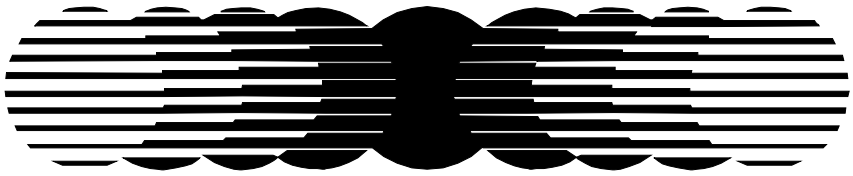
OPERATING MANUAL

HARVESTER
12 ROW

Amity
TECHNOLOGY



2800 7TH Avenue North
Fargo, ND 58102

Phone: (701) 232-4199
Fax: (701) 234-1716
www.amitytech.com

AMITY TECHNOLOGY, LLC LIMITED WARRANTY FOR NEW PRODUCTS

1. **General Provisions**. This Warranty shall apply to the original purchaser of (1) any new and unused machine manufactured by Amity Technology, LLC ("Amity"), and (2) any new and unused part which is manufactured by Amity for use in an Amity machine, jointly referred to as "Products," whether such Product is purchased through a dealer or directly from Amity. Under this Warranty, Amity will repair or replace, as it chooses in its sole discretion, any covered Product, or any component thereof, which Amity determines to be defective. This Warranty shall be in effect for a period of twelve (12) months ("the Warranty Period"), beginning on the date of delivery of the covered machine or part by the dealer or Amity to the purchaser ("the Warranty Start Date"). The purchaser must pay the cost of transportation of a Product to be repaired or replaced to and from an authorized Amity dealer. This Warranty may not be transferred from the original purchaser of a Product to any other person. This Warranty does not give a purchaser the right to any relief other than repair or replacement of the Product, and it specifically does not allow for consequential or incidental damages, exemplary or punitive damages, or costs and fees.

2. **Scope and Limitations of Warranty**. With respect to machines, this Warranty is void if any part not supplied by Amity is used in assembly or repair of the machine, or if the machine has been altered, abused or neglected, as determined by Amity. With respect to parts, this Warranty is void if the part is used in any manner other than that for which it is intended. This Warranty does not extend in any way to tires and any other component of a Product warranted by another manufacturer, a copy of which warranty is provided herewith ("Third-Party Warranties"). In the event Amity determines that a Product is not defective, or that any other provision of this Paragraph 2 operates to limit the Warranty, this Warranty shall not apply and the purchaser shall be responsible for transporting the Product from the authorized Amity dealer's location within 10 days of notice by Amity.

3. **Procedures for Obtaining Service**. To secure Warranty service, a purchaser must (1) report the defect to an authorized dealer and request repair within 45 days of the failure and within the Warranty Period; (2) present evidence that this Warranty applies to the Product; (3) present evidence of the Warranty Start Date; and (4) bring the Product to an authorized Amity dealer within a reasonable period of time after reporting the defect.

4. **LIMITION OF IMPLIED WARRANTIES AND OTHER REMEDIES**. To the extent allowed by law, neither Amity, its dealers, nor any company affiliated with Amity makes any warranties, representations, or promises as to the quality, performance, or freedom from defect of any Product covered by this Warranty.

   AMITY HEREBY WAIVES, TO THE EXTENT APPLICABLE, ANY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. A PURCHASER'S ONLY REMEDIES IN CONNECTION WITH THIS WARRANTY ARE THOSE SET FORTH ON THIS PAGE. IN NO EVENT WILL AMITY, ITS DEALERS, OR ANY COMPANY AFFILIATED WITH AMITY BE LIABLE FOR INCIDENTIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES.

   Some states do not allow waivers of certain warranties, so the above waivers may not apply to you. You may also have other rights which vary from state to state.

5. **No Dealer Warranty**. This is the exclusive warranty applicable to Amity Products. No dealer has any authority to make any other warranty, modify, limit, or expand the terms of this Warranty in any fashion, or make any representation or promise on behalf of Amity.

6. **Dispute Resolution**. Any controversy or claim arising out of or relating to this Warranty must be settled by arbitration in Fargo, North Dakota, at a time and location designated by the arbitrator, but not exceeding 30 days after a demand for arbitration has been made, and may be conducted by electronic, video, or other technical means. Arbitration will be conducted by the American Arbitration Association in accordance with its Rules of Commercial Arbitration, and judgment upon the award rendered by the arbitrator may be entered in any court having jurisdiction thereof. The arbitrator will have the authority to order Amity to undertake a repair or replace any Product, at its election, if the arbitrator finds that this Warranty requires Amity to do so. The arbitrator will not have the authority to impose any other remedy against Amity, including without limitation consequential or incidental damages, exemplary or punitive damages, or costs and fees.

TABLE OF CONTENTS

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 General Information

Read this manual carefully to learn how to operate and service your machine correctly. Failure to read this manual can result in personal injury or equipment damage.

This manual is a permanent part of your machine and should remain with the machine when you sell it.

Measurements in this manual are given in both customary U.S. units and metric equivalents. Use only correct replacement parts and fasteners. Metric and inch fasteners require appropriate tools to install.

NOTE: Right and left-hand sides are determined by facing in the direction the implement will travel when moving forward.

1.2 Serial Number

Record the serial number, model number, and model year of your harvester to help trace the machine should it be stolen. Your dealer also needs these numbers for all warranty claims and when you order parts.

The harvester serial number is found on the serial number plate which is located on the front of the left shield as shown in Figure 1.

Record your serial number, model number, and model year in the space provided below.

Serial Number:

_____

Model Number:

_____

Model Year:

_____

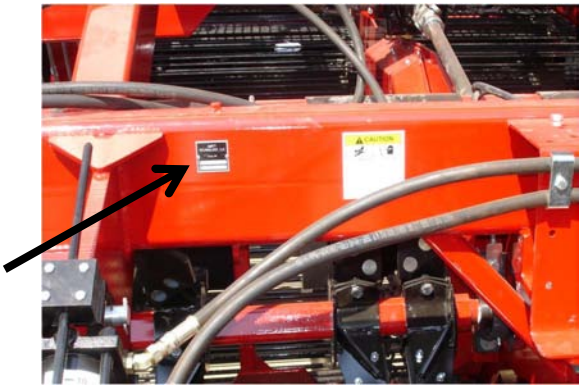


Figure 1: Serial Number Plate Location

2.0 SAFETY

2.1 Recognizing Safety Information in Manual

Figure 2 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.

Figure 2: Safety-Alert Symbol

2.3 General Harvester 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.

Safety practices protect you and the people around you, so make them a working part of your safety program.

Harvester owners must give operating instructions annually to operators or employees before allowing them to operate the harvester 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 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 and warranty of the product.

The following list is a set of safety guide lines to adhere to:

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 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.

Think SAFETY! Work SAFELY!

2.3 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. Electrocution can occur without direct contact.

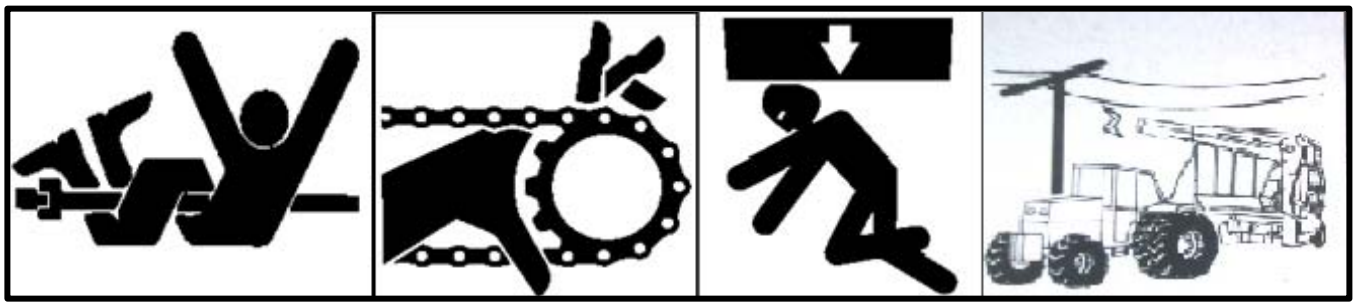


Figure 3: Maintenance and Operation Safety Symbols

2.4 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.

Figure 4: Hydraulic Safety Symbols

2.5 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 Slow Moving Vehicle (SMV) emblem and required lights and reflectors are in place, 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).

2.6 Understand Signal Words

Signal words- DANGER, WARNING, or CAUTION- are used in conjunction with the safety-alert symbol on Amity safety decals. 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.

Figure 5 shows the signal words used on your Amity beet harvester.

Figure 5: Signal Words

2.7 Safety Decals

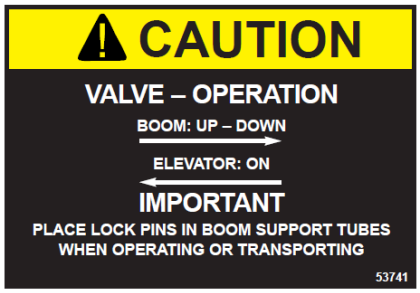
The types of decals on the equipment are shown in the illustration below. Proper safety requires that you familiarize yourself with the various safety decals, the type of warning, and the area, or particular function related to that area, that requires your safety awareness.

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.


DANGER
NEVER CRAWL OR WORK UNDER MACHINE UNLESS IT IS PROPERLY SUPPORTED.
64617


DANGER
KEEP SHIELDS AND GUARDS PROPERLY MAINTAINED AND IN PLACE.
NEVER WEAR LOOSE CLOTHING WHEN WORKING AROUND MACHINE.
KEEP HANDS AWAY FROM ALL MOVING PARTS.
DO NOT PERMIT OTHERS TO BE NEAR MACHINE WHILE IN OPERATION.
DO NOT ATTEMPT TO CLEAN OR ADJUST MACHINE WHEN PTO IS ENGAGED OR WHEN TRACTOR ENGINE IS RUNNING.
52329


CAUTION
HIGH-PRESSURE FLUID HAZARD
To prevent serious injury or death:
• Relieve pressure on system before repairing or adjusting or disconnecting
• Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.
• Keep all components in good repair.
62964


CAUTION
VALVE – OPERATION
BOOM: UP – DOWN
ELEVATOR: ON
IMPORTANT
PLACE LOCK PINS IN BOOM SUPPORT TUBES WHEN OPERATING OR TRANSPORTING
53741

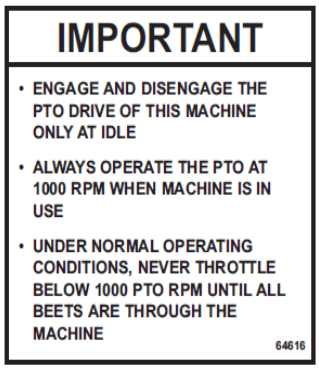

CAUTION
To Avoid Injury Due to Falling:
• Climbing on this equipment is not recommended.
• Use ladder on opposite side to access equipment.
• Refer to operator's manual for other safety information.
59614

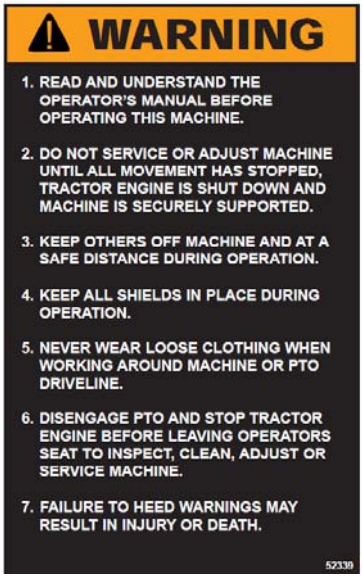

WARNING
CLOSED
OPEN
HIGH PRESSURE FLUID HAZARD
TO PREVENT SERIOUS INJURY OR DEATH:
• BALL VALVE MUST BE OPEN WHILE OPERATING THIS EQUIPMENT
64429


CAUTION
TIRE PRESSURE:
46 PSI
MAXIMUM SPEED:
FULL TANK: 5 MPH
EMPTY TANK: 25 MPH
72967


CAUTION
TIRE PRESSURE:
55 PSI
MAXIMUM SPEED:
FULL TANK: 5 MPH
EMPTY TANK: 25 MPH
73399

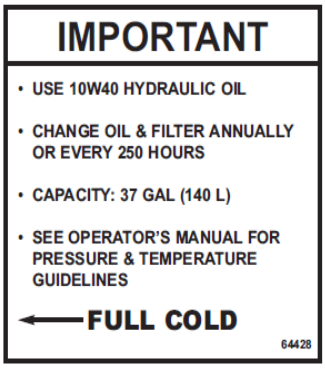

CAUTION
To Avoid Injury While Using Ladder:
• While climbing ladder, use both hands to maintain balance.
• Remain facing the ladder while moving up or down.
• Do not reach to the sides while on ladder.
• See operator's manual for other safety information.
59613


IMPORTANT
• ENGAGE AND DISENGAGE THE PTO DRIVE OF THIS MACHINE ONLY AT IDLE
• ALWAYS OPERATE THE PTO AT 1000 RPM WHEN MACHINE IS IN USE
• UNDER NORMAL OPERATING CONDITIONS, NEVER THROTTLE BELOW 1000 PTO RPM UNTIL ALL BEETS ARE THROUGH THE MACHINE
64616


WARNING
1. READ AND UNDERSTAND THE OPERATOR'S MANUAL BEFORE OPERATING THIS MACHINE.
2. DO NOT SERVICE OR ADJUST MACHINE UNTIL ALL MOVEMENT HAS STOPPED, TRACTOR ENGINE IS SHUT DOWN AND MACHINE IS SECURELY SUPPORTED.
3. KEEP OTHERS OFF MACHINE AND AT A SAFE DISTANCE DURING OPERATION.
4. KEEP ALL SHIELDS IN PLACE DURING OPERATION.
5. NEVER WEAR LOOSE CLOTHING WHEN WORKING AROUND MACHINE OR PTO DRIVELINE.
6. DISENGAGE PTO AND STOP TRACTOR ENGINE BEFORE LEAVING OPERATORS SEAT TO INSPECT, CLEAN, ADJUST OR SERVICE MACHINE.
7. FAILURE TO HEED WARNINGS MAY RESULT IN INJURY OR DEATH.
52339


WARNING
DO NOT REMOVE SHIELDS
52341


WARNING
DO NOT RIDE ON EQUIPMENT
52334


IMPORTANT
• USE 10W40 HYDRAULIC OIL
• CHANGE OIL & FILTER ANNUALLY OR EVERY 250 HOURS
• CAPACITY: 37 GAL (140 L)
• SEE OPERATOR'S MANUAL FOR PRESSURE & TEMPERATURE GUIDELINES
← FULL COLD
64428

3.0 SPECIFICATIONS

3.1 Harvester Specifications

Table 1: Harvester Specifications

	Scrub	Wheel
Weight (Approx.)	36,000 lbs [16,335 kg]	36,500 lbs [16,560 kg]
Tank Capacity	4.5 tons [4085 kg]	4.5 tons [4085 kg]
Recommended Working Speed	3-5 mph [4.8-8.1 kmh]	3-5 mph [4.8-8.1 kmh]
Max Road Travel Speed (Unloaded)	25 mph [40.2 kmh]	25 mph [40.2 kmh]
Transport Width (with boom down)	24' 6" [7.5 m]	24' 6" [7.5 m]
Operating Width (with boom up)	31' [9.5 m]	31' [9.5 m]
Length	30' 6" [9.3 m]	26' 6 " [8.1 m]
Height	14' [4.3 m]	14' [4.3 m]

Table 2: Tire Size, Pressure, and Lug Nut Torque

	Tire Size	Tire Pressure	Lug Nut Torque
Standard Axle	710/70R38	46 PSI [317 kpa]	400-450 ft-lb [542.4-610.2 N·m]
Steerable Axle	600/60R30.5	55 PSI [379 kpa]	400-450 ft-lb [542.4-610.2 N·m]

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

Table 3: Hydraulic Flow Rates

Circuit	Standard	Metric
Beet Tank	10 gpm	37.9 L/m
Row Finder	8 gpm	30.3 L/m
Lift	5 gpm	18.9 L/m
Active Depth Control (Open Center)	16 gpm	60.5 L/m
Active Depth Control (Closed Center)	6 gpm	22.7 L/m
Hydraulic Paddle	25 gpm	94.5 L/m
Jump Chain (Wheel)	20 gpm	75.6 L/m

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

3.2 Tractor Specifications

Table 4: Tractor Specifications

	Scrub	Wheel
Minimum Horsepower	250 hp [186.5 kw]	250 hp [186.5 kw]
PTO Output	1000 RPM	1000 RPM
Spline Size	1- 3/4 in -20	1- 3/4 in -21
Vertical Drawbar Load	6000 lbs [2722 kg]	6500 lbs [2949 kg]
Minimum Hydraulic Capacity	30 GPM [114 L/m]	30 GPM [114 L/m]
Hydraulic Pressure	2700 PSI [18.6 Mpa]	2700 PSI [18.6 Mpa]
Number of remotes	5 remotes or 4+ power beyond	5 remotes or 4+ power beyond

3.2.1 Traction: Front wheel assist (or 4 wheel drive) is recommended when pulling a harvester. In addition, front and/or rear weights may be necessary for balance, traction, and steering.

Typically for a front wheel assist tractor, Amity recommends a minimum of 4,500 lbs [2041.7 kg] in rear weights and 2000 lbs [907.5 kg] in front weights.

4.0 PREPARATION

4.1 Tractor Preparation

4.1.1 Adjusting the Drawbar: The tractor drawbar must be set within the given range to maintain the integrity of the drive system. The range is shown in Figure 6.

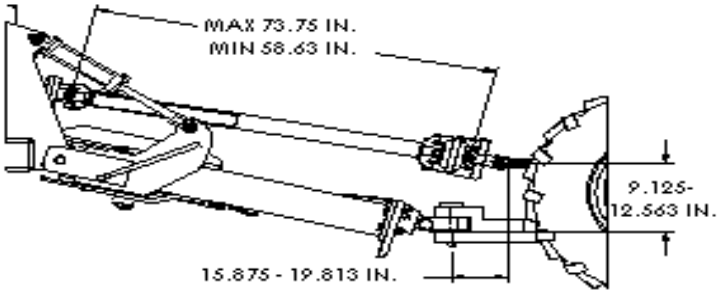


Figure 6: Drawbar Range

IMPORTANT: Ensure the driveline remains within operating range under all conditions.

4.1.2 Tire Spacing and Inflation: Tires should be inflated to the manufacturer's specification. See section Table 2: Tire Size and Pressure on page 7 for more information. Figure 7 shows the appropriate tire spacing.

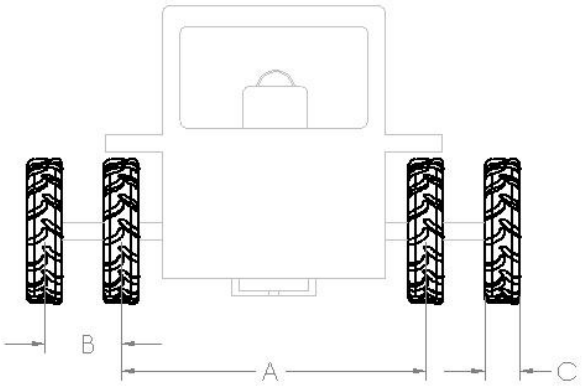


Figure 7: Tire Spacing

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 the harvester.

NOTE: The Front tires must be aligned with the rear tires.

4.1.3 Three-Point Hitch Position: Three-point hitches cannot be connected to the hitch when using an Amity beet harvester. It must be fully raised or removed.

NOTE: Amity recommends removing three-point hitches.

⚠ **CAUTION:** Ensure the receiver and drawbar support arms clear the PTO driveline under all conditions.

Figure 8: Fully Raised Three-Point Hitch

4.2 Harvester Preparation

4.2.1 Lifter Strut Spacing: Verify the spacing matches the spacing of the planted crop as shown in Figure 9.

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 6.9.1 for pinch point spacing guidelines.

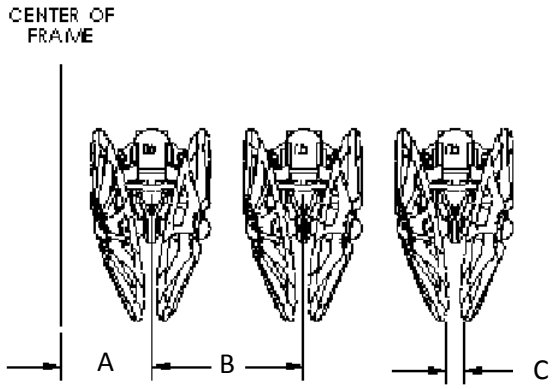
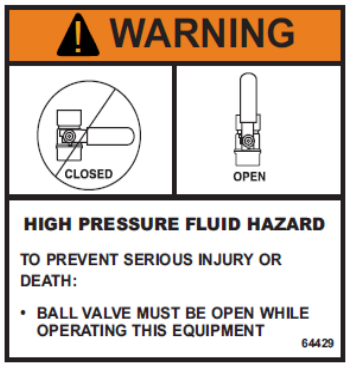


Figure 9: Lifter Strut Spacing

4.2.2 Hydraulic Tank Oil Level and Valve Position: Refer to section 11.0, Lubrication and Maintenance, for the service schedule and oil type. "Full Cold Line" on the decal should be at the dimension shown in Figure 10.

CAUTION: Valves (1 & 2) must be open prior to engaging the PTO, or system failure will occur. Valves in Figure 9 are shown in the open position.



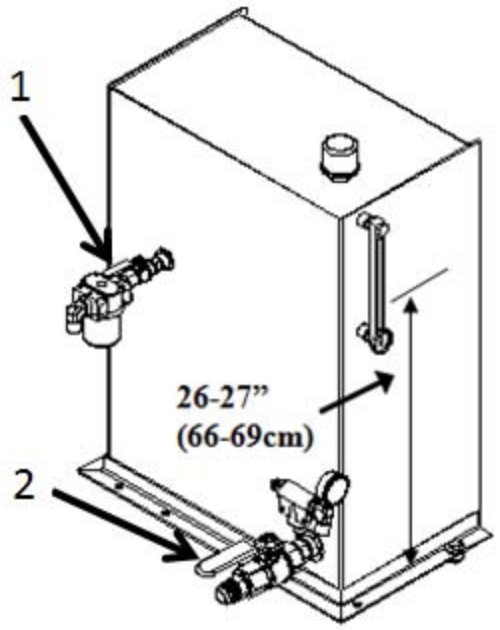


Figure 10: Hydraulic Oil Level

4.2.3 Scrub Control Box Wiring and Location: The scrub control box must be correctly wired and securely fastened in the tractor cab. The correct wiring is as follows:

White or Red wire- 12V Positive
Black wire- 12V Negative

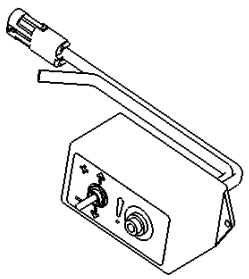


Figure 11: Scrub Control Box

NOTE: Locate the scrub box in a safe and secure location away from potential liquid spills.

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

When a 12V switched source is not available, an alternative way to attach the control box is shown in Figure 13.

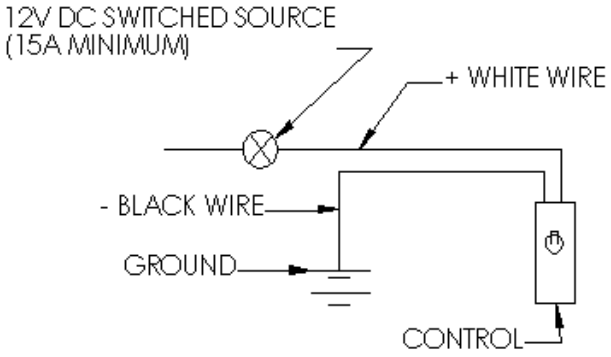


Figure 12: Preferred Wire Attachment Method

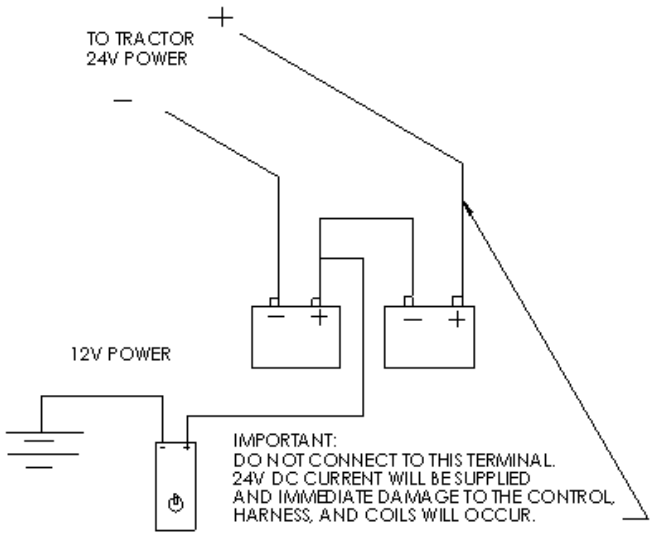


Figure 13: Alternative Wire Attachment Method

NOTE: Figure 12 shows the preferred method of attachment and should be used if at all possible.

CAUTION: When using the connection method shown in Figure 13, the control must be disconnected when not in use.

After wiring the control box to the tractor, the harness on the harvester must be wired to the actuator switch as shown in Figure 14.

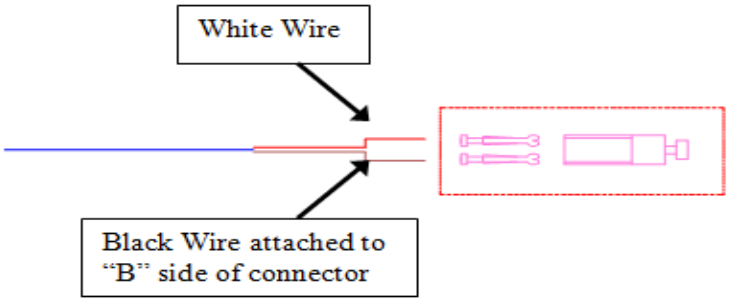


Figure 14: Wiring Harness to Actuator

4.2.4 Shield Placement: Before starting, be sure to secure the shields in operating position (closed position).

4.2.5 Gearbox Oil Level: Check all gearbox oil levels before operating. Refer to section 11.0, Lubrication and Maintenance, for oil type and fill level information.

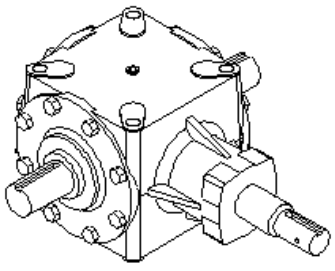


Figure 15: Gearbox

4.2.6 Greasing: Refer to section 11.0, 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. If damage due to over greasing occurs, replace the damaged seals immediately.

4.2.7 Attaching PTO to Harvester:

1. Remove the spring pin on the shield.
2. Slide the shield forward.
3. Connect the PTO to the spline shaft.
4. Lock the PTO in place using 2- $^{5}/_{8}$ in. bolts and nuts.
5. Slide and lock the shield into place.

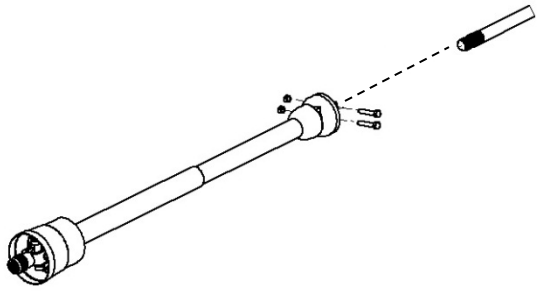
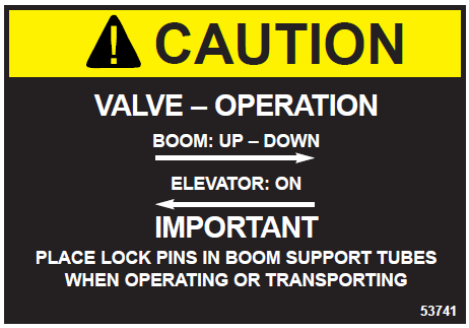


Figure 16: Attaching PTO to Harvester

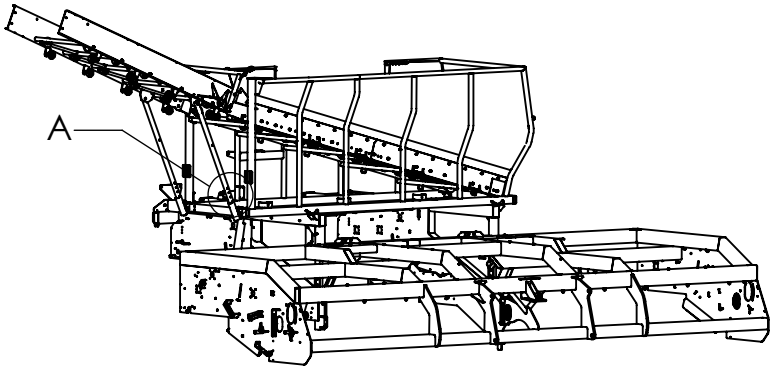
4.2.8 Raising Boom: Once in the field, follow these steps before lifting beets:

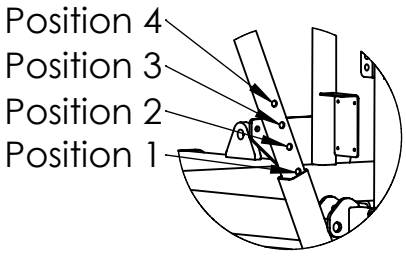
1. Raise the boom
2. Set the boom to the desired height by locking pins to one of the 4 holes on the support struts.
3. Lower the boom onto the pins to relieve hydraulic pressure on the hydraulic cylinders.
4. Move the selector valve to elevated position.

Figure 17: Lifted Boom



12 Row Harvester Boom Positions

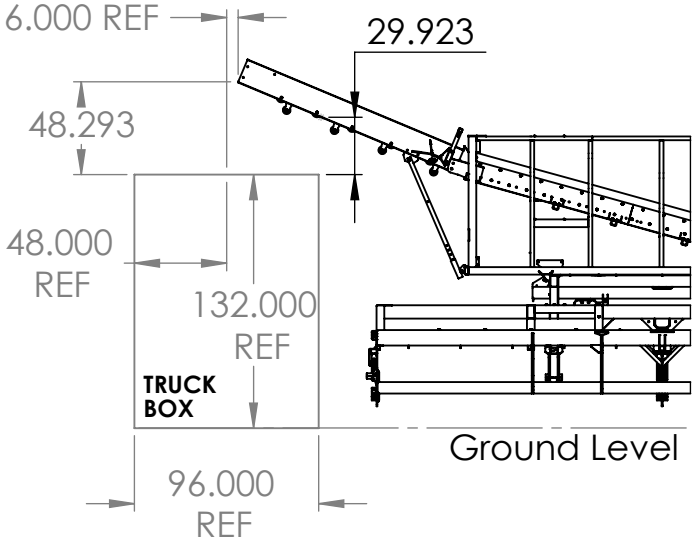




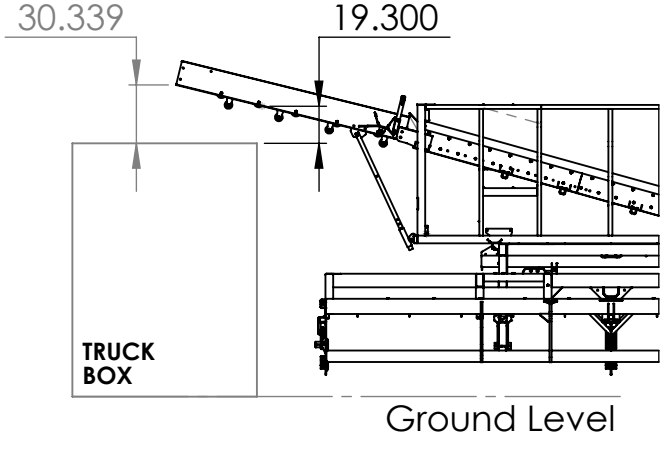
DETAIL A
SCALE 1 : 20

NOTE ALL DIMENSIONS IN INCHES. REF. DIMENSIONS SAME FOR ALL VIEWS

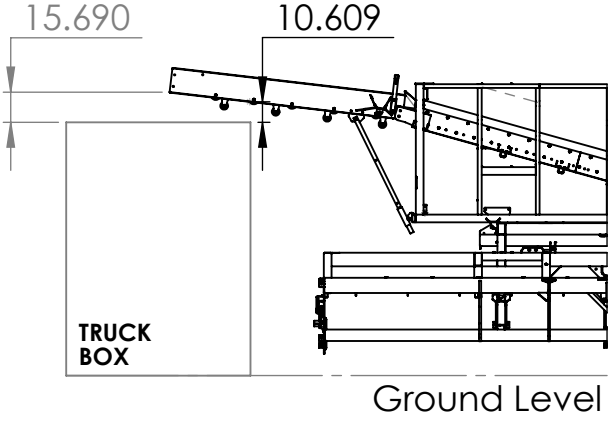
POSITION 1:



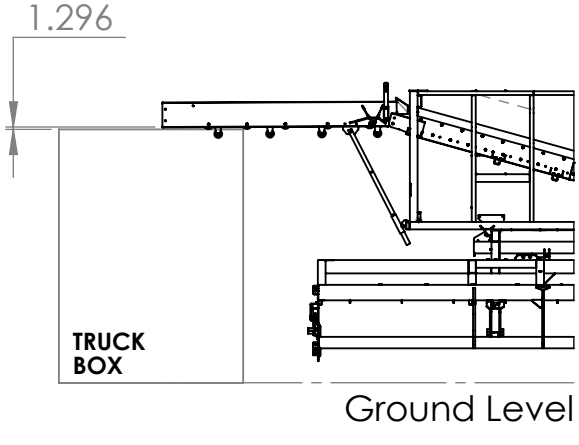
POSITION 2:



POSITION 3:



POSITION 4:



5.0 ATTACHING AND DETACHING

5.1 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.

Figure 18: Attaching Hydraulic Lines

⚠ **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 all hydraulic lines to tractor as shown in Figure 19.
2. Connect the harvester warning light harness to the tractor. Make sure the harvester warning lights operate with the tractor warning lights and turn signals.
3. Connect the control monitor or switchbox to the harness routed into the tractor cab.

5.2 Attaching Harvester to Tractor Drawbar

1. Adjust the tractor drawbar (see Tractor Preparation, section 4.1.1)
2. Remove the tractor hitch pin.
3. Install required bushings into pull plate.
4. Adjust the hitch height.
5. ⚠ Shift to park, shut off the engine, and remove the ignition key before getting out of tractor.
6. Line up the pull plate with the drawbar.
7. Place hardened washer (A) between the drawbar and pull plate, and install shims as necessary (B).
8. Reinstall the hitch pin.
9. Connect the safety chain to the drawbar supporting structure.

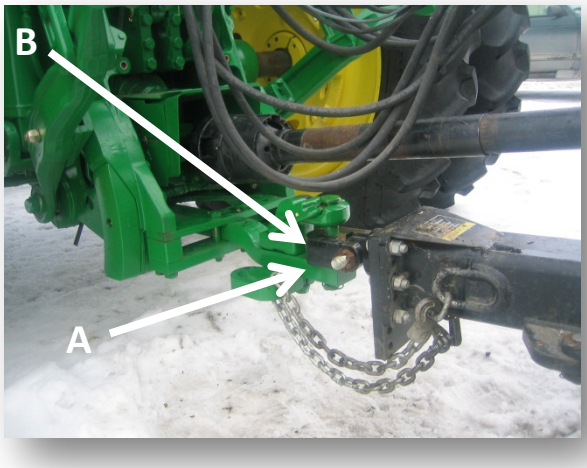


Figure 19: Attaching the Harvester to the Tractor Drawbar

5.3 Attaching PTO Driveline

Figure 20: Attached PTO Driveline

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

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

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

5.4 Using Stands

CAUTION: Always use stands when working on, near, or underneath the harvester.

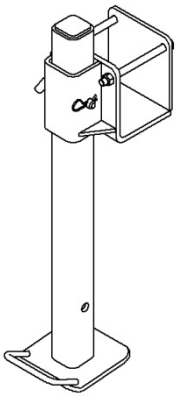


Figure 21: Amity Optional Stand

6.0 OPERATING THE HARVESTER

6.1 Start Up

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

CAUTION: The PTO must be turning if any beets are present on the grabroll bed or if the harvester is lifting beets. Engaging the PTO with a loaded grabroll bed can cause belt damage.

6.2 Field 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 creating the need for other operating adjustments. Refer to Troubleshooting, section 12.0, if problems occur.

6.3 Turning Radius

Turning at the end of the field while pulling the harvester requires a wide area. One way to accommodate the large turning radius is to plant headland rows. Amity recommends a minimum of 48 headland rows on each end of the field.

IMPORTANT: Failure to provide a sufficient turning radius for the tractor and harvester may lead to damage of the rowfinder assembly, active depth control wands, and/or tractor tires.

6.4 Break- in Period

After an initial 5 hours of normal field operation, check the apron chain tension and all fasteners, lug nuts, rollers, and lifter struts. Refer to section 7.0, Adjustments, if adjustments are required.

After checking the items listed above, do a general check of all major systems and components before continuing.

6.5 Field Cleaning

The harvester will collect mud at different rates during operation depending on soil conditions. It is important to clean the machine every two hours or more often if the conditions demand.

IMPORTANT: If left unclean, mud will clog the machine and cause imminent damage. Frequently clean the machine to avoid damage.

6.6 Lifter Struts

Amity offers two styles of lifter struts: 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. The movement minimizes wheel damage.

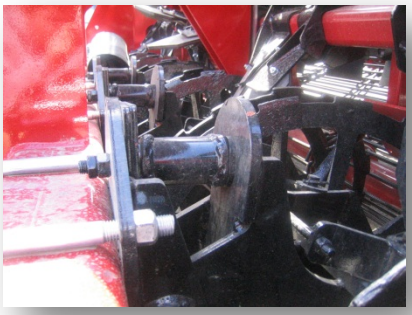


Figure 22: Lifter Struts

6.7 Leveling

6.7.1 Manual: 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 to compensate for an un-level harvester. See section 7.1 for adjustment instructions.

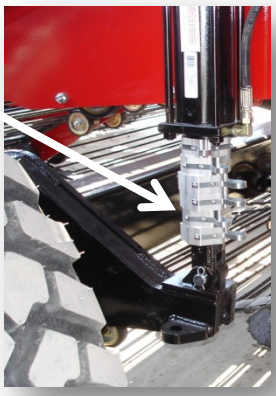


Figure 23: Manual Leveling Adjustment

6.7.2 Automatic Depth Control (ADC): ADC is an optional feature that automatically adjusts the lifting depth for optimal performance. No manual depth adjustment is required if your Amity beet harvester has this feature.

Figure 24: ADC Depth Wands

6.8 Row Finder

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

Figure 25: Row Finder

6.9 Digging Depth

Digging depth varies with soil and crop conditions. Three inches (7.62 cm) is a good starting point. 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 to lift whole beets should be used. Digging shallower will extend the life of the machine.

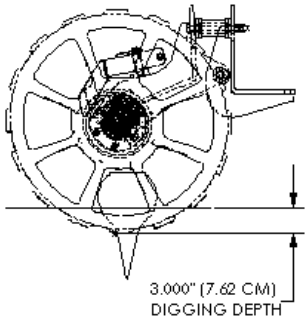


Figure 26: Digging Depth

6.9.1 Pinch Point Spacing and Position:

The pinch point position and spacing should be placed as to allow maximum beet yield while minimizing excess soil and debris from entering the machine. See sections 7.3 and 7.4 for adjustments.

6.10 Wheel Fillers

Optional wheel fillers can be bolted onto lifter wheels to lift more soil helping 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 can reduce machine life and lead to excess wear on components.

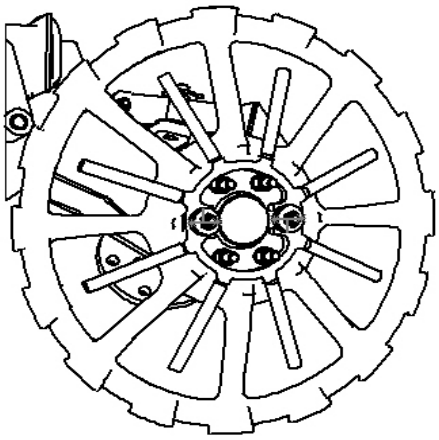


Figure 27: Lifter Wheel 53867 with Center Mount Wheel Filler

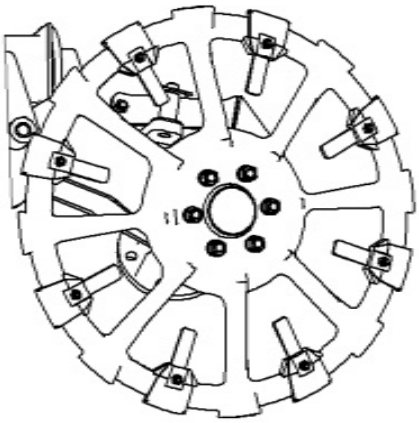


Figure 28: Lifter Wheel 69855 with Rim Mounted Filler Tabs. Note: Center mount wheel fillers also available on this lifter wheel.

6.11 Scrapers

Scrapers keep the Lifter Wheels clean by removing mud and dirt off the wheels. In turn, the Lifter Wheels are able to turn freely and lift beets.

Amity lifting struts are available with two types of scrapers, Top or Bottom. Bottom scrapers come standard with the Single Plate Strut. Top scrapers come standard on the Double Plate Strut.

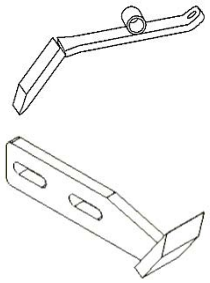


Figure 29: Above- Top Scraper, Below- Bottom Scraper

6.12 Paddles

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

Figure 30: Rubber Paddles

Figure 31: Plastic Paddles

Two types of paddles are available for your Amity beet harvester. Rubber paddles are required when using rock struts to lift beets and work well in standard soil conditions. Plastic paddles are available for better cleaning action in heavy, clay-based soils and cannot be used with rock struts. Figures 30 and 31 show the two styles of paddles.

Sections 7.7 and 7.8 have information regarding adjustments for paddles and the paddle shaft.

6.13 Apron Chain

The apron consists of several parallel sets of chains. The apron provides the first system to remove dirt, clods, and debris from the beets. See section 7.10.1 for proper apron chain tension.

Figure 32: Apron Chain

6.14 Grabroll Bed

Grabroll beds provide 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.

6.14.1 Front Grabroll Bed: The front grabroll bed separates trash and dirt from the beets while transferring beets to the center of the machine and onto the jump chains.

The smooth grabrolls are spring mounted to allow relief for rocks as they pass over the rolls. The bed has several adjustments to

Figure 33: Front Grabroll Bed

optimize cleaning and minimize beet damage. See sections 7.12 and 7.14 for front grabroll spacing and speed adjustments.

6.14.2 Rear Grabroll Bed: The rear grabrolls provide additional cleaning while transferring beets to the rear, center of the harvester to discharge them into the scrub.

As with the front grabroll bed, the smooth grabrolls are spring mounted to allow relief for rocks as they pass over the rolls. 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.) of cleaning potential. Refer to sections 7.17, 7.18, and 7.19 for adjustments.

Figure 34: Rear Grabroll Bed

6.15 Front Grabroll Flap

The front grabroll flap is used to increase or decrease the flow rate of product off the front cleaning grabrolls. Section 7.13 provides information for adjusting the flap.

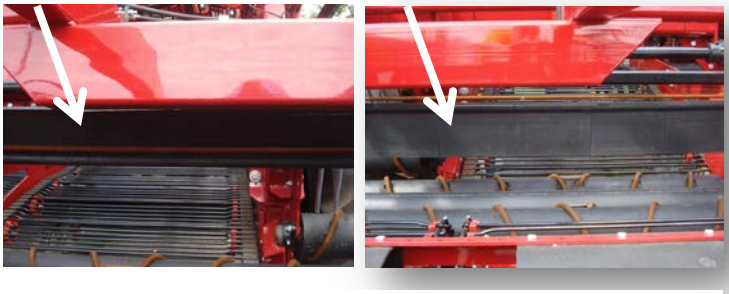


Figure 35: Front Grabroll Flap: Left- Up position, Right- Down position.

6.16 Extended Jump Chain Option

Extended jump chain is an option in lieu of rear grabrolls. Instead, the jump chain continues where the grabrolls would be placed. This option is intended for harvesting in lighter soils and offers a gentler handling of the beets.

6.17 Wheel Option

The wheel option is available for those whose soil is lighter or who do not want chains. The bed consists of the standard jump chain.

Figure 36: Wheel Harvester

6.18 Scrub Chain

The scrub chain lifts beets from the rear grabrolls to the tank.

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.

Figure 37: Scrub Chain

6.19 Machine Shutdown

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

1. Raise the harvester out of ground with the PTO still engaged.
2. Continue running the PTO at 1000 RPM until the grabroll bed is empty, and the harvester is completely clear of beets.
3. Once there are no beets left in harvester, throttle the 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 the machine to cycle through beets will result in imminent damage to the drivebelt, and/or other components.

7.0 ADJUSTMENTS

7.1 Manual Leveling

1. Raise the rear of the harvester with the hydraulic cylinders.
2. Add or remove cylinder stops as necessary.
3. Lower the rear of the harvester onto the stops.

NOTE: A 1 in. (2.5 cm) stop in a rear cylinder provides approximately 1 in. (2.5 cm) of lift in the corresponding front side.

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

7.2 Row Finder

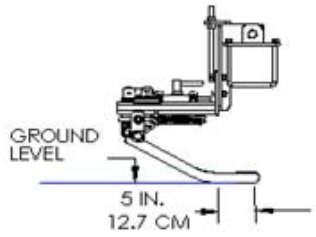


Figure 38: Row Finder Wand Placement

When harvesting, the row finder wands should be adjusted like Figure 38 such that there is 5 in. (12.7 cm) of contact between the ground and row finder wands. Adjustment spring (B), shown in Figure 39, can be adjusted to apply more down pressure to ensure constant contact with the beet row.

Likewise, the row finder wands should be angled down when lifted out of the ground as shown in Figure 39. Dimension (A) can be adjusted using nuts (D):

1. To increase distance (A), adjust nuts (D) along line (F) toward the rear of the machine.
2. To decrease distance (A), adjust nuts (D) along line (F) toward the front of the machine.

Adjusting Height (E):

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

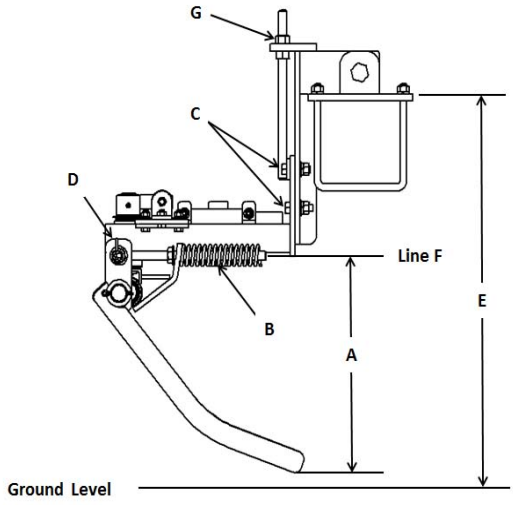


Figure 39: Row Finder Adjustment- Right Side View

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

7.3 Pinch Point Position

The pinch point position can be adjusted by spacer (G), part number 50139. In muddy conditions, roll the pinch point forward by adding spacers. This will pop the beet faster with less mud. For dry or hard digging conditions, roll the pinch point back by removing spacers giving the wheels a longer time to lift the beet and reduce breakage in the ground. The extra dirt will lift the beets high enough for the paddles to send them into the machine. To adjust the pinch point position:

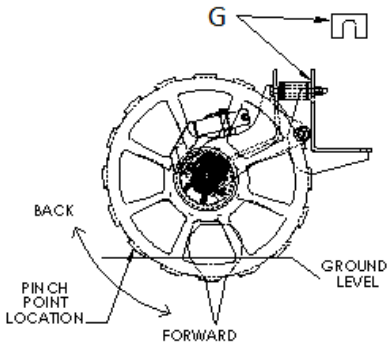


Figure 40: Pinch Point Adjustment

1. Loosen the two nuts on the front of the strut.
2. Add or remove spacers (G) to adjust the pinch point forward or back.
3. Retighten the hex nuts when desired position is reached.

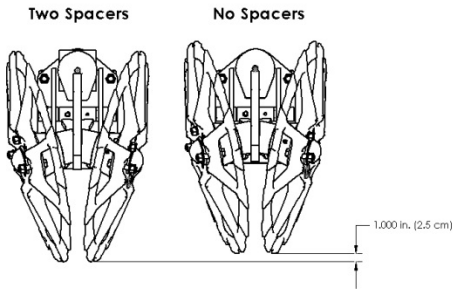


Figure 41: Pinch Point Height

NOTE: The addition of 1 spacer (G) will decrease the pinch point height by ½ in. (1.3 cm) and 2 spacers by 1 in. (2.5 cm). Numbers are approximate.

7.4 Pinch Point Width

Matching pinch point to crop size is important to maximize yield and minimize tear. If the pinch point is too wide, smaller roots may be left in the ground resulting in a larger digging depth. In turn, more dirt will be put in the harvester. If the pinch point is too narrow, larger roots may be sliced. The pinch point width is adjusted by changing the quantity of half-moon spacers (B), part number 50747. To add or remove spacers:

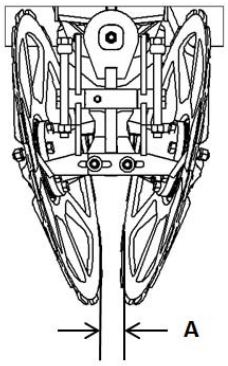


Figure 42: Pinch Point Width

1. Loosen the hex nuts holding the lifter wheel tight to the hub. Only the center bolt on the half-moon spacer is required to be removed. Adjust the other half of the spacer to allow another spacer to be added or removed.
2. Add or remove spacers (B) as necessary. It is most common to work in sets of 4 half-moon spacers.
3. Retighten the lifter wheel bolts

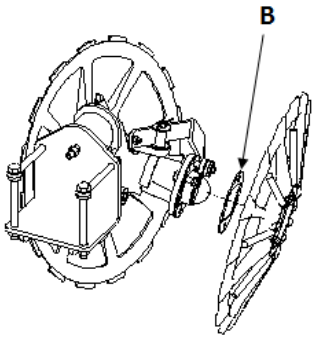


Figure 43: Pinch Point Spacer Adjustment

NOTE: The addition or subtraction of 1 spacer (B) will add or subtract .1875 in. (4.8 mm), respectively, from the pinpoint width.

IMPORTANT: As a general rule, the pinch point spacing (A) should be adjusted as shown in Table 5.

7.5 Wheel Fillers

7.5.1 Adding or Removing Center Mount Wheel Fillers:

1. Remove the lock nut, lock washer, and flat washer from bolts (B) as shown in Figure 44.
2. Add or remove the center mount wheel filler.
3. Replace the fasteners.

Table 5: Pinch Point Width

Pinch Point Width	Average Beet Weight
$1\,^{1}/_{2}$-$1\,^{3}/_{4}$ in. [3.8-4.4 cm]	.9-1.2 lb. [.41-.54 kg]
$1\,^{3}/_{4}$- $1\,^{7}/_{8}$ in. [4.4-4.7 cm]	1.1-1.5 lb. [.50-.68 kg]
$1\,^{7}/_{8}$-2 in. [4.7-5.0 cm]	1.3-1.7 lb. [.59-.77 kg]

NOTE: If bolts (B) are removed, they must be reassembled in holes (C) shown below in Figure 45. The bolts must line up exactly in line with the opposite spokes of the lifter wheels or they will not line up correctly on the wheel fillers.

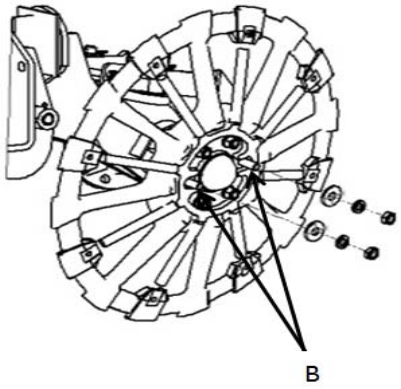


Figure 44: Adding or Removing Center Mount Filler Wheels

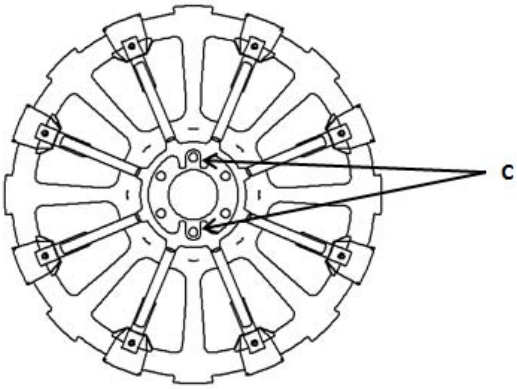


Figure 45: Center Mount Wheel Filler Hole Alignment

7.5.2 Adding Rim Mount Filler Tabs:

1. Insert the filler tab into the slot on the backside of the lifter wheel.
2. Fasten with a bolt and nut as shown in Figure 46.
3. Repeat steps 1 and 2 for the remaining 7 tabs.

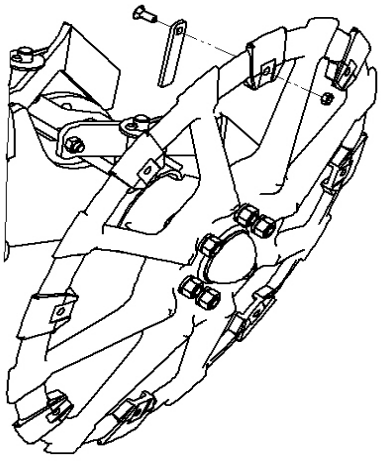


Figure 46: Adding or Removing Rim Mounted Filler Tabs

7.6 Scrapers

7.6.1 Top Scraper: Adjust bolt (A) to move scrapers out to the lifter wheels.

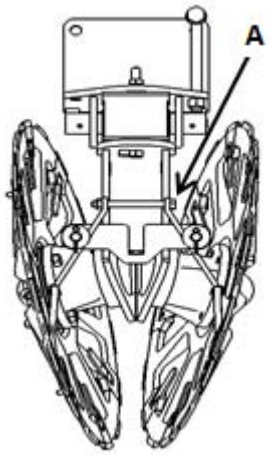


Figure 47: Top Scrapers

7.6.2 Bottom Scraper:

1. Loosen bolts (B).

4. Adjust scrapers to the desired position.

5. Tighten bolts (B).

NOTE: The lifter wheels must rotate a full 360° after adjusting the scrapers to ensure clearance.

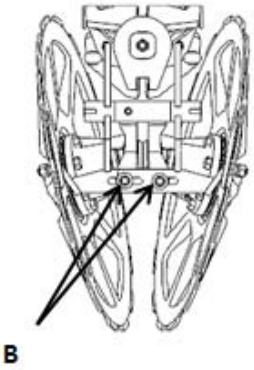


Figure 48: Bottom Scraper

7.7 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.

CAUTION: When the harvester is equipped with rock struts, distance (C), the distance between the lift wheels and paddle shaft, should be a minimum of 1 in. (2.5 cm) more than the digging depth to protect the paddle shaft from the lifter wheels in the event of contact with a rock.

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the ignition key, and wait for all moving parts to stop before dismounting.

2. Lower machine onto stands or blocks to take weight off the lifter wheels.

3. Open the left and right access doors and latch them.

4. Loosen the bearing mounting bolts and the jam nuts on the adjusting bolts.

5. Measure the distance between the paddle shaft and the rim of the lifter wheels.

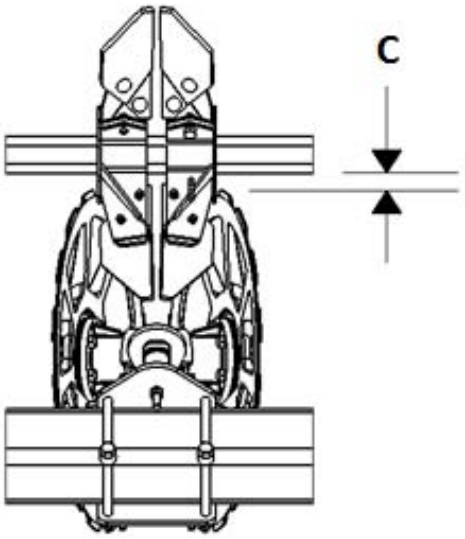


Figure 49: Paddle Shaft to Lifter Wheel Rim Dimension

6. Turn the adjusting bolt to give a minimum of 1 in. (2.5 cm) more than the digging depth of the machine. This dimension is critical, especially when using rubber bumpers (rock struts).

NOTE: It may be necessary to readjust the apron/paddle shaft chain tension on both sides to provide slack to allow the paddle shaft to move.

7. Tighten the shaft mounting bolts and the jam nuts on the adjusting bolts. Set the same dimension (B) on both sides and secure the mounting fasteners in position. On wide-frame harvesters, set the same dimension (B) on the center mount as on the outer mounts.

8. For harvesters equipped with rock struts, place a 4 x 4 in. (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.

9. The rim should clear the shaft by at least ½ in. (1.3 cm). If the rim is touching the shaft, raise the paddle shaft until it clears by at least ½ in. (1.3 cm).

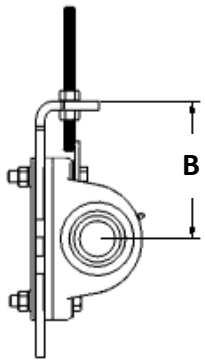


Figure 50: Apron/Paddle Shaft Chain Tension

10. If the bumper compression is adjusted, raise the wheel off the block and lower it again. Check the clearance again.

11. Repeat the procedure with each set of lifter wheels. This will ensure that none of the wheels will contact the paddle shaft.

12. Close and latch the access doors before starting the machine.

7.8 Paddles

The paddles are adjustable, in and out, depending on wet or dry harvest conditions. Moving paddles toward the wheels will clean the rim of the wheel and aid in rotation. Adjusting the paddles in or out should be done after making any paddle shaft height adjustments.

IMPORTANT: Excess contact may stop lifter wheel rotation.

7.8.1 Rubber Paddles:

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

Figure 51: Rubber Paddle Adjustment

7.8.2 Plastic Paddles:

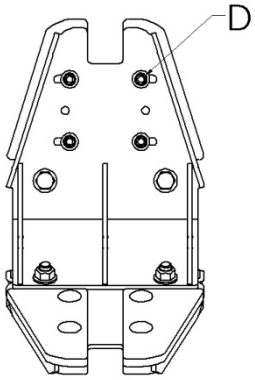


Figure 52: Plastic Paddle Adjustment

1. Loosen lock nuts (D) on the backside of the paddles.
2. Move the paddles in or out for the desired position.
3. Tighten lock nuts (D).

7.9 Apron and Paddle Drive Chain

7.9.1 Drive Chain Tension:

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the 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. Move the adjustment rod until the chain is at the desired tension (see section 7.16.1 for the chain tension).
5. Tighten the idler sprocket and recheck the chain tension.
6. Close and secure the access door before starting the machine.

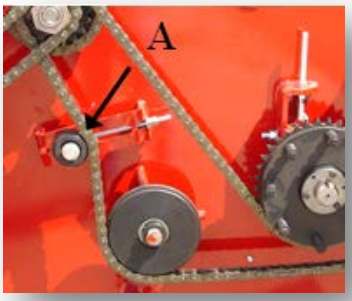


Figure 53: Chain Idler Sprocket

7.9.2 Replacing Drive Chain:

1. Follow steps 1-3 from above.
2. Remove the old chain and install a new chain.
3. Move the adjustment rod until the chain is at the correct tension (see section 7.16.1 for the chain tension).
4. Tighten the idler sprocket and recheck the chain tension.
5. Lubricate the chain if necessary (see Lubrication and Maintenance, section 11.0).
6. Close and secure the access door before starting the 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 the sprockets.

7.10 Apron Chain

7.10.1 Apron Chain Tension: Tension of the apron chain should not be excessively tight; however, the chain should never drag on the ground or droop enough on the top to allow beets to be lost out the sides of the machine. To adjust the chain:

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the 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 by first: removing or adding links and last: moving the front idler shaft.

4. To adjust the shaft, loosen the 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.

NOTE: Adjusting the lower shaft too close to the lifter wheels can cause loss of beets. Removing slack from the chain with this adjustment is not advised.

6. Always measure the dimension between the shaft centers when making adjustments, keeping the dimension equal on the left and right sides.

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

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

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

8. Close and secure the access door before starting the machine.

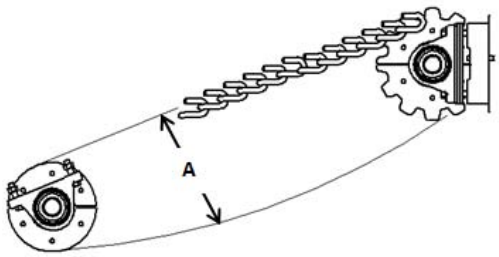


Figure 54: Distance between Top and Bottom Chains

NOTE: Machines with rubber paddles have zero spacers installed on the lower apron shaft (see Figure 54). Machines with plastic paddles have 4 spacers installed on the lower apron shaft with additional spacers included in the hardware kit.

7.10.2 Replacing Apron Chain:

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the 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 jam nuts holding the adjustment rods on the bearing mounting arms.

4. Slide the front bearing mounting arms backward to its loosest position.

5. Rotate the shafts until the splice link is accessible, and then disconnect the chain on both ends of the link.

6. Remove the apron chain or attach the new chain to the old chain before its removal. Use it to thread the new chain over the sprockets.

7. Thread a new chain over the sprockets, bringing the ends together.

8. Hook the ends of the chain together.

9. Repeat steps 5-8 for each apron chain.

10. 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 the lifter wheels.

11. Always measure the dimension between the shafts when tensioning. Keep them equal on the left and right hand sides.

12. When correctly positioned, tighten the jam nuts on the bearing mounting arm adjustment rods.

13. Latch the access doors on both sides before starting the machine.

7.11 Front Drive Belt

7.11.1 Belt Tension:

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the 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 in. (34 cm).

4. Lock double nuts (B).

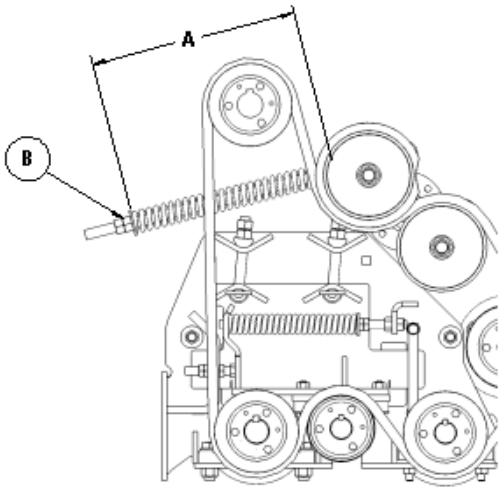


Figure 55: Front Drive Belt Adjustments

5. Close and secure the access door before starting the machine.

7.11.2 Replacing Belt:

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

7.12 Front Grabroll Spacing

Adjusting the space between grabrolls will cause the beets to be cleaned at differing degrees. Muddier conditions may require more cleaning than dry conditions. To increase the cleaning action, increase the grabroll gap between #1 and #2.

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the 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 the scrolled grabrolls.
4. Readjust the drive belt to the proper tension (see to section 7.11.1).
5. Adjust nuts (D) to readjust rock trip spring compression (C) to 8.5 in. (21.7 cm).
6. Close the access door and latch it.

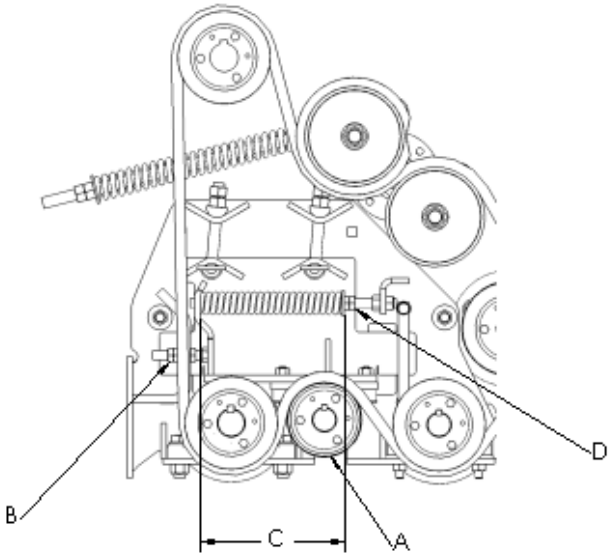


Figure 56: Front Grabroll Spacing Adjustment

IMPORTANT: Grabrolls must not touch each other under any operating conditions.

7.13 Front Grabroll Flap

To adjust the height of the front grabroll flap, adjust the rod with the flaps attached. To do so:

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the ignition key, and wait for all moving parts to stop before dismounting.
2. Remove pin (B).
3. Swing bracket (C) off to the side exposing the slots. The bracket pivots around bolt (A).
4. Pull the rod out of the far side bracket and insert into the desired hole on that side.
5. Place the flap rod in the corresponding slot making sure the pin located in the rod is placed behind the plate.
6. Replace bracket (C) and secure with pin (B).

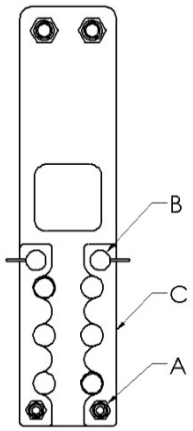


Figure 57: Front Grabroll Flap Adjustment

NOTE: To put the flaps up, follow steps 2-6 with the plain rod and trap the flaps above the rod.

7.14 Grabroll Speed

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the ignition key, and wait for all moving parts to stop before dismounting.
2. Open the access door and latch it.
3. Remove the grabroll bed drive belt according section 7.11.2 for the front drive belt or section 7.20.2 for the rear drive belt.
4. Remove the sheave by first removing sheave bolts.
5. Install the sheave bolts in the previously unused holes in the taper lock hub. Evenly tighten bolts until the sheave is loose.
6. Remove the taper lock hub, key, and sheave from the shaft.
7. Replace the drive sheave to obtain the desired grabroll bed speed. Refer to Table 6 for grabroll RPMs and part numbers.
8. Place the sheave on the shaft.

IMPORTANT: Ensure tapered surfaces are clean and free of all lubricants.

9. Place the taper lock hub on the shaft, and then insert the key into the shaft and hub.

10. Start the bolts through the taper lock hub into the sheave.

11. Align sheave (A) with the other sheaves and tighten evenly. Be sure the sheaves are aligned with each other after tightening.

12. Reinstall the grabroll bed drive belt.

13. Close and latch the access door before starting the machine.

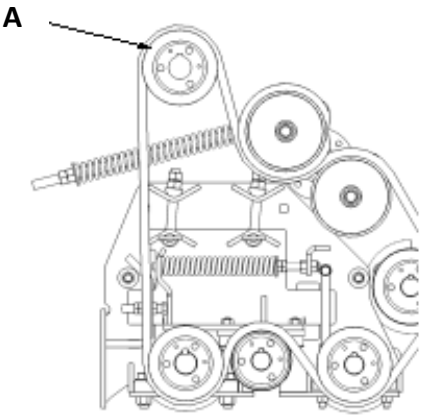


Figure 58: Front Grabroll Speed Adjustment

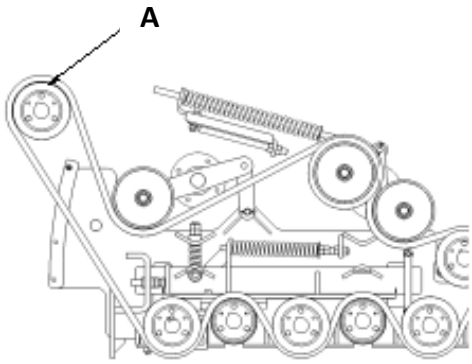


Figure 59: Rear Grabroll Speed Adjustment

NOTE: Grabroll tubes turn at 552 RPM from the factory unless ordered otherwise. A larger shaft sheave is available to speed the rolls to 606 RPM if mud collects on the grabrolls in muddy conditions. A smaller drive sheave is available to slow down the grabrolls to 500 RPM during dry conditions to reduce crop damage. See Table 6 for sheave dimensions and part numbers.

Table 6: Grabroll Tubes

Sheave A	Ouside 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 Amity dealer

7.15 Rock Trip Spring

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the 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 dimension (C) is 8.5 in. (22 cm).*

4. Close and latch the access door before starting machine.

***** Refer to Figure 56 on page 30.

7.16 Roller Chain Tension and Replacement

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

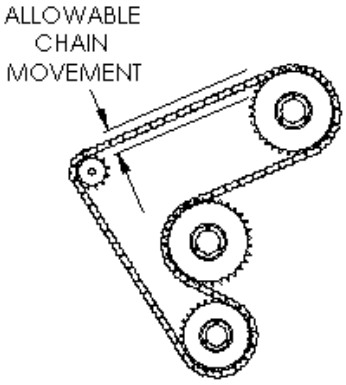


Figure 60: Allowable Chain Movement

Each chain has a certain amount of allowable chain movement. To measure the chain movement, hold a tape measure 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 the following sections). When servicing or replacing roller chains, reset the chain to factory specifications.

Check the alignment of the sprockets periodically during the season and whenever replacing roller chains. To check alignment, 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.

IMPORTANT: Recheck chain tension after an initial 5 hours of operation.

7.16.1 Paddle Shaft Chain:

Figure 61: Paddle Shaft Chain Tension

Paddle Shaft chain has 1 ½ to 2 in. (3.8-5.1 cm) of allowable chain movement as shown in Figure 61.

7.16.2 Reduction Chain:

Figure 62: Reduction Chain Tension

Reduction chain has 1 ½ to 2 in. (3.8-5.1 cm) of allowable chain movement as shown in Figure 62.

7.16.3 Jump Chain:

Figure 63: Jump Chain Tension

Jump Chain has ½ to ¾ in. (1.3-1.9 cm) of allowable chain movement as shown in Figure 63.

7.16.4 Grabroll Bed Chain:

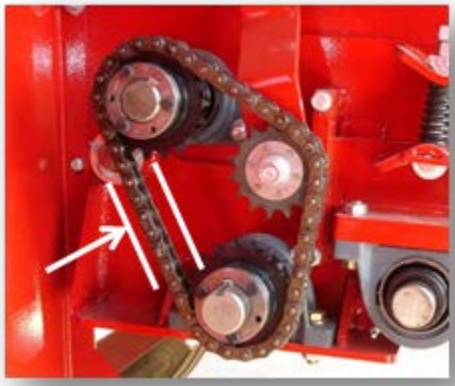


Figure 64: Grabroll Bed Chain Tension

Grabroll Bed Chain has ½ to ¾ in. (1.3-1.9 cm of allowable chain movement as shown in Figure 64.

7.16.5 Drive Chain and Apron Shaft Chain:

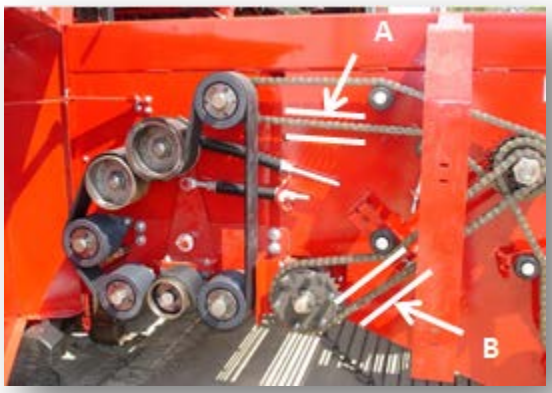


Figure 65: Drive and Apron Shaft Chain

Drive Chain (A) has 1 ½ to 2 in. (3.8-5.1 cm) of allowable chain movement.

Likewise, Apron Shaft Chain (B) has 1 ½ to 2 in. (3.8-5.1 cm) of allowable chain movement.

Both chains are shown in Figure 65.

7.17 Smooth Grabroll Height

Smooth grabroll height adjustments affect the amount of time beets remain on the grabrolls cleaning as well as the effectiveness of the cleaning. Decreasing the height of the grabrolls to below that of the scrolled grabrolls will increase cleaning ability by increasing the scrolling grabroll aggressiveness.

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the 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 (H) up or down, use eyebolts (I).
4. Readjust the drive belt to the proper tension (see section 7.20.1)
5. Close the access door and latch it.

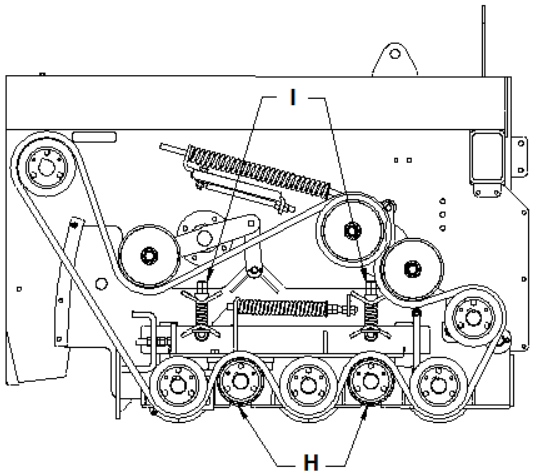


Figure 66: Smooth Grabroll Height Adjustment

7.18 Rear Grabroll Spacing

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

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

4. Readjust the drive belt to the proper tension (see section 7.20.1)
5. Readjust rock trip spring compression (C) to 8.5 in. (21.7 cm).
6. Close and latch the access doors before starting the machine.

IMPORTANT: Grabrolls must not touch each other under any operating conditions.

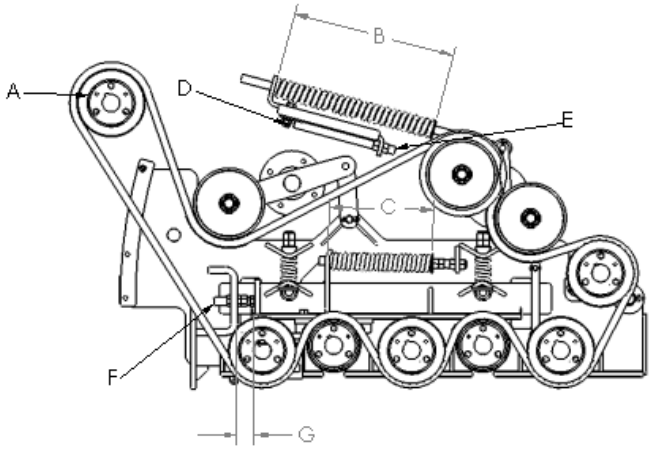


Figure 67: Rear Grabroll Spacing Adjustment

7.19 Grabroll Bed Angle

Increasing the angle of the rear grabroll bed will increase cleaning time; likewise, decreasing the angle will decrease the cleaning time. To change the angle of the bed:

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the ignition key, and wait for all moving parts to stop before dismounting.

2. Adjust ratchet jack (C).

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

NOTE: If your Amity harvester is equipped with the optional Hydraulic Rear Grabroll Adjustment, no manual adjustment is required.

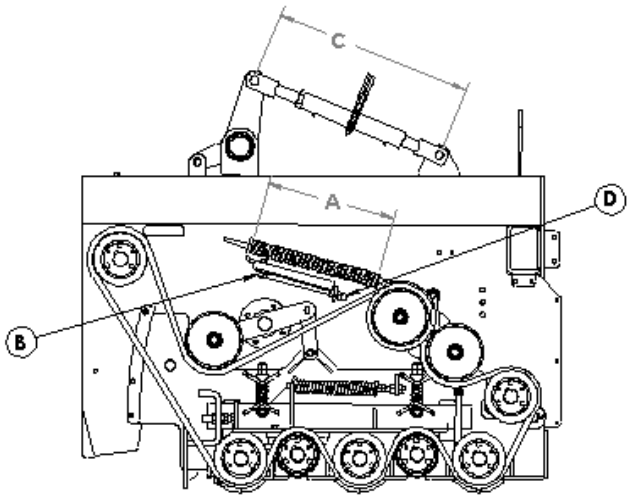


Figure 68: Grabroll Bed Angle and Rear Drive Belt Adjustment

7.20 Rear Drive Belt

7.20.1 Belt Tension:

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the 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).

6. Close and latch the access door before starting the machine.

7.20.1 Replacing Belt:

1. Follow steps 1-3 from above.

2. Loosen adjustment rod (D) until the belt is loose.

3. Remove the old belt and install a new belt.

4. Tighten adjustment rod (D) until spring length (A) is 13.5 in. (34 cm).

5. Tighten bolt (B), and check alignment of the sheaves.

6. Make sure the belt is in the proper grooves, and secure the access door before starting the machine.

7.21 Grabroll Drive Chain

7.21.1 Chain Tension:

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the ignition key, and wait for all moving parts to stop before dismounting.

2. Open the right access door and latch it.

3. Loosen chain idler sprocket (E).

4. Slide the sprocket upward until the chain is at the proper tension (see section 7.16.4).

Figure 69: Grabroll Drive Chain Adjustment

5. Tighten idler sprocket (E).

6. Close and secure the access door before starting the machine.

7.21.2 Replacing Chain:

1. Follow steps 1-3 from above.

2. Slide the sprocket down until the chain is loose.

3. Remove the old chain and install a new chain.

4. Slide the idler sprocket upward until the chain is at the proper tension (see section 7.16.4).

5. Tighten idler sprocket (E).

6. Lubricate the chain if necessary (see Lubrication and Maintenance, section 11.0).

7. Close and secure the 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 the sprockets.

7.22 Reverse Grabroll #4

Grabrolls #2 and #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.

7.22.1 Installing Reverse Grabroll Kit (For 6 row/22 inch and 12 row/22 inch harvester):

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the ignition key, and wait for all moving parts to stop before dismounting.
2. Open the access door and latch it.
3. Remove the drive belt.
4. Remove sheave (A) from grabroll #4 and attach to the harvester frame using the stub shaft included in reverse #4 kit (B).
5. Install idler pulley (E) onto grabroll #4 shaft. Tighten both the lock rollers.
6. Attach sprockets (C) to the shafts on grabrolls #4 and #5 using hubs provided.

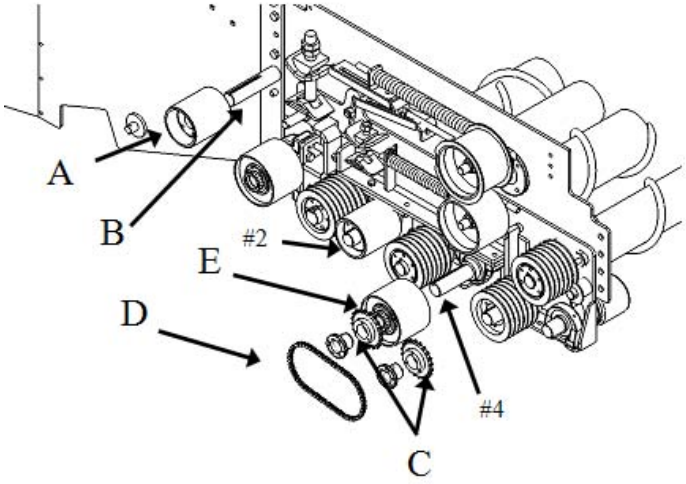


Figure 70: Installing Reverse Grabroll Kit (Pictured- 6 row)

7. Reinstall the drive belt with the correct tension (see section 7.20.2).
8. Install drive chain (D) over the sprockets on grabrolls #4 and #5.
9. Close and secure the access door before starting.

7.23 Head Shaft Sprocket Dimensions

The distance between the head shaft sprockets, idler sprockets, and idler rollers is important. The schematics shown in Figure 71 are a good starting point for sprocket and roller placement.

IMPORTANT: Dimension (G) 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.

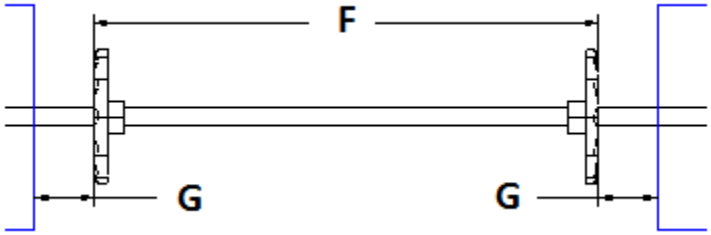


Figure 71: Sprocket and Roller Placement

Table 7: Sprocket Dimension

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

7.24 Slip Clutches

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 are necessary.

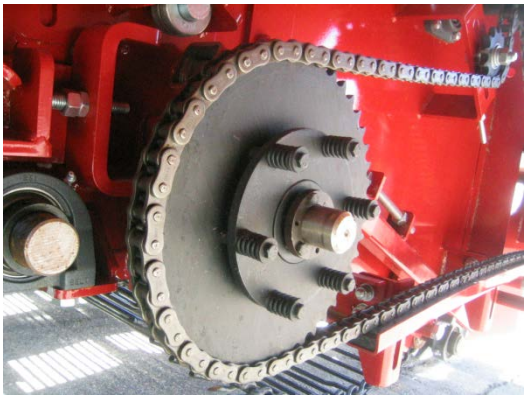


Figure 72: Slip Clutch

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 over-tightening of the slip clutch. Do not remove the preset tubes and retighten the slip clutch.

7.25 Rear Scrub

7.25.1 Inside Roller Location: The inside rear scrub rollers come standard in locations C, D, E, F, and G shown in Figure 74.

Adjusting Roller Position:

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

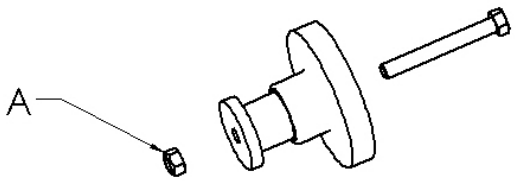


Figure 73: Adjusting Rollers (Roller Style May Vary)

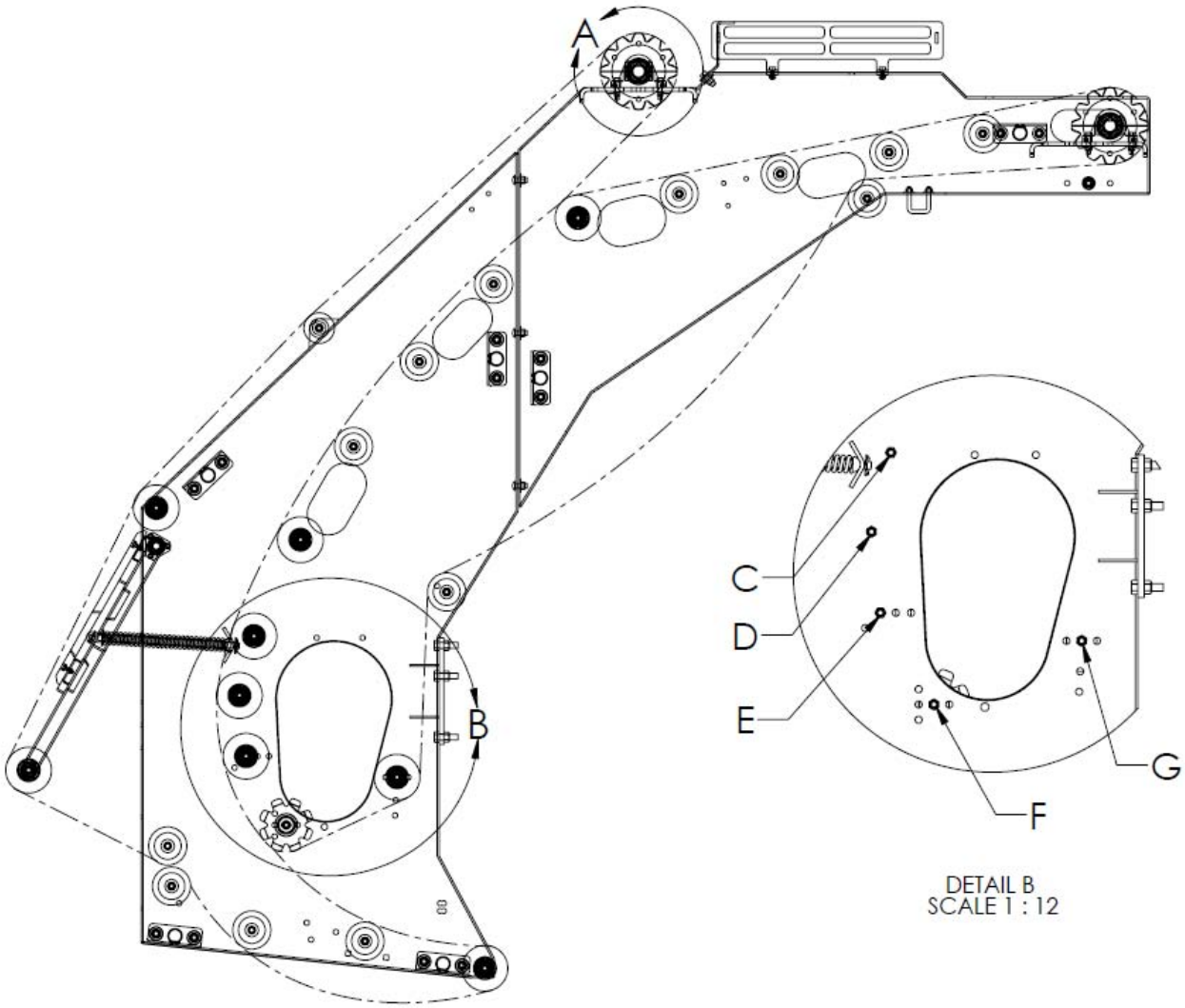


Figure 74: Rear Scrub shown with Scrub Chain, Rollers, and Head Shafts

7.25.2 Outside Scrub Chain Tension:

The outside scrub chain tension is adjustable to increase or decrease the capacity for beets. To increase the capacity of the scrub chain, head shaft (Detail A), shown in Figure 74, must be moved back to provide more slack in the chain. To adjust the head shaft location:

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the ignition key, and wait for all moving parts to stop before dismounting.
2. Remove pressure of the belt on the head shaft sprockets.
3. Remove nuts (H) and lock washers (I). Pull out bolts (J) and washers (K).
4. Slide bearing (L) to the appropriate holes and insert washers (K) and bolts (J).

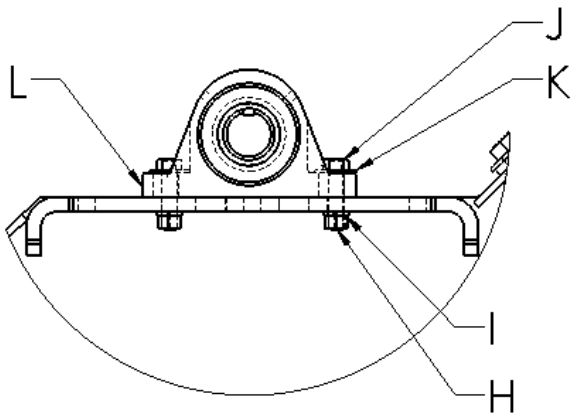


Figure 75: Adjusting Head Shaft Location

NOTE: Sliding the bearing towards the rear increases capacity and towards the front decreases capacity.

5. Loosely tighten nuts (H) and lock washers (I).
6. Move to the other side of the scrub, and repeat steps 2-4. Make sure the shaft is aligned. Fully tighten nuts (H).
7. Return to the original side, and fully tighten nuts (H).
8. Reapply pressure of the belt and check chains for proper alignment.

7.26 Rear Wheel

NOTE: Rear wheel wear drive plates (M) should be rotated prior to wear in the wheel weldment.

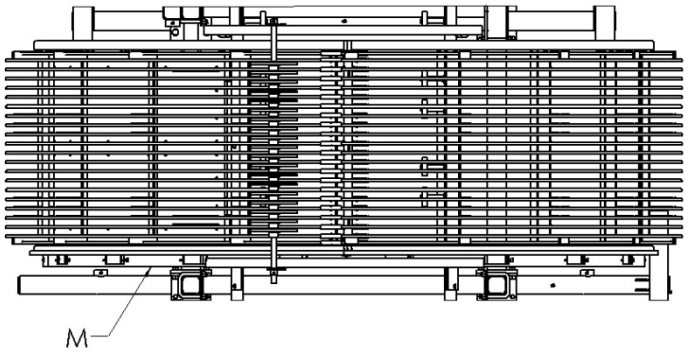


Figure 76: Rear Wheel Wear Drive Plates

7.26.1 Wheel Speed/ Conveyor Speed:

The wheel and conveyor speed flow controllers are shown in Figure 77.

To increase the speed of either component, move the switch in a manner such that the corresponding number increases. Likewise, decreasing the number will decrease the speed.

Figure 77: Flow Controllers

7.26.2 Wheel Drive Chain Tension:

To adjust the wheel drive chain tension:

1. Shift to park, disengage the PTO, lower the machine to the ground, relieve hydraulic pressure, stop the engine, remove the ignition key, and wait for all moving parts to stop before dismounting.

2. Tighten nut (A) until at desired chain tension.

If the spring is fully compressed and more chain tension is required:

3. Loosen nut (A) unit the spring is not under compression.

4. Remove nut (B) and the bolt. Line up the second hole from the top with the arm linkage. Replace the bolt, and tighten nut (B).

5. Tighten nut (A) until at desired chain tension.

For more tension, follow steps 3-5 for the third hole.

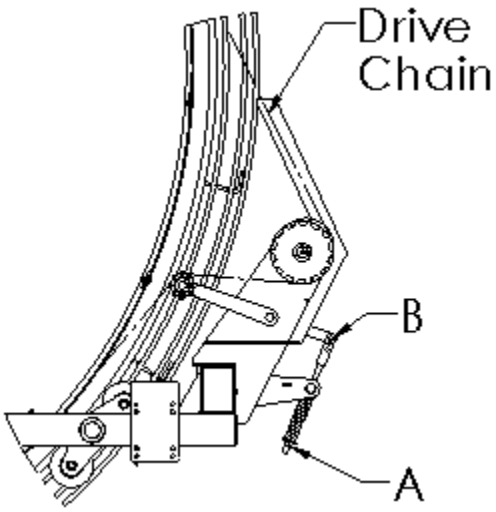


Figure 78: Wheel Drive Chain Tension Adjustment

7.26 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 the tightness of cap screws periodically.

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

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

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

Tighten cap screws with a plastic insert or crimped steel-type lock nuts to approximately 50% of the torque shown in Table 8. Tighten toothed or serrated-type lock nuts to the full torque value.

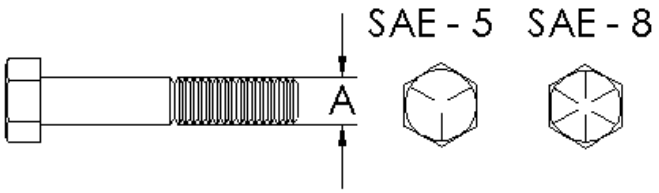


Figure 79: Bolt Grade Identification

Table 8: Torque Chart

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

8.0 TRANSPORTATION

8.1 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.

8.2 Preparing for Transport

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

Figure 80: Lowered Boom

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

NOTE: Maximum speed when transporting the harvester is 25 mph (40.2 kmh).

8.3 Wheel Option

NOTE: Axle cylinders must be extended during transport to gain clearance for the drive wheel.

CAUTION: Be aware of overhead obstructions.

9.0 CLEANING

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

9.1 Row Finder

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

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

Figure 81: Row Finder Cleaning

9.2 Lifter Struts and Paddles

Lifter struts and paddles typically require the most frequent cleanings. Any mud buildup around the lifter struts and paddles must be periodically removed for optimum performance and to prolong machine life.

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

Figure 82: Lifter Strut and Paddle Cleaning

9.3 Grabrolls

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

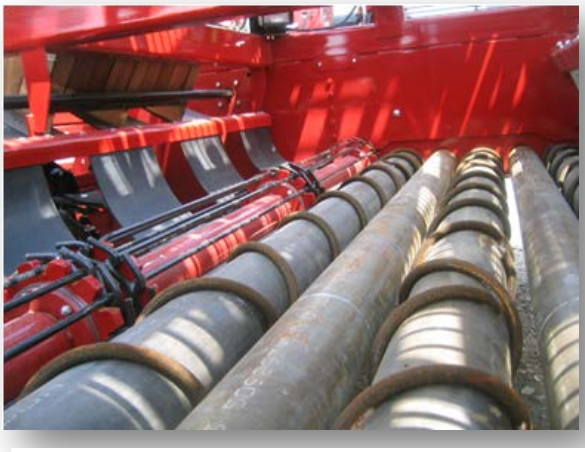


Figure 83: Grabroll Cleaning

9.4 Apron Shafts

If mud buildup occurs under or between the apron chains, mud must be removed from the apron shafts.

Figure 84: Apron Shaft Cleaning

9.5 Rear Scrub

The interior of the 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 unclean, mud balls may cause belted chain to jump off the sprockets.

Figure 85: Rear Scrub Cleaning

9.6 Beet Tank

The elevator, 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.

NOTE: Open the tank to clean.

Figure 86: Beet Tank with Open Tailgate

10.0 STORAGE

10.1 End of Season

1. Thoroughly clean the harvester inside and out. Debris and dirt will draw moisture and cause rust.

2. Inspect the harvester for any damaged or worn components; repair or replace as required.

3. Loosen or remove the 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 lubricate (see Lubrication and Maintenance, section 11.0).

6. Lower the boom.

7. Move the harvester to a level, dry, and clean area.

8. Put blocking material under the lifter wheels to prevent sinking and under the rear struts to take load off the tires. Do not deflate the tires. If exposed to the elements, put covers over tires to protect them from light, grease, and oil.

10.2 Beginning of Season

1. Attach the harvester to the tractor (see section 5.0).

2. Remove all support blocks from the lifter struts and rear struts.

3. Lubricate the entire machine (see Lubrication and Maintenance, section 11.0). This will force any collected moisture out of the bearings. Replace the gearbox oil and hydraulic oil (see Lubrication and Maintenance, section 11.0).

4. Reinstall the drive belt and verify all pulleys, idlers, and slip clutches are functioning properly.

5. Run the harvester to ensure proper function.

6. Tighten all loose components including guards and shields.

7. Review the 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).

11.0 LUBRICATION AND MAINTENANCE

11.1 General Maintenance Information

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

IMPORTANT: The period for recommended lubrication and maintenance is based on normal conditions. Severe or unusual conditions may require more frequent lubrication or oil changes.

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

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

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

11.2 U Joints

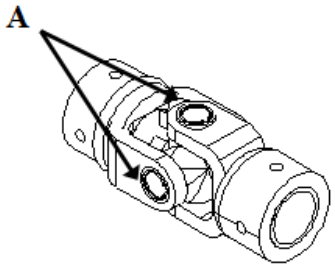


Figure 87: Needle Bearings

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

11.3 Hydraulic Oil Tank Level

The hydraulic oil tank should be filled so that 2 in. (5.1 cm) of oil shows above the low level line.

NOTE: Check the oil level every 10 hours.

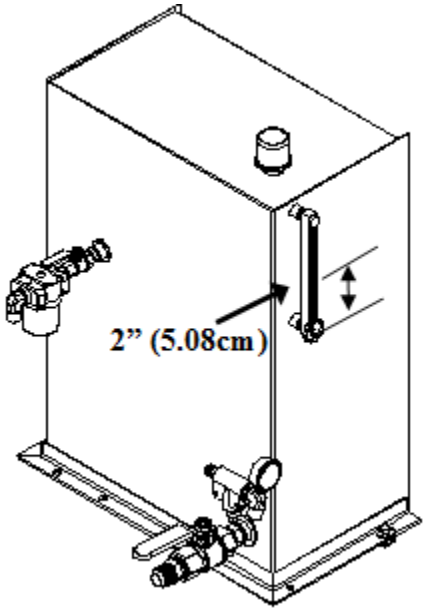


Figure 88: Hydraulic Oil Tank Level

11.4 Roller Chain

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

IMPORTANT: Excess oil applied to the roller chain may contaminate slip clutch (B).

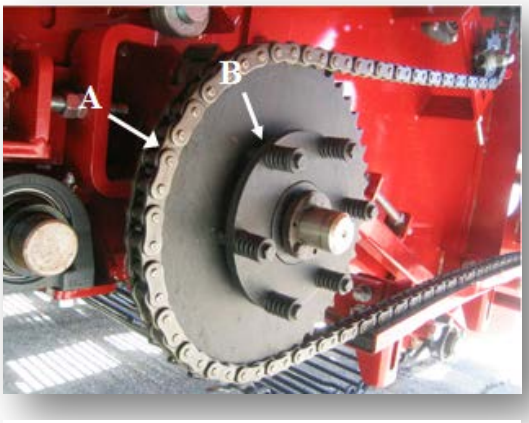


Figure 89: Roller Chain and Slip Clutch

11.5 Drive Belt

Check drive belts for wear every 10 hours.

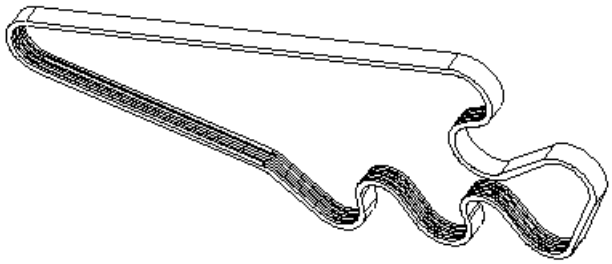


Figure 90: Drive Belt

11.6 Lifter Strut Hubs

Lifter strut hubs (A) need to be repacked with grease, have seals checked, and spindle nut re-torqued every 400 acres or sooner in sever conditions.

11.6.1 Torqueing Spindle Nut:

1. Ensure the seal and bearings are seated properly before tightening the spindle nut.
2. Torque the spindle nut to 200 ft-lb (271.2 N·m) while continuously rotating hub (A). At this point, the hub should be difficult to rotate.

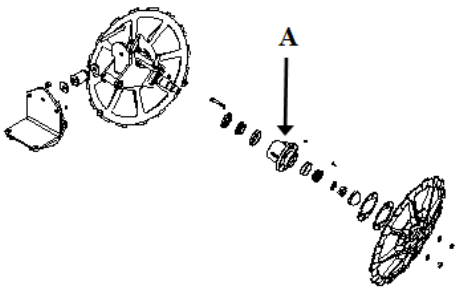


Figure 91: Hub

3. Loosen the spindle nut one full turn or until it's loose.
4. Torque the spindle nut to 50 ft-lb (67.8 N·m) while continuously rotating the lifter wheel hub.
5. Back off the spindle nut $^{1}/_{6}$ of a turn or just enough to install the cotter pin in the spindle.

11.7 Gearbox Oil Level

Gearbox oil levels should be checked routinely and filled to line (A) shown in Figure 92.

Side plugs (B) can be found on all gearboxes and can be used to measure the 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 the gearbox using side plug (B).

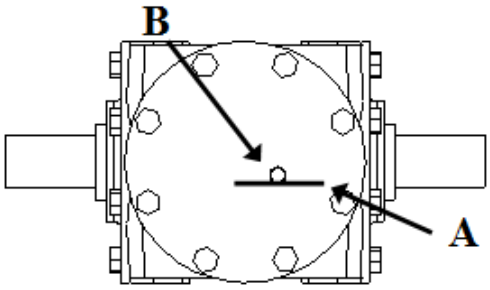


Figure 92: Gearbox Oil Level

11.8 Breather Cleaning

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

1. Remove 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 wire to remove any residue from breather passages.
5. Blow out the breather with high pressure air.
6. Blow through the breather to ensure the passages are clear.
7. Reinstall and tighten breather (A) in the gearbox.

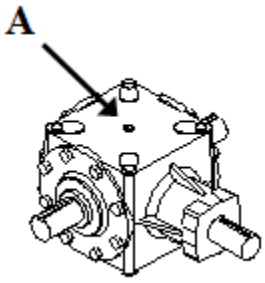


Figure 93: Gearbox Breather

11.9 Slip Clutch Maintenance

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

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

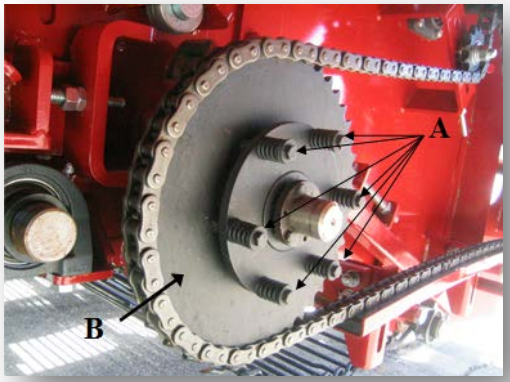


Figure 94: Testing Slip Clutch

Fiber pads within the slip clutch must be replaced once excessive slippage occurs.

IMPORTANT: Do not contaminate slip clutches with oil. This may cause slippage and lead to premature fiber disc replacement.

11.10 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 the joints.

40% = approximately $^{3}/_{10}$ in. (.8 cm) remaining in $^{1}/_{2}$ in. (1.3 cm) 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.

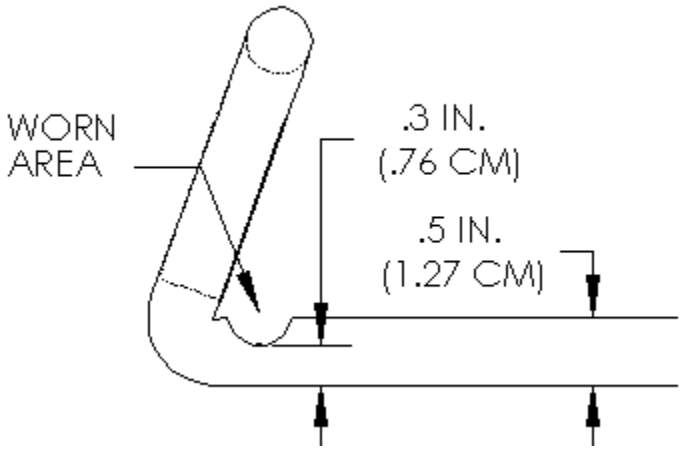


Figure 95: Hook Rod Chain Wear

11.11 Servicing Intervals

Before 1st 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.

12 Hours:

1. Grease row finder, hitch assembly, lifter strut rod (when equipped with rock struts), belt idler pivot hub, hitch assembly, sealed bearings, and rear strut.
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.

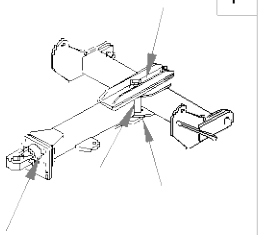
40 Hours:

1. Lubricate the elevator hinge and all U joints
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.

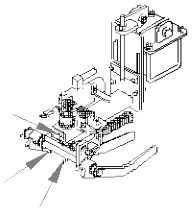
250 Hours or Annually:

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.

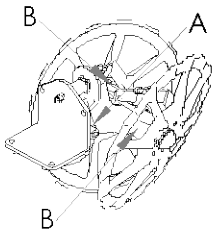
1



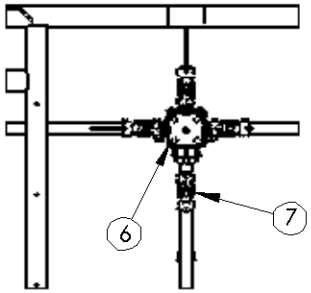
2

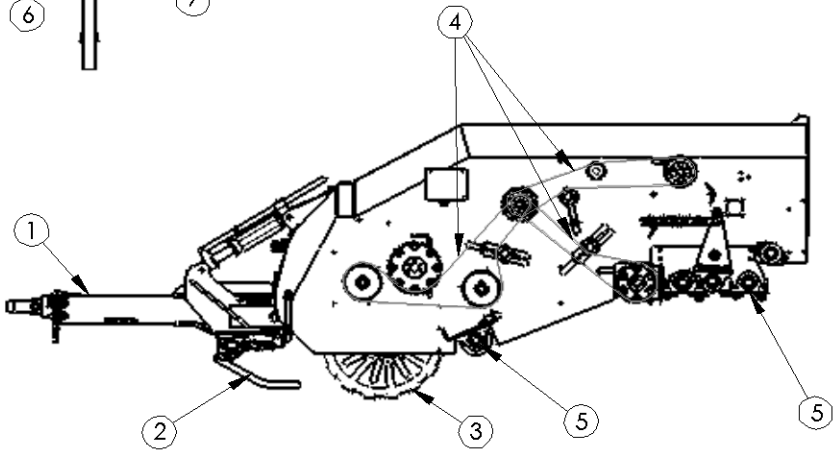


3

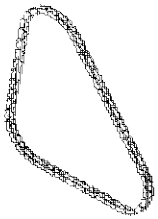


TOP VIEW

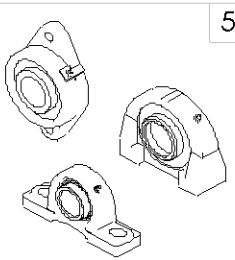




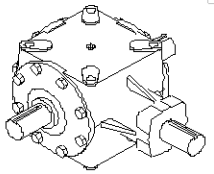
4



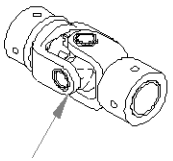
5



6

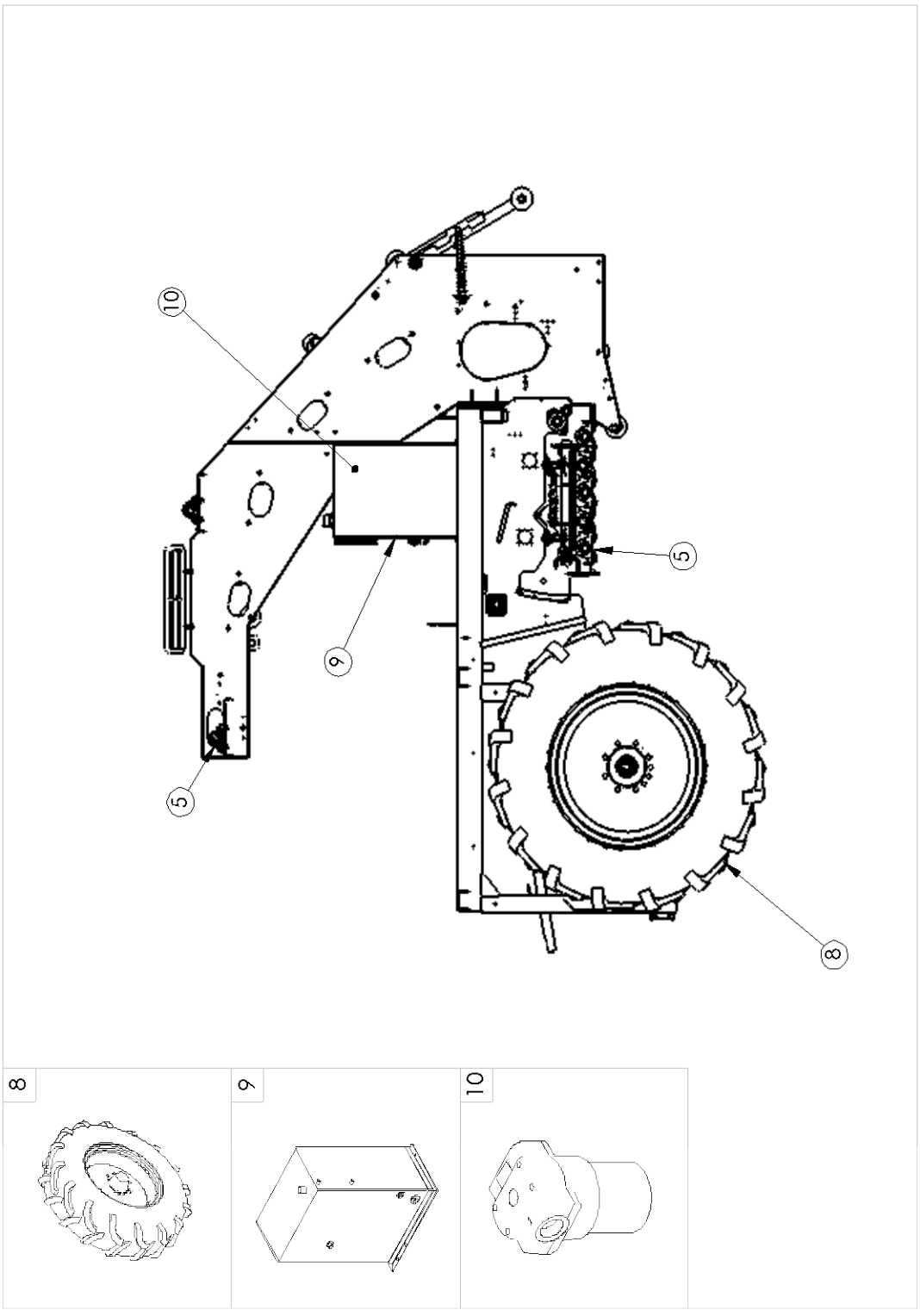


7



11.12 Lubrication Chart

Ref #	Description	Lubrication Type	Frequency	Quantity	Number of Instances
1	Hitch Assembly	Multi-Purpose Grease	12 Hours	3-5 pumps	4
2	Rowfinder	Multi-Purpose Grease	12 Hours	1-2 pumps	3
3a	Lifter Strut Rod- Rock Strut	Multi-Purpose Grease	12 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 (20 to 100°F)	12 Hours	As required	8
5	Sealed Ball Bearings	Multi-Purpose Grease	12 Hours	1-2 pumps	Multiple
6	Gearbox	EP 80W90 Oil	250 Hours/ Annually	3 Qt. (2.8 L)	1-2
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


10
5
9
5
8
8
9
10

11.13 PTO Driveline Servicing

The first lubrication interval should be 16 to 24 hours of operation after initial start-up. Then follow the schedule outlined in Table 9.

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

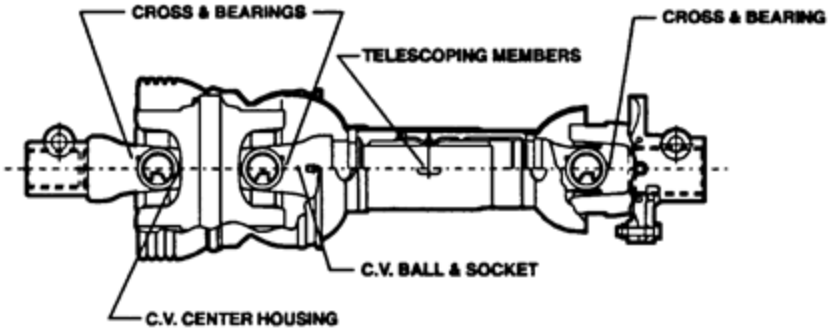


Figure 96: PTO Shaft

Table 9: PTO Driveline Servicing

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 the time of assembly. Use amounts listed above per location. Then, follow the above recommendations.

12.0 TROUBLESHOOTING

PROBLEM	*CAUSE*	*SOLUTION*
Lifter wheels slicing beets.	Lifter wheels not adjusting to row spacing.	Set lifter strut spacing to same as beet rows.
	Row finder wands clogged, or row finder is not adjusted or working properly.	Adjust or clean rowfinder (see section 7.2).
	Machine is not level.	Level machine (see section 7.1).
	Irregular planting.	Align harvester with rows using manual override.
	Paddle shaft too slow.	Increase PTO speed or hydraulic speed.
Loss of beets in lifter wheels.	Pinch point is too wide.	Remove wheel spacers to obtain narrower pinch point (see section 7.4).
	Losing beets between wheel spokes.	Install wheel fillers.
	Ground speed too slow.	For proper speed see section 6.2.
	Tractor operating under 1000 RPM PTO speed.	Increase tractor throttle so PTO rotates at 1000 RPM.
	Lifter wheels digging too shallow.	Lower machine.
	Paddle shaft too slow.	Increase PTO speed or hydraulic speed.
Loss of beets through grabrolls.	Rollers too far apart.	Move rollers closer together, or tighten rock spring (see section 7.15).
	Dirt sticking to rollers.	Install larger drive sheave to speed up grabrolls (see section 7.14).
	Angle of grabroll bed adjusted incorrectly.	Raise front of cleaning bed to increase flow of beets through grabrolls (see section 7.19).

PROBLEM	CAUSE	SOLUTION
Excessive debris/mud 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. Change pinch point position (see section 7.3).
	Unnecessary use of wheel fillers.	Remove wheel fillers.
	Pinch point is too wide.	Adjust pinch point width (see section 7.4).
	Paddle shaft too slow.	Increase PTO speed or hydraulic speed.
Grabrolls backing up with beets.	Bed angle too steep.	Adjust grabroll bed angle (see section 7.19).
	Grabrolls moving too slow.	Speed up grabrolls by installing a larger drive sheave (see section 7.14).
	Smooth rolls too low.	Raise smooth grabrolls (see section 7.17).
	Front grabroll flap in down position.	Move into up position (See section 7.13).
	Traveling too fast while harvesting.	Slow down.
	Outside scrub chain too tight.	Reposition head shaft (see section 7.25.2).
Beets not coming out of lifter wheels.	Paddle shaft not adjusted properly.	Lower paddle shaft (see section 7.8).
	Rubber paddles worn severely.	Replace rubber paddles.
	Beets aren't being lifted to paddles.	Increase ground speed (see section 6.2).
	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 section 7.25).

PROBLEM	CAUSE	SOLUTION
Lifter wheels plugging.	Digging too deep.	Raise machine.
	Paddles not keeping wheel rim clean.	Adjust paddles outward and/or down (see section 7.8).
	Scrapers not close enough to wheel.	Adjust scrapers with adjusting bolts (see section 7.6).
	Rocks clutching or stopping lifter wheel rotation.	Change position of pinch point (see section 7.3).
	Excessive mud	Clean machine.
Beets coming out front of machine.	Paddles too wide.	Adjust inward (see section 7.8).
	Paddles not reaching deep enough into lifter wheels.	Lower paddle shaft (see section 7.8).
	Apron chain tension too loose.	Adjust chain tension (see section 7.10).
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 section 7.3).
	Wheel fillers are installed.	Remove wheel fillers (see section 7.5).
	Pinch point is too wide.	Remove lifter wheel spacers (see section 7.4).
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 section 7.14).
	Soil conditions (clay, mud, temperature).	Clean more frequently.

PROBLEM	CAUSE	SOLUTION
Tires built up with soil.	Soil conditions.	Clean rear struts frequently (refer to Cleaning, section 9.0). Lower tire pressure. (see section 3.1).
Scrapers building up with mud.	Scrapers too far from lifter wheels.	Adjust outward to wheels (see section 7.6).
	Soil conditions.	Move paddles out close to lifter wheels (see section 7.7).
Mud building up on lifter wheels.	Paddles not close enough to lifter wheels.	Move paddles out closer to lifter wheels (see section 7.7).
	Digging too deep.	Raise machine.
	Soil conditions.	Clean lifter struts frequently (refer to Cleaning, section 9.0).
	Scrappers adjusted incorrectly.	Adjust toward lifter wheels (see section 7.6)
Breaking beets.	Digging too shallow.	Lower machine.
	Small beets or dry conditions.	Install reverse #4 grabroll kit.
	Grabrolls moving too fast	Install smaller drive sheave (see section 7.14).
	Pinch point too narrow.	Add wheel spacers (see section 7.4
	Tractor tires running over beets.	Adjust tractor tires properly (see section 7.1.2).
	Grabrolls opened too far.	Close up grabrolls (see section 7.12 for front and 7.18 for back).
Machine "frozen up."	Soil freezing overnight.	Run machine empty, and clean before storing each night (Refer to Cleaning, section 9.0).
	Foreign material jamming machine.	Remove obstruction. Check between grabrolls and sprockets on scrub chain.

13.0 Appendices

13.1 Conversions

1 acre= .404 hectares	1 mph= 1.609 kph
1 acre= 43,560 square feet	1 mile= 1.609 km
1 inch= 2.54 cm	1 psi= 6.895 kPa
1 foot= 0.3048 m	1 GPM= 3.785 LPM
1 lb= .45359 kg	1 hp= .746 kw
1 lb= 16 oz	1 ft-lb= 1.356 N·m

13.2 Trantorque Installation Procedures

Shaft and bore diameters along with surface finishes are 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:** Do not use 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 the 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 gripping area of the Trantorque.

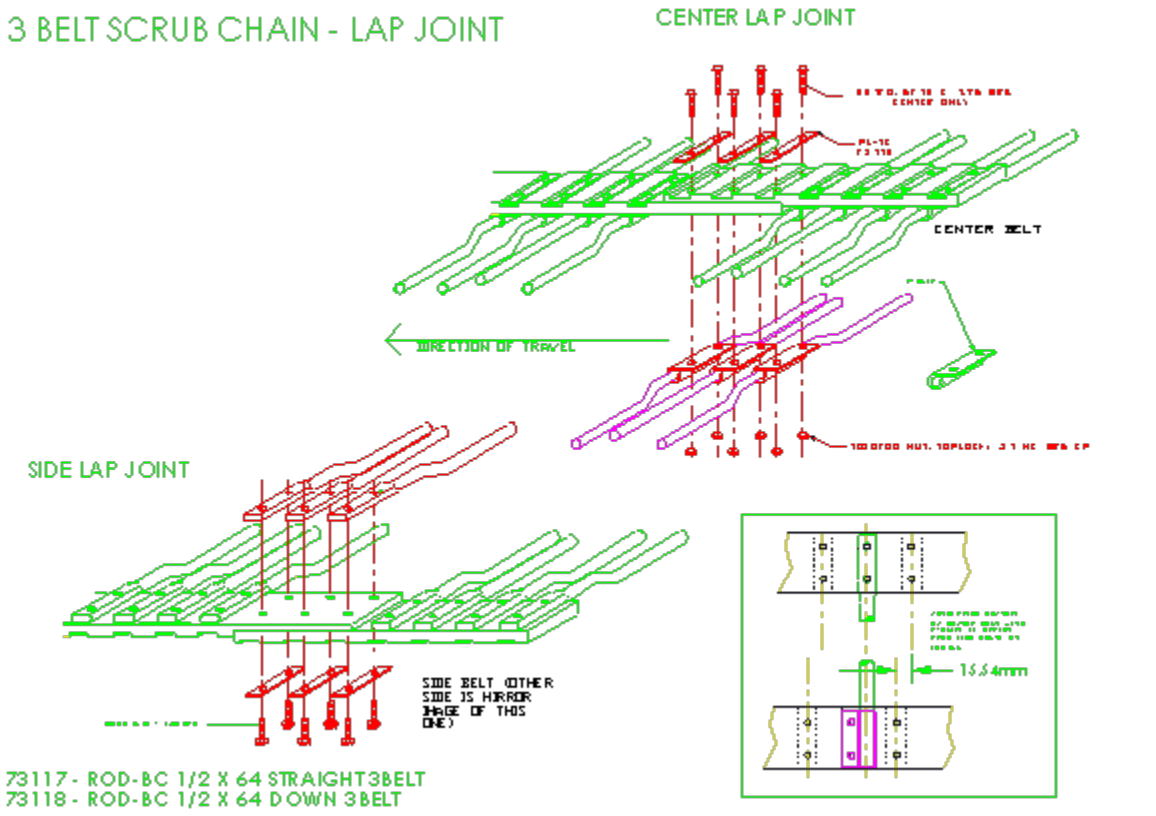
4. Using a torque wrench, tighten the nut to the proper torque shown in Table 10.

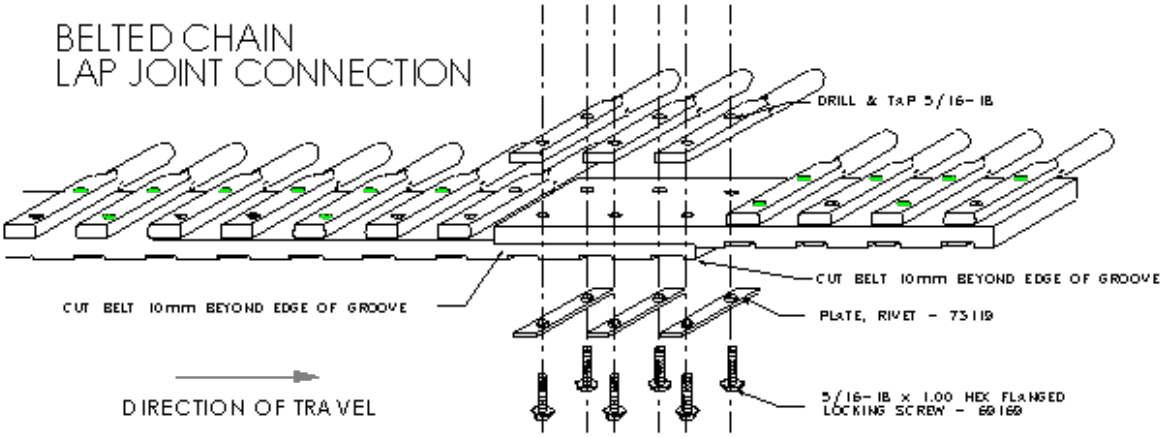
IMPORTANT: A torque wrench must be used! An impact wrench will not yield the proper torque and the installation will fail. Minimal under-tightening will allow the Trantorque or shaft to spin in the bore. Over-tightening will damage or crack the Trantorque. Do not use an impact wrench during installation.

Table 10: Trantorque Installation Torque

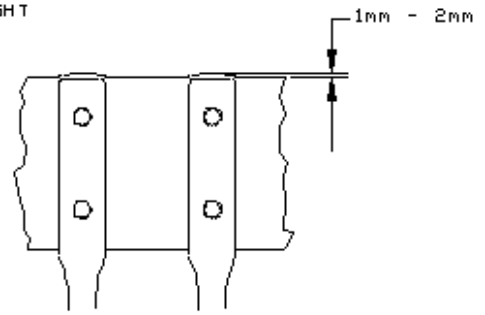
Part #	Description	Torque
58459, 64163	Hub-Trantorque 1.75 in.	270 ft-lb (366 N·m)
58460, 64165	Hub-Trantorque 2.00 in.	470 ft-lb (637 N·m)
59259	Hub-Trantorque 2.25 in.	510 ft-lb, (691 N·m)

13.3 Belted Chain Splice Procedure





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

13.4 Tools

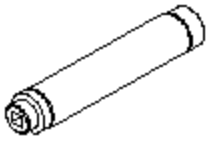
Amity has the following tools available:

Trantorque sockets
(#59107, #59108, #64820)

Trantorque wrench (#64320)

Belted chain link removal tool (#62802)

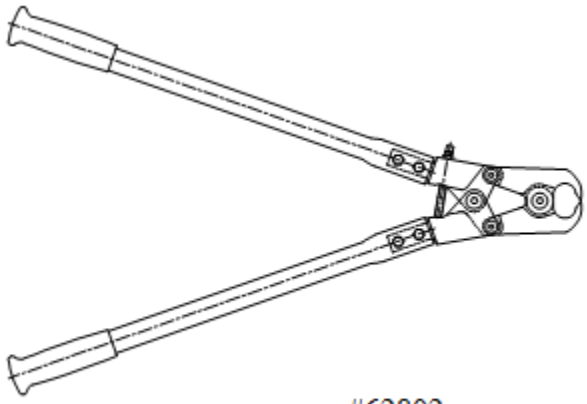
#64320



#59107 (1 ¾ in., 4.45 cm)
#59108 (2 in., 5.08 cm)
#64820 (2 ¼ in., 5.7 cm)

#72417

#72418



#62802

13.5 Tapered Hub/ Sprocket Installation

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 the bushing in the sprocket or other Martin MST part.
3. Place the cap screws loosely in the “pull up” holes. The bushing remains loose to ensure a sliding fit on the shaft.
4. With the key on the shaft, slide the sprocket to the desired position on shaft. Be sure the heads of the cap screws are accessible.

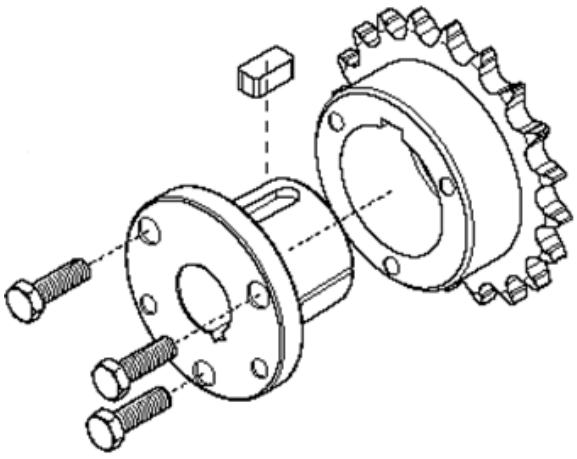


Figure 97: Bushing Installation

5. Align the sprocket, and tighten the screws alternately and progressively until they are pulled up tight (see Table 11). Do not use extensions on wrench handles, and do not allow the sprocket to be drawn in contact with the flange of the bushing. There should be a gap between bushing flange and sprocket.

CAUTION: This gap must not be closed.

Removal:

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

Table 11: Wrench Torque Values for Tightening Bushings

MST bushing size	Size of cap screw Inches	Wrench torque in-lbs (N·m)
H	1/4 X 3/4	95 (129)
P	5/16 X 1	192 (260)
Q	3/8 X 1 1/4	348 (472)
R	3/8 X 1 3/4	348 (472)
S	1/2 X 2 1/4	840 (1139)
U	5/8 X 2 3/4	1680 (2278)
W	3/4 X 3	3000 (4068)

WARNING: Use of anti- seize lubricant on tapered cone surfaces or on bolt threads when mounting may result in damage to the sheaves and sprockets. This voids all manufacturers' 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.)

13.6 Torque Wrench Effective Length

To recalculate a torque reading when using a torque adapter, use the following formula, and refer to Figure 98:

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

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**.

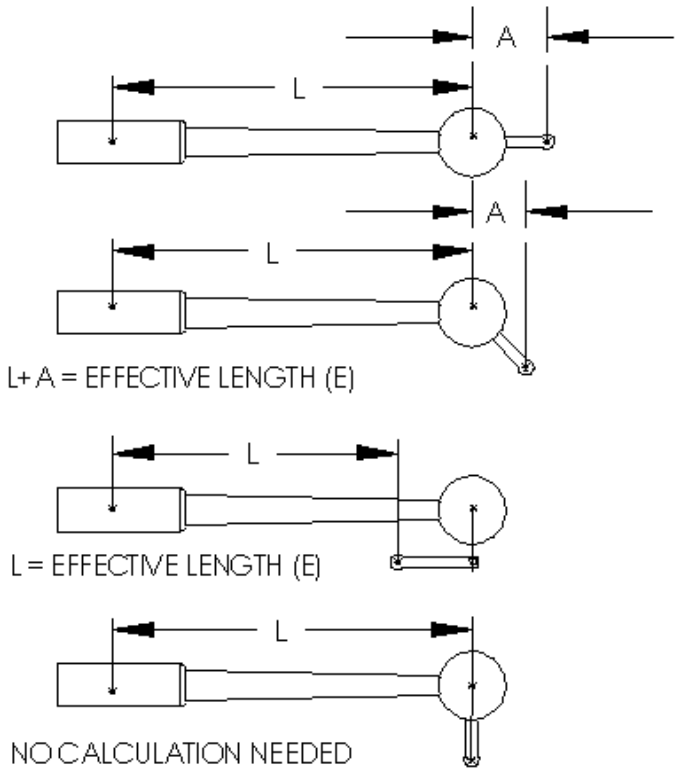


Figure 98: Torque Wrench Effective Length

13.7 Easy Lock Assembly and Removal

Removal:

1. Remove the EASY LOCK® tab with a screwdriver (Figure 99).
2. If the guard is chained, remove or hold back the chain to prevent it from blocking the bearing.
3. Turn the bearing in the direction as indicated in Figure 100. Then, slide guard off the bearing.

Assembly:

1. Align the bearing tabs with the guard bell slots.
2. Slide the bell onto the bearing.
3. Turn the bearing to lock it in place.
4. Snap the EASY LOCK tab into the bell.

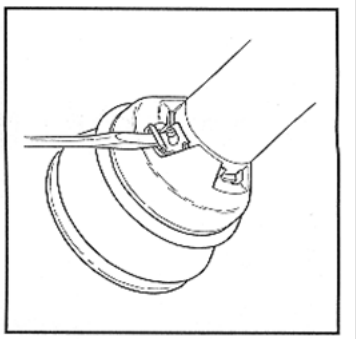


Figure 99: Remove Tab

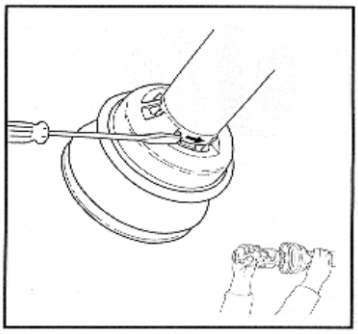


Figure 100: Turning Bearing