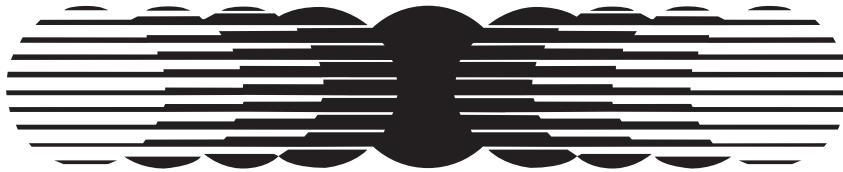


# OPERATING MANUAL

2010  
WIC HARVESTER  
12 ROW

Amity  
TECHNOLOGY



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## INTRODUCTION

**READ THIS MANUAL** carefully to learn how to operate and service your machine correctly. Failure to do so could result in personal injury or equipment damage.

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

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

**WRITE SERIAL NUMBER** in the Specifications section. Accurately record all the numbers to help in tracing the machine should it be stolen. Your dealer also needs these numbers for all warranty claims, and when you order parts. File the identification numbers in a secure place off the machine.

**WARRANTY** is provided as a part of Amity'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 Amity will back its products where defects appear within the warranty period.



## **MANUFACTURER'S GUARANTEE POLICY**

Amity Technology warrants to its authorized dealer or distributor each new and unused machine, when properly assembled, adjusted, and operated, to be free of defects in material and workmanship, in normal use and properly serviced for a period of twelve (12) months after date of delivery by the dealer to the original retail purchaser.

Amity Technology shall repair or, at its option, replace f.o.b. its designated location, any part or parts of such new and unused machine which shall have been reported in writing to Amity Technology within forty-five days from date of failure thereof and which Amity Technology's inspection shall disclose to have been thus defective.

This warranty is void if any part not supplied by Amity Technology is used in assembly or repair, or if the machine has been altered, abused, or neglected. Amity Technology makes no warranty whatever as to motors, tires, and other trade accessories in as much as such items are warranted by the manufacturer thereof. This warranty is exclusive and in lieu of all other warranties, whether expressed, implied, or statutory (including warranties of merchantability and fitness for purpose) and Amity Technology shall not be liable for special or consequential damages of any kind on account of any Amity Technology product.

Amity Technology recommends that if ownership of this machine is transferred, this manual should accompany the machine.

## SAFETY

### SAFETY

**YOU** are responsible for the SAFE operation and maintenance of your Amity beet harvester. **You** and anyone else, who will operate, maintain, or work around the harvester should be familiar with the operating and maintenance procedures and **SAFETY** information in this manual.

These safety practices protect you and the people around you. Make them a working part of your safety program.

Harvester owners must give operating instructions to operators or employees before allowing them to operate the harvester at least annually thereafter per OSHA regulation 1928.57.

The most important safety device on this equipment is a SAFE operator. It is the operator's responsibility to read and follow ALL Safety and Operating instructions in the manual. All accidents can be avoided.

A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.

Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could alter the life of equipment.

Think SAFETY! Work SAFELY!

### RECOGNIZE SAFETY INFORMATION

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

Follow recommended precautions and safe operating practices.






## 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.

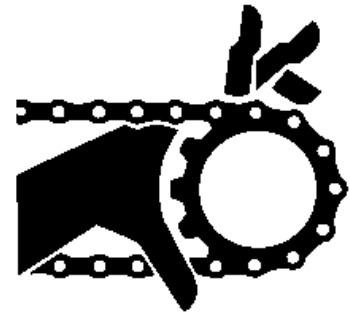


## GENERAL SAFETY

1. Read and understand the Operator's Manual and all safety signs before operating, maintaining, or adjusting the harvester.
2. Install and properly secure all shields and guards before operating.
3. Have a first-aid kit available and know how to use it.
4. Have a fire extinguisher available for use and know how to use it.
5. Clear the area of people and remove foreign objects from the machine before starting and operating.
6.  Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing or disconnecting.
7. Review safety related items with all operators annually.
8. Wear suitable ear protection for prolonged exposure to excessive noise.

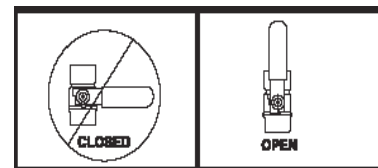
## MAINTENANCE AND OPERATING SAFETY

1. Read and understand all information contained in the Operator's Manual regarding maintenance, adjustment, and operation of the harvester.
2.  Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing, or disconnecting.
3. Keep hands, feet, clothing, and hair away from all moving and/or rotating parts.
4. Ensure that all tractor controls are in neutral before starting.
5. Never wear ill-fitting, baggy, or frayed clothing when working on or around the harvester.
6. Make sure that all guards and shields are properly installed and secured before operating the harvester.
7. Clear the area of all bystanders, especially children, when carrying out any maintenance or making adjustments on the systems or components.
8. Place stands or blocks under the frame before working beneath the machine.
9. Do not allow riders on the harvester or tractor during field operation or transport.
10. Never operate the harvester inside a closed building.
11. Stay away from overhead obstructions and power lines during set up and operation. Electrocutation can occur without direct contact.



### HYDRAULIC SAFETY:

1. Always place all tractor hydraulic controls in neutral before dismounting.
2. Make sure that all components in the hydraulic system are kept in good condition and are clean and tight.
3. Replace any worn, cut, abraded, flattened or crimped hoses and metal lines.
4. Do not attempt any makeshift repairs to the hydraulic lines, fittings, or hoses by using tape, clamps, or cements. The hydraulic system operates under extremely high-pressure. Such repairs may fail suddenly, creating a hazardous and unsafe condition.
5. Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to isolate and identify a leak.
6. If injured by a concentrated high pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface.
7. Before applying pressure to the system, make sure all components are tight and that lines, hoses and couplings are not damaged.
8. On self-contained hydraulic systems, make sure that shut off valves are in open position before engaging PTO.



### **TRANSPORT SAFETY**

1. Read and understand ALL information in the Operator's Manual regarding procedures and SAFETY when operating the harvester in the field, or on the road.
2. Make sure the SMV (Slow Moving Vehicle) emblem and required lights and reflectors are in place, are clean, and can be seen clearly by all overtaking and oncoming traffic.
3. Do not allow riders on any part of the harvester during either field operation or travel.
4. Attach to the tractor using only a drawbar pin with provisions for a mechanical retainer.
5. Always attach a safety chain.
6. Always use hazard warning flashers when transporting unless prohibited by law.
7. Always lower elevator boom when transporting harvester.
8. Stay away from overhead obstructions such as power lines.
9. Maximum transport speed on smooth roads is 15 mph (24 kmh).

## SAFETY DECALS

### SAFETY DECALS

The types of decals on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various safety decals, the type of warning, and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

Think SAFETY work SAFELY



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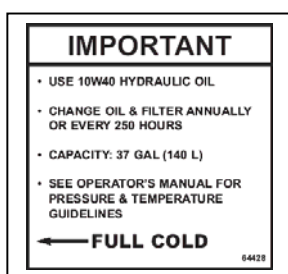
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**REMEMBER:** If safety decals have been damaged, removed, become illegible, or parts are replaced without decals, new decals must be applied. New decals are available from your authorized dealer.

## RECOMMENDED TRACTOR SPECIFICATIONS

### MINIMUM TRACTOR HORSEPOWER:

Minimum horsepower requirements are as follows:

Horsepower	240 horsepower/ 179 kw	
------------	------------------------	--

### PTO OUTPUT:

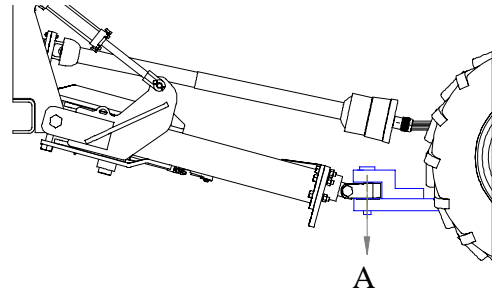
1000 RPM is required with the following shaft option:

1-3/4in-20 Spline



### DRAWBAR WEIGHT CAPACITY:

Drawbar must be able to support a vertical load of 6000 lbs (2700 kg) (A).



### HYDRAULIC CAPACITY REQUIREMENTS:

2700 PSI @ 30 GPM (18.6 Mpa @ 113.6 l/m) with 5 hydraulic remotes (A) or 4+ power beyond.



### **TRACTION:**

Front wheel assist (or 4 wheel drive) is recommended when pulling a harvester.

Front weights may also be necessary to provide balance, traction and steering control.

Weights





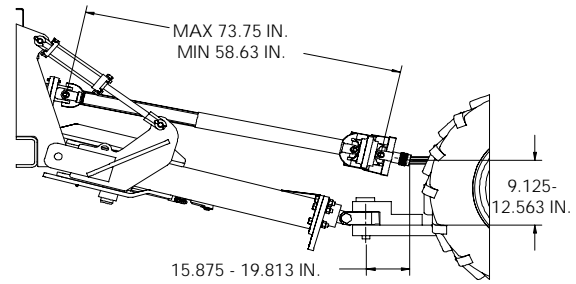
## PREPARING THE TRACTOR

### ADJUSTING THE DRAWBAR:

The tractor drawbar must be set within the given range to maintain the integrity of the drive system.

#### IMPORTANT:

Ensure driveline remains within operating range under all conditions.



### TIRE SPACING AND INFLATION:

Tires should be inflated to the manufacturer's specification.

$$A = 4 * B$$

B = Row Spacing

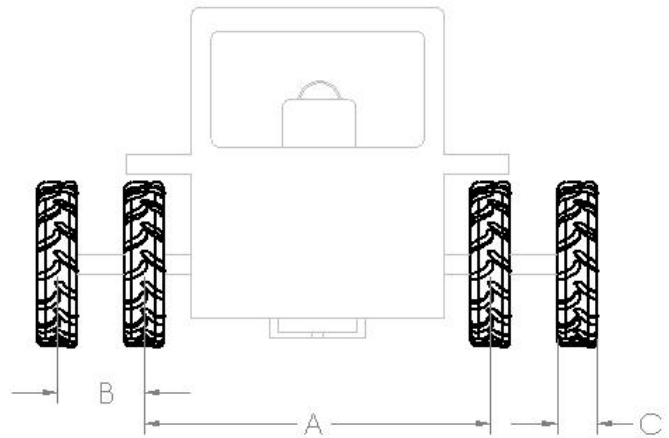
C = Tire Width, must be as narrow as possible.

#### IMPORTANT:

Tires must be narrow enough not to contact beets when driving down rows, while still providing enough traction to pull harvester.

#### NOTE:

Front tires must be aligned with rear tires.



## THREE-POINT HITCH POSITION:

### Three-Point Hitch not connected to hitch

Must be fully raised or removed.



### CAUTION:

Ensure receiver and drawbar support arms clear PTO driveline under all conditions.

## CONTROL BOX LOCATION:

Control box must be correctly wired and securely fastened within the cab.

### Correct Wiring:

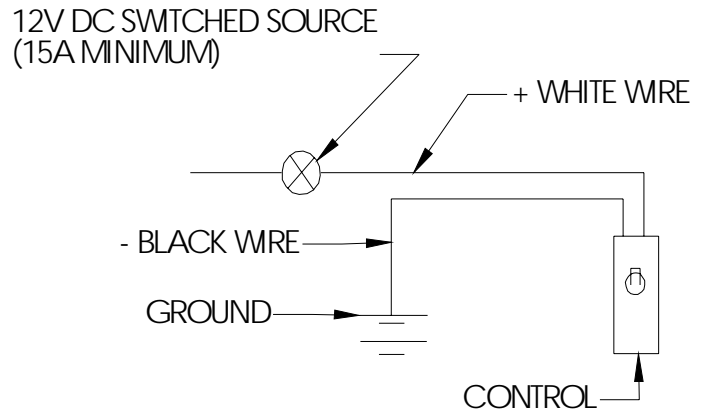
White or Red wire - 12V Positive

Black wire - 12V Negative



## ATTACHING THE CONTROL BOX:

The preferred method for attaching the control box to the tractor is to use a 12V switched source, as shown.



## ALTERNATE WIRING:

When a 12V switched source is not available, an alternate way to attach the control box is shown.

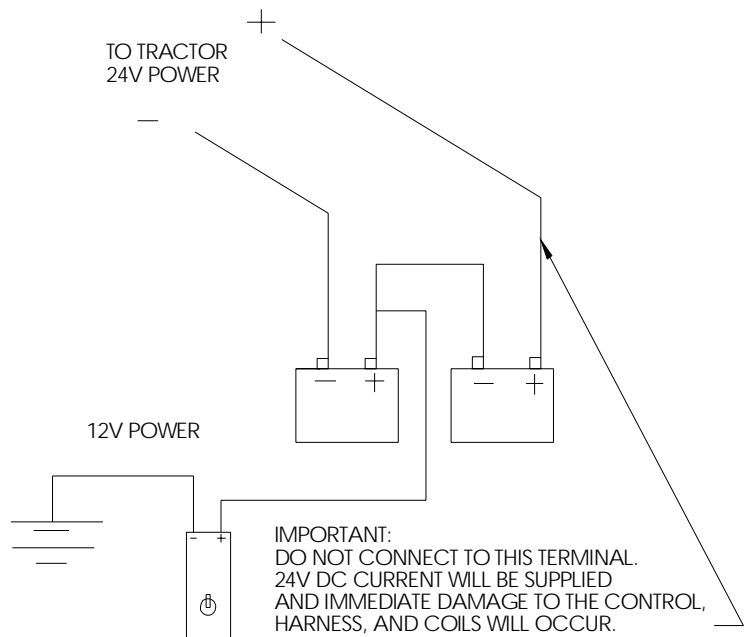
### NOTE:

This is not the preferred method of attachment; a 12V switched source should be used in place of this method if at all possible.



### CAUTION:

When connected in this manner, the control must be disconnected when not in use.



### **PTO RPM SETTING:**

Tractors equipped with 2 speed PTO's must be set to 1000 rpm.



## PREPARING THE HARVESTER

### LIFTER STRUT SPACING:

Verify spacing matches spacing of planted crop.

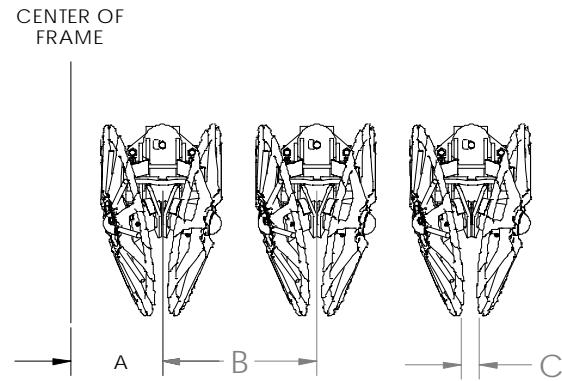
$A = B/2$  Center of frame to center of strut

B=Row spacing

C=Space appropriate for size of beets  
(This space is the pinch point)

#### NOTE:

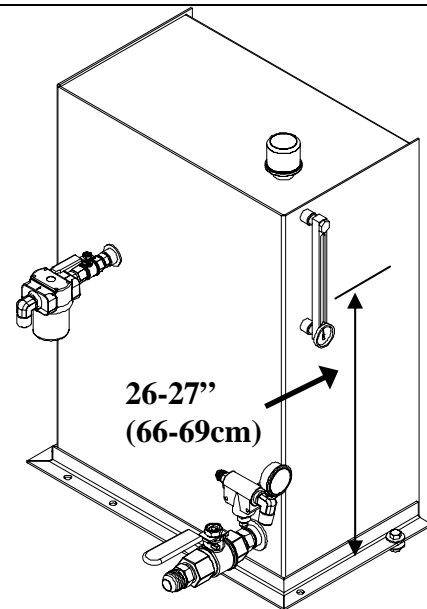
Refer to Operating the Harvester section for pinch point spacing guidelines.



### HYDRAULIC TANK OIL LEVEL:

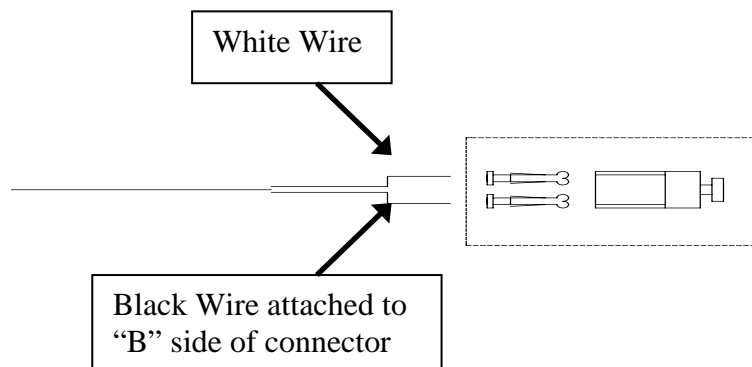
Refer to Lubrication and Maintenance for service schedule and oil type.

“Full Cold Line” on decal should be at dimension shown.



## CONNECTING ACTUATOR:

After wiring control box to tractor, the harness on the harvester must be wired to the actuator switch, as shown.



## SECURE SHIELDS:

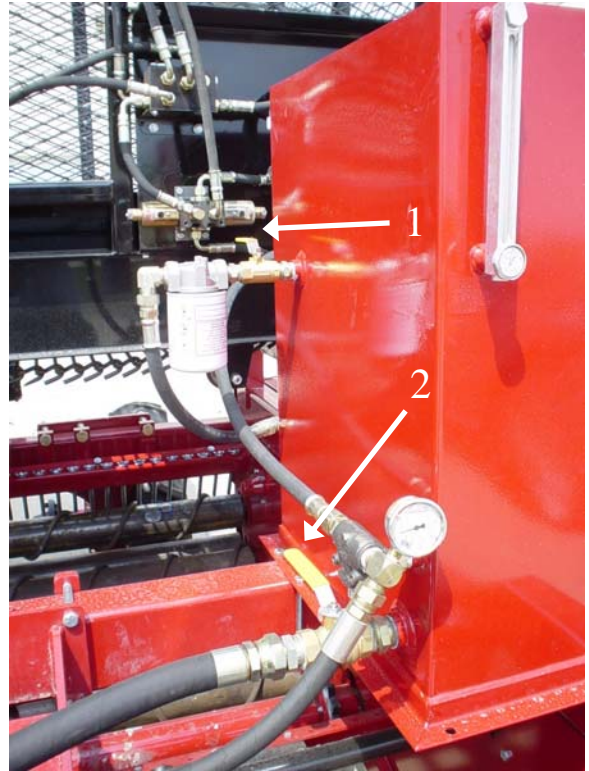
⚠ Before starting, be sure to secure shields in operating position.



## OPEN VALVES ON HYDRAULIC TANK:

### ⚠ CAUTION:

Valves (1,2) must be open prior to engaging PTO, or system failure may occur.

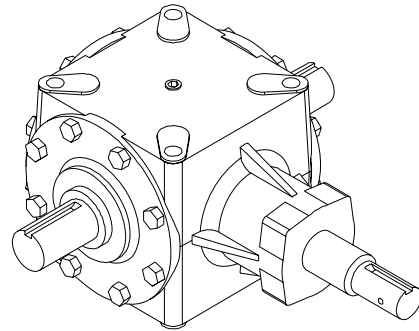


**NOTE:**  
**VALVES SHOWN IN CLOSED**  
**POSITION**

## GEARBOX OIL LEVEL:

Check all gearbox oil levels.

Refer to Lubrication and Maintenance for oil type and fill level information.



**GREASE WHERE NEEDED:**

Refer to Lubrication and Maintenance for grease type and frequency requirements.

**IMPORTANT:**

Use only hand held grease guns. Air-powered grease guns can damage your seals. Over greasing may also damage bearing seals. In such a case, replace damaged seals immediately.



### ATTACHING HYDRAULIC AND ELECTRICAL SYSTEMS:

Harvesters are available with ISO couplers or metric adapters. If the hydraulic attachments on your harvester do not fit the tractor, contact your Amity dealer.

#### CAUTION:

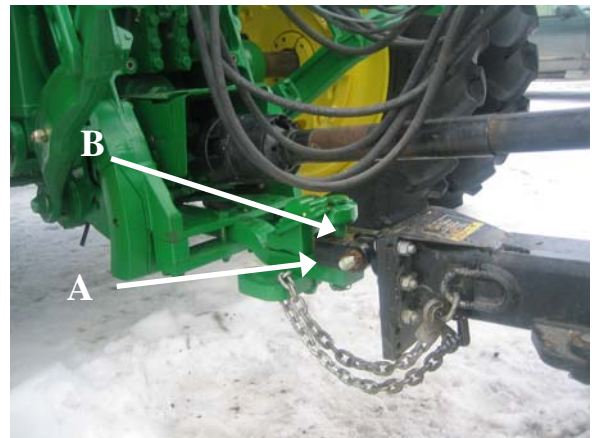
To avoid injury from escaping fluid under pressure, relieve the pressure in the system before disconnecting or connecting hydraulic or other lines. Tighten all connections before applying pressure.

1. Connect hydraulic lines to tractor as shown.
2. Connect harvester warning light harness to tractor. Make sure harvester warning lights operate with tractor warning lights and turn signals.
3. Connect control monitor or switchbox to harness routed into tractor cab.



### ATTACHING HARVESTER TO TRACTOR DRAWBAR:

1. Adjust tractor drawbar (see Preparing the Tractor section)
2. Remove tractor hitch pin.
3. Install required bushings into pull plate.
4. Adjust hitch height.
5. Shift to park, shut off engine, and remove ignition key before getting out of tractor.
6. Line up pull plate with drawbar.
7. Place hardened washer A between drawbar and pull plate, and install shims as necessary B.
5. Reinstall hitch pin.
6. Connect safety chain to drawbar supporting structure.



## CONNECT PTO DRIVELINE:

### CAUTION:


To avoid bodily injury or death, shut off tractor and lower machine to ground before attaching PTO driveline.

### NOTE:

Always operate harvester using 1000 rpm PTO.

### IMPORTANT:

Keep driveline and powershaft splines clean of dirt, paint, and debris.

1.  Shift to park, disengage PTO lever, lower machine to ground, relieve hydraulic pressure, stop engine, and remove ignition key.
2. Raise tractor PTO shield.
3. Pull back on PTO collar until it latches.
4. Align splines between harvester driveline and tractor PTO shaft. Push driveline onto shaft until collar snaps forward on yoke.
5. To ensure PTO is secure, pull back on shield. Do not pull on collar as this will release latch.
6. Lower tractor PTO shield.



## TRANSPORTING

### WARNING LIGHTS:

#### CAUTION:

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 or hand signals.

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

### PREPARE FOR TRANSPORT:

1. Run machine until it is clear of beets & tank is empty.
2. Clean all soil and debris off machine.
3. Lower boom.
4. Raise machine out of ground.
5. Make sure all safety decals and lights are clean and visible, and that tail lights and turn signals function properly.

#### CAUTION:

Always use warning lights when transporting. Braking distance is greatly increased when towing a harvester.

#### NOTE:

Maximum speed when transporting the harvester is 15 mph (24 kmh).



### CLEAN HARVESTER:

The harvester should be thoroughly cleaned each time it leaves the field.

## OPERATING THE HARVESTER

### TURNING RADIUS:

Turning at the end of the field while pulling the harvester requires a wide area. A good way to accommodate this is to plant headland rows.

A minimum of 60 headland rows are recommended on each end of the field.

### IMPORTANT:

Failure to provide a sufficient turning radius for the tractor and harvester may lead to damage to the rowfinder assembly and/or tractor tires.

### OPERATING SPEED:

The harvester should be operated at speeds specific to the conditions; typical speeds are 3-5 mph (4.8-8 kmh)

Changing speed may affect the function of the machine, therefore creating the need for other operating adjustments (refer to Troubleshooting if problems occur).

### RAISE BOOM:

Once in the field, these steps should be followed before lifting beets:

1. Raise boom.
2. Set boom to desired height by moving locking pins (A) to one of the 3 holes on support struts.
3. Lower boom onto pins to relieve pressure on hydraulic cylinders.
4. Move selector switch (B) to elevator position.





### Start Up:

1. Ensure that yourself, bystanders, and all objects are clear of harvester before starting.
2. Check PTO lever to ensure it is not engaged.
3. Make sure the grabroll beds are clear of beets.
4. Start the tractor, throttle down to idle.
5. Engage PTO.
6. Throttle up to 1000 PTO rpm and ensure boom is raised before lifting any beets.



### CAUTION:

PTO must be turning at 1000 RPM if any beets are present on the grabroll bed, or if the harvester is lifting beets. If the tractor's PTO is turning at any less than 1000 RPM when beets are present, imminent damage will ensue.

### MACHINE SHUT DOWN:

To ensure maximum life of the machine, follow this procedure when stopping.

1. Raise harvester out of ground with PTO still engaged.
2. Continue running PTO at 1000 RPM until grabroll bed is empty, and harvester is completely clear of beets.
3. Once there are no beets left in harvester, throttle tractor down to idle, and disengage the PTO.

### CAUTION:

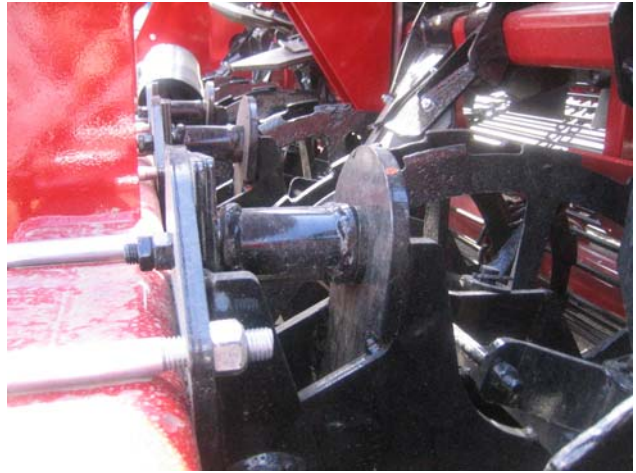
When shutting down or reducing ground speed, the PTO must remain turning at 1000 RPM until the harvester is completely clear of beets. Failure to allow necessary time for machine to cycle through beets will result in imminent damage to drivebelt, and/or other components.

### **BREAK-IN:**

- After the initial 5 hours of normal field operation, check all fasteners, lug nuts, apron chain tension, rollers, and lifter struts (refer to Adjustments section if adjustments are required).
- After checking these items, do a general check over all major systems and components before continuing.

### **LIFTER STRUTS:**

Harvesters come equipped with either steel spacer tubes that hold the lifter strut securely in position for lifting in normal soil conditions, or an optional rubber bumper for use in rocky conditions. The rubber bumper compresses when the wheels strike a large rock and allow the assembly to move upward, minimizing wheel damage.

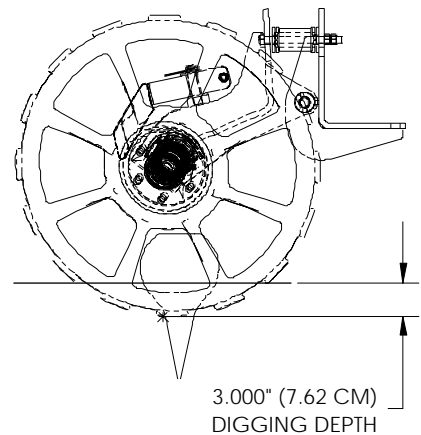


### **DIGGING DEPTH:**

Digging depth will vary with soil and crop conditions. 3 in. (7.62 cm) is a good bench mark. Actual digging depth is best determined by checking the depth in several areas after harvesting 100 ft. (30 meters)

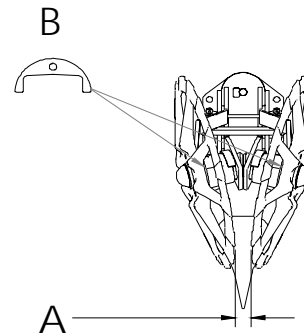
#### **IMPORTANT:**

Though 3 in. (7.62 cm) is a good starting depth, the shallowest possible depth that the lifters will still lift the entire beet should be used. Digging shallower will also extend the life of the machine.



## PINCH POINT SPACING:

- Pinch point spacing (A) should be adjusted to allow for the shallowest possible digging depth.
- Pinch point adjustments are done by adding or removing spacers (B). See parts manual for part #.
- Once again, the pinch point should be adjusted so that the entire beet is lifted, with the least amount of soil possible.



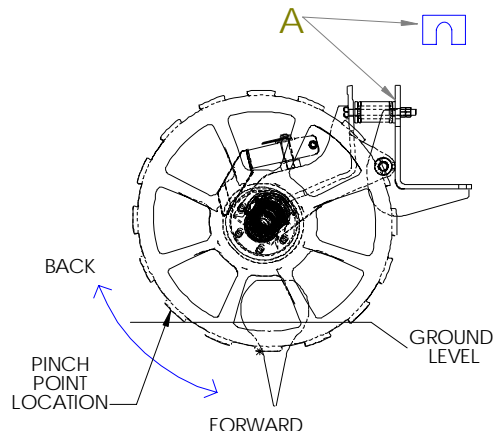
## IMPORTANT:

As a general rule, the pinch point spacing (A) should be:

Pinch Point Spacing	Tons/Acre
1 1/2 - 1 3/4"	18 – 22
1 3/4 - 1 7/8"	22 – 26
1 7/8 – 2"	26 – 30

## Pinch Point Position:

- Pinch point position can be adjusted by the top spacer (A) on the lifter strut. See parts manual for part #.
- In muddy conditions the pinch point should be rolled forward by adding strut spacers.
- In dry soil conditions, if beet tails are being broken off, the pinch point should be rolled back by removing lifter strut spacers.



## NOTE:

The directional adjustments should be taken in relation to the driver's seat of the tractor, that is, back is away from the driver, and forward is toward the driver.

## Paddles:

-Paddles are designed to transfer beets from the lifter wheels onto the apron chain.

-Paddles can be adjusted vertically up and down, or horizontally toward or away from the lifter wheels.

-They should be adjusted down into the lifter wheels only far enough to move the beets onto the chain.

### NOTE:

Paddle adjustment may change when pinch point position is changed.



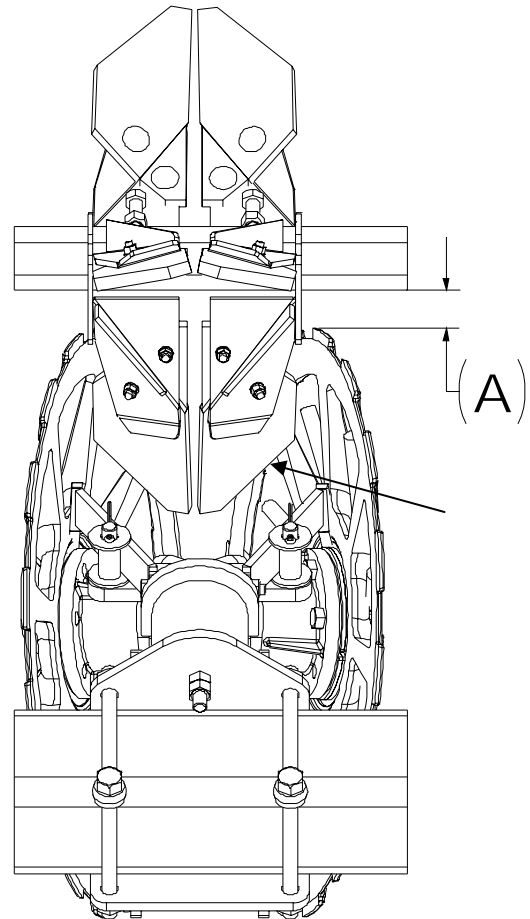
### CAUTION:

**When harvester is equipped with rock struts, the paddle shaft should be 4 3/4" (12 cm) above highest point of the lifter wheels (A).**

### IMPORTANT:

**Always operate harvester at 1000 RPM to maintain cleaning action of paddles.**

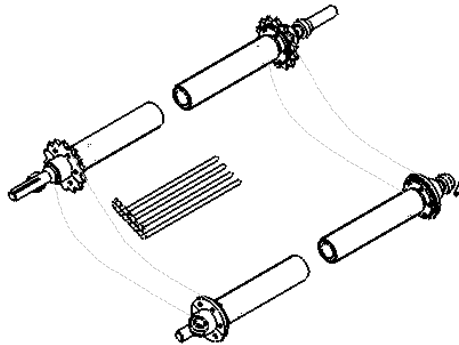
When in sticky, muddy conditions, adjust the paddles out until the rubber paddles just touch the insides of the lifter wheels. When conditions are drier, paddles can be moved inward.





## **APRON CHAIN:**

The apron consists of several parallel sets of hook rod chains. The apron provides the first system to remove dirt, clods, and debris from the beets. Tension of this chain should not be excessively tight, however the chain should never drag on the ground or droop enough on the top allowing beets to be lost out the sides of the machine. Running it at a slightly slack tension will allow the chain to move while turning, allowing dirt, clods and debris to come off the beets and drop away (see “Apron Chain” in Adjustments for proper chain tension).



## **GRABROLL BED:**

The grabroll bed provides the majority of the cleaning action within the harvester. Grabrolls with scrolling provide an aggressive push to beets. Beets are continually turned and flipped over so that the entire beet is cleaned. Scrolled grabrolls will also thoroughly remove mud and break up dirt clods. The smooth grabrolls turn slightly faster than the scrolled, and provide a wedging action to remove dirt, tailings, and debris.

The scrolled grabrolls each move the beets to the center and to the rear of the machine. Kickers, welded to the scrolled rolls, kick the beets to keep them moving on the grabroll bed. The beets can take full advantage of 75 sq. ft. (6.96 sq. m.) cleaning potential.

## **REAR GRABROLL BED**

The grabrolls move beets to the center and to the rear to discharge them into the scrub. The spacing can be adjusted wider or narrower as conditions permit. The smooth grabrolls are spring mounted to allow relief for rocks as they pass over the rolls.

The bed has several adjustments to optimize cleaning and minimize beet damage. The bed can be angled up or down, to increase or decrease cleaning time. The smooth rolls can be adjusted vertically to change the amount of time the beets remain on the bed. They can also be adjusted forward and backward to increase or decrease the amount of mud being taken off during cleaning.

### **NOTE:**

Grabroll tubes turn at 550 RPM from the factory. A larger drive sheave is available to speed the rolls to 600 RPM if mud collects on grabrolls in muddy conditions. A smaller drive sheave is available to slow down the grabrolls to 500RPM during dry conditions to reduce crop damage.

## **IMPORTANT:**

Always operate PTO at 1000 RPM to obtain maximum cleaning action of the grabrolls.



## **FIELD CLEANING:**

During operation, the harvester will collect mud at different rates depending on soil conditions. It is important to clean the machine every 2 hours, or more often if the conditions demand it.

### **IMPORTANT:**

If left uncleaned, mud can eventually clog the machine, and will cause imminent damage to the machine. Frequent cleanings will help to avoid this.

## **SCRUB CHAIN:**

The rear vertical chains which lift the beets from the grabrolls up to the tank are also known as a scrub.

The inside chain typically runs faster than the outside chain providing additional cleaning.

### **NOTE:**

The larger the difference in the chain speed, the greater the chance of additional damage to the beets.

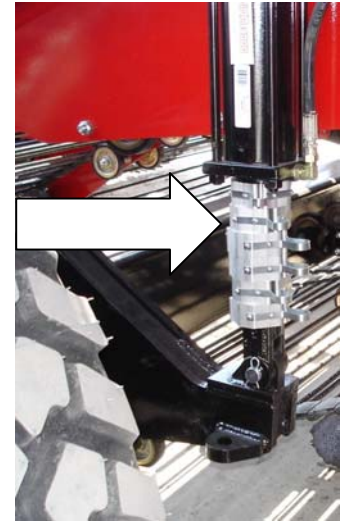


## **LEVELING ADJUSTMENTS:**

To obtain optimal performance of the harvester, the machine must be level from left to right, and front to rear while harvesting. The rear struts can be adjusted vertically with cylinder stops on the axle cylinders to compensate for an unlevel harvester.

### **NOTE:**

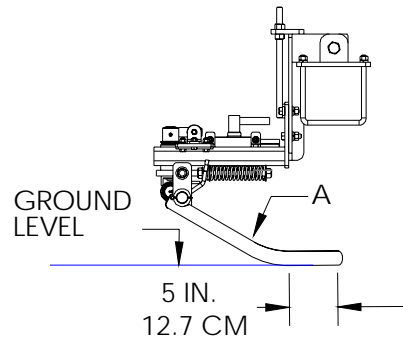
The harvester might not be level is a result of the weight of the extended boom. Adjusting the rear struts will help solve this problem.



## ROW FINDER:

Amity harvesters have the option of a hydraulic row finder attachment. Row finders help keep the lifter struts directly in line with the crop rows.

The row finder wands (A) should be adjusted so that there is 5" (12.7 cm) of contact between the ground and the row finder wands.



### IMPORTANT:

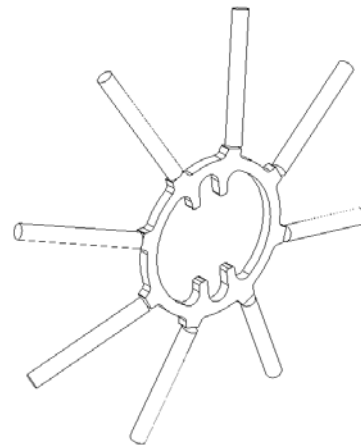
Raise harvester out of ground when backing up machine. Failure to do so may damage row finder.

## WHEEL FILLERS:

Optional wheel fillers can be bolted onto lifter wheels to lift more soil. This helps reduce beet damage in extremely dry conditions and loss of small beets through lifter wheel spokes.

### IMPORTANT:

**Wheel fillers should only be used when necessary. Loading excess soil into machine may reduce machine life, and lead to excess wear on components.**



## **PERFORM LUBRICATION AND MAINTENANCE:**

Perform each lubrication and service illustrated in this section at the beginning of the season and at the end of the season.

### **IMPORTANT:**

**The period recommended is based on normal conditions; severe or unusual conditions may require more frequent lubrication or oil changes.**

## **GREASE:**

SAE multipurpose high temperature/extreme pressure grease with less than 1% molybdenum disulfide grease should be used.

Clean grease fittings before using grease gun. Replace any lost or broken fittings immediately. If a new fitting fails to take grease, remove and check for failure of adjoining parts.

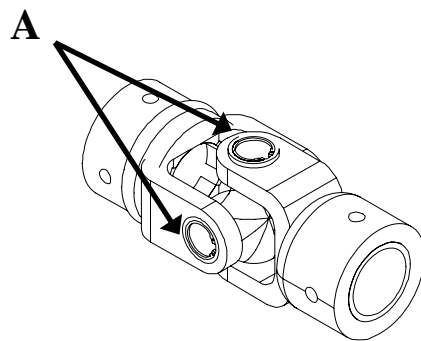
### **IMPORTANT:**

The items separately listed from the lubrication chart, and the servicing intervals pages are of extra importance. These items must be well maintained and checked routinely to maximize their lifespan.

## **U JOINTS:**

### **IMPORTANT:**

On needle bearings (A), use of grease with more than 1% molybdenum disulfide content may lead to premature U joint failure.

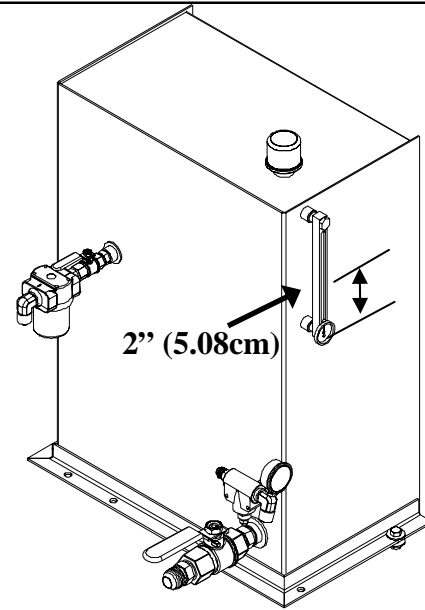


### HYDRAULIC TANK OIL LEVEL:

Tank should be filled so that 2" (5.08 cm) of oil shows above the low level line.

**NOTE:**

Check oil level every 10 hours.

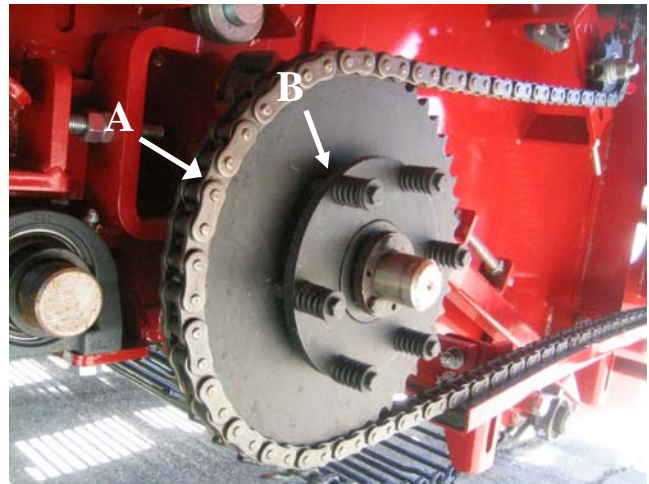


### ROLLER CHAIN:

Apply proper amount of oil to roller chain (A) to prevent bearings from becoming dry.

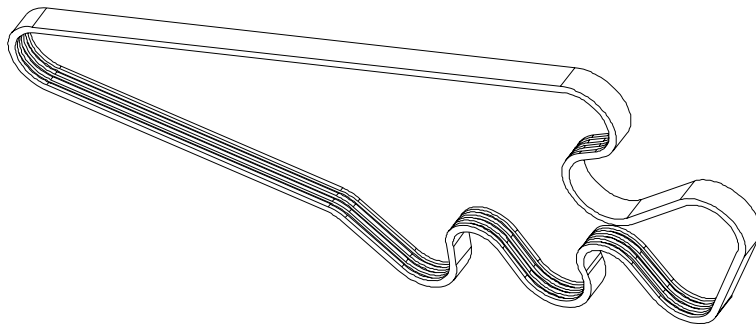
**IMPORTANT:**

Excessive oil applied to roller chain may contaminate slip clutch (B).



### DRIVE BELT:

Check drive belt for wear every 10 hours.

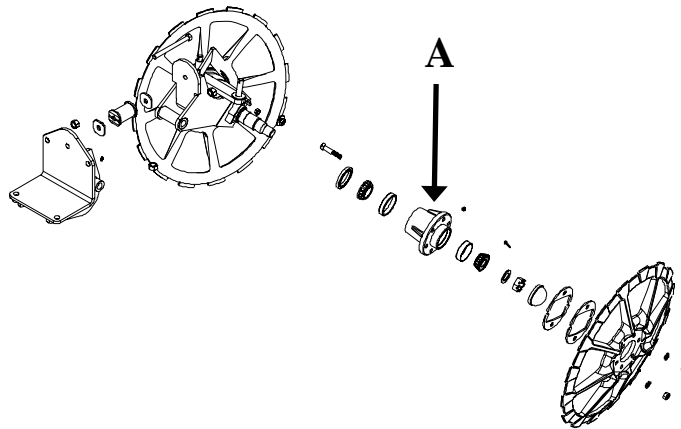


### LIFTER STRUT HUBS:

Lifter strut hubs (A) need to be repacked with grease, seals need to be checked, and spindle nut retorqued every 400 acres, or sooner in severe conditions.

#### Torquing Spindle Nut:

1. Ensure seal and bearings are seated properly before tightening the spindle nut.
2. Torque the spindle nut to 200 lb-ft while continuously rotating hub (A). At this point, the hub should be difficult to rotate.
3. Loosen spindle nut one full turn, or until it's loose.
4. Torque spindle nut to 50 lb-ft while continuously rotating lifter wheel hub.
5. Back off spindle nut 1/6 of a turn, or just enough to install cotter pin in the spindle.



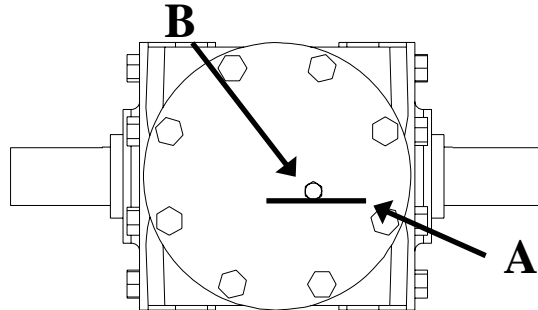


### GEARBOX OIL LEVEL:

Gearbox oil levels should be checked routinely and filled to the line shown at (A).

Side plugs (B) can be found on all gearboxes and can be used to measure correct fill level.

When gearboxes are filled with the proper amount of oil, the level should be just below the threads of side plug (B). Excess oil can be drained from gearboxes using side plugs (B).

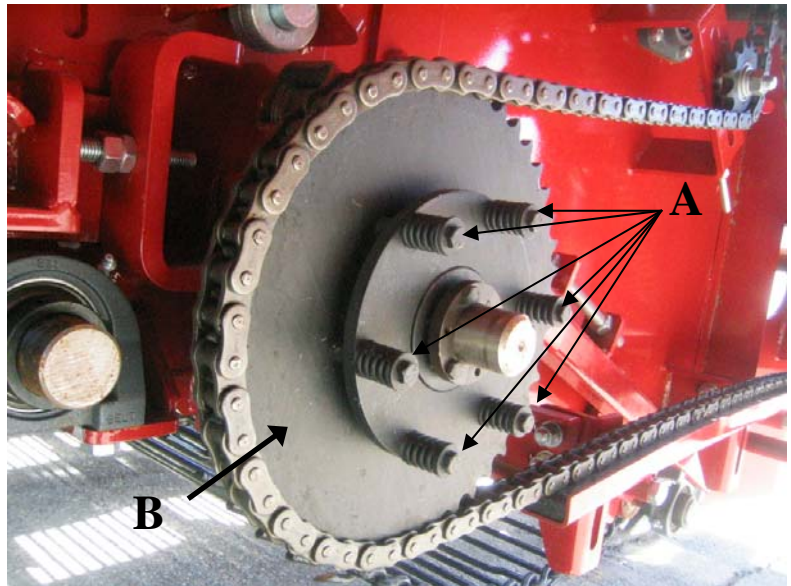


### SLIP CLUTCH MAINTENANCE:

Prior to use each year, slip clutches should be tested to ensure they are functioning properly.

#### Testing slip clutch

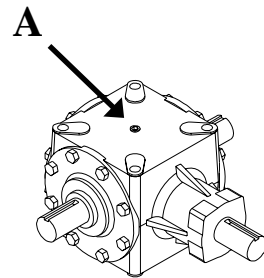
1. Loosen springs by loosening 6 spring bolts (A).
2. Rotate sprocket (B) 1-2 revolutions to ensure proper fiber pad slippage.
3. Retighten bolts (A) to original torque.



### BREATHER CLEANING:

The breather must be able to vent to atmospheric conditions during the heating and cooling cycles of operation. If it cannot vent, oil will seep out the seals and run low. Prolonged operation with low oil levels will damage the internal components. To clean breathers, follow this procedure:

1. Remove the breather (A).
2. Stop up the breather opening using a plastic plug or a clean rag to prevent contaminants from entering the gearbox.
3. Soak the breather in solvent for one hour.
4. Use a pointed instrument or a wire to remove any residue from the breather passages.
5. Blow out the breather with high pressure air.
6. Blow through the breather to ensure that the passages are clear.
7. Reinstall and tighten breather (A) in the gearbox.



### SLIP CLUTCHES:

Fiber pads (A) within slip clutches must be replaced once excessive slippage occurs.

#### IMPORTANT:

Do not contaminate slip clutch with oil. This may cause slippage, leading to premature fiber disc replacement.



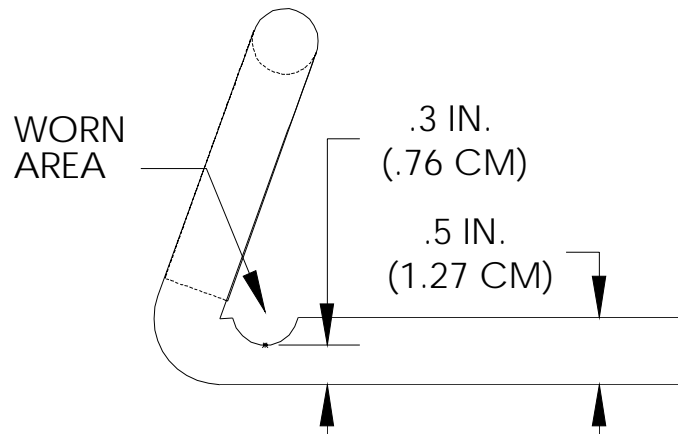
### HOOK ROD CHAINS:

Hook rod chain, such as apron chain, is a high wear item. Hook rod chains should be replaced when the chain is worn 40% through at joints.

40% wear = approximately .3 in. (.76 cm) remaining in ½ in. chain.

**NOTE:**

Sprockets should typically be replaced when replacing chain.



**NOTE:**

By the time apron chain has experienced 40% wear, approximately 10 links will have been removed from each section.

### **SERVICING INTERVALS:**

#### **BEFORE 1<sup>ST</sup> USE**

1. Grease hitch, drivelines, row finder, U joints, and PTO driveline assembly
2. Check all gearbox oil levels.
3. Do not grease ball bearings.

#### **5 HOURS**

1. Grease driveline, and all U joints.

#### **10 HOURS**

1. Grease row finder, hitch assembly, lifter strut rod (when equipped with rock struts), belt idler pivot hub, and hitch assembly.
2. Oil all roller chains using a hand held oil can to control the amount and position of oil placement.
3. Check tightness of the following: lug bolts on rims, lifter strut mounting bolts, hubs on sheaves and sprockets, rear struts mounting bolts, bearing mount on grabrolls, splice bolts on all belted chains, drive sprockets for belted and hook chain.
4. Service apron chain. Check tension, and remove links if necessary.
5. Check belted chain splices.
6. Check for drive belt tension and wear; check idlers for proper tension and alignment. Adjust as required.
7. Check roller chain tension and wear; check sprockets and idlers for proper tension and alignment. Adjust as required.

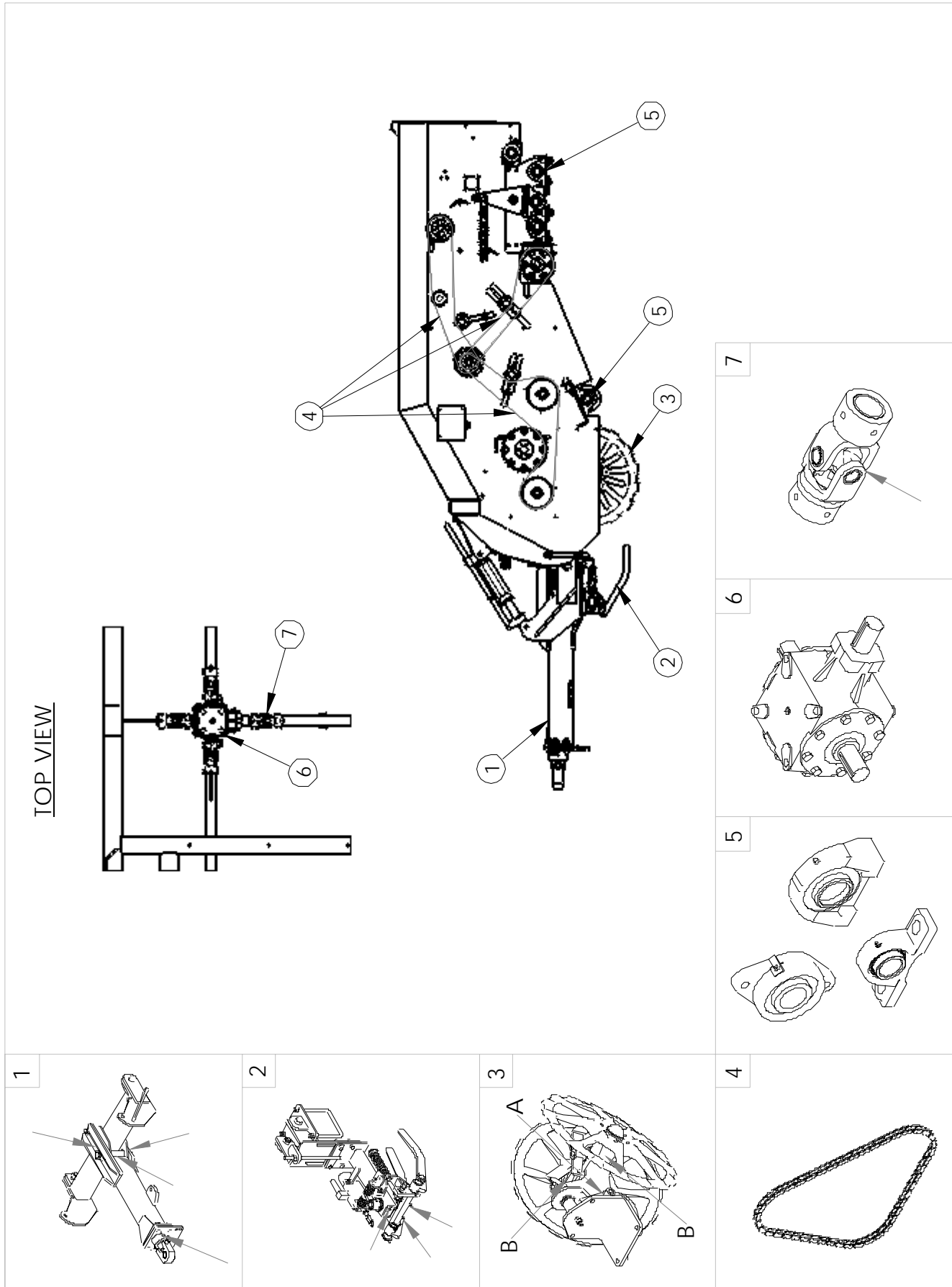
#### **40 HOURS**

1. Lubricate all sealed bearings, rear strut and elevator hinge.
2. Lubricate the hydraulic cylinder pivot points.
3. Check oil level in gearboxes. Fill to proper level. Check more often if leaks are noticed.
4. Check wear on elevator plastic slides, idler wheel bearings, and bogey wheel bearings, and replace as necessary.












#### **250 HOURS OR ANNUALLY**

1. Repack rear strut hubs, and lifter wheel hubs.
2. Change hydraulic oil and replace filter.
3. Change oil in gearboxes, rinse gearbox when oil is replaced.
4. Clean gearbox breathers.

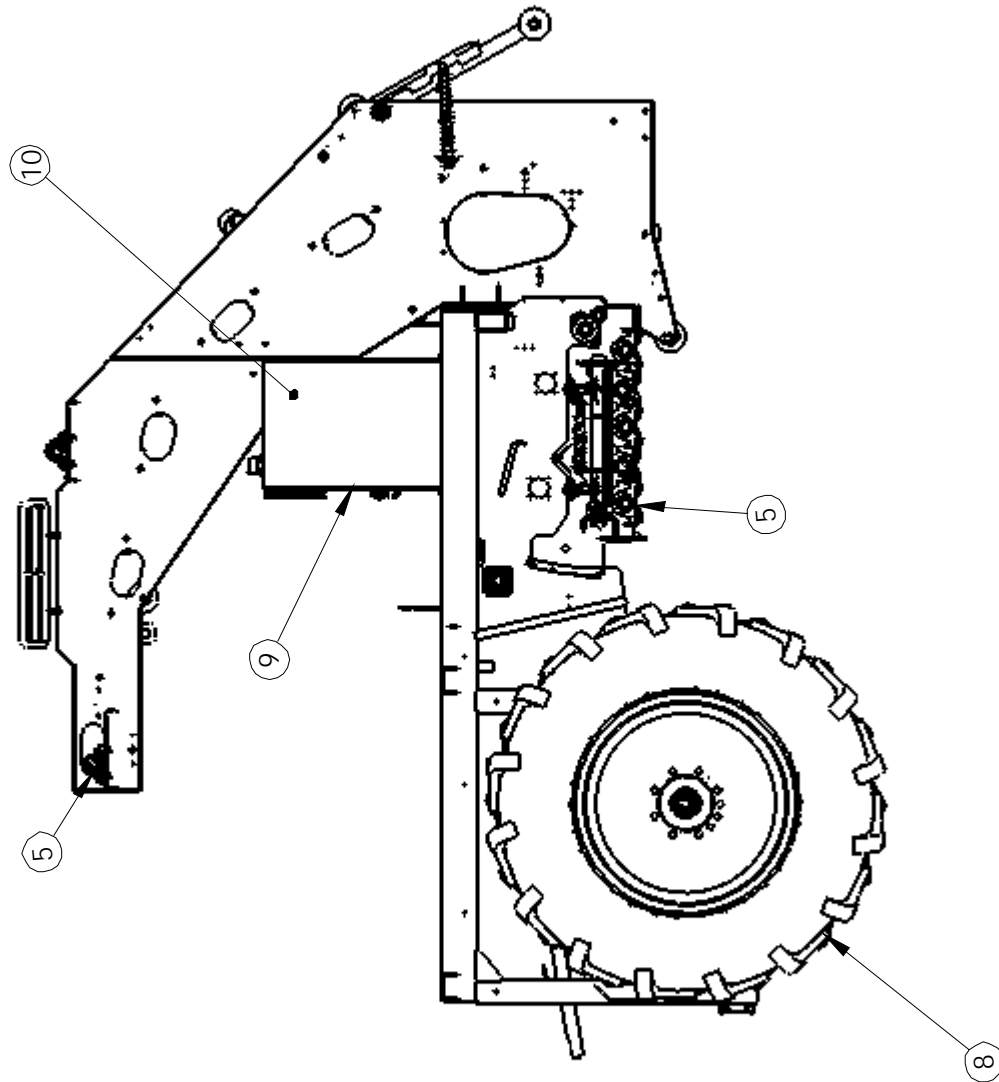
# Lubrication and Maintenance



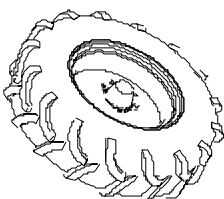
## Lubrication and Maintenance

Ref #	Description	Lubrication Type	Frequency	Quantity	Number of Instances	
1	Hitch Assembly	Multi-Purpose Grease	40 Hours	1-2 pumps	4	
2	Rowfinder	Multi-Purpose Grease	40 Hours	1-2 pumps	3	
3A	Lifter Strut - Rod	Multi-Purpose Grease	10 Hours	2-3 pumps	2	
3B	Lifter Strut- Hub	Multi-Purpose Grease	40 Hours	1-2 pumps	2	
4	Roller Chain	SAE 20 (20 to 40°F) SAE 30 (40 to 100°F)	10 Hours	As Required	2	
5	Sealed Ball Bearings	Multi-Purpose Grease	40 Hours	1-2 pumps	58	
6	Gearbox	EP 80W90 Oil	250 Hours/Annually	3 Qt (2.8 L)	2	
7	U-Joint	Multi-Purpose Grease	40 Hours	2-3 pumps	5	
8	Rear Strut	Multi-Purpose Grease	250 Hours	1-2 pumps	2	
9	Hydraulic Tank	ISO 32 Equivalent	250 Hours/Annually	37 Gal (140 L)	1	
10	Oil Filter	ZINGA #AE25	250 Hours/Annually	1 filter	1	

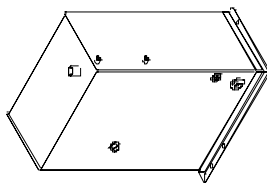
# Lubrication and Maintenance



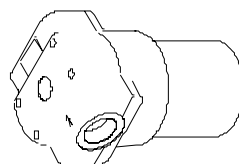
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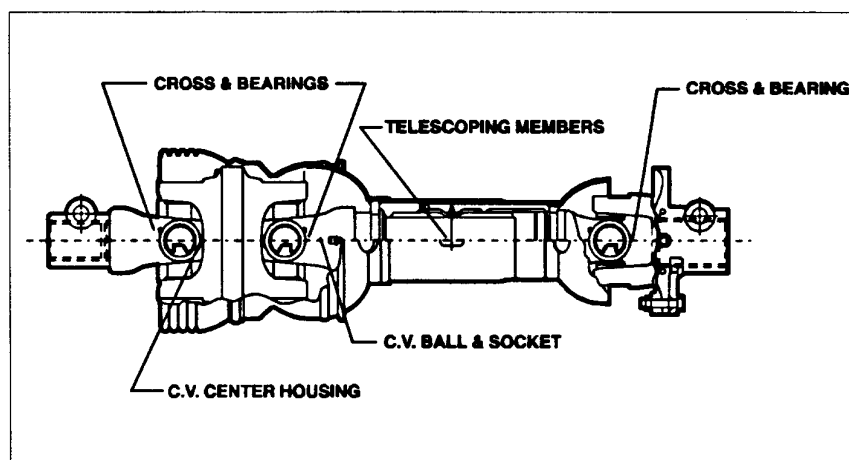


### PTO DRIVELINE SERVICING:

The first lube interval should be 16-24 hours of operation after initial start-up, then follow schedule.

**NOTE:**

**A 1% Molybdenum disulfide grease should be used for the below listed grease points.**



Description	Frequency	Quantity	Instances
Cross and bearings*	8 hours	2-3 pump	3
Telescoping members	8 hours	8-10 pumps	1
CV ball and socket*	8 hours	2 pumps	1
CV center housing*	24 hours	2 pumps	1

\*Constant angle applications must have a lube interval of 4 hours.

**NOTE:**

**Replacement parts are not lubricated. They must be lubricated at time of assembly.  
Use amounts listed above per location, then follow above recommendations.**



## CLEANING

### CLEANING:

Cleaning is an important part of harvester maintenance. This section illustrates a few points where mud will routinely build up which need to be cleaned.

### LIFTER STRUTS /PADDLES:

This is the area that typically requires the most frequent cleanings. Any mud buildup around the lifter struts and paddles must be periodically removed for optimum performance and machine life.

#### IMPORTANT:

If left uncleaned, mud buildup in these areas may lead to paddle shaft failure, slip clutch failure, excessive paddle wear, lifter strut seal damage, and lifter strut bearing failure.



### GRABROLLS:

Mud buildup on grabrolls can typically be eliminated by proper drive sheave selection. If increasing grabroll RPM does not eliminate mud buildup, the grabrolls will need to be periodically cleaned until conditions improve.



### **APRON SHAFTS:**

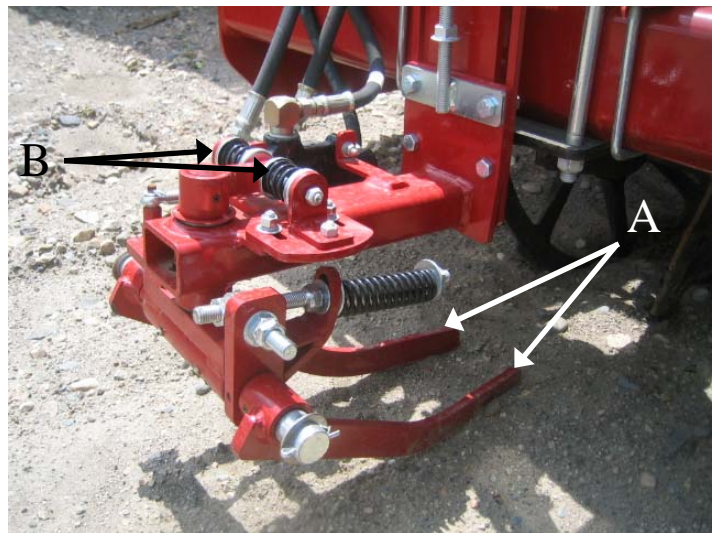
Mud must be removed from apron shafts if buildup occurs under or between apron chains.



### **ROWFINDER:**

Row finder wands (A) and springs (B) must be cleaned routinely in order for row finder to correctly locate beets.

Also clean the area around the hydraulic valve spool and all other moving components to prevent seal failure.



### **REAR SCRUB:**

Interior of inside chain on the rear scrub may build up with mud balls or beets. This area should be checked frequently and emptied if build up occurs. The areas around the bogie wheels and frame cross members must also be kept clean. If left uncleaned, mud balls may cause belted chain to jump off sprockets.



### **BEET TANK:**

The elevator and boom structure, bogie wheels, slides and frame members should be cleaned frequently to prevent soil buildup.

Excess soil in the beet tank causes undue strain on the elevator's hydraulic motor.





### **END OF SEASON:**

1. Thoroughly clean harvester inside and out. Debris and dirt will draw moisture and cause rust.
2. Inspect harvester for any damaged or worn components, repair or replace as required.
3. Loosen or remove drive belt. This will prolong the life of the belt.
4. Touch up paint on all parts from which paint has been worn to prevent rusting.
5. Clean all chains by washing with diesel fuel. Dry well and relubricate (see Lubrication and Maintenance section).
6. Lower boom.
7. Move harvester to a level dry and clean area.
8. Put blocking under lifter wheels to prevent sinking and under rear struts to take load off tires. **DO NOT DEFLATE TIRES.** If exposed, put cover over tires to protect them from light, grease, and oil.
9. Following these guidelines will help prevent any unnecessary downtime during next season's pre-harvest preparation.

**BEGINNING OF SEASON:**

1. Install tires if they were removed for storage.
2. Attach harvester to tractor (see Attaching and Detaching section).
3. Remove all support blocks from lifter struts and rear struts.
4. Lubricate entire machine (see Lubrication and Maintenance), this will force any collected moisture out of the bearings. Replace gearbox oil and hydraulic oil (see Lubrication and Maintenance section).
5. Reinstall drive belt and verify that all pulleys, idlers, and slip clutches are functioning properly.
6. Run harvester to ensure proper function.
7. Tighten all loose components including all guards and shields
8. Review operator's manual prior to operation.

**IMPORTANT:**

All components that are damaged or worn must be repaired or replaced before operating the harvester (see parts book for part numbers).

## ADJUSTMENTS

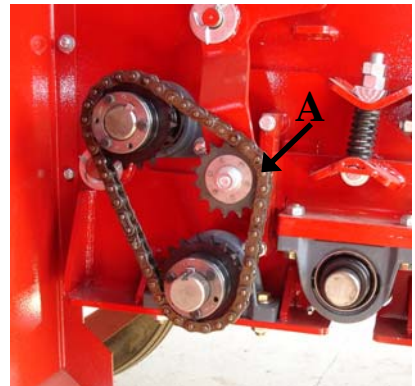
### ADJUSTMENTS:

This section is a reference on how to make the adjustments suggested in Troubleshooting and Lubrication and Maintenance. These fine tunings will help ensure a harvest with minimal losses due to excesses in crop damage and tare.

### GRABROLL DRIVE CHAIN:

#### Adjusting Chain Tension

1. Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Open the right access door and latch it.
3. Loosen the chain idler sprocket (A).
4. Slide sprocket upward until chain is at desired tension. (See “Chain Tension” within this section).
5. Tighten idler sprocket (A).



#### Replacing Chain

1. Follow steps 1-3 from above.
2. Slide sprocket down until chain is loose.
3. Remove old chain, and install new chain.
4. Slide idler sprocket upward until the chain is at desired tension. (See “Chain Tension” within this section).
5. Tighten idler sprocket (A).
6. Lubricate chain if necessary (see Lubrication and Maintenance).
7. Close and secure access door before starting machine.

#### NOTE:

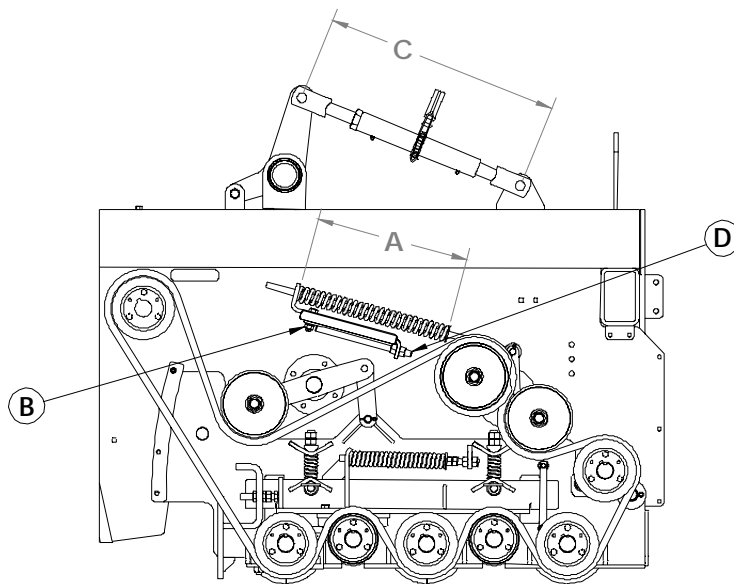
Use a straight edge across the faces of the sprockets to determine their alignment. If they are not aligned, loosen sprockets, realign, and then retighten sprockets.

## GRABROLL BED ANGLE:

1. Shift to park, disengage PTO, lower machine to ground, relieve pressure from hydraulics, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Adjust ratchet jack.

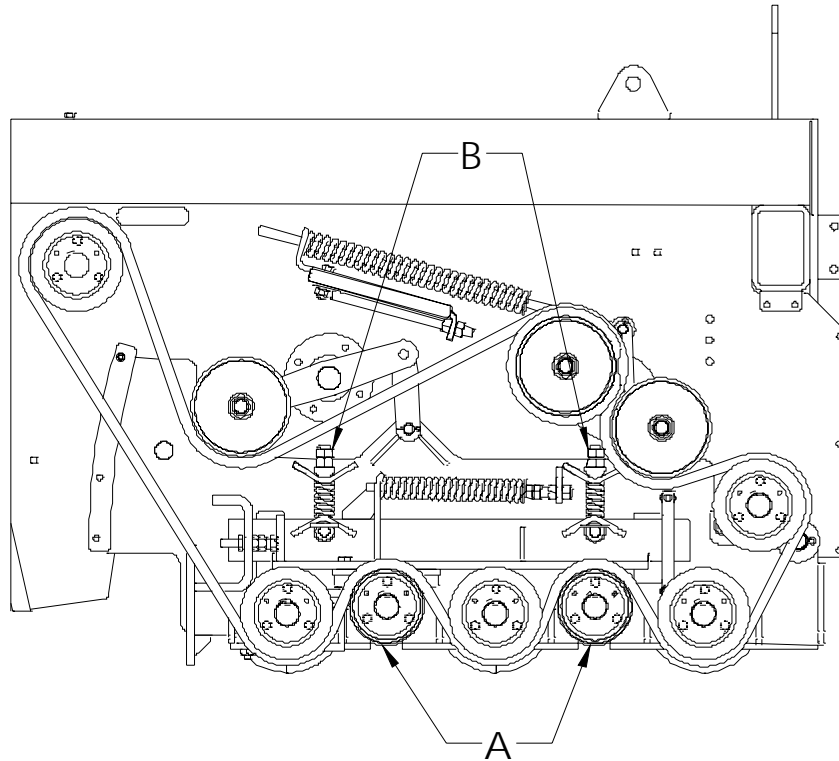
### NOTE:

To level grabroll bed, set C at 24 in. (61 cm).



### SMOOTH GRABROLL HEIGHT ADJUSTMENT:

1. ⚠ Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Open the access door and latch it.
3. To adjust smooth grabrolls (A) up or down, adjust using eyebolts (B).
4. Readjust drive belt to proper tension (see to “Drive belt”).
5. ⚠ Close access door and latch it.



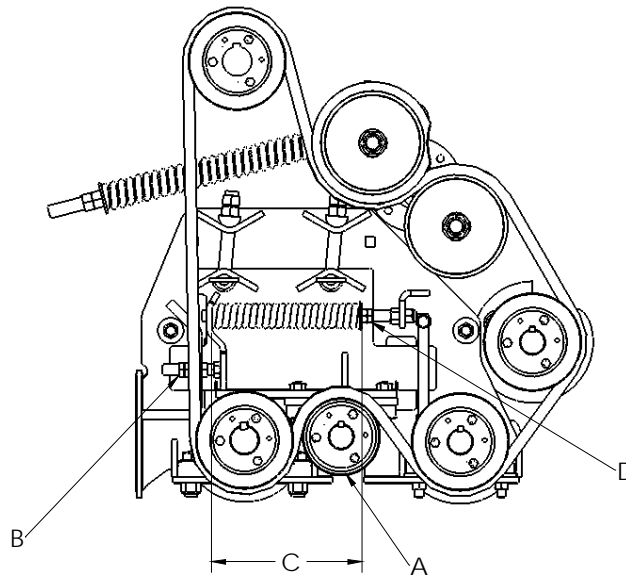


## FRONT ROLL SPACING ADJUSTMENT:

1. ⚠ Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Open the access door and latch it.
3. Adjust nuts (B) to change the gap between smooth grabroll (A) and scrolled grabrolls.
4. Readjust drive belt to proper tension (see to “Drive belt”).
5. Adjust nuts (D) to readjust rock trip spring compression (C) to 8.5 in (21.7 cm).
6. ⚠ Close access door and latch it.

### IMPORTANT

Grabrolls must not touch each other under any operating conditions.



## REAR ROLL SPACING ADJUSTMENT:

1. ⚠ Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Open access door and latch it.
3. Adjust bolt (F) to change the gap between smooth grabrolls and scrolled grabrolls.

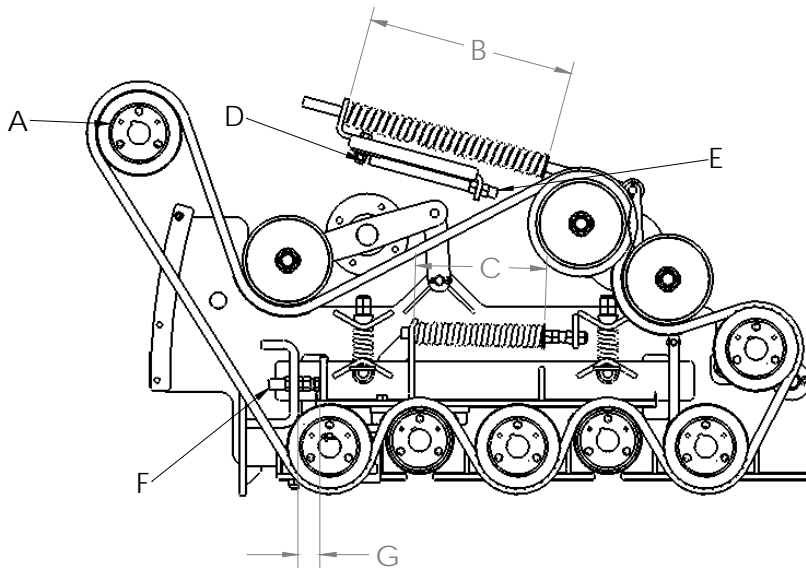
### NOTE:

To set gap between grabrolls to original factory spacing, adjust bolt (F) so (G) is 2 inches ( 5 cm).

4. Readjust drive belt to proper tension (see to “Drive belt”)
5. Readjust rock trip spring compression (C) to 8.5 in. (21.7 cm).
5. ⚠ Close and latch access doors before starting machine.

### IMPORTANT:

Grabrolls must not touch each other under any operating conditions.



**GRABROLL SPEED ADJUSTMENT:**

1. ⚠ Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Open the access door and latch it.
3. Remove grabroll bed drive belt according to chart within this section.
4. Remove sheave by first removing sheave bolts.
5. Install sheave bolts in previously unused holes in the taper lock hub. Evenly tighten bolts until sheave is loose.
6. Remove taper lock hub, key and sheave from shaft.
7. Replace drive sheave to obtain grabroll bed speed desired, refer to figure below.
8. Place sheave on shaft.

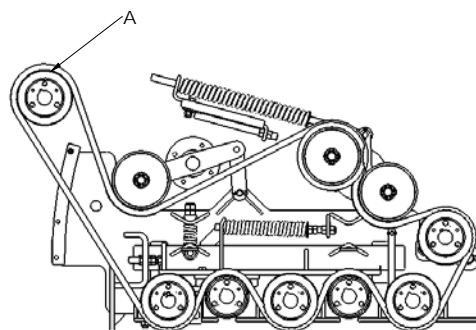
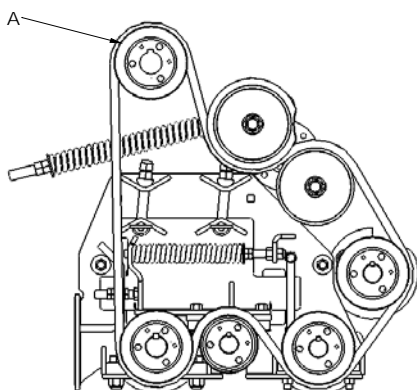
**IMPORTANT:**

Ensure tapered surfaces are clean and free of all lubricants.

9. Place taper lock hub on shaft, then insert key into shaft and hub.
10. Start bolts through taper lock hub into sheave.
11. Align sheave (A) with other sheaves and tighten evenly. Be sure sheaves are aligned with each other after tightening.
12. Reinstall grabroll bed drive belt according to diagram provided.
13. ⚠ Close and latch access door before starting machine.

Sheave A	Outside Diameter	Roll RPM	P/N
6.8*	7.15 in 182 mm	606	56647
6.2	6.55 in 166 mm	552	56646
5.6*	5.95 in 151 mm	500	53668

\* Available from your authorized WIC dealer



## ROCK TRIP SPRING ADJUSTMENT:

1. ⚠ Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Open the access door and latch it.
3. Adjust nut (B) so that (C) is 8.5 inches (22 cm)
4. ⚠ Close and latch access door before starting machine.

**\*Refer to chart on previous page.**

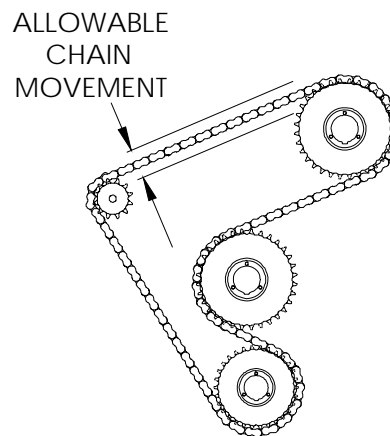
## ROLLER CHAIN TENSION OR REPLACEMENT:

Roller chains need to be tightened when they are worn or when they jump sprocket teeth.

Each chain has a certain amount of allowable chain movement. To measure allowable chain movement, hold a tape measurer up to the chain, then pull the chain down and then up. (The total amount of movement the chain moves should fit the specifications listed within this section).

Check alignment of the sprockets periodically during the season, and whenever replacing roller chains. Lay a straight edge along a machined surface of the sprockets. If there is any misalignment, adjust the sprocket. For sprockets on a shaft with end float, align the sprocket for the normal operating position.

Install the replacement chain around both sprockets, bringing the free ends together on one sprocket. Insert a connector link and secure in place.



## ROLLER CHAIN TENSION SPECIFICATIONS:

Roller chains on the harvester are set to allow for designated amounts of chain movement. When servicing or replacing these chains, they should be reset to factory tensions.

### IMPORTANT:

Recheck chain tension after initial 5 hrs. of operation.

**Paddle Shaft Chain**



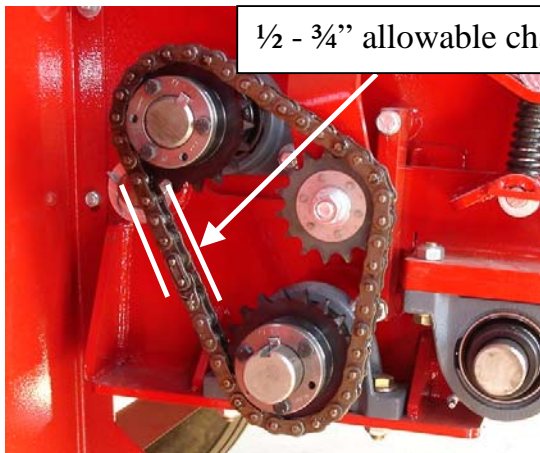
1 ½ - 2" allowable chain movement

**Reduction Chain**



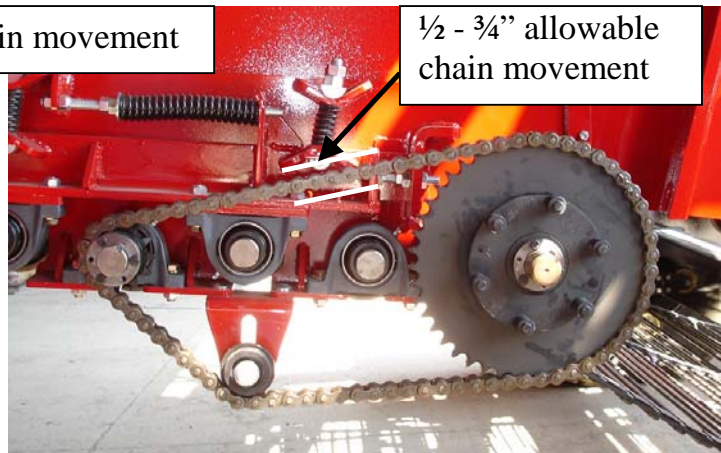
1 ½ - 2" allowable chain movement

**Grabroll Bed Chain**



½ - ¾" allowable chain movement

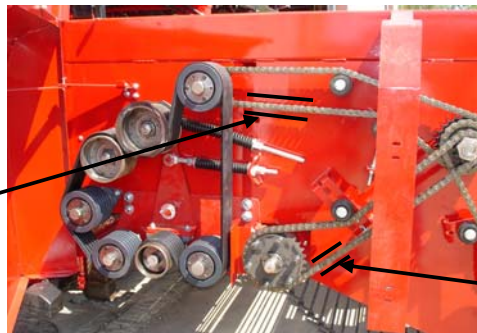
**Jump Chain**



½ - ¾" allowable chain movement

**Drive Chain**

1 ½ - 2" allowable chain movement



**Apron Shaft Chain**

1 ½ - 2" allowable chain movement

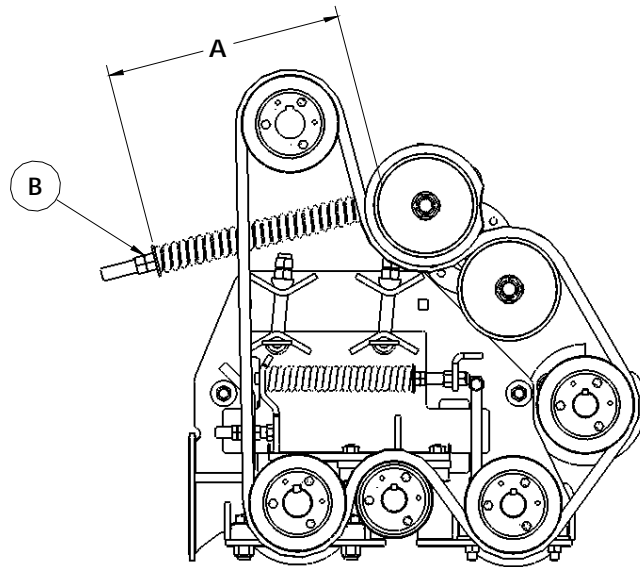
## FRONT DRIVE BELT:

### Adjusting Belt Tension

1. Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Open the access door and latch it.
3. Adjust the nut (B) until spring length (A) is 13.5 inches (34 cm).
4. Lock double nuts (B).

### Replacing Belt

1. Follow steps 1 & 2 from above.
2. Loosen nut (B) until the belt is loose.
3. Remove old belt and install new belt.
4. Tighten nut (B) until spring length (A) is 13.5 inches (34 cm).
5. Lock double nuts (B), and check alignment of sheaves.
6. Make sure belt is in proper grooves, and secure access door before starting machine.



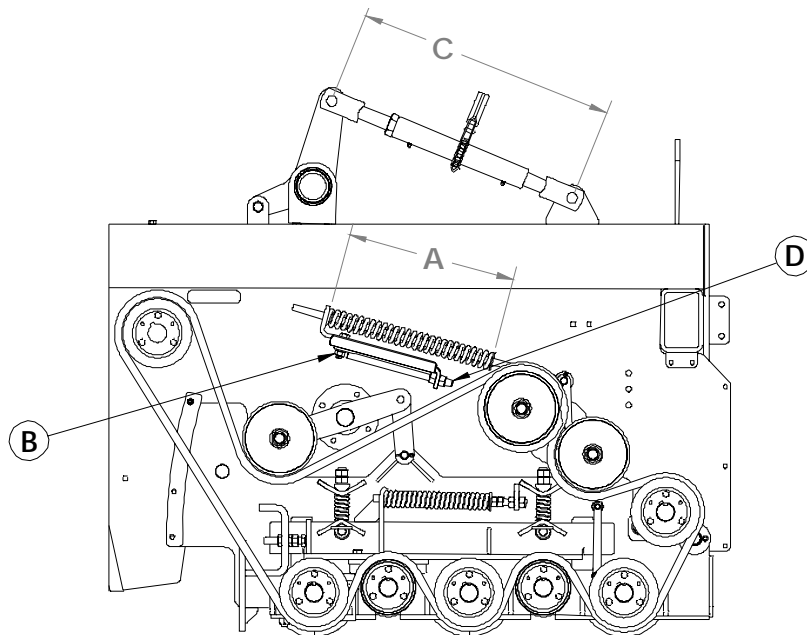
## REAR DRIVE BELT:

### Adjusting Belt Tension

1. Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Open the access door and latch it.
3. Loosen bolt (B) on the adjustment slide.
4. Adjust the adjustment rod (D) until spring length (A) is 13.5 inches (34 cm).
5. Tighten bolt (B).

### Replacing Belt

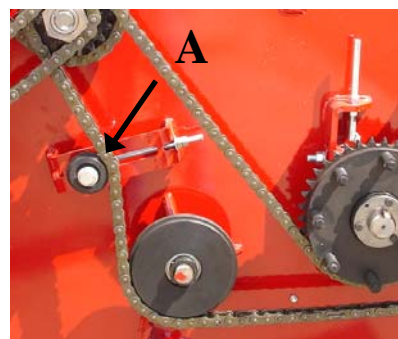
1. Follow steps 1-3 from above.
2. Loosen adjustment rod (D) until the belt is loose.
3. Remove old belt and install new belt.
4. Tighten adjustment rod (D) until spring length (A) is 13.5 inches (34 cm).
5. Tighten bolt (B), and check alignment of sheaves.
6. Make sure belt is in proper grooves, and secure access door before starting machine.



## APRON AND PADDLE DRIVE CHAIN: (RIGHT SIDE)

### Adjusting Chain Tension

1. ⚠ Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Open the access door and latch it.
3. Loosen the chain idler sprocket (A).
4. Adjust the adjustment rod until the chain is at the desired tension (see “Roller Chain Tension Specifications” within this section).
5. Tighten the idler sprocket and recheck the chain tension.



### Replacing Chain

1. Follow steps 1-3 from above.
2. Remove old chain and install new chain.
3. Adjust the adjustment rod until the chain is at the correct tension (see “Roller Chain Tension Specifications” within this section).
4. Tighten the idler sprocket and recheck the chain tension.
5. Lubricate chain if necessary (see Lubrication and Maintenance section).
6. ⚠ Close and secure access door before starting machine.

#### NOTE:

Use a straight edge across the faces of the sprockets to determine their alignment, if they are not aligned, loosen the sprockets, realign, and tighten sprockets.



## APRON CHAIN:

### Adjusting Chain Tension

1. ⚠ Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Open the left and right access doors and latch them.
3. Adjustments on the apron chain tension are made first by removing or adding links, and lastly by moving the front idler shaft.

NOTE: Apron chain is a high wear chain, and links may need to be removed frequently.

4. To adjust the shaft, loosen jam nuts holding the adjustment rods on the bearing mounting arms.
5. Use the adjusting rod, and slide the bearing mounting arms apart or together.
6. Always measure the dimension between the shaft centers when making adjustments, keeping them equal on the left and right sides.

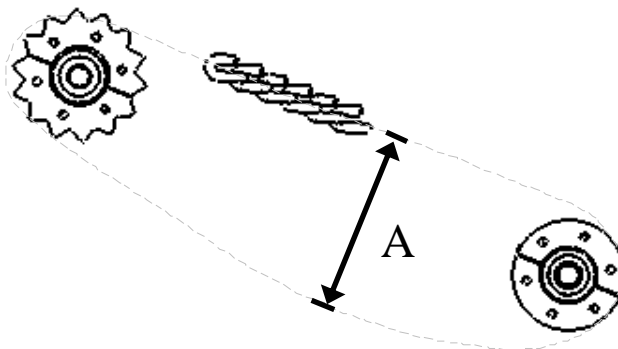
NOTE:

Distance (A) between top and bottom chain should be kept at 11-12" (27.9 – 30.5 cm) measured from centerline of chains.

7. Tighten jam nuts on the adjusting rods, and be sure the adjusted apron chain does not contact lifter wheels.

### Replacing Apron Chain

1. Loosen jam nuts holding the adjustment rods on the bearing mounting arms.
2. Slide the front bearing mounting arms backward to its loosest position.
3. Rotate shafts until splice link is accessible, then disconnect chain on both ends of the link.
4. Remove the apron chain or attach the new chain to the old chain before its removal and use it to thread the new chain over the sprockets.



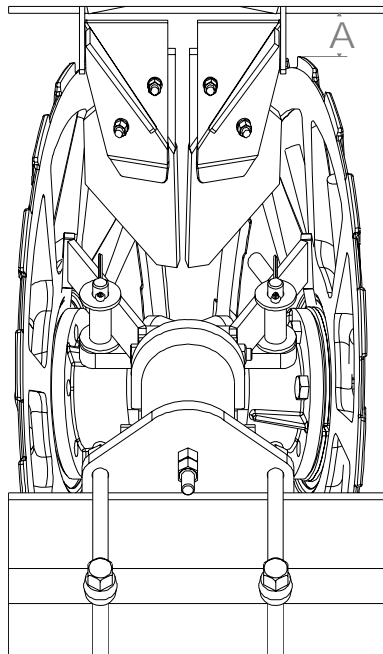
5. Thread a new chain over the sprockets, bringing the ends together.
6. Hook the ends of the chain together.
7. Repeat steps 3-6 for each apron chain.
8. Use the adjusting rod to slide the lower apron shaft into position to give the required tension, making sure the apron chain does not contact lifter wheels.
9. Always measure the dimension between the shafts when tensioning. Keep them equal on the left and right hand sides.
10. When correctly positioned, tighten the jam nuts on the bearing mounting arm adjustment rods.
11. Latch access doors on both sides before starting machine.

## PADDLE SHAFT POSITION:

When operating with a steel spacer in the lifter strut, set the paddle shaft to clear the lifter wheel rims to ensure that all beets get moved to the apron chain. Spacing of the paddles on the shaft is then set for wet or dry harvest conditions.


When operating in rocky conditions and with rubber bumpers installed in the lifter wheel struts, the paddle shafts must be at least 5 in. (12.7 cm) from the edge of the lifter wheel rim (A). To set, follow this procedure:

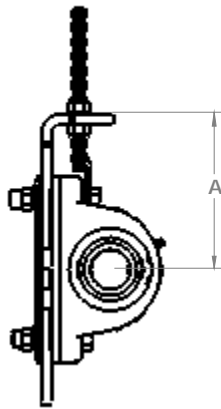
1. Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Open the left and right access doors and latch them.
3. Loosen the bearing mounting bolts and the jam nuts on the adjusting bolts.
4. Lower machine onto stands or blocks to take weight off the lifter wheels.
5. Measure the distance between the paddle shaft and the rim of the lifter wheels.
6. Turn the adjusting bolt to give at least 5 in. (12.7cm) between the shaft and rim (A). This dimension is critical, especially when using rubber bumpers.



### NOTE

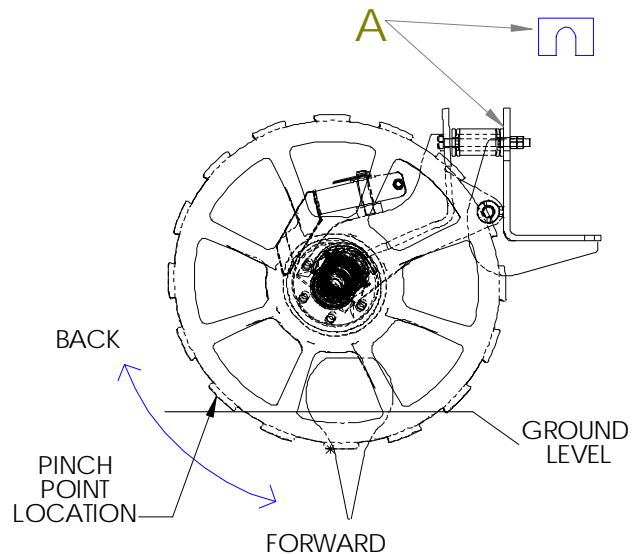
It may be necessary to readjust the apron/paddle shaft chain tension on the right side to provide slack to move the sprocket.

1. Tighten the shaft mounting bolts and the jam nuts on the adjusting bolts. Set the same dimension (A) on both sides and secure mounting fasteners in position. On wide-frame harvesters, set the same dimension (A) on the center mount as on the outer mounts.
2. Place a 4" x 4" (8.9 x 8.9 cm) block of wood under one of the lifter wheels and lower the entire weight of the machine down on this strut.
3. The rim should clear the shaft by at least  $\frac{1}{2}$ " (1.27 cm). If the rim is touching the shaft, raise the paddle shaft until it clears by at least  $\frac{1}{2}$ " (1.27 cm).
4. If the bumper compression is adjusted, raise the wheel off the block and lower it again. Check the clearance again.
5. Repeat the procedure with each set of lifter wheels. This will ensure that none of the wheels will contact the paddle shaft.
6.  Close and latch access doors before starting machine.



### PINCH POINT POSITION:

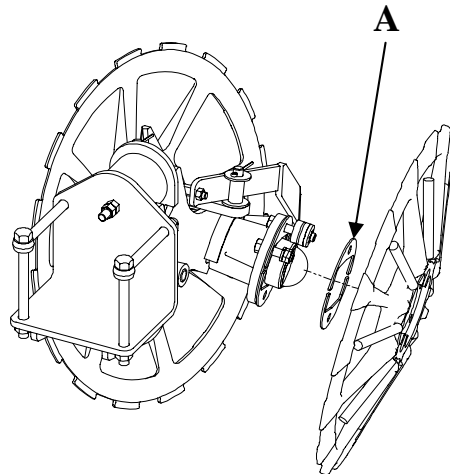
1. To roll pinch point forward or back, first loosen the two nuts on the front of the strut.
2. Add or remove spacers (A) to adjust pinch point forward or back.
3. When desired position is reached, retighten hex nuts.



### PINCH POINT SPACING:

#### Adjusting Pinch Point

1. Remove hex nuts on outside of lifter wheels.
2. Remove lifter wheels if necessary.
3. Add or remove spacers (A) as necessary.
4. Reinstall lifter wheels if removed.
5. Retighten hex nuts on outside of lifter wheels.



## TORQUE CHART:

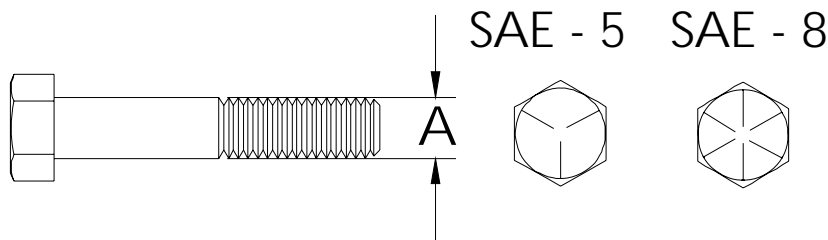
Torque values listed are for coarse thread bolts, in general use only. Do not use these values if a different torque value or tightening procedure is listed for a specific application. Check tightness of cap screws periodically.

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

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

Make sure fastener threads are clean and dry, and thread engagement is properly started. This will prevent them from failing when tightening.

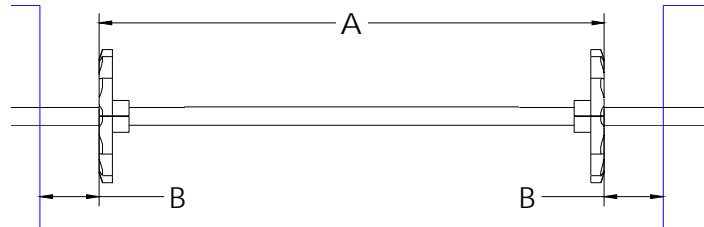
Tighten cap screws with plastic insert or crimped steel-type lock nuts to approximately 50% of amounts shown in chart. Tighten toothed or serrated-type lock nuts to full torque value.



Size (A)		Grade 5		Grade 8	
Standard	Metric	N*m	lb-ft	N*m	lb-ft
1/4"	.635 cm	12	9	17	12.5
5/16"	.794 cm	25	18	35	26
3/8"	.953 cm	44	33	63	46
7/16"	1.11 cm	70	52	100	75
1/2"	1.27 cm	110	80	150	115
9/16"	1.43 cm	155	115	225	160
5/8"	1.59 cm	215	160	300	225
3/4"	1.91 cm	375	280	550	400
7/8"	2.22 cm	625	450	875	650
1"	2.54 cm	925	675	1300	975
1 1/8"	2.86 cm	1150	850	1850	1350
1 1/4"	3.18 cm	1650	1200	2600	1950
1 3/8"	3.49 cm	2150	1550	3400	2550
1 1/2"	3.81 cm	2850	2100	4550	3350

## HEAD SHAFT SPROCKET DIMENSIONS:

The distance between head shaft sprockets, idler sprockets, or idler rollers is important. The schematics below show a good starting point for sprocket and roller placement.



Chain Type	Sprocket Dimension (A)
42" (107 cm) Belted Chain	36.5" (92.7 cm)
64" (162.6 cm) Belted Chain	58.5" (23 cm)

### IMPORTANT:

Dimension (B) is the distance between the face of the sprocket, and the walls of the elevator. This dimension must be equal on both sides of the shaft.

## SLIP CLUTCHES:

All harvesters are equipped with fiber pad slip clutches on the paddle shaft and apron shaft. Some may also have slip clutches on the rear scrub drive. These slip clutches prevent failure of rotating components, in the event they stop rotating. All slip clutches are set at the factory, and no field adjustments should be necessary.

### IMPORTANT:

Do not use any type of oil on slip clutches.

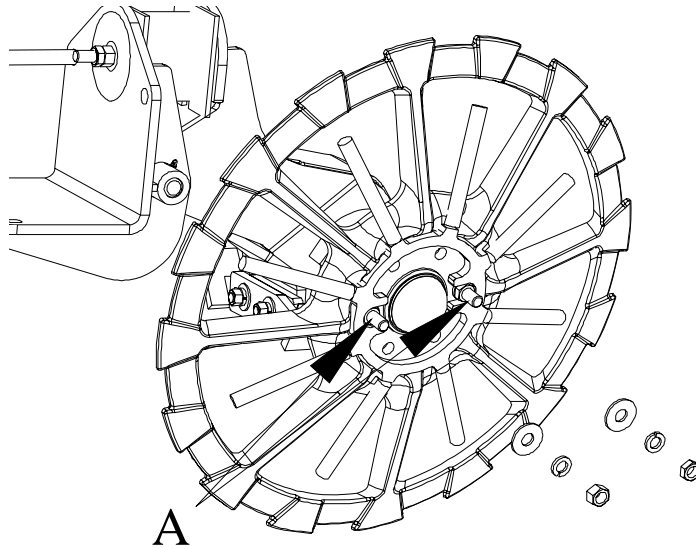
Tubes of preset length are housed inside the slip clutch springs. These tubes prevent overtightening of the slip clutch. **DO NOT** remove the preset tubes and retighten the slip clutch.



## WHEEL FILLERS:

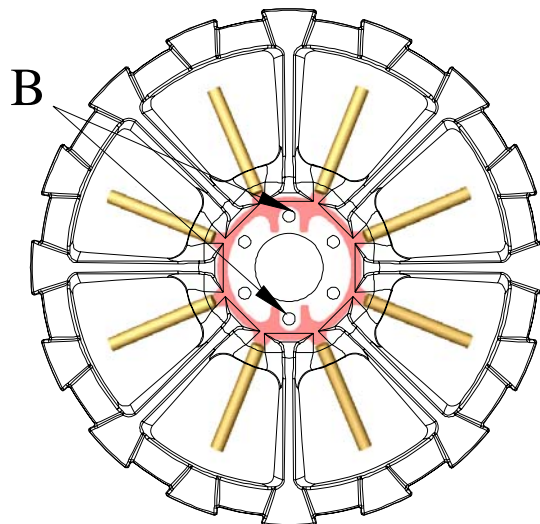
### Adding or Removing Wheel Fillers

1. Remove lock nut, lock washer, and flat washer from two longest bolts (A).
2. Add or remove wheel fillers.
3. Replace fasteners.



#### NOTE:

If bolts (A) are removed, they must be reassembled in the holes shown below (B); lining up exactly in line with the opposite spokes of the lifter wheels or they will not line up correctly on wheel fillers.





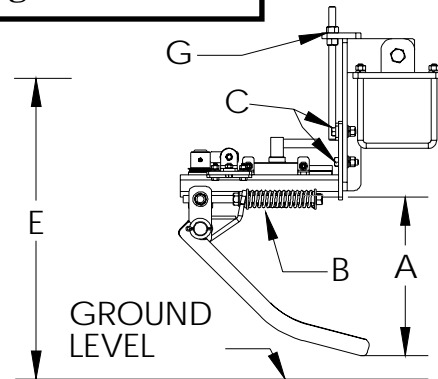
## ROW FINDER ADJUSTMENTS:

The row finder should look as shown when the machine is raised out of the ground.

Notice that the wands are angled down, dimension (A). They can be adjusted up or down by moving nuts (D).

Adjustment spring (B) can be adjusted to apply more down pressure to ensure that wands remain in constant contact with the beet row when the machine is lowered to digging depth.

**Right Side View**



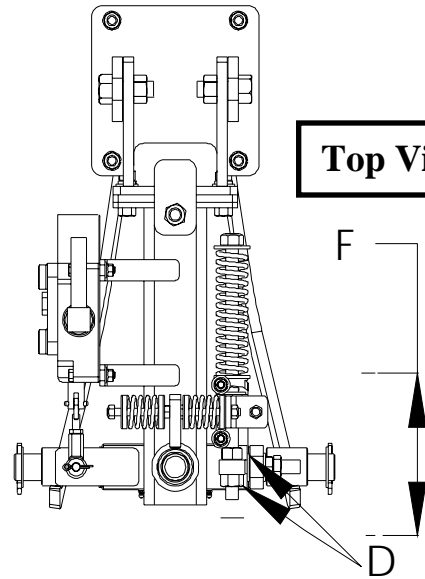
### Adjusting (A)

1. To increase distance (A), adjust nuts (D) along line (F).
2. To decrease distance (A), adjust nuts (D).

### Adjusting Height (E)

1. To change height (E) of row finder, loosen bolts (C).
2. Adjust jam nuts (G) to desired height.
3. After adjusting height (E), retighten bolts (C).

**Top View**



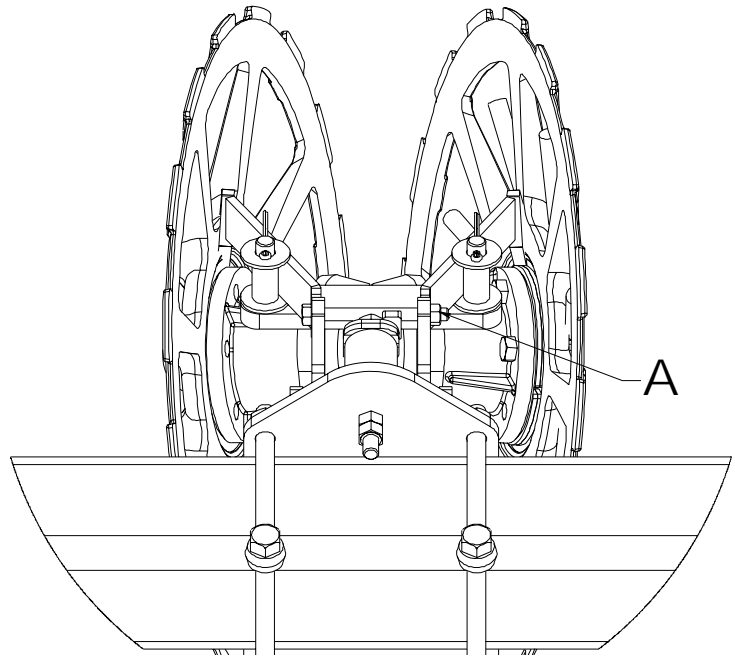
### NOTE:

The wands should be angled down slightly when machine is out of the ground. This will create some down pressure from spring (B) when machine is lowered to digging depth.

## SCRAPERS:

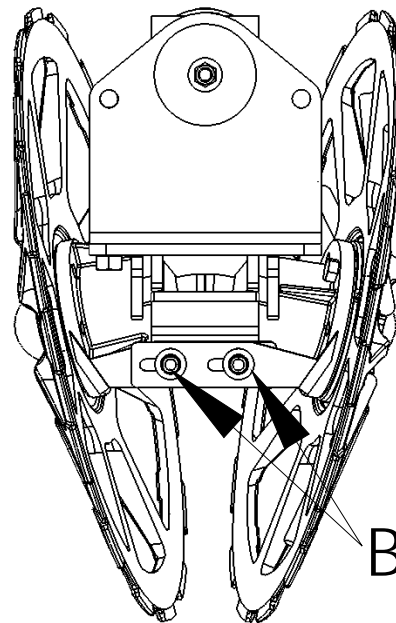
### Adjusting Top Scrapers

1. Adjust bolt (A) to move scrapers out to lifter wheels.



### Adjusting Bottom Scrapers

1. Loosen bolts (B).
2. Adjust scrapers to desired position.
3. Tighten bolts (B).



### IMPORTANT:

Lifter wheels must rotate a full 360° after adjusting scrapers to ensure clearance.

## REAR SCRUB ROLLERS:

The rear scrub rollers at locations (A, B, and C) can be moved to provide more slack in the scrub chain when beet yield is very high.

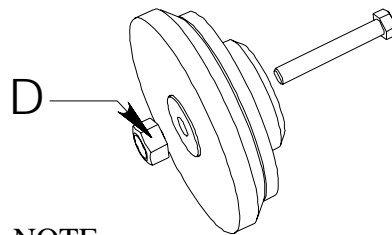
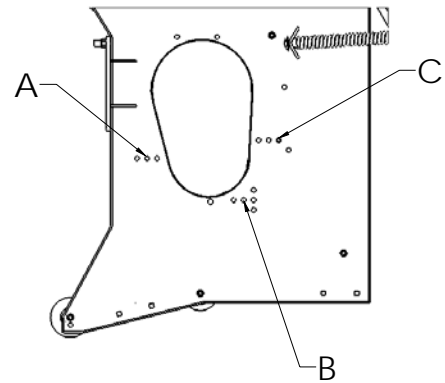
Rollers should be moved when beets back up on the grabroll bed.

### NOTE:

On harvesters equipped with hook rod chain in the rear scrub, more links can be added to substitute moving rollers.

### Adjusting Rollers

1. Remove roller nut (D).
2. Change roller position.
3. Tighten roller nut (D).



NOTE:  
Roller style may vary.

## **PADDLE ADJUSTMENT:**

Paddles can be adjusted closer to and further from the lifter wheels. Paddle wheels are usually adjusted when the pinch point is adjusted wider or narrower.

### **Adjusting Paddles**

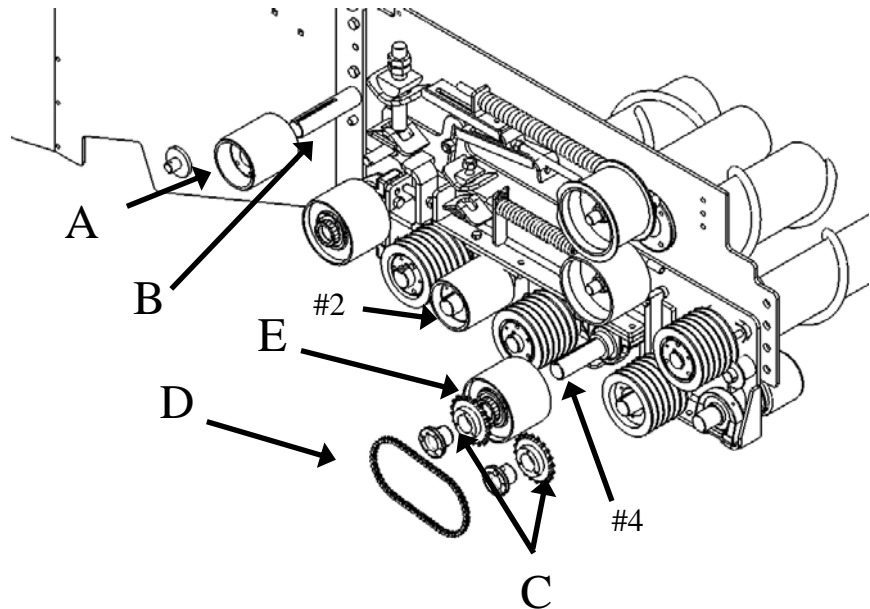
1. Loosen lock nuts on paddle mounts (A).
2. Move paddles to desired position.
3. Tighten lock nuts (A).



## REVERSE #4 GRABROLL:

Grabrolls #2, 4 come set to spin in the same direction as the tractor wheels (opposite grabrolls 1, 3, and 5).

In dry conditions, to reduce beet damage, a kit is available to make grabroll #4 spin in the same direction as rolls #1, 3, and 5.



### Installing Reverse Grabroll Kit (For 6 row/22 inch harvester)

1. ⚠ Shift to park, disengage PTO, lower machine to ground, relieve hydraulic pressure, stop engine, remove ignition key, and wait for all moving parts to stop before dismounting.
2. Open access door and latch it.
3. Remove drive belt.
4. Remove sheave (A) from grabroll #4 and attach to harvester frame using stub shaft included in reverse #4 kit (B).
5. Install idler pulley (E) onto grabroll #4 shaft. Tighten lock rollers.
6. Attach sprockets (C) to shafts on grabrolls #4, 5, using hubs provided
7. Reinstall drive belt to correct tension (see "Drive Belt" within this section).
8. Install drive chain (D) over sprockets on grabrolls #4, 5.
9. ⚠ Close and secure access door before starting.

## TROUBLESHOOTING

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Lifter wheels slicing beets.	<p>Lifter wheels not adjusting to row spacing.</p> <p>Row finder wands clogged, or row finder is not adjusted or working properly.</p> <p>Machine is not level.</p> <p>Irregular planting.</p>	<p>Set lifter strut spacing to same as beet rows.</p> <p>Adjust or clean rowfinder. (see "Row Finder Adjustments" in Adjustments).</p> <p>Level machine (see "Leveling Adjustments" in Operating the Harvester).</p> <p>Align harvester with rows using manual override.</p>
Loss of beets in lifter wheels.	<p>Pinch point is too wide.</p> <p>Losing beets between wheel spokes.</p> <p>Ground speed too slow.</p> <p>Tractor operating under 1000 RPM PTO speed.</p> <p>Lifter wheels digging too shallow.</p>	<p>Remove wheel spacers to obtain narrower pinch point (see "Pinch Point Spacing" in Adjustments).</p> <p>Install wheel fillers.</p> <p>For proper speed see "Operating Speed" in Operating the Harvester.</p> <p>Increase tractor throttle so PTO rotates at 1000 RPM.</p> <p>Lower machine.</p>
Loss of beets through grabrolls.	<p>Rollers too far apart.</p> <p>Dirt sticking to rollers.</p> <p>Angle of grabroll bed adjusted incorrectly.</p>	<p>Move rollers closer together, or tighten rock spring (see "Rock Trip Spring Adjustment" in Adjustments).</p> <p>Install larger drive sheave to speed up grabrolls (see "Grabroll Speed Adjustment" in Adjustments).</p> <p>Raise front of cleaning bed to increase flow of beets through grabrolls (see "Grabroll Bed Angle" in Adjustments).</p>

## Troubleshooting

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Excessive debris being loaded into machine.	Poor defoliation job.	Run defoliator over field again to eliminate excess debris.  Make sure defoliator is adjusted properly.
	Digging too deep.	Raise machine to dig shallower.
	Unnecessary use of wheel fillers.	Remove wheel fillers.
Grabrolls backing up with beets.	Bed angle adjusted too far down.	Adjust grabroll bed angle (see "Grabroll Bed Angle" in Adjustments).
	Grabrolls moving too slow.	Speed up grabrolls by installing a larger drive sheave (see "Grabroll Speed Adjustment" in Adjustments).
Beets not coming out of lifter wheels.	Paddle shaft not adjusted properly.	Lower paddle shaft (see "Paddle Shaft Position" in Adjustments").
	Rubber paddles worn severely.	Replace rubber paddles.
	Beets aren't being lifted to paddles.	Increase ground speed (see "Operating Speed" in Operating the Harvester).
	Digging too deep.	Raise machine to prevent excessive amounts of material from being loaded.
Grabrolls clogging with beets before scrub is full.	Rear scrub chain too tight.	Adjust tension by moving rear scrub rollers (see "Rear scrub rollers" in Adjustments).

## Troubleshooting

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Lifter wheels plugging.	Digging too deep.	Raise machine.
	Paddles not keeping wheel rim clean.	Adjust paddles outward and/or down (see "Paddle Shaft Position" in Adjustments).
	Scrapers not close enough to wheel.	Adjust scrapers with adjusting bolts (see "Lifter Wheel Scrapers" in Adjustments).
	Rocks clutching or stopping lifter wheel rotation.	Change position of pinch point (see "Pinch Point Position" in Adjustments).
	Excessive mud	Clean machine.
Beets coming out front of machine.	Paddles too wide.	Adjust inward (see "Paddle Shaft Position" in Adjustments).
	Paddles not reaching deep enough into lifter wheels.	Lower paddle shaft (see "Paddle Shaft Position" in Adjustments).
	Apron chain tension too loose.	Adjust chain tension (see "Apron Chain" in Adjustments).
Excessive soil being loaded into machine.	Digging too deep.	Raise machine.
	Ground speed too fast.	Reduce ground speed.
	Incorrect pinch point position.	Roll pinch point forward (see "Pinch Point Position" in Adjustments).
	Wheel fillers are installed.	Remove wheel fillers (see "Wheel Fillers" in Adjustments).
	Pinch point is too wide.	Remove lifter wheel spacers (see "Pinch Point Spacing" in Adjustments).
Soil build-up on grabrolls.	Loading excessive soil.	Refer to problem listed above.
	Grabrolls moving too slow.	Speed up cleaning rolls with larger drive sheave (see "Grabroll Speed Adjustment" in Adjustments).
	Soil conditions (clay, mud, temperature).	Clean more frequently.



## Troubleshooting

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Tires built up with soil.	Soil conditions.	Clean rear struts frequently (refer to Cleaning section).  Lower tire pressure. (see Specifications).
Scrapers building up with mud.	Scrapers too far from lifter wheels.  Soil conditions.	Adjust outward to wheels (see "Lifter Wheel Scrapers" in Adjustments).  Move paddles out close to lifter wheels (see "Adjusting Paddles" in Adjustments section).
Mud building up on lifter wheels.	Paddles not close enough to lifter wheels.  Digging too deep.  Soil conditions.	Move paddles out closer to lifter wheels (see "Adjusting Paddles" in Adjustments section).  Raise machine.  Clean lifter struts frequently (refer to Cleaning section).
Breaking beets.	Digging too shallow. Small beets or dry conditions.  Grabrolls moving too fast Pinch point too narrow.  Tractor tires running over beets.  Grabrolls opened too far.	Lower machine.  Install reverse #4 grabroll kit. Install smaller drive sheave (see "Grabroll speed adjustment" in Adjustments). Add wheel spacers (see "Pinch Point Spacing" in Adjustments).  Adjust tractor tires properly (see "Tire Spacing and Inflation" in Preparing the Tractor).  Close up grabrolls (see "Roll Spacing and Adjustment" in Adjustments).
Machine "frozen up."	Soil freezing overnight.  Foreign material jamming machine.	Run machine empty, and clean before storing each night (Refer to Cleaning section).  Remove obstruction. Check between grabrolls and sprockets on scrub chain.

## SPECIFICATIONS

### SPECIFICATIONS:

#### MECHANICAL/HARVESTER

	<b>12 Row 22"</b>	
<b>Weight(Approx.)</b>	36,000 lbs.	
<b>Length</b>	30' 6"	
<b>Width (Elevator Extended)</b>	31'	
<b>Height (Elevator Extended)</b>	17'	
<b>Tank Capacity</b>	4.5 ton	
<b>Recommended Tractor HP</b>	240 HP	
<b>Recommended Working Speed</b>	3-5 mph	
<b>Tractor Hydraulic Requirements</b>	2700 PSI 30 GPM	
<b>Transport Width</b>	25'	
<b>Transport Height</b>	14'	

Tire Size/Pressure:   Standard Axle - 710/70R38 177A8 (46PSI)  
                                  Steerable Axle – 600/60R30.5 (60PSI)

Input:               1000 RPM

### RECORD SERIAL NUMBER:

When ordering parts, always furnish model and serial number as given on serial number plate. It will assist your Amity dealer in giving you prompt and efficient service.

The harvester serial number is located on the front of the left shield, as shown.

Record serial number in the space provided.

**SERIAL NUMBER:**

\_\_\_\_\_



**Serial  
Number  
Location**

## APPENDICES

### CONVERSIONS:

Some useful conversions are listed in the table below:

<b>Metric</b>	<b>Standard</b>
1 kg	2.204 lb.
.746 kw	1 hp
1 hectare	2.471 acres
1 km	.6213 miles
1 L	.264 gal=1.056 qt.=61 in. <sup>3</sup>
(Celsius •1.8)+32	Fahrenheit
Celsius	(Fahrenheit-32)/1.8
6.895 kpa	1 psi
1.356 N•m	1 ft-lb

### HYDRAULIC FLOW RATES:

Each hydraulic circuit for the harvester has a designated flow rate; approximate values are listed in the table below:

<b>Circuit</b>	<b>Metric</b>	<b>Standard</b>
Beet Tank	37.9 l/m	10 gpm
Row Finder	30.3 l/m	8 gpm
Lift	18.9 l/m	5 gpm
Self contained row finder/ lift circuit	37.9 l/m	10 gpm

#### NOTE:

Values listed are a good starting point; however, flow rates should be fine tuned to allow for the smallest flow rate possible, while still providing enough power to run harvester properly.

## TRANTORQUE INSTALLATION PROCEDURES:

Shaft and bore diameters along with surface finish are extremely critical for the proper installation of a Trantorque bushing. These specifications are held at the factory during manufacturing. If it is necessary to disassemble and reassemble a Trantorque application that is undamaged and intact the following procedures will insure a positive installation. If it is necessary to replace a unit in which the Trantorque or shaft may have come loose, rotated or been damaged, a thorough inspection of the components is necessary to insure the failure will not reoccur.

### CAUTION:

**Use no lubricants in this installation. The use of any lubricant on the contact surfaces may result in bushing failure and will void all warranties**

1. Both shaft and component bore must be completely free of paint, grease, oil, dirt and burrs. Clean the surfaces with a non-petroleum based solvent, such as isopropyl alcohol.
2. Insert the Trantorque into the bore making sure the mating hub is flush against the shoulder at the hex flats.
3. Insert the shaft fully and hand-tighten the nut until the assembly becomes snug on the shaft.

### IMPORTANT:

The shaft must fully engage the shaft gripping area of the Trantorque.

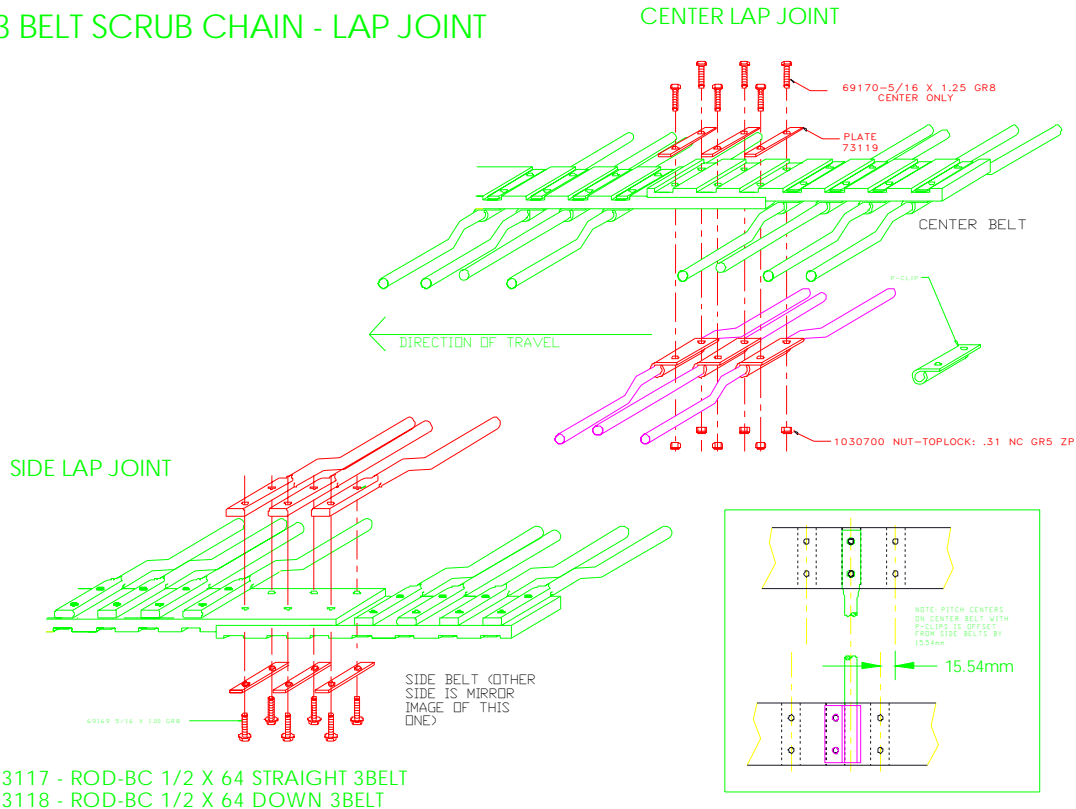
4. Using a torque wrench, tighten the nut to the proper torque as listed below.

### IMPORTANT:

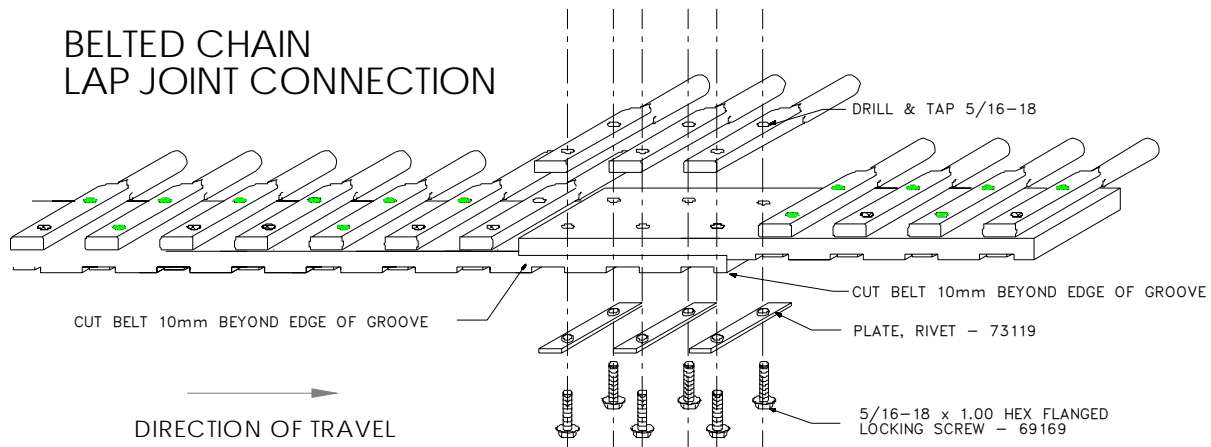
A torque wrench must be used! A impact wrench will not yield the proper torque and the installation will fail. Minimal under-tightening will allow the Trantorque or shaft to spin in the bore. Over-tightening will damage or crack the Trantorque. Do not use an impact wrench in the installation.

Part #	Description	Torque
58459, 64163	Hub-Trantorque 1.75"	270 ft-lb, 366 N-m
58460, 64165	Hub-Trantorque 2.00"	470 ft-lb, 637 N-m
59259	Hub-Trantorque 2.25"	510 ft-lb, 691 N-m

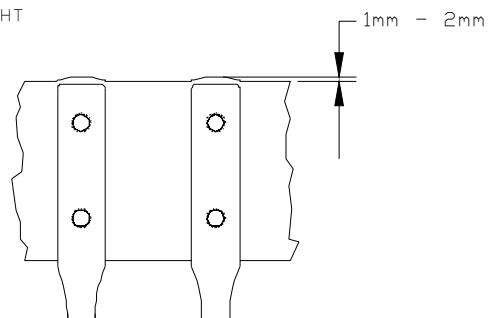
## 3 BELT SCRUB CHAIN - LAP JOINT



## BELTED CHAIN LAP JOINT CONNECTION



WARNING : ENSURE THAT SCREWS ARE SUFFICIENTLY TIGHT TO PRODUCE A BULGE AT THE EDGE OF THE BELT OF BETWEEN 1 AND 2mm (SEE DIAGRAM). FAILURE TO DO SO MAY CAUSE PREMATURE FAILURE AND VOID YOUR WARRANTY



.50 Ø RODS DRILL & TAP .313-18

73122 STRAIGHT - ELEVATOR CHAIN  
73123 UP - ELEVATOR CHAIN

73163 STRAIGHT - JUMP CHAIN  
73128 UP - JUMP CHAIN

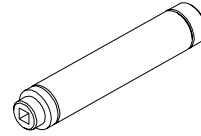
## TOOLS:

Amity has the following tools available:

Trantorque sockets  
(#59107, 59108, 64820))

Trantorque wrench (#64320)

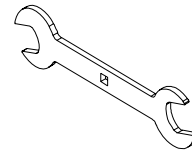
Belted chain link removal tool (#62802)



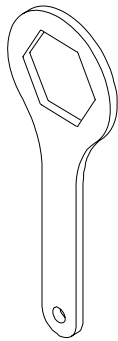
#59107 (1 3/4", 4.45 cm)

#59108 (2", 5.08 cm)

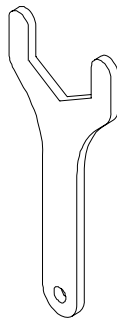
#64820 (2 1/4", 5.7 cm)



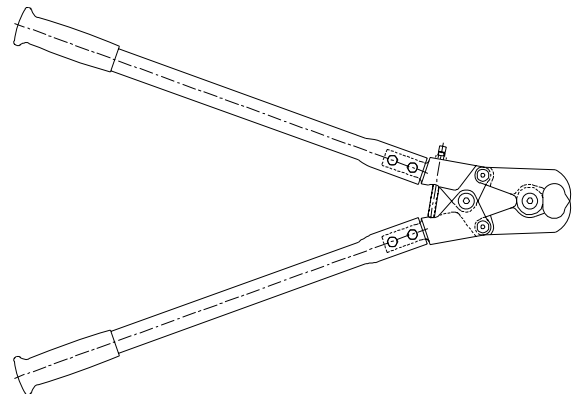
#64320



#72417



#72418



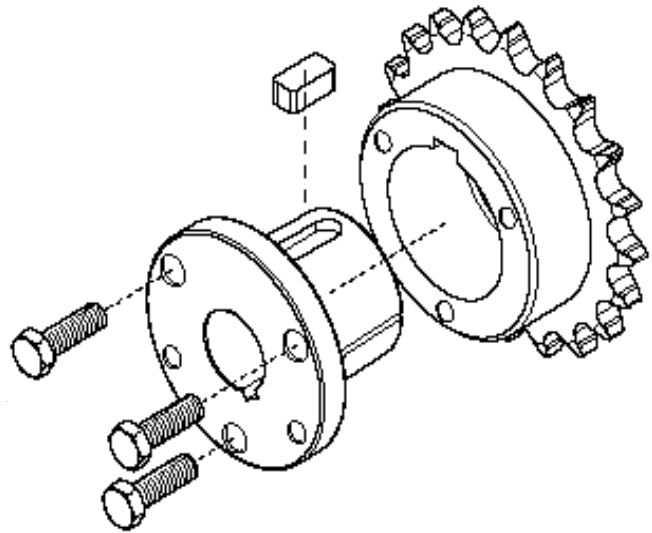
#62802

## **Martin MST BUSHING** **INSTALLATION & REMOVAL INSTRUCTIONS**

The MST bushings are easy to install and remove. They are split through the barrel and have a taper to provide a true clamp on the shaft. They are keyed to both the hub and the shaft to help during “blind” installations.

### Installation:

1. Be sure the tapered cone surfaces of the bushing and the inside of the driven product are clean and free of anti-seize lubricants.
2. Place bushing in sprocket or other Martin MST part.
3. Place cap screws loosely in “pull up” holes. Bushing remains loose to ensure sliding fit or shaft.
4. With key on shaft, slide sprocket to desired position on shaft, be sure heads of cap screws are accessible.
5. Align sprocket, tighten screws alternately and progressively until they are pulled up tight (see table below). Do not use extensions on wrench handles, do not allow sprocket to be drawn in contact with flange of bushing. There should be a gap between bushing flange and sprocket



### CAUTION:

**This gap must not be closed.**

#### WRENCH TORQUE VALUES FOR TIGHTENING BUSHINGS

MST bushing size	Size of cap screw	Wrench torque in.lbs
H	1/4 X 3/4	95
P	5/16 X 1	192
Q	3/8 X 1 1/4	348
R	3/8 X 1 3/4	348
S	1/2 X 2 1/4	840
U	5/8 X 2 3/4	1680
W	3/4 X 3	3000

### REMOVAL

1. Loosen and remove capscrews.
2. Insert capscrews in tapped removal holes.
3. Tighten inserted screws until sprocket is loose on shaft.
4. Remove sprocket from shaft.

**WARNING: USE OF ANTI-SEIZE LUBRICANT ON TAPERED CONE SURFACES OR ON BOLT THREADS WHEN MOUNTING MAY RESULT IN DAMAGE TO SHEAVES AND SPROCKETS. THIS VOIDS ALL MANUFACTURER'S WARRANTIES.**

**WARNING:** Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed: Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions given above must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. All rotating power transmission products when used in a drive are potentially dangerous and must be guarded by the user as required by applicable laws, regulations, standards, and good safety practice. (Refer to ANSI Standard B15.1.)

## HOW TO MEASURE TORQUE WRENCH EFFECTIVE LENGTH:

To recalculate a torque reading when using a torque adapter, use the following formula, and refer to the drawing below:

$$TW = \frac{TA \times L}{L + A}$$

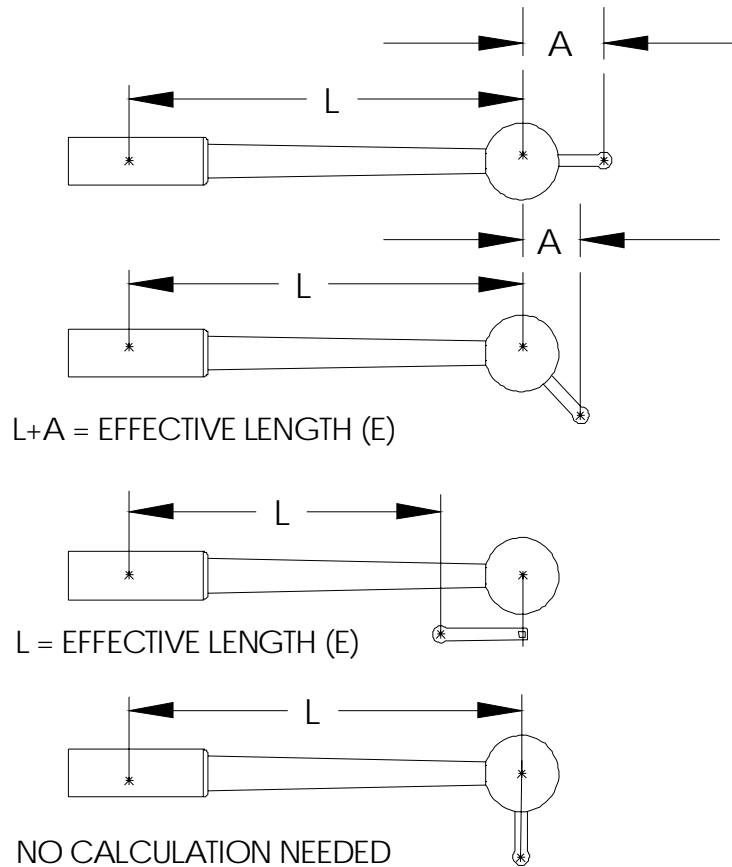
**TW** is the torque setting or dial reading on the wrench

**TA** is the torque specification (The actual amount of torque that should be applied to the fastener)

**A** is the amount that the adapter increases (or reduces) the effective lever length as measured along the centerline of the torque wrench

**L** is the lever length of the wrench as measured from the center of the drive to the center of the grip.

The effective length of the torque wrench measured along the centerline of the torque wrench is the sum of **L** and **A**





## Removal and Assembly of an EASY LOCK guard

### REMOVAL

Remove the EASY LOCK<sup>®</sup> tab with a screwdriver (Fig. A).

If the guard is chained, remove or hold back the chain to prevent it from blocking the bearing.  
Turn the bearing in the direction as indicated then slide guard off the bearing (Fig. B).

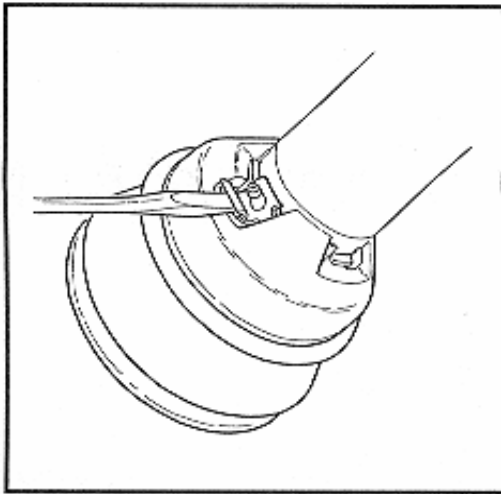


Fig. A

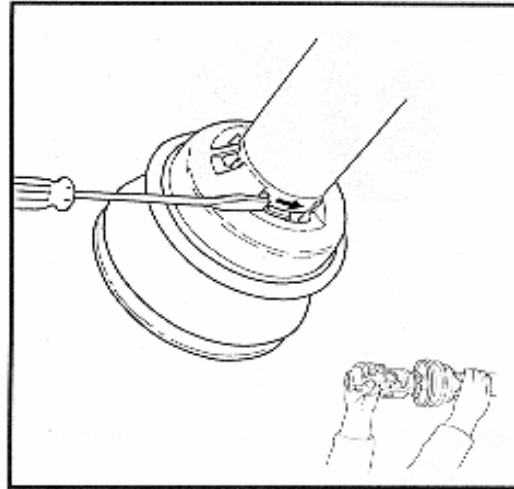


Fig. B

### ASSEMBLY

Align the bearing tabs with the guard bell slots.

Slide the bell onto the bearing.

Turn the bearing to lock it in place.

Snap the EASY LOCK tab into the bell.