	29.1	27.6	26.2	24.8
28	18	30.7	29.4	28.1	26.8	25.5	24.2
26	18	28.8	27.7	26.5	25.4	24.3	23.2
21	16	26.4	25.5	24.6	23.6	22.7	21.8
36	30	24.4	23.6	22.8	22.1	21.3	20.5
21	18	23.8	23.0	22.3	21.6	20.8	20.1
36	33	22.4	21.7	21.1	20.4	19.8	19.2
36	36	20.7	20.1	19.6	19.0	18.5	18.0
16	16	20.7	20.1	19.6	19.0	18.5	18.0
28	30	19.4	18.9	18.4	18.0	17.5	17.0
16	18	18.5	18.1	17.7	17.2	16.8	16.4
26	30	18.1	17.7	17.3	16.9	16.5	16.1
28	33	17.7	17.3	17.0	16.6	16.2	15.8
26	33	16.5	16.2	15.9	15.5	15.2	14.9
28	36	16.3	16.0	15.7	15.4	15.0	14.7
26	36	15.2	15.0	14.7	14.4	14.1	13.8
21	30	14.8	14.5	14.3	14.0	13.7	13.5
21	33	13.5	13.3	13.1	12.9	12.6	12.4
21	36	12.4	12.3	12.1	11.9	11.7	11.5
16	30	11.4	11.3	11.1	11.0	10.8	10.7
16	33	10.4	10.3	10.2	10.0	9.9	9.8
16	36	9.6	9.5	9.4	9.3	9.2	9.0

A30818

A30818 -19-20APR89

B21,7AT,AB -19-28JUN90

36 IN. ROWS - REGULAR RATE HOSES
LOW RANGE

NOTE: The following delivery rates are approximate and will vary with changes in temperature and the specific fertilizer being used.

Approximate Delivery Rates Using a 14-Tooth Driver Gear and 28-Tooth Driven Gear with Regular Rate Pump Hoses
36 In. Row Spacing

Transmission Combination		Travel Speed in mph Gallons per Acre					
Driver	Driven	3.0	4.0	5.0	6.0	7.0	8.0
36	16	17.4	17.0	16.6	16.2	15.8	15.4
36	18	15.6	15.3	15.0	14.6	14.3	14.0
28	16	13.8	13.5	13.3	13.0	12.8	12.5
26	16	12.8	12.6	12.4	12.2	12.0	11.8
28	18	12.3	12.1	11.9	11.7	11.5	11.3
26	18	11.5	11.3	11.1	11.0	10.8	10.6
21	16	10.5	10.3	10.2	10.0	9.9	9.8
36	30	9.6	9.5	9.4	9.2	9.1	9.0
21	18	9.3	9.2	9.1	9.0	8.9	8.8
36	33	8.8	8.7	8.6	8.5	8.4	8.3
36	36	8.0	8.0	7.9	7.8	7.7	7.6
16	16	8.0	8.0	7.9	7.8	7.7	7.6
28	30	7.5	7.5	7.4	7.3	7.2	7.2
16	18	7.2	7.1	7.0	7.0	6.9	6.9
26	30	7.0	6.9	6.9	6.8	6.8	6.7
28	33	6.9	6.8	6.7	6.7	6.6	6.6
26	33	6.4	6.3	6.3	6.2	6.2	6.1
28	36	6.3	6.3	6.2	6.2	6.1	6.1
26	36	5.9	5.8	5.8	5.7	5.7	5.6
21	30	5.7	5.6	5.6	5.6	5.5	5.5
21	33	5.2	5.1	5.1	5.1	5.0	5.0
21	36	4.8	4.7	4.7	4.7	4.6	4.6
16	30	4.4	4.3	4.3	4.3	4.3	4.2
16	33	4.0	3.9	3.9	3.9	3.9	3.9
16	36	3.6	3.6	3.6	3.6	3.6	3.6

A30816

A30816 -19-31JAN89

B21,7AT,Z -19-28JUN90

36 IN. ROWS - REGULAR RATE HOSES
HIGH RANGE

NOTE: The following delivery rates are approximate and will vary with changes in temperature and the specific fertilizer being used.

Approximate Delivery Rates Using a 28-Tooth Driver Gear and 14-Tooth Driven Gear with Regular Rate Pump Hoses 36 In. Row Spacing

Transmission Combination		Travel Speed in mph Gallons per Acre					
Driver	Driven	3.0	4.0	5.0	6.0	7.0	8.0
36	16	54.8	48.2	41.6	35.0	28.4	21.8
36	18	50.7	45.5	40.3	35.0	29.8	24.6
28	16	46.1	42.1	38.1	34.1	30.1	26.1
26	16	43.6	40.1	36.7	33.2	29.8	26.4
28	18	42.1	39.0	35.8	32.7	29.5	26.4
26	18	39.7	37.0	34.3	31.6	28.9	26.1
21	16	36.8	34.5	32.3	30.1	27.8	25.6
36	30	34.2	32.3	30.4	28.5	26.7	24.8
21	18	33.4	31.6	29.8	28.0	26.3	24.5
36	33	31.5	30.0	28.4	26.9	25.3	23.8
36	36	29.3	28.0	26.6	25.3	24.0	22.7
16	16	29.3	28.0	26.6	25.3	24.0	22.7
28	30	27.5	26.4	25.3	24.1	23.0	21.9
16	18	26.4	25.4	24.3	23.3	22.3	21.2
26	30	25.8	24.8	23.8	22.9	21.9	20.9
28	33	25.3	24.4	23.4	22.5	21.6	20.6
26	33	23.7	22.9	22.1	21.3	20.5	19.7
28	36	23.4	22.6	21.9	21.1	20.3	19.5
26	36	21.9	21.2	20.6	19.9	19.2	18.5
21	30	21.3	20.7	20.0	19.4	18.7	18.1
21	33	19.5	19.0	18.5	17.9	17.4	16.9
21	36	18.0	17.6	17.1	16.7	16.2	15.8
16	30	16.6	16.2	15.8	15.5	15.1	14.7
16	33	15.2	14.9	14.5	14.2	13.9	13.6
16	36	14.0	13.7	13.5	13.2	12.9	12.7

A30822

A30822 -19-31JAN89

B21,7AT,AF -19-28JUN90

36 IN. ROWS - LOW RATE HOSES
LOW RANGE

NOTE: The following delivery rates are approximate and will vary with changes in temperature and the specific fertilizer being used.

Approximate Delivery Rates Using a 14-Tooth Driver Gear and 28-Tooth Driven Gear with Low Rate Pump Hoses 36 In. Row Spacing

Transmission Combination		Travel Speed in mph Gallons per Acre					
Driver	Driven	3.0	4.0	5.0	6.0	7.0	8.0
36	16	0.0	9.9	9.7	9.6	9.4	9.3
36	18	8.9	8.8	8.7	8.6	8.5	8.4
28	16	7.9	7.8	7.7	7.6	7.5	7.4
26	16	7.3	7.2	7.2	7.1	7.0	6.9
28	18	7.0	6.9	6.9	6.8	6.7	6.7
26	18	6.5	6.5	6.4	6.4	6.3	6.2
21	16	5.9	5.9	5.8	5.8	5.8	5.7
36	30	5.4	5.4	5.4	5.3	5.3	5.2
21	18	5.3	5.3	5.2	5.2	5.1	5.1
36	33	5.0	4.9	4.9	4.9	4.8	4.8
36	36	4.6	4.5	4.5	4.5	4.4	4.4
16	16	4.6	4.5	4.5	4.5	4.4	4.4
28	30	4.3	4.2	4.2	4.2	4.2	4.1
16	18	4.1	4.0	4.0	4.0	4.0	3.9
26	30	4.0	3.9	3.9	3.9	3.9	3.9
28	33	3.9	3.9	3.8	3.8	3.8	3.8
26	33	3.6	3.6	3.6	3.6	3.5	3.5
28	36	3.6	3.5	3.5	3.5	3.5	3.5
26	36	3.3	3.3	3.3	3.3	3.2	3.2
21	30	3.2	3.2	3.2	3.2	3.2	3.1
21	33	2.9	2.9	2.9	2.9	2.9	2.9
21	36	2.7	2.7	2.7	2.6	2.6	2.6
16	30	2.5	2.4	2.4	2.4	2.4	2.4
16	33	2.2	2.2	2.2	2.2	2.2	2.2
16	36	2.0	2.0	2.0	2.0	2.0	2.0

A30813

A30813 -19-31JAN89

B21,7AT,W -19-28JUN90

36 IN. ROWS - LOW RATE HOSES
HIGH RANGE

NOTE: The following delivery rates are approximate and will vary with changes in temperature and the specific fertilizer being used.

Approximate Delivery Rates Using a 28-Tooth Driver Gear and 14-Tooth Driven Gear with Low Rate Pump Hoses 36 In. Row Spacing

Transmission Combination		Travel Speed in mph Gallons per Acre					
Driver	Driven	3.0	4.0	5.0	6.0	7.0	8.0
36	16	34.9	32.6	30.4	28.1	25.8	23.5
36	18	31.7	29.9	28.1	26.3	24.5	22.7
28	16	28.3	27.0	25.6	24.2	22.8	21.4
26	16	26.6	25.4	24.2	23.0	21.8	20.6
28	18	25.6	24.5	23.4	22.3	21.2	20.2
26	18	24.0	23.1	22.1	21.2	20.2	19.3
21	16	22.0	21.3	20.5	19.7	18.9	18.2
36	30	20.3	19.7	19.0	18.4	17.7	17.1
21	18	19.8	19.2	18.6	18.0	17.4	16.8
36	33	18.6	18.1	17.6	17.0	16.5	16.0
36	36	17.2	16.8	16.3	15.9	15.4	15.0
16	16	17.2	16.8	16.3	15.9	15.4	15.0
28	30	16.1	15.8	15.4	15.0	14.6	14.2
16	18	15.4	15.1	14.7	14.4	14.0	13.7
26	30	15.1	14.7	14.4	14.1	13.7	13.4
28	33	14.8	14.5	14.1	13.8	13.5	13.2
26	33	13.8	13.5	13.2	12.9	12.7	12.4
28	36	13.6	13.3	13.1	12.8	12.5	12.3
26	36	12.7	12.5	12.2	12.0	11.8	11.5
21	30	12.3	12.1	11.9	11.7	11.4	11.2
21	33	11.3	11.1	10.9	10.7	10.5	10.4
21	36	10.4	10.2	10.1	9.9	9.8	9.6
16	30	9.5	9.4	9.3	9.1	9.0	8.9
16	33	8.7	8.6	8.5	8.4	8.3	8.2
16	36	8.0	7.9	7.8	7.7	7.6	7.5

A30819

A30819 -19-31JAN89

B21,7AT,AC -19-28JUN90

38 IN. ROWS - REGULAR RATE HOSES
LOW RANGE

NOTE: The following delivery rates are approximate and will vary with changes in temperature and the specific fertilizer being used.

Approximate Delivery Rates Using a 14-Tooth Driver Gear and 28-Tooth Driven Gear with Regular Rate Pump Hoses
38 In. Row Spacing

Transmission Combination		Travel Speed in mph Gallons per Acre					
Driver	Driven	3.0	4.0	5.0	6.0	7.0	8.0
36	16	16.5	16.1	15.7	15.3	14.9	14.5
36	18	14.8	14.5	14.2	13.9	13.5	13.2
28	16	13.0	12.8	12.6	12.3	12.1	11.9
26	16	12.2	11.9	11.7	11.5	11.3	11.1
28	18	11.7	11.5	11.3	11.1	10.9	10.7
26	18	10.9	10.7	10.5	10.4	10.2	10.1
21	16	9.9	9.8	9.6	9.5	9.4	9.2
36	30	9.1	9.0	8.9	8.8	8.6	8.5
21	18	8.8	8.7	8.6	8.5	8.4	8.3
36	33	8.3	8.2	8.1	8.0	7.9	7.8
36	36	7.6	7.5	7.5	7.4	7.3	7.2
16	16	7.6	7.5	7.5	7.4	7.3	7.2
28	30	7.1	7.1	7.0	6.9	6.9	6.8
16	18	6.8	6.7	6.7	6.6	6.6	6.5
26	30	6.6	6.6	6.5	6.5	6.4	6.3
28	33	6.5	6.4	6.4	6.3	6.3	6.2
26	33	6.0	6.0	5.9	5.9	5.9	5.8
28	36	6.0	5.9	5.9	5.8	5.8	5.7
26	36	5.6	5.5	5.5	5.4	5.4	5.4
21	30	5.4	5.3	5.3	5.3	5.2	5.2
21	33	4.9	4.9	4.8	4.8	4.8	4.7
21	36	4.5	4.5	4.5	4.4	4.4	4.4
16	30	4.1	4.1	4.1	4.1	4.0	4.0
16	33	3.8	3.7	3.7	3.7	3.7	3.7
16	36	3.4	3.4	3.4	3.4	3.4	3.4

A30817

A30817 -19-31JAN89

B21,7AT,AA -19-28JUN90

38 IN. ROWS - REGULAR RATE HOSES
HIGH RANGE

NOTE: The following delivery rates are approximate and will vary with changes in temperature and the specific fertilizer being used.

Approximate Delivery Rates Using a 28-Tooth Driver Gear and 14-Tooth Driven Gear with Regular Rate Pump Hoses
38 In. Row Spacing

Transmission Combination		Travel Speed in mph Gallons per Acre					
Driver	Driven	3.0	4.0	5.0	6.0	7.0	8.0
36	16	51.9	45.7	39.4	33.2	26.9	20.7
36	18	48.0	43.1	38.1	33.2	28.3	23.3
28	16	43.6	39.9	36.1	32.3	28.5	24.7
26	16	41.3	38.0	34.8	31.5	28.2	25.0
28	18	39.9	36.9	33.9	30.9	28.0	25.0
26	18	37.7	35.1	32.5	29.9	27.3	24.8
21	16	34.9	32.7	30.6	28.5	26.3	24.2
36	30	32.4	30.6	28.8	27.0	25.3	23.5
21	18	31.6	29.9	28.3	26.6	24.9	23.2
36	33	29.9	28.4	26.9	25.5	24.0	22.5
36	36	27.7	26.5	25.2	24.0	22.8	21.5
16	16	27.7	26.5	25.2	24.0	22.8	21.5
28	30	26.1	25.0	23.9	22.9	21.8	20.7
16	18	25.0	24.0	23.1	22.1	21.1	20.1
26	30	24.4	23.5	22.6	21.7	20.7	19.8
28	33	24.0	23.1	22.2	21.3	20.4	19.5
26	33	22.5	21.7	20.9	20.2	19.4	18.6
28	36	22.2	21.5	20.7	20.0	19.2	18.5
26	36	20.8	20.1	19.5	18.8	18.2	17.5
21	30	20.2	19.6	19.0	18.4	17.8	17.2
21	33	18.5	18.0	17.5	17.0	16.5	16.0
21	36	17.1	16.6	16.2	15.8	15.4	15.0
16	30	15.7	15.4	15.0	14.7	14.3	13.9
16	33	14.4	14.1	13.8	13.5	13.2	12.9
16	36	13.2	13.0	12.7	12.5	12.3	12.0

A30823

A30823 -19-31JAN89

B21,7AT,AG -19-28JUN90

38 IN. ROWS - LOW RATE HOSES
LOW RANGE

NOTE: *The following delivery rates are approximate and will vary with changes in temperature and the specific fertilizer being used.*

Approximate Delivery Rates Using a 14-Tooth Driver Gear and 28-Tooth Driven Gear with Low Rate Pump Hoses
38 In. Row Spacing

Transmission Combination		Travel Speed in mph Gallons per Acre					
Driver	Driven	3.0	4.0	5.0	6.0	7.0	8.0
36	16	9.5	9.4	9.2	9.1	8.9	8.8
36	18	8.5	8.4	8.3	8.2	8.0	7.9
28	16	7.4	7.4	7.3	7.2	7.1	7.0
26	16	6.9	6.9	6.8	6.7	6.7	6.6
28	18	6.6	6.6	6.5	6.5	6.4	6.3
26	18	6.2	6.1	6.1	6.0	6.0	5.9
21	16	5.6	5.6	5.5	5.5	5.4	5.4
36	30	5.2	5.1	5.1	5.0	5.0	5.0
21	18	5.0	5.0	4.9	4.9	4.9	4.8
36	33	4.7	4.7	4.6	4.6	4.6	4.5
36	36	4.3	4.3	4.3	4.2	4.2	4.2
16	16	4.3	4.3	4.3	4.2	4.2	4.2
28	30	4.0	4.0	4.0	4.0	3.9	3.9
16	18	3.8	3.8	3.8	3.8	3.8	3.7
26	30	3.8	3.7	3.7	3.7	3.7	3.6
28	33	3.7	3.7	3.6	3.6	3.6	3.6
26	33	3.4	3.4	3.4	3.4	3.3	3.3
28	36	3.4	3.4	3.3	3.3	3.3	3.3
26	36	3.1	3.1	3.1	3.1	3.1	3.1
21	30	3.0	3.0	3.0	3.0	3.0	3.0
21	33	2.8	2.8	2.7	2.7	2.7	2.7
21	36	2.5	2.5	2.5	2.5	2.5	2.5
16	30	2.3	2.3	2.3	2.3	2.3	2.3
16	33	2.1	2.1	2.1	2.1	2.1	2.1
16	36	1.9	1.9	1.9	1.9	1.9	1.9

A30814

A30814 -19-31JAN89

B21,7AT,X -19-28JUN90

38 IN. ROWS - LOW RATE HOSES
HIGH RANGE

NOTE: The following delivery rates are approximate and will vary with changes in temperature and the specific fertilizer being used.

Approximate Delivery Rates Using a 28-Tooth Driver Gear and 14-Tooth Driven Gear with Low Rate Pump Hoses
38 In. Row Spacing

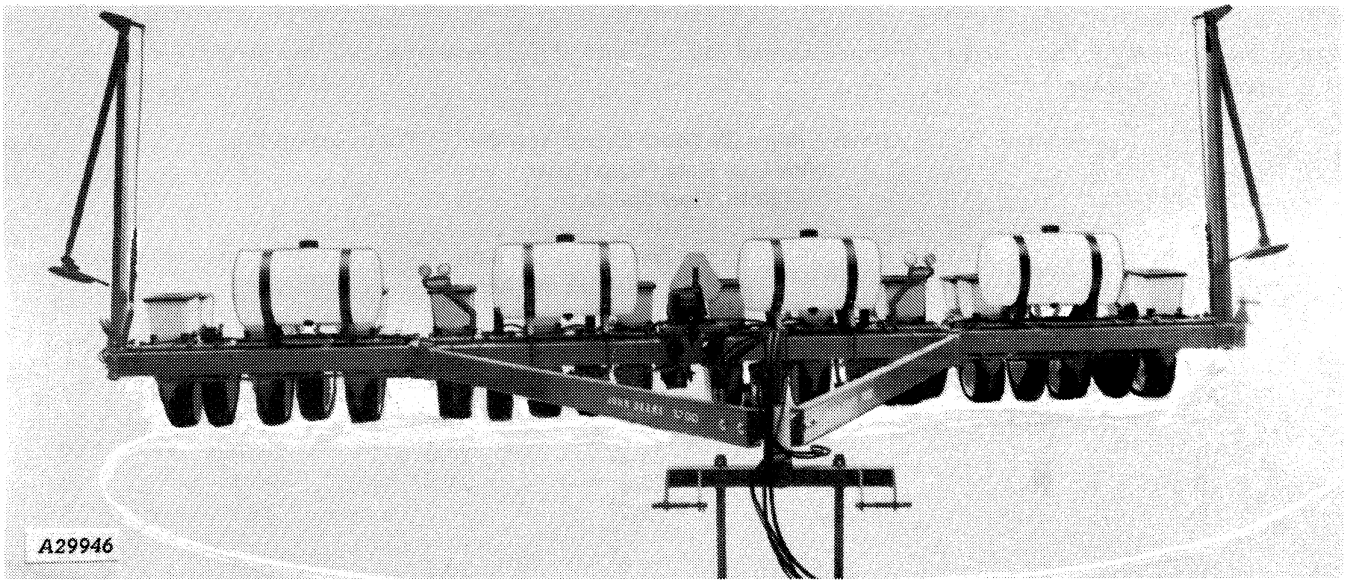
Transmission Combination		Travel Speed in mph Gallons per Acre					
Driver	Driven	3.0	4.0	5.0	6.0	7.0	8.0
36	16	33.1	30.9	28.8	26.6	24.4	22.3
36	18	30.1	28.3	26.6	24.9	23.2	21.5
28	16	26.9	25.5	24.2	22.9	21.6	20.3
26	16	25.2	24.1	22.9	21.8	20.7	19.6
28	18	24.3	23.2	22.2	21.2	20.1	19.1
26	18	22.7	21.8	20.9	20.1	19.2	18.3
21	16	20.9	20.1	19.4	18.7	17.9	17.2
36	30	19.3	18.6	18.0	17.4	16.8	16.2
21	18	18.8	18.2	17.6	17.0	16.5	15.9
36	33	17.7	17.2	16.6	16.1	15.6	15.1
36	36	16.3	15.9	15.5	15.0	14.6	14.2
16	16	16.3	15.9	15.5	15.0	14.6	14.2
28	30	15.3	14.9	14.6	14.2	13.8	13.4
16	18	14.6	14.3	13.9	13.6	13.3	12.9
26	30	14.3	14.0	13.6	13.3	13.0	12.7
28	33	14.0	13.7	13.4	13.1	12.8	12.5
26	33	13.1	12.8	12.5	12.3	12.0	11.7
28	36	12.9	12.6	12.4	12.1	11.9	11.6
26	36	12.0	11.8	11.6	11.4	11.1	10.9
21	30	11.7	11.5	11.3	11.1	10.8	10.6
21	33	10.7	10.5	10.3	10.2	10.0	9.8
21	36	9.8	9.7	9.5	9.4	9.2	9.1
16	30	9.0	8.9	8.8	8.7	8.5	8.4
16	33	8.2	8.1	8.0	7.9	7.8	7.7
16	36	7.6	7.5	7.4	7.3	7.2	7.1

A30820

A30820 -19-31JAN89

B21,7AT,AD -19-28JUN90

BALLAST TANK ATTACHMENT



Consists of four tanks which, when filled with water, will add approximately 1180 kg (2600 lb) to the frame for conservation planting and planting in reduced tillage areas.

For assembly instructions, see Predelivery Instruction assembly section.

B21,7AT,AK -19-28JUN90

Double-Disk Fertilizer Opener Attachment

DOUBLE-DISK FERTILIZER OPENERS

Both the liquid and dry fertilizer attachments use the double disk opener.

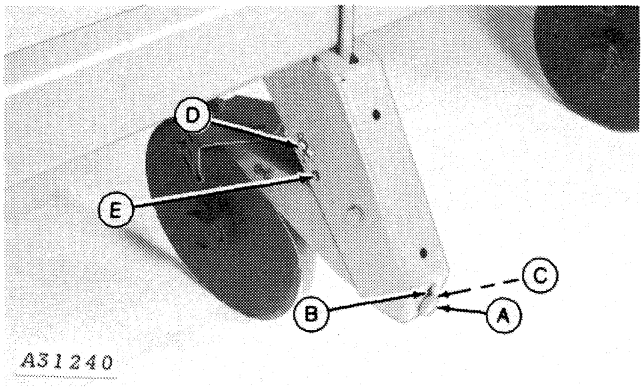
The openers will place the fertilizer from 50 to 125 mm (2 to 5 in.) off row center. The opener will place the fertilizer from 76 to 125 mm (3 to 5 in.) deep, depending on soil conditions. The disks are equipped with self-lubricating anti-friction bearings.

The double-disk opener can be adjusted to two positions for light or heavy soil conditions. For light soils, place the spring anchor bolt (A) at top of slot (B) and for heavy soils, place the spring anchor bolt at bottom of slot.

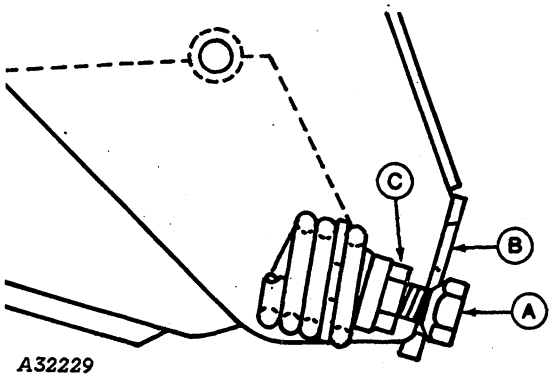
To change spring position, raise machine, loosen jam nut (C) and turn spring anchor bolt until spring is loose, move bolt to desired position and tighten bolt and jam nut securely.

IMPORTANT: Be certain the adjusting bolt jam nut NEVER bottoms against the housing. Bottoming this nut against the housing restricts the pivoting action of the bolt, resulting in premature spring and/or bolt failures.

Insert stop pin (D) in opener hole (E) on row 3 for the 6-Row with dry or liquid fertilizer to prevent interference between the fertilizer opener at maximum upward travel and the fertilizer transmission input shaft.



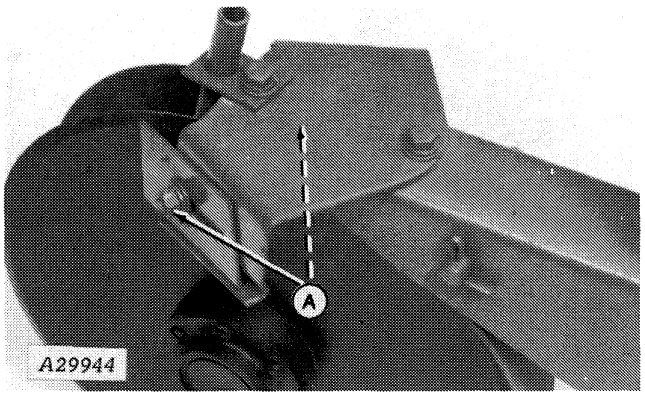
A31240 -UN-12OCT88



A32229 -UN-07OCT88

B21,3AT,AB -19-28JUN90

Adjust scrapers with cap screws (A) until scraper is close but not touching the disk blade.



A29944 -UN-06OCT88

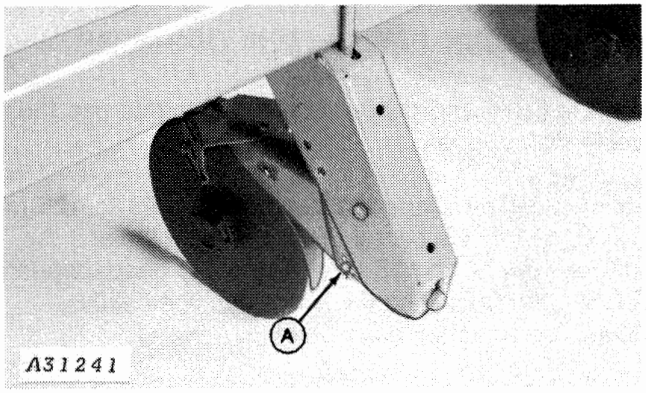
B21,7AT,AI -19-28JUN90

The opener can be locked in a raised position when the fertilizer attachment is not being used, or for storage.

To lock the opener, proceed as follows:

(Not Illustrated) Raise the planter and place blocks beneath the openers. Remove the stop pin.

Lower the planter carefully with the openers resting on the blocks and install stop pin in locking hole (A), which is normally hidden by the mounting bracket.



-UN-12OCT88

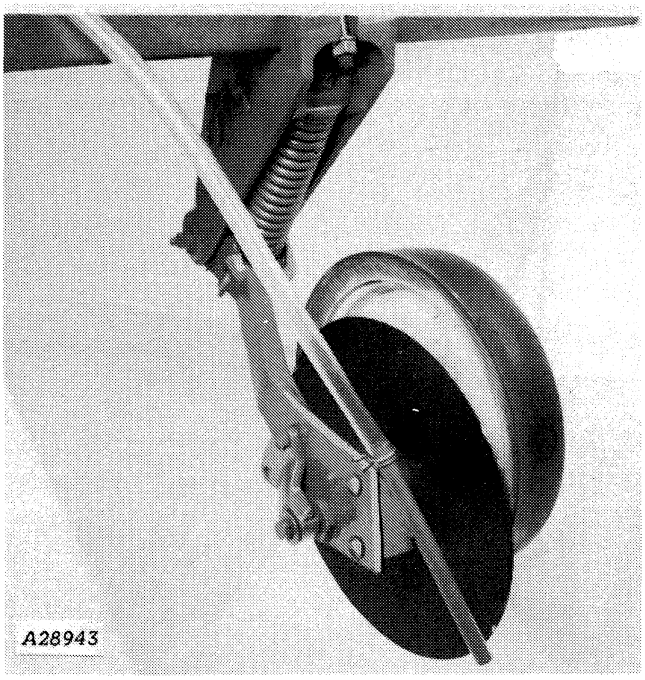
A31241

B21,3AT,AC -19-28JUN90

Single-Disk Fertilizer Opener Attachment

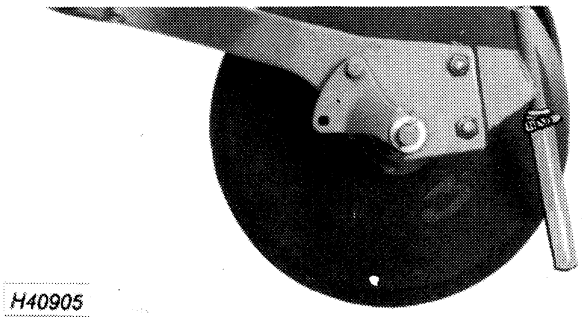
SINGLE-DISK FERTILIZER OPENERS

Single-disk fertilizer openers are designed specifically for band application of liquid and granular fertilizer in high-residue, difficult-to-penetrate conservation seedbeds. The single blade and gauge wheel configuration minimizes disturbance of the seed zone in these conditions and helps preserve seedbed moisture. The gauge wheel helps in maintaining a consistent fertilizer depth.



A28943 -UN-14OCT88

Opener W/Liquid Fertilizer Tube

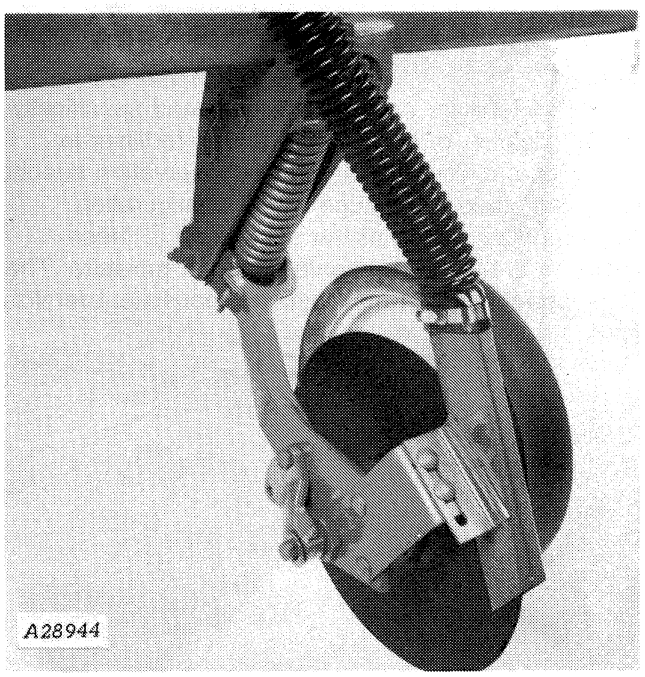


H40905 -UN-27APR89

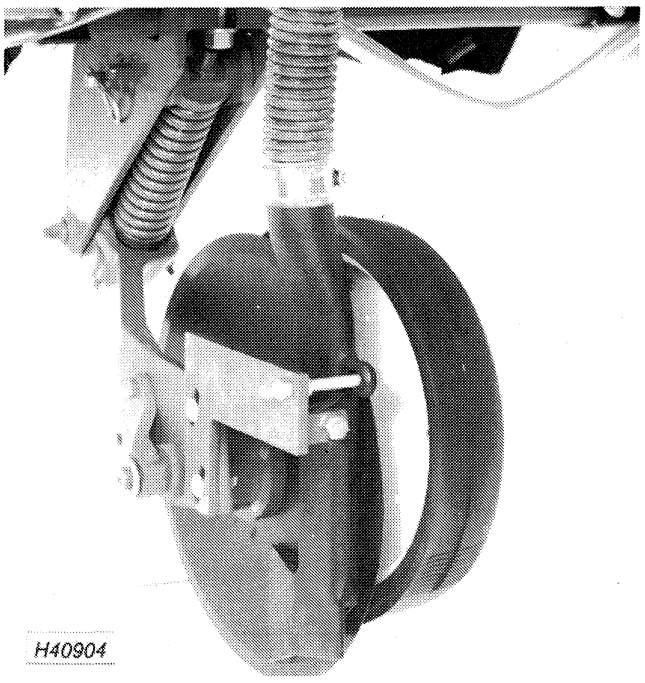
Opener W/Liquid Fertilizer Extension

B21,1AT,T -19-28JUN90

Operating the opener in soils containing many large rocks is not recommended since the opener's upper movement limit stop is incapable of supporting the planter frame weight as the opener rides up over large rocks.



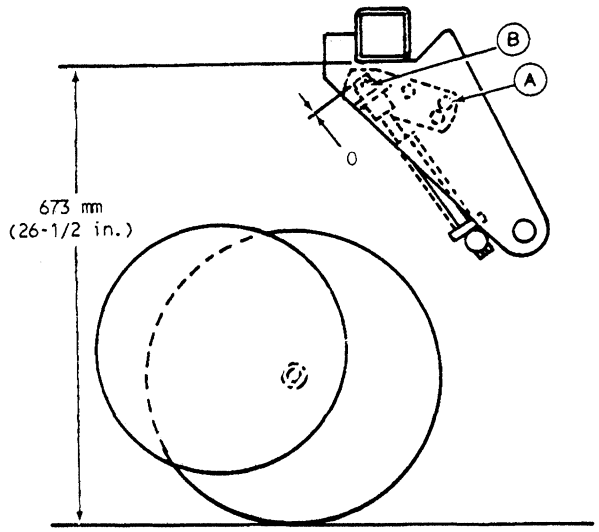
Opener W/Dry Fertilizer Spout



Opener W/Cast Dry Fertilizer Spout

HX,B21,5AT,B -19-28JUN90

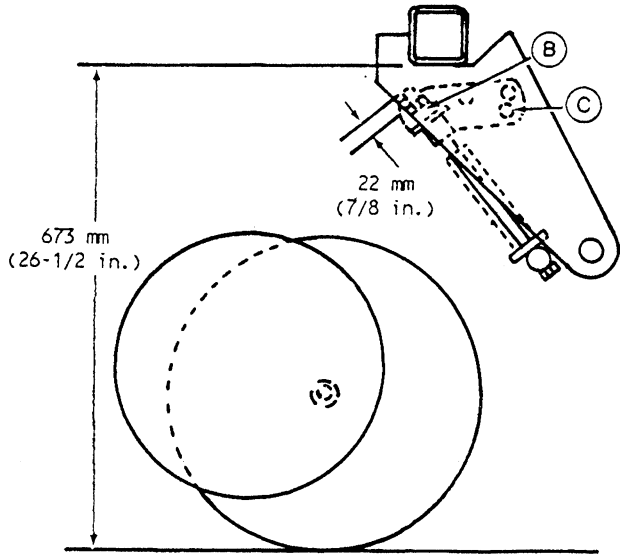
When openers are set in the minimum setting (A), adjust jam nut (B) so there are no threads showing.



H40297 -UN-02MAY89

When openers are set in the maximum setting (C), adjust jam nut (B) so there is 22 mm (7/8 in.) of thread showing.

IMPORTANT: Maintain 673 mm (26-1/2 in.) dimension between bottom of planter frame and bottom edge of disk opener.



H40298 -UN-15MAY89

HX,B21,5AT,A -19-28JUN90

The recommended placement of fertilizer is 25 to 125 mm (1 to 5 in.) to either side of planting unit double-disk seed opener (A).

To change location of fertilizer opener, loosen opener U-bolt (B), wedge bolts (D), and slide opener to right or left until disk (C) is at desired location.

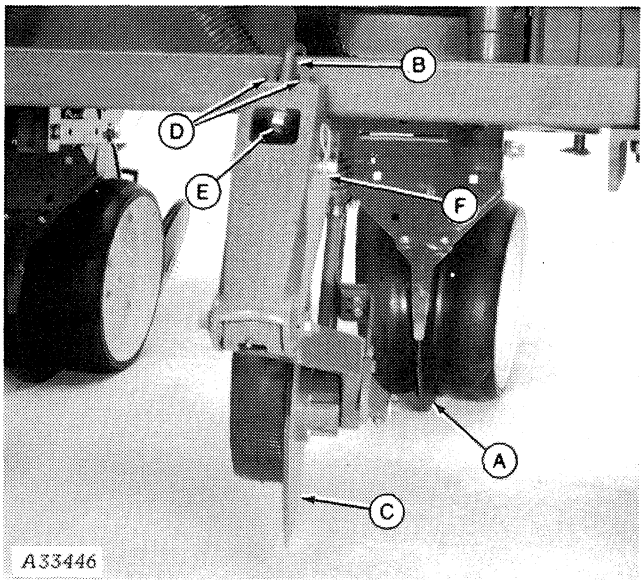
To secure fertilizer opener to frame tube:

1. Snug U-bolt nuts (E) until the opener is square with and touching the bottom of the fertilizer tube.

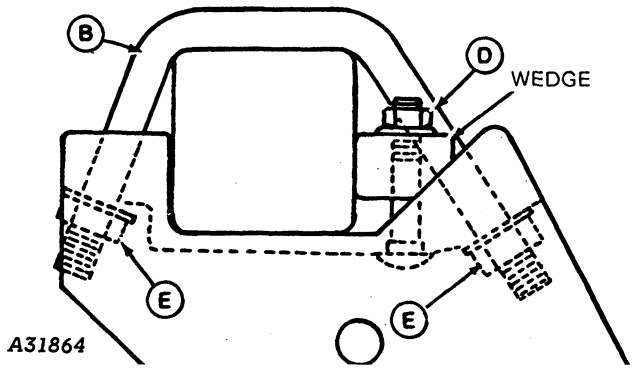
2. Tighten wedge bolts (D) to 70 N·m (52 lb-ft).

3. Tighten U-bolt nuts (E) to 175 N·m (129 lb-ft).

4. (12-Row Planter Only) Install pin at (F) on rows 6 and 7 with head of pin toward outside of machine. Head of pin may contact hitch during force adjustment if head is next to hitch.



A33446 -UN-12OCT88

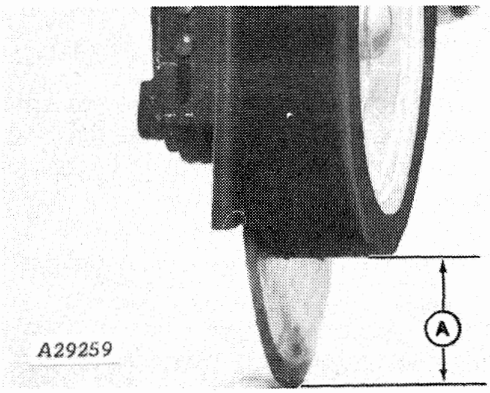


A31864 -19-31JAN89

B21,7AT,CJ -19-28JUN90

SETTING THE GAUGE WHEEL

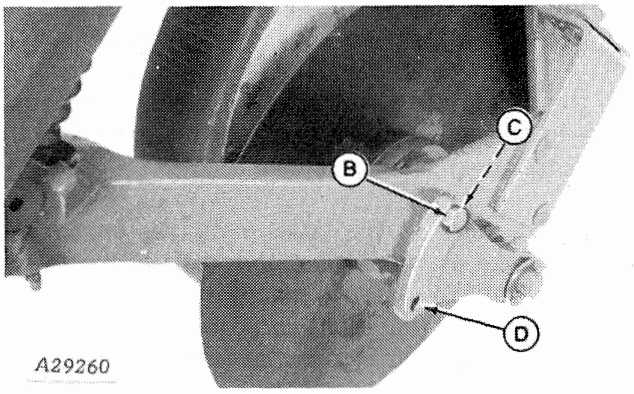
The gauge wheel can be positioned for two different application depths: regular and shallow. Seedbed conditions will dictate the optimum setting for maintaining the most consistent fertilizer placement. The regular setting should be used for most conditions except when inadequate opener penetration or rocks pose a problem.



-UN-14OCT88 A29259

Depending upon soil conditions, the shallow setting will apply fertilizer up to approximately 50 mm (2 in.) depth. The regular setting will allow up to approximately 100 mm (4 in.) depth.

NOTE: The concentration pattern of fertilizer will vary with soil conditions. Dry, loose soil will fill in somewhat, causing the fertilizer to be distributed in a narrow vertical band. Moist or firm soil will create a more well-defined furrow, causing the fertilizer to be concentrated more near the bottom of the opener furrow.



-UN-14OCT88 A29260

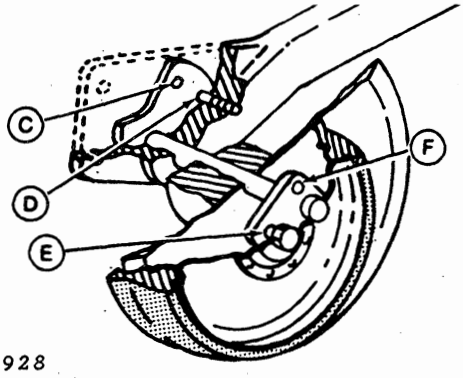
To adjust dimension (A), position depth adjustment bolt (B) in the proper hole.

For maximum depth, locate adjustment bolt in hole (C); for minimum depth, locate bolt in hole (D).

For most conditions, wheel should be bolted to lever arm at (E).

NOTE: On left-hand openers, bolt (E) has left-hand threads; on right-hand opener, bolt (E) has right-hand threads. Bolts should tighten in rotation of wheel.

If frame mounted coulters are used, attach wheel at (F) to avoid interference between the wheel and coulter support frame.



-UN-14OCT88 A31928

B21,1AT,AB -19-28JUN90

ADJUSTING DOWN FORCE

The opener down force is adjustable to provide effective penetration for varying field conditions. Use the following criteria when determining the proper down force setting for the opener:

1. Use no more down force than necessary for the conditions.

2. Observe how deeply the gauge wheel is running:

A. If the wheel is sinking deeply into the soil, use the minimum spring pressure setting.

B. If the disk is not penetrating sufficiently for the gauge wheel to consistently contact the soil surface, use the maximum spring pressure setting.

NOTE: Excessive opener down force may cause the planter frame to run higher than desirable or may substantially reduce planter drive wheel traction. Additional frame ballast or reduced spring force may be necessary to maintain adequate planter drive wheel traction.

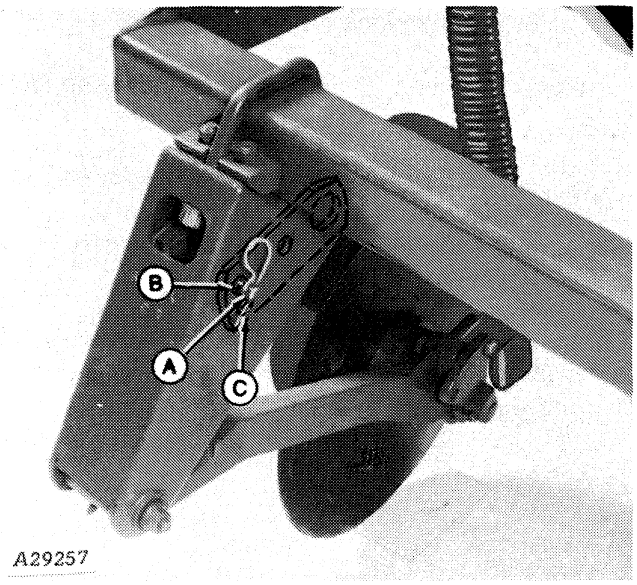
To adjust down force, proceed as follows:

(Not Illustrated) Raise planter and install service locks.

Remove spring locking pin from pin (A) and remove pin from spring housing.

Position pin through internal strap and hole (C) for maximum spring pressure. Position pin through strap and hole (B) for minimum spring pressure.

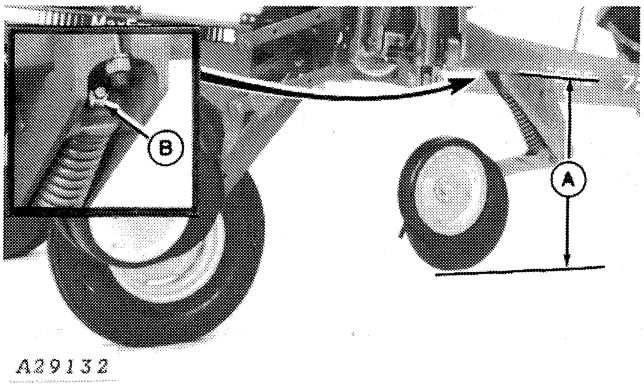
Secure with spring locking pin.



B21,1AT,Y -19-28JUN90

After down force adjustment has been made, check to make sure dimension (A) is not less than 635 mm (25 in.). Loosen jam nut (B) and adjust spring bolt as necessary. Retighten jam nut.

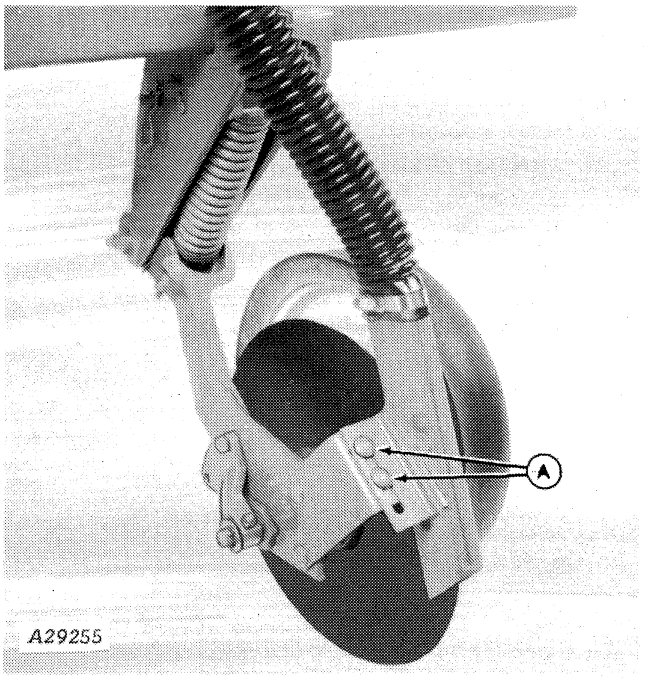
NOTE: With dry fertilizer opener, make sure dimension (A) is not greater than 711 mm (28 in.) or fertilizer tube may plug with soil as opener engages the ground.



B21,1AT,Z -19-28JUN90

The granular fertilizer spout may require adjusting to ensure the fertilizer is delivered to the center of the soil furrow. To adjust proceed as follows:

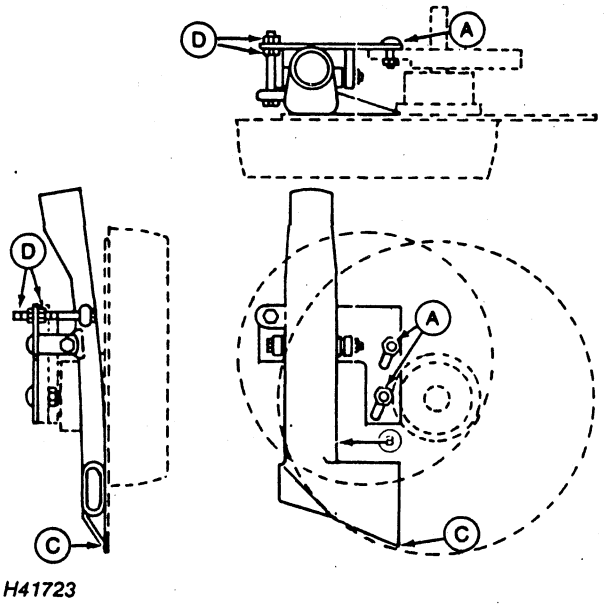
1. Loosen bolts (A).
2. Move lower end of spout inward or outward as required.
3. Position bottom portion of the spout vertically until it is approximately 15 mm (5/8 in.) above the soil surface. In wet conditions it may be necessary to raise the spout until it is approximately 25 mm (1 in.) above the soil surface to avoid plugging.
4. Tighten nuts after completing adjustment.



B21,1AT,W -19-28JUN90

ADJUSTING CAST SPOUT

1. Adjust arm pivot (A) so point of scraper (B) is inside the outside diameter of the disk as illustrated at (C). Tighten bolts at (A).

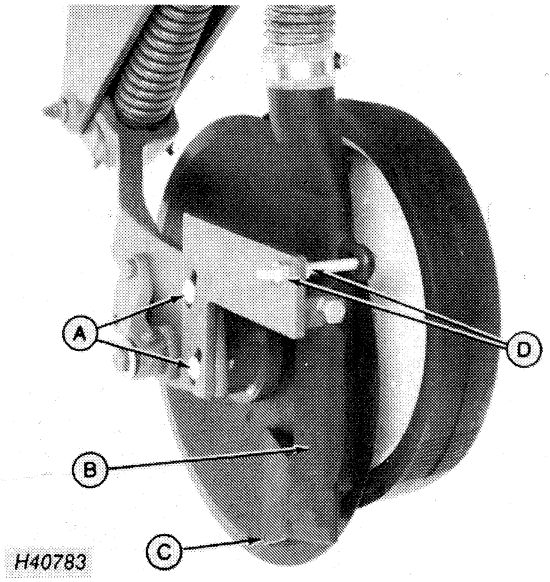


H41723 -UN-16MAR90

H41723

2. Adjust preload of arm pivot scraper against opener blade with two nuts (D).

IMPORTANT: Scraper should "drag" on opener blade at (C).



H40783 -UN-05APR89

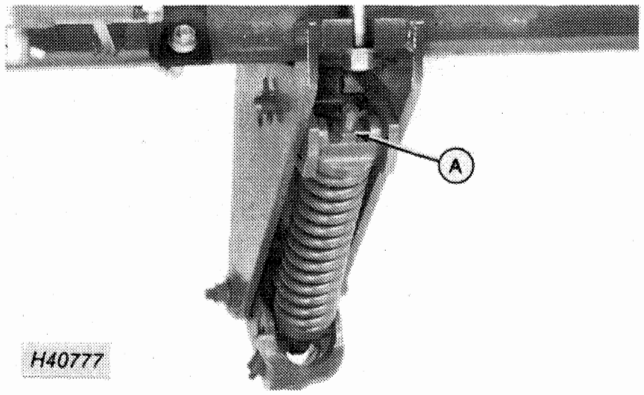
H40783

HX,B21,5AT,C -19-28JUN90

INSTALLING HEAVY-DUTY SPRING

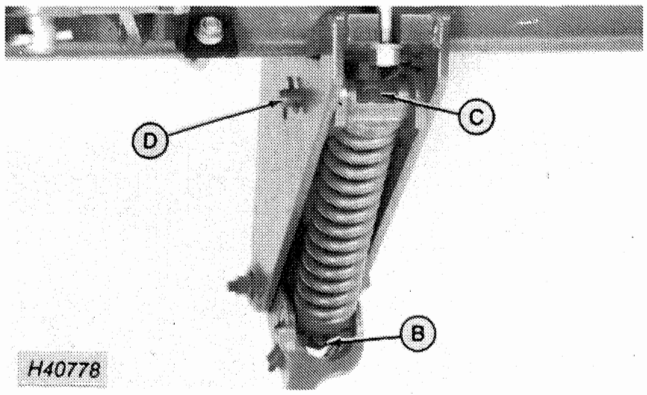
NOTE: Heavy-duty spring (A50733) (yellow) is recommended for no-till and hard soil conditions to maintain proper soil penetration.

1. Remove nut (A) from old spring.



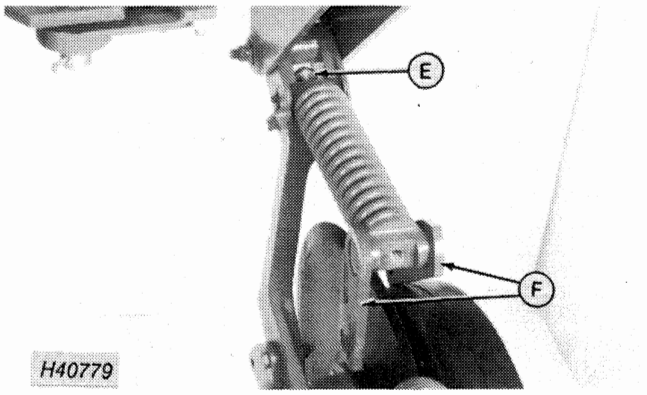
2. Unscrew bolt (B) from casting until bolt at (C) is almost free from casting.

3. Remove pin (D).



4. Unscrew bolt (E) securing spring to casting and remove old spring.

5. Keep plates (F) for new spring.

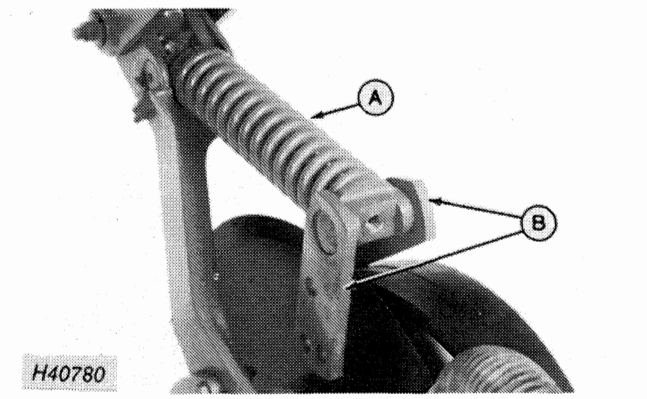


HX,B21,6AS,BJ -19-28JUN90

6. Install new spring (A) on bolt.

7. Install plates (B) removed from old spring.

NOTE: Be certain flat surfaces on plates are on top.



HX,B21,6AS,BK -19-28JUN90

If fertilizer is not at desired depth, check the following before changing the depth adjustment:

The gauge wheel is in contact, but not pressing into the ground. Readjust down pressure spring if necessary.

The dry fertilizer spout is centered over the trench. Reposition spout if necessary.

The dry fertilizer spout height is not set correctly for dry soil or windy conditions. Move spout downward until it is approximately 15 mm (5/8 in.) above the trench.

In wet ground conditions, help prevent plugging by positioning spout upward until it is approximately 25 mm (1 in.) above the trench.

B21,1AT,AA -19-28JUN90

PLANTER (UNFOLDED)

Symptom	Problem	Solution
Planter will not lower. (Tractor engine must be running and console power light on.)	Service locks installed.	Reposition service locks.
	7P valve stuck closed.	Clean or replace valve.
	7P solenoid not energizing.	Check solenoid.
	Pilot check valves stuck closed.	Clean or replace valves. (See your John Deere dealer.)
	Control console not powered.	Check electrical connections at 7-pin connector.
	Pressure and return hoses not fully engaged in SCV outlets.	-
Planter frame unequal. (Left wing frame higher or lower than right wing frame).	Air in hydraulic system.	Remove air and rephase master cylinder.
	Service lock on wing frame.	Reposition service lock.
Planter center frame higher than wing frames.	Service locks on center frame wheels.	Remove service locks.
	Air in hydraulic system.	Remove air.
	Excessive attachment and planting unit down force.	Reduce spring force on unit down force springs, openers (attachments).
		Add Ballast Attachment.
	Collar on rear of master cylinder misadjusted.	Adjust stop. See Leveling the Planter in Operation section.
	Defective or stuck flow divider valve.	Clean and replace valve. (See your John Deere dealer.)
Planter frame raises or lowers slowly.	Low tractor hydraulic pressure.	Tractor standby pressure must be a minimum of 15 513 kPa (155.1 bar) (2250 psi).
	SCV not in "HARE" full open position.	-
Erratic or uneven lift.	Air in hydraulic system.	Remove air.

Continued on next page

Symptom	Problem	Solution
	Stuck or defective flow dividers.	Clean or replace flow dividers. (See your John Deere dealer).
	SCV not in "HARE" full open position.	-
Planter will not raise.	Tractor SCV bypassing oil.	Readjust SCV lever linkage. (See Tractor Operator's Manual.)
		Re-cut vacuum blower rubber stop.
Planter will not fold.	5R solenoid not energizing.	Check solenoid.
	5R valve stuck closed.	Clean or replace valve.
Planter folds when not selected.	5R valve is stuck open.	Clean or replace valve.
	Thermal relief valve stuck open.	Clean or replace valve.
Wings bulldoze in soft soil conditions.	Excessive weight on wings.	Close off outer fertilizer tanks. Order BA25425 from your John Deere dealer.
	Unit furrowers, disk openers, gauge wheels or transport wheels must rotate freely.	-
	Planting too fast.	Reduce operating speed.
	Hitch too low.	Raise hitch.
	Excessive planting unit down force.	Reduce down force.
Marker floats off ground.	Air in hydraulic system.	Bleed marker lift cylinder.
	Alternator valve defective.	Replace valve. (See your John Deere dealer.)
	Leaking tractor SCV.	-
	Marker cylinder not dropping down into J-slot. (Hose loop too short.)	-
Markers not alternating.	Air in the marker valve.	Bleed marker hydraulic system.
	Marker valve defective.	Replace valve. (See your John Deere dealer.)

Continued on next page

Symptom	Problem	Solution
Marker lowers when not selected.	2P valve stuck open.	Clean or replace valve.
	Air in the marker valve.	Bleed marker hydraulic system.
	Switch in NORMAL position.	Press switch to MARKER OFF.
Marker lowers and disk blade is forced into the ground.	Marker cylinder is not floating in J-slot.	Lengthen marker hydraulic hoses.
Marker will not lower.	2P solenoid not energizing.	Check solenoid.
	Switch in MARKER OFF position.	Press switch to NORMAL position.
Row units on right-hand side of planter not planting.	Right-hand drive shaft cotter pin sheared.	Repair cause of pin shearing and replace cotter pin.
	Half-Width Drive Disconnect is engaged.	Move switch to middle position.
Row units on left-hand side of planter not planting.	Left-hand drive shaft cotter pin(s) sheared.	Repair cause of pin shearing and replace cotter pin.
	Half-Width Drive Disconnect is engaged.	Move switch to middle position.
Closing wheels leave severe imprint in soil.	Too much spring force.	Adjust closing wheel spring.
Closing wheels not firming soil around seed.	Insufficient spring force.	Adjust closing wheel spring.
Closing wheel running on top of seed furrow.	Improper centering.	Align.
Closing wheels not applying equal force.	—	Realign.
Fertilizer opener does not penetrate sufficiently.	Improper adjustment of pressure.	Move bolt to lower position.
Fertilizer opener penetrates too deeply.	Improper adjustment of pressure.	Move bolt to upper position and adjust spring bolt.
One fertilizer opener not distributing fertilizer.	Fertilizer tube opener spout plugged.	Inspect, clean and remove obstruction.
Dry fertilizer not being uniformly distributed.	Using wrong augers or augers assembled incorrectly.	Reassemble with correct augers.

Continued on next page

Symptom	Problem	Solution
	Augers not centered in hopper.	Reposition hoppers on center augers.
Consistent shearing of drill shaft cotter pin.	Drill shaft not aligned properly at couplers.	Loosen bearing and align shaft.
Drive wheel chain consistently falls off.	Chain may be too long.	Remove offset link.
	Chain links stiff.	Oil or replace chain.
	Chain dislodged by trash.	Add chain shields.

B21,7TS,A -19-28JUN90

PLANTER (FOLDED)

Symptom	Problem	Solution
Planter will not unfold.	5P solenoid not energizing.	Check solenoid.
	Planter wings not unlatched.	Unlatch wings.
Planter unfolds when not selected.	5P valve is stuck open.	Clean or replace valve.
Wing wheel cylinders will not extend.	Wing wheel transport locks installed.	Reposition transport locks.
Wing wheel cylinders extend very slowly.	10P solenoid not energizing.	Check solenoid.
Planter will not unfold completely.	Foreign material in wing-fold hydraulic cylinder flow divider valve or valve defective.	Clean or replace flow divider valve (see your John Deere dealer).
Planter frame raises and lowers slowly.	10 solenoid not energizing.	Check solenoid.
	10 valve stuck closed.	Check or replace valve.
	Low tractor hydraulic pressure.	Tractor standby pressure must be a minimum of 15 513 kPa (155.1 bar) (2250 psi).
	SCV not in "HARE" full open position.	—

B21,7TS,E -19-28JUN90

Symptom	Problem	Solution
VACUUM METER		
No seed being planted.	Hoppers empty.	Fill hoppers.
	No vacuum.	See "Low Vacuum" in Troubleshooting chart.
	Seed tubes plugged or damaged.	Inspect seed tubes.
Poor seed spacing.	Seed disk vacuum holes plugged.	Clean seed disks.
	Worn meter brushes.	Replace brushes.
	Low vacuum.	See "Low Vacuum" in Troubleshooting chart.
	Rusty planting unit chains.	Lubricate chains.
	Dirt build-up on herbicide/insecticide drive.	Clean drive.
	Worn meter seals.	Replace seals.
	Seed disk hubs misadjusted.	Readjust hubs.
	Incorrect vacuum.	Adjust knob on control valve.
	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. Ensure seed tube hook is properly positioned in unit shank.
	Treated seed sticking in cell.	Increase application rate of A51237 Talc.
	Seed disks have not been sprayed with Slip Plate.	Spray seed disks with Slip Plate TY6431.
Low seed population.	Seed disk vacuum holes plugged.	Clean seed disks. (Sorghum/Beet only) Install knockout or replace worn knockout.
Low seed population.	"Dirty" seed plugging vacuum holes.	Use clean seed. (Sorghum/Beet only) Install knockout or replace worn knockout.

Continued on next page

Symptom	Problem	Solution
	Seed disk wiper missing.	Replace wiper.
	"Treated" seed sticking in cells.	Add Talc A51327 to seed hoppers.
	Hopper applied treatment causes buildup, seeds stick.	Follow recommended usage.
	Rusty planting unit chains.	Lubricate chains.
	Low vacuum.	See "Low Vacuum" in Troubleshooting chart.
	Dirt build-up on herbicide/insecticide drives.	Clean drives.
	Worn meter seals.	Replace seals.
	Worn seed disks.	
	Replace seed disks.	
	Seed "bridging" in hopper.	Use smaller seed.
		Add Talc A51327 to seed hoppers.
		Clean vacuum meter and hopper.
	Seed size not compatible with seed disks.	Use correct seed disks.
	Excessive drive slippage.	Reduce unit down force.
		Readjust seed transmission.
	Vacuum level too low.	Increase vacuum level.
	Planting too fast for rough field conditions.	Plant at speed recommended in planting rate chart.
		Increase unit down force.
	Meter brush improperly installed.	Install brush properly.
	Using incorrect transmission sprocket combination.	Use sprocket combination recommended in planting rate chart.
High Seed Population.	High vacuum.	Adjust knob on control valve.

Continued on next page

Symptom	Problem	Solution
	Faulty vacuum gauge.	Check air line and orifice in line to gauge. Clean if plugged. Replace if cut.
	Worn seed disks.	Replace seed disks.
	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.	Tighten hubs.
	Using incorrect transmission sprocket combination.	Use sprocket combination recommended in planting rate charts.
Seed tubes plugging.	Planter rolling backward when lowering.	Lower planter while moving forward.
	Turning tractor steering wheel when planter is down and stationary. (Four Wheel Drive tractors only.)	Avoid turning tractor when planter is down and stationary.
Inconsistent seed depth.	Planting in rough seed bed.	Use down force spring attachment on planting units.
	Seed tubes partially plugged or improperly installed.	Inspect seed tubes. Ensure seed tubes are hooked properly in unit shank.
Premature blower motor seal failure.	Incorrect hydraulic connections.	Reconnect hydraulic hoses.
	SCV lever not installed.	Install SCV lever stop in tractor console.
Low vacuum.	Incorrect hydraulic connections.	Reconnect hoses.
	Planting unit vacuum hoses not connected to meter.	Connect vacuum hoses to meter.
	SCV lever stop not installed.	Install lever stop in tractor console.
	Control valve misadjusted.	Adjust control valve knob.

Continued on next page

Symptom	Problem	Solution
	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 handle not engaged.	Secure housing handle to chamber.
	Meter seals worn or flipped.	Inspect seals. Reposition or replace.
	Air manifold system assembled without O-rings.	Add O-rings.
	SCV lever stop cut to wrong length.	Recut lever stop.
Erratic vacuum.	SCV lever stop not installed.	Install lever stop.
	SCV lever stop cut to wrong length.	Recut SCV lever stop.
	Tractor SCV linkage is mistimed.	Tractor SCV linkage must be readjusted.
	Air manifold system clogged with dust.	Clean air manifold system.
	"Flow checking" at SCV prevents return oil flow.	Install Auxiliary Return Line Coupler Kit (BA25379) in SCV.
	Control valve failed.	Replace control valve.
	Tractor oil level low.	Add oil.

B21,7TS,S -19-28JUN90

Symptom	Problem	Solution
PLATELESS METER		
No seed being planted.	Seed hopper empty.	Fill seed hopper.
Irregular or incorrect seed spacing.	Driving too fast.	Check chart for correct speed.
	Wrong tire pressure.	Inflate tires to correct air pressure.
	Drive wheels slipping.	Reduce down force on unit down force spring.
	Wrong sprockets.	Check charts for correct sprocket combinations.
Seed spacing not as indicated in charts.	Wrong tire pressure.	Inflate tires to correct air pressure.
	Inconsistent seed size.	—
	Wrong sprockets.	Check chart for correct sprocket combination.
	Charts are approximate.	—
Scattering of seeds.	Planting too fast.	Reduce planting speed.
	Seed tube improperly installed.	Check seed tube.
Seed tubes or openers plugging.	Allowing planter to roll backward when lowering.	Lower planter only when tractor is moving forward.
	Turning tractor steering wheel (Four Wheel Drive tractors only) when planter is down and stationary.	Avoid turning tractor steering wheel when planter is lowered and stationary.
Inconsistent seed depth.	Rough seed bed.	Use down pressure springs on planting units.
		Reduce planting speed.
	Partially plugged seed tube.	Inspect and clean.
	Seed tube improperly installed.	Install properly. Be certain seed tube hook is secured in shank.
One row not planting seed.	Foreign material in seed hopper.	Check seed hopper.
	Seed hopper empty.	Fill seed hopper.
	Planting unit drive chain off of sprocket or broken.	Check drive chain.

Continued on next page

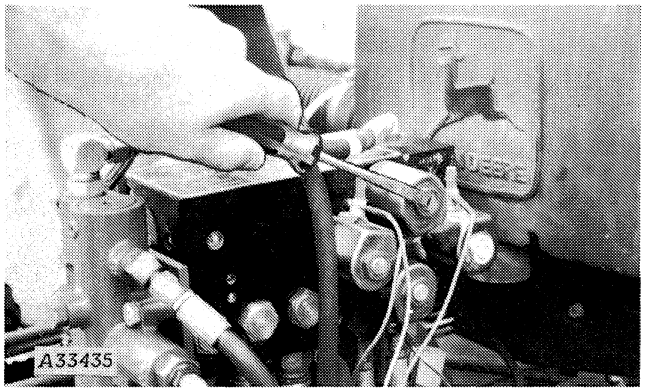
Symptom	Problem	Solution
	Drive not functioning.	Inspect all drives.
Too many skips.	Obstruction or foreign material in seed metering unit.	Empty hopper and check metering unit for obstruction.
	Loose finger holder.	Adjust tension of finger pickup.
	Broken finger.	Replace finger.
	Planting too slowly.	See charts for correct speed.
Too many doubles.	Planting too fast.	See charts for correct speed.
	Loose finger holder.	Adjust tension of finger pickup.
	Worn brush in finger pickup.	Replace brush.

B21,7TS,Y -19-28JUN90

CHECKING SOLENOIDS

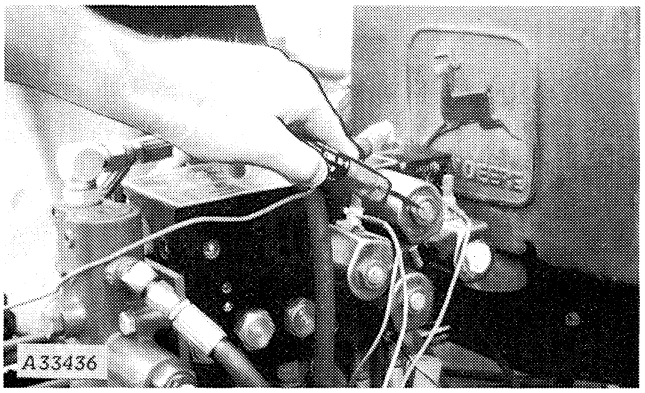
Place a small steel screwdriver, or the threaded stud of the valve cover knob, close to the solenoid stud. If the coil is drawing current, a slight pull will be felt on the screwdriver when the proper switch is pushed on the control console.

If no magnetic pull is felt, check to see if solenoid is receiving voltage. To check the solenoid for voltage:



B21,7TS,F -19-28JUN90

Connect clip end of voltage probe (similar to the one shown at right) to the valve block ground screw and touch the probe to the solenoid stud as shown. The light on the probe shculd come on when the proper switch is pushed on the control console.



A33436 -UN-12OCT88

If the light on the probe does not come on, this could indicate a break in the planter harness. See your John Deere dealer.

If the light on the probe comes on, this indicates that the solenoid is receiving voltage from the control console but the solenoid is not drawing current. This could be caused by either:

1. Defective solenoid.

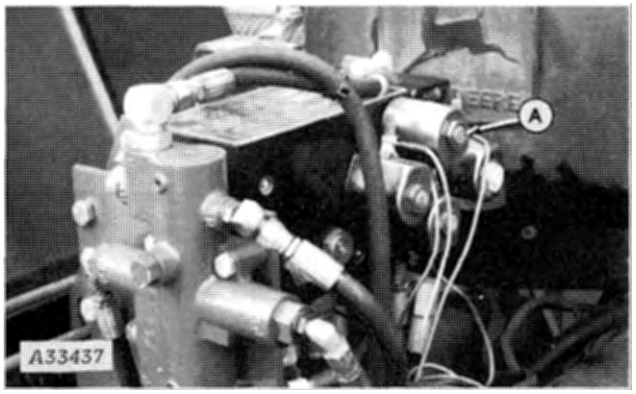
2. Lack of contact between valve threads and valve block, or:

3. Lack of contact between the coil and the valve stud.

To check for a defective solenoid, proceed as follows:

B21,7TS,G -19-28JUN90

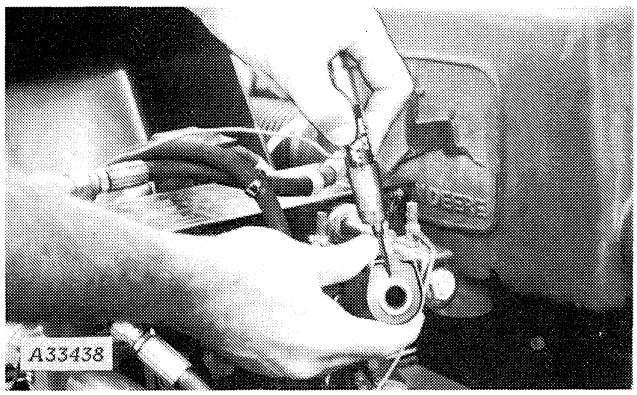
Remove nut (A) and cover from solenoid.



A33437 -UN-12OCT88

B21,7TS,H -19-28JUN90

Lift solenoid from valve. Place probe on metal ring on solenoid and clip end of probe to ground. If the light does not come on, the solenoid is defective. If the light does come on and the function still does not work, the solenoid may not be making contact with the valve block. See "CHECKING VALVES" in this section.



A33438 -UN-12OCT88

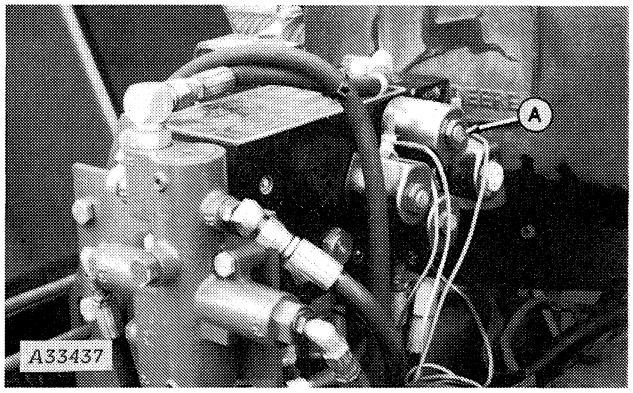
B21,7TS,I -19-28JUN90

CHECKING VALVES

Foreign material can work its way into the valves and cause them to stick open or closed. To check valves, proceed as follows:

CAUTION: To avoid injury from escaping hydraulic oil under pressure, relieve the pressure from the system. To relieve hydraulic pressure, turn the tractor engine off and turn the key to the ON position. Move the SCV lever back and forth while pressing the switch on the control console to all positions.

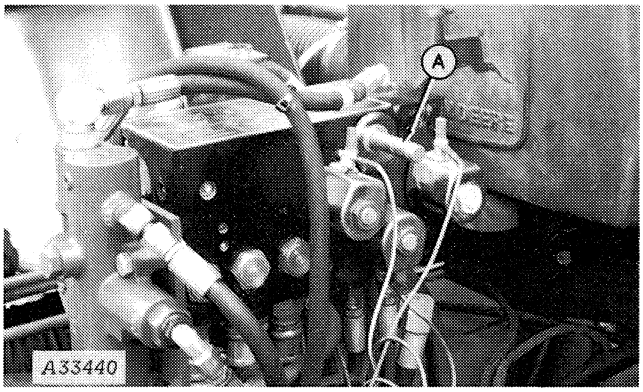
Remove nut (A) and cover from solenoid.



-UN-12OCT88 A33437

B21,7TS,J -19-28JUN90

Remove metal washer (A) from valve.

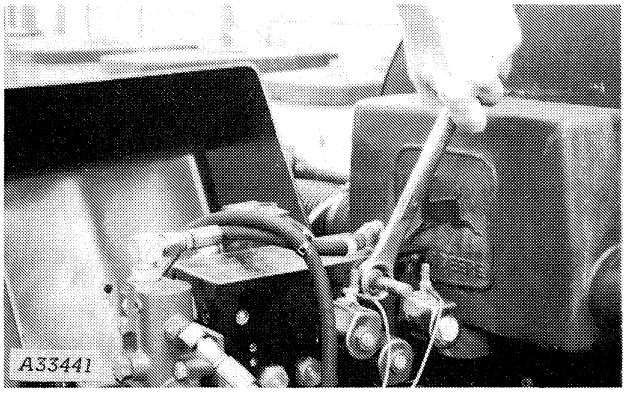


-UN-12OCT88 A33440

B21,7TS,K -19-28JUN90

CAUTION: Lower planter and relieve hydraulic pressure before removing valve.

Remove valve slowly.



-UN-12OCT88 A33441

B21,7TS,L -19-28JUN90

(Not Illustrated) Place valve in solvent and press poppet inside of valve back and forth to dislodge any foreign material from the valve.

Inspect the threads on both ends of the valve for rust or oxidation. Use a wire brush to clean the threads.

Install the valve in the valve block, replace metal washer, solenoid, thin washers (if any), cover and nut. If the problem still persists, replace the valve.

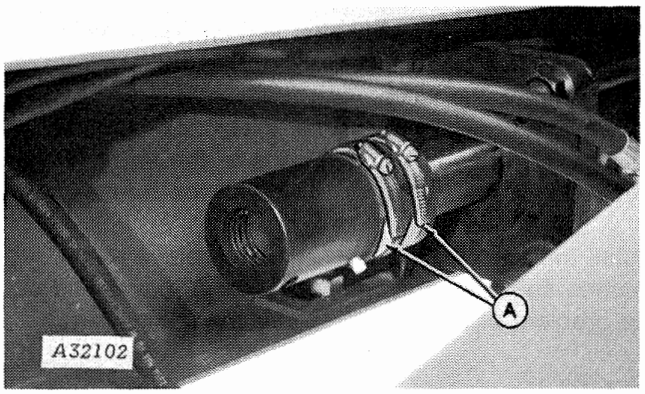
B21,13TS,O -19-28JUN90

BLEEDING THE HYDRAULIC LIFT SYSTEM

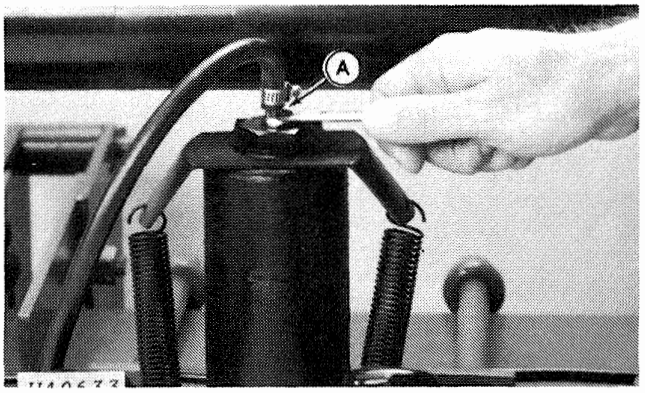
Unfold the planter, raise and lower it several times to help force trapped air toward the tractor or wheel module cylinders.

Lower the planter on level ground, remove clamps and collars (A) from front of master cylinder.

With the collars removed, the wheel modules can then be bled by one or two persons. If only one person is bleeding the wheel modules, proceed as follows:



A32102 -UN-13OCT88



H40633 -UN-05MAY89

CAUTION: When bleeding the wheel modules, open the bleeder valve slowly to prevent injury from hydraulic oil, or from sudden wheel movement.

If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result.

With planter in raised position and tractor engine shut off, place remote cylinder operating lever in neutral, install bleeder hose (B) on bleeder valve. Bleed trapped air from each wheel module cylinder (alternating sides of planter), allowing planter to lower and oil to flow until it is free of air float. Repeat as required.

IMPORTANT: Be certain to alternate sides of planter when bleeding wheel module cylinders to prevent row units from dragging sideways on the ground.

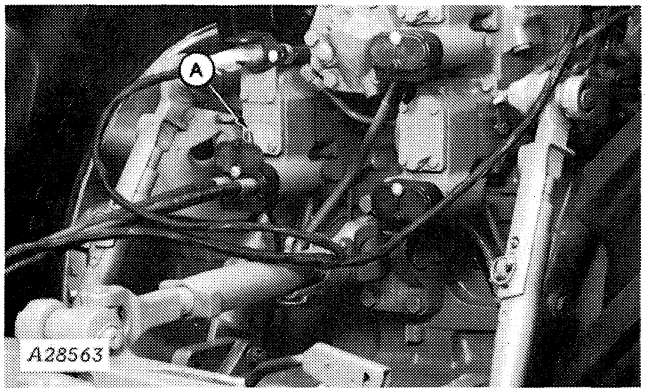
The wheel modules on each end of the planter have a large plug fitting. Do not loosen this fitting, only the bleeder valve.

When all the trapped air has been removed from the wheel modules, fully raise the planter and hold the remote cylinder operating lever rearward approximately five seconds. Lower the planter and replace the collars.

B21,5TS,A -19-28JUN90

If two people are bleeding the system, proceed as follows:

Move the remote cylinder flow valve lever (A) to the "tortoise" position.



B05,13TS,Q -19-28JUN90

Throttle back to 1500 rpm or less.

Raise the planter and hold the remote cylinder operating lever rearward.

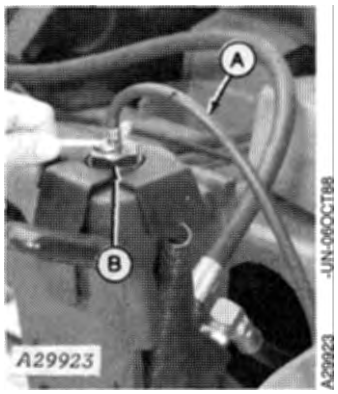


B05,13TS,R -19-28JUN90

CAUTION: When bleeding the wheel modules, open the bleeder valve slowly to prevent injury from hydraulic oil, or from sudden wheel movement.

Have second person install bleeder hose (A) on bleeder valve. Bleed trapped air from each wheel module cylinder until oil is free of foam.

The wheel modules on each end of the planter have a large plug fitting (B). Do not loosen this fitting; only the bleeder valve.



B21,7TS,O -19-28JUN90

If the oil is caught in a clean container and is not contaminated, it can be poured back into the tractor. However, if the oil is quite foamy, allow it to stand until the air is gone before putting it back into the tractor.

Check the oil in the tractor and add as necessary.

Move the remote cylinder control valve lever back to the "HARE" position.

Raise, fold, unfold and lower the planter several times.

Recheck the wheel modules to be sure you have removed all trapped air and foam from the lift system.

Replace the collars on the master cylinder.

B21,7TS,P -19-28JUN90

FILLING MARKER HYDRAULIC CYLINDERS

CAUTION: Before operating, be sure cylinders and attaching hoses are fully charged with oil. Failure to do so will allow markers to fall rapidly when attempting to lower from transport position.

After servicing planter, always cycle cylinders with marker transport locks still in place. This will fill hydraulic marker cylinders with oil and prevent markers from falling when marker transport locks are removed.

B21,5TS,D -19-28JUN90

GENERAL PURPOSE GREASE

John Deere Multipurpose Grease is recommended in all grease fittings at hourly intervals indicated on the symbols.

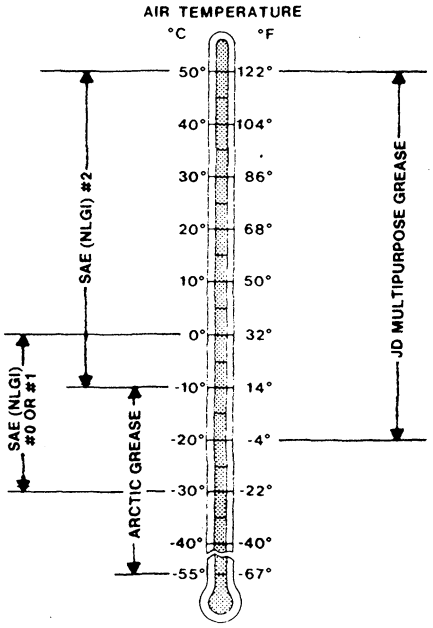
Depending upon the expected air temperature range during the service interval, use grease as shown on the adjoining temperature chart.

John Deere Multipurpose Grease is recommended. If other greases are used, use:

- SAE Multipurpose Grease.
- SAE Multipurpose Grease containing 3 to 5 per cent molybdenum disulfide.

At temperatures below -30°C (-22°F), use arctic greases such as those meeting Military Specification MIL-G10924C.

NOTE: All hourly intervals can be doubled if SAE Multipurpose Grease containing 3 to 5 per cent molybdenum disulfide is used.



B04,14LU,A -19-28JUN90

HIGH TEMPERATURE/EXTREME PRESSURE GREASE

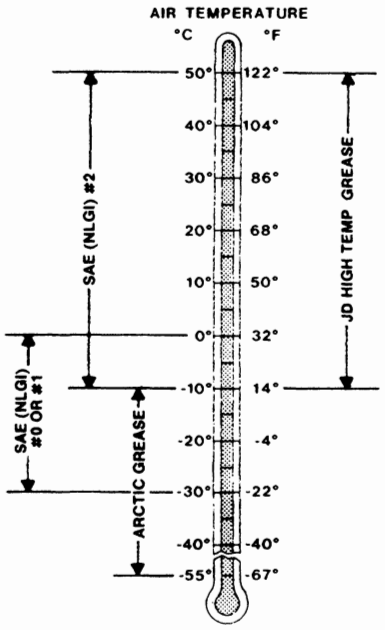
Depending upon the expected air temperature range during the service interval, use grease as shown on the adjoining temperature chart.

John Deere High Temperature/Extreme Pressure Grease is recommended.

If other greases are used, they must be greases meeting SAE Multipurpose High Temperature Grease with Extreme Pressure (EP) Performance and capable of operating at compartment temperatures above 150°C (302°F).

At temperatures below -30°C (-22°F), use Arctic greases such as those meeting Military Specification MIL-G-10924C.

NOTE: Repack wheel bearings once a year with wheel bearing grease.



X9328 -19-01DEC88

B04,14LU,B -19-28JUN90

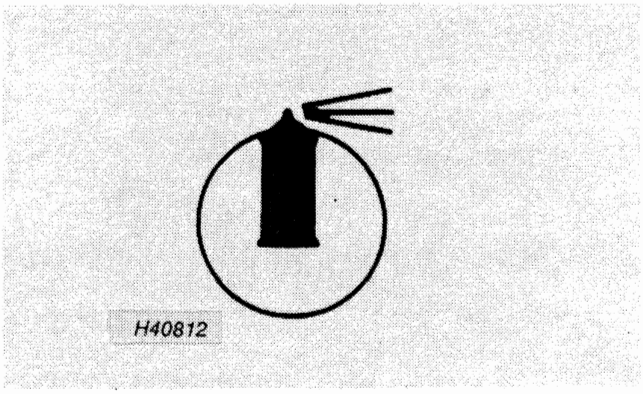
Lubricate with grease at hourly interval indicated on symbol.

Pack wheel bearings with axle bearing grease at hourly interval indicated on symbol.

Lubricate with SAE 10W oil at hourly interval indicated on the symbol.

N04,655N,C -19-27APR90

Lubricate with John Deere TY6350 Multipurpose spray lube as required.



H40812 -UN-20APR89

B21,3LU,B -19-28JUN90

ROLLER CHAIN AND PESTICIDE GEAR LUBRICATION

The most effective roller chain lubrication routine varies, depending on the environmental conditions and/or condition of the chain. The goal is to maintain complete freedom at every chain link joint.

Lubricate all planter roller chains with John Deere Multipurpose Spray Lube, TY6350 (or equivalent) at intervals sufficient to maintain free chain movement.

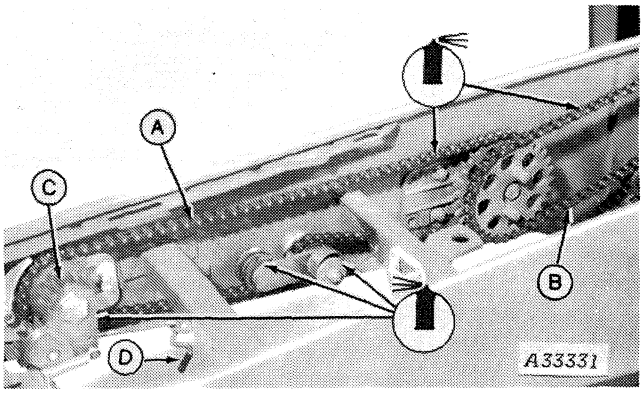
When roller chains remain unused for several days, moisture in the air will accumulate on the chain, causing the chain to rust. This can and will become serious enough in time to cause the chain joints to become stiff, restricting their normal free movement. While very difficult to detect, this stiffness can disturb the smooth rotation of seed meter components and cause a deterioration in performance.

If the planter is not to be used for several days, thoroughly lubricate the chains with John Deere Multipurpose Spray Lube, TY6350, at the beginning of the idle period. If the roller chains have become rusty or stiff during the idle period, lubricate prior to continued usage and operate or "work" the chains sufficiently to ensure all chain joints move freely before normal planter operation is resumed.

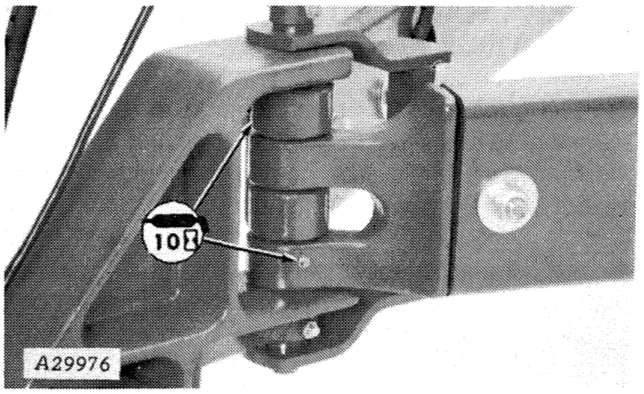
Lubricate pesticide drive chain (A) and seed meter drive chain (B) with John Deere Multipurpose Spray Lube, TY6350.

Lubricate pesticide drive gears (C) with John Deere Multipurpose Spray Lube, TY6350. Move the drive disconnect handle (D) back and forth while spraying. This will loosen any paint or dirt buildup and help allow the gears to turn freely. In adverse conditions it may be necessary to lubricate these gears daily.

IMPORTANT: Do not use chain lube or any other heavy petroleum base lubricant that may cause a buildup of dust or dirt in the sprocket or gear teeth.



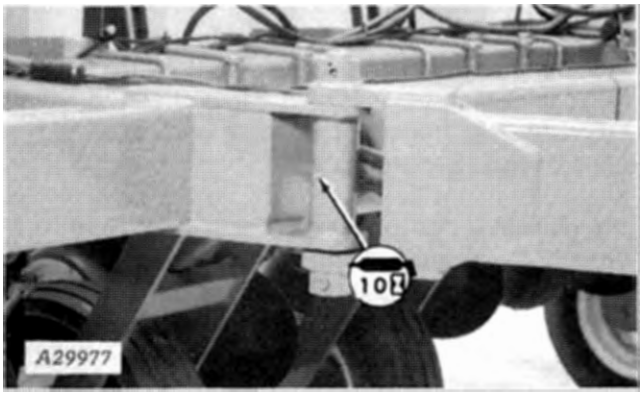
B21,3LU,C -19-28JUN90



Hitch

-UN-06OCT88 A29976

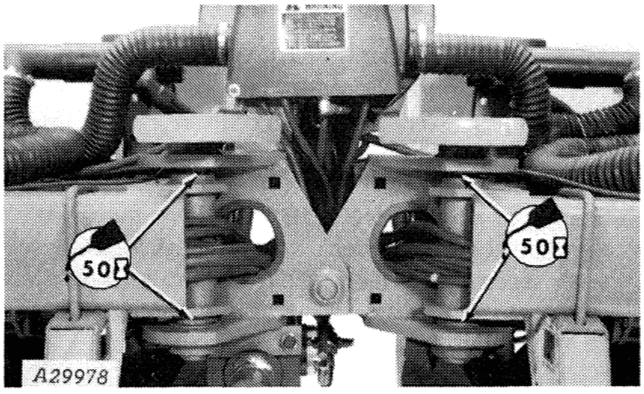
B21,7LU,B -19-28JUN90



Drawbar Pin

-UN-06OCT88 A29977

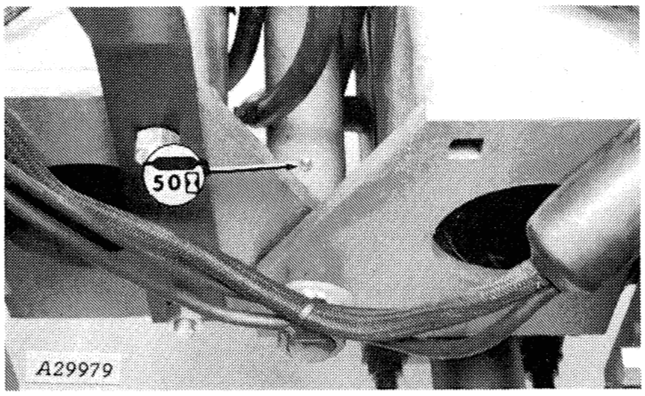
B21,7LU,C -19-28JUN90



Pivot Pins

-UN-06OCT88 A29978

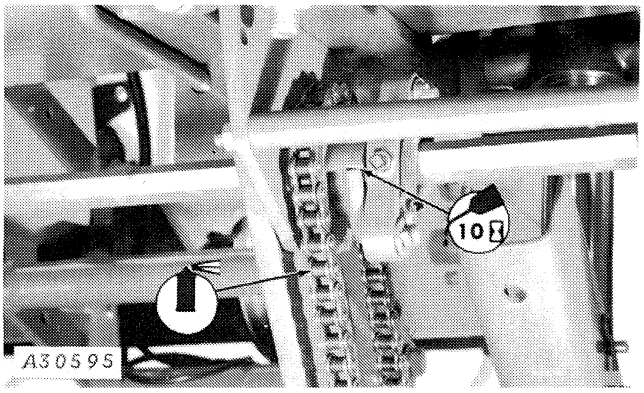
B21,7LU,D -19-28JUN90



Hinge Pin

-UN-06OCT88 A29979

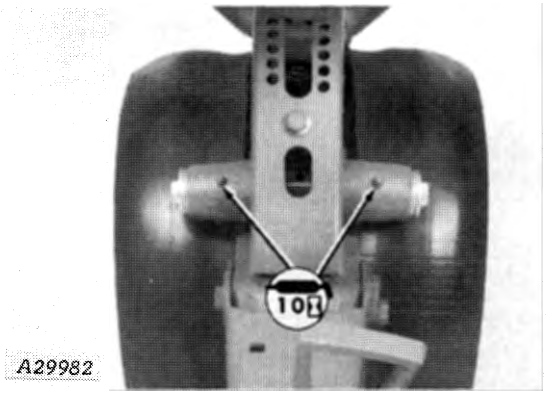
B21,7LU,E -19-28JUN90



-UN-12OCT88 A30595

Drive Wheel

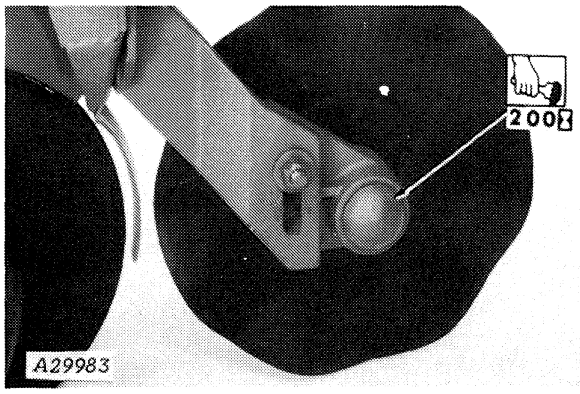
B21,7LU,G -19-28JUN90



-UN-06OCT88 A29982

Gauge Wheels

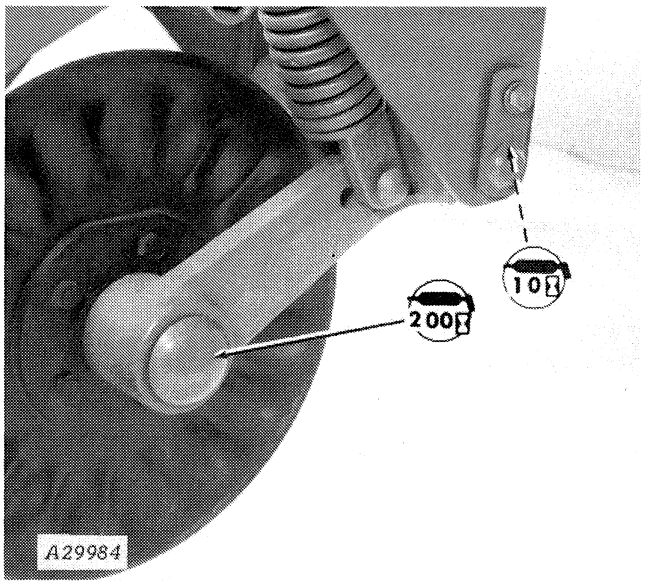
B21,7LU,H -19-28JUN90



-UN-06OCT88 A29983

Unit Mounted Coulter

B21,7LU,I -19-28JUN90

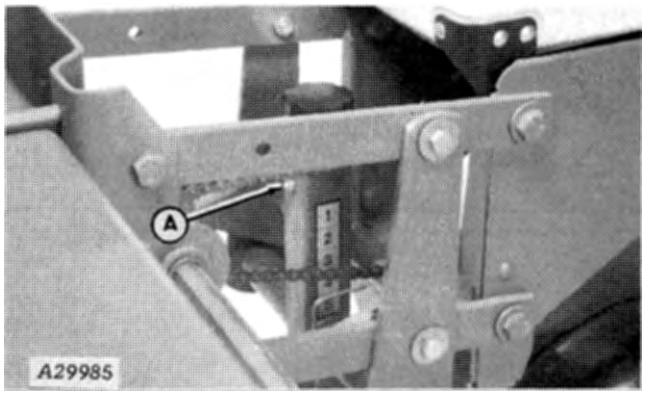


A29984 -UN-06OCT88

Frame Mounted Coulter

B21,7LU,J -19-28JUN90

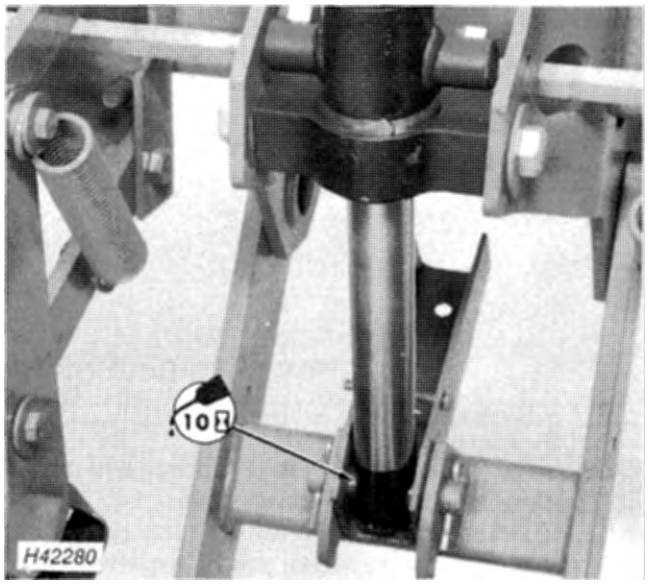
A—Lubricate at beginning and end of planting season with John Deere Multi-Purpose Lubricant or an equivalent SAE multi-purpose-type grease.



A29985 -UN-11OCT88

Tillage Support Bracket

B21,7LU,K -19-28JUN90

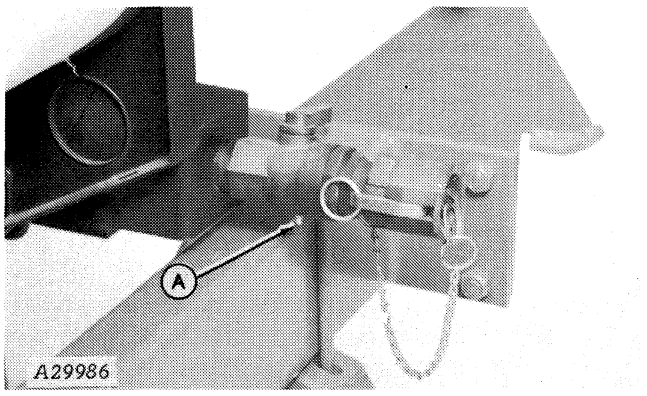


H42280 -UN-18JUN90

Wheel Cylinder Pin

B21,7LU,M -19-28JUN90

A—Lubricate at beginning and end of planting season with John Deere Multi-Purpose Lubricant or an equivalent SAE multi-purpose-type grease.

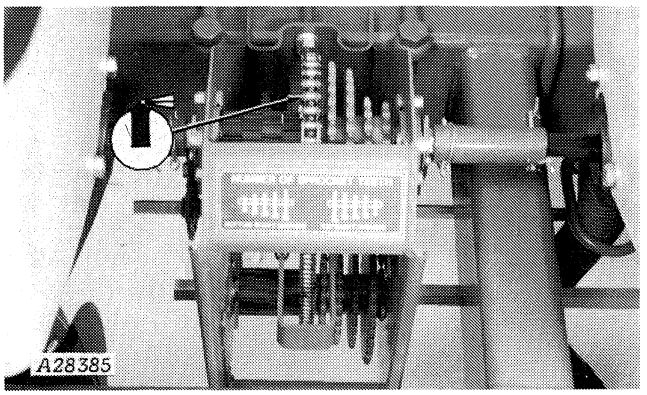


A29986 -UN-06OCT88

*Shut-Off Valves**

**Liquid Fertilizer Attachment Illustrated*

B21,7LU,L -19-28JUN90

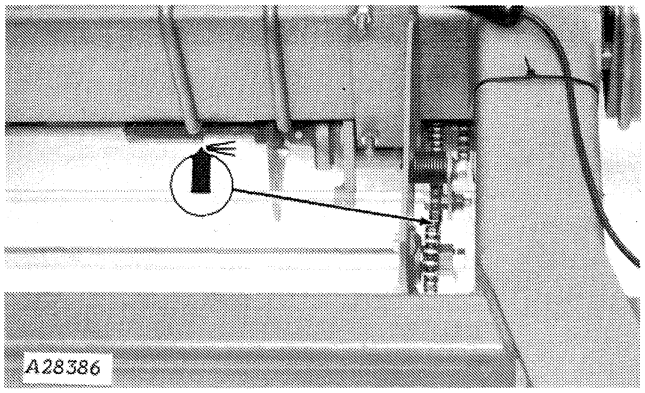


A28385 -UN-13OCT88

*Fertilizer Transmission**

**Dry Fertilizer Attachment Illustrated*

B05,13LU,K -19-28JUN90

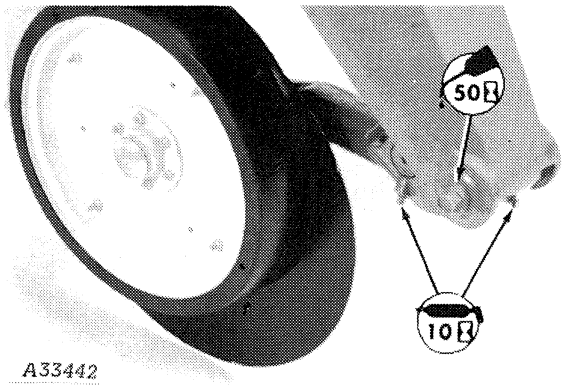


-UN-13OCT88
A28386

Fertilizer Drive Chain (Right-Hand Side)

B05,13LU,L -19-28JUN90

NOTE: Grease lower pivot pins (2 places) and arm pivot every ten hours. Oil lower spring pivot pins every 50 hours and at the beginning and end of each season. Oil will prevent top of pin from rusting.



-UN-12OCT88
A33442

Single-Disk Fertilizer Opener

B21,1LU,E -19-28JUN90

ALTERNATIVE LUBRICANTS

Conditions in certain geographical areas may require special lubricants and lubrication practices which do not appear in this operator's manual. If you have any questions, consult your John Deere dealer to obtain the latest information and recommendations.

B04,14LU,C -19-28JUN90

SPECIAL LUBRICANTS FOR VACUUM SEED METERS

Seed treatments can cause a deterioration in seed singulation, spacing accuracy, and seed flow into the vacuum seed meter. To minimize the effect seed treatments may have on vacuum meter performance, A51237 Talc lubricant should be used whenever treated seed is being planted.

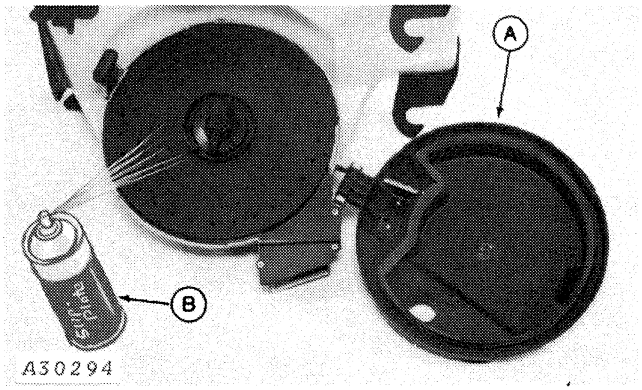
Spread 1/2 cup of talc over the top of each hopper full of seeds to be planted. Adjust this rate as necessary so all seeds become coated with talc, while avoiding an accumulation of talc settling in the bottom of the seed hopper.

For small seed sizes, seed types with excessive treatment, or for humid planting environments (all commonly associated with cotton or sorghum planting), increasing the rate to one cup per hopper full of seed and mixing thoroughly may be required.

NOTE: Using talc with liquid hopper applied seed treatments which leave a wet coating on the seed is not recommended.

B22,9LU,C -19-28JUN90

If vacuum seal (A) is replaced, spray seed disk with Slip Plate (B). Order TY6431 from your John Deere dealer.



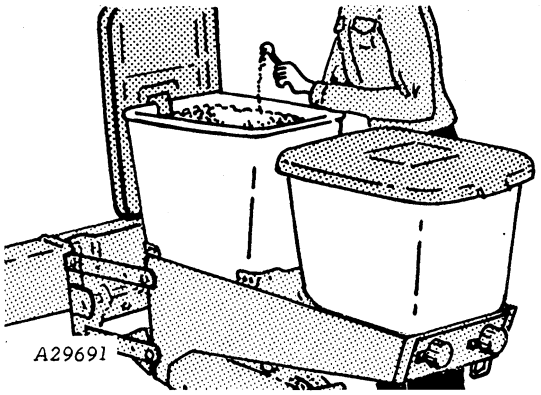
B22,9LU,B -19-28JUN90

(FINGER PICKUP AND PLATE METERS ONLY)

IMPORTANT: Sprinkle a teaspoon of powdered graphite (part No. B33379) each day.

The graphite will filter down into the finger pickup mechanism or hopper bottom and insure proper lubrication. John Deere Graphite provides a dry lubrication. Some types have an oil base and will form a gummy residue on parts. The graphite does not eliminate the need for proper and regular lubrication indicated in the lubrication charts.

NOTE: Any additives other than John Deere powdered graphite in finger pickup units may leave residue on parts that could affect planting rates.



A29691 -UN-13OCT88

B22,8LU,A -19-28JUN90

PRACTICE SAFE MAINTENANCE

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

Never lubricate or service 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.

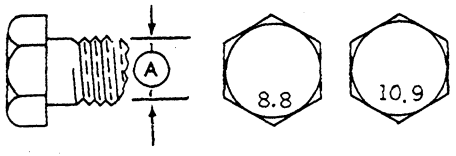
Disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.



TS218 -UN-23AUG88

DX,SERV -19-04JUN90

BOLT TORQUE (METRIC)



Tighten all bolts to the torques specified in the chart. Keep bolts tight at all times. Loose bolts can cause breakage of parts.

Check the tightness of bolts periodically and keep them tightened to specified torques. When bolts are replaced, be sure they are replaced with bolts of equal strength.

Metric bolts furnished with the planter are identified by 8.8 or 10.9 on the head. Metric nuts may be identified by 8 or 10 stamped on the top or bottom of the nut.

NOTE: Bolts having lock nuts with plated and wax finish should be tightened to approximately 50 per cent of amounts shown in chart.

Bolt Diameter "A"	Wrench Size Metric	8.8 N·m	8.8 (Lb-Ft)	10.9 N·m	10.9 (Lb-Ft)
5 mm	8 mm	6.5	(5)	9.2	(7)
6 mm	10 mm	11.1	(8)	15.6	(12)
8 mm	13 mm	27	(20)	38	(30)
10 mm	16 mm	53	(39)	75	(55)
12 mm	18 mm	93	(70)	130	(96)
16 mm	24 mm	230	(170)	325	(238)
20 mm	30 mm	450	(332)	635	(468)
24 mm	36 mm	780	(575)	1100	(811)
30 mm	46 mm	1550	(1143)	2180	(1608)
36 mm	55 mm	2710	(1999)	3810	(2810)

A28608

-19-18JAN89

A28608

CAUTION: Use only metric tools on metric hardware. Other tools may not fit properly. They may slip and cause injury.

B05,13SE,C -19-28JUN90

INSTALL SERVICE LOCKS

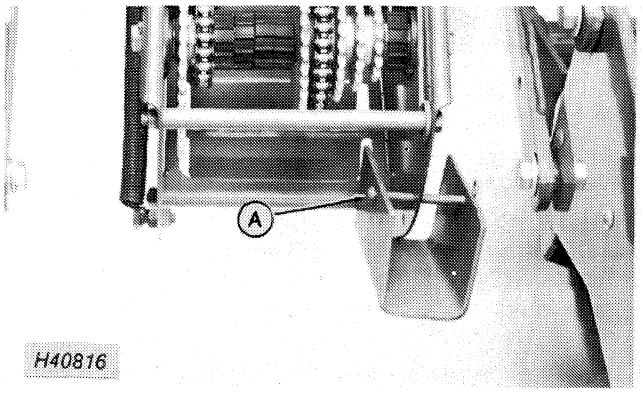
CAUTION: Always install service locks when working around or near the planter.

Remove wing-frame wheel service locks (A) from storage on seed transmission and install on cylinder as illustrated.

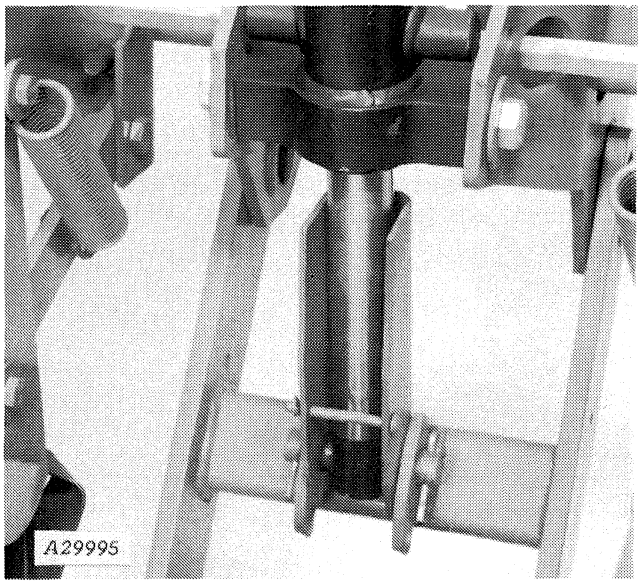
Pivot service locks into position and secure with drilled pin and spring locking pin.

Service locks should not be used while transporting planter since they lock out the hydraulic suspension system.

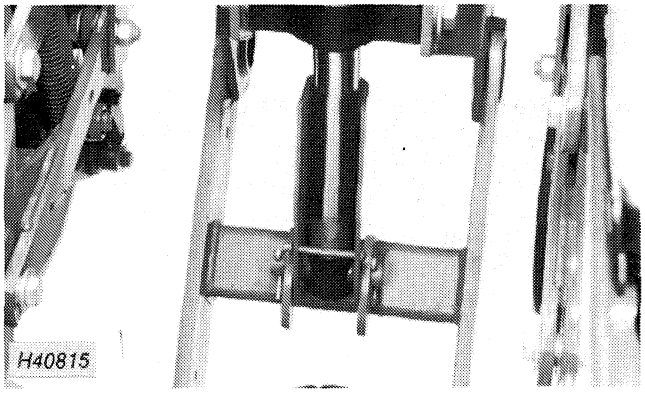
NOTE: Service stops are provided for added safety when performing normal maintenance and adjustments with the planter raised. They are not transport stops. The planter hydraulic system requires that the wheels float up and down in transport to properly distribute frame weight to the individual wheel modules.



H40816 -UN-25APR89



A29995 -UN-06OCT88



H40815 -UN-25APR89

B21,7SE,A -19-28JUN90

SERVICE TIRES SAFELY

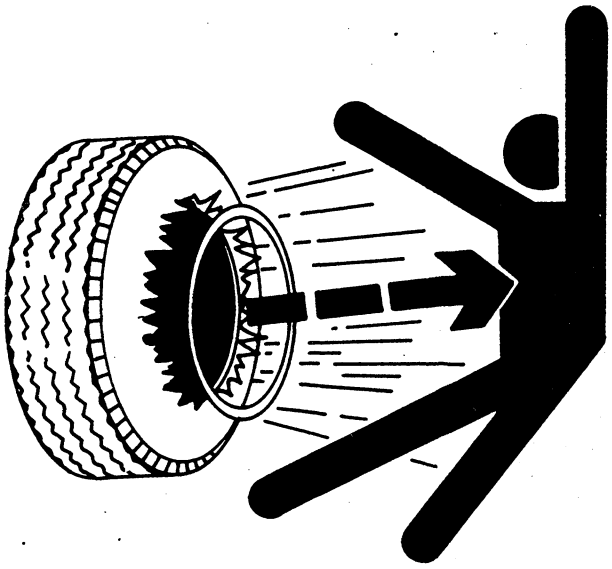
CAUTION: Explosive separation of a tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job. Have it done by your John Deere dealer or a qualified repair service.

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

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.

Inspect tires and wheels daily. Do not operate with low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.



TS211 -UN-23AUG88

B21,1SA,C -19-28JUN90

HYDRAULIC LINE FILTERS MAINTENANCE

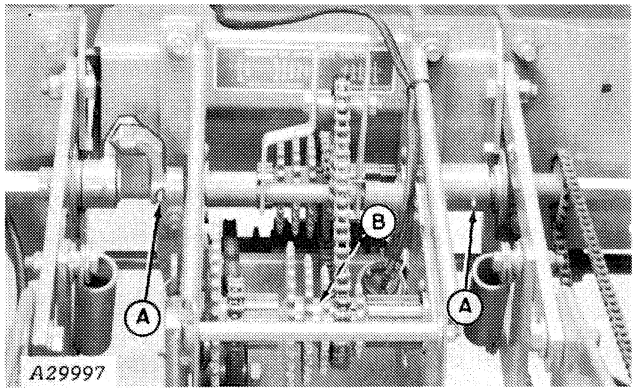
Your master cylinder contains line filters in the cylinder ports.

Remove and clean these filters once a year. After cleaning, use the following instructions to reinstall the line filters.

Assemble line filters into all ports using snap ring pliers, being careful not to damage filters. The filters must bottom out inside ports.

B05,13SE,F -19-28JUN90

DRILL SHAFT COTTER PINS



-UN-12OCT88 A29997

The cotter shear pins (A), which connect the drill shaft to the transmission, will shear when an excessive load is put on the drill shaft.

NOTE: If drill shaft binds due to misalignment, loosen bolts on drill shaft bearings on planting units. Make certain shaft turns freely, then tighten bolts.

Cotter shear pins may also become deformed through normal usage after extended use. In this condition, it is possible for the cotter pin to eventually fail without a planter malfunction. Infrequent or improper lubrication causes "binding" of moving parts within the planter. This "binding" will cause the cotter shear pins to shear, thus preventing breakage of planter parts.

If either cotter pin shears, turn the drill shaft by hand to locate where the "binding" is occurring. When the drill shaft can be turned freely by hand, replace the cotter pin.

NOTE: Replace the cotter shear pins only with cotter shear pins of the same size. Do not replace with other type pins. Extra shear pins for countershaft are located on the inside rear of seed transmission at (B).

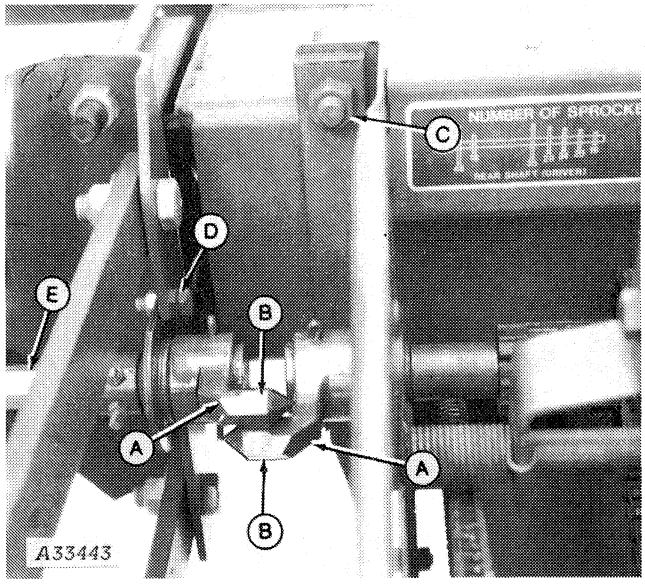
B21,7SE,B -19-28JUN90

If repeated cotter pin shearing occurs, it may be necessary to align couplers (A). The FLAT surfaces (B) on the SIDES of the couplers should be touching and in alignment. To align couplers, proceed as follows:

Completely unfold and lower the planter to the ground.

Loosen bolts (C) on the seed drive transmission.

Move the transmission laterally to align the FLAT surfaces (B).

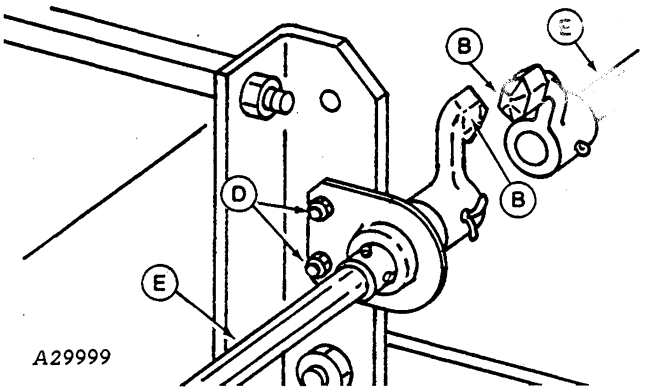


-UN-12OCT88 A33443

B21,7SE,C -19-28JUN90

Loosen bolts (D) and align shafts (E).

After maximum alignment is obtained on surfaces (B) and shafts are in alignment, tighten the transmission mounting bolts (C).

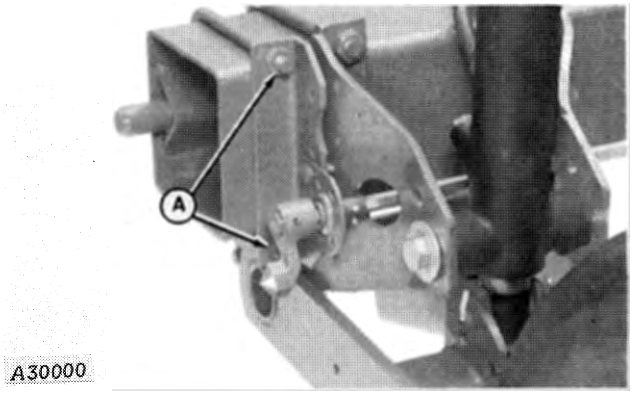


B21,7SE,D -19-28JUN90

On 8-Row, 97 cm (38 in.) spacing planter, loosen the bolts on the left-hand wing frame bearing bracket (A). Adjust the bracket until the couplers are aligned and torque the bracket bolts.

NOTE: If the transmission is moved, it will be necessary to check the connecting shafts and drives going to and from the transmission. The countershaft that is driven from the planter wing wheels must also be checked. Loosen the set screws on the ratchet assembly to allow the shaft to move.

The clutch throwout linkage must also be checked for alignment. If fertilizer is being used (liquid or dry), check the alignment of the drive chain coming from the main transmission.

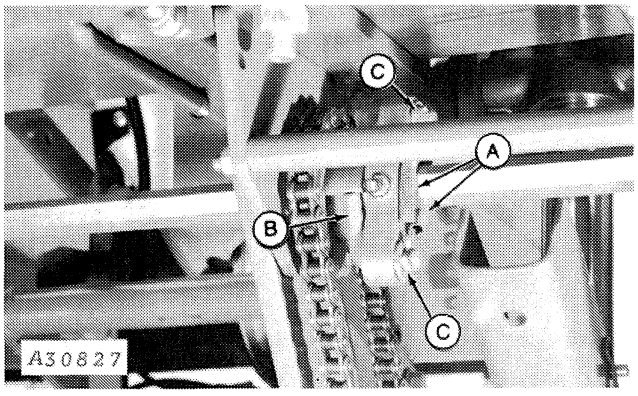


B21,7SE,E -19-28JUN90

RATCHET DRIVE

The ratchet assembly must operate freely and the spring (A) must bring the dogs (B) back against the ratchet.

If the springs do not bring the dogs back against the ratchet, push the cotter pins (C) all the way in and re-spread the cotter pins to put more tension on the springs.



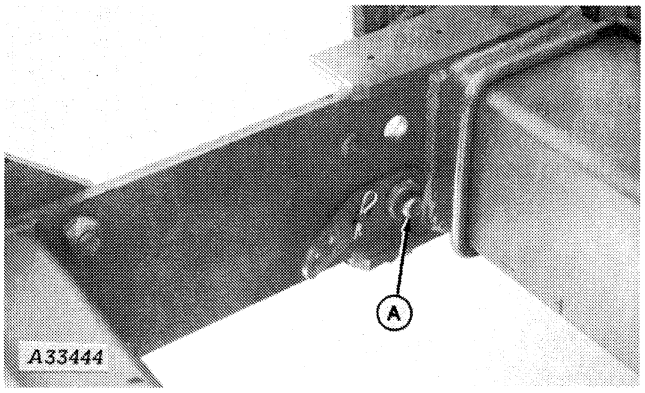
B21,7SE,BD -19-28JUN90

MARKER BREAKAWAY BOLT

The marker breakaway bolt (A) provides breakaway protection when the marker hits an obstacle.

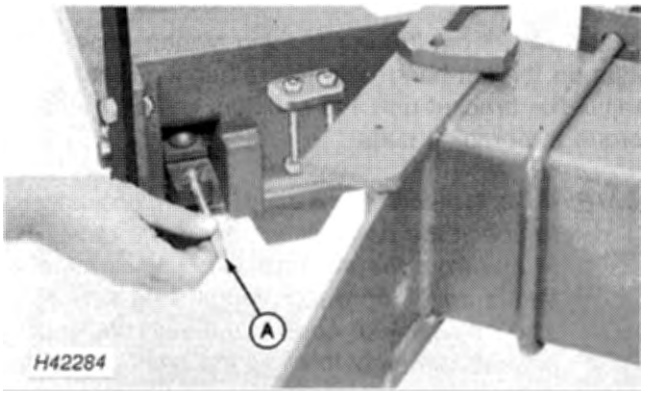
To replace the breakaway bolt, proceed as follows:

NOTE: Extra shear bolts are located on the inside of each marker frame.



B21,7SE,F -19-28JUN90

Replace broken breakaway bolt with M10 x 100 grade 8.8 bolt (A). Position new bolt in pivot as shown.

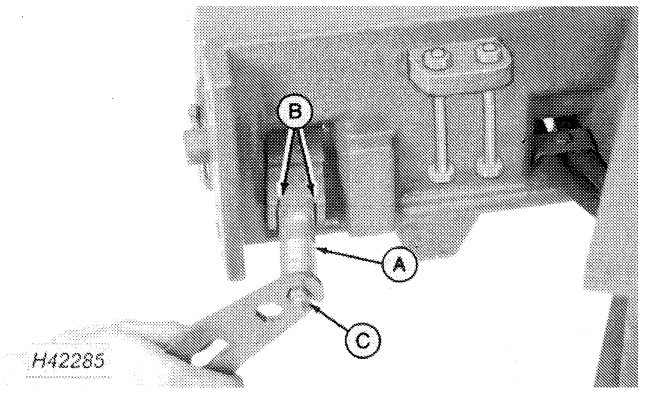


B21,3SE,D -19-13JUL90

Remove wrench (C) from storage position and remove nut securing large bolt (A) from frame. Install large bolt on breakaway bolt.

NOTE: Be certain flat sides (B) of A45294 bolt are in the slot in pivot.

Secure large bolt with M10 nuts.

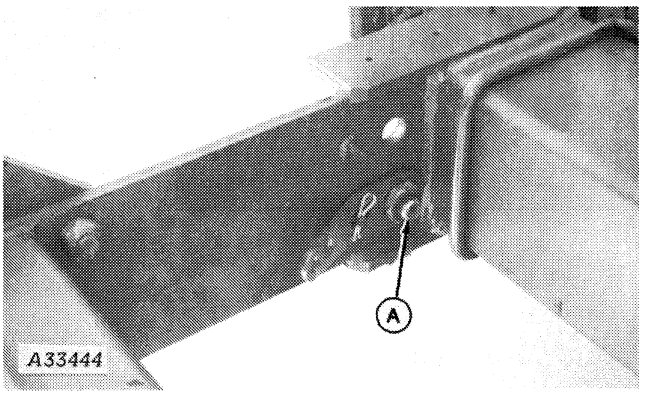


B21,3SE,B -19-13JUL90

Return marker arm to operating position and insert breakaway bolt through hole in planter frame.

Secure breakaway bolt (A) with M24 nut.

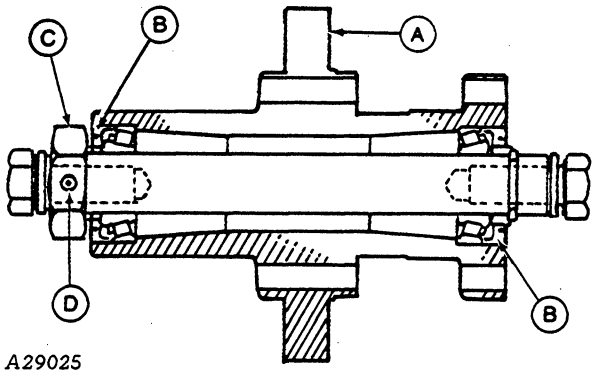
Secure wrench in storage position with spring locking pin.



B21,7SE,I -19-28JUN90

DRIVE WHEELS

Should the wheel hub (A) be disassembled for any reason, clean and repack the bearing with wheel bearing grease and assemble on the axle. Be careful not to damage seals (B). Install the special jam nut (C) on the axle shaft. While turning the hub, adjust the jam nut until a slight drag is felt. Once this drag is established, tighten the set screw (D) on the jam nut.



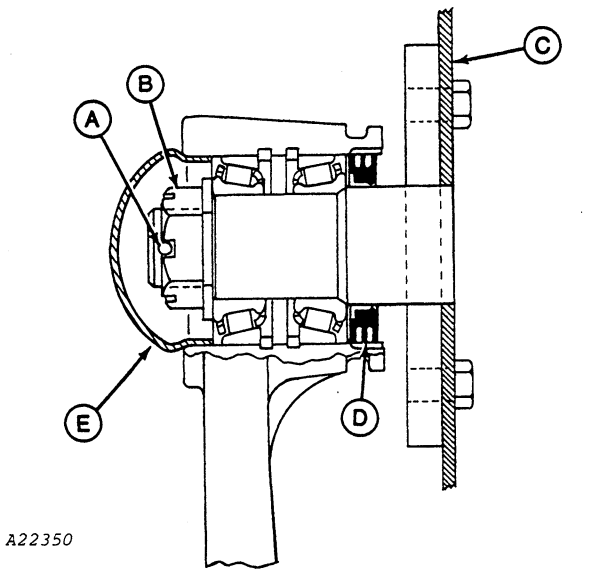
B21,1SE,H -19-28JUN90

COULTER MAINTENANCE

The anti-friction bearing has a face-type seal. The contact of the seal against a machined surface retains grease and excludes dirt. Unless the bearing is in proper adjustment, the seal is ineffective. If there is any looseness in the bearing, clamp coulter blade (C) in vise, disassemble, clean and repack with John Deere Multi-Purpose Lubricant or an equivalent SAE multipurpose-type grease. Tighten nut (B) until there is drag on the bearing.

NOTE: Apply .13 to .32 N·m(10 to 25 lb-in) of drag on the bearing. This drag assures positive sealing. Be sure to replace the cotter pin (A) in the slotted nut to lock the nut in position.

These anti-friction bearings are packed with grease at the factory. Every 100 hours, inspect the bearing and adjust it if necessary. Every 200 hours, or before each planting season, whichever comes first, disassemble the bearing, clean, and repack it as outlined above. Do not use chassis lubricant in anti-friction bearings.



A—Cotter Pin
B—Slotted Nut
C—Coulter Blade
D—Face Seal
E—Hub Cap

B05,13SE,BC -19-28JUN90

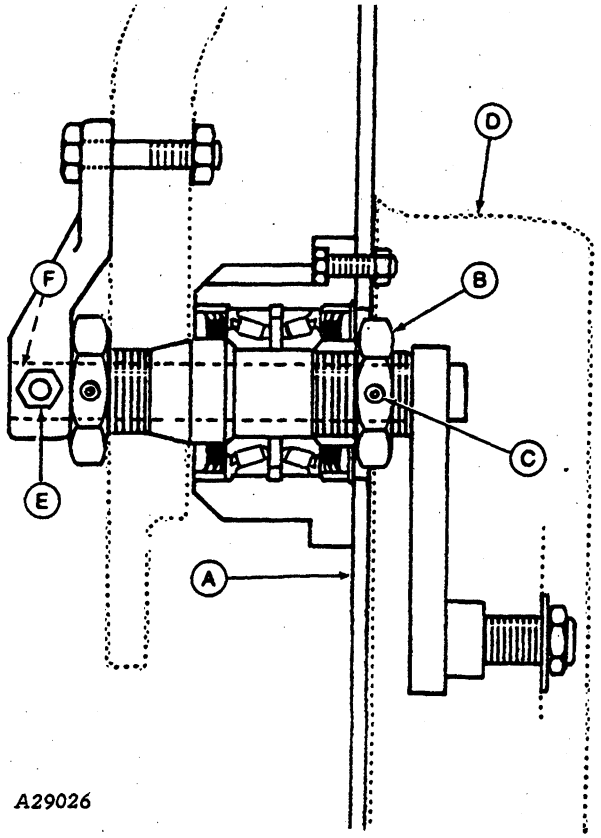
SINGLE-DISK FERTILIZER OPENER MAINTENANCE

The anti-friction bearing has a face-type seal. The contact of the seal against a machined surface retains grease and excludes dirt. Unless the bearing is in proper adjustment, the seal is ineffective. If there is any looseness in the bearing, remove wheel and axle (D) by removing shear bolt (E). Loosen set screw (C) and remove nut (B). Disassemble opener and clean and repack bearings with John Deere Multi-Purpose Lubricant or an equivalent SAE multipurpose-type grease. Tighten nut (B) until the proper seal drag is achieved.

NOTE: During re-assembly, tighten nut (B) until 1.6-2.8 N·m (14-25 lb-in) of torque is required to rotate the bearing housing and blade assembly (A). This drag assures positive sealing. Be sure to retighten set screw (C) when adjustment is complete. These anti-friction bearings are packed with grease at the factory. After the first 10 hours inspect the bearing and adjust if necessary.

Every 100 hours, inspect the bearing and adjust if necessary. Every 200 hours, or before each planting season, whichever comes first, disassemble the bearing, clean and repack it as outlined above. Do not use chassis lubricant in anti-friction bearings.

Lubricate surface of pin (F) that engages the spindle to prevent rusting and to keep depth adjustment working freely.

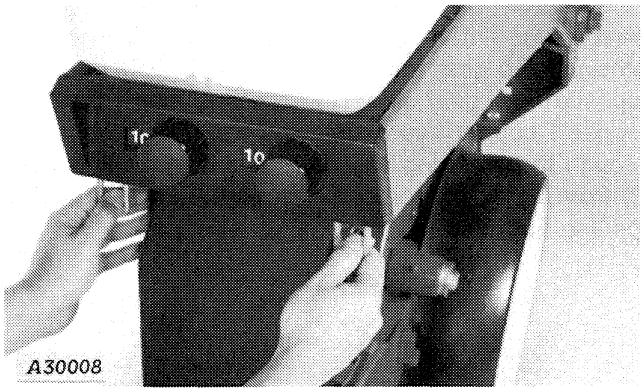


B21,1SE,I -19-28JUN90

CLEANING INSECTICIDE AND/OR HERBICIDE HOPPERS

CAUTION: Agricultural chemicals can be dangerous. Follow the instructions of the chemical manufacturer when cleaning hoppers and handling insecticides or herbicides.

IMPORTANT: Under certain humidity or moisture conditions, material may tend to cake. When this happens, thoroughly clean hoppers at the end of each day's use.



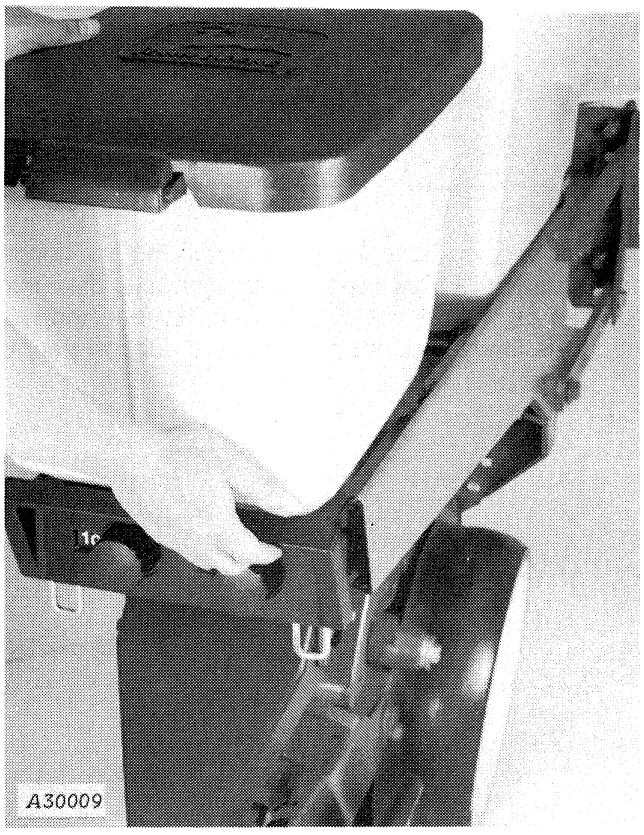
A30008 -UN-06OCT88

To remove hoppers, proceed as follows:

Rotate inner end of pin toward rear of planting unit.

B21,7SE,R -19-28JUN90

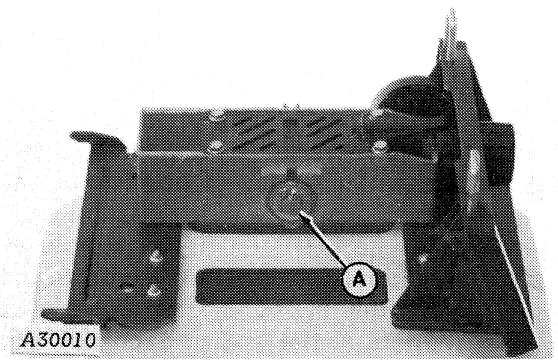
Pull straight back and up until front hopper support hits back of slot in support rail, then lift up to disengage hopper from panels.



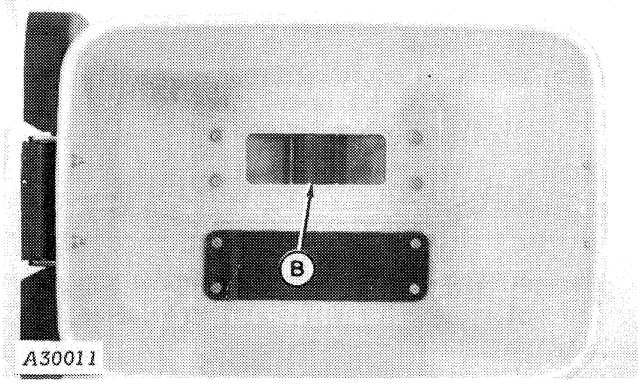
A30009 -UN-06OCT88

B21,7SE,S -19-28JUN90

Remove the fluted roller from the hopper by first removing the gear and then pull the shaft (A) out opposite from gear side. Remove one meter from the hopper if hopper has double meters. Pull the shaft through the metering assembly and remove fluted roller (B) from hopper. Thoroughly clean the hopper outlet opening and fluted roller.



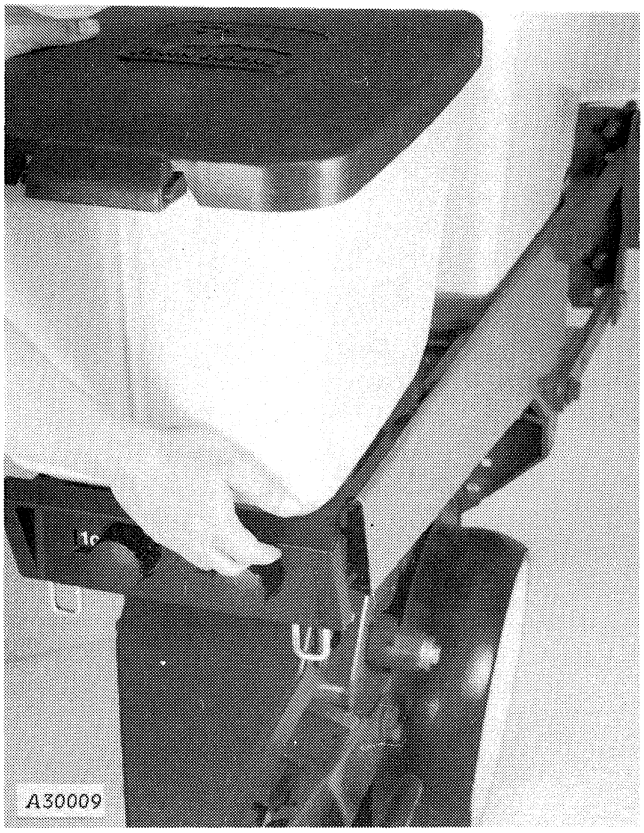
A30010 -UN-06OCT88



A30011 -UN-06OCT88

B21,7SE,T -19-28JUN90

Install hopper on hopper support by sliding the hopper forward until the front hopper support hooks drop into the slots on the hopper support and the rear hopper support is firmly seated on the hopper support panel.

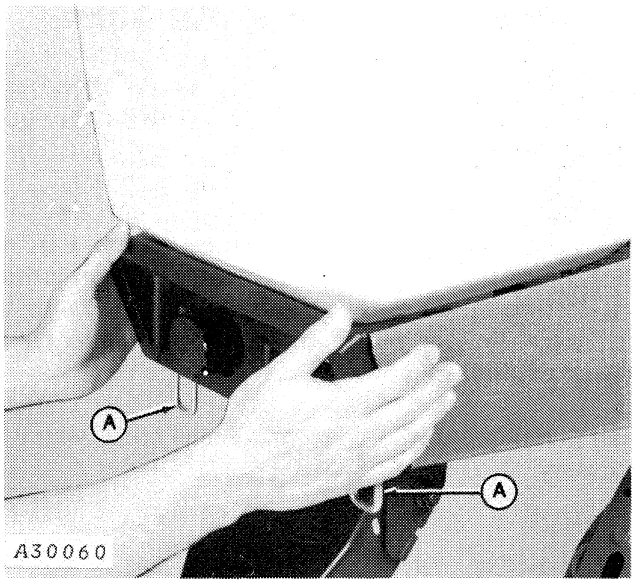


A30009 -UN-06OCT88

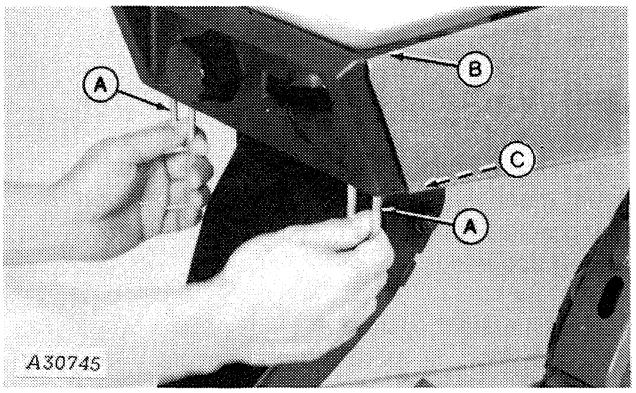
B21,1SE,AA -19-28JUN90

Push the hopper forward until it stops. Rotate the spring pins (A) inward slightly until pin "snaps" into place and locks hopper to unit at (B).

Do NOT attempt to install pin in support panel hole (C).



A30060 -UN-06OCT88

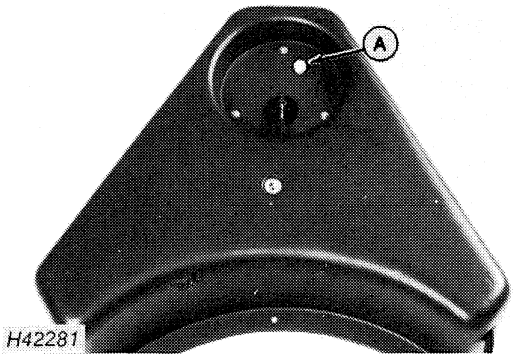


A30745 -UN-06OCT88

B21,1SE,AB -19-28JUN90

VACUUM GAUGE FILTER

The vacuum gauge filter (A) may become clogged with dust. Annually inspect vacuum gauge and, if needed, replace filter (part number A51781).



H42281 -UN-18JUN90

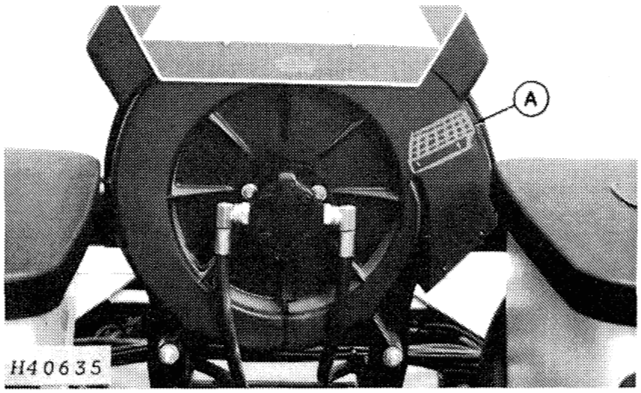
B22,9SE,AC -19-28JUN90

CLEAN VACUUM PUMP MOTOR GUARD

The vacuum pump guard (A) may become clogged with dust or seed inoculant/treatment. A clogged pump guard could cause loss of vacuum.

CAUTION: Agricultural chemicals can be dangerous. Improper selection or use can injure persons, animals, plants, soils or other property. BE SAFE: Handle and apply with care. Follow instructions of the chemical manufacturer.

Clean pump guard with a rag or a small brush when necessary.



-UN-20MAR89
H40635

B22,9SE,A -19-28JUN90

CLEAN VACUUM MANIFOLD SYSTEM

Dirt or seed inoculant/treatment may build up in vacuum manifold system and cause low vacuum at planting units. This could result in loss of seed metering accuracy.

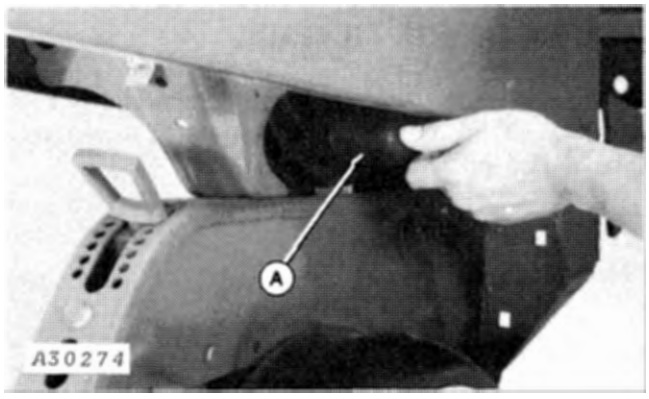
Clean air manifold system at least once a week during operation, or more often in severe dusty conditions.

Clean as follows:

1. Insert SCV lever stop in tractor SCV console and start tractor. (See INSTALL SCV LEVER STOP in Preparing for Use section.)

B22,9SE,B -19-28JUN90

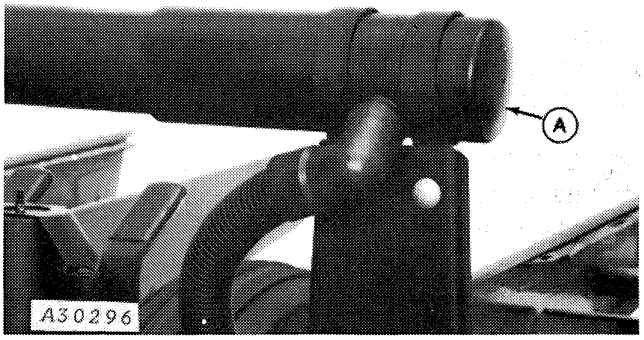
2. One at a time, remove vacuum hoses (A) from meters. Shake the hose for a few seconds and replace it on the meter.



-UN-13OCT88
A30274

B22,9SE,C -19-28JUN90

3. Remove end cap (A) from both ends of manifold tube.



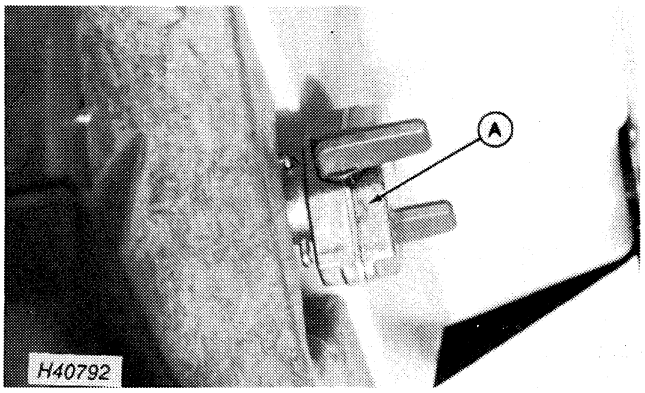
-UN-13OCT88
A30296

B22,9SE,D -19-28JUN90

CLEAN VACUUM METER DRIVE

Drive (A) can stick in dusty conditions. Lubricate with John Deere Multipurpose Spray Lube, TY6350.

Prior to use season, disassemble drive, clean and repack with new graphite base grease.



-UN-05APR89
H40792

HX,B21,5SE,A -19-28JUN90

VACUUM METER INSPECTION AND SERVICE

Annually inspect seed meter for wear and chemical/seed treatment build-up.

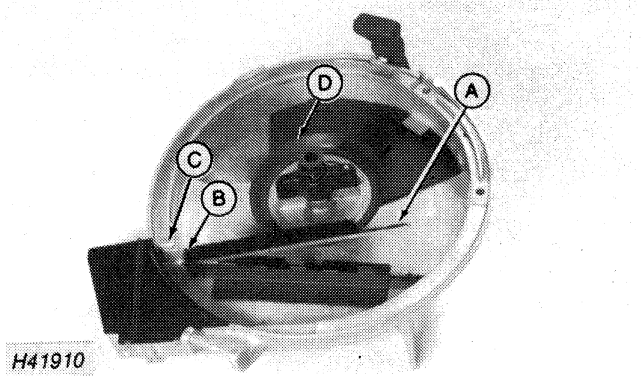
1. Check brush (A) for gaps. If gaps are big enough to allow seed to pass through, replace brush.

NOTE: When replacing brush:

a. Insert end (B) into slot first.

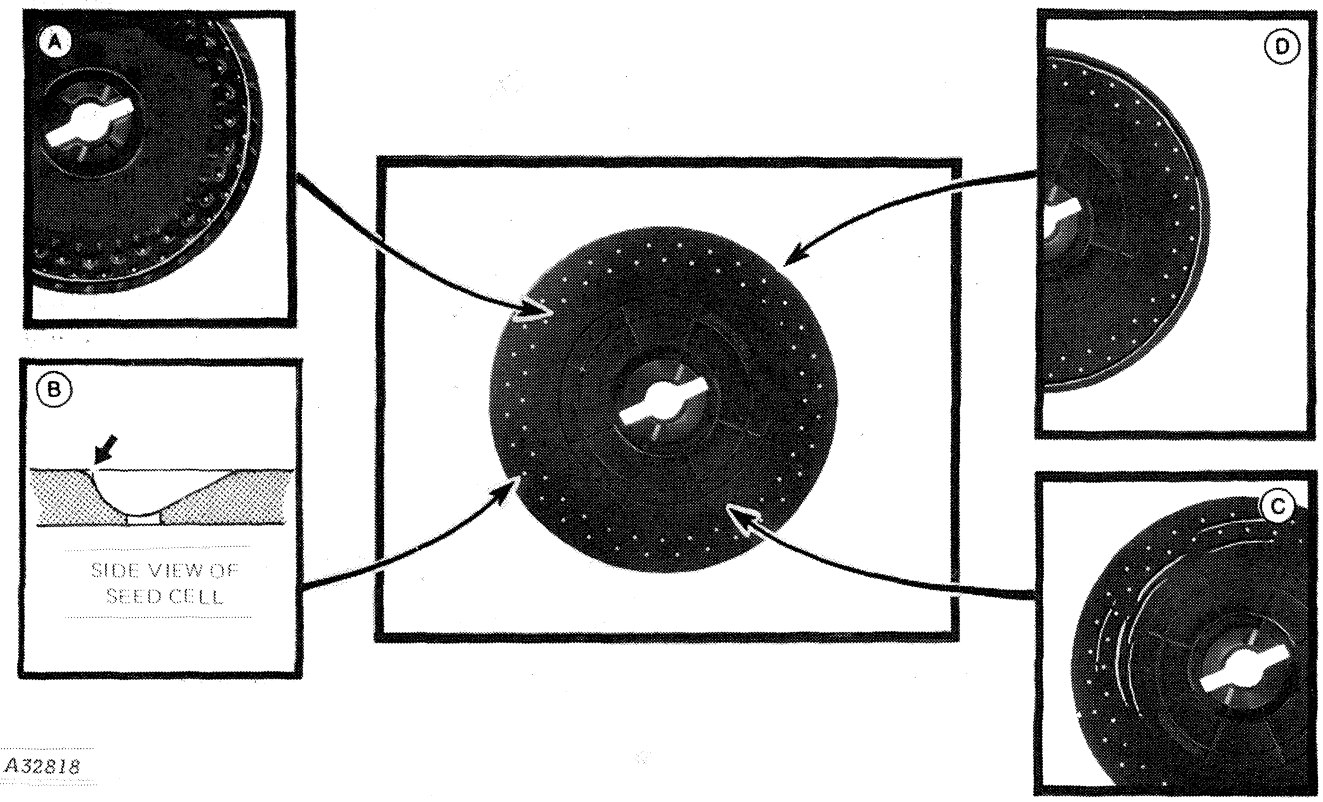
b. Snap brush into slot until it contacts side of meter housing (C).

2. Replace hub seal (D) if cracked or weathered.



-UN-08MAY90
H41910

B22,9SE,F -19-18MAY90



3. Check seed disks for wear in the following areas. Replace as needed.

a. A small amount of wear around the perimeter of the disk (A), caused by the seed seal, is acceptable. If wear occurs, check to see if seed can leak through the gap between the disk and seed seal.

Seed leakage may be eliminated by adjusting meter hub. See ADJUSTING METER HUB in Preparing the Vacuum Meter Unit section.

b. Inspect the individual seed cells. The abrasion of the seed may cause wear of the sharp corners (B), which increases cell size. (This could result in over-population when planting small seed or under-population when planting large seed.) Replace the seed disk if the size of cell is significantly increased and field checks determine a reduction in accuracy.

c. Small grooves or scratches are acceptable on the vacuum side of seed disk (C).

d. Wear around the perimeter of the disk (D) caused by the vacuum seal is acceptable up to an approximate depth of 1.0 mm (3/64 in.).

NOTE: Before replacing seed disks, perform a field check to determine if the disk is metering seeds accurately. (See CHECKING SEED POPULATION section.)

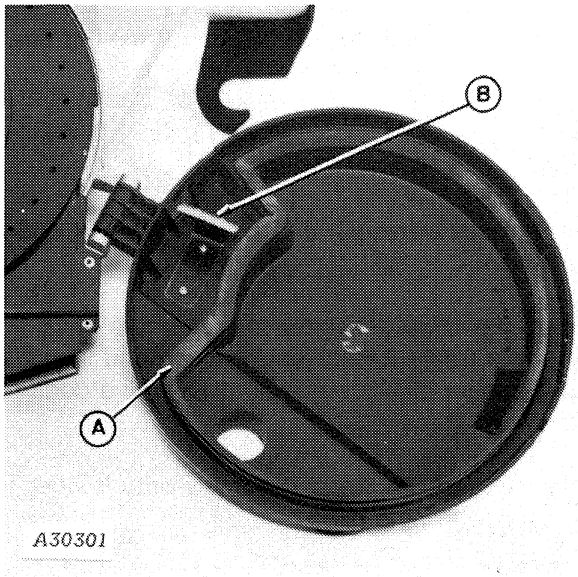
It is not necessary to replace the seed disk if its metering performance is satisfactory.

B23,C5005,AG -19-28JUN90

4. Replace vacuum seals (A) if seed disks are replaced or when large cracks/wear areas are visible.

NOTE: If vacuum seals are replaced, spray Slip Plate on used seed disks. (See Lubrication section.) New seed disks are factory lubricated.

5. Replace seed disk wiper (B) if edge of wiper is grooved or excessively worn.



A30301 -UN-13OCT88

B22,9SE,H -19-28JUN90

6. Annual cleaning of vacuum meter and seed disks is recommended. Use mild detergent and a soft brush.

NOTE: Thoroughly clean the seed disk cell area and remove any excessive treatment buildup behind the plastic (A) in the vacuum meter housing.

IMPORTANT: Use precautions as recommended by chemical manufacturers when handling parts coated with seed treatments. Use proper skin, eye and respiratory protection.



H41899 -UN-03MAY90

B22,9SE,J -19-18MAY90

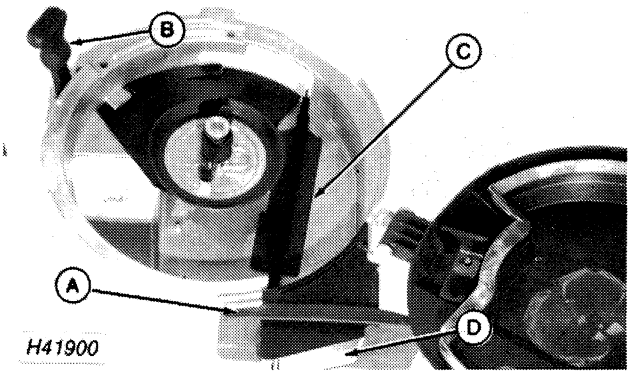
7. Replace the vacuum meter dust cover (A) if it does not fit securely, or is cracked or weathered.

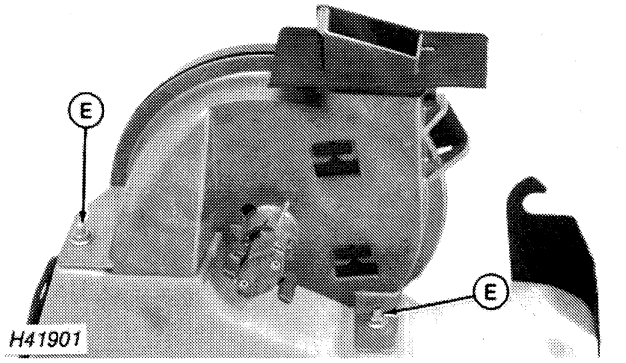
8. Inspect the rubber handle (B) and replace if cracked or broken.

9. Inspect plastic insert (C) and chute cover (D) and replace if worn.

10. Inspect flex-drive assembly to make sure drive coupler pivots freely. Disassemble, clean and lubricate with molybdenum disulfide grease if flex drive does not pivot freely.

11. Assemble vacuum meter assembly onto hopper and secure meter with nuts (E).





B22,9SE,M -19-18MAY90

VACUUM MOTOR INSPECTION

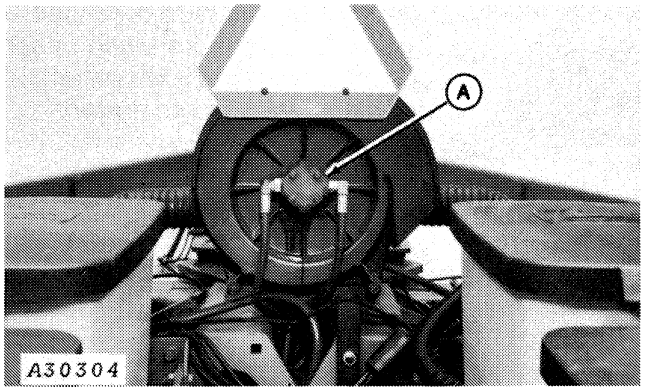
Check vacuum motor (A) for oil leaks.

A small amount of oil leakage is acceptable but if oil leakage is excessive, or if you are unable to attain necessary vacuum, order Vacuum Motor Repair Kit AA36389 from your John Deere dealer. Installation instructions are provided with the kit. If leakage occurs on the motor housing at (A), check for loose hardware on the motor or loose fittings.

NOTE: Excessive oil leakage may cause the vacuum pump guard to become clogged. This may cause loss of vacuum.

If necessary, clean pump guard. (See CLEANING VACUUM PUMP GUARD in this section.)

This leakage will occur inside pump housing and can be seen on the pump guard (B).



B22,9SE,K -19-28JUN90

INSTALLING NEW VACUUM SEAL

1. Remove seed hopper from planting unit and lay on its side. It is not required to empty seed out of hopper.

2. Unlatch handle and swing open vacuum chamber.

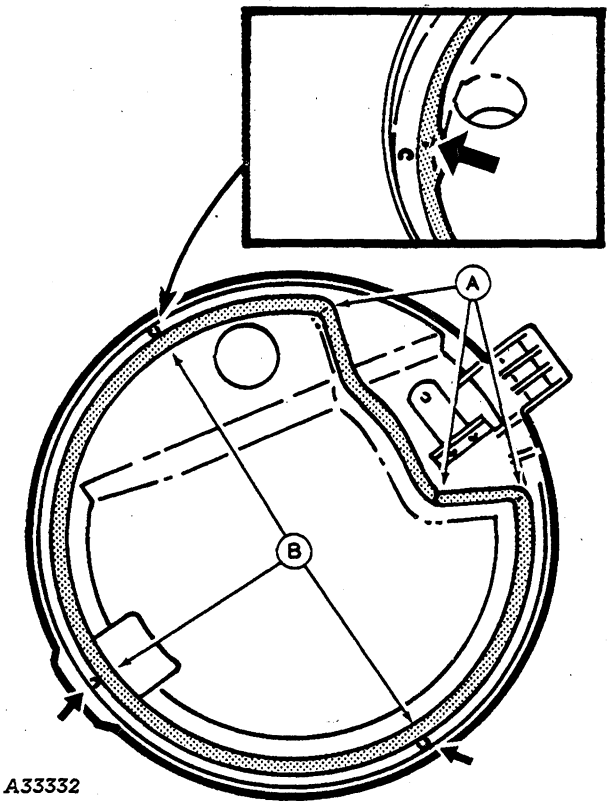
3. Remove and scrap old vacuum seal.

4. Install new seal by first inserting corners of seal (A). Next, insert seal at three locations with dimples on seal and housing (B) aligned. Finally, insert remaining portions of seal.

NOTE: This procedure prevents excessive slack in the seal.

5. Close vacuum chamber and latch handle. Install seed hopper on planting unit.

6. If seed disk has been used, respray with John Deere Slip Plate on vacuum seal side.



B22,9SE,O -19-28JUN90

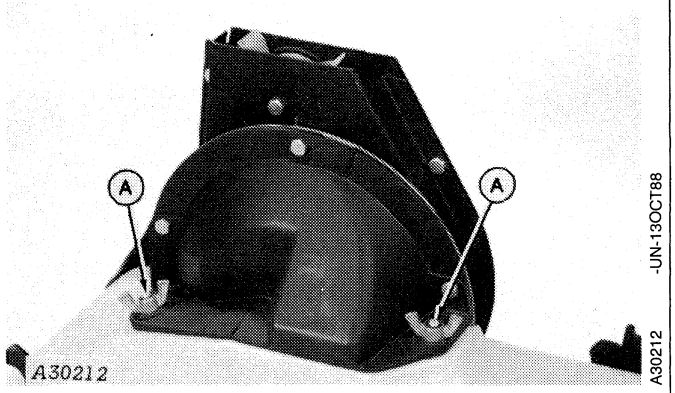
FINGER PICKUP MECHANISM

Empty the finger pickup of all corn, chaff, and foreign material after every 50 hours of use. This may be done by removing the seed hopper from the shank and dumping all material. Be sure that the baffle covering the fingers is also emptied. Rotate the finger pickup several revolutions by hand to free any corn or foreign material from beneath the fingers and empty this material before replacing the seed hopper on the planting unit.

B05,13SE,P -19-28JUN90

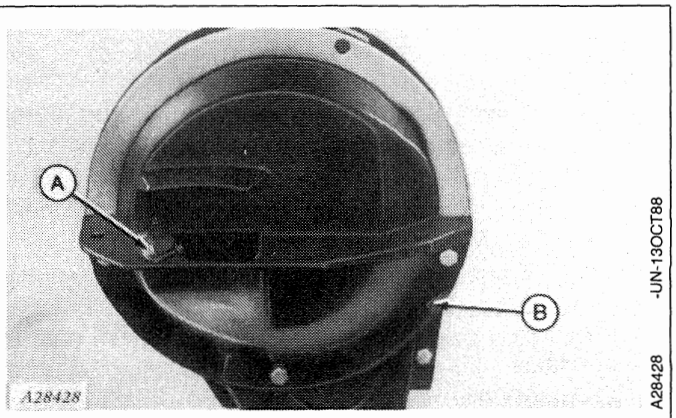
To thoroughly inspect the finger pickup mechanism, remove it from the seed hopper. This may be done by the following procedure:

Remove the seed hopper from the planter and remove the two wing nuts (A) that secure the finger pickup mechanism to the bottom of the seed hopper. With the seed hopper upside down, pull the finger pickup mechanism straight up to disengage it from the two mounting studs in the retainer ring.



B22,8SE,A -19-28JUN90

Remove the baffle (B) from the front of the finger pickup assembly (A) to provide access to the fingers by removing the three screws.

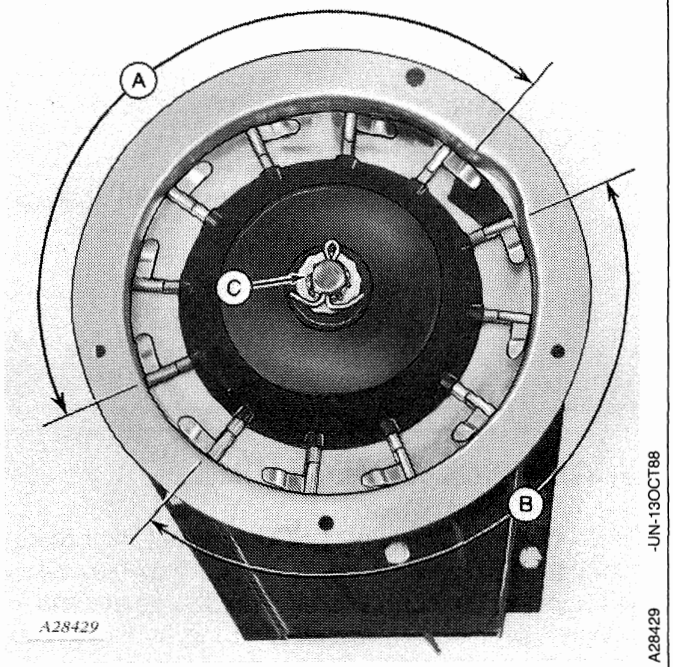


B05,13SE,R -19-28JUN90

Turn the finger pickup by hand to see that the springs are holding the tabs of the fingers in contact with the carrier plate in the appropriate area (A) and that the cam is raising the fingers properly in the remaining area (B).

If there is an excessive build up of seed treatment material or chaff beneath the finger holder, disassemble and clean the mechanism as follows:

Remove the cotter pin, lock nut, and adjusting nut from shaft (C). Carefully lift finger pickup assembly off shaft and clean.

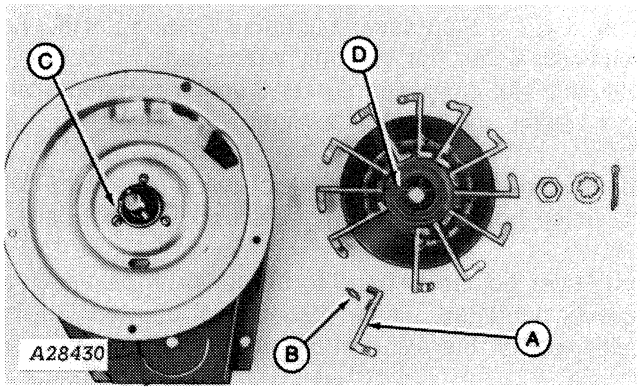


B05,13SE,S -19-28JUN90

To replace fingers (A) or springs (B), remove springs from finger and remove finger from carrier. When replacing fingers, be certain to install springs with open end of spring loop toward inside of finger holder.

NOTE: Finger should seat in holder so holder is flush with carrier plate when assembled. Be certain to align notch in bearing (C) with projection on cam (D).

A—Pickup Finger
B—Spring
C—Notch in Bearing
D—Projection on Cam

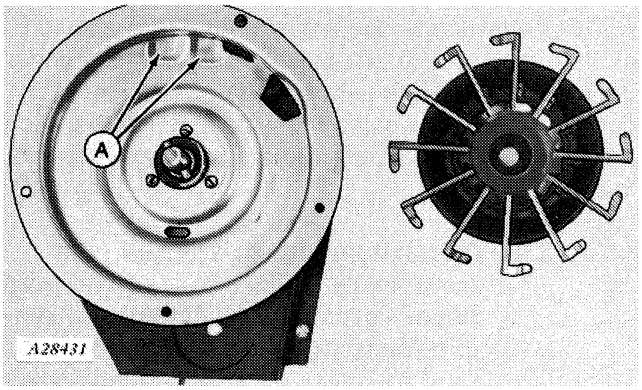


B05,13SE,T -19-28JUN90

Before installing the finger pickup assembly on the carrier, check the dimples (A) on the carrier plate for wear.

The carrier plate is made of case-hardened steel with a hard chrome plated wear surface. Excessive wear of the carrier plate at the dimples will result in over population, especially with small seed corn sizes.

Inspect the carrier plates yearly. Replace the carrier plates when the hard chrome surface has worn away and the case-hardened steel begins to wear. This will be identifiable by the change in the shape of the dimples.



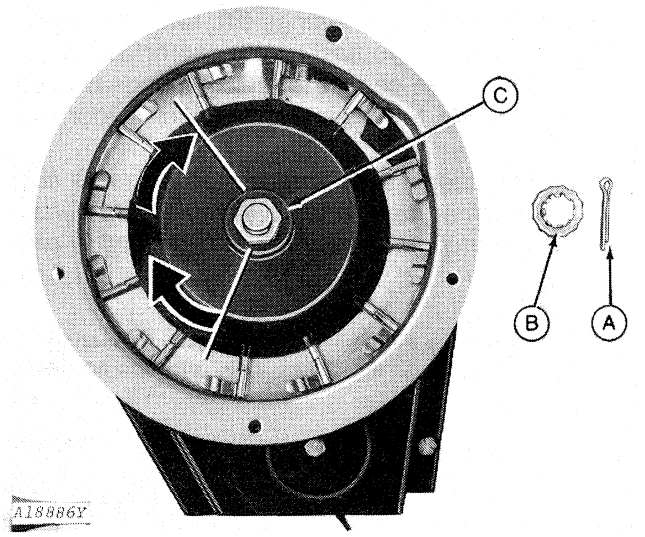
B05,13SE,U -19-28JUN90

Install finger pickup assembly and adjusting nut (C) on shaft. With finger holder firmly seated against carrier plate, turn nut clockwise by hand until it contacts the finger holder and you feel a slight resistance.

Continue to turn nut two flats clockwise (one third turn) until finger holder is properly positioned against carrier.

Turn finger holder by hand to be certain mechanism is not over tightened. Finger holder must be adjusted firmly against carrier but still turn by hand with moderate force.

Secure adjustment with nut lock (B) and cotter pin (A).

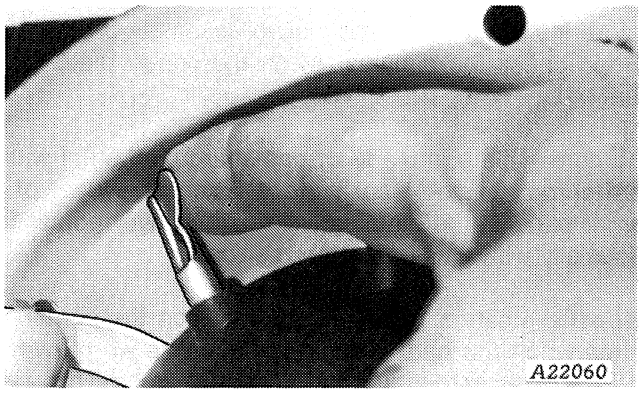


A18886 -UN-13OCT88

B05,13SE,V -19-28JUN90

As a check on the above adjustment, there should be less than 0.15 mm (0.006 in.) gap between the finger holder and carrier with light tension on a finger tab adjacent to the area being measured. Raise the finger tab until contact is felt, then use a feeler gauge as shown.

IMPORTANT: Check tightness of adjusting nut periodically. Failure to maintain proper finger assembly adjustment will result in a loose finger assembly which will tend to over populate, especially with small seed corn sizes.

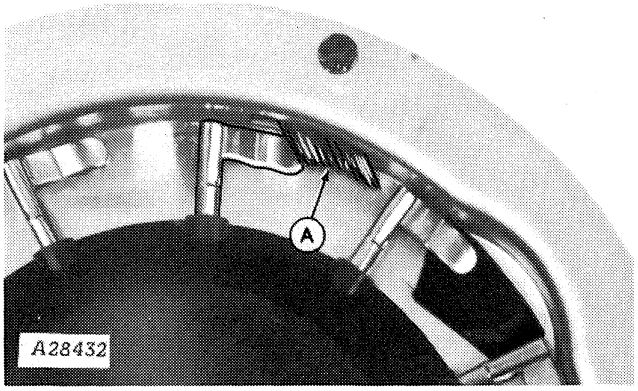


A22060 -UN-13OCT88

B05,13SE,W -19-28JUN90

The meter brush (A) helps dislodge multiple seeds held under individual fingers. If brush wear becomes excessive, individual fingers can meter multiple seeds, resulting in over population.

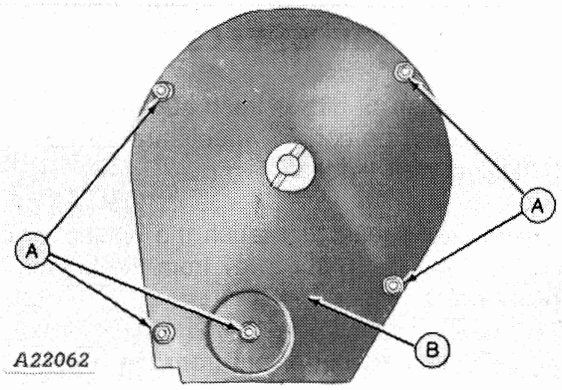
The brush length should cover at least one-half the tab on the pickup finger. Since the brush is being constantly used during operation, replacement is recommended every 100 hours.



A28432 -UN-07JUN89

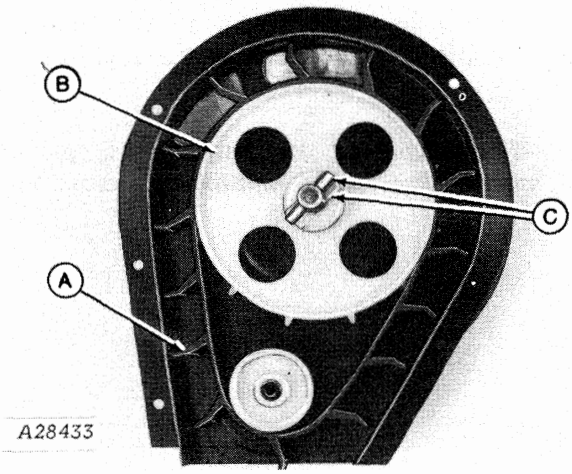
B05,13SE,X -19-28JUN90

To inspect seed belt, remove bolts (A) and belt housing cover (B).



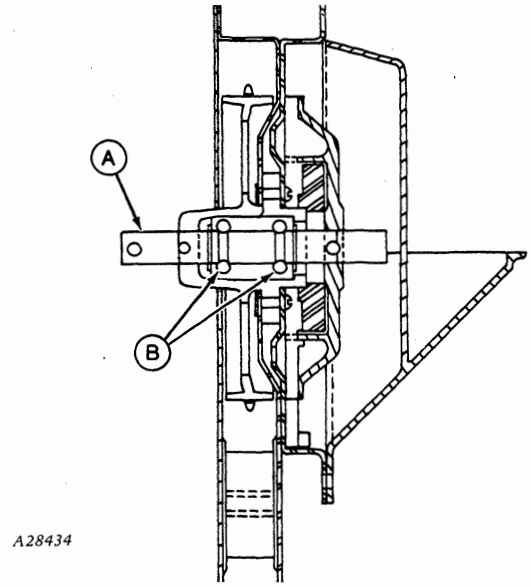
B05,13SE,Y -19-28JUN90

IMPORTANT: If belt is replaced, be certain paddles (A) are oriented as shown when belt is replaced. Belt driver wheel (B) may be removed by removing spring pins (C).



B05,13SE,Z -19-28JUN90

The finger pickup drive shaft (A) has a sealed double row ball bearing (B) designed to give years of dependable service. The drive shaft and bearing may be removed from the belt housing by removing driver wheel and the three face plate screws.



B05,13SE,AA -19-28JUN90

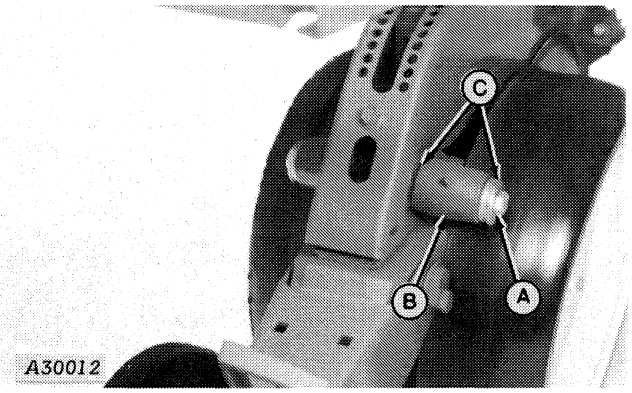
ADJUSTING GAUGE WHEELS

To prevent a buildup of dirt or trash between gauge wheels and opener, be certain wheels are positioned correctly against disk blades.

Gauge wheel tires should just touch the blades, or be no more than 1.5 mm (1/16 in.) away from the blades at their closest point.

To move a gauge wheel in or out from the blade, remove bolt (A), gauge wheel (B), and washers (C) from pivot shaft. Add or remove 0.048 in. thick spacer washers between shank and wheel arm as required. Place any remaining spacer washers on the outside of the wheel arm and replace lock washer and 1/2 x 1-1/4 in. bolt.

NOTE: When assembled, gauge wheels and disk blades must be free to turn with minimal resistance.



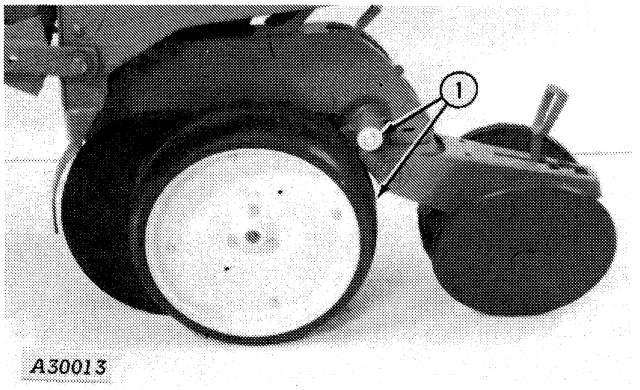
-UN-07JUN89
A30012

B21,7SE,U -19-28JUN90

REPLACING SEED OPENER BLADES AND SEED TUBE GUARD

If opener blades must be replaced for any reason, be certain they are replaced with the correct amount of blade contact. To replace blades, proceed as follows:

1. Remove cap screw and gauge wheel from pivot shaft making certain to leave inside washers in place.

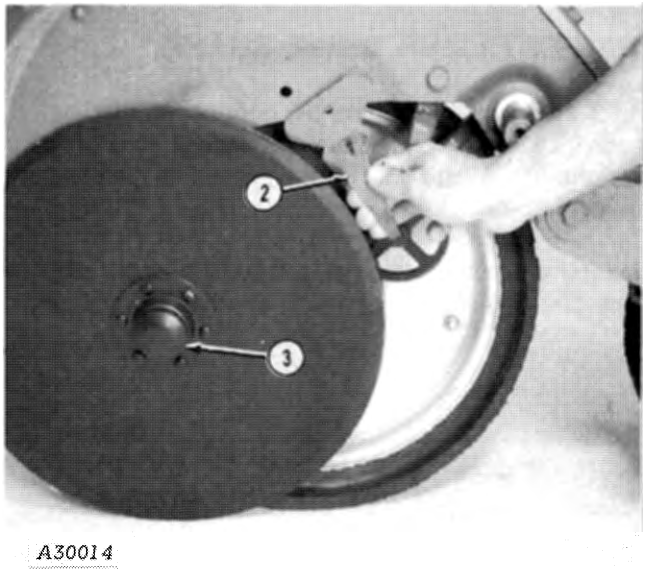


-UN-06OCT88
A30013

B21,7SE,V -19-28JUN90

2. (Planting unit equipped with rotary scraper) Pull front engagement pin outward, disengage it from the shank panels, rotate and insert scraper between opener blades.

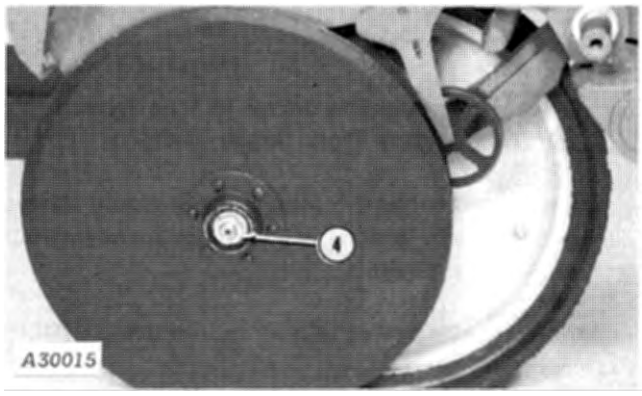
3. Remove hub cap.



B21,7SE,W -19-28JUN90

4. Remove nut, washer from outside of bearing, disk blade and hardened washers from shaft.

NOTE: Nut on left-hand side of opener has left-hand thread.



B21,7SE,X -19-28JUN90

5. To properly replace blade assembly, add or remove hardened washers behind blade bearing to obtain up to 55 mm (2 in.) of blade edge contact at point (A).

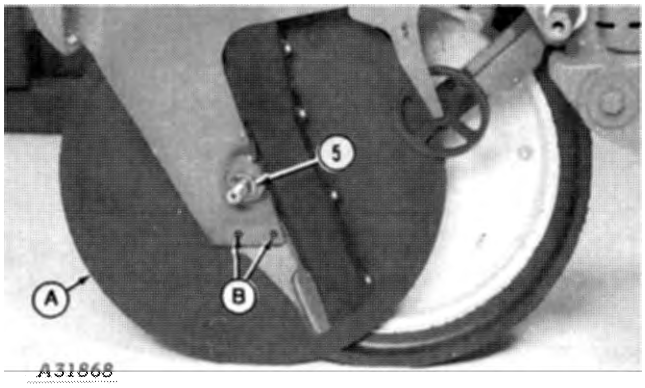
NOTE: Inserting a piece of paper at point (A) will help verify this dimension.

Replace blade, bearing washer, nut and cap.

NOTE: Nut on left-hand side of opener has left-hand thread.

Replace seed tube guard (B) if excessively worn.

When assembled, the blades should turn with minimal resistance.

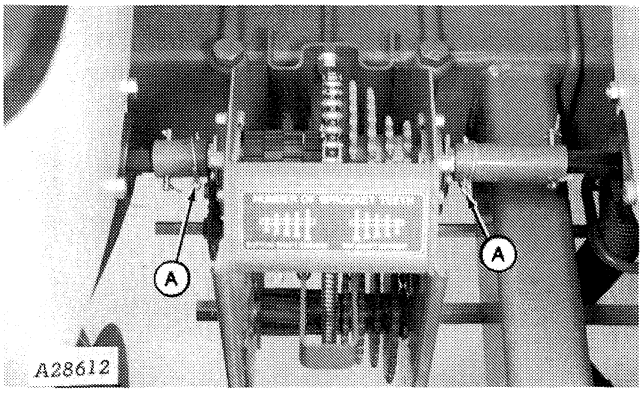


B21,7SE,Y -19-28JUN90

DRY FERTILIZER DRIVE SHAFT

The 5 x 40 mm cotter pins (A) connecting the transmission shaft to the coupler serves as a shear pin. This cotter pin will shear when excessive load is put on the fertilizer drive shaft.

Replace the cotter shear pins only with cotter pins of the same size. Do not replace with another type of pin.



B21,7SE,BE -19-28JUN90

CLEANING DRY FERTILIZER HOPPERS

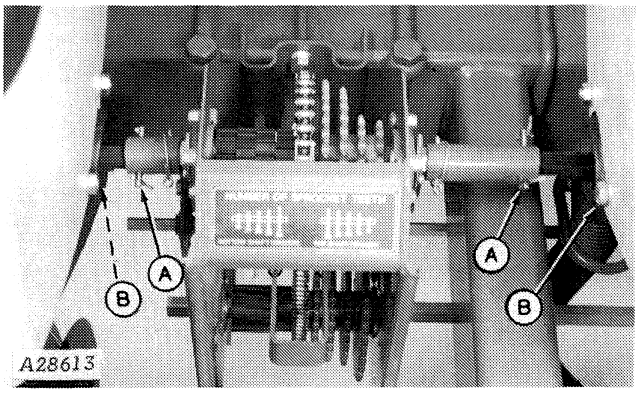
CAUTION: Agricultural chemicals can be dangerous. Improper selection or use can injure persons, animals, plants, soils or other property. BE SAFE: handle and apply with care. Follow instructions of the chemical manufacturer.

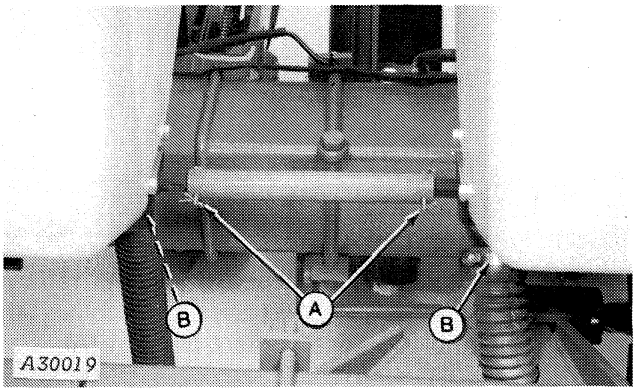
Do not use welding torch to free frozen dry fertilizer augers from auger shaft.

Fertilizer trapped inside augers could cause gas to form which, when heated, may cause augers to explode.

Disconnect couplers from augers by removing cotter pins and drilled pins (A).

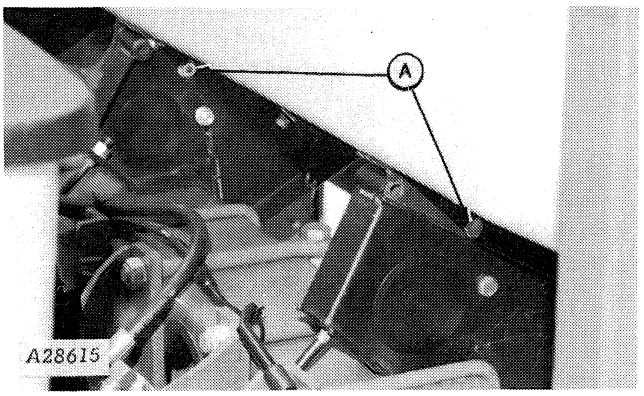
Remove clamps and disconnect fertilizer hoses (B) from hoppers.





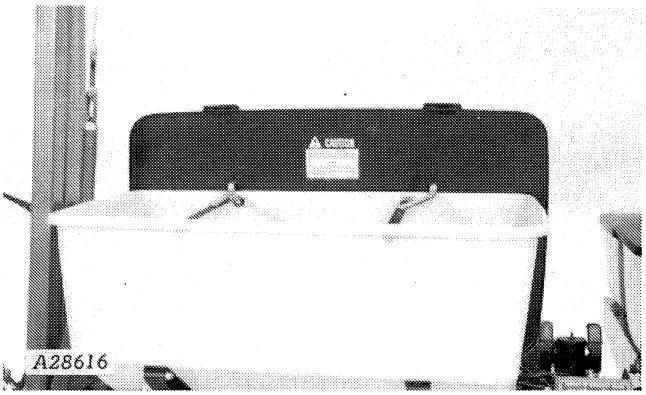
B21,7SE,AB -19-28JUN90

Remove hopper support cap screws (A).



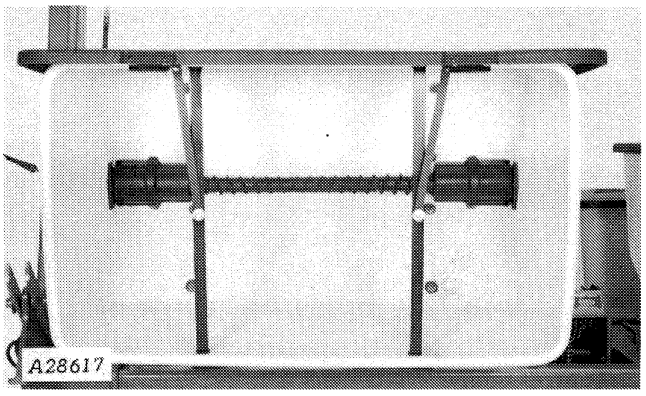
B05,13SE,AR -19-28JUN90

Release lid fastener and slide lid rearward until it hangs on edge of hopper.



B05,13SE,AS -19-28JUN90

Tip hopper forward and thoroughly clean hopper and auger components of granular fertilizer and flush with water.

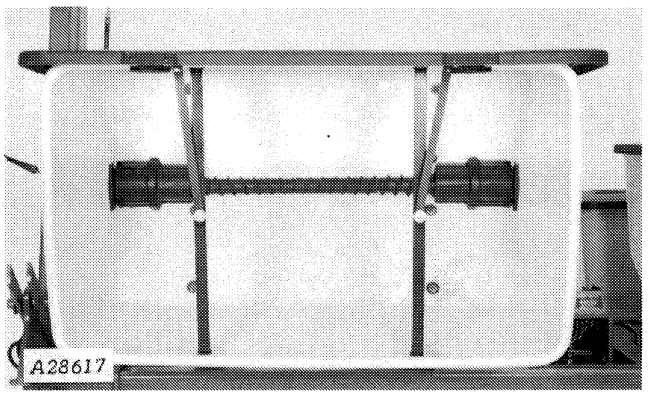


B21,7SE,AC -19-28JUN90

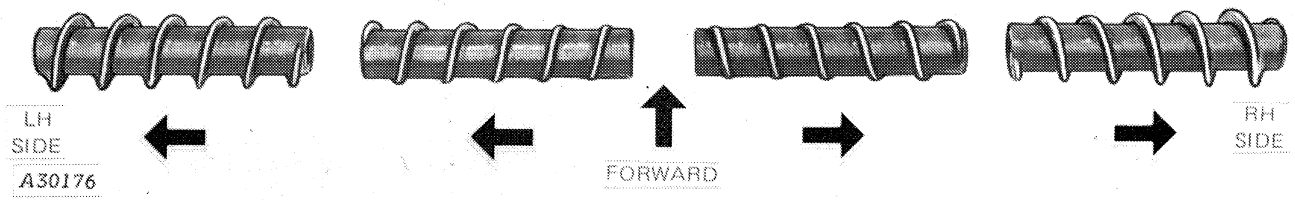
REPLACING AUGER SECTIONS

Remove couplers from augers, disconnect fertilizer hoses from hoppers and tip hopper forward.

CAUTION: Do not use torch to free frozen augers. Certain types of fertilizers may explode when heated.



B05,13SE,AU -19-28JUN90



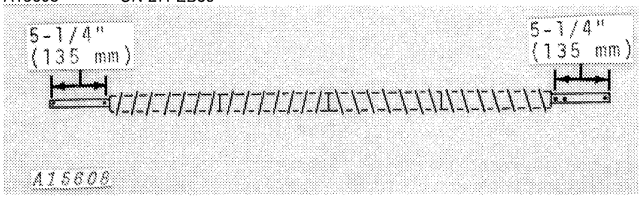
Remove hopper shaft and auger assemblies.

Position new auger sections on the floor (as illustrated above) (larger flutes to the outside) so the flights on the auger sections will carry the fertilizer to the outside ends in each hopper when the planter is moving forward.

Remove cotter pins holding old auger sections on shafts and slide old auger sections off the shafts.

Install new auger sections on shafts as shown. Secure with 15/16 x 1-3/8 x .105 in. washers as required and 1/4 x 1-1/2 in. cotter pins.

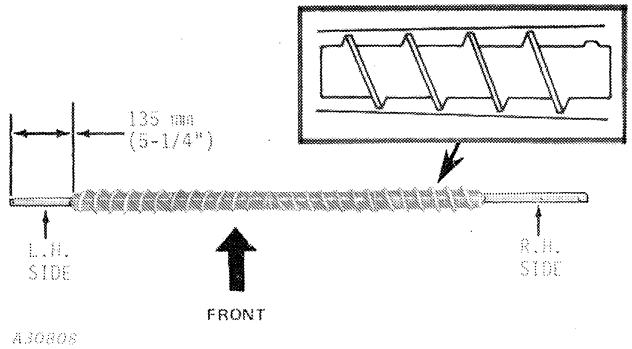
A15608 -UN-27FEB89



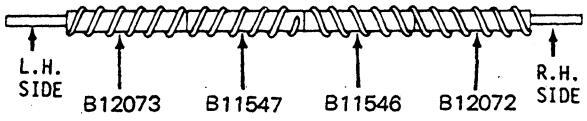
B21,7SE,BG -19-28JUN90

Determine desired fertilizer rate from charts in the Attachment section and install auger sections on 1118 mm (44 in.) shaft as shown at right. Secure with 15/16 x 1-3/8 x .105 in. washers as required and 5 x 40 mm cotter pins.

Install augers on shaft so augers move fertilizer to spouts at ends of the hopper when the planter is moving forward. Augers must be positioned with smaller end of taper toward center of hopper.



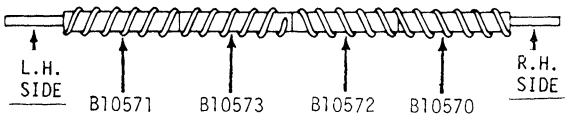
-19-18JAN89



A30809

-19-18JAN89

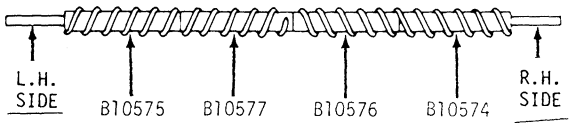
Low-Rate Augers



A30810

-19-18JAN89

Regular-Rate Augers



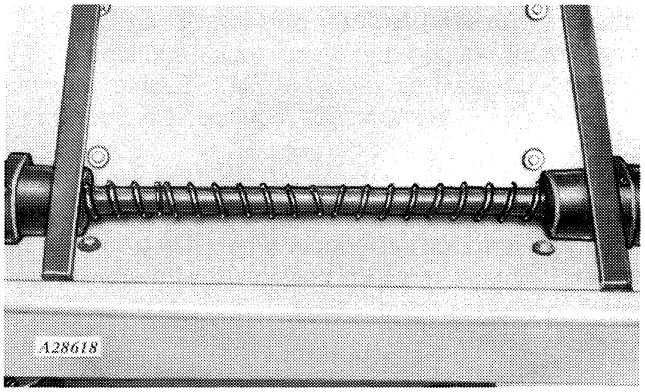
A30811

-19-18JAN89

High-Rate Augers

B21,3SE,N -19-28JUN90

IMPORTANT: When replacing auger sections in fertilizer hoppers, be certain auger sections are centered in the hoppers.



B05,13SE,AW -19-28JUN90

CLEANING LIQUID FERTILIZER TANKS

Although the tanks are made of a highly durable and corrosion resistant plastic, proper maintenance is required.

Rinse the tank with water when changing from one solution to another.

Rinse tank thoroughly with water after each season or before any shutdown lasting over one week.

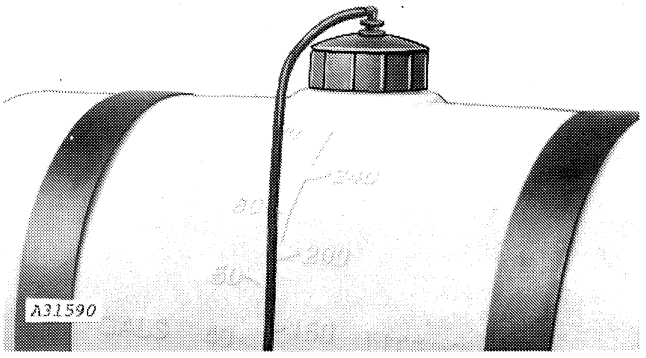
Do not allow sludge to accumulate in the bottom of the tank.

Do not leave fertilizer in the tanks if the temperature is expected to drop below 40 degrees as some types of liquid fertilizers will begin to crystallize at this temperature.

To clean the tanks, proceed as follows:

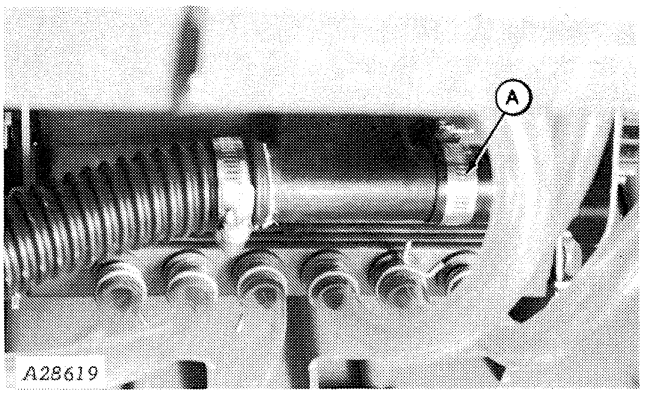
B05,13SE,AX -19-28JUN90

Remove lids from tanks.



B05,13SE,AY -19-28JUN90

Remove tension from pump hoses and remove cap (A) from metering pumps.

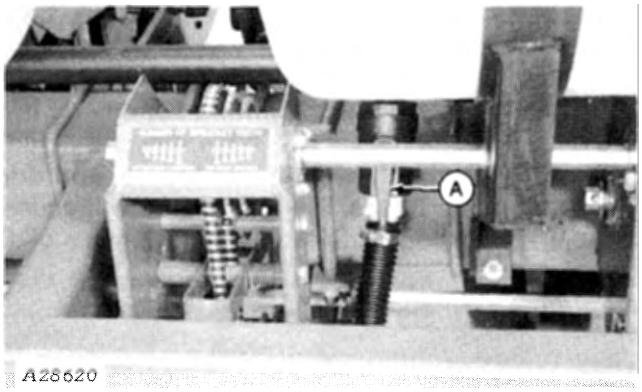


B21,7SE,BJ -19-28JUN90

Open shutoff valves (A) going to metering pumps.

Open valve between right and left sides of planter.

After cleaning tanks, close shutoff valves, replace cap on metering pump and replace lids on tanks.

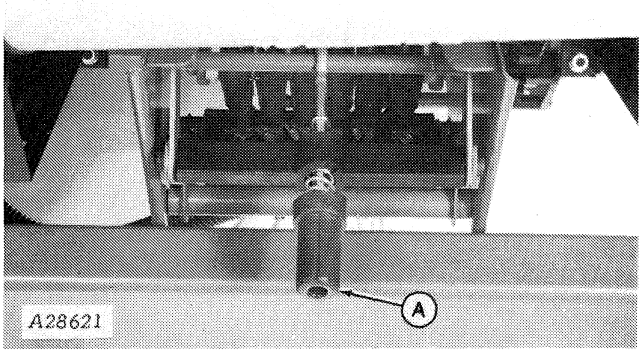


B05,13SE,BA -19-28JUN90

METERING PUMP

When the machine must sit for an extended period of time, turn the handle (A) on the metering pump out approximately 25 mm (1 in.) from groove. This helps extend hose life.

Shut off valves are provided in the liquid lines to shut off flow from the tanks when servicing the pump or delivery lines and to prevent siphoning when the machine must sit overnight.

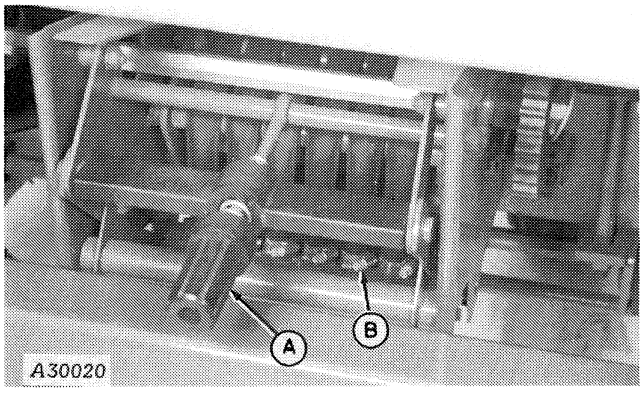


B05,13SE,BB -19-28JUN90

To change hoses on metering pump, turn handle (A) counterclockwise to relieve tension on hoses. Remove clamps (B) securing hoses and replace hoses.

NOTE: Make certain hose is not twisted or kinked.

Secure hose with clamps.

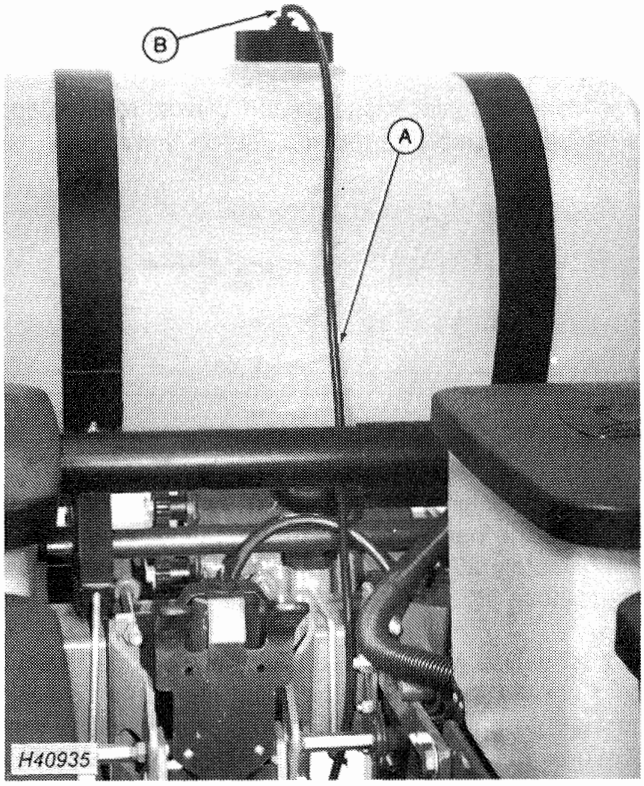


B21,7SE,AE -19-28JUN90

CLEANING LIQUID FERTILIZER TANK LID FITTINGS AND DRIP LINE HOSES

IMPORTANT: In very dusty planting conditions it may be necessary to flush dirt and liquid fertilizer from the lid fittings and drip line hoses. Plugged hoses will cause an air lock; the tank will not empty or fill.

Remove hose (A) and fitting (B) and flush.



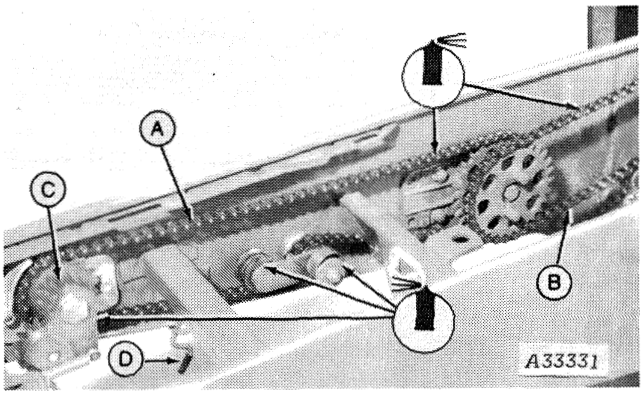
H40935 -UN-10MAY89

HX,B21,5SE,B -19-28JUN90

BEGINNING OF THE SEASON SERVICE



A29690 -UN-06OCT88



A33331 -UN-12OCT88

Before using the planter after it has been stored, inspect the seed hoppers for cleanliness to be certain the seed will flow from hoppers freely.

Thoroughly inspect the planter unit for loose parts and adjust as necessary.

Clean any dirt or grease that may have accumulated on moving parts, gears and chains before operating the planter. This will prevent abrasive action that could cause excessive wear.

When roller chains remain unused for several days, moisture in the air will accumulate on the chain, causing the chain to rust. This can, and will, become serious enough in time to cause the chain joints to become stiff, restricting their normal free movement. While very difficult to detect, this stiffness can encourage the chains to operate abnormally and disturb the smooth rotation of important meter components, causing deterioration in *performance.*

If the planter is not used for several days, or if oil has been removed from chains, etc. while cleaning the planter, thoroughly lubricate chains with John Deere Multipurpose Spray Lube, TY6350.

Pay particular attention to pesticide drive chain (A), seed meter drive chain (B), and pesticide drive gears (C). Be certain these chains and gears have adequate lubrication.

When lubricating the pesticide drive gears, move the drive disconnect handle (D) back and forth while spraying to help loosen any paint or dirt buildup and allow the gears to turn freely.

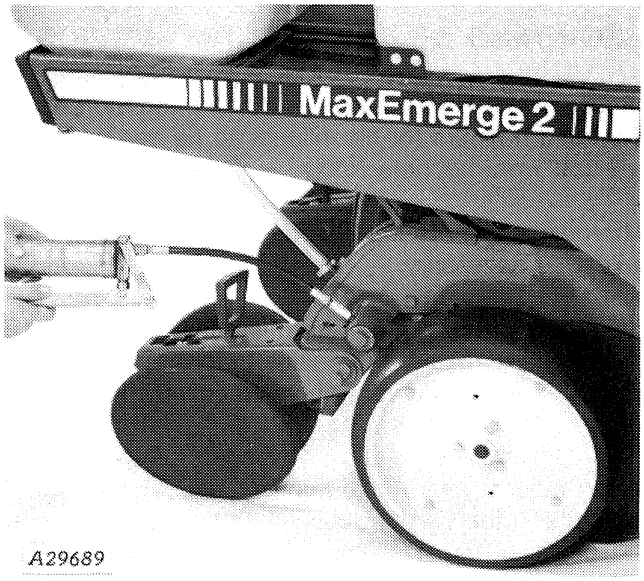
IMPORTANT: Do not use chain lube or any other heavy petroleum base lubricant that may cause a buildup of dust or dirt in the sprocket or gear teeth.

B21,7ST,A -19-28JUN90

Turn the meter drive shaft, by hand, to be sure the drive shaft and seed meter are free to turn. Rotate forward only, as assemblies are not designed to rotate in reverse.

Be certain all adjustments are made for the planting conditions to be encountered.

Lubricate the unit as outlined in the Lubrication section.



B21,7ST,B -19-28JUN90

SERVICE AT THE END OF THE SEASON

When planting is completed for one season, store the planter under cover with all parts in operating condition.

Paint all parts which are chipped or worn and require repainting.

Clean the planter thoroughly to remove dirt and trash which would hold moisture and cause rusting.

Lubricate the planter as outlined in the Lubrication section, and grease exposed cylinder rods.

Thoroughly lubricate chains with John Deere Multipurpose Spray Lube, TY6350, at the beginning of the idle period.

Empty and clean seed hoppers.

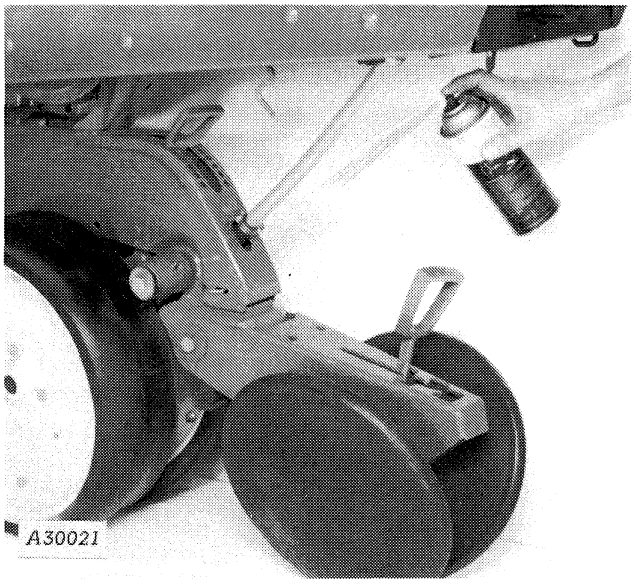
Clean insecticide and/or herbicide hopper thoroughly as various chemicals may deteriorate the system components.

Inspect the planter for worn or broken parts. See your John Deere dealer during the off season so that parts or service can be acquired when the planter is not needed in the field.

Store the planter in a clean, dry place with the planting unit gauge wheels and firming wheels out of the sun.

Place handle for closing wheel down force in long slot to relieve tension on closing wheels.

Thoroughly flush liquid herbicide system with clean water. Disconnect from tractor and completely drain all lines and components to prevent damage from freezing.



A30021 -UN-06OCT88

B21,7ST,C -19-28JUN90

Remove seed disks from meter. (See VACUUM METER INSPECTION AND SERVICE in Service section.)

a. Clean meter housing, meter chamber and seed disk with mild detergent and soft brush.

b. Store disks in shipping box or hang on wall (A).

IMPORTANT: Be sure to store seed disks away from extreme heat or direct sunlight. Do not leave disks in the meters during the off season. Do not store under heavy parts.

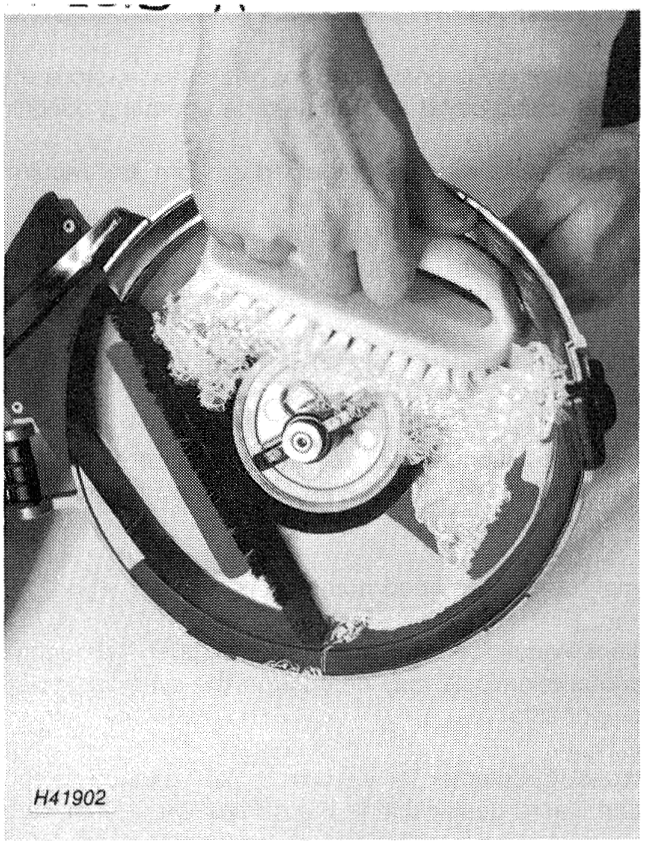
Clean air manifold system. (See CLEAN AIR MANIFOLD SYSTEM in Service section.)

Check for hydraulic leaks.

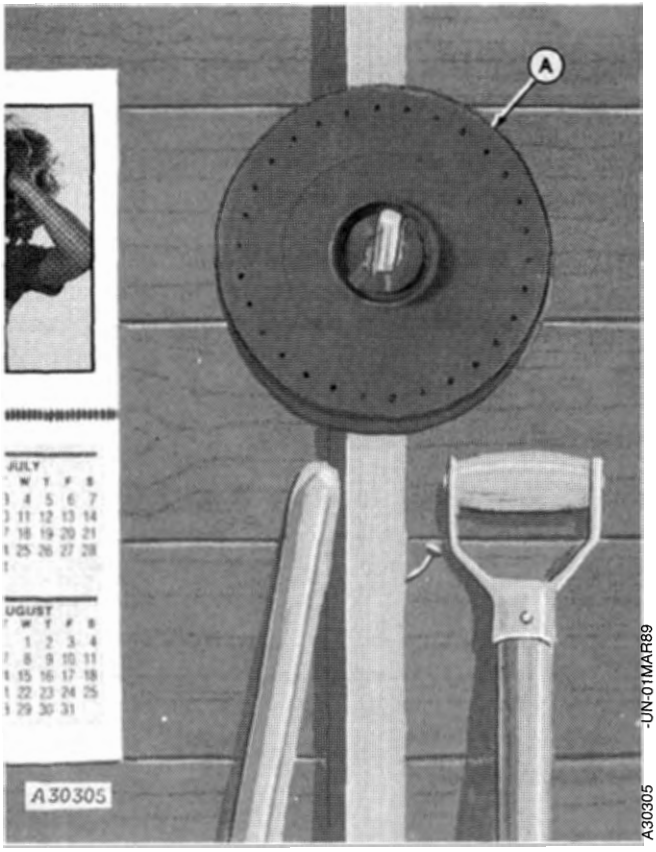
Check and clean out manifolds.

Check and clean vacuum meters.

Check and replace necessary vacuum meter seals.



H41902 -UN-04MAY90



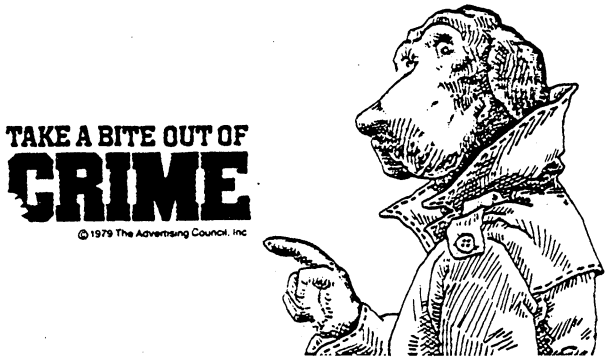
A30305 -UN-01MAR89

B22,9ST,C -19-18MAY90

Crime Prevention Tips

HELP PREVENT CRIME

You can help take a bite out of crime by properly documenting ownership and discouraging theft.



TS140 -19-07OCT88

DX,CRPRV,A -19-04JUN90

RECORD IDENTIFICATION NUMBERS

1. Mark your machines with your own unique numbering system.

2. Record the Product Identification Number (PIN) of the unit and also individual component identification numbers for engines, axles, pumps, etc. Include the PIN numbers on all documentation, such as insurance, financial, and warranty papers.



TS161 -UN-23MAR89

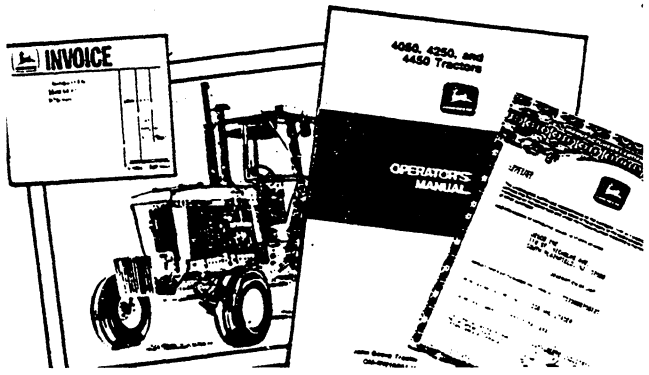
DX,CRPRV,B -19-04JUN90

KEEP PROOF OF OWNERSHIP

1. Take color photographs from several angles of each machine.

2. Maintain an up-to-date inventory of all your machines.

3. Keep your documented identification numbers, color photographs, and inventory in a safe, secure location.

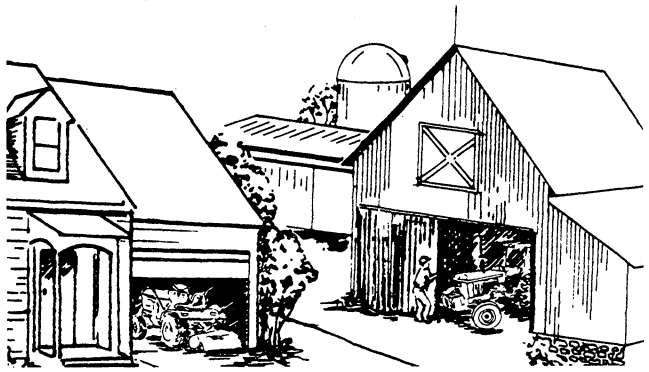


TS142 -UN-23MAR89

DX,CRPRV,C -19-04JUN90

PARK INDOORS OUT OF SIGHT

Make machines hard to move:
- Park large equipment in front of exits.
- Lower equipment to the ground. Remove key.
- Remove battery when unit is in storage.
- Lock cab doors, windows, and vandal-proof devices.
- Set wheels in widest position making loading more difficult. Lock building.

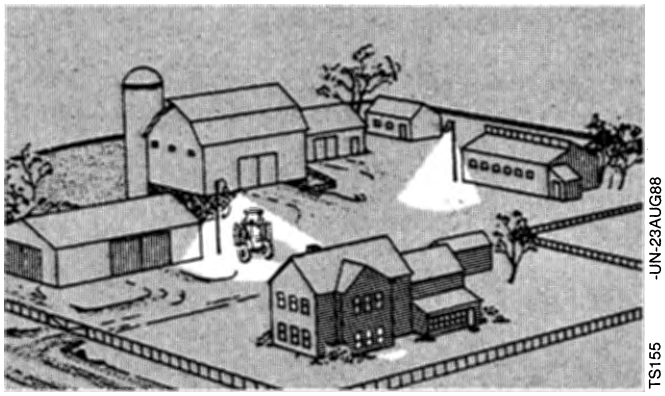


TS143 -UN-23AUG88

DX,CRPRV,D -19-04JUN90

WHEN PARKING OUTDOORS

Make machines hard to move:
- Park in a well-lighted, fenced area.
- Lower all equipment to the ground.
- Remove ignition key. Remove battery when unit is in storage.
- Lock cab doors, windows, and vandal-proof devices.
- Set wheels in widest position making loading more difficult.



TS155 -UN-23AUG88

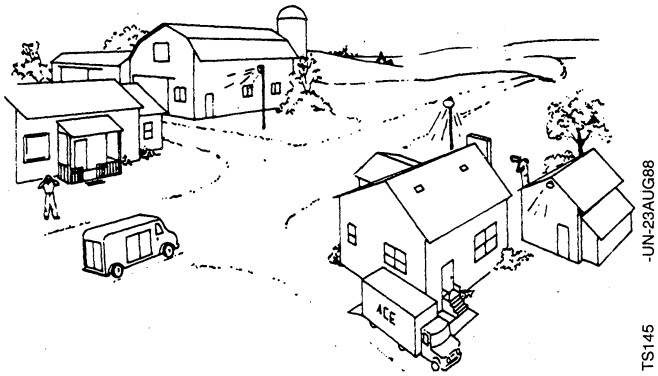
DX,CRPRV,E -19-04JUN90

REDUCE VANDALISM

1. Install vandal-proof devices.

2. Participate in a neighborhood watch program. Take written notes of suspicious vehicles or persons and report your findings to law enforcement agency.

3. Regularly verify that identification plates have not been removed. If they have, notify law enforcement agency. Order duplicate plates from your dealer.



TS145 -UN-23AUG88

DX,CRPRV,F -19-04JUN90

REPORT THEFTS IMMEDIATELY

1. Immediately notify your local law enforcement agency and insurance agent.

2. Provide a complete description of the machine, all of the documented identification numbers and color photographs.

3. Request verification of the identification numbers after they have been entered with any regional or national crime information center. Double check the numbers to be sure they are correct.

4. Notify your John Deere dealer of the theft and request that its loss be posted with full description and identification numbers.



TS146 -UN-09JAN89

DX,CRPRV,G -19-04JUN90

Specifications

PLANTING UNIT TYPES — Plate, Plateless or Vacuum Meter.

SEED OPENERS — Tru-Vee double disk.

ROW SPACING — 8-Row Wide and 12-Row Narrow.

8-Row Wide—91 cm and 97 cm (36 and 38 in.) row widths.

12-Row Narrow—76 cm (30 in.) row width.

TYPE OF LIFT — Wheel modules with hydraulic cylinders.

TYPE OF DRIVE — Sprocket and chain from drive wheels.

TIRES — 7.60 x 15 8PR rib implement tire.

SEED HOPPERS — 58L (1.6 bu.) or 106 L (3 bu.) capacity.

MARKERS — Automatic alternating or independent controlled.

MINIMUM TRACTOR SIZE REQUIRED —

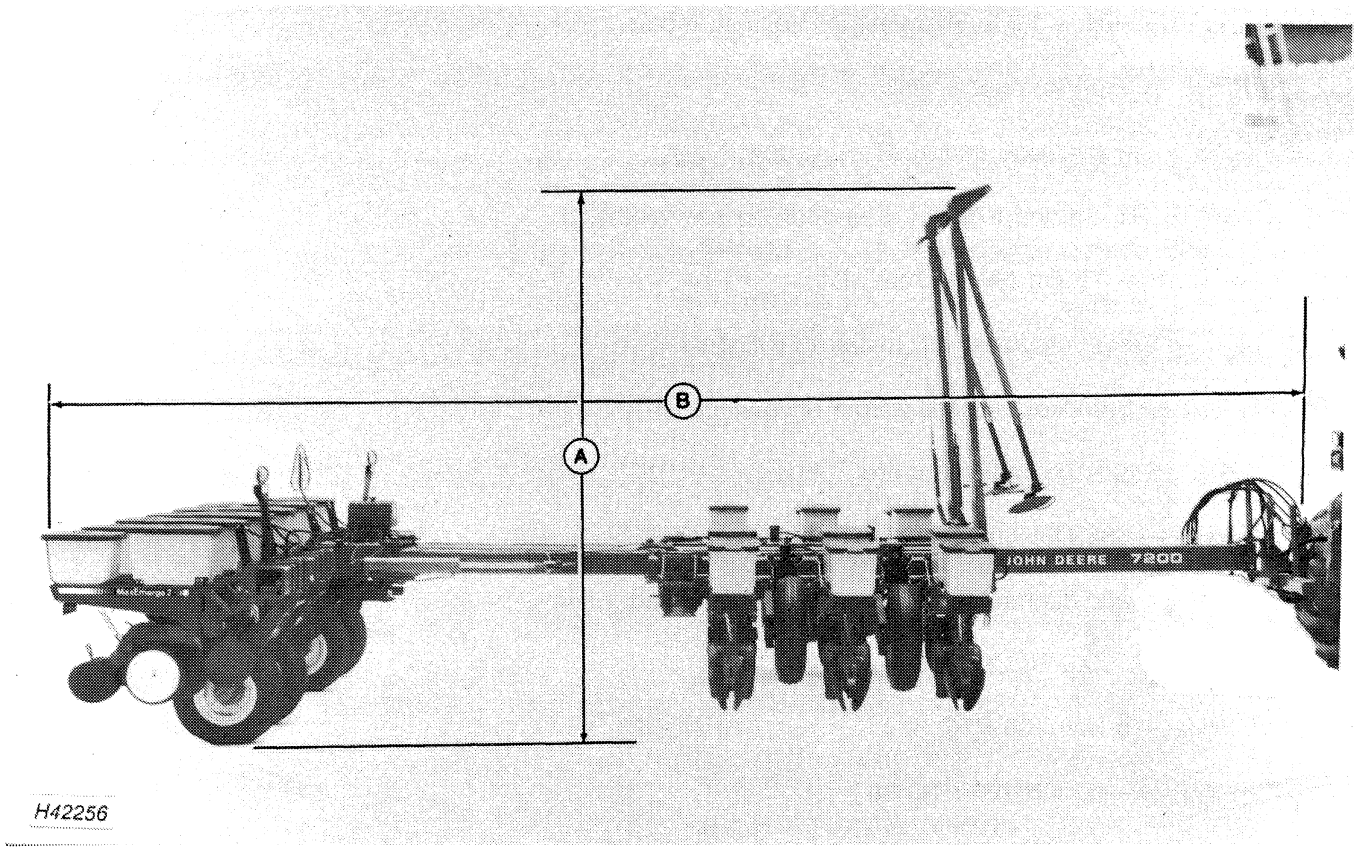
8-Row Wide—75 kW (100 PTO hp.)

12-Row Narrow—90 kW(120 PTO hp.)

HYDRAULIC OIL REQUIRED TO OPERATE PLANTER — 5.7L (1-1/2 U.S. gal.).

TRACTOR STANDBY PRESSURE — 15 514 kPa (155.1 bar) (2250 psi).

B21,7SP,A -19-28JUN90



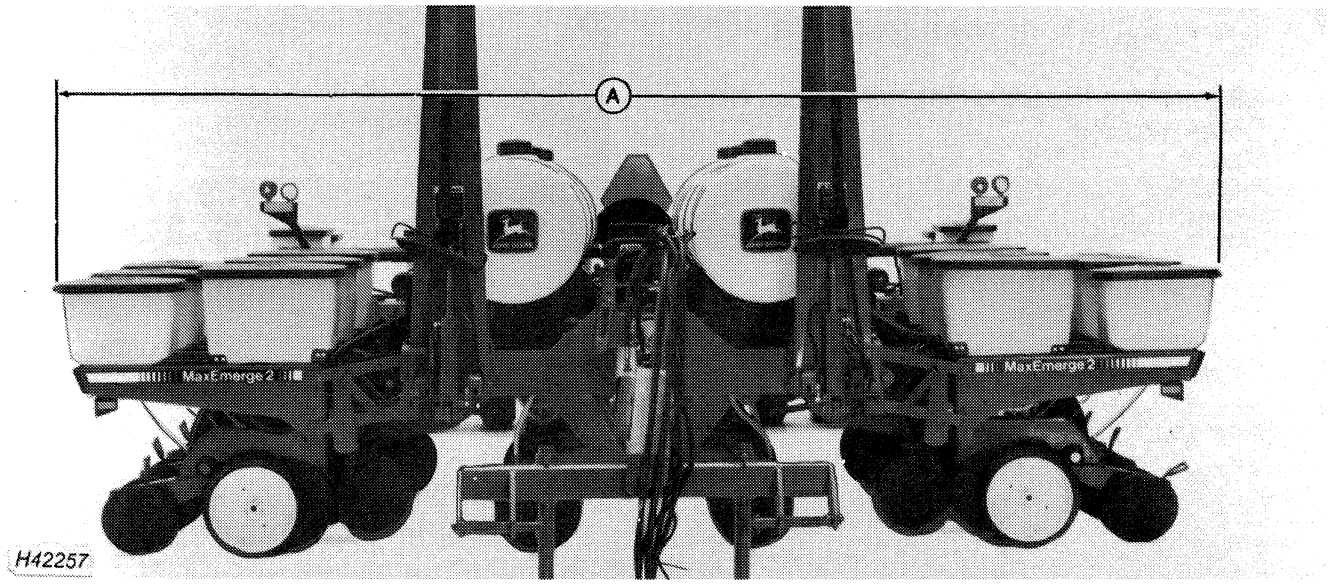
-UN-21JUN90

H42256

Model	Dimension "A"	Dimension "B"
8-Row	3.7 m (12 ft. 4 in.)	8.3 m (27 ft. 3 in.)
12-Row	4.1 m (13 ft. 6 in.)	9.0 m (29 ft. 6 in.)

CAUTION: Serious injury or death can result from contact with electric lines. Use care when moving or operating this machine near electric lines to avoid contact.

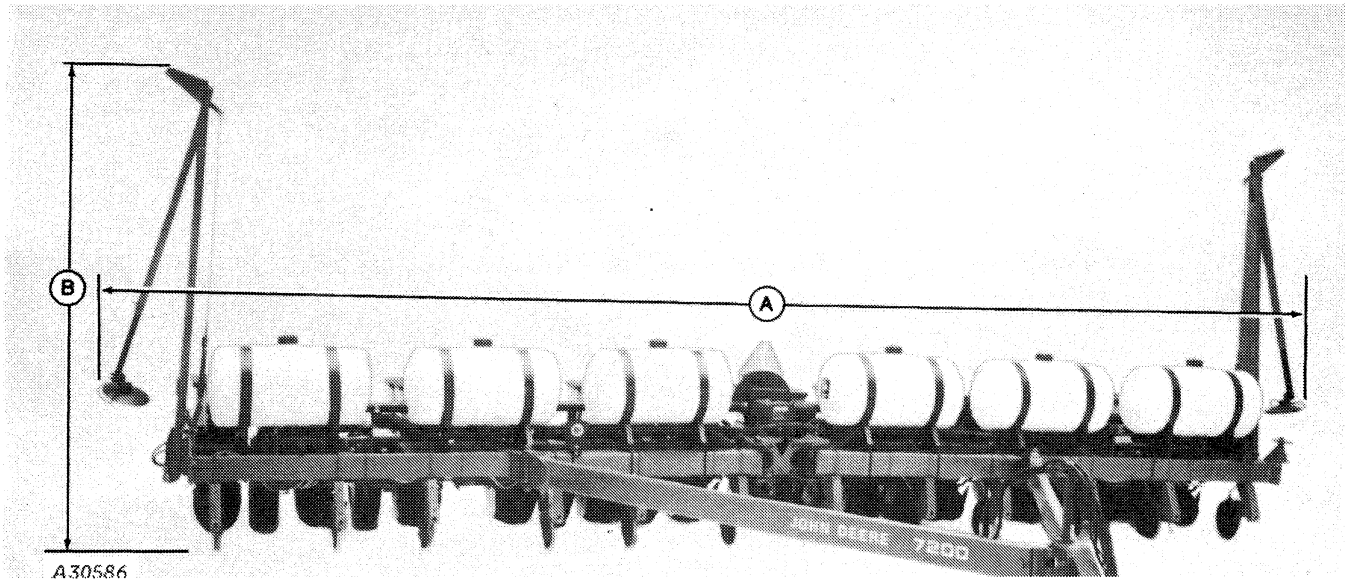
B21,7SP,B -19-28JUN90



H42257 -UN-21JUN90

Model	Dimension "A"
8-Row	4.6 m (15 ft. 2 in.)
12-Row	4.6 m (15 ft. 2 in.)

B21,7SP,C -19-28JUN90



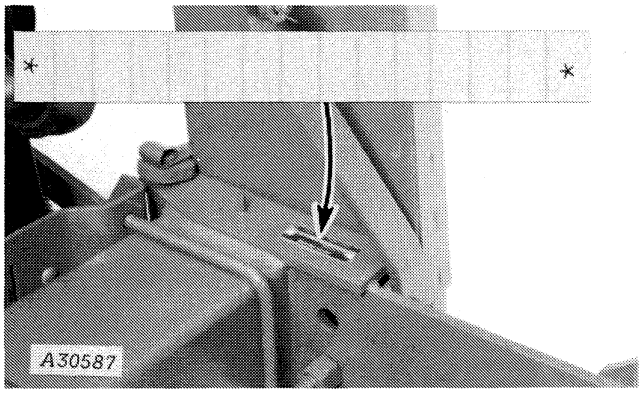
A30586 -UN-06OCT88

Model	Dimension "A"	Dimension "B"
8-Row	9.1 m (29 ft. 10 in.)	3.8 m (12 ft. 4 in.)
12-Row	10.0 m (33 ft. 0 in.)	3.4 m (11 ft. 3 in.)

B21,7SP,D -19-28JUN90

RECORD PLANTER SERIAL NUMBER

The serial number is located on the main frame. Record in the spaces provided.



B21,7SP,E -19-28JUN90

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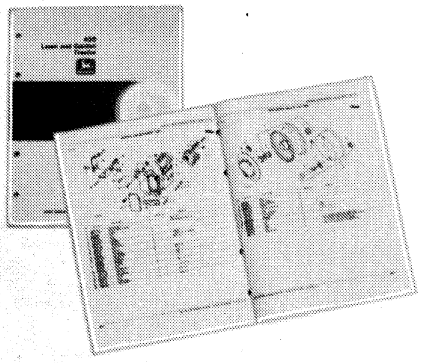
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John Deere Service Literature Available

PARTS CATALOG

The parts catalog lists service parts available for your machine with exploded view illustrations to help you identify the correct parts. It is also useful in assembling and disassembling.



TS189 -UN-17JAN89

DX,PARTS -19-04JUN90

OPERATOR'S MANUAL

The operator's manual provides safety, operating, maintenance, and service information about John Deere machines.

An extra copy of the operator's manual is important if the copy furnished with your machine is misplaced.

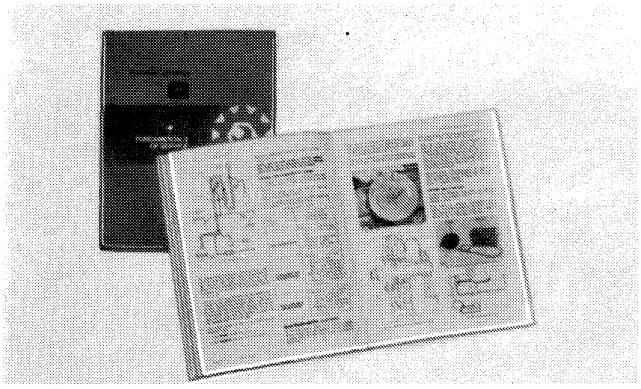


TS190 -UN-17JAN89

DX,OM -19-04JUN90

FUNDAMENTALS OF SERVICE MANUALS

These basic manuals cover most makes and types of machines. FOS manuals tell you how to SERVICE machine systems. Each manual starts with basic theory and is fully illustrated with colorful diagrams and photographs. Both the "whys" and "hows" of adjustments and repairs are covered in this reference library.



TS193 -UN-02DEC88

DX,FOS -19-04JUN90

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John Deere is at your service when you need it

John Deere takes pride in providing superior service. We'll be around when you need us. To help minimize downtime, we maintain a large and varied parts inventory. Precision tools and testing equipment enable our dealerships to locate and correct troubles quickly. We hold regular training schools for service technicians so they know your equipment and how to maintain it. Our goal is to provide prompt, efficient service through competent dealerships.

Should you experience any difficulty obtaining satisfactory parts or service:

- Discuss your problem with your dealership service manager.
- If still unable to properly resolve, see the dealership manager.
- If you have a persistent problem that your dealership is unable to satisfy, contact the John Deere sales branch in the area in which you live. (See the map below to locate the sales branch.) The sales branch will also help you locate the dealership nearest you.

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   Columbus, OH 43228
   614-275-1500

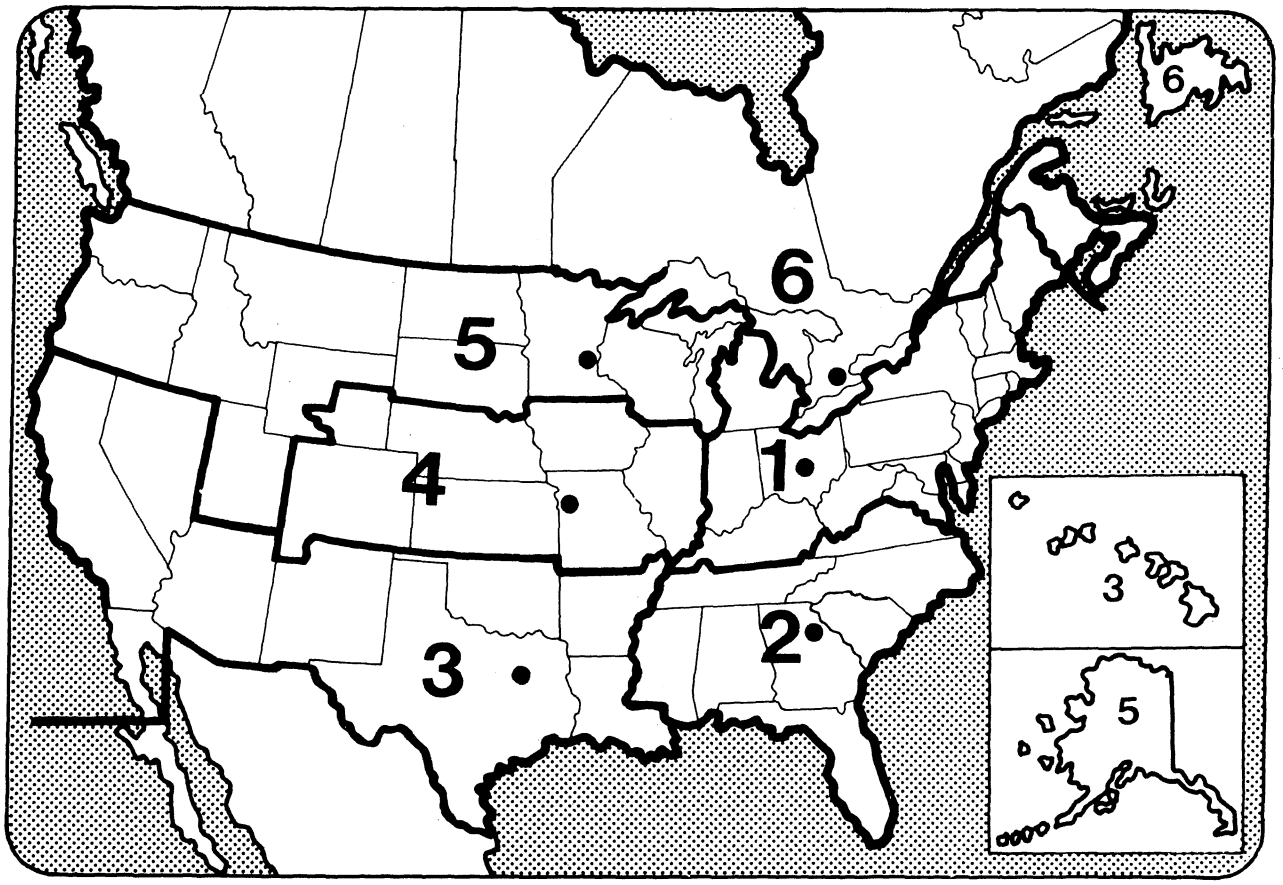
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3. JOHN DEERE COMPANY
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