OPERATOR'S MANUAL

CORN HEADS

CH2112

CH2208

FRONTIER EQUIPMENT™

November 2011 Edition

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 and safety signs on your machine may also be available in other languages. (See your Frontier dealer to order.)

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

MEASUREMENTS in this manual are given in both metric and customary U.S. unit equivalents. Use only correct replacement parts and fasteners. Metric and inch fasteners may require a specific metric or inch wrench.

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

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

WARRANTY is provided as part of Frontier'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 Frontier will back its products where defects appear within the warranty period. In some circumstances, Frontier 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.

P/N 5XB00251-B

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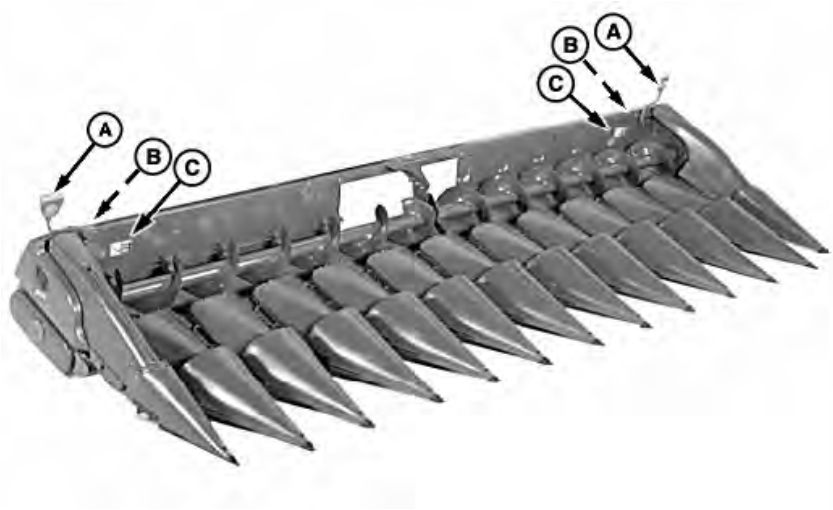
All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

Corn Head Safety Features

Corn Head Safety Features



A - Warning Lights B - Reflective Materials C - Safety Decals

In addition to the safety features shown here, safety signs on the corn head, and safety messages and instructions in the operator's manual contribute to the safe operation of this corn head when combined with the care and concern of a capable operator.

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Safety

Recognize Safety Information

This is a safety alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.

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.

DANGER

WARNING

CAUTION

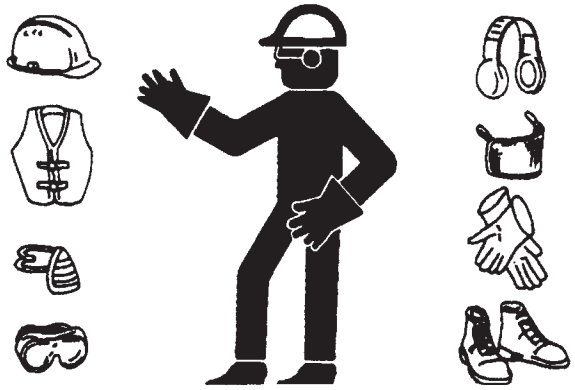
Wear Protective Clothing

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

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

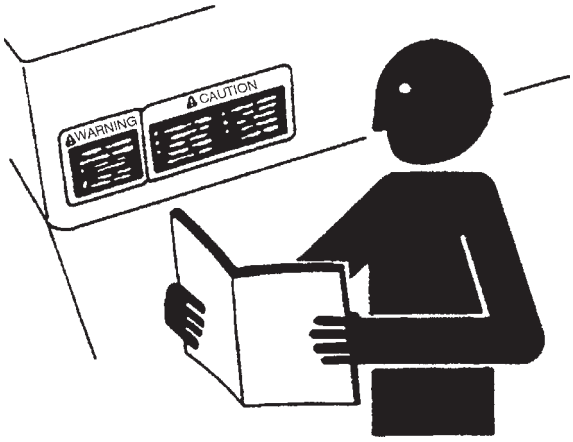
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

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



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 dealer.



Learn how to operate the equipment and how to use controls properly. Do not let anyone operate without instruction.

Keep your equipment in proper working condition. Unauthorized modifications to the equipment may impair the function and/or safety and affect equipment life.

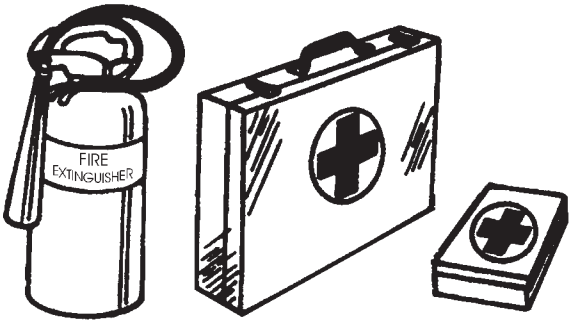
If you do not understand any part of this manual and need assistance, contact your dealer.

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.



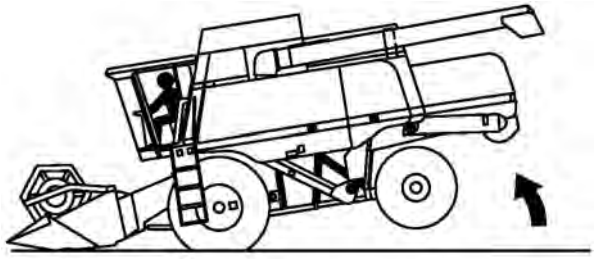
Store Attachments Safely

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.

Ballasting for Safe Ground Contact

Operating, steering and braking performance of the combine can be considerably affected by attachments which alter the center of gravity of the machine. To maintain safe ground contact, ballast the combine at the rear end as necessary. Observe the maximum permissible axle loads and total weights.



Parking and Leaving the Combine

Lower harvesting unit to the ground.

Before leaving the combine, disengage harvesting unit and separator. Shut off engine and move gear shift lever to neutral. Apply parking brake, remove key and lock the operator's cab.

Never leave combine unattended as long as engine is running.

Never leave the operator's cab when driving.

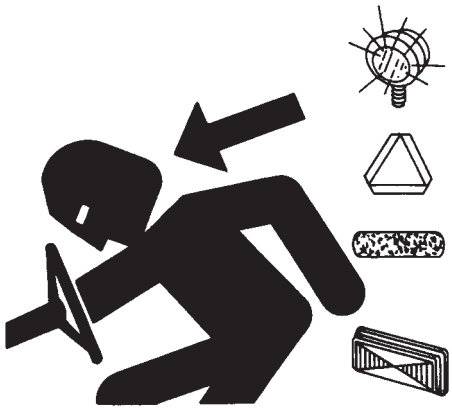
Avoid Contact With Moving Parts

Keep hands, feet and clothing away from power driven parts. Never clean, lubricate or adjust machine when it is running.

Use Safety Lights and Devices

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

Use headlights, flashing warning lights, and turn signals day and night. Follow local regulations for equipment lighting and marking. Keep lighting and marking visible, clean, and in good working order. Replace or repair lighting and marking that has been damaged or lost. An implement safety lighting kit is available from your dealer.



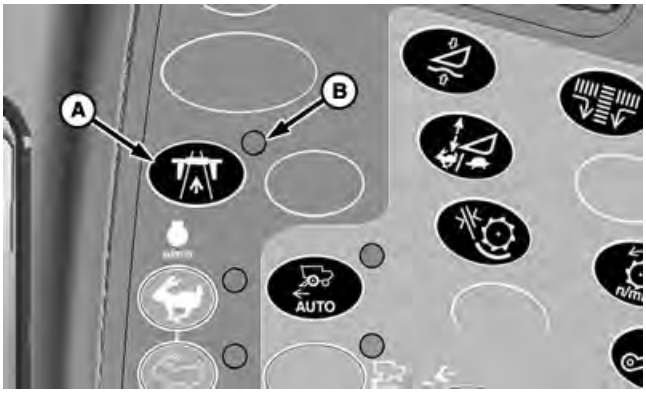
Road Transport Disconnect Switch (Black)

Road transport disconnect switch (A) must be in road position when transporting machine on roadway.

When road transport disconnect switch is pressed, indicator light (B) will turn ON indicating switch is in road position. Road transport disconnect switch will prevent the following functions:

- Header Height Resume
- Header Height Sensing
- CONTOUR MASTER
- Reel Raise/Lower and Reel Fore/Aft
- Unloading Auger
- Auger Swing
- Power Folding Auger (If Equipped)
- Separator Engage
- Header Engage
- Header Raise/Lower

To reengage functions for field operation, press road transport disconnect switch again and indicator light will turn OFF allowing the desired function switches to operate again.



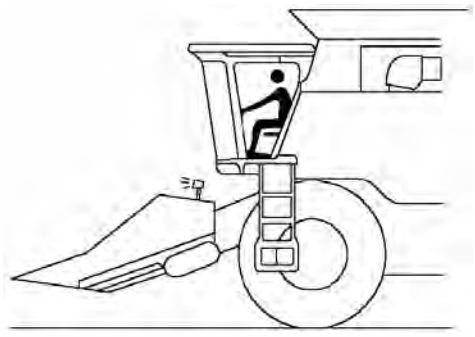
Transport Combine With Header Safely

Whenever possible avoid transporting on public roadways when the header is attached.

If the combine must be transported with the header attached, make sure that the flashing warning lights on the header are operating and the reflective material is clean and visible.

The use of a spotter or pilot vehicle is recommended on busy, narrow or hilly roads and when crossing bridges.

Drive at a speed that is safe for conditions.



Stay Clear of Header

Stalk rolls of the corn head, etc., cannot be completely shielded by constructional measures due to their function. Always stay clear of these moving elements during operation! Always disengage header drive, shut off the engine and remove key before servicing or unclogging header.

Avoid Tanglement

To avoid entanglement, do not feed crop material into machine by hand or attempt to manually unplug machine while it is running. The stalk rolls can feed the crop material in faster than you can release your grip on the material.

Stay Clear of Rotating Drivelines

Entanglement in backshaft rotating driveline can cause serious injury or death.

Keep driveline shields in place at all times.

Wear close fitting clothing. Stop the combine engine and be sure driveline is stopped before making adjustments, connections, or cleaning out header or its drive components.

Practice Safe Maintenance

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

Never lubricate, service, or adjust engine while it is running. 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 engine to cool.

Securely support any engine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

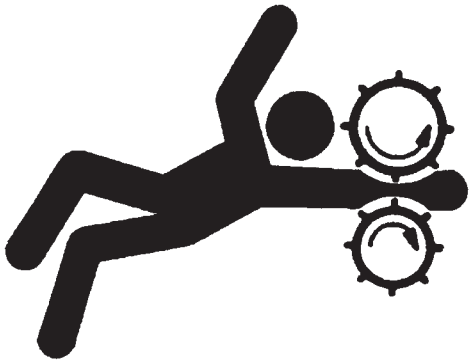
On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

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

Service Machines Safely

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.

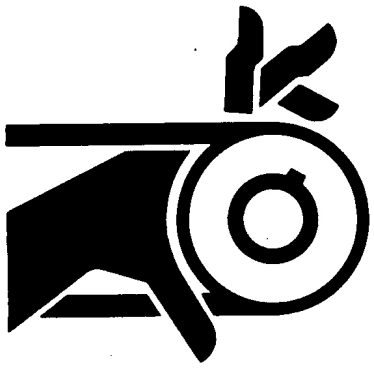


Guards and Shields

Keep guards and shields in place at all times. Ensure that they are serviceable and installed correctly.

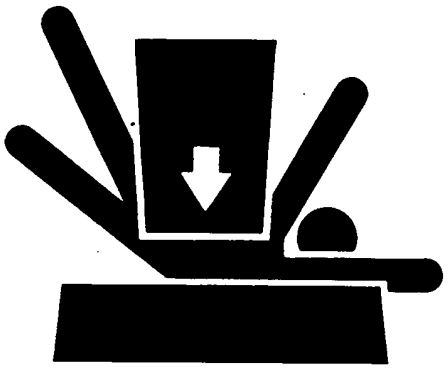
Always disengage main clutch, shut off engine and remove key before removing any guards or shields.

Keep hands, feet and clothing away from moving parts.



Support Machine Properly

Always lower the attachment or implement to the ground before you work on the machine. If the work requires that the machine or attachment be lifted, provide secure support for them. If left in a raised position, hydraulically supported devices can settle or leak down.

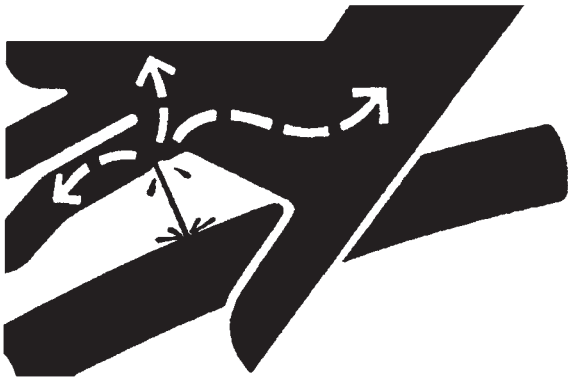


Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.

When implements or attachments are used with a machine, always follow safety precautions listed in the implement or attachment operator's manual.

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 should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

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.

Remove paint before heating:

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

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

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

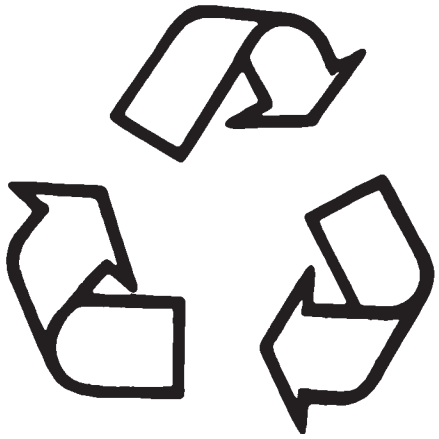
Dispose of paint and solvent properly.

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 accidentally burst when heat goes beyond the immediate flame area.

Dispose of Waste Properly

Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with Frontier equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.



Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

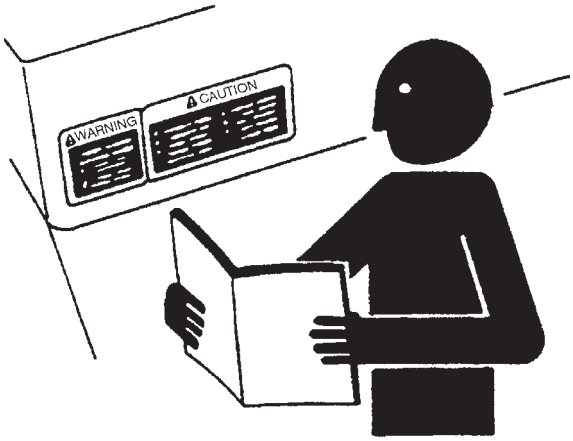
Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your Frontier dealer.

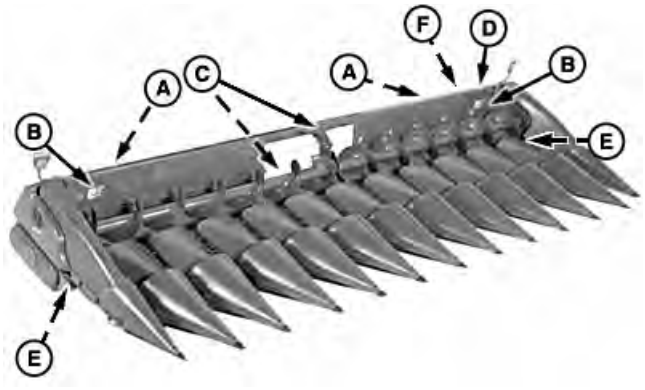
Replace Safety Signs

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.



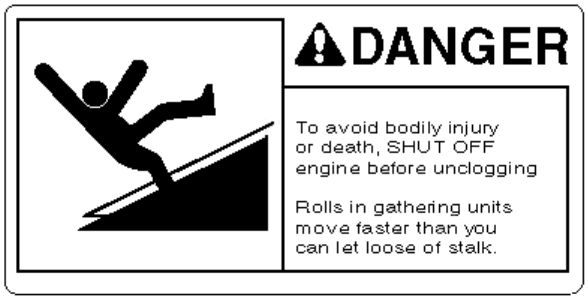
Safety Decal Locations

Safety Decal Locations



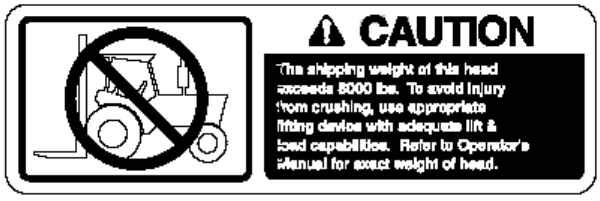
A

D



B

E



C

Chopping Corn Head Safety Decal

F

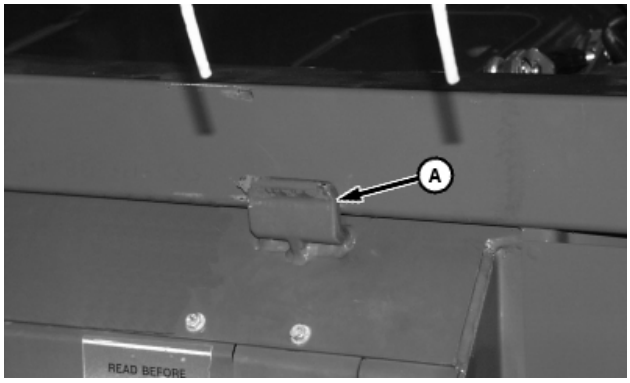
Attaching and Detaching

Attaching Corn Head to Feeder House

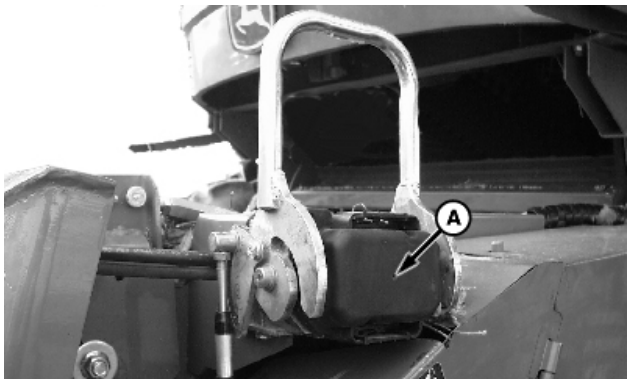
IMPORTANT: See your combine operator's manual for specific tires required when operating the header.

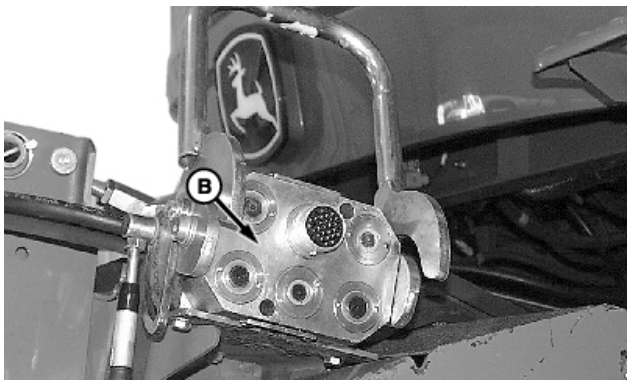
Latch pins are not to be actuated with header on the ground. If multi-coupler must be actuated with header on ground, unhook cable from handle.

1. Sound horn, start engine and lower feeder house.
2. Drive combine slowly forward until feeder house is centered in attachment frame opening.
3. Raise platform completely, making sure two hooks (A) on feeder house catch front side of main frame beam of platform.
4. Set parking brake, shut off engine, remove key and lower safety stop.

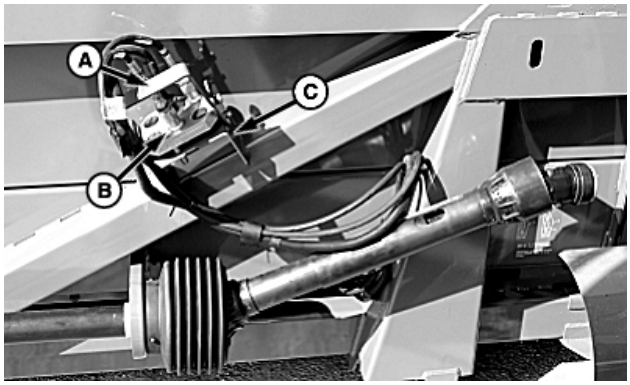


5. Remove cover (A) and clean multi-coupler face (B).



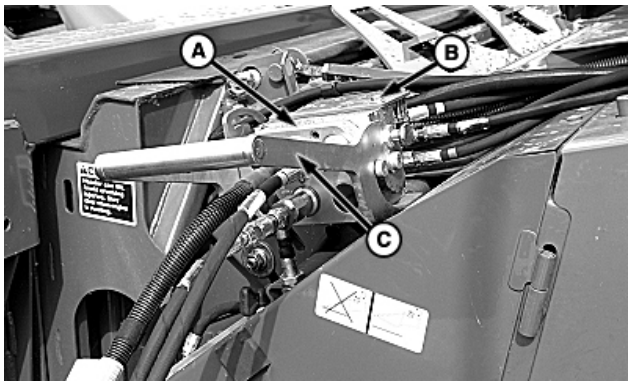


6. Open handle (A) and remove multi-coupler (B) from storage (C).



NOTE: To prevent damage to latching cable, a shear screw is attached to the handle. Attempts to actuate latching pins with header on ground will shear the screw on the handle. (See Extra Shear Screw Location later in this section.)

With header attached, latch pins should move freely through latch plate holes. If latch pins do not extend through the latch plates, make sure that the latching plates on the header are properly adjusted.

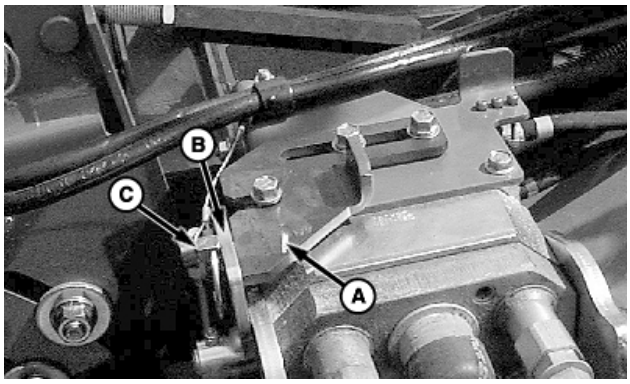


7. Install multi-coupler (A) onto receptacle (B) and close handle (C).

Machines Equipped with Slide Lock Multi-couplers

IMPORTANT: Failure to slide lock plate through multi-coupler assembly could result in the header falling off while harvesting or transporting.

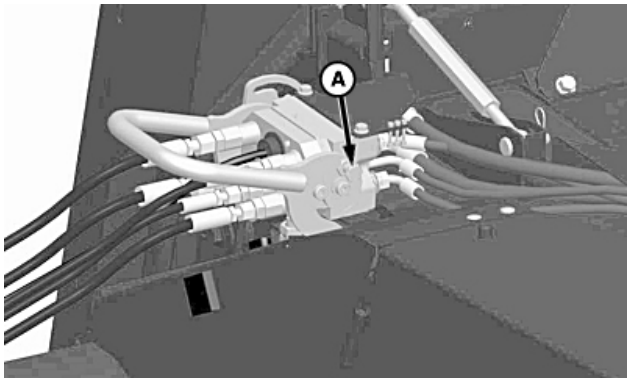
When multi-coupler handle is closed, slide lock plate (A) through multi-coupler latch assembly (B) and retain with quick-lock pin (C).



Machines Equipped with Button Lock Multi-couplers

IMPORTANT: Failure to close multi-coupler fully so button lock can engage could result in the header falling off while harvesting or transporting.

1. When multi-coupler handle is fully closed, button lock (A) will automatically lock couplers together.



Button Lock Equipped Latch

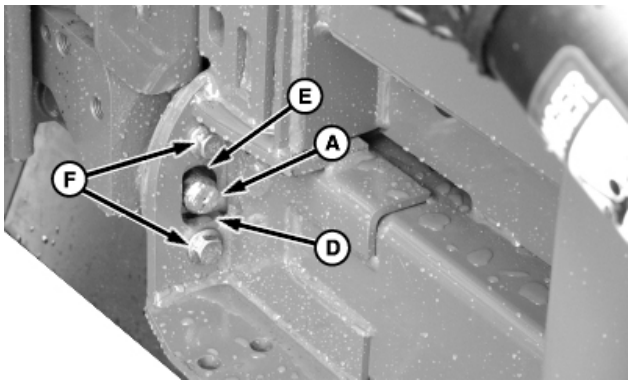
2. Latch pins (A) should move freely through latch plate holes in header when multi-coupler is latched. Latch plate (B) must make contact with bracket (C). Less clearance (D) should be maintained between bottom of plate and pin rather than top of plate (E) and pin. This may require latch plate to be flipped.

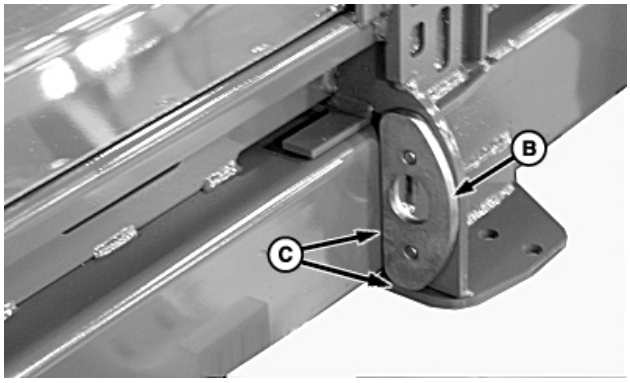
3. If adjustment is needed: Remove cap screws (F), flip plate (D) end for end and reinstall.

4. Tighten cap screws to M12 specification.

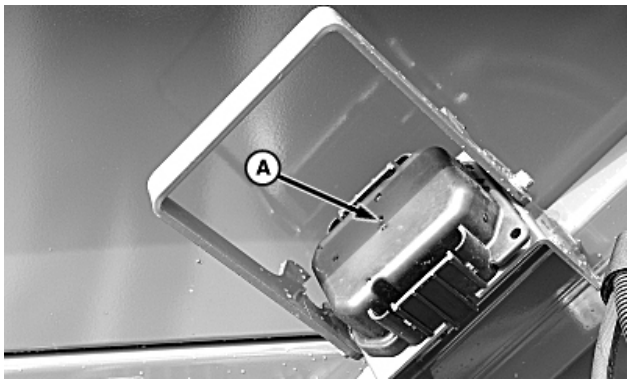
Specification

M12 Cap
Screws — Torque .....130 N·m (96 lb-ft)



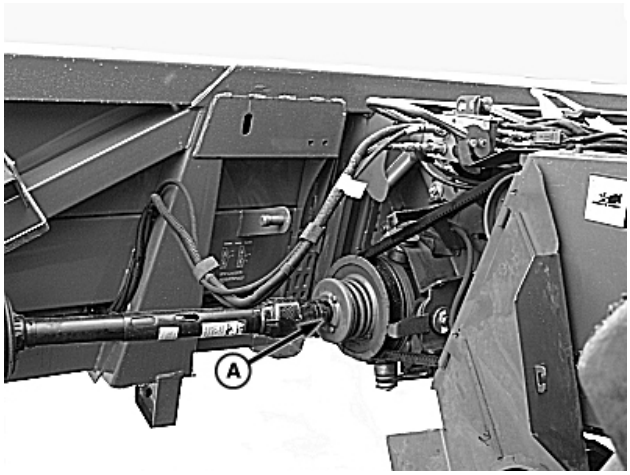


5. Install multi-coupler (A) on platform storage position.



Storage Position

6. Remove telescoping shaft (A) from storage position and install onto feeder house backshaft, making sure quick attach collar locks fully.



Detaching Corn Head from Feeder House

CAUTION: Do not leave drive shafts on combine. Personal injury or machine damage may occur if feeder house is accidentally engaged.

1. Disconnect telescoping drive shaft from feeder house at the quick disconnect coupler (A) on left-hand side of feeder house.

2. Place telescoping drive shaft in storage position (B).

   IMPORTANT: Latch pins are not to be actuated with header on the ground. If multi-coupler must be actuated with header on ground, unhook cable from handle.

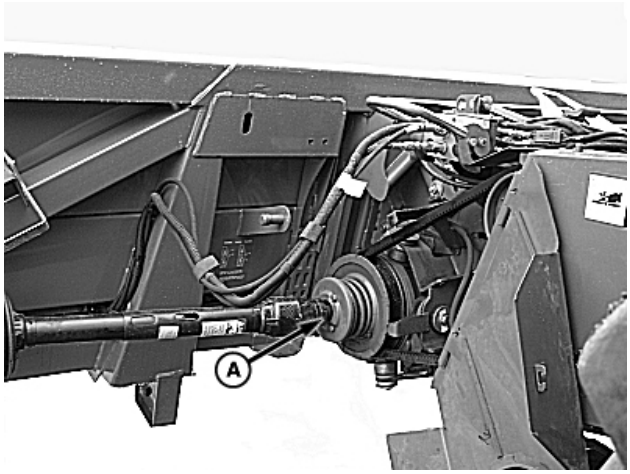
   NOTE: Latch pins should be fully retracted when handle is all the way up against the stop. Adjust cable mounting if latch pins are not fully retracted (see Single Point Latching—Adjusting).

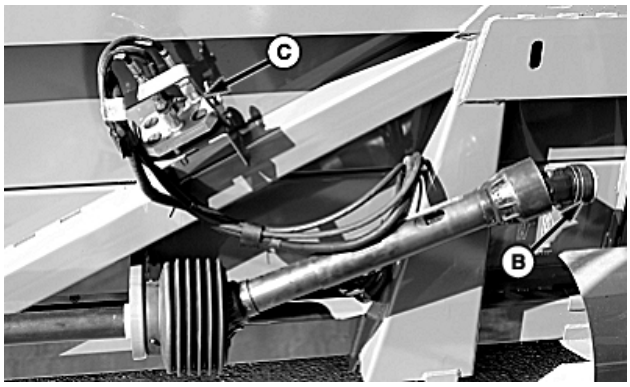
3. Remove quick-lock pin and slide lock plate through multi-coupler latch assembly.

4. Raise handle to disconnect multi-coupler.

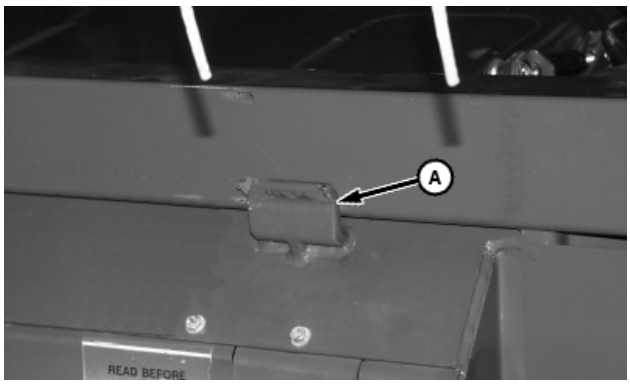
5. Remove multi-coupler cover from storage position on header and place cover on combine multi-coupler.

6. Disconnect multi-coupler from combine and place in storage position (C).





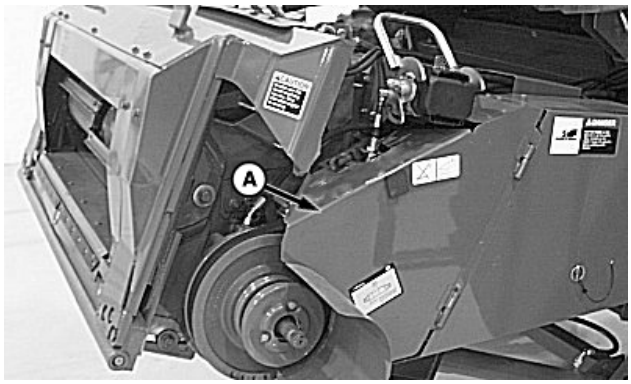
7. Sound horn, start engine, lower feeder house until hooks (A) are below top beam of head, and drive combine slowly rearward.



Single Point Latching — Adjusting

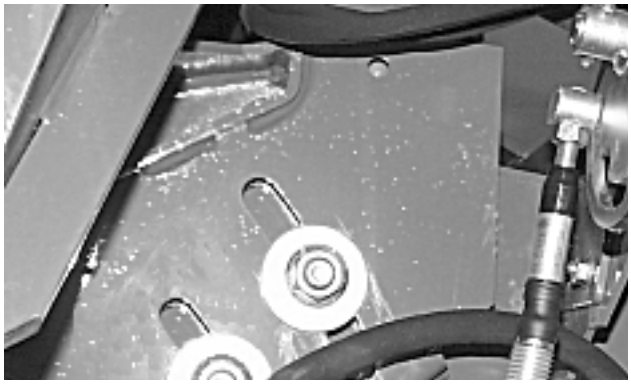
NOTE: CONTOUR MASTER Feeder House: Adjustments should only be made to cable at multi-coupler handle.

Level Land Feeder House: Adjustments should only be made to cable at multi-coupler handle, unless cable is not centered at lower end (latch pin location). See Level Land Feeder House Lower End Cable—Adjusting.



1. Open left-hand feeder house shield (A).
2. Loosen cable jam nuts (B).

   IMPORTANT: Verify handle is against stop on multi-coupler. Failure to verify handle is against the stop will result in inaccurate pin dimensions and could result in the header falling off while harvesting or transporting.



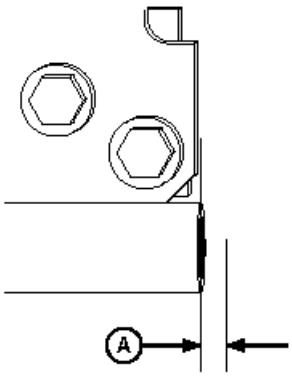
3. Rest multi-coupler handle against stop.

NOTE: Moving cable "up" in bracket pulls pin farther in.

Moving cable "down" in bracket pushes pin farther out.

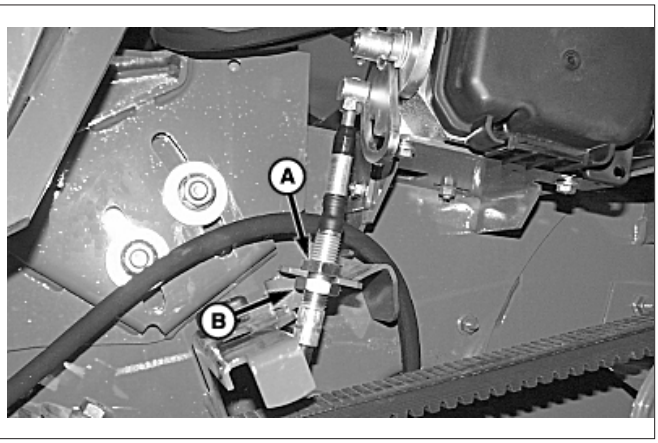
4. Adjust cable in bracket as needed for proper pin adjustment:

   • Left-hand latching pin should be flush to +/2 mm (A).



Left-Hand Latching Pin

5. Hold bottom jam nut (B) and tighten top jam nut (A).

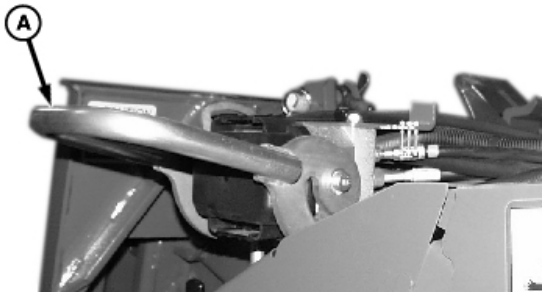


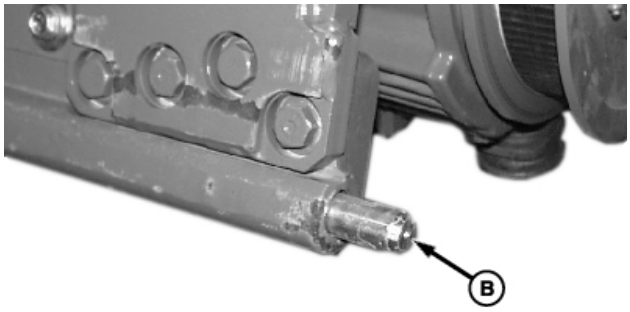
IMPORTANT: Failure to verify pins are set to specified dimensions could result in the header falling off while harvesting or transporting.

6. Fully lower multi-coupler handle (A) and verify pins (B) (both sides) are set to specification. Readjust if not set to specification.

Specification

Feeder House
Pins — Distance.....45 — 52 mm (13/ 4 in. — 2 in.)



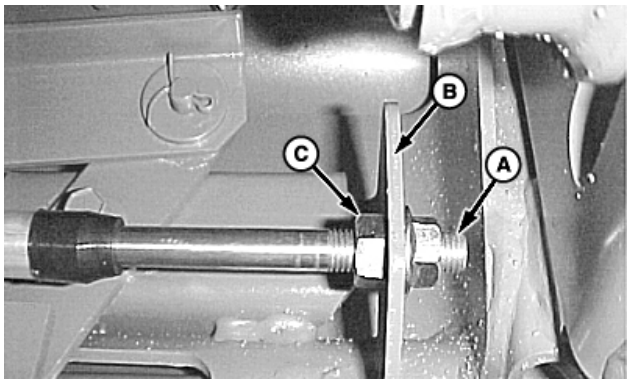


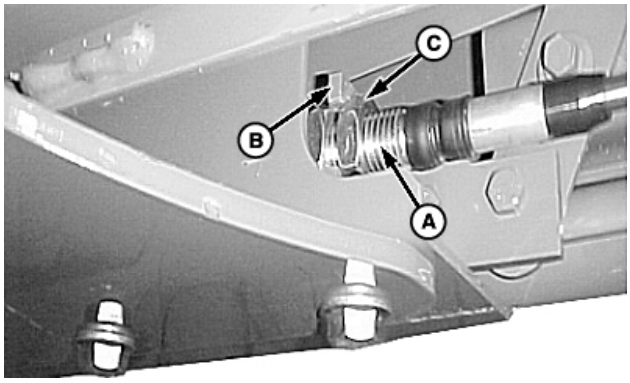
Level Land Feeder House Lower End Cable — Adjusting

Adjustments should be made to the lower end of the latching cable if the threads (A) are not centered in the bracket (B).

Loosen jam nuts (C) and adjust cable so that threads are centered in bracket.

Tighten jam nuts.



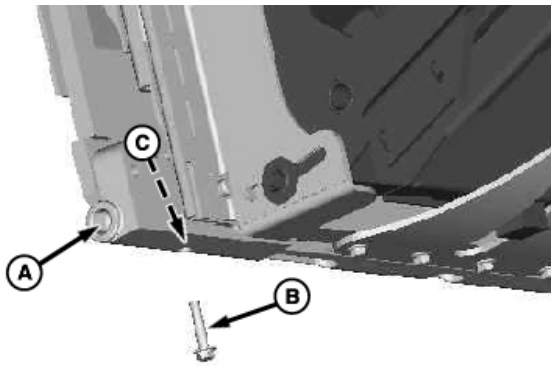


Feeder House Latching Pins (Cleanout)

If latch pins are hard to move, remove cap screws (A) and cleanout pin area. It may be necessary to fully tilt the feeder house frame in order to access these cap screws.

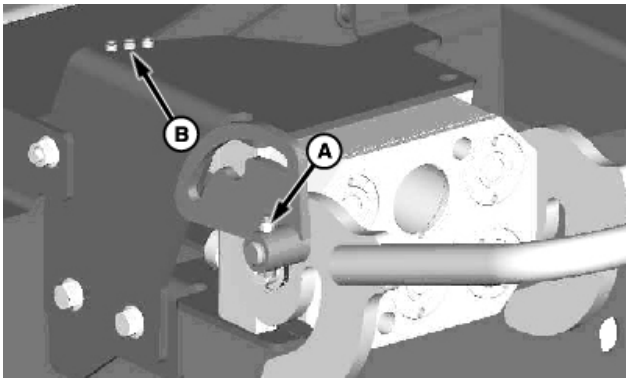
Feeder House Manual Unlatching

To remove header if shear screw should fail, push latching pins (A) through latch plates and install M12 cap screw (B) in hole (C). Repeat on opposite side.



Latching Cable Shear Screw Location

If shear screw (A) should break, remove and replace with extra shear screw (B). Three extra shear screws have been provided.



Attaching and Detaching Corn Head to Forage Harvester or Corn Husker

For attaching or detaching corn head on a forage harvester or a corn husker, see the operator's manual for that machine.

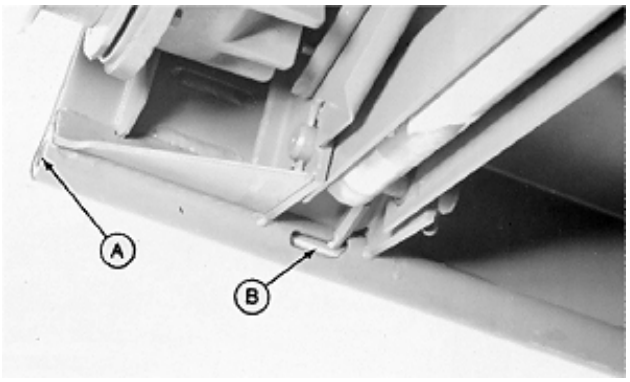
Retrofit Head to Pre 60 Series Combine

Attaching Corn Head to Pre 60 Series Combine

In order to attach a corn head to an older combine conversion bundles are required. See your John Deere Dealer for the proper bundle(s).

IMPORTANT: Avoid damage to platform and feeder house, latch pins (A) (both sides) must be in the IN position before attaching header (as shown).

Slide stop bolt (B) in and then rotate up. If pins are in the OUT position, feeder house will be damaged when header is attached.



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Transporting

Transporting Corn Head on a Trailer

CAUTION: Follow local regulations regarding width, lighting and marking.

IMPORTANT: Whenever possible avoid transporting the combine with the corn head attached. Instead, transport the corn head on a truck or header trailer.

Follow the header trailer manufacturer's recommendations regarding safe transport procedures. In absence of such instructions follow these guidelines:

- **Do not transport at speeds greater than 32 km/h (20 mph) on a trailer not equipped with brakes and 40 km/h (25 mph) on a trailer equipped with brakes.**
- **Always attach a properly sized safety tow chain.**
- **Always make sure a slow moving vehicle emblem is mounted to the rear of the trailer or header.**
- **Always make sure that the rear of the trailer is equipped with red reflectors, two red taillights and turn signals.**

Reference combine Operator's Manual for combine transporting procedures.

If equipped with ACTIVE HEADER HEIGHT CONTROL (AHHC)™ ground sensors, the sensors must be placed in storage position to prevent equipment damage when folding points (see next page for procedures).

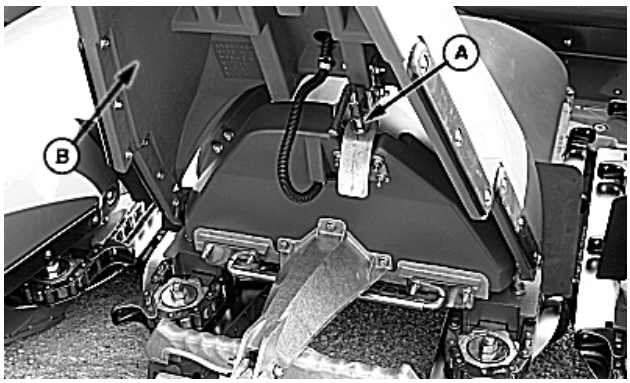
Points Folded for Transporting

ACTIVE HEADER CONTROL is a trademark of Deere & Company

To reduce transport width, points should be in upwards position (see Points Folded for Transport illustration).

1. **Center Gatherer Shields**

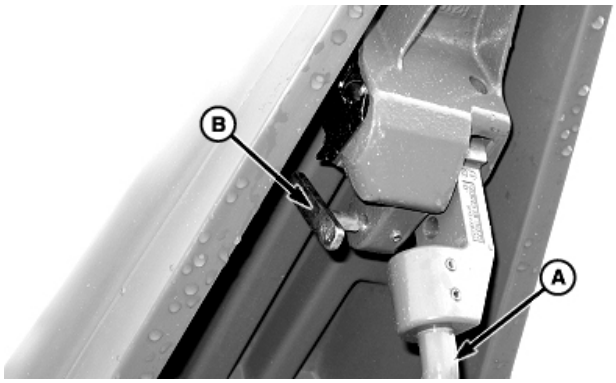
   Raise point (B) and latch (A).



IMPORTANT: If equipped with ACTIVE HEADER HEIGHT CONTROL (AHHC) ground sensors, the sensors must be placed in storage position to prevent equipment damage when folding points.

2. Place in storage position.

   Equipped with ACTIVE HEADER HEIGHT CONTROL (AHHC): Rotate sensor arm (A) up into storage position and retain with storage lock pin (B).



3. Rotate header warning lights (A) rearward.

4. **Outer Gatherer Shields** Raise point until latch pin (A) engages. To lower, pull latch and lower point.

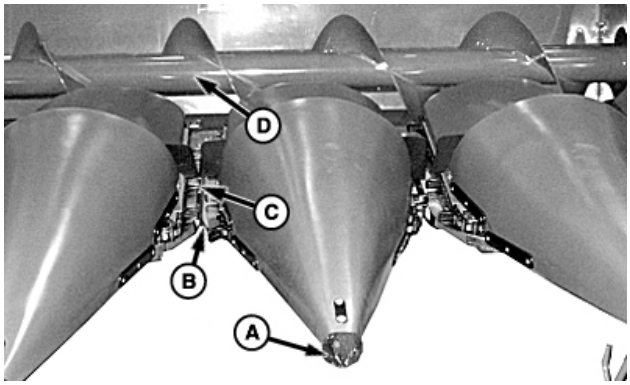
Operating Header

General Information

The gatherer points (A) are positioned between the rows of corn. Stalk rolls (B) grab the corn stalks and pull them rapidly down between the rolls.

When an ear of corn reaches the deck plate, the ear is prevented from going through because of the narrow opening. The stalk rolls continue to pull on the stalk and snap the ear free of the stalk.

Gatherer chains (C) catch the ears and carry them to an auger (D) which delivers the ears to the feeder conveyor. The feeder conveyor delivers the ears to the threshing cylinder.



Starting in the Field

Operate the combine in a lower gear until you become familiar with the corn head.

After making several rounds, stop the corn head and shut off engine and remove key. Check all bearings for heating. All bolts must be tight and chains properly adjusted.

Adjust Corn Head Properly

After making several rounds, check adjustments on corn head and combine. (See “ADJUSTMENTS”).

Drive and Operate Carefully

Drive carefully so the corn head will stay on the rows. Never force the corn head or combine to the point of overloading. Overloading can cause breakdowns. Start out in a lower gear and increase speed until you find the proper ground speed at which to operate.

Listen for slipping clutches or other unusual noises. If the corn head becomes plugged, clean it out by keeping engine at operating speed, but decrease ground speed until header has been cleared.

IMPORTANT: The forward movement of the combine must be approximately the same as the rearward movement of the gathering chain flights or plugging can result.

Corn Head Engage/Disengage Drive

NOTE: To engage the header, operator must be in the operator seat before engaging the separator and head switches.

To engage header:

- Switch road transport disconnect switch (A) to field position.
- Engage separator switch (B).
- Engage header switch (C).

Header Engage Switch (9000 and 10 Series Combines)

Corn Head Drive Speeds

Forward combine travel must be close to the same as rearward movement of gathering chain flights.

If ground speed is too fast, gathering chains will push stalks forward and knock off ears. If ground speed is too slow, gathering chains will jerk stalks back into the corn head, possibly shearing off stalks or knocking off ears.

50, 60 and 70 Series Combines with Variable Speed Feeder House

The corn head drive speed is varied by changing the speed of the lower feeder house shaft. Lower feeder house shaft speed is changed with reel switch (A) located on the multifunction control handle.

To operate reel switch, the road transport disconnect switch (B) must be in field position.

Push and hold the top of switch to increase speed, push and hold bottom of switch to decrease speed.

Engine and header must be running to adjust speed.

9400, 9410, 9500, 9510, 9600 and 9610 Combines With Variable-Belt-Drive Feeder House

Corn head drive speed is varied by changing speed of the lower feeder house shaft. Lower feeder house shaft speed is changed with the plus (+) or minus (-) switch located on the hydro handle.

Push and hold the bottom of switch to increase speed, push and hold top of switch to decrease speed.

Engine and header must be running to adjust speed.

Shaft speed of variable drive equipped feeder house ranges from approximately 630 to 780 RPM.

Use the following table as a guide in matching corn head speed to combine travel speed:

	Approximate Combine Travel Speed	Approximate Lower Feeder House Shaft Speed
less than:	6.4 km/h (4.0 mph)	630 rpm
	8.9 km/h (5.5 mph)	710 rpm
greater than:	11.3 km/h (7.0 mph)	780 rpm maximum

Combines With Fixed Speed Feeder House

Refer to adjustments Section for modifying header speed on fixed speed feeder house combine.

Harvesting Corn With Weakened or Broken Stalks

Stalks and ears can be weakened by disease (stalk rot) or insects (corn borers), causing them to break off near the ground when contacted by corn head divider points and gatherer shields. This material is pushed into piles that prevent stalks from contacting the stalk rolls. Crop is lost and harvesting productivity is reduced when this occurs.

The following is a list of possible solutions to these problems:

- Reduce combine ground speed.
- Increase corn head speed with the variable speed feeder house.
- Adjust deck plates as wide as possible without allowing ears to contact the stalk rolls.
- Remove ear savers.
- Replace stalk rolls if flutes are badly worn.

Harvesting Popcorn

- Adjust deck plates as close as possible
- Check combine operator's manual for correct settings.
- Raise cross auger so the largest diameter ear passes between flighting and floor without contact.
- Decrease header backshaft speed.

Gatherers

For most conditions, operate front of gatherer points just touching the ground.

In muddy conditions, or in snow, raise header high enough to prevent scooping material into throat opening.

Adjust all points level with one another.

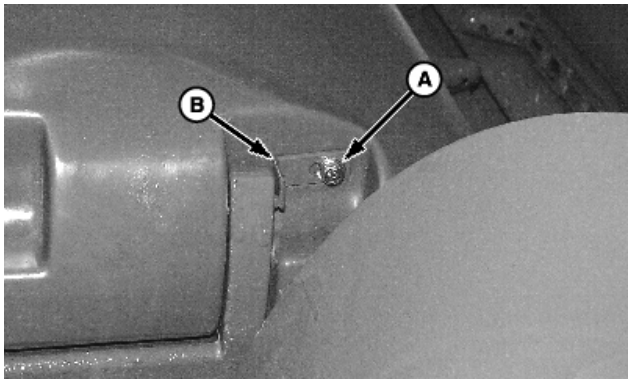
Raising and Removing Center Gatherer Shields and Points

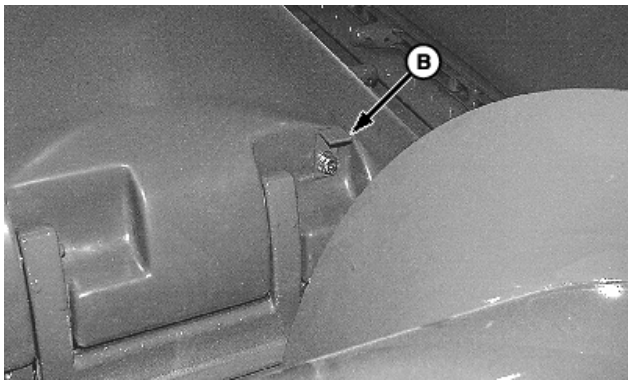
1. Loosen cap screw (A) on the rear of the gatherer shield and raise stop (B) to the vertical position.

NOTE: Do not over tighten cap screw (A).

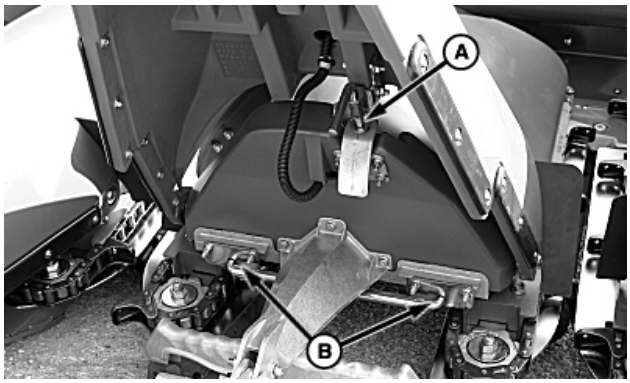
Specification

Gatherer Shield Cap Screw — Torque .....20 Nm (15 lb-ft)





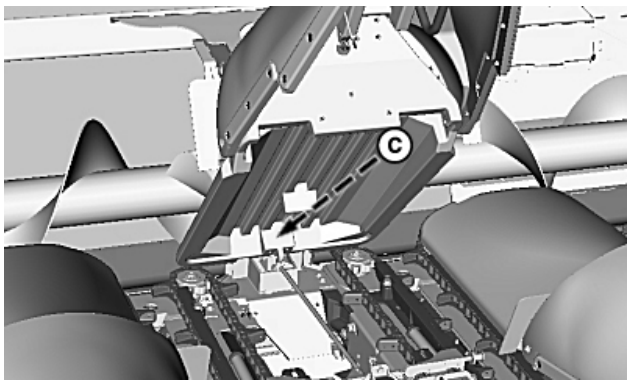
2. Raise point and retain using pin (A). Pull latch bar (B) and lift point.

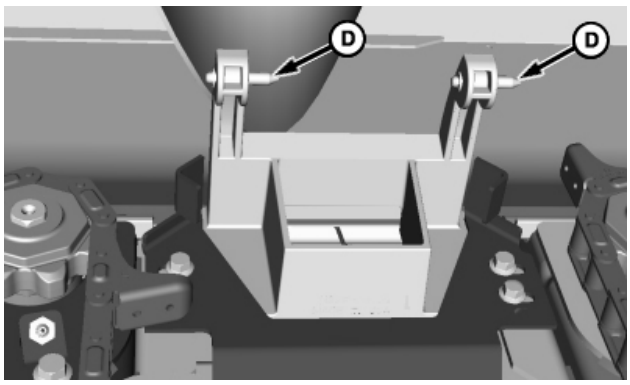


3. IF EQUIPPED: Disconnect ACTIVE HEADER CONTROL sensor wiring harness connector (C) from main wiring harness connector. Connector is located inside of the deck cover, near the through hole. Cut tie band attached to the rear of the cover, and then pull connector out to access.

CAUTION: The center shield and point assembly is heavy and awkward to handle.

4. Slide the gatherer shield to right-hand side until shield is free of support pins (D), lift off point and gatherer shield assembly.

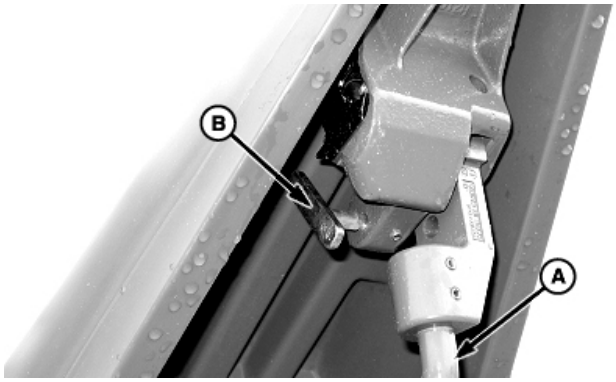




Lowering ACTIVE HEADER CONTROL Ground Sensors (Optional)

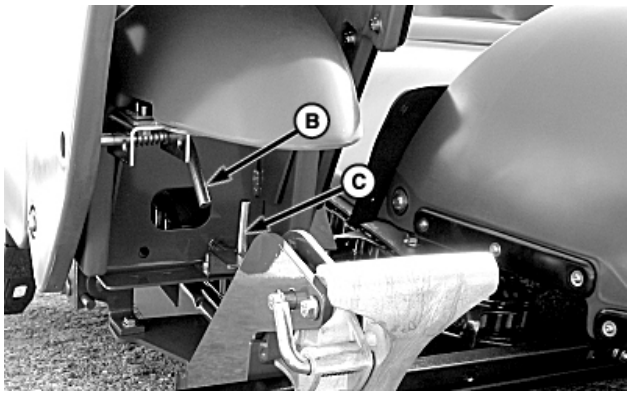
Support sensor arm (A) and pull storage pin (B) out to unlock sensor arm.

Storage lock pin should remain in locked out position for field operation.



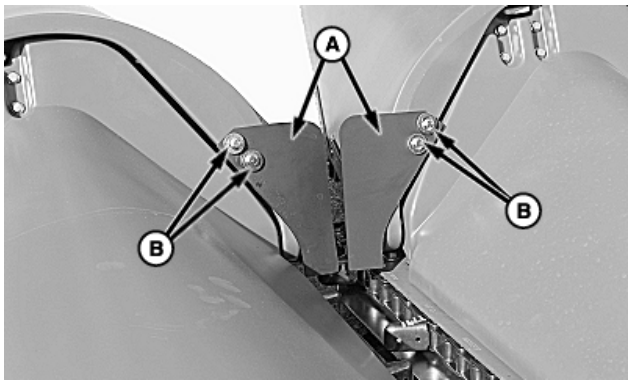
Raising and Tilting End Fenders and Points

1. Release latch pin (A) and rotate to locked position.
2. Raise outer point until pin (B) latches.
3. Release pins (C) and rotate gatherer shield and point outward.



Ear Savers

Ear savers (A) prevent loose ears from sliding over the gatherer chains to the ground.



In down corn, or if stalks tend to plug up at the gatherer throat opening, remove ear savers. Retain ear savers and hardware.

In standing corn, replace ear savers to prevent ear loss.

Replace ear savers as follows:

Remove cap screws (B) attaching ear savers and remove ear savers.

NOTE: When installing ear savers, torque cap screws to specification.

Specification

Cap Screws — Torque.....20 — 25 Nm (15 — 18 lb-ft)

Row Units

The row unit houses the trash knives, gathering chains, deck plates, and stalk rolls. Ears of corn are snapped from the stalk and conveyed to the auger by the row unit.

Stalk Rolls

Stalk rolls pull cornstalks down so the ears will be snapped off at the stalk and onto the deck plates.

To help you decide which stalk rolls are best suited for your needs, see the following guidelines.

Knife Stalk Rolls

Are recommended if your need is to cut and size corn stalks (10 16 in. length) at harvest for the following reasons:

- Faster residue breakdown.
- Earlier soil warm up and dry out.
- Improved handling of residue by tillage and planting equipment, especially in high yielding corn (150 bu/ac plus).
- Desire to reduce passes needed for shredding, cutting or sizing stalks with other implements.
- Knife stalk rolls perform well in all conditions.
- Knife rolls work better in damp tough and high moisture conditions.
- Knife rolls also work better in heavy grass, vines and weeds.

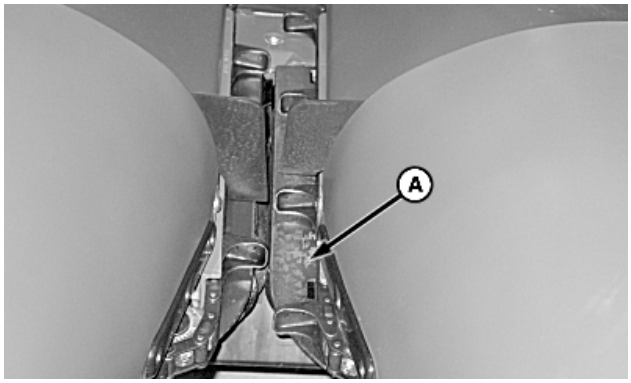
Hydraulic Adjustable Deck Plates

NOTE: To adjust or calibrate your deck plate, see your combine Operator's Manual.

Hydraulic adjustable deck plate (A) allows operator to adjust deck plates within the cab for varying stalk and ear size to prevent grain loss from head.

Deck plates can be moved only when engine is running and road transport disconnect switch is in field position.

Pressing reel forward switch opens deck plates and pressing reel aft switch closes deck plates.

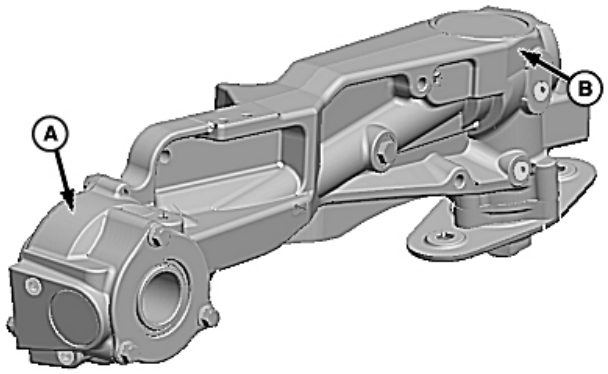


Chopping Gear Cases (Optional)

Factory installed corn stalk choppers are available for model CH2208 header.

Chopping gear cases have two reservoirs that are filled with 80W90 GL5 oil from the factory.

IMPORTANT: Replacement gear cases purchased through service parts are shipped dry. Be sure to fill any replacement gear cases with oil to specification before operating machine.



Item	Measurement	Specification
Rear Gear Case Reservoir (A)	Capacity	325 mL (11 oz)
Front Gear Case Reservoir (B)	Capacity	500 mL (16.9 oz)

Each reservoir is equipped with a drain plug and an oil check/fill plug that need to be removed to fill or drain the reservoirs.

Oil should be checked once a season or every 200 hours of operation (see LUBRICATION AND MAINTENANCE section).

Oil should be drained and replaced every 1000 hours of operation (see LUBRICATION AND MAINTENANCE section).

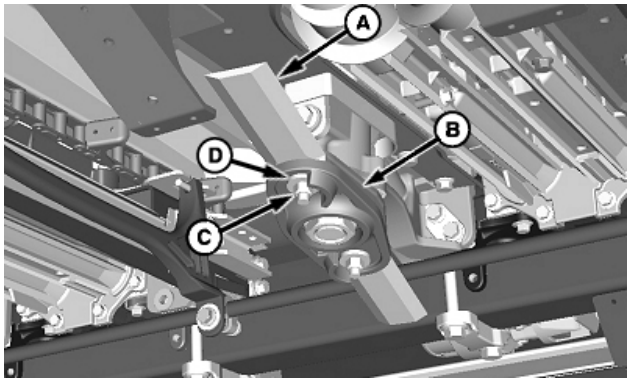
Removing, Flipping, and Installing Chopping Knife Blades

CAUTION: Knives have two sharp cutting edges and can cause serious injury. Wear gloves when handling knives.

NOTE: Chopping knives are wear items. Knives can be flipped for extended knife wear. Worn, dull, or damaged knives are factors that affect corn head power consumption and stalk chopping quality, both of which can limit harvest speed. The expected wear life of chopping knives will vary with the operator's harvest conditions and operation habits. Flip and replace knives as needed to maintain acceptable stalk chopping ability & replace any excessively worn bushings and hardware.

NOTE: Chopping knife blades must be replaced in pairs on each chopping gear case.

1. Remove lock nuts (C), washers, bushings (D), and cap screws.
2. Remove knives (A) from between plate (B).
3. Inspect all hardware and bushings for excessive wear or damage and replace as necessary. Lock nuts can be reused when flipping blades. Lock nuts must be replaced when replacing knives.
4. Install knives using cap screws, bushings, washers, and lock nuts. Tighten to specification.



Specification

Screw — Torque .....130 Nm (96 lb-ft)

Auger

Auger (A) conveys crop material from the row units and directs crop material into the feeder house.

Stubble Lights

Lights up the area directly behind the corn head so the operator can see the height of cut during night-time harvesting.

Stubble lights can be tilted up or down, and can be twisted left and right.

Outer Gatherer Extensions

Extensions (A) prevents ear loss over the sides of the low profile gatherer sheets.

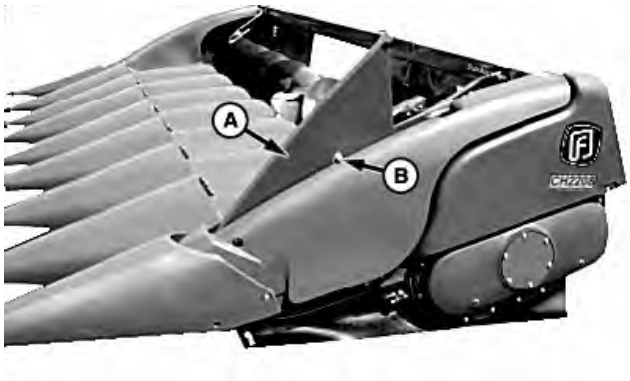
When operating in conditions where the corn stalks are down, Lower the outer gatherer extensions for smooth stalk gathering action.

Extensions are incorporated into the end fender and can be raised and lowered.

1. Raise extension until pin (B) locks.

2. To lower extension push pin (B) in an lower extension.

NOTE: Extension must be lowered to raise outer point.



Calibration and Programing

When to Calibrate

NOTE: **All Calibration:** *See calibrations for your Header in your Combine Operator's Manual.*

Calibration procedures must be performed before first use or if header height control sensor, deck plate position sensor or associated components are replaced.

- Header Calibration - LC1 (hdr).
- CONTOUR MASTER Angle Sensor Calibration - LC1 tilt (Optional).
- Hydraulic Adjustable Deck Plate - LC1 (Optional) on a 50 and 60 Series Combines Sensor Calibration - dEc.
- Active Float Calibration - FLO.

NOTE: The condition causing the error must be corrected before the calibration can be continued.

If any errors occur during the calibration procedures, error codes will be displayed on the triple display tachometer, on 50 and 60 Series Combines and displayed on the Command Center Display on a 70 Series Combine.

Calibration Error Codes

IMPORTANT: Condition(s) causing the error code must be corrected before the calibration procedure can continue.

If any error codes occur (ERxx) during the calibration procedures, call your Frontier dealer with the error code number.

Armrest Functions

CommandCenter™ Armrest header functions: For complete information on each function see your Combine Operator's Manual.

A — Header Engage and Feeder House Reverse Switch
B — Separator Engage Switch
C — Cutterbar Pressure Adjust Switch
D — Draper Belt Speed Adjust Switch
E — Feeder House Rate/Sensitivity Adjust Switch
F — Road Transport Disconnect Switch
G — Header Height/HydraFlex™ Pressure Control Dial
H — Reel Speed or Belt Pickup Speed Dial
I — Selection Dial (Operating Adjustments and Controls)

Active Header Control Display

NOTE: For complete information on each function and calibrations. Refer to your Combine Operator's Manual.

Header Height Sensing Button: allows the operator to select the position of the header relative to the ground and return to that position automatically.

Header Height Sensing Button (HydraFlex): allows the operator to adjust the cutterbar ground pressure, or weight of the cutterbar, and return to that setting automatically. HydraFlex works in conjunction with header height sensing to maintain a header position relative to the ground, follow the ground contour, and return to that position automatically.

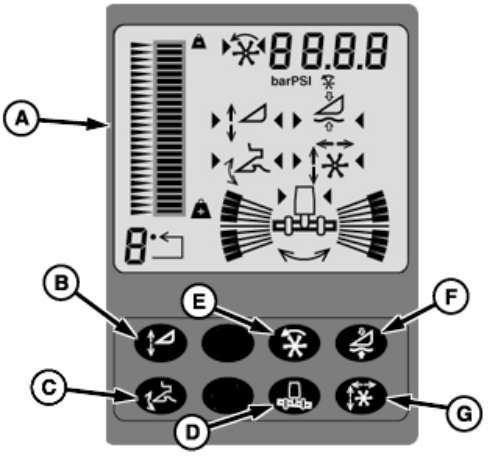
Header Height Resume Button: allows the operator to select the position of the feeder house relative to the machine and return to that position automatically.

Contour-Master Button: allows the operator to maintain the header position relative to the ground. Sensors are used to determine the height at each end of the header. The header tilts to equalize the distances to the ground at each end of the header. If equipped with Header Height Sensing — HydraFlex (optional), the two systems work together to maintain the closest position of the cutterbar relative to the ground.

Reel Dial-A-Speed Button: allows the operator to automatic control of operating speed for reel or belt pickup headers. Operating speed will be a ratio of the machine ground speed to the reel or belt speed.

Active Header Float Button: allows a rigid header to be operated in contact with the ground and maintain a set contact pressure. The operator selects how firmly the header contacts the ground and returns to that pressure automatically.

Dial-A-Speed is a trademark of Deere & Company.



A — Active Header Control Display
B — Header Height Sensing Button
C — Header Height Resume Button
D — ContourMaster Button
E — Reel Dial-A-Speed ™ Button
F — Active Header Float Button
G — Reel Position Resume Button

Deck Plate Control Display

Reel fore/aft switch (A) on multifunction control handle allows operator to open and close adjustable deck plates.

System is active when:

- Engine is running
- Road transport disconnect switch (B) is in field position

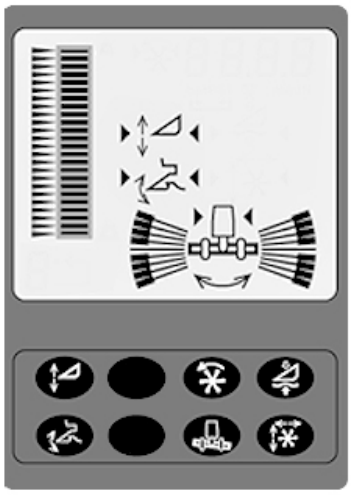
Press left-hand side of reel fore/aft switch (C) to open deck plates and right-hand side (D) to close deck plates to desired position.

Deck plate position icon (E) and deck plate opening (F) will appear on display. Deck plates have a range of 0 (minimum position) to 9 (maximum position).

Press and hold activations buttons 1,2, or 3 on multifunction control handle for two seconds to memorize current deck plate position. After deck plate position has been changed, press memory button to return to previous position.

Description of Automatic Header Height Control System

Automatic Header Height Control system compensates for uneven ground and controls horizontal and vertical positions of the header. The system continuously compares the preset position and the actual position, thus keeping the header in the desired working position. Values are entered by the response rate adjust and sensitivity adjust along with the selection dial located on armrest.



System Requirements:

- Road transport disconnect switch must be in field position.
- Engine is running.
- Header engaged.
- Desired header control mode activated.

Lateral Tilt Adjustment — Two modes

- Manual Adjust — hydraulic components are directly activated by multifunction control handle.
- Automatic Adjust — parallel adjustments of the header in relation to the ground are carried out by sensors on each end of header. This ensures that the distance between the header and the ground is equal on both the left-hand and right-hand sides.

Platform Height Adjustment — Four Modes

- Manual Adjust — hydraulic components are directly activated by multifunction control handle.
- Automatic height resume — platform can be set to any position within the feeder house range.
- Automatic height sensing — height of the platform is maintained with height sensors attached to the platform. This ensures that header height is always constant over rough terrain.
- Automatic float control — machine maintains a constant header pressure with ground contact.

NOTE: It is possible to override automatic modes manually.

Height Sensing and Active Header Float Pressure Sensitivity (Automatic Functions)

controls the speed of response for header movements when in automatic sensing and automatic float modes.

Operation:

NOTE: Press feeder house rate adjust and sensitivity adjust switch twice to adjust sensitivity settings (C).

Sensitivity setting will be shown on CommandCenter display when adjusting. Settings are adjusted between 0 to 100.

Press feeder house rate adjust and sensitivity adjust switch (A) **twice** and use selection dial (B) to adjust speed at which header follows ground contour.

Turn selection dial clockwise to increase response rate or counterclockwise to decrease response rate settings.

Manual Raise/Lower Speed (Manual Functions) controls response rate of header raise/lower functions for manual control or when in automatic height resume mode.

Operation:

NOTE: Press feeder house rate adjust and sensitivity adjust switch once to adjust rate settings (C).

Rate setting will be shown on CommandCenter display when adjusting. Settings are adjusted between 0 to 100.

Press feeder house rate adjust and sensitivity adjust switch (A) once and use selection dial (B) to adjust rate at which header will react when being raised or lowered.

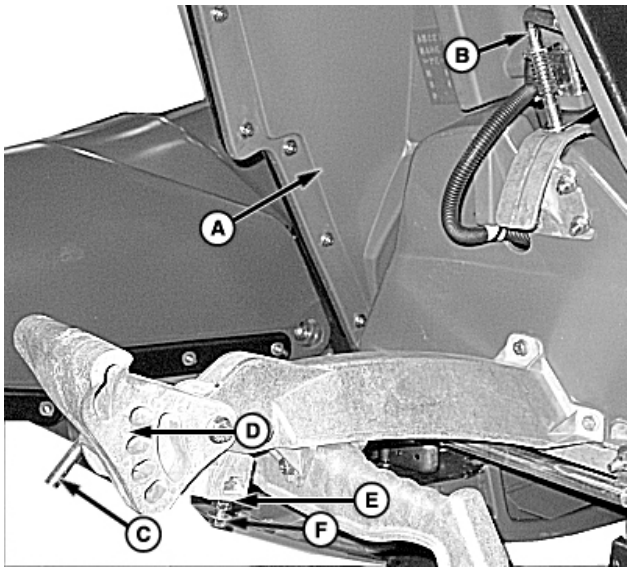
Turn selection dial clockwise to increase response rate or counterclockwise to decrease response rate settings (C).

Adjusting and Leveling Gatherer Points

CAUTION: Raise corn head until points are off of the ground, shut off engine, and remove key.

Set one gatherer point to an appropriate height. Set remaining points to same height.

1. Raise point (A) and lock latch (B).
2. Pull spring locking pin (C) and adjust height using location holes (D).
3. The points can also be fine adjusted by loosening jam nut (E) and adjusting cap screw (F) up or down.



Adjusting Trash Knives

Trash knives prevent weeds and trash from wrapping around stalk rolls.

Trash knives must be set as close as possible to rolls without striking the flutes.

1. Loosen four cap screws (B).

2. Adjust trash knife (C) so that gap (A) between knife roll is within specification.

Specification

Trash knife roll to
Stalk-Roll-Flute
Gap — Gap .....1.5 mm (1/16 in.)

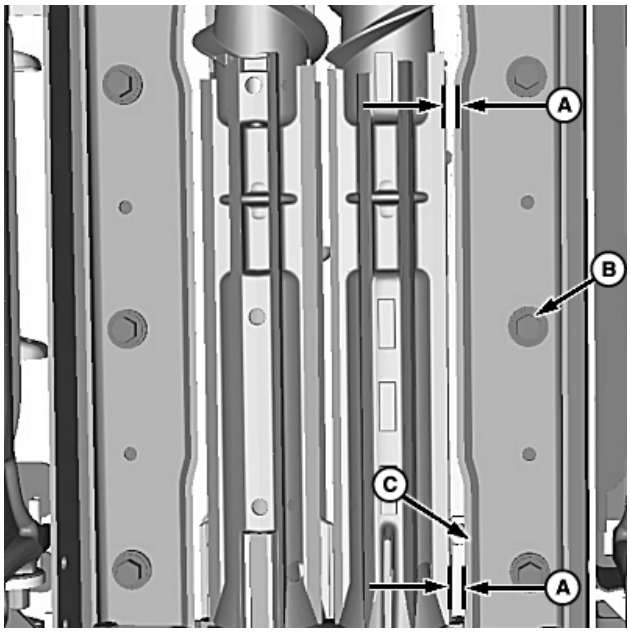
3. Tighten cap screws (B) to specification.

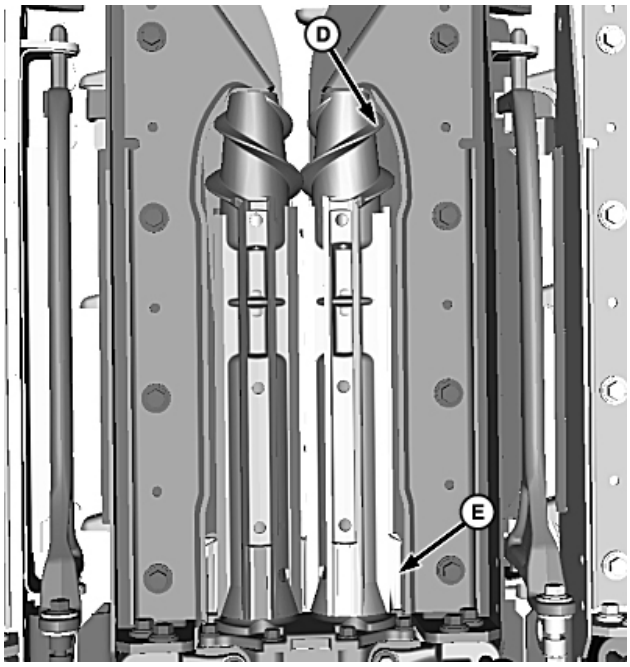
Specification

Trash Knife Mounting
Cap screws — Torque .....130 Nm (96 lb-ft)

4. Verify stalk roll spiral (D) (front of roll) and stalk roll fin (E) (rear of roll) clear the trash knife when rotated.

5. Repeat procedure on opposite trash knife and for remaining row units.



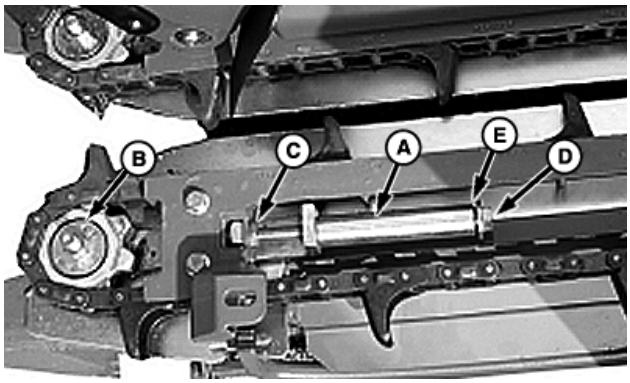


Adjusting Gatherer Chain Tension

Gatherer chain tension is maintained by a spring-loaded tightener. The spring is shielded by a spacer tube (A) that also serves as a stop to prevent the idler sprocket (B) from retracting too far.

To increase gatherer chain tension, loosen nut (C) and tighten bolt (D).

To prevent chain from running off idler sprocket, maintain a 4.8 mm (3/16 in.) maximum space between spacer tube (A) and washer (E).

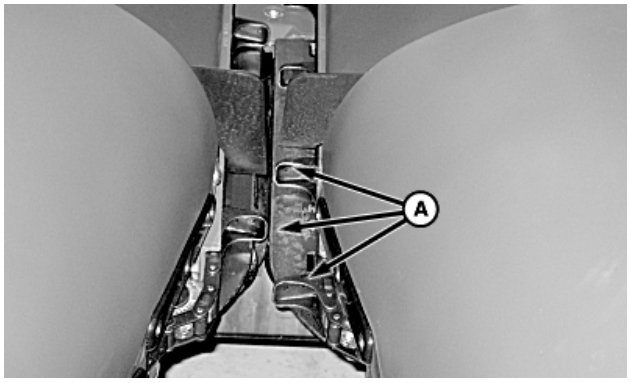


Adjusting Gatherer Chain Flights

Gathering chains are assembled at the factory with the chain flights (A) staggered between one another.

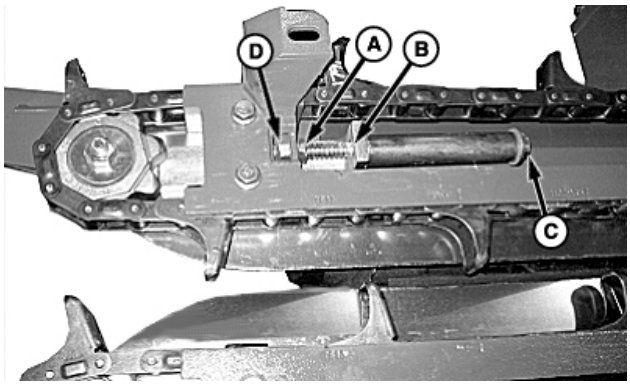
IMPORTANT: Be careful to avoid rocks and other obstructions in the row when running gatherers close to the ground.

1. Remove center shield.



2. Turn nut (A) until it is against leg of idler support strap (B).

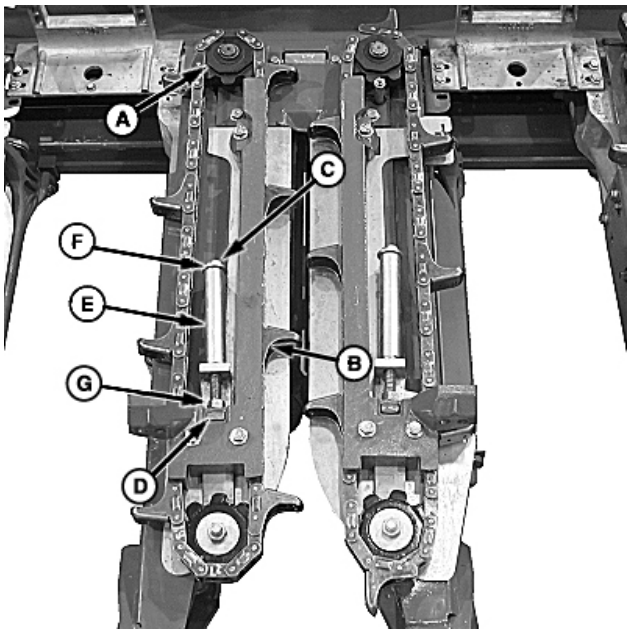
3. Loosen bolt (C) until nut (D) disengages.



4. Lift chain off sprocket (A) and rotate chain until flights (B) are uniformly spaced.

5. Turn bolt (C) into nut (D) and tighten bolt until a 4.8 mm (3/16in.) maximum space between spacer tube (E) and washer (F).

6. Screw nut (G) tight against idler assembly.

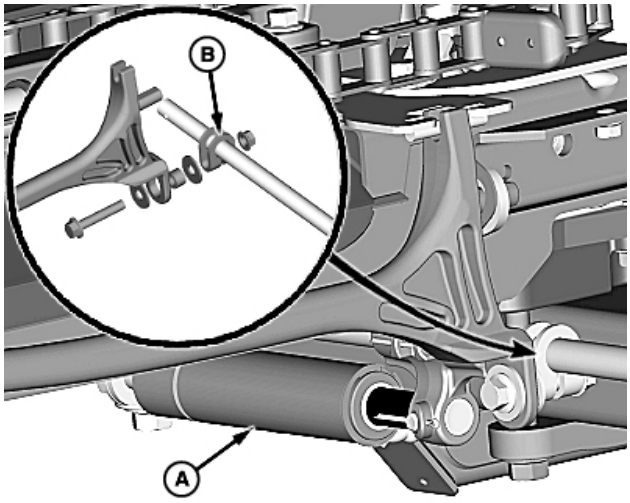


Adjusting Deck Plates

NOTE: Deck plates are factory set.

1. Set deck plates to closed position (cylinder (A) fully extended). Verify left-hand side deck plates are in the closed position and reset and tighten clamp if necessary.

2. Clamp (B) should close and crimp tie bar when hardware is tightened. Install pivot arms on remaining row units.



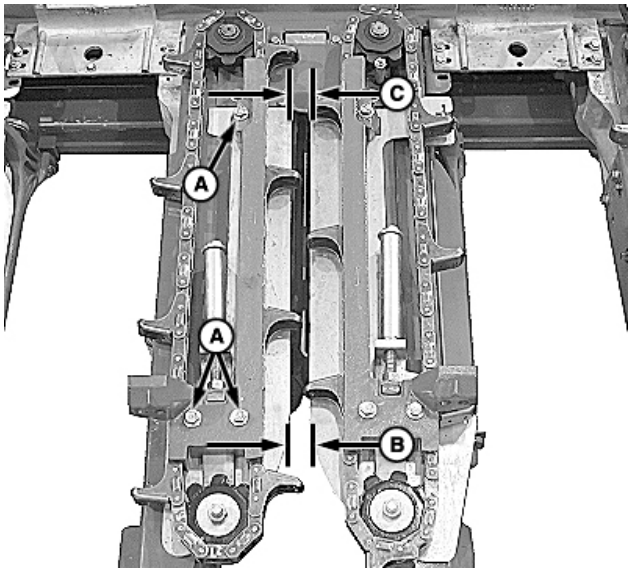
3. Loosen cap screws (A) retaining right-hand side deck plate to row unit frame.

4. Set front spacing (B) to 18 mm (23/32 in.) and rear spacing (C) to 20 mm (25/32 in.).

5. Tighten cap screws to specification.

Specification

Deck Plate Cap
Screws — Torque .....95 Nm (70 lb-ft)

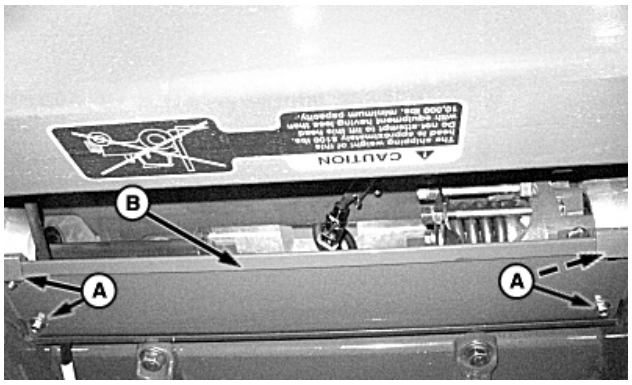


Adjust Row Spacing

CAUTION: When working under the corn head, always place the hydraulic cylinder safety stop in safety position to prevent header from lowering.

ROW SPACING

Corn Head	cm	in.
CH2112	91.4, 96.5	36, 38
CH2208	91.4, 96.5	36, 38



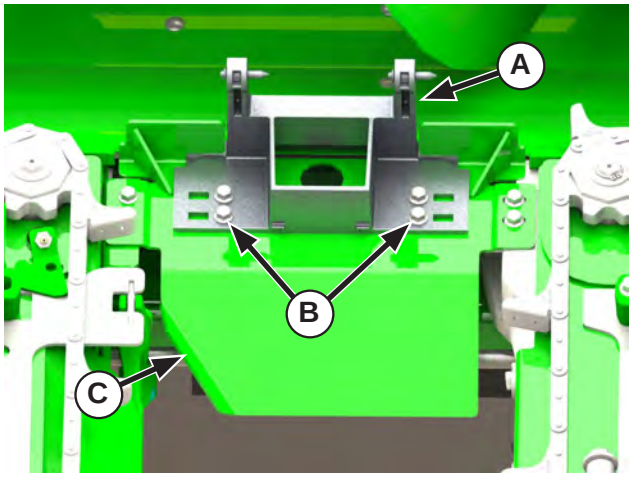
1. Remove and retain attaching hardware (A) and row unit drive shield (B).

2. Remove gatherer shields and points. (See Raising and Removing Center Gatherer Shields and Points in the Operating Header section for procedure.)

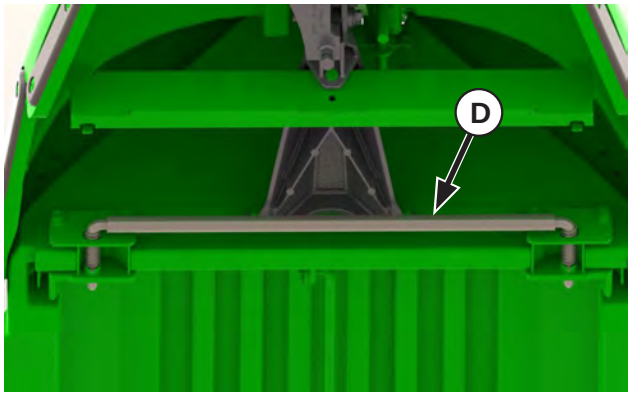
   NOTE: Row unit spacing cannot be changed on the CH2112. A different frame and augers are used for 36" and 38" spacing.

3. Remove cap screws (B), shield (C) and support (A).

   NOTE: Shields (C) are different for 36" and 38" row spacing. See the Parts Catalog for correct part numbers for desired row spacing.

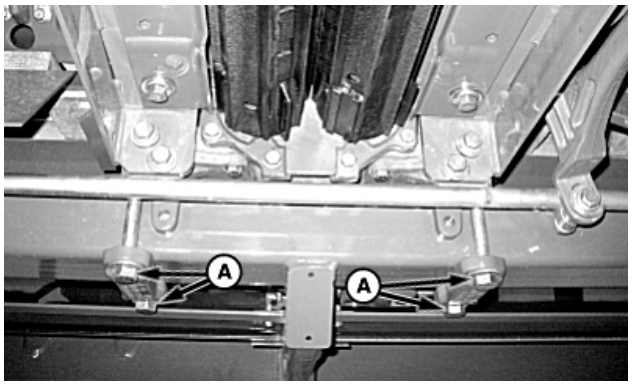


   Replace the tubes (D) used for latching the points to the row units. See the Parts Catalog for correct part numbers for desired row spacing.



   NOTE: To slide row units to desired location, with correct lifting devise lift and support under row unit skid plates keeping weight of unit on main frame.

4. Loosen bolts (A) of center two row units. Move both row units an equal distance to correct row spacing. Then move to the next outer row unit. Loosen bolts and move unit to the desired row spacing and continue until all row units are spaced correctly. Torque unit attaching bolts to specification.



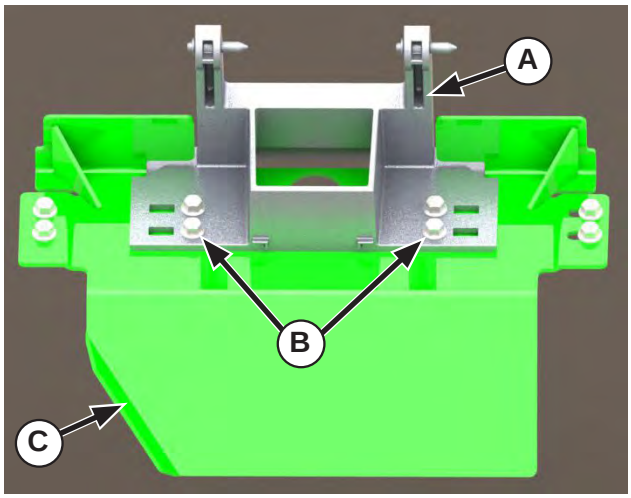
Specification

Unit Attaching
Bolts — Torque .....310 Nm (229 lb-ft)

5. Position row unit shield and gatherer shield support for desired row spacing and reinstall cap screws (B) in shield (C) and gatherer shield support (A).

Specification

Gatherer Shield
Support — Torque .....70 Nm (52 lb-ft)

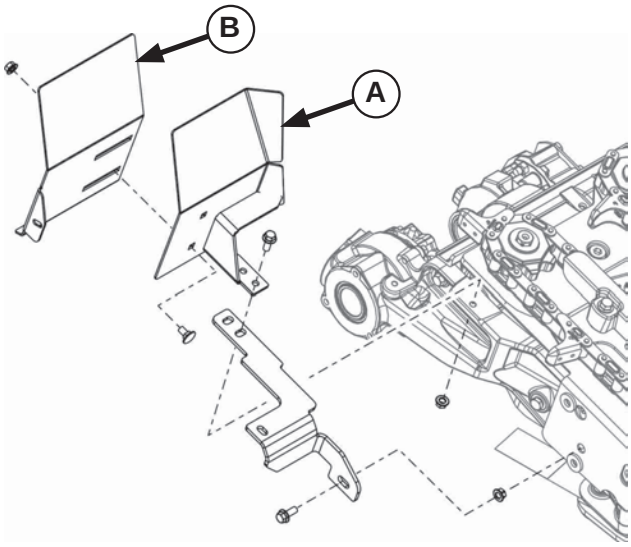


6. Reinstall shields and points on row units.

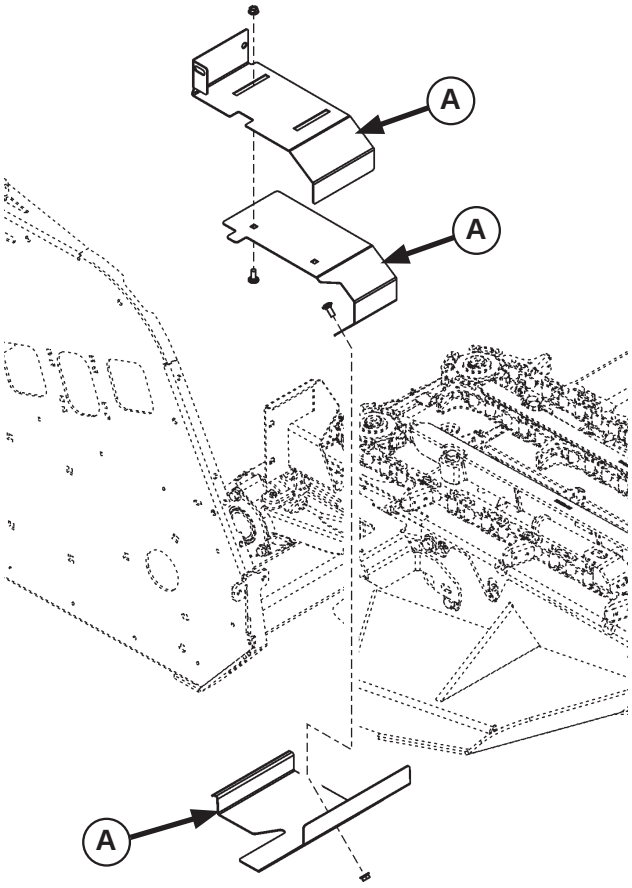
7. Connect sensor wire harness (if equipped) and push connector into hole of deck cover. Retain harness at yellow tape marks on harness to ensure proper slack for raising points.

8. Reinstall row unit drive shield.

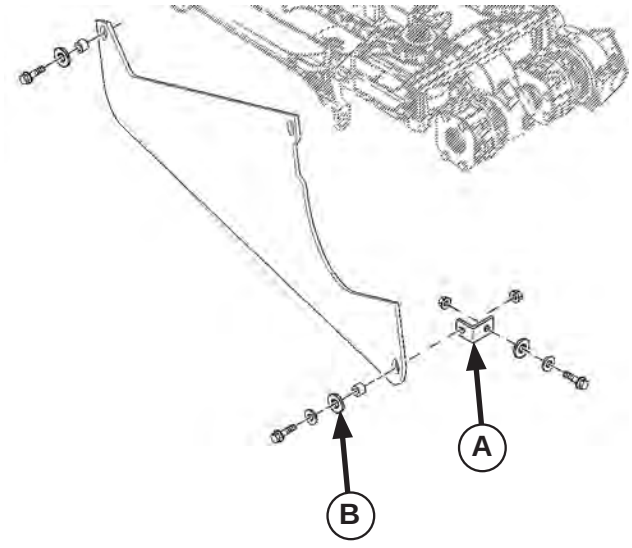
9. Replace outer strippers (A) and gap adjusters (B). See the Parts Catalog for correct part numbers for desired row spacing.



10. If converting to 36” spacing, install debris shields (B). See the Parts Catalog for correct part numbers for desired row spacing.



11. If converting to 36” spacing, install additional angle (A) and washer (B) on LH outer chopping curtain. See the Parts Catalog for correct part numbers for desired row spacing.

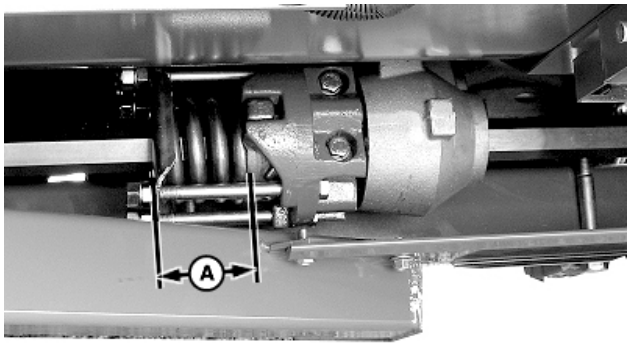


Adjusting Slip Clutches (CH2112 only)

Slip clutches protect the corn head drives. Each row unit drive and auger drive has a slip clutch.

All slip clutches are properly adjusted at the factory. The only time slip clutches will require adjusting is when they are disassembled for service. The length of the row unit slip clutch spring (A), when correctly adjusted, must be 66 mm (25/8 in.). Chopping corn units and auger drive slip clutch are not adjustable.

IMPORTANT: Do not tighten nuts to the point where the clutch will not slip. The two nuts used to compress the spring must be jammed together. Torque to specifications. Grease thrust washer but do not grease clutch facings.



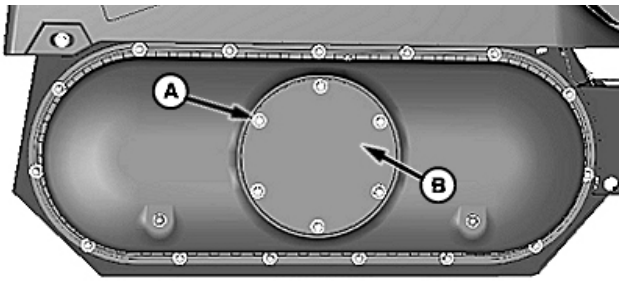
Specification

Slip Clutch Jam
Nuts — Torque.....125 Nm (92 lb-ft)

NOTE: 12 row corn heads cross augers are driven from both sides.

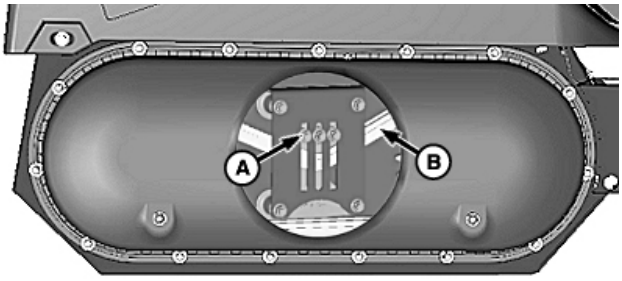
Adjusting Row Unit Drive Chain

1. Remove cap screws (A) and cover (B).



NOTE: An overtightened chain will cause undue chain wear. Row unit chain is a continuous chain without a connector link.

2. Adjust tension on drive chain (B) using tensioner (A). Lower chain strand should have play in chain with movement of 10 mm up and 10 mm down. Tighten cap screws to specifications.



Specification

Tightener Cap
Screws — Torque .....90 Nm (66 lb-ft)

3. Reinstall cover with retained capscrews.

Adjusting Row Unit Drive Sprockets With (ONLY) Fixed Speed Drive (Combines)

IMPORTANT: Changing corn head sprockets with a variable speed feeder house can result in the corn head over speeding, resulting in machine damage. Front driven shaft should never exceed 715 rpm.

Models CH2112 and CH2208 are driven from both sides of the head with a 30-tooth driver and 33-tooth driven sprockets standard equipment.

Chopping corn head models are driven with a 24-tooth driver and 27-tooth driven sprockets.

NOTE: Drain oil and remove pan before changing or adjusting sprockets, see Remove/Install Oil and Pan in Service section.

When operating at increased ground speeds, install small sprocket on driven shafts and large sprocket on drive shafts.

Adjust tightener so chain will operate without climbing or jumping sprockets.

The following chart gives the approximate combine travel speed that is used with each sprocket combination.

NOTE: Recommended travel speed in chart is based on average field conditions. Your particular field condition may differ and determine which sprocket must be used. Front Driven shaft should never exceed 715 rpm. Corn head running higher than 715 rpm can result in machine damage.

NOTE: FIXED SPEED COMBINE ONLY — The sprockets are set from the factory 30T Driver and 33T Driven for non-chopping and 24T Driver and 27T Driven for chopping. These sprockets must NOT be changed for variable speed combines.

When Combining at:	**Non Chopping Corn Head**		**Chopping Corn Head**	
	Sprocket		**Sprocket**	
	Driver	**Driven**	**Driver**	**Driven**
Up to 7 km/h (Up to 4 mph)	30-tooth	33-tooth	24-tooth	27-tooth
Over 7 km/h (4 mph)	33-tooth	30-tooth	27-tooth	24-tooth

Adjusting Row Unit Drive Sprockets With (ONLY) Fixed Speed Drive (Forage Harvesters)

IMPORTANT: Front Driven shaft should never exceed 715 rpm. May result in machine damage.

8 and 12 row corn heads are driven from both sides which include two 30-tooth driver and two 33-tooth driven sprockets as standard equipment.

NOTE: Drain oil and remove pan before changing or adjusting sprockets, see Remove/Install Oil and Pan in Service section.

For maximum operating speed, install large sprockets on drive shafts and small sprocket on driven shaft.

When changing sprocket location, secure sprockets to shafts and align sprockets for smooth operation.

Adjust tightener so chain will operate without climbing or jumping sprockets.

The following chart gives the approximate harvester travel speed that must be used with each sprocket combination.

NOTE: Recommended travel speed in chart is based on average field conditions. Your particular field condition may differ and determine which sprocket must be used.

Fixed Speed Forage Harvesters Only

CH2112 and CH2208 Corn Heads			
Adapter Plate Sprocket (Drive)	Corn Head Shaft Sprocket (Driven)	Front Corn Head Shaft Speed @ 2100 Engine rpm	Approx. Suggested Ground Speed
30-tooth	33-tooth	410	Under 3 mph (5 km/h)
33-tooth	30-tooth	495	3 - 4 mph (5 - 7 km/h)

Adjusting Row Unit Drive Sprockets With (ONLY) Fixed Speed Drive (Corn Huskers)

IMPORTANT: Front driven shaft should never exceed 715 rpm. May result in machine damage.

NOTE: Drain oil and remove pan before changing or adjusting sprockets, see Remove/Install Oil and Pan in Service section.

Install 33-tooth sprocket on drive shaft and 30-tooth sprocket on driven shaft.

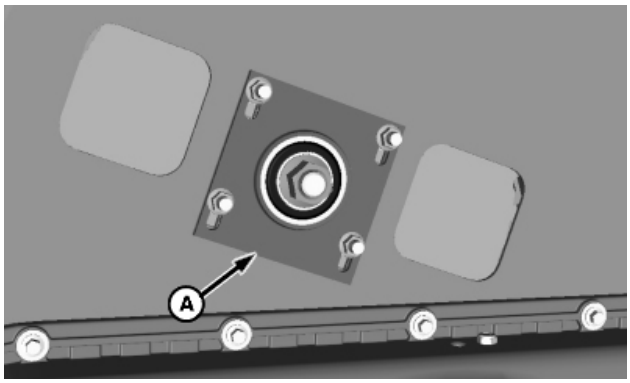
When changing sprocket location, secure sprockets to shafts and align sprockets for smooth operation.

Adjust tightener so drive chain will operate without climbing or jumping sprockets.

Adjusting Auger

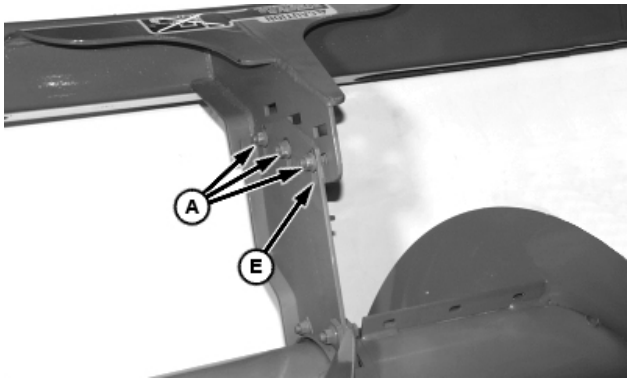
CAUTION: Keep safety shields in place.

1. Both sides of corn head main frame and auger bearing carriers (A) are slotted for adjusting auger. Auger can be adjusted up and down for clearance between auger flighting and floor.
2. Keep auger adjusted down in most conditions. Raise auger to prevent ear damage in popcorn and food grade corn.
3. In normal conditions, keep a minimum of 6 mm (1/4 in.) clearance between auger and the lower adjustable auger stripper.
4. In normal conditions, keep a minimum of 32 mm (11/4 in.) clearance between auger flighting and bottom of floor.
5. Bearing carriers can be removed and auger lifted and bolts install to upper slotted holes on each side to raise auger off of floor 76 mm (3 in.) for use in food corn.



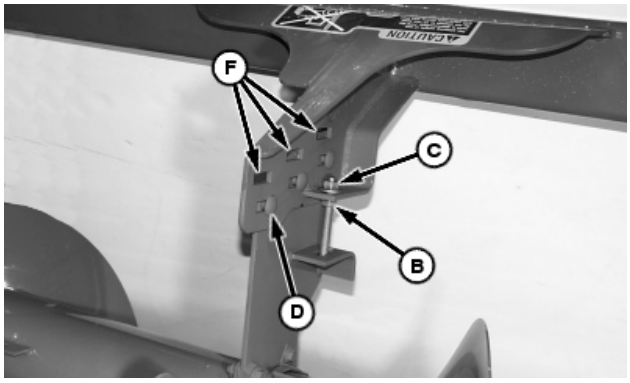
12-Row Auger Adjustment Only

Adjust the auger height and fore-and-aft as follows:



1. Loosen three flange nuts (A).
2. Loosen nut (B).
3. Adjust nut (C) to move auger up or down.
4. Move auger fore-and-aft as necessary according to specifications.

   IMPORTANT: There must be 22 mm (7/8 in.) clearance between auger flighting and floor and a 6 mm (1/4 in.) clearance between auger flighting and stripper.



Specification

Auger Flighting and
Floor — Clearance .....22 mm (7/8 in.)

Auger Flighting and
Stripper — Clearance.....6 mm (1/4 in.)

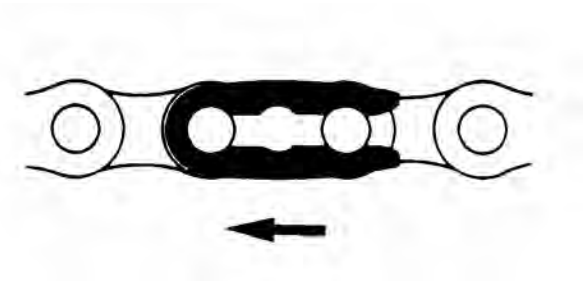
5. If raising auger off of the floor 76 mm (3 in.) for use in food corn, remove carriage bolts (D) and raise auger to align slots (E) with top slots (F). Install carriage bolts and retain with nuts.
6. Tighten all nuts to specification

Specification

Nuts — Torque.....90 Nm (66 lb-ft)

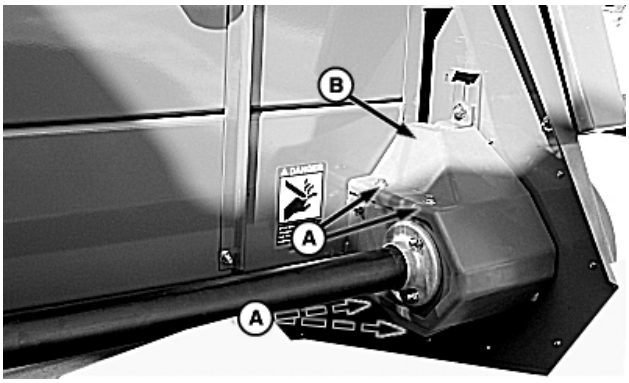
Coupling the Chain

When securing a chain coupler link, closed end of spring lock must face in direction of chain travel as shown with bold arrow.



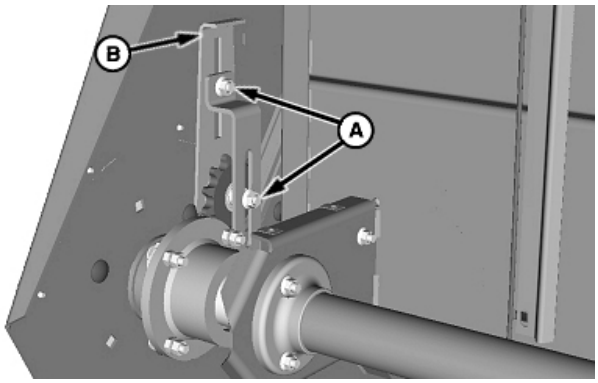
Adjusting Auger Drive Chain

1. Remove cap screws (A) and cover (B).



2. Loosen nuts (A). Push on adjusting plate (B) to adjust chain tension.

3. Tighten nuts (A) to specification.



Specification

Nuts (A) — Torque.....90 Nm (66 lb-ft)

NOTE: An overtightened chain will cause undue chain wear. Adjust chain tension so that the slack side movement is 10 mm (3/8 in.) up and 10 mm (3/8 in.) down.

Lubrication

Corn Head Grease

John Deere CORN HEAD GREASE is recommended for the corn head row unit gear cases.

You may also use SAE Multipurpose Grease with Extreme Pressure (EP) Performance and meeting NLGI Consistency Number 0.

Grease

Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

The following grease is recommended:

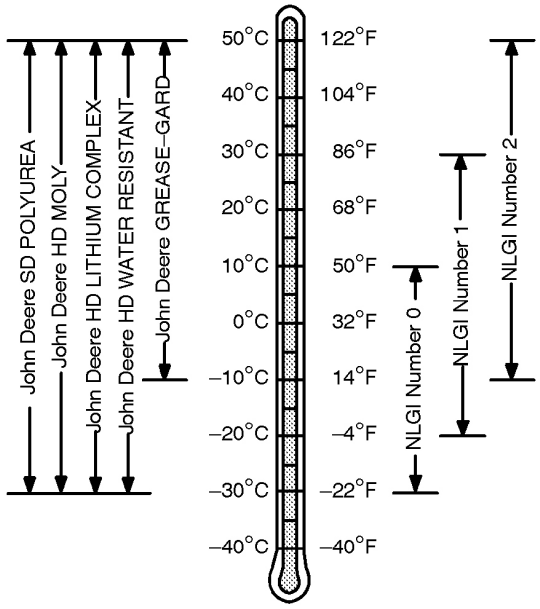
- John Deere SD POLYUREA GREASE (TY6341)

Other greases may be used if they meet the following:

- NLGI Performance Classification GCLB

IMPORTANT: Some types of grease thicken and are not compatible with others.

If grease fitting is missing, replace immediately. Clean fittings thoroughly before using grease gun.



Product Number	Description
TY6341	Multipurpose grease. High-Temperature Extreme Pressure Grease, especially effective in rolling contact applications.

Lubricant Storage

Your equipment can operate at top efficiency only when clean lubricants are used.

Use clean containers to handle all lubricants.

Whenever possible, store lubricants and containers in an area protected from dust, moisture, and other contamination. Store containers on their side to avoid water and dirt accumulation.

Make certain that all containers are properly marked to identify their contents.

Properly dispose of all old containers and any residual lubricant they may contain.

Alternative and Synthetic Lubricants

Conditions in certain geographical areas may require lubricant recommendations different from those printed in this manual.

Some John Deere brand coolants and lubricants may not be available in your location.

Consult your John Deere dealer to obtain information and recommendations.

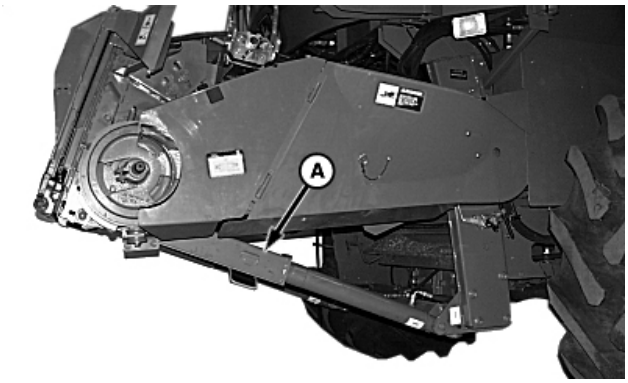
Synthetic lubricants may be used if they meet the performance requirements as shown in this manual.

The temperature limits and service intervals shown in this manual apply to both conventional and synthetic oils.

Re-refined base stock products may be used if the finished lubricant meets the performance requirements.

Hydraulic Cylinder Safety Stop

CAUTION: When working under the corn head, always place the hydraulic cylinder safety stop in safety position to prevent header from lowering.



1. Start engine, raise feeder house and fully extend hydraulic cylinder to place safety stop in safety position.

2. (6620, 7720 and 8820 Combines) Disconnect support chain from safety stop (A) and lower safety stop onto the cylinder rod.

3. (9400, 9500, 9600, 10 Series, and 50 Series Combines) Raise safety stop (A) from storage position and lower it down onto the cylinder rod.

After completing work on the corn head, place safety stop in storage position.

Lubrication Symbols

CAUTION: Never lubricate or service corn head while combine engine is running. Turn off Engine, remove key, and set safety stops.

Lubricate with John Deere Multipurpose SD Polyurea High Temperature/Extreme Pressure lubricant or an equal SAE Multipurpose High Temperature Grease with Extreme Pressure (EP) performance at hours shown on the symbol.

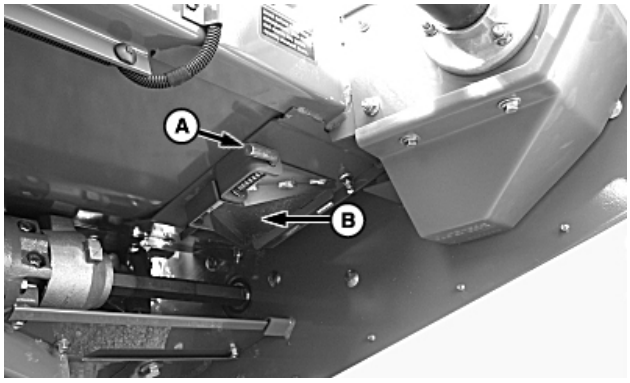
Lubricate with John Deere SAE 30 oil or heavier oil at hourly intervals indicated on the symbols.

Lubricate with John Deere corn head grease (type "O" [zero] extreme pressure) at hourly intervals indicated on the symbols. The lubricant is available in a 0.4 kg (141/ 2 oz) tube AN102562. Wipe away all grease and dirt before removing inspection plugs. Wipe grease fittings clean before lubricating.

IMPORTANT: Recommended service intervals are for average conditions. Service MORE OFTEN if corn head is operated under adverse conditions.

Auger Floor Clean Out Door

1. Release latch (A) and open door (B).
2. Clean auger floor using clean out door on both sides of corn head.
3. Make sure door is fully latched before moving machine.

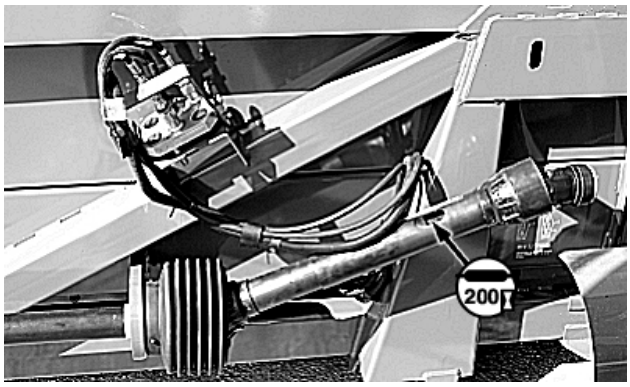


Annually or Every 200 Hours of Operation

1. Grease header drive shafts.
   Rotate shield as needed to access grease fitting.

2. Inspect and adjust the following;
   - Row Unit Drive Chain(s)
   - Auger Drive Chain
   - Row Unit Gatherer Chains

   (See Adjustments section for procedures.)



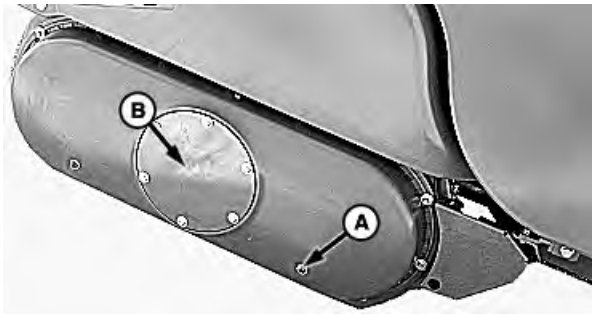
IMPORTANT: Keep oil level to specification to prevent excessive chain wear.

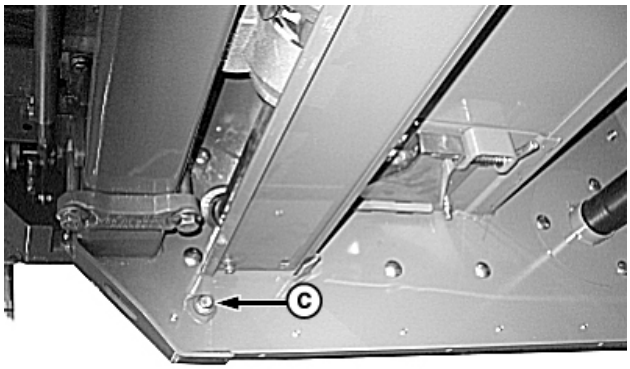
3. Replace oil in the drive chains (both sides of head) annually or every 200 hours of operation.

Specification

Drive Chain Oil — Capacity..... 0.9 L (0.95 qt.)

a. Raise head and engage safety stop.
b. Operate head to warm oil prior to draining.
c. Remove plug (C) and lower header to drain oil.
d. Raise head and engage safety stop.
e. Install plug.
f. Lower header onto flat level ground and remove access door (B) and check plug (A).
g. Add SAE 80/90 gear lube through access door until level with the bottom of check plug (A). Approximate capacity is 0.9 L (.95 qt.).
h. Install access door and check plug.





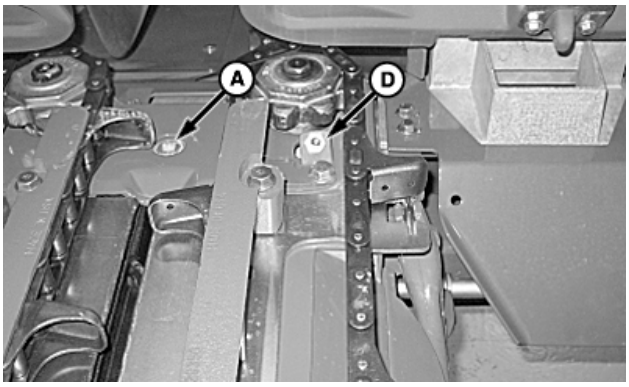
4. Check row unit gear case grease annually or every 200 hours of operation.

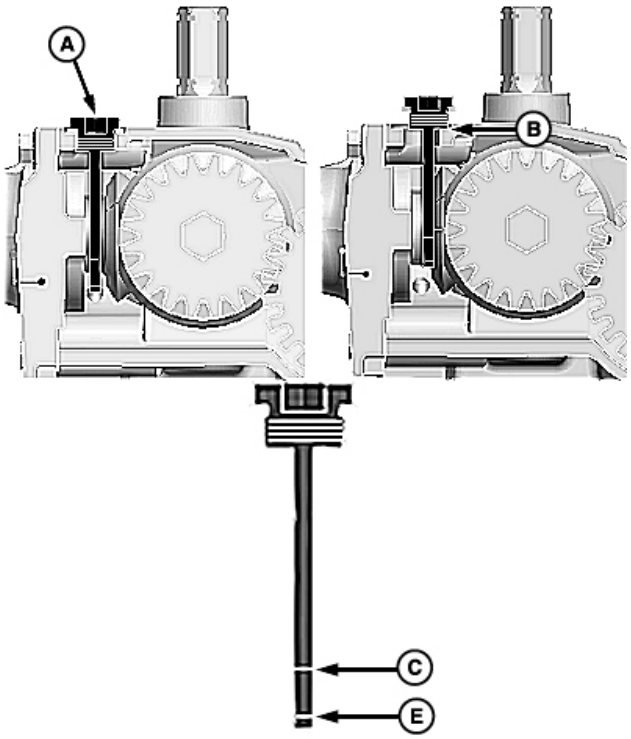
   NOTE: Row unit gear case grease must be warm with header raised to obtain accurate readings on dipstick.

   a. Operate header to warm row unit grease.
   b. Raise header and lower safety stop.
   c. Raise row unit shield.
   d. Clean area around inspection plug/dipstick (A) to avoid dirt and debris from entering gear case.
   e. Remove dipstick and wipe off grease.
   f. Insert dipstick until bottom of dipstick threads rest on top of gear case recess (B).
   g. Remove and observe grease level on dipstick.
   h. If level is below full mark (C), add John Deere Corn Head Grease through grease fitting (D) until level with mark.

   IMPORTANT: Do not overfill gear case. 0.42 L (1 tube) of grease is required to fill gear case from minimum mark (E) to full mark (C). The amount of grease to add at other levels is proportional.

   i. Install dipstick and operate header again to warm new grease as necessary to obtain accurate reading.





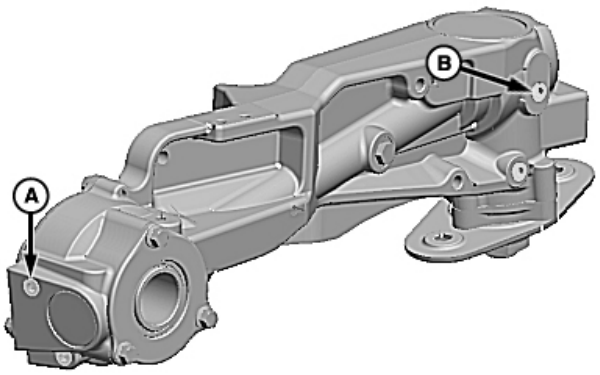
5. Check gear case oil (if equipped) annually or every 200 hours of operation.

   NOTE: Chopping corn head gear cases must be warm with header raised to verify accurate oil level.

   a. Raise header and lower safety stop.

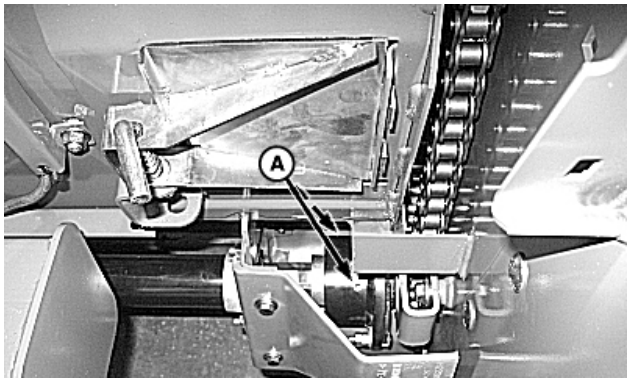
   b. Remove check/fill plug (A) at the rear of the gear case on each row. Oil level should be at the bottom of the check/fill plug hole. Add TY6296 80W 90 GL5 gear lube as necessary to obtain correct level.
   Reinstall check/fill plug.

   c. Remove check/fill plug (B) at the front of the gear case on each row. Oil level should be at the bottom of the check/fill plug hole. Add TY6296 80W 90 GL5 gear lube as necessary to obtain correct level.
   Reinstall check/fill plug.



NOTE: 12 row chopping corn heads are driven from both sides of the head and requires two drive clutches.

6. **Chopping Corn Head ONLY:** Grease drive clutch fitting (A) annually or every 200 hours of operation.

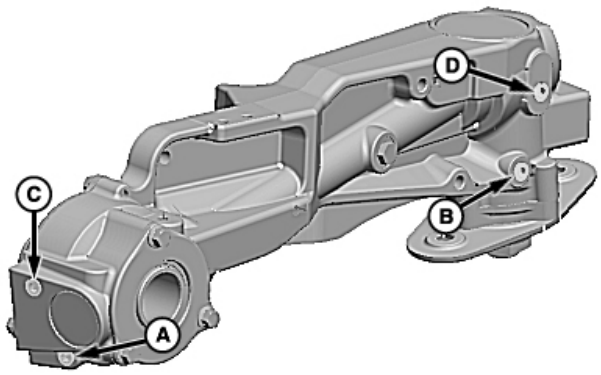


Chopping Corn Head Only

Every 1000 Hours of Operation

NOTE: Drain and refill chopping gear case oil every 1000 hours.

Chopping corn head gear cases must be warm with header raised to drain and refill oil.



1. Raise header and engage safety stop.
2. Set parking brake, shut OFF engine and remove key.
3. Place a proper container under machine. Remove drain plug (A) at the rear of the gear case and drain plug (B) at the front of the gear case.
4. After oil has drained reinstall plugs.
5. Remove check/fill plug (C) at the rear of the gear case and check/fill plug (D) at the front of the gear case. Add TY6296 80W 90 GL5 Gear Lube to front and rear gear cases until level with the bottom of check/fill plug holes (C and D). Install plugs.

Specification	
Rear Gear	
Case — Capacity	325 mL (11 oz.)

Specification	
Front Gear	
Case — Capacity	500 mL (16.9 qt.)

Troubleshooting

Troubleshooting

The majority of corn head operating problems can be traced to improper adjustment. The following trouble shooting chart will help you when problems develop by suggesting a probable cause and the recommended remedy. Make certain when you are trying to solve a problem, that the source does not come from some place other than where the problem exists.

Symptom	Problem	Solution
Loss of ear corn in the field.	Point tips set too high.	Point tips set too high. Adjust points so tips lightly touch ground when row unit skid plate is 1 inch above ground.
	Ground speed too fast or too slow.	When picking low hanging ears, raise front tip of gatherer points and run corn head with the skids close to the ground. Operate at a speed to meet field and ground conditions. Too much ground speed can bend stalks forward and cause ears to fall ahead of gatherer chains. Slow ground speed can cause gatherer chains to jerk stalks and snap off ears causing ears to slide off header. Operate at a speed where gatherer chains help guide stalks into the rolls.
	Not picking planter rows.	Follow planted rows to minimize ear loss.
	Row units not centered on rows.	Adjust corn head row spacing to equal row spacing of corn in field.
	Ears sliding out over gatherer chains.	Replace worn ear savers or reinstall previously removed ear savers.
	Gatherer chain speed too fast or too slow.	Change speed of variable speed feeder house or increase ground speed.
Ear shelling at stalk rolls.	Deck plates not adjusted correctly.	Adjust deck plates. Reduce gap between deck plates.
	Machine operating too high.	Raise point tip and run head lower.
Shelled corn coming out rear of combine.	Excessive trash intake from corn head.	Increase variable drive speed or fixed drive speed. Open deck plate spacing on corn head.
Ears sliding out through the throat.	Ear savers worn out.	Replace ear savers.

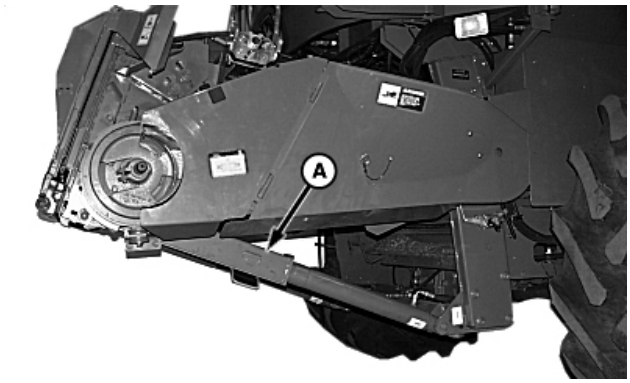
Symptom	Problem	Solution
Pulling up corn stalks.	Deck plates set too close together.	Gradually open deck plates until stalks feed through rolls more freely.
	Traveling too fast for gathering speed.	Slow down to meet crop conditions or increase row unit drive speed.
	Gatherer chain flights digging into cornstalk roots.	Lower point tip and run head higher.
	Corn too dry or worn.	Remove ear savers.
	Worn stalk rolls.	Replace stalk rolls.
Plugging	Stalks breaking in stalk rolls or deck plates.	Adjust opening of deck plates. Also be sure deck plates are set equally and centered over center of rolls.
	Trash winds around trash rolls.	Set trash knives closer to stalk rolls.
	Loose gathering chains.	Check gathering chain mechanism.
	Not picking planter rows.	Follow the rows to minimize ear loss.
	Ground speed too fast, causing material to overrun corn head.	Operate at a speed to meet yield and ground conditions. Faster speed causes plugging.
	Material not flowing with auger.	Check auger housing for obstructions and roughness. Check auger for 22 mm (7/8 in.) clearance between auger flight and floor. Check auger for 6 mm (1/4 in.) clearance between auger flighting and stripper.
	Corn stalks plugging in gatherer throat opening.	Remove ear savers.
	Worn stalk rolls.	Replace worn stalk rolls.
Loss of ear corn from weakened or broken stalks. Problem is caused by disease (stalk rot) or insects (corn borers).	Contact of stalk with ear savers.	Remove ear savers.
	Ground speed too fast.	Reduce ground speed.
	Feeder house speed incorrect.	Find the correct speed for your conditions by trying different feeder house speeds.
	Worn stalk rolls.	Worn stalk rolls. Replace stalk rolls.

Active Header Control (AHC)

Symptom	Problem	Solution
Active Header Control (AHC) Will not operate.	Manual raise or lower will not work.	See your Frontier dealer.
	Active Header Control (AHC) unit not enabled.	Enable Active Header Control mode that is desired in cornerpost display unit.
	Feeder house to connector not connected or loose.	Connect properly.
	Header sensor not properly connected or damaged.	Connect or repair sensor.
Active Header Control Lowers but will not raise.	Defective Active Header Control relay or Active Header Control card.	See your Frontier dealer.
Active Header Control Raises but will not lower.	Defective Active Header Control relay or Active Header Control card.	See your Frontier dealer.
	Control shaft restricted.	Check for restriction.
	Auto drop rate valve closed.	Adjust in-line valve.
System cycles or hunts.	Incorrect drop rate adjustment.	Adjust in-line valve.
	Incorrect accumulator setting.	See your combine Operator's Manual.
System fails intermittently after manually raising header over obstacle.	System was de-activated.	To reactivate, press activation button in multifunction control handle.
Header raises or lowers too slow or too fast.	Incorrect drop rate adjustment.	Adjust valve stack drop rate.
	In-line valve problem.	See your Frontier dealer.

Hydraulic Cylinder Safety Stop

CAUTION: When working under the corn head, always place the hydraulic cylinder safety stop in safety position to prevent header from lowering.



1. Start engine, raise feeder house and fully extend hydraulic cylinder to place safety stop in safety position.

2. (6620, 7720 and 8820 Combines) Disconnect support chain from safety stop (A) and lower safety stop onto the cylinder rod.

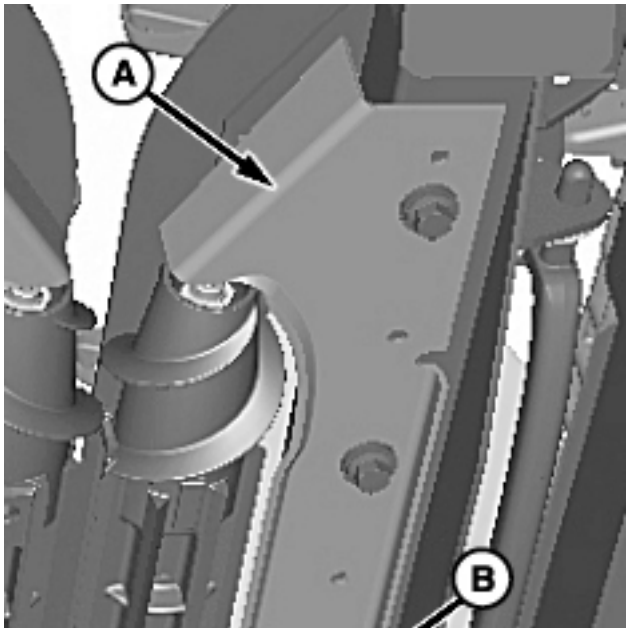
3. (9400, 9500, 9600, 10 Series, and 50 Series Combines) Raise safety stop (A) from storage position and lower it down onto the cylinder rod.

After completing work on the corn head, place safety stop in storage position.

Remove and Install Stalk Rolls

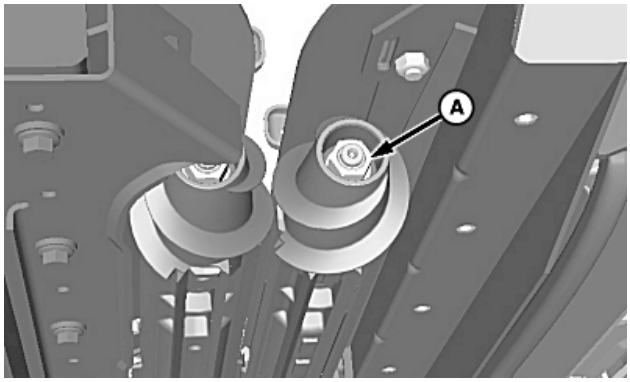
CAUTION: Lower hydraulic cylinder safety stop before working under corn head..

1. Remove cap screws (B), washers, and trash knife (A) from underside of row unit frame.



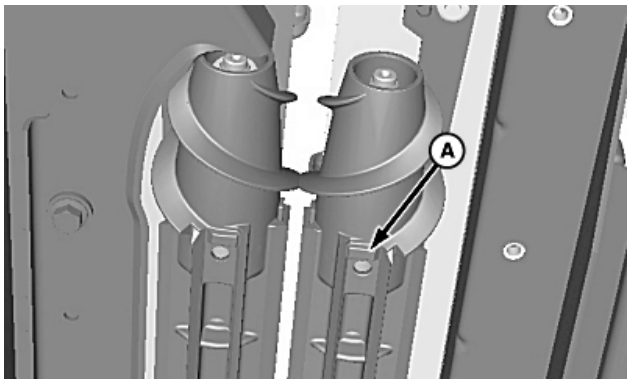
NOTE: Stalk rolls will turn when attempting to remove nut (A). Place a pry bar between the stalk roll and row unit frame to prevent stalk rolls from turning.

2. Remove and discard nut (A)



3. Stalk rolls can typically be pulled off by hand. If unable to do so locate the two ribs (A) on stalk roll. Remove stalk roll from shaft attaching a 2-jaw puller to ribs.

4. Shaft taper should be free of rust and dirt. Inspect stalk rolls for wear or damage.



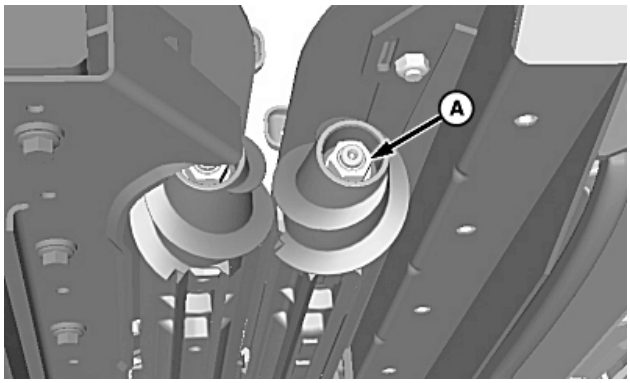
IMPORTANT: Stalk roll spherical nut (A) contains a pre-applied thread locking patch (B) and cannot be reused. A replacement nut must be purchased from Frontier Service Parts.

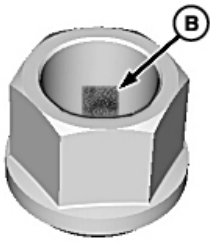
5. Align splines on stalk roll and shaft and install stalk roll.

6. Install replacement spherical nut (A) and tighten to specification.

Specification

Stalk Roll Spherical
Nut — Torque .....400 Nm (295 lb-ft)

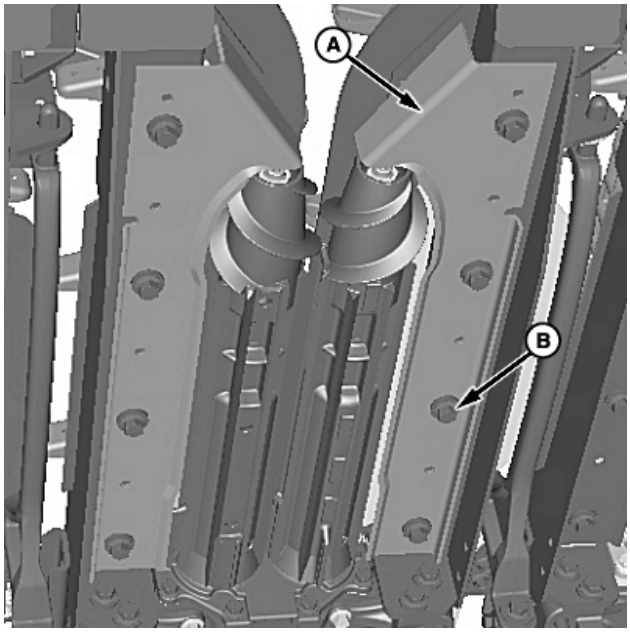




7. Install trash knife (A) and retain using four washers and cap screws (B).

8. Adjust trash knives. (See ADJUSTING TRASH KNIVES in ADJUSTMENT section.

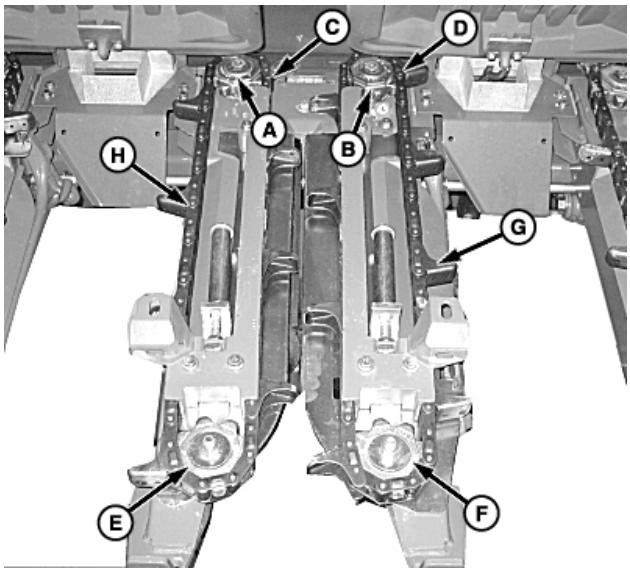
9. Repeat procedure on opposite stalk roll.



Reversing Gatherer Chains and Sprockets for Additional Wear

The gatherer chains and sprockets can be reversed for additional wear. This should be done to all row units at the same time. To reverse the chains and sprockets:

1. Release tension on gatherer chains and remove chains.
2. Remove rear sprockets (A) and (B).
3. Install sprocket (A) on row unit (D).
4. Install sprocket (B) on row unit (C).
5. Remove sprockets (E and F).
6. Install sprocket (E) on row unit (D).
7. Install sprocket (F) on row unit (C).
8. Turn gatherer chain (G) over and install on row unit (C).
9. Turn gatherer chain (H) over and install on row unit (D).



Replacing Gatherer Chain

CAUTION: Raise corn head, turn engine off, remove key, and lower safety stop before working under header.

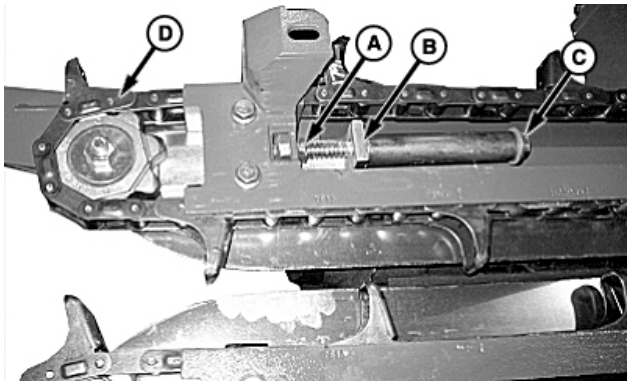
NOTE: Gatherer chains have chrome pins for longer wear life. Black pin or chrome pin chains are available from your John Deere dealer.

If gatherer chain breaks, or is badly worn, replace with a new chain.

Gatherer chains can be removed for servicing parts of the gatherer mechanism without disconnecting the chain.

CAUTION: Never service any part of the mechanism or idler sprocket until you have nut (A) tight against leg of idler support strap (B).

1. Turn nut (A) until it is against leg of idler support strap (B), to release gatherer chain tension.
2. Loosen bolt (C) if necessary until tension is off chain.
3. Remove gatherer chain (D).



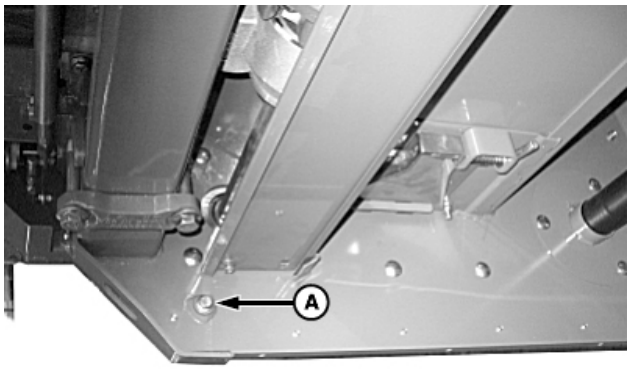
Remove and Install Oil Pan

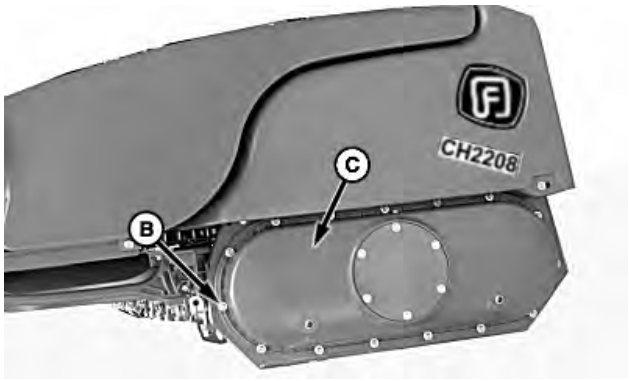
NOTE: Capture fluid in a clean container. Dispose of oil properly, do not reuse.

1. Remove drain plug (A).

   IMPORTANT: Avoid damage to reusable seal on pan. Do not use sharp objects to pry between pan and corn head.

2. Remove cap screws and washers (B) and oil pan (C).

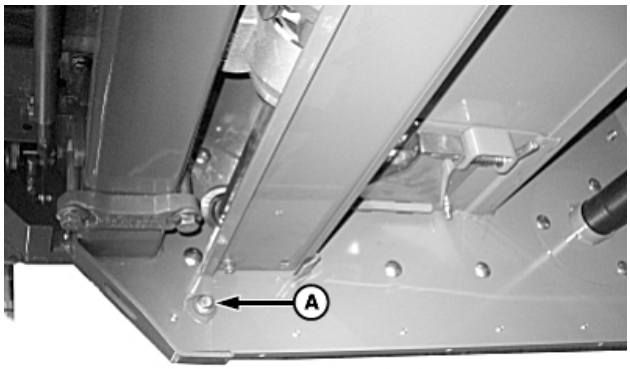


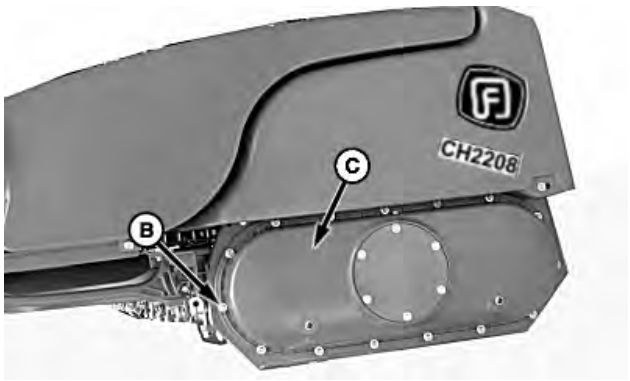


NOTE: When retaining pan with cap screws, start in center and move outward.

3. Reinstall drain plug (A).

4. Clean all dirt and oil from side sheet where oil pan (C) is mounted. Reinstall oil pan with cap screws and washers (B).



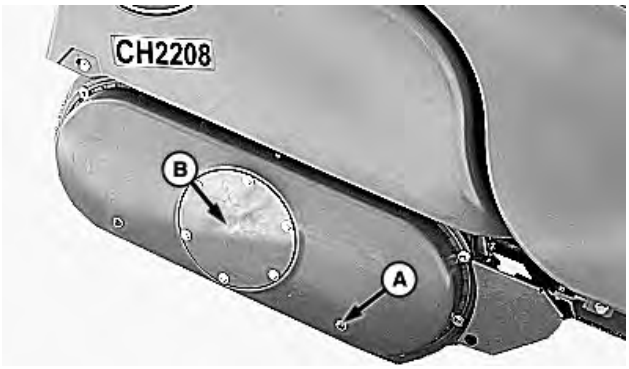


5. Remove check plug (A) and access door (B).

   IMPORTANT: Oil level should be checked with corn head on combine and row unit skids touching ground (approximately a 25 degree angle).

6. Add SAE 80/90 gear lube through access door until level with bottom of check plug (A).

7. Install plug and access door.



Specification

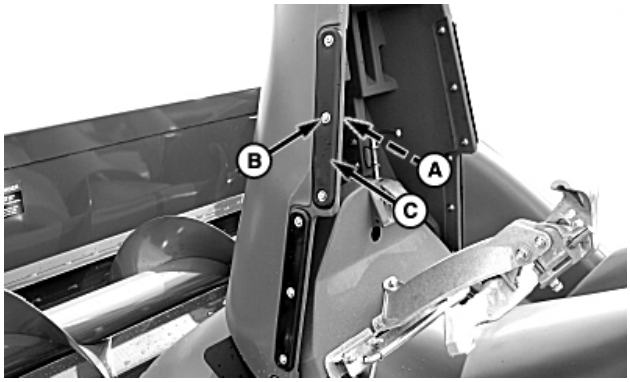
Oil Pan — Capacity ..... 0.9 L (1 qt.)

Wear Strips

1. Remove nut and washer (A).

2. Remove bolt and washer (B).

3. Remove wear strip (C) and install new wear strip in reverse order.



Specification

Wear Strip Nut — Torque .....10 Nm (7.38 lb-ft)

Stubble Light Bulb Replacement

1. Unplug wire harness from light.

   NOTE: DO NOT touch bulb with bare fingers, oil or water.

2. Twist connector on light assembly 90 degrees and pull out and install new bulb.

3. Reinstall in reverse order of removal.

Header Warning Light Bulb Replacement

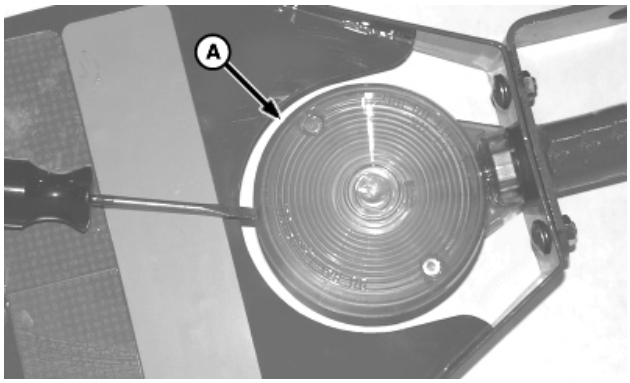
NOTE: Use a flat-blade screwdriver.

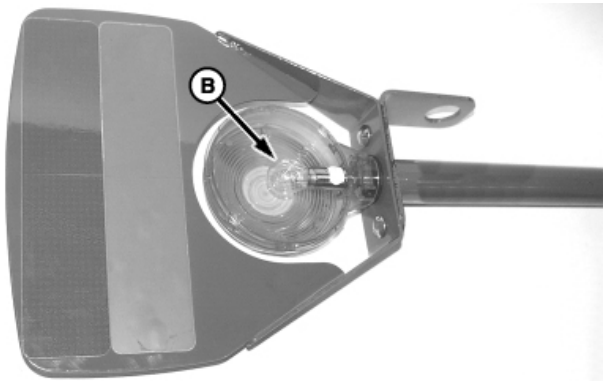
Carefully, pry off lens (A) from light.

Push bulb (B) in and turn to remove.

Install new bulb.

Press lens back onto light housing.





Storage

End of Season Service

IMPORTANT: Do not use high pressure washer spray directly on bearings or any other area that might be damaged by water. High pressure water can get past most seals and cause damage. Dry these areas, then lube and run combine.

CAUTION: Support the corn head with either the hydraulic cylinder safety stop or with blocks, or lower it to ground level.

1. Clean the corn head thoroughly. Chaff and dirt will draw moisture and cause rust.
2. Lubricate the corn head. Grease the threads on adjusting bolts.
3. Paint all parts from which paint has worn.
4. Use a polymer protectorate on the points, deck covers and end fenders.
5. If possible, shelter the corn head in a dry place.
6. Order repair parts needed for next season.

Beginning of Season Service

1. Clean the corn head thoroughly.
2. Adjust gatherer chains to proper tension.
3. Adjust chains to proper tension.
4. Lubricate corn head completely.
5. Go over complete corn head and see that all bolts are tight and cotter pins are spread.
6. Run corn head at half speed for a few minutes. Check bearings for overheating or excessive looseness.
7. Review your operator's manual.

Specifications

Specifications

Specifications given in the manual are intended for service only and do not include normal factory manufacturing tolerances.

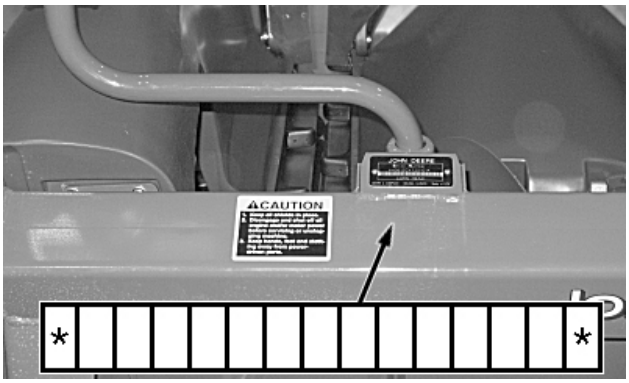
NOTE: Specifications and design subject to change without notice.

Gatherer Points		Low profile floating type hinged above gatherer chains
Center and Outer Gatherers		Hinged, quick-removable
Gatherer Chains		Heavy duty 620 endless steel roller chain with chromed pins (no master connecting link)
Minimum Clearance Between Gatherer Chains and Ground		32 mm (1-1/ 4 in.)
Row Unit Drive		Enclosed gear box with gears submerged in lubricant; driven by single input hex shaft
Gatherer Chain Adjustment		Spring loaded self-adjusting
Stalk Rolls		Spiral pointed, knife-type (2 per row unit)
Deck Plate Adjustment		Hydraulic Adjusted
Slip Clutch		CH2112 - One per row unit
		CH2208 - Two per row unit
Trash Knives		Full length one piece heat-treated steel
Approximate Overall Width for Storage:		
Model	**Header ID**	**Width mm (in.)**
CH2112	12R36	11066.20 mm (435.68 in.)
CH2112	12R38	11675.80 mm (459.68 in.)
CH2208	8R36	7615.25 mm (299.81)
CH2208	8R38	7615.25 mm (299.81)
Approximate Overall Length for Storage (All Corn Heads):		
Points in operating position		3000 mm (9 ft 10 in.)
Points folded up (service position)		2400 mm (7 ft 11 in.)
Approximate Shipping Weight of Corn Head (Includes Shipping Skid)		
Non-Chopping Corn Head		
Model	**Header ID**	**Weight kg (lb.)**
CH2112	12R36	4332.79 kg (9552 lbs.)
CH2112	12R38	4433.49 kg (9774 lbs.)
Chopping Corn Head		
Model	**Header ID**	**Weight kg (lb.)**
CH2208	8R36	3383.86 kg (7460 lbs.)
CH2208	8R38	3429.22 kg (7560 lbs.)

Serial Number

Locate serial number plate on base of the left hand warning light bracket.

Record your corn head serial number in the space above.
Give this serial number to your dealer when ordering parts.



Keep Proof of Ownership

1. Maintain in a secure location an up-to-date inventory of all product and component serial numbers.

2. Regularly verify that identification plates have not been removed. Report any evidence of tampering to law enforcement agencies and order duplicate plates.

3. Other steps you can take:
   - Mark your machine with your own numbering system.
   - Take color photographs from several angles of each machine.

Keep Machines Secure

1. Install vandal proof devices.

2. When machine is in storage:
   - Lower equipment to the ground.
   - Set wheels to widest position to make loading more difficult.
   - Remove any keys and batteries.

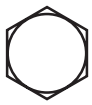
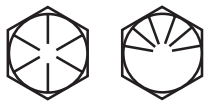
3. When parking indoors, put large equipment in front of exits and lock your storage buildings.

4. When parking outdoors, store in a well lighted and fenced area.

5. Make note of suspicious activity and report any thefts immediately to law enforcement agencies.

6. Notify your Frontier dealer of any losses.

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES

SAE Grade and Head Markings	NO MARK	1 or 2[b] 	5 5.1 5.2 	8 8.2 
SAE Grade and Nut Markings	NO MARK	2 	5 	8 

Size	Grade 1				Grade 2[b]				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	215	160	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	470	300	510	375	470	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

DO NOT use these torque values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

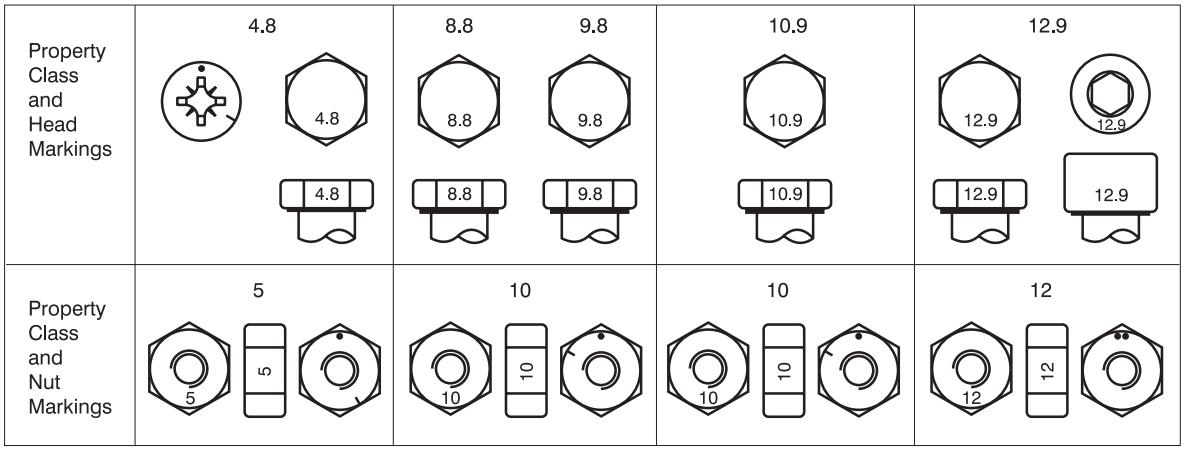
Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

a
"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

b
Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6 in.) long. Grade 1 applies for hex cap screws over 152 mm (6 in.) long, and for all other types of bolts and screws of any length.

METRIC BOLT AND CAP SCREW TORQUE VALUES



Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	225	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

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FRONTIER EQUIPMENT™