IF THIS MACHINE IS USED BY AN EMPLOYEE, IS LOANED, OR IS RENTED, MAKE SURE THAT THE OPERATOR UNDERSTANDS THE TWO INSTRUCTIONS BELOW.

BEFORE THE OPERATOR STARTS THE ENGINE:
1. GIVE INSTRUCTIONS TO THE OPERATOR ABOUT SAFE AND CORRECT USE OF THE MACHINE.
2. MAKE SURE THE OPERATOR READS AND UNDERSTANDS THE OPERATOR’S MANUAL FOR THIS MACHINE.

WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE INJURY OR DEATH.

BEFORE STARTING THE ENGINE, DO THE FOLLOWING:
1. READ THE OPERATOR’S MANUAL.
2. READ ALL SAFETY DECALS ON THE MACHINE.
3. CLEAR THE AREA OF OTHER PERSONS.

LEARN AND PRACTICE SAFE USE OF MACHINE CONTROLS IN A SAFE AND CLEAR AREA BEFORE YOU OPERATE THIS MACHINE ON A JOB SITE.

It is your responsibility to observe pertinent laws and regulations and to follow manufacturer’s instructions on machine operation and maintenance.

See your Authorized Art’s-Way Manufacturing Co., Inc. dealer or Art’s-Way Manufacturing Co., Inc. for additional operator’s manuals, illustrated parts catalogs, and service manuals.
TO THE OWNER

Congratulations on the purchase of your new Art's-Way 6812A Sugar Beet Harvester. You have selected a top quality machine that is designed and built with pride to ensure you have many years of efficient and reliable service.

Many people have worked on the design, production, and delivery of this 6812A Sugar Beet Harvester. The information in this manual is based on the knowledge, study, and experience through years of specializing in the manufacturing of farm machinery. This manual is designed to provide you with important information regarding safety, maintenance, and machine operation so you can and will get the best possible performance from your 6812A Sugar Beet Harvester.

Even if you are an experienced operator of this or similar equipment, we ask that you read this manual before operating the 6812A Sugar Beet Harvester. The way you operate, adjust, and maintain this unit will have much to do with its successful performance. Any further questions you may have about this product of Art's-Way equipment should be directed to your local Art's-Way dealer or to Art's-Way Manufacturing Co., Inc., Armstrong, Iowa, 50514, (712) 864-3131.

SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE

Art's-Way Manufacturing Co., Inc. is continually making product improvements. In doing so, we reserve the right to make changes and/or add improvements to our products without obligation for the equipment previously sold.

Modifications to this 6812A Sugar Beet Harvester may affect the performance, function, and safety of its operation. Therefore, no modification are to be made without the written permission of Art's-Way Manufacturing Co., Inc. Any modification made without the written permission of Art's-Way Mfg. Co. shall void the warranty of this product.

In the interest of continued safe operation of this 6812A Sugar Beet Harvester, pay particular attention to the safety alert symbol(s) throughout this Manual.

ART’S-WAY MANUFACTURING CO., INC. STATEMENT OF PRODUCT LIABILITY

Art’s-Way Manufacturing Co., Inc. recognizes its responsibility to provide customers with a safe and efficient product. Art’s-Way Manufacturing Co., attempts to design and manufacture its products in accordance with all accepted engineering practices effective at the date of design. This statement should not be interpreted to mean that our products will protect against the user’s own carelessness or failure to follow common safety practices nor will Art’s-Way Manufacturing Co., be liable for any such act. In addition, Art’s-Way Manufacturing Co. assumes no liability for any altered product or any modified product by users or anyone other than an authorized dealer.

IMPORTANT WARRANTY INFORMATION

The warranty for this 6812A Sugar Beet Harvester appears on page 5 of this manual. In order to establish proper warranty registration, the Warranty Registration must be completed and returned to the factory. Failure to comply with this requirement may result in reduced warranty allowances.

LIMITATIONS OF THIS MANUAL

This manual contains operating instructions for your 6812A Sugar Beet Harvester only. Any mention of other machinery in this manual other than the 6812A Sugar Beet Harvester is for reference only. This manual does not replace nor is it to be used for any machinery that may be attached to or used in conjunction with the 6812A Sugar Beet Harvester.
PARTS & SERVICE

As the purchaser of your new harvester, it is very important to consider the following factors:

A. Original Quality
B. Availability of Service Parts
C. Availability of Adequate Service Facilities

Art’s-Way Manufacturing Co., Inc. has an excellent dealership network ready to answer any questions you may have about your harvester. Parts for your machine may be ordered through our dealers. When placing a parts order, please have the model and serial number ready. This will allow the dealer to fill your order as quickly as possible.

For your convenience, we have provided this space for you to record your model number, serial number, and the date of purchase, as well as your dealer’s name and address.

Owner’s Name: ___________________________________________________________

Owner’s Address: __________________________________________________________

Purchase Date: __________________________________________________________________

Dealership Name: ___________________________________________________________

Dealership Address: _________________________________________________________

Dealership Phone No.: __________________________

Machine Serial Number Location

The placard containing the serial and model number is located on the front left-hand side of the harvester frame and header.

Enter the serial number and model of your harvester and header within the space provided.

Figure 1 - Location of Serial & Model Number Placard on Harvester

Figure 2 - Location of Serial & Model Number Placard on Header
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LIMITED WARRANTY

Art's-Way Manufacturing Co., Inc. warrants the products it sells to be free from defects in material and workmanship for a period of one (1) season after the date of delivery to the first (original) purchaser, subject to the following conditions:

- Art's-Way Manufacturing Co., Inc. obligation and liability under this warranty is to repair or replace (at the company’s option) any parts that upon manufacture were defective in material or workmanship.

- All parts and repairs under this warranty shall be supplied at Art's-Way Manufacturing Co., Inc. or an authorized Art's-Way Manufacturing Co., Inc. dealer, at the option of Art’s-Way Manufacturing Co., Inc.

- Art's-Way Manufacturing Co., Inc. warranty does not extend to parts and elements not manufactured by Art's-Way Manufacturing Co., Inc. and which carry the warranty of other manufacturers.

- Transportation or shipping to an authorized dealer for necessary repairs is at the expense of the purchaser.

- Art's-Way Manufacturing Co., Inc. makes no other warranty expressed or implied and makes no warranty of merchantability or fitness for any particular purpose beyond that expressly stated in this warranty. Art’s-Way Manufacturing Co., Inc. liability is limited to the terms set forth in this warranty and does not include any liability for direct, indirect, incidental or consequential damages or expenses of delay and the company’s liability is limited to repair or replacement of defective parts as set forth herein.

- Any improper use and/or maintenance, including operation after discovery of defective or worn parts, operation beyond the rated capacity, substitution of parts not approved by Art’s-Way Manufacturing Co., Inc., or any alternation or repair by other than an authorized Art’s-Way Manufacturing Co., Inc. dealer which affects the product materially and adversely, shall void the warranty.

- No dealer, employee or representative is authorized to change this warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of Art’s-Way Manufacturing Co., Inc.

- Some states do not allow limitations on how long an implied warranty lasts or exclusions of, or limitations on relief such as incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you the specific legal rights and you may have other rights that vary from state to state.
SAFETY FIRST

“A careful operator is the best insurance against an accident”

(National Safety Council)

Most accidents can be prevented if the operator:

- Fully understands how the machine functions
- Can anticipate situations which may produce problems
- Can make necessary corrections before problems develop

**Figure 4 - Universal Safety Alert Symbol**

The American Society of Agricultural Engineers has adopted the Universal Safety Alert Symbol as a way to identify areas of potential danger if the equipment is not operated correctly. Please be alert whenever you see this symbol in the manuals or on your harvester.

Art’s-Way Manufacturing Co., Inc. strives to make our equipment as safe as possible. The Art’s-Way 6812A Sugar Beet Harvester conforms to applicable safety standards at the time of manufacturing. A safety conscious equipment operator makes an effective accident-prevention program complete.

Safety features and instructions for the harvester are detailed in the Safety Guidelines section of this Operator’s Manual. It is the responsibility of the owner to ensure that all operators read and understand the manual before they are allowed to operate the beet harvester. (Occupational Safety and Health Administration (OSHA) regulations 1928.57.)

**NOTICES OF DANGER, WARNING, AND CAUTION**

Signal Words: Note the use of signal words **DANGER**, **WARNING**, and **CAUTION** on the harvester and in this manual. The appropriate signal word for each has been selected using the following guidelines:

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<tr>
<td><strong>DANGER</strong></td>
<td>IMMEDIATE AND SPECIFIC HAZARD WHICH WILL RESULT IN SEVERE PERSONAL INJURY OR DEATH IF PROPER PRECAUTIONS ARE NOT TAKEN.</td>
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<td><strong>WARNING</strong></td>
<td>SPECIFIC HAZARD OR UNSAFE PRACTICE COULD RESULT IN SEVERE PERSONAL INJURY OR DEATH IF PROPER PRECAUTIONS ARE NOT TAKEN.</td>
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<td><strong>CAUTION</strong></td>
<td>A REMINDER OF GOOD SAFETY PRACTICES. PERSONAL INJURY COULD RESULT IF PROPER PROCEDURES ARE NOT FOLLOWED.</td>
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**SAFETY GUIDELINES**

**Remember:**

“The Best Operator is a Safe Operator”

---

**CAUTION: READ AND UNDERSTAND THE OPERATOR’S MANUAL AND ALL THE SAFETY DECALS BEFORE OPERATING THE HARVESTER. REVIEW ALL SAFETY INSTRUCTIONS WITH ALL OPERATORS ANNUALLY.**

---

**BEFORE OPERATING**

- Do not wear loose fitting clothing as it may catch in moving parts.
- Make sure to install and/or secure all guards and shields, including the tractor power take-off (PTO) master shield, before starting or operating the harvester.
- Be sure that the correct implement driveline parts are used and that they are properly secured.
- Lower the lifter wheels when the harvester is not in use.
- Install the safety chain when attaching the harvester to the tractor.
- Clear the area of bystanders, especially children, when making repairs, adjustments or performing maintenance on the harvester.
- Do not allow riders.
- Put all tractor and machine controls in “neutral” and disengage the PTO before starting. Follow the starting instructions according to your tractor manual.
- Operate the harvester only while seated on the tractor seat.
- Make sure the unit is adequately supported with safety blocks or safety stands when changing tires or performing maintenance.

---

**DURING OPERATION**

- Keep hands, feet, hair, and clothing away from moving parts.
- Keep all shields and guards in place and in good working condition.
- Keep all bystanders, especially children, away from the harvester while in operation.
- Do not allow riders while the harvester is in operation.
- Do not attempt to unclog, clean, or adjust the harvester while it is running.
- Stay away from overhead power lines. Electrocution can occur even without direct contact.
- Keep all hydraulic lines, fittings, and couplers tight and free of leaks. *(Refer to Safety Guidelines – Hydraulic Safety.)*
- Use caution when ascending or descending on the harvester. Wet shoes or boots are slippery.

---

**MAINTENANCE SAFETY**

- Follow all operating, maintenance and safety instructions found in this Manual.
- Before servicing, adjusting, repairing or unclogging the machine, always make sure the tractor engine is stopped, key in your pocket, the machine is lowered to the ground, all controls are placed in neutral, the parking brake is set, and all the moving parts have stopped.
- Use sufficient tools, jacks, and hoists that have the capacity for the job.
- Use support blocks or safety stands when changing tires or performing maintenance.
- Follow good shop practices of keeping the service area clean and dry and use adequate light for the job at hand.
- Before applying pressure to the hydraulic system, make sure all lines, fittings and couplers are tightly secured and in good condition.
- Make sure all shields/guards are in place and properly secured when performing maintenance.

---

**HYDRAULIC SAFETY**

- Make sure components in the hydraulic system are kept clean and in good working condition.
- Relieve pressure from the hydraulic system before servicing or disconnecting from the tractor.
- Keep all hydraulic lines, fittings, and couplers tightly secured and free of leaks.
- Replace any worn, cut, abraded, flattened or crimped hoses.
• Do not make any temporary repairs to the hydraulic lines, fittings or hoses using tape, clamps, or cement. The hydraulic system operates under extremely high pressure and temporary repairs may fail suddenly and create a hazardous/dangerous situation.

• 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 identify and isolate a leak. If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop if hydraulic fluid penetrates the surface of the skin.

• Before applying pressure to the system, make sure all components are tight and that the hydraulic lines, hoses and couplings are not damaged.

**TRANSPORTATION SAFETY**

• Make sure the harvester complies with all local regulations regarding transporting equipment on public roads and highways.

• Make sure the Slow Moving Vehicle (SMV) emblem and all lights and reflectors required by local highway and transportation authorities are properly in place, clean and clearly visible to traffic.

• Do not allow riders on any machinery during transport.

• Make sure the harvester is securely attached to the tractor and install a safety chain to the harvester.

• Make sure the tractor brake pedals are latched together.

• Do not exceed 20 mph (32 km/h) when transporting the harvester. Always reduce speed on rough roads and surfaces, or when going down inclines.

• Use caution when turning and always use the turn signals on the tractor to indicate your turning intentions to the other traffic.

• The weight of the trailed machine should NEVER exceed the weight of the towing vehicle.

• Check all clearances carefully whenever the machine is towed.

• Lower the elevator into the transport position before transporting the harvester on the highway.

• Stay away from overhead obstructions and power lines during transport. Electrocutation can occur even without direct contact.

**STORAGE SAFETY**

• Store the harvester in an area away from human activity.

• Do not permit children to play on or around the stored machine at any time.

• Make sure that the harvester is stored in an area with a firm and level base to prevent the machine from tipping or sinking into the ground.

• Block the wheels to prevent the machine from rolling.

**TIRE SAFETY**

• Have only a qualified tire dealer or tire repair service perform tire repairs.

• Do not attempt to install a tire on a wheel or rim unless you have the proper equipment and experience to do the job.

• Follow proper procedures when installing a tire on a wheel or rim to prevent an explosion that could result in serious injury.

• Do not substitute tires with a lesser road rating and/or capacity for the original equipment tires.

**CAUTION:** FAILURE TO FOLLOW PROPER PROCEDURES WHEN INSTALLING A TIRE ON A WHEEL OR RIM CAN PRODUCE AN EXPLOSION THAT MAY RESULT IN SERIOUS INJURY OR DEATH. DO NOT ATTEMPT TO INSTALL A TIRE UNLESS YOU HAVE THE PROPER EQUIPMENT AND EXPERIENCE TO PERFORM THE JOB. REPLACEMENT, REPAIR, AND/OR MAINTENANCE SHOULD BE DONE BY A QUALIFIED TIRE DEALER OR QUALIFIED REPAIR SERVICE.

**ASSEMBLY SAFETY**

• Use adequate manpower to perform assembly procedures safely.

• Assemble the harvester in an area with sufficient space to maneuver the largest components and allow easy access to all sides of the machine.

• Use only forklifts, lift cranes, jacks and tools with sufficient capacity for the loads.

• Do not allow spectators, especially children, in the working area.

Remember:

“The Best Operator is a Safe Operator”
SAFETY DECALS

DECAL LOCATIONS & IDENTIFICATION

The different types of safety decals for your Sugar Beet Harvester are illustrated on the following pages. Please familiarize yourself with the appearance of each decal, the warning it describes, and the area where it is located on the harvester.

Safety awareness is the responsibility of each operator of the harvester. Keep safety decals and signs clean and legible and be sure replacement parts display the current safety decals and signs as well.

*Remember:* Always replace missing, damaged or illegible safety decals. New decals and signs are available from an authorized dealer.

Figure 5 - Harvester Safety Decals

**NOTE:** Keep all decals clean and free of dirt for maximum visibility. Replace all individual decals that are no longer legible. Read and obey all safety decals and be familiar with their meaning.
1. Decal, Warning, No Riders/Falling Hazard
   P/N: 467420

2. Decal, Danger Rotating Roll Hazard
   P/N: 467410

3. Decal, Warning, Thrown Object Hazard
   P/N: 467400

4. Decal, Warning, Falling / Crush Hazard
   P/N: 510730

5. Decal, Danger, Shield Missing
   P/N: 467430

6. Decal, Warning, Moving Part Hazard
   P/N: 467450
CAUTION

2. Observe all safety practices. Learn to operate this machine safely.
3. Keep all shields in place and in good repair, including the power drive line shields.
4. NO RIDERS. Keep children and bystanders clear of the machine while operating.
5. Keep hands, feet, hair, and clothing away from moving parts.
6. Make sure power source is disconnected and machine properly supported to prevent movement before servicing, adjusting, or repairing.
7. Use flashing warning lights when travelling on highways except when prohibited by law.
8. Keep all hydraulic components in good repair.
9. Stay away from overhead power lines, electrocution can occur without direct contact.

WARNING

HIGH PRESSURE FLUID HAZARD

To prevent serious injury or death:
Release pressure on system before servicing.
Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead if hands.
Keep all hydraulic components in good repair.

DANGER

ROTATING DRIVELINE
CONTACT CAN CAUSE DEATH
KEEP AWAY!

Do not operate without:
- All driveline, tractor and equipment shields in place
- Driveline securely attached at both ends
- Driveline shields that turn freely on driveline

Decal, Caution, Safety Instructions

P/N: 368040

Decal, Warning, High Pressure Fluid Hazard

P/N: 366310

Tape, Red, Retro-Reflective

P/N: 476450

Tape, Yellow, Retro-Reflective

P/N: 476460

Decal-Slow Moving Vehicle Emblem

P/N: E224138

Decal, Caution, Hitch

P/N: 467460

Decal, Danger, Rotating Driveline (located on PTO)

P/N: 268860

6812-OPS-007
Figure 6 - Header Safety Decals
1. P/N: 467430
   Decal, Danger, Shield Missing

2. P/N: 467470
   Decal, Warning, Overhead Hazard

3. P/N: 476460
   Tape, Yellow, Retro-Reflective

4. P/N: 467440
   Tape, Danger, Electrocution

5. P/N: 467410
   Decal, Danger Rotating Roll Hazard

6. P/N: 467400
   Decal, Warning, Thrown Object Hazard
**WARNING**

**FALLING HAZARD**
To prevent serious injury or death from falling into or off machine:
- No Riders Allowed

P/N: 467420
Decal, Warning, No Riders/Falling Hazard

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**WARNING**

**MOVING PART HAZARD**
To prevent serious injury or death from moving parts:
- Close and cover all guards and shields before starting equipment.
- Keep hands, feet, hair, and clothing away from moving parts.
- Disconnect and lockout power source before adjusting or servicing.

P/N: 467450
Decal, Warning, Moving Part Hazard

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9  P/N: 476450  Tape, Red, Retro-Reflective
10  P/N: 476470  Tape, Red-Orange, Fluorescent
HARVESTER OVERVIEW

This manual has been prepared to familiarize the owner/operator with the proper assembly, operation, adjustment, service, and lubrication of the harvester. Take adequate time to better understand the efficient operation and care of your harvester.

Whenever the term(s) “left-hand” and “right-hand” are used, it should be understood that this means you are standing behind the harvester and facing the direction of forward travel.

![Image of sugar beet harvester](image)

**HARVESTER OVERVIEW**

**Beet Flow Harvesting Sequence**

The lifter wheels of the header (A) penetrate the soil and lift the beets upward out of the ground.

The revolving rubber paddles (B – Not Seen) located above and slightly rear of the lifter push the beets towards the header conveyor rollers. The paddles also serve to clean the beets by removing excess dirt from the beets surface.

The header conveyor rollers (C) also serve to remove dirt from the beets as well as transfer the beets to the main harvester grabrollers. Depending upon the owner/operators preference, the first header roller can be either a star or smooth roller to match soil conditions. The diverter roller is smooth and acts as a grabroll with the rear header conveyor roll.

A short conveyor (D) located to the rear of the header serves to transfer the beets from the header to the main harvester grabrollers (E). This short conveyor is secured to the header and is allowed to free float on the main harvester frame to allow for orientation changes between the header and main harvester frame.

The main harvester grabroller bed consists of four spiral grab rollers paired with four smooth rollers that strip dirt, soil, and trash from the beets as they are transferred to the wheel elevator (F).

The wheel elevator, set slightly lower than the main harvester grabroller bed, receives and then carries the beets to the top of the harvester. A retainer (G) holds the beets in the wheel elevator until they reach the top where the beets fall onto the holding tank conveyor (H). A stripper (I) clears the wheel elevator of any rocks or beets that may become wedged between the wheel elevator rods.

The transfer conveyor transports the beets from the wheel elevator to the holding tank.

The offloading conveyor (K) also serves as the bottom of the holding tank. The offloading conveyor extends up and outward to facilitate the offloading of the beets to a truck or other appropriate vehicle.

**Harvester Structure**

The basic structure of the harvester is its frame. From the frame all of the major assemblies such as the header, holding tank, wheels, and conveyors are attached. In its operational configuration, (i.e. the header attached and the holding tank empty) the harvester has a total weight of approximately ranging from 30,000 lbs [13,607 kg] for the 6 row 28/30 to 37,000 lbs [16,782 kg] for the 12 row 22.
The main structures of the harvester are:

- Frame
- Tongue
- Carrier Wheels
- Header (4 different configurations)
  - 6 row header – 28 or 30 inch [71.12 to 76.2 cm]
  - 8 row header – 22 inch [55.88 cm]
  - 8 row header – 28 or 30 inch [71.12 to 76.2 cm]
  - 12 row header – 22 inch [55.88 cm]
- Short conveyor
- Harvester grabroll bed
- Wheel elevator
- Transfer conveyor
- Holding tank
- Offloading conveyor / truck boom

**ELECTRICAL SYSTEM**

Harvester components powered by the tractor’s electrical power are:

- Road hazard lights
- Work lights
- Steerable wheel option

**HYDRAULIC SYSTEM**

The harvester has two hydraulic systems. The first hydraulic system is powered from the tractor’s hydraulic system and the second is a self-contained system powered by the harvester’s drive shaft.

**Harvester/Tractor Hydraulic System**

Harvester components powered by the tractor’s hydraulic power are:

- Tongue lift cylinders
- Rowfinder
- Rowfinder override
- Truck conveyor motor, also powers the transfer conveyor lateral cylinder
- Truck conveyor cylinders

The harvester/tractor hydraulic system operates well with current tractor hydraulic systems. There are 10 hydraulic hose connections (5 circuits) between the tractor and the harvester with no hydraulic reservoir associated with this system.

**NOTE:** The circuit that runs the truck/tank conveyor has a high hydraulic demand. The load sense system on the tractors continually try to supply oil needed. If power beyond circuit is used for the rowfinder, it should be connected to the load sense. Contact your dealer for the best way to accomplish this.

**Figure 8 - Harvester/Tractor Hydraulic System**

The truck conveyor motor circuit has the lateral transfer conveyor tee’d into it so when the truck conveyor motor is turned off, the reverse direction moves the transfer conveyor left as the operator chooses. When the truck conveyor motor is started, the transfer conveyor moves back right at the speed controlled by the needle valve.

**Figure 9 - Hydraulic Connection, Needle Valve Near The Front Left Corner**
While the rowfinder and the steering cylinder have their own connections, both systems are connected. This allows the rowfinder to independently operate the steering cylinder as well as allow the operator to manually adjust the steering cylinder.

The only components that operate from their own connections are the tongue lift cylinder and boom lift cylinders.

**Harvester Self-Contained Hydraulic System**

Harvester components powered by the harvester’s self-contained hydraulic system:

- Wheel elevator motor
- Short small conveyor motor
- Transfer conveyor belt motor

![Figure 10 - Harvester Self-Contained Hydraulic System](image)

The harvester’s self-contained hydraulic system operates on a dual pump, located on the rear of the harvester and is mechanically powered by the harvester’s drive shaft.

From the pump, the two pressure hoses connect to relief valves. The relief valves protect the entire self-contained system from over-pressurization. From the pressure relief valves one pressure line powers the wheel elevator motor while the other powers the short conveyor and transfer conveyor.

The pressure hose leading to the wheel elevator connects to a flow control valve. This control valve allows the operator to manually control the revolution speed of the wheel elevator.

**Mechanical System**

**Drive Shafts And Gearbox**

The harvester’s mechanical power comes from the tractor’s power takeoff (PTO). The harvester’s drive shaft is connected to a gearbox.

![Figure 11 - Harvester Gearbox](image)

The gearbox drives to the left and right sides of the header and to the rear of the harvester. An additional gearbox on the 12 row 22 and 8 row 30 reverses drive to the left side of the head.

Mechanically driven harvester systems:

1. Left and right paddle shafts.
2. Right conveyor roll and front roll or star drive.
3. Rear spiral grabroll drive.
5. Spiral rolls drive back to smooth.

![Figure 12 - Header Left-Hand Paddle Shaft Chain/Drive](image)

The drive shaft connects at the rear of the harvester to an additional gearbox. The left output shaft drives the hydraulic pump for the harvester’s self contained hydraulics. The rear output drives the harvesters grabrolls in the rear drive box.
Other drives associated with the harvester hydraulic system:

1. Truck conveyor, and chain drive.
2. Wheel elevator chain drive.
3. Appropriate sprockets to drive belted draper chain.
Figure 18 - Truck Conveyor Sprocket and Drive Chain.

Figure 19 - Wheel Elevator Motor Sprocket and Drive Chain.

Figure 20 – Draper Chain Drives, Short Conveyor Shown.
TRACTOR/HARVESTER CONNECTION

TRACTOR REQUIREMENTS

The Art’s-Way 6812A Sugar Beet Harvester is designed to be used by large agricultural tractors. To ensure good performance, Art’s-Way recommends that the harvester be operated by a tractor with 200 PTO horsepower or larger. Utilizing a tractor with a 200 PTO horsepower rating or higher will provide the stability and control necessary for safe operation and highway transport.

NOTE: The 8 row 28/30 and the 12 row 22 heads must be operated by a tractor with 220 PTO horsepower or larger.

TRACTOR/HARVESTER CONNECTION PROCEDURES

1. Clear the area of bystanders, especially small children.
2. Block the harvester wheels to prevent rolling.
3. Position the tractor near the harvester hitch.
4. Attach the lift cylinder hoses only to tractor outlets.
5. Activate the lift cylinders, lift the harvester tongue above the tractor hitch.
6. Place all tractor controls in neutral, set the park brake, and stop the engine.
7. Remove the ignition key from the tractor before dismounting.
8. Set the tractor drawbar according to the size of the tractor’s PTO.
9. Attach the harvester to the tractor with yoke weldment and bolts provided. Make sure to install the hardened washers between the yoke and the hitch clevis. The existing tractor clevis may be used if a 3 inch [7.62cm] spacing can be maintained. Install hardened washers to shim the hitch clevis so that it is snug. If the tractor drawbar-mounting hole is smaller than 1-3/8 inch [3.175cm] pin is available from your Art’s-Way Dealer (AW Part Number 456220). If the tractor drawbar-mounting hole is larger than 1-7/16 inch [3.65 cm], a bushing should be installed or the spacer can be left out (the holes in the clevis is for 2.0 inch diameter bolt) and hook directly to the tractor wheatland hitch using the tractor pin.

NOTE: Additional support for the tractor drawbar is recommended.

10. Check the oil level in the hydraulic reservoir by visually checking the sight gage. Make sure the valve in the suction line is open.

11. Clean any dirt or hydraulic fluid build-up from around the remote hydraulic receptacles and the hydraulic hose male tips.

12. Insert the male tips into the receptacle. Make sure the hydraulic hoses are securely fastened.

13. The needle valve that supplies oil to the lateral transfer conveyor needs to be adjusted for speed when moving left and for when the truck conveyor motor is turned on.

14. Make sure the hydraulic hoses are properly routed in the hose support to provide adequate clearance when turning.

15. Run tractor hydraulic systems functions to purge the hydraulic system.
16. Check the hydraulic fluid levels of the tractor. Verify hydraulic fluid levels are at the proper levels. Service the hydraulic systems as needed.

17. Cycle the lift cylinders and observe the lift height. Position the front bolt-on hitch to obtain the desired lift height, while still allowing adequate penetration into the ground.

NOTE: The hitch must have at least three (3) bolts installed on each side, for a total of six (6) bolts.

18. Attach the safety chain to the harvester hitch by inserting the large chain eyelet through the chain brackets on the tongue (from the back side). Route all chain links through the large chain link and pull tight. Route chain through the intermediate chain support and secure the chain to the tractor drawbar carrier. Be certain to allow enough slack in the chain for full articulation of the tractor and harvester without binding.

19. Clean the splines inside the yoke and on the tractor shaft. Be sure the driveline and safety guard move easily and that the guard rotates freely.

20. Retract the slide collar on the PTO yoke and slide the yoke over the shaft. Stop when the slide collar clicks into place. Pull on the yoke to make sure it is securely locked in place.

21. Be sure there is sufficient clearance between the drawbar, three-point hitch links and the driveline to allow maneuvering in the field. Make sure to check the distance between the universal joint centers.

22. Lower the tractor PTO shield over the universal joint and properly secure the shield.

NOTE: Dimension B in Figure 21 must be between 58 and 68 inches.

23. The harvester requires five (5) tractor hydraulic circuits to operate. Connect the tractor hydraulics according to the appropriate circuit per Figure 8.

NOTE: It is important to have the lift and truck boom conveyor motor on the number one and number two priority valves. Adjust the flow at the tractor to the minimum required to operate all functions.

24. There may be special requirements in the circuit for the truck conveyor on some of the load sense systems, check with your tractor dealer.

25. Connect tractor hydraulics to the harvester to suit the owners preferred positions.

26. Lift the harvester so the lifter wheels are off the ground.

27. Cycle the rowfinder cylinder by moving the rowfinder arms from side to side. The harvester should move in the same direction as the rowfinder arms.

28. When boom motor is shut off, transfer conveyor moves left. Adjust to the desired speed with the needle valve that supplies oil to the cylinder for lateral transfer conveyor.

29. If the machine has not been test run, refer to the Dealer Assembly Instructions Section for instructions.
FIELD OPERATIONS

CAUTION: KEEP WELL CLEAR OF MOVING PARTS. BE SURE TO SHUT OFF TRACTOR AND PLACE KEY IN POCKET WHILE MAKING ADJUSTMENTS. WAIT FOR ALL MOVEMENT TO STOP BEFORE APPROACHING MACHINE.

OPERATING SPEEDS

It is recommended the harvester be operated at a speed between 3.5 and 4.5 mph [5.6 and 7.2 km/h]. During harvesting operations, make sure the tractor PTO maintains at least 950 rpm output.

BASIC CONTROLS

Power Takeoff (PTO) – Constant Velocity

CAUTION: IT IS EXTREMELY IMPORTANT TO FOLLOW THE LUBRICATION GUIDELINE. (REFER TO LUBRICATION SCHEDULE.)

Always engage the PTO with the tractor at low rpm. Once the PTO is engaged, gradually increase the tractor rpm to the desired setting.

Turning the Harvester

Normal operation with wide end rows is to slow the tractor so the PTO is at a maximum of 600 rpm prior to raising the harvester. Complete the turn, lower the harvester, and then increase the PTO to the desired rpm setting.

It is recommended that if making a sharp turn in irrigated areas or in rough terrain the PTO be shut off prior to raising the harvester.

It is not necessary to operate the constant velocity PTO while turning.

NOTE: If the telescoping members become hard to slide between seasons it is recommended that the PTO be disassembled, solvent cleaned, re-coated with grease, and then assembled.

Figure 24 - Harvester Lift & Steering Cylinders

The harvester lift cylinders are powered by the tractor/harvester hydraulic system. By extending or retracting, the operator can increase or decrease the height of the harvester header.

The depth can be set by adding stops on the cylinder rod, then fine adjusting with the adjustable nut on the rod end of the cylinder to the desired position.

NOTE: It is very important to have both cylinders stopped to exactly the same length.

Steering Cylinder

The side shift cylinder is powered by the tractor/harvester hydraulic system and can be controlled automatically by the rowfinder or manually by the operator (See Figure 24)
Rowfinder

The rowfinder assists in keeping the harvester aligned with the rows. The feeler arms rest astride the row and follow the line of beets, sensing any changes in the direction of the row or the position of the harvester. Lateral (sideward) movement of the feeler arms actuates the hydraulic valve, which controls oil flow to the rowfinder steering cylinder.

The rowfinder steering cylinder extends or retracts according to the action of the feeler arms, steering the harvester back onto the row. A manually controlled hydraulic override function allows the operator to steer the harvester. The override function is helpful when entering rows.

The rowfinder should be installed so that the tips of the rowfinder arms move in the same direction as the harvester.

CAUTION: MAKE SURE TO RAISE THE HARVESTER WHEN BACKING UP SO THE ROWFINDER IS NOT DAMAGED.

Header

The harvester has been designed with three different headers. Each header has been designed for various sugar beet planting multiples. For example, if beets have been planted in rows of eight (8) with a spacing of 22 inches, then the owner will require the 8 row 22 inch header. Refer to the Harvester Structure Section, Page 16.

NOTE: Beets must be harvested in the same multiple as they are planted.

Lifter Wheels

The lifter wheels dig into the ground and lift both beet and dirt upwards towards the paddle assemblies. The lifter wheels attach to the lifter wheel struts, which come in two different configurations: fixed and flex.

In rocky soil conditions, the flex struts help absorb shock loads as large rocks are encountered. The flex struts also allow the entire strut and lifter wheel to roll up over the rock.

The entire lifter wheel and strut assembly can be adjusted left and right (laterally) to match the specific multiple beet row center lines.

Attached to the lifter wheel strut are wheel scrapers. The scrapers keep dirt and trash from building up on the lifter wheel hubs.
Figure 29 - Lifter Wheel Optional Equipment: Close-Up Attachments.

The lifter wheel has an optional close-up attachment. Close-up attachments prevent small beets from falling out between the lifter wheel spokes. Slot adjustments are provided on the close-up attachments so they may be rotated out of the way as conditions warrant.

Paddle Assemblies

Figure 30 - Header Paddle Assembly.

The paddle assemblies push the harvested beets from the lifter wheels to the header grab rollers. Mechanical rotation of the paddle assemblies comes from the harvester gearbox through a sprocket and chain drive system.

The paddle assemblies are equipped with a split rubber paddle. This allows each paddle to be narrowed or widened for certain conditions. For example, in muddy conditions the paddle can be moved to the open position to help clean mud off the wheels.

The paddles also have two holes to adjust the length of the rubber being exposed. The longer position will help in muddy conditions as well as to help push small beets back into the rollers.

NOTE: If the entire lifter wheel and strut assembly is adjusted left or right (laterally), the paddle assemblies and barriers must also be adjusted.

Conveyor Rollers

Figure 31 - Header Conveyor Rollers.

The conveyor rollers rotate rearward, pushing the beets toward the center of the rollers and towards the short conveyor.

The conveyor rollers are mechanically rotated using both a belt and chain drive system.

If the poly rolls have been selected as an option, the spacing can be adjusted to an open or closed position. Poly rolls are set to the closed position at the factory. To move the rolls to the open position, the outside bearings must be rotated backwards and fastened into the new bolt holes. On the 8R28/30 and 12R22, the center bearing holders must be adjusted by rotating the assembly up and towards the rear of the machine and fastened in the new hole. (See Figure 32, Figure 33, and Figure 34.)

The steel rolls leave the factory in the open position to allow for more room for rocks to clear the rolls and are not adjustable. The closed position does not allow enough space for the rolls to float without hitting.

Rear Short Diverter Roll Options

Standard Rear Diverter Rolls

These rolls turn the same direction as the smooth and four (4) spiraled conveyor rolls. These rolls push any beets at the rear of the bed to the center of the machine.

Optional Rear Smooth Diverter Grab Rolls

These rolls turn the opposite direction of the front smooth and four (4) spiraled conveyor rolls and act as a grabroll. These rolls are used pull thru excess mud and dirt from the conveyor roll bed so it doesn’t travel through the short conveyor. These rolls are designed to help control the windrow of mud that can form under the harvester.
**Header Drive Shaft**

The header drive shaft is the primary means for transferring mechanical power from the harvester’s gearbox to the header. On the header, there are two drive shafts per side. Each pair of drive shafts are connected by a U-joint.

**Header Mechanical Drive (Left-Hand Side)**

![Figure 32 - Header Left-Hand Drive. (8 Row 22 Header Shown.)](image)

**Header Mechanical Drive (Right-Hand Side)**

![Figure 34 - Header Right-Hand Drive.](image)

The header drive shaft is connected to the harvester’s gearbox. On the other end of the header drive shaft is a sprocket. For the paddle shaft slip clutch using a #80 roller chain. An idler sprocket between the drive shaft and paddle shaft slip clutch ensures the chain is tight.

In addition there is a second chain drive system that connects the full length grab roller to the smaller left-hand diverter roller. As with the previous system, an idler sprocket keeps the chain tight.

**Figure 33 - Header Left-Hand Drive With Diverter Grab Roll Option (12 Row 22 And 8 Row 30).**

The paddle shaft is always driven from both sides with a #80 roller chain. When the slip clutch needs to rotate in the opposite direction, two additional idler sprockets have been installed to route the chain properly.

The slip clutch is jaw type with steel rolls and friction type with poly rolls.

The 6 Row 30 and 8 Row 22 headers have full length conveyor rollers which are belt driven from the right-hand side only. The 8 Row 30 and 12 Row 22 headers have conveyor rollers split in the middle which are belt driven from both the left- and right-hand sides. A gearbox is required to reverse the rotation to the left-hand side.

A V-belt is routed around each grab roller belt sheave allowing the mechanical power to be transferred from the header drive shaft to each grab roller. A spring loaded tension roller ensures proper belt tension is maintained. Additional chain drives are required for the front smooth or star roll and the left-hand diverter roll on the left-hand side for the 6 Row 30 and 8 Row 22.

**Short Conveyor**

![Figure 35 - Short Conveyor](image)

The purpose of the short conveyor is to transport the beets from the header to the harvester’s main grab rollers. The short conveyor is attached to the header and is positioned slightly below the rear full length...
header conveyor roller. The rear end of the short conveyor free floats on the harvester’s frame.

As the beets are transported to the back of the header, they transfer onto the short conveyor. The rear end of the short conveyor overlaps the harvester’s main grab rollers. Therefore, the beets will drop off the short conveyor directly onto the grab rollers and then to the wheel elevator.

The short conveyor is powered by the harvesters self-contained hydraulic system and is physically rotated using four sprockets.

**Harvester Grab Rollers**

![Figure 38 - Harvester Grab Rollers Front Drive.](image)

At the front of the grab rollers is an additional V-belt drive. This belt drive connects the four spiraled grab rollers to the four smooth rollers.

**Wheel Elevator**

![Figure 39 - Wheel Elevator](image)

The wheel elevator transports the beets from the harvester conveyor up to the holding tank conveyor. The beets are carried up to the holding tank conveyor as the wheel elevator revolves clockwise.

To make sure beets do not fall downward as the wheel elevator rotates, a retainer applies spring pressure outward against the wheel elevator. At the top of the wheel elevator, the beets fall downward onto the transfer conveyor.

A stripper installed at the top of the wheel elevator clears any rocks or beets that may have become wedged between the wheel elevator rods.

**Figure 36 - Harvester Grab & Smooth Rollers**

The purpose of the grab rollers is to transport the beets from the short conveyor to the wheel elevator. In addition, the grab rollers are designed to remove dirt and rocks from the harvested beets. The spacing between the grab rollers can be manually changed from a single point at the front and rear. (Refer to System Adjustments – Harvester Grab Rollers.)

**Figure 37 - Harvester Rear Belt Drive System.**

The harvester grab rollers are connected to a V-belt drive in the rear of the harvester that is powered by the harvester’s rear drive shaft. Only the four spiraled grab rollers are powered by this belt drive.
powered by the harvester’s self-contained hydraulic system and is physically rotated using sprockets and metal chain. The wheel elevator is supported on the heavy rollers to the rear. The wheel elevator is also held from going forward by two small rollers at the top. The rotation rpm of the wheel elevator can be changed using the control valve on the harvester’s self-contained hydraulic system. (Refer to System Adjustments – Wheel Elevator.)

Figure 42 - Wheel Elevator Stripper.
The stripper is an adjustable device with several disks which help clear the wheel elevator of any rocks, trash, soil, or beets that may become wedged between the wheel elevator rods.

Transfer Conveyor

Figure 43 - Transfer Conveyor
The transfer conveyor moves the beets from the wheel elevator to the holding tank.

The transfer conveyor is powered by the harvester’s self-contained hydraulic system and is physically rotated using two sprockets.
A unique feature of the transfer conveyor is the ability for the conveyor to pivot left and right to ensure the holding tank is filled totally and the beets have a minimum drop into the tank. This is accomplished using a hydraulic cylinder powered by the harvester/tractor hydraulic system.

The height of the discharge end of the transfer conveyor can be changed by changing the length of the parallel arms.

**Truck Boom Conveyor**

The truck boom conveyor transfers the beets from holding tank to the truck on the right-hand side of the harvester. The truck boom conveyor also serves as the bottom surface of the holding tank.

The truck boom conveyor is powered by the tractor/harvester hydraulic system and is physically rotated using two sprockets and a metal chain.

The operation of the truck boom conveyor is controlled by operator using the tractor hydraulic lever. It is prevented from turning backwards by a check valve.

**Truck Boom**

The truck boom is the outer section of the offloading conveyor. The truck boom has the ability to raise and lower and is selected by operator using a small switch attached on the hydraulic lever. The truck boom must be raised if the operator is going to be transferring the harvested beets to a truck on the right-hand side of the harvester.

The height can be adjusted to the desired position for the truck height. For harvester transport, the truck boom must be lowered.
Figure 48 - Truck Boom Conveyor Hydraulic Cylinders.
The Beet Harvester is designed for simplicity and trouble free operation. Art’s-Way Manufacturing Co., Inc. has provided a wide range of adjustments on this machine to allow the best operation in various operating conditions. It is essential that all adjustments be set for your operating conditions. Continual review during harvest must be done for optimum performance. When field or crop conditions change, re-check your harvesting operation and adjustments. The following explains the operation and adjustment of the machine. See your dealer if questions arise.

**POWER TAKEOFF (PTO) – CONSTANT VELOCITY**

Refer to the tractor/harvester connection section.

**HARVESTER LIFT CYLINDERS**

Refer to the tractor/harvester connection section.

**ROWFINDER STEERING CYLINDER**

The steering cylinder is activated by the rowfinder or by the operator with the tractor control valve. The factory-installed cylinder should not require adjustment.

**ROWFINDER**

The rowfinder is adjustable to accommodate beet size, beet height, operating depth and soil conditions. Correct adjustment of the rowfinder and a good understanding of the importance of each adjustment will provide maximum satisfaction during field operation.

Make the following adjustments as necessary to meet crop and field conditions before taking the machine to the field.

**NOTE:** Be sure to raise the harvester when backing up so the rowfinder is not damaged.

**Feeler Arm Spacing**

For this adjustment, the feeler arms (A) should be set so the largest beets will just pass through the opening, between the arms, remove the spring pins (C), set the arms to the appropriate width, then install the spring pins.

**Feeler Arm Centering**

The horizontal shaft (I) in the rowfinder must be parallel with the front of the harvester frame to function accurately. Remove the pin (F) and loosen the nuts (D), then slide the plate (E) until the shaft is parallel with the frame. Tighten the nuts.

The hydraulic control valve must be centered each time the shaft (I) is adjusted. Loosen the lock nut (H) and adjust the nut (G) until the pin (F) can be inserted freely through the nut (G) and valve spool. Tighten the lock nut (H) and make sure the pin (F) is still free.

The feeler arms must be centered with the gap between the lifter wheels to function accurately. To adjust, loosen the bolts (J) and slide the entire assembly on the tube until they are centered. Tighten the bolts (J).

**Rowfinder Height**

The feeler arms should ride along the surface of the ground or slightly penetrating the surface. Set the rowfinder height in its correct relationship to the lifter wheel working depth to assure proper function.

Example: If the lifter wheels will work at a depth of 3
inches [7.62 cm], the bottom edge of the feeler arms should be about 3 inches [7.62 cm] above the rims of the lifter wheels when operating in the rows.

To change the rowfinder height by more than 1 inch [2.54 cm], loosen bolts attaching the rowfinder vertical tube to the support plate and move to the desired operating height. Tighten the bolts snug first so the unit is forced into corner then set jam nuts.

**NOTE:** For less than 1 inch [2.54 cm] height adjustments raise or lower the feeler arms by adjusting the nuts (Figure 54, Item K).

**Feeler Arm Down Pressure**

The down pressure of the rowfinder is factory set at a spring length of 4.25 inches [10.795 cm]. If the beet crowns are below the ground surface, adjust down pressure so the rowfinder arms penetrate the soil. To increase the down pressure, turn lock nut (Figure 54, Item L) to compress the spring.

**HEADER**

**Lifter Wheels**

**Spacing**

Make sure the lifter wheels are located at the proper row widths. This measurement is taken at the pinch point, to prevent slicing and breaking of the beet tails.

**Lateral Adjustments**

![Figure 51 - Header Lifter Wheel Lateral Adjustment.](image)

Loosen the strut mounting L-bolts, paddle bolts, and the bolts holding the barriers.

**NOTE:** When adjusting a lifter wheel, adjustment of the paddle assemblies, barriers, and protective rubber covers maybe required.

Adjust the rubber covers so they are centered over the row and routed over the round tube. Slide and adjust all to the proper row spacing. Tighten all of the bolts.

**Pinch Point Width**

![Figure 52 – Header Lifter Wheel Width Shims.](image)

The distance between each pair of lifter wheels can be increased to accommodate larger beets, or decreased for smaller beets. Lifter wheel spacing is adjusted by inserting or removing spacers between the lifter wheel and the hub. Be sure to set the spacing at the widest position possible to prevent beet damage. When adding spacers, be sure to add to the same side one set on each row so the row spacing stays the same. Whenever the lifter wheel pinch point is adjusted, adjust the scrapers.

**Pinch Point Height**

![Figure 53 - Header Lifter Wheel Height Shims.](image)

To adjust the pinch point height, insert or remove spacers between the upper portion of the strut and the mounting pad. The pinch point height is factory preset with three (3) 0.25 inch and one (1) 0.125 inch thick spacers. Spacers of this size function well in most conditions.
Scrapers

Figure 54 - Header Lifter Wheel Scraper Adjustments.

Shim the scrapers so they just clear the hub and lifter wheel.

Operating Depth

As a starting point, the lifter wheels should be set to dig approximately 2 to 3.5 inches [5.08 to 8.255 mm] deep. This setting will change with soil conditions. Set the lifter wheels to run as shallow as possible to prevent lifting excessive amounts of dirt and to reduce power requirements. To prevent breaking the beet tails in extremely hard ground, add shims to widen the lifter wheels before you try deeper settings. Set the stop on the lift cylinder to help maintain the proper digging depth.

Procedure for finding the correct depth

1. Make sure the harvester is not digging across guess rows between rounds.
2. Begin digging as deep as necessary to keep from breaking the beet tails.
3. Raise the lifter wheels gradually until some minor beet tail breakage occurs.
4. Lower the lifter wheels about 0.25 inch [6.35 mm].
5. Set the lift cylinder stop to maintain this depth.

Cylinder floatation in rocky conditions

In rocky conditions, it is strongly recommended that the lift cylinder be allowed to float in the running position. Set your tractor valve in the float position, connect the lift cylinder to this circuit, and make sure the control lever is in the float position. The cylinder may require the use of depth stops.

Flex Struts

Figure 55 - Header Lifter Wheel Flex Struts.

In rocky conditions, flex lifter wheel struts are recommended. These struts are mounted with flex cushions that help absorb shock loads as large rocks are encountered. They flex to allow the strut to roll up over the rock. The lifter wheels are also protected by rock cushions that allow the lifter wheels to spread apart when rocks are pinched between the wheels.

As a starting position, set the flex strut cushions at 3.25 inches [8.25 cm] (actual cushion length). Adjust to match conditions as necessary. Flex strut cushions may need to be adjusted to 3.12 inches [7.92 cm] to reduce the amount of flexing on hard ground.

Paddles
Figure 56 - Header Paddle Assembly

The rubber paddles may be removed if desired (except when flex struts are used). If removed, reposition the paddle shaft by lowering it to the bottom set of the bearing holes. This will keep the paddle tips in their correct relationship.

Make sure the paddles are positioned sequentially around the paddle shaft so adjacent paddles contact beets at 30 degree intervals. This avoids excessive shock loads to the paddle shaft and drives.

When flex lifter wheel struts are used, the paddle shaft bearings must stay mounted in the top holes. The rubber paddles must be attached to the steel paddles. With the paddle shaft in the top holes, the lifter wheel struts can flex without hitting the paddle shaft.

The paddles are split in two pieces to allow the desired settings for extreme mud or rocks. If extremely muddy conditions exist, it is best to move the steel portion closer to the lifter wheels. In rocky conditions moving the steel away from the lifter wheels may reduce the rocks catching in the wheels.

Barriers and Covers

Barriers

To adjust the barriers, loosen the U-bolts, center the barriers between the lifter wheels, and then tighten the U-bolts.

Figure 57 - Barrier U-Bolts (Used on all but the center barrier).

Figure 58 - Header Barrier (Center)

Rubber Covers

The rubber covers located above the paddles, are only effective when they are centered over the paddle clusters and routed over the round tube.

The rubber covers are attached to a front tightening tube and the barrier tube. They must be moved to the holes on the front tube and slid on the 2x2 tube.

Figure 59 - Header Protective Rubber Covers.
**Paddle Shaft Slip Clutch**

There are two paddle shaft slip clutches used on the header, a jaw or friction type. The jaw type paddle shaft slip clutch is used with steel rollers. The friction clutch is used with the polyethylene coated rollers.

Prior to each season’s use, it is recommended to loosen the slip clutches, allow them to slip, and then tension the springs to proper setting.

**Jaw Slip Clutch**

![Figure 60 - Jaw Slip Clutch. (RH Shown)](image1)

The paddle shaft is protected by a jaw type slip clutch. The six (6) springs set the tension of the clutch. The recommended actual spring length setting is 2.375 inches [6.0325 cm]. Make sure all springs are the same length and the jaws are free from grease. Over tightening springs may damage the machine.

**Friction Slip Clutch**

![Figure 61 - Friction Slip Clutch](image2)

Torque for the friction type slip clutch is set by the spacers. If excessive slippage occurs, the friction disks must be replaced.

**Roller Chain Tensions**

Use appropriate idlers to tension roller chains for paddle shaft, front roller, rear roller, and truck conveyor drive.

Roller chain drives are tensioned by moving idler sprockets in slots. Check roller chains frequently and tension approximately 20 force pounds (lbf) [88.96 N] deflects chain 0.5 to 1.0 inch [1.27 to 2.54 cm].

Also, frequently check sprocket alignment. If more wear appears on one side of a sprocket, realign the sprockets.

**Roller Belt Drive**

![Figure 62 - Header Grab Roller Belt Drive. (12 Row Header Shown).](image3)

The conveyor rolls and grab roll drive belts are tensioned by spring-loaded idlers. These should be tightened so the springs are compressed to 4.5 inches [11.43 cm] for the 6-5V wide belt. Re-check tension frequently and retention promptly if slippage occurs.
On harvesters with the 12 row 22 inch or 8 row 30 inch, install the front header gage wheels on the front corners of the header with the clamps provided. The suggested setting is 3.5 inches (8.89 cm) (4 x 4) with the lifter wheels on concrete. There is also an extension available for gage wheels, to front mount.

**Figure 63 - Front Head Gage Wheels** (Standard on 8 row 28/30, 9 row 24/26, and 12 row 22 Heads - Optional on 6 row 22/24, 6 row 28/30, and 8 row 22 Heads)

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**SHORT CONVEYOR**

See Figure 25, Figure 35, and Figure 65.

Adjust the tension of the draper chain by loosening bearings and moving upper shaft. To adjust clearance of the short conveyor or to service:

1. To adjust front height, attach a come-along to the upper loop and front of short conveyor. Loosen bolts and tighten in desired position.

2. To adjust clearance to rear conveyor roll, loosen bolts ahead of 1 inch adjusting bolts, adjust with 1 inch nuts. Tighten in desired position.

   **NOTE:** Riser link is closest to roll.

3. For the rear, the roller must be revised to adjust height.

4. Re-adjust grates if required.

---

**HARVESTER GRAB ROLLERS**

The smooth steel grabrollers are cushioned to flex open in rocky conditions. These cushions should be set to 2.50 inches (6.35 cm) actual cushion length (both front and rear). Cushions may easily be added to poly rolls if needed.

---

**Figure 65 - Short Conveyor**

**Figure 66 - Harvester Grabrollers**
After the length of the cushions is set, the spacing can be set with a single 1 inch [2.54 cm] bolt to the front and rear on the left-hand side. Always maintain a wider gap at the back. Open the rolls as wide as possible without losing beets.
WHEEL ELEVATOR

The recommended speed of the wheel elevator is 11 rpm. In some conditions a slower speed of 9 to 10 rpm may be desirable. Adjust the flow control to control the wheel elevator speed.

Wheel drive chain to hydraulic motor.

Figure 71 - Wheel Elevator Sprocket, Chain Drive, and Roller

To tighten the wheel elevator drive chain, see Figure 71. Loosen nuts (A) directly below the idler. Reposition until the chain can be pulled 1.25 inch away from the wheel (as shown in Figure 69). The spring length directly below these nuts is factory set to 6-3/4 long (nuts below spring). It should not deviate from this.

The hydraulic motor mounting can be adjusted forward and aft if needed. Adjust the motor position so the chain is in line with the wheel.

The retainer and rods keep the beets from falling out of the wheel elevator pockets on the way up. The retainer frame must be centered right-and-left and front to back with the wheel elevator. The distance between the retainer and the wheel elevator must be the same at the top as it is at the bottom. Make this adjustment at the top attaching point. Make sure the retainer does not make contact with the truck elevator. The distance from wheel to the retainer should be approximately 1.5 inches (3.81 cm).

The retainer rod assembly is able to move away from the wheel as more beets are conveyed. Field adjustment is dependent on beet size, tonnage, and mud controls. The spring adjusting nuts are used to adjust the spring tension. Loosening the stop nuts will decrease the tension. It is normally necessary to tighten the stop nuts in muddy conditions to help clear mud build-up. An additional set of holes are provided for the spring bracket, if required for large beets and high tonnage.

Stripper

Figure 73 - Wheel Elevator Stripper.

The stripper disks (A) must be centered between the wheel elevator rods so they do not make contact. Adjust position so disks do not hit the cross tube weldments of the wheel.
**TRUCK CONVEYOR**

The draper chain tension is maintained by the weight of the large bag area in the center. An additional position is provided if needed. The roller chain drive to the hydraulic motor is maintained by loosening the mounting plate using the take-up bolt and re-tightening.

The speed of the truck conveyor may appear to be slow. Speeding it up will normally take the beets at a lower depth and not really speed the unloading. Adjust the speed so when starting to unload a full tank, the beets do not over flow the grates. This should still allow the tank to unload in less than one minute.

**HYDRAULIC SYSTEM**

Refer to Figure 76 for self-contained hydraulic system and Figure 77 for the tractor/harvester hydraulic system. Both of these figures will show specific routings and components.

**Tractor/Harvester Hydraulic System**

The five hydraulic circuits are noted as follows:

A) Truck Conveyor Drive Motor And Transfer Conveyor Lateral Movement
   1) Connect to the No. 2 priority valve, if applicable.
   2) The circuit has a check valve installed to allow for operation in only the proper direction.
   3) Set the speed with the tractor flow control.
   4) The cylinder for lateral movement of the transfer conveyor is also tee’d into this circuit. When the truck conveyor motor is turned off, the reverse direction moves the transfer conveyor left as the operator chooses. When the truck conveyor is started the transfer conveyor moves back right at a speed controlled by the needle valve.

B) Main Machine Lift Cylinder
   1) Connect to the No. 2 priority valve, if applicable.
   2) The lift cylinders are equipped with an adjustable nut. Add segments on the cylinder rod to control the depth of the machine.
   3) This will most likely work best at a mid-range flow.

C) Rowfinder Operation (Valve and Cylinder)
   1) If a power beyond circuit is used, it should be connected to this function. Check with dealer for proper connection.
   2) This circuit normally requires 5 to 7 gpm to operate. The circuit has an orifice restrictor to control this flow if connected to the power beyond circuit.
   3) If this circuit is connected to a regular outlet the flow should be reduced to the minimum needed. It may be desirable to remove the restrictor.

D) Rowfinder Over-ride to Cylinder
   1) Reduce flow to a comfortable speed for you.
   2) A restrictor also in this circuit.

E) Operates the Cylinders for the two cylinders that raise and lower the truck elevator. The lock valves mounted on the cylinders prevent the truck elevator from falling, if a hose should break.

---

**Harvester Self-Contained Hydraulic System**

The self-contained hydraulic system consists of the following main components.

A) The hydraulic reservoir holds approximately 50 gallons of 10W/30 hydraulic oil. Use the same type of hydraulic oil as your tractor’s hydraulic system. Make sure a visible oil level appears in the hydraulic reservoir level gauge.

   1) Strainer in fill neck
   2) Strainer in the lower suction line, along with a shut-off valve. Never shut-off this valve unless required.
   3) Filter in the return line.

B) Main Machine Lift Cylinder
   1) Connect to the No. 2 priority valve, if applicable.
   2) The lift cylinders are equipped with an adjustable nut. Add segments on the cylinder rod to control the depth of the machine.
   3) This will most likely work best at a mid-range flow.

C) Rowfinder Operation (Valve and Cylinder)
   1) If a power beyond circuit is used, it should be connected to this function. Check with dealer for proper connection.
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D) Rowfinder Over-ride to Cylinder
   1) Reduce flow to a comfortable speed for you.
   2) A restrictor also in this circuit.

E) Operates the Cylinders for the two cylinders that raise and lower the truck elevator. The lock valves mounted on the cylinders prevent the truck elevator from falling, if a hose should break.

---

**CAUTION: NEVER REMOVE THE LOCK VALVES.**

---

**Harvester Self-Contained Hydraulic System**

The self-contained hydraulic system consists of the following main components.

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   2) The lift cylinders are equipped with an adjustable nut. Add segments on the cylinder rod to control the depth of the machine.
   3) This will most likely work best at a mid-range flow.

C) Rowfinder Operation (Valve and Cylinder)
   1) If a power beyond circuit is used, it should be connected to this function. Check with dealer for proper connection.
   2) This circuit normally requires 5 to 7 gpm to operate. The circuit has an orifice restrictor to control this flow if connected to the power beyond circuit.
   3) If this circuit is connected to a regular outlet the flow should be reduced to the minimum needed. It may be desirable to remove the restrictor.

D) Rowfinder Over-ride to Cylinder
   1) Reduce flow to a comfortable speed for you.
   2) A restrictor also in this circuit.

E) Operates the Cylinders for the two cylinders that raise and lower the truck elevator. The lock valves mounted on the cylinders prevent the truck elevator from falling, if a hose should break.
3) A dual relief and junction block limits the pressure to 2,250 psi in these circuits. This block also can be used to attach a pressure gauge in each circuit if required.

4) Circuit for the wheel elevator hydraulic motor drive is equipped with a flow control to allow for the wheel elevator to be slowed down if required.

5) The remaining circuit runs the short conveyor and transfer conveyor hydraulic motors that are connected in a series.

---

**CAUTION:** WHEN WORKING WITH HYDRAULIC SYSTEMS, USE EVERY PRECAUTION TO KEEP THE HYDRAULIC OIL CLEAN AND FREE OF CONTAMINATES. USE GOOD SAFETY PRACTICE TO PREVENT BODILY HARM FROM HYDRAULIC FLUID.

---

**TIRES**

Frequently check tire pressures. Lists recommended pressure for tires used on 6812A Beet Harvester.

<table>
<thead>
<tr>
<th>Tire Size</th>
<th>Recommended Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.5-32 – 12 PLY</td>
<td>24 psi</td>
</tr>
<tr>
<td></td>
<td>28 psi Maximum</td>
</tr>
<tr>
<td>OPTIONAL TIRE</td>
<td>30.5L-32 - 14 PLY</td>
</tr>
</tbody>
</table>

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**Installing Tires**

CAUTION: FAILURE TO FOLLOW PROPER PROCEDURES WHEN INSTALLING A TIRE ON A WHEEL OR RIM CAN PRODUCE AN EXPLOSION THAT MAY RESULT IN SERIOUS INJURY OR DEATH. DO NOT ATTEMPT TO INSTALL A TIRE UNLESS YOU HAVE THE PROPER EQUIPMENT AND EXPERIENCE TO PERFORM THE JOB. HAVE IT DONE BY YOUR DEALER OR QUALIFIED TIRE REPAIR SERVICE.

WHEN SEATING TIRE BEADS ON RIMS, NEVER EXCEED 36 PSI OR MAXIMUM INFLATION PRESSURES SPECIFIED BY TIRE MANUFACTURERS FOR INSTALLING TIRES. INFLATION BEYOND THIS MAXIMUM PRESSURE MAY BREAK THE BEAD, OR EVEN THE RIM, WITH DANGEROUS EXPLOSIVE FORCE. IF BOTH BEADS ARE NOT SEATED WHEN THE MAXIMUM RECOMMENDED PRESSURE IS REACHED, DEFLATE, REPOSITION TIRE, RELUBRICATE BEAD, AND REINFLATE. DETAILED AGRICULTURAL TIRE INSTALLING INSTRUCTIONS, INCLUDING NECESSARY SAFETY PRECAUTIONS, IS ALSO AVAILABLE FROM THE RUBBER MANUFACTURERS ASSOCIATION AND FROM TIRE MANUFACTURERS.
Figure 76 - Tractor/Harvester Hydraulic System
Figure 77 - Harvester Self-Contained Hydraulic System
TROUBLE SHOOTING GUIDE

The Art's-Way 6812A Sugar Beet Harvester is designed to provide simple and reliable operation throughout beet harvest. Its full range of adjustments ensures efficiency in varying operating conditions.

If you encounter a problem with the Harvester, check this Trouble Shooting section for possible cause and solutions. If you have a problem that is not covered in this section, please call your local Art's-Way dealer for assistance. Make sure you give the dealer your model and serial numbers when you call.

### BASIC MACHINE

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Possible Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulls too hard</td>
<td>Lifter wheels running too deep</td>
<td>Do not run the lifter wheels deeper than necessary</td>
</tr>
<tr>
<td></td>
<td>Tractor too small</td>
<td>Use a larger tractor</td>
</tr>
<tr>
<td></td>
<td>Grabrolls building up with mud</td>
<td>Wait for dry conditions</td>
</tr>
<tr>
<td></td>
<td>Grabroll spacing wrong between pairs</td>
<td>Adjust grabrolls to a wider setting – must be further apart at discharge end</td>
</tr>
<tr>
<td></td>
<td>Hydraulics system too much demand</td>
<td>Review speeds and check with dealer for best connection for your tractor</td>
</tr>
<tr>
<td>Gear case runs hot, leaks oil</td>
<td>Dirt buildup around main gearbox</td>
<td>Clean and lubricate the machine to avoid overload</td>
</tr>
<tr>
<td></td>
<td>Low Oil</td>
<td>Check oil/add</td>
</tr>
<tr>
<td></td>
<td>Lubrication viscosity too light for climate</td>
<td>If weather is hot and problems persist, change to No. 140 gear lube</td>
</tr>
<tr>
<td>Hard to keep on rows</td>
<td>Lifter wheel strut assemblies not set properly with rows.</td>
<td>Make sure the lifter wheels struts assemblies match the rows at the pinch</td>
</tr>
<tr>
<td></td>
<td>Machine straddling the guess row</td>
<td>Make sure you are not straddling the guess row</td>
</tr>
<tr>
<td></td>
<td>Rowfinder not adjust correctly</td>
<td>Adjust rowfinder</td>
</tr>
<tr>
<td></td>
<td>Conditions suitable for utilization of rowfinder</td>
<td>Install a rowfinder for automatic tongue steering</td>
</tr>
<tr>
<td>Will not dig deep</td>
<td>Tractor drawbar not set properly</td>
<td>Set tractor drawbar properly</td>
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<td></td>
<td>Front hitch in wrong hole setting</td>
<td>Adjust front hitch to the proper holes</td>
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<td></td>
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<td>Use correct depth control cylinder</td>
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<td></td>
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<td>Adjust tire pressure</td>
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<tr>
<td>Premature wear of roller chains</td>
<td>Improper lubricant or infrequent intervals</td>
<td>Lubricate chains with proper oil and more frequently</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible Cause</td>
<td>Possible Remedy</td>
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<tr>
<td>------------------------------</td>
<td>-----------------------------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>Lose small beets</td>
<td>Conditions suitable for utilization of close-ups</td>
<td>Install close-ups</td>
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<tr>
<td></td>
<td>Grabroll spacing too wide</td>
<td>Reduce gap of grabroll pairs</td>
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<tr>
<td></td>
<td>Ground speed too slow</td>
<td>Increase ground speed – this may help get the beets to the paddles and onto the cleaning bed</td>
</tr>
<tr>
<td></td>
<td>Lifter wheels too far apart</td>
<td>Space the wheels closer together</td>
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<tr>
<td>Break the tails off</td>
<td>Lifter wheels not running deep enough</td>
<td>Run lifter wheels deeper</td>
</tr>
<tr>
<td></td>
<td>Lifter wheel strut assemblies not properly spaced</td>
<td>Make sure lifter wheel strut assemblies are spaced to fit rows</td>
</tr>
<tr>
<td></td>
<td>Not steering properly (if so equipped)</td>
<td>Adjust steering toe in and/or tracking</td>
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<tr>
<td></td>
<td>Lifter wheels too narrow, pinch point is too tight</td>
<td>Adjust rowfinder arms</td>
</tr>
<tr>
<td></td>
<td>Rowfinder not adjusted properly</td>
<td>Adjust down pressure</td>
</tr>
<tr>
<td></td>
<td>Pinch point too high or too low</td>
<td>Lower or raise pinch point. Make sure suggested spacers are installed</td>
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<td></td>
<td>Front smooth roll too high or too low</td>
<td>Lower or raise front roll</td>
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<td>Beet slicing</td>
<td>Rowfinder not adjusted properly</td>
<td>Adjust rowfinder</td>
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<td>Adjust down pressure</td>
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<tr>
<td></td>
<td>Harvester positioned over guess rows</td>
<td>Dig on planted row only</td>
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<td></td>
<td>Lifter wheels too narrow</td>
<td>Space wheels further apart</td>
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<td>Check tire size and spacing</td>
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<td></td>
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<tr>
<td>Loads too many clods</td>
<td>Lifter wheels set too deep</td>
<td>Run lifter wheels shallower, if possible without breaking tails</td>
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<tr>
<td></td>
<td>Lifter wheels too wide</td>
<td>Remove Shims</td>
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<td></td>
<td>Grabrolls not set wide enough</td>
<td>Set grabrolls for wider gap</td>
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<td></td>
<td>Very dry soil conditions</td>
<td>Irrigate field or wait for moisture</td>
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<tr>
<td>Excessive trash or dirt</td>
<td>Cleaning areas built up with mud or trash</td>
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</tr>
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<td>in the truck</td>
<td>CLODDY, STONY field conditions</td>
<td>Space grabrolls further apart</td>
</tr>
<tr>
<td></td>
<td>Improper defoliating</td>
<td>Improve defoliating operation.</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible Cause</td>
<td>Possible Remedy</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Beet plugging cleaning bed</td>
<td>PTO speed too slow</td>
<td>Increase PTO speed to a minimum of 950 RPM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grabroll spacing wrong between</td>
<td>Adjust grabrolls must be further apart at discharge end</td>
</tr>
<tr>
<td></td>
<td>pairs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loading too much dirt</td>
<td>Raise digging depth of machine</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flighting and transfer areas of</td>
<td>Respiral rolls or replace</td>
</tr>
<tr>
<td></td>
<td>spiral worn</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ground speed too fast</td>
<td>Decrease ground speed</td>
</tr>
<tr>
<td></td>
<td>Small beets</td>
<td>Space the grabrolls closer together</td>
</tr>
</tbody>
</table>

**ROWFINDER**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Possible Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifter wheels moving away from beets</td>
<td>Hydraulic hoses incorrectly connected</td>
<td>Check the valve connections at the tractor outlets</td>
</tr>
<tr>
<td>Lifter wheels not tracking properly</td>
<td>Feeler arms not centered</td>
<td>Center feeler arms</td>
</tr>
<tr>
<td>Lifter wheels jump off rows</td>
<td>Not enough down-pressure</td>
<td>Increase down-pressure or lower rowfinder</td>
</tr>
<tr>
<td></td>
<td>Rowfinder arms too high</td>
<td>Lower arms</td>
</tr>
<tr>
<td></td>
<td>Drawbar mounting hole greater than</td>
<td>Insert bushing</td>
</tr>
<tr>
<td></td>
<td>1.25 inch [3.175 cm].</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reaction too fast</td>
<td>Decrease oil flow to rowfinder</td>
</tr>
</tbody>
</table>
LUBRICATION SCHEDULE

GENERAL

Economical and efficient operation of the Harvester depends upon the regular and proper lubrication of all moving parts with quality lubricant. Failure to lubricate can result in reduced efficiency, premature wear, mechanical breakdown and needless and costly replacement of parts.

CAUTION: Keep well clear of moving parts. Be sure to shut off the tractor, set the parking brake, put the machine in neutral, and remove the tractor key while making adjustments. Wait for all movement to stop before approaching the machine.

NOTE: All unmarked locations 1, 2, or 3 pumps every 10 hours. Every 20-30 hours on items marked with ▲

NOTE: For items marked with ⚫ see special instructions.

QUICK REFERENCE BY SYSTEM

A) CV PTO

Figure 78 - Constant Velocity PTO.

CAUTION: When rotating the driveline to gain access to the lubrication zerks, be sure to shut off the tractor, and wait for all movement to stop. Remove the key before lubricating.

NOTE: A high quality general-purpose grease may be used. However, a lithium-based grease is recommended. Lubricate every 8 hours of operation.

1) Cross and Bearings (2 places), until grease is purged around the seal (4 to 5 pumps).
2) CV, Cross & Bearings (1 place - 8 to 12 pumps).
3) Telescoping Members, until grease fills the telescoping area. Disassembly occasionally to ensure components are adequately greased (4 to 8 pumps).
4) Shield Bearings (3 plastic zerks) (2 pumps).

Figure 79 - Harvester Hitch Area

1) Hitch pin and swivel at tractor connection pivot.
2) Pivot at rear center of tongue.
3) Slide hitch to frame (2 zerks).
4) Pillow block bearings on short jackshaft and on other side of double U-joint and center of long jackshaft (4 zerks). (Not Shown)
5) U-joints. (Not Shown)
6) Rowfinder. (Not Shown)

B) Hitch, Input Drive and Rowfinder.

C) Harvester Gearbox (Qty 2)

Figure 80 - Harvester Gearbox (3 On Wide Heads).

1) U-joints, 4 shafts of gearbox and head jackshafts.
2) Check oil level in gearbox every 50 hours. Oil level should be about half-way up shafts.

D) Header Lifter Wheels
   1) Lifter wheel hubs every 20 to 50 hours depending on conditions.

E) Right Hand drives.

![Figure 81 - Header Right-Hand Drive.](image1)

A) 1) Flange block bearings on conveyor rolls and Center bearing of Star roll (2 zerks).

B) 2) Paddle shaft pillow block bearing.

C) 3) Slip clutch paddle shaft (if jaw clutch). Very sparingly.

F) Left Hand drives.

![Figure 82 - Header Left-Hand Drive. (8 Row Header Shown)](image2)

D) 1) Flange block bearings on ends of conveyor rolls and grabrolls (7 zerks).

E) 2) Paddle shaft pillow block bearings.

F) 3) Slip Clutch – Paddle shaft (if jaw clutch). Very sparingly.

G) Grabrolls
   1) Flange block bearings – Front drive CC drive.
2) Flange block bearings – Rear drive and Upper drive shaft.

H) Elevator and Tank Area.
   ▲ 1) Flange block bearings drive and idler end of elevators, short conveyor, transfer conveyor, and truck conveyor
   ▲ 2) Pivot slide of stripper adjusting rod.

I) Harvester Wheels.

Figure 83 - Harvester Wheel And Tire.
   ✽ 1) Carrier wheel bearings, clean and pack with wheel bearing grease every 200 hours or each season.

J) Self Contained Hydraulic System
   1) Check oil level in reservoir.
   ✽ 2) Replace filter at the start of each season. Run system prior to replacement.
**Quick Reference By Hour**

A) Every 8 hours
   1) CV PTO. If making frequent or sharp turns, grease the CV center housing at four (4) hour intervals.
   2) Cross and Bearings until grease is purged around the seal (2 to 4 pumps).
   3) CV center Housing until grease is evident around the center section disk (6 to 12 pumps).
   4) Telescoping Members until grease fills the telescoping area. Disassembly occasionally to ensure components are adequately greased (4 to 8 pumps).
   5) Shield Bearings (3 plastic zerks) (2 pumps).

B) Every 10 hours
   1) All roller chains, oil lightly.
   2) Hitch, Input Drive and Rowfinder.
   3) Pillow block bearings on short jackshaft and on other side of double U-joint and center of long shaft (4 zerks).

C) Every 20 to 30 hours
   1) Right-hand Drives
      a) Flange block bearings on conveyor rolls and center bearing of star rolls.
      b) Paddle shaft pillow block bearing.
      c) Flange block bearings on discharge ends of grabrolls.
   2) Left-hand Drives.
      a) Flange block bearings on ends of conveyor rolls.
      b) Paddle shaft pillow block bearing.
   3) Grabrolls
      a) Front grabroll flange bearings.
      b) Rear grabroll flange bearings.
   4) Pillow block bearings drive ends of conveyors.
   5) Pivot slide of stripper adjusting rod.

D) Every 20 to 50 hours
   1) Lifter wheel hubs.

E) Every 50 to 100 hours
   1) Check oil level in the gearbox.
   2) Slip clutch hub. Grease very sparingly.

F) Every 200 hours or every season
   1) Carrier wheel bearings, clean and pack with wheel bearing grease.
SEASONAL STORAGE

Proper storage of the harvester will increase the service life and make it easier to place it back into service at the beginning of the next season.

**PREPARING THE HARVESTER FOR STORAGE**

1. Store harvester in a dry place.
2. Squirt diesel fuel on seals of bearing prior to washing with a power washer.
3. Wash the harvester thoroughly.
4. Clean and then apply heavy oil to the drive chains to prevent rust.
6. Remove belt tension.
7. Scrape and repaint all worn parts or coat with light oil to prevent rust.
8. Block up harvester to remove load from tires, do not deflate tires. If stored outside, remove the wheels and tires. Store both in a cool, dark, dry place.
9. Place a plank under lifter wheels so they do not sink into ground, if harvester is not stored on a hard surface.
10. List the replacement parts needed before next season and order early. Your dealer can give better service in the off-season. Replacement parts can be installed in your spare time – no delay at time of need.
11. If the hydraulic cylinders will remain on the harvester and extended, apply grease to the exposed rod end.
12. If the harvester is not sheltered, the belted elevator chain should be protected from direct sunlight.
13. Make sure reservoir is full of oil and oil remains in all hydraulic components.

**RETURNING THE HARVESTER FROM STORAGE**

1. Replace wheels, if they were removed, and remove blocking.
2. Inflate tires to 25 psi [172.3 kPa], 30 psi [206.8 kPa] maximum.
3. Clean harvester thoroughly.
4. Check drive and conveyor chains making certain they have proper tension.
5. Clean the slip clutches. Check and adjust spring lengths as necessary.
6. Retention belt drives.
7. Lubricate harvester; then run at half speed for 10 to 15 minutes listening for any unusual noises. Stop harvester and check bearings for over heated or excessive looseness. Recheck chain tension.
8. Review safety and operating instructions in this manual.
9. Inspect all connections and make certain that hardware is tight and cotter pins are in place.
10. If cylinders were stored on machine and cylinder rods where extended and coated with grease, clean grease from exposed rods.
11. Make sure all shields are in place and properly fastened.
TRANSPORTING THE HARVESTER

CAUTION: IT IS THE RESPONSIBILITY OF THE OPERATOR TO KNOW THE LIGHTING AND MARKING REQUIREMENTS OF LOCAL HIGHWAY AUTHORITIES. ROAD HAZARD LIGHTS PROVIDED WITH THIS HARVESTER CONFORM TO CURRENT ASAE STANDARD 279.10 LIGHTING AND MARKING OF AGRICULTURAL EQUIPMENT ON HIGHWAYS. BE SURE TO USE AND MAINTAIN THE PROPER WARNING LIGHTS AND MARKINGS AT ALL TIMES ON PUBLIC ROADS.

1. Connect the harvester to the tractor. (Refer to Tractor/Harvester Connection Section.)

2. Ensure a safety chain is connected to the tractor and harvester.

CAUTION: A SAFETY CHAIN WILL HELP CONTROL DRAWN EQUIPMENT SHOULD IT ACCIDENTALLY SEPARATE FROM THE DRAWBAR WHILE TRANSPORTING. USING THE APPROPRIATE ADAPTER PARTS, ATTACH THE CHAIN TO THE TRACTOR DRAWBAR OR OTHER SPECIFIED ANCHOR LOCATION. PROVIDE ONLY ENOUGH SLACK IN THE CHAIN TO PERMIT TURNING.

3. Lower the harvester’s offloading boom.

4. Raise the harvester so the header lifter wheels do not contact the ground.

5. Ensure the harvester will pass below any overpasses, power lines, or elevated obstacles.

6. Transport the harvester empty when possible.

7. Transport the harvester at speeds below 20 mph [32 km/h].

8. Ensure the harvester is equipped with road hazard lights, a slow moving vehicle (SMV) emblem, two (2) red reflectors, and two (2) red-orange reflectors mounted on the rear of the harvester. Keep the lights, emblem, and reflectors clean and visible at all times.

9. Ensure the harvester is equipped with amber reflectors mounted on the front and sides of the harvester. Keep the reflectors clean and visible at all times.

10. Turn on the road hazard lights when transporting the harvester on public roads.

11. Adhere to all safety guidelines. (Refer to Safety Guidelines – Transportation Safety.)
DEALER ASSEMBLY INSTRUCTIONS

PRE-DELIVERY

CAUTION: THE HARVESTER HAS A TOTAL WEIGHT RANGING FROM 29,000 LBS [13,145 KG] FOR THE 6 ROW 28/30 TO 35,400 LBS [16,057 KG] FOR THE 12 ROW 22. WHILE WORKING ON THE MACHINE BE SURE TO WORK SAFELY. BE SURE TO USE ADEQUATE BLOCKING. USE ADEQUATELY RATED LIFTING DEVICES. MAKE SURE PARTS ARE SECURED BEFORE WORKING UNDER OR NEAR THEM.

Check harvester and head for various components: Main Frame Unit, Head, Short Conveyor, Stripper, Grates for Truck Conveyor. If 12 row 22 or 8 row 30 machine also find Gage Wheels and Truck Conveyor Extension.

NOTE: A hoist or lift truck is necessary to assembly the harvester this must be capable of reaching across the head and picking up and moving the tongue of the machine which weighs approximately 1000 pounds.

It also must be capable of lifting the heads, which are approximately 8,000 & 10,000 pounds for the 6 row 28/30 & 8 row 22. The 12 row 22 weighs approximately 14,000 pounds (8 row 30, 11,000 pounds). The Main Frame Unit weighs approximately 22,000 pounds.

NOTE: Parts required for assembly are stored in the side shields of the head and the rear shield of the harvester, remove for assembly.

NOTE: Set the frame on a level area to assemble. Set the header lifter wheels on a board so they do not penetrate into soft ground.

ASSEMBLY INSTRUCTIONS

1. Installation of wheel and tire assemblies.
2. Adjust the axle to the outer most position.
   a. Install the left- and right-hand wheel and tire assemblies on the hub and spindle assembly. Larger distance of the dish in on the 8 row 22/6 row 30; dish out on the 8 row 30 & 12 row 22. Tires in the ground drive direction (Lugs point rearward on the top of the tire).
   b. Secure each wheel and tire assembly to the hub and spindle assembly using ten nuts provided.
   c. Install the rubber flap to the inside of the axle to close up where the axle had extended over the grabrolls.

3. Install tongue to cross hitch (see Figure 86). Parts loosely attached. If needed, install the front hitch swivel to the tongue with the six (6) 1 inch (2.54 cm) x 3.0 inch (7.62 cm) bolts provided.
4. Prepare head to install to basic unit.
   a. For the 12 Row 22 head, rotate the head back to its correct position and remove the shipping stands. The 12 Row 22 head will also have the rear grate rods removed. Install in the diagonal position.
   b. For all heads, loosen the U-joints on the shafts that connect to the center gearbox. Slide both U-joints on both shafts onto shafts as far as possible. The temporary stands for the shafts should be removed and the shafts positioned so the notch in the frame clear the shafts.

   ![Figure 87 - Header Drive Shafts](image)

   Do not tighten setscrews at this time and leave through bolts off.

   ![Figure 88 - Header Positioning.](image)

5. Position the header.
   a. Position the header just in front of the main frame of the harvester. Ensure the header and harvester centerlines are aligned and square with each other. Leave enough room for the tongue of the harvester to be raised over the header.

   ![Figure 89 - Harvester Alignment.](image)

6. Installation of the header to the harvester.
   a. Secure the header to the harvester. Using the plates and bolts provided. See Figure 89, Figure 91, and Figure 92.

   ![Front Mounting Plate](image)

   ![Figure 90 - Header To Harvester Attaching Hardware (2 Bolts)](image)
c. Lift the short conveyor into position on the angles over the grab rolls and secure to the front position with bolts shown. Position so rods of draper chain are slightly lower than the top of the roll flighting. Then so the riser links clear the spiral of the roll 1/8 to 3/16. This is done be loosening bolts and adjusting with 1 inch nuts.

d. Install the grates and rubber flap per Figure 95.

7. Installation of short conveyor, see Figure 93, Figure 95,and assembly illustration figure.

a. Remove parts from short conveyor and review compared to illustration.

b. Move the short conveyor into position between the header and the harvester.

b. Attach U-Joints back to Shafts. Tighten setscrews and replace through bolts & lock nuts on U-Joints and tighten.

c. Install four pipes under 12 inch cover flaps with HHCS 1/2 x 2-3/4 flat lock washers and nut that are in pipes.

8. On harvesters with the 12 row 22 inch or 8 row 30 inch, install the front header gage wheels on the front corners of the header with the clamps provided. The suggested setting is 3.5 inches (8.89 cm) (4 x 4) with the lifter wheels on concrete. Optional front mounts attach gage wheels to front of head.

Figure 91 - Header To Harvester Attaching Hardware (8 Bolts).

Figure 92 - Mounting Plate Details

b. Attach U-Joints back to Shafts. Tighten setscrews and replace through bolts & lock nuts on U-Joints and tighten.

c. Install four pipes under 12 inch cover flaps with HHCS 1/2 x 2-3/4 flat lock washers and nut that are in pipes.

Figure 93 - Short Conveyor Attachment Point.

Figure 94 - Front Header Wheels (12 Row 22 and 8 Row 30 Only) (Optional On 6 Row 28/30, and 8 Row 22)
9. Install the grates on the offloading conveyor using 0.5 x 3.75 inch (1.27 x 9.525 cm) HHCS, two (2) flat washers, lock washer & nut.

10. Install the boom extension on the 8 Row 30 or 12 Row 22 machine. See separate instructions.

13. Install grates on transfer elevator and two tank extensions as shown in Figure 100 and Figure 101.

11. Connect the upper mounting of the truck conveyor hydraulic cylinders.

12. Install draper chain in the tank and boom. Make sure lap is proper direction (top surface trailing). See Figure 99.
Figure 100 – Grates For Transfer Elevator
14. Installing the wheel elevator stripper.
   a. Position the stripper so it is the desired depth into the ferris wheel, this will most likely be 4 to 6 inches (10.16 to 15.24 cm) from the outside of the lower frame tube.

Figure 101 - Wheel Elevator Stripper
b. Secure the stripper using four u-bolts, flat washers, lock washers, and nuts.
c. Center the round disks between the wheel elevator rods, allowing for the coupler tubes. Ensure the disks do not strike against the square cross tubes or joint cross bar. Make sure they allow the optional rubber flaps to drop out of the way.
d. Rotate the wheel elevator one or two full revolutions to check for stripper disk and support clearances.

15. Installing the rowfinder.
   a. Remove the rowfinder from the shipping position and install in proper running position.
   b. Install the feeler arms to the desired width with double roll pins and safety cotter pins.
   c. See instructions to adjust rowfinder.

16. Five (5) tractor hydraulic circuits are required. The rowfinder may be a power beyond circuit. Be sure to connect this circuit to the power beyond as needed to reduce power consumption. See HARVESTER ADJUSTMENTS – Field Operations.

17. The self contained system runs three (3) hydraulic motors. The short conveyor and transfer conveyor are connected in series. The wheel elevator is driven by the second circuit.

Figure 102 - Tractor/Harvester Hydraulic System

18. Complete assembly of the hazard lights.

Figure 103 - Harvester Self-Contained Hydraulic System

Figure 104 - Hose Routing And Rowfinder
NOTE: Main harness has pigtail wires to connect running lights.

a. Install the amber flashing lights on top of the left & right header drive housings.  
   NOTE: Wiring can be routed inside through side drive housing.

Figure 105 - Hazard Light Installation

   b. Connect lights to wiring y-harness on main machine.
   c. Route and secure wires with power cord to tractor.

19. Connect the Power Take-off to the harvester input shaft with woodruff key and 0.375 inch (0.9525 cm) x 3.25 inches (8.255 cm) bolt & lock nut.

20. Check the hydraulic reservoir oil level and make sure the valve on the lower suction line is open (lever parallel with line).

21. Service the harvester gearbox. Add SAE 90 oil is required.

22. Install boom extension on 8 row 30 and 12 row 22 machines, see separate instructions.

23. Perform a visual inspection of the harvester. Make sure of the following:
   a. All bolts and screws are tight.
   b. Roller chains, drive belts, and draper chains have proper tension.
   c. The PTO is properly installed and lubricated.
   d. Hydraulic hoses, routing, and connections are correct and secured.
   e. Electrical wiring harnesses and connections are correct and secured.
   f. The gearbox has the proper oil level.
   g. All shields, guards, access covers, and doors are installed/closed.
   h. Tires have correct air pressure.

Harvester Adjustments

1. Adjust the harvester components to ensure efficient operation. (Refer to Harvester Adjustments.)
Figure 106 – 44 Inch Fixed Boom Extension Installation (526800)

<table>
<thead>
<tr>
<th>FIG ITEM</th>
<th>PART NUMBER</th>
<th>NOMENCLATURE</th>
<th>UNITS PER ASSY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>526800</td>
<td>BOOM EXTENSION 12R22 (44 INCH)</td>
<td>RF</td>
</tr>
<tr>
<td>2</td>
<td>526830</td>
<td>HOSE, HYD. 5/8 X 44</td>
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<td>3</td>
<td>524010</td>
<td>BOOM WLDT., 44 INCH EXT.</td>
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<td>4</td>
<td>524100</td>
<td>ARM WLDT., EXT. SUPT.</td>
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<td>5</td>
<td>526670</td>
<td>CHAIN, BELTED 50MM</td>
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<td>6</td>
<td>526560</td>
<td>CHAIN, BELTED 56MM</td>
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<td>BUSHING, ELEV. PIVOT</td>
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<td>WASHER, FLAT 1/2</td>
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<td>WASHER, FLAT 1 X 2 X 3/16</td>
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<td>BOLT, HHCS 5/8-11 X 5</td>
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</table>
**PRE-DELIVERY TEST RUN**

**CAUTION:** BEFORE CONDUCTING THE PRE-DELIVERY TEST RUN, KEEP ALL CHILDREN AND BYSTANDERS AWAY FROM THE MACHINE.

1. Lubricate the constant velocity PTO. *(Refer to Lubrication – Quick Reference By System.)*
2. Connect the tractor to the harvester. PTO and five (5) hydraulic circuits.
3. Connect the 7-plug connector to the tractor and check operation of the hazard lights. See separate section.
4. Connect tongue to tractor drawbar. Check PTO length per preparing for field operations.
5. Clear the area of bystanders.
6. Check that the harvester is clear of foreign objects and that the elevator chains and belts are free to operate.
7. Operate the tractor hydraulic functions. Raise the truck conveyor before running the hydraulic motor. Make sure the rowfinder is moving in the proper direction per rowfinder instructions.
8. Engage the PTO with the tractor at low rpm quickly on and off. Make sure ferris wheel, short conveyor and transfer conveyor are turning the proper direction. Observe operation at low speed and listen for any unusual noises.
9. Gradually speed up the PTO to a speed of 1,000 rpm.

**CAUTION: KEEP WELL CLEAR OF MOVING PARTS. BE SURE TO SHUT OFF THE TRACTOR, SET THE PARKING BREAK, PUT THE MACHINE IN NEUTRAL, AND REMOVE THE TRACTOR KEY WHILE MAKING ADJUSTMENTS. WAIT FOR ALL MOVEMENT TO STOP BEFORE APPROACHING THE HARVESTER.**

10. Check operation, alignment, and clearances of all moving parts. If adjustments are necessary, shut down the tractor to make any necessary adjustments.

11. Operate for 10 to 15 minutes.

12. Shut down the tractor, allow all moving parts to come to a complete stop.

13. Check the harvester for any loose hardware review all drives.

14. Check the hydraulic connections for leaks. Tighten as necessary. *(Refer to the Safety Guidelines – Hydraulic Safety.)*

15. Disconnect the tractor/harvester hydraulic and electrical connections.

16. Disconnect the tractor from the harvester.
SPECIFICATIONS

GENERAL

Model
- 6, 8, or 12 Row Tank Type Harvester

Overall Dimensions
- Operating – 13’ 11” H x 15’ 1” W x 30’ 10” L
- Machine Weight – 29,
- Tread Width – Adjustable to row spacing

Tires
- Implement – 24.5 x 32 – 12 ply
- Operating Pressure – 24 psi [165.5 kPa]
- Optional Tire
  - 30.5L x 32 – 14 ply

Row Spacing
Header Option 1
Non-Adjustable 6 row header – 22 inch [55.88 cm]

Header Option 2
Adjustable 6 row header – 30 inch [76.2 cm]
or
Adjustable 8 row header – 22 inch [55.88 cm].

Header Option 3
Non-Adjustable 8 row header – 30 inch [76.24 cm]

Header Option 4
Non-Adjustable 12 row header – 22 inch [55.88 cm]
- Operating Speed – 4.5 mph [7.2 km/h]
- Lift and depth control* - Hydraulic
- Steering hitch control** - Hydraulic

* Two 4” x 8” remote cylinders for lift
** One 4” x 8” remote cylinder for rowfinder

Lifter Wheels
- Two (2) per row – 28 inch [71.12 cm] solid rim heavy duty cast alloy steel.

Lifter Struts
- Heavy-duty tapered bearings.

Lifter Wheel Scrapers
- To prevent mud buildup on lifter wheels.

Paddle Shaft and Drive
- Type – three steel per row
- Drive – Heavy #80H roller chain with heavy duty slip clutch

Gearboxes (Qty 2 or 3)
- Heavy, 1.75 inch [4.445 cm] Diameter Shafts
- Capacity 0.5 quart [0.47 L] 90W Gear Oil

Conveyor Roll Bed and Drive
- Size –
  - 6 Row 22 – 36 sq feet
  - 6 Row 30 & 8 Row 22 – 48 sq feet
  - 8 Row 30 – 64 sq feet
  - 12 Row 22 – 76 sq feet
- Type – Four spiral conveyor rolls
- Drive – Belt drive with spring loaded idlers

Grab Rolls and Drive
- Size – 46 sq ft.
- Type – Four (4) grab rolls with 0.75 inch spiral rods and four (4) smooth grab rolls adjustable spring loading and spacing
- Drive – Belt drive with spring loaded idlers.
- Single point adjustment.

Offloading Boom
- Size – Width, 42”. Optional 50 or 56mm pitch belted chain
- Type – Hydraulic motor driven belted chain with tractor hydraulics.

Tank
- Construction – Welded Steel
- Capacity – 9,000 lbs.
- Unloading – Chain type conveyor, and hydraulic motor.

SAE Bolt Identification
Identification of SAE Bolt Grades; Head Markings

<table>
<thead>
<tr>
<th>Grades</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades 0, 1, and 2</td>
<td>No markings</td>
</tr>
<tr>
<td>Grades 5</td>
<td>3 radial dashes 120º apart</td>
</tr>
<tr>
<td>Grades 8</td>
<td>6 radial dashes 60º apart</td>
</tr>
</tbody>
</table>
**Torque Specification Guide**
(SAE Grade 5 Coarse Thread)

<table>
<thead>
<tr>
<th>Size</th>
<th>Clamp Load</th>
<th>Plain</th>
<th>Plated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 - 20 (.250)</td>
<td>2,205</td>
<td>8 ft. lbs.</td>
<td>76 in. lbs.</td>
</tr>
<tr>
<td>5/16 – 18 (.3125)</td>
<td>3,338</td>
<td>17 ft. lbs.</td>
<td>13 ft. lbs.</td>
</tr>
<tr>
<td>3/8 – 16 (.375)</td>
<td>4,950</td>
<td>31 ft. lbs.</td>
<td>23 ft. lbs.</td>
</tr>
<tr>
<td>7/16 – 14 (.4375)</td>
<td>6,788</td>
<td>50 ft. lbs.</td>
<td>37 ft. lbs.</td>
</tr>
<tr>
<td>1.2 – 13 (.500)</td>
<td>9,075</td>
<td>76 ft. lbs.</td>
<td>57 ft. lbs.</td>
</tr>
<tr>
<td>9/16 – 12 (.5625)</td>
<td>11,625</td>
<td>109 ft. lbs.</td>
<td>82 ft. lbs.</td>
</tr>
<tr>
<td>5/8 – 11 (.625)</td>
<td>14,400</td>
<td>150 ft. lbs.</td>
<td>112 ft. lbs.</td>
</tr>
<tr>
<td>3/4 - 10 (.750)</td>
<td>21,300</td>
<td>266 ft. lbs.</td>
<td>200 ft. lbs.</td>
</tr>
<tr>
<td>7/8 – 9 (.875)</td>
<td>29,475</td>
<td>430 ft. lbs.</td>
<td>322 ft. lbs.</td>
</tr>
<tr>
<td>1 – 8 (1.00)</td>
<td>38,625</td>
<td>644 ft. lbs.</td>
<td>483 ft. lbs.</td>
</tr>
<tr>
<td>1-1/8 – 7 (1.125)</td>
<td>42,375</td>
<td>794 ft. lbs.</td>
<td>596 ft. lbs.</td>
</tr>
</tbody>
</table>

**TRACTOR REQUIREMENTS**

**Recommended Horsepower Rating**
- 200 PTO Horsepower (MINIMUM)
- 220 PTO Horsepower (MINIMUM for 8 Row 30 and 12 Row 22 Headers)

**Remote Cylinders: (Furnished)**

**Hydraulic Requirements**
- Tractor must be equipped with five remote hydraulic outlets. The tractor must be capable of supplying 22 gpm [21 L] flow. If using the “Power Beyond”, connect to rowfinder.

**PTO Shaft**
- Tractors must have 1.375 inch [3.49 cm] or 1.75 inch [4.445 cm] diameter 1,000 rpm PTO shaft (Do not use an adapter shaft).

**Front Ballast**
- Maximum tractor front ballast is required

**Drawbar Support (Recommended)**

**Electrical System**
- 12 Volt

**ATTACHMENTS**

**Rowfinder**
- To keep the harvester on the row

**Lifter Wheel Close-up (Optional)**
- To prevent loss of small beets through lifter wheels.

**Lifter Wheel Spacers**
- To increase lifter wheel opening by 0.25 inch [6.35 mm] increments.

**Flex Struts (Optional)**
- To protect lifter wheels in rocky soil conditions

**Constant Velocity PTO**
- Standard – Allows turning without disengaging PTO.

**Flashing Warning Light Kit**
- Standard

**Light Package (Optional)**
- To light machine for night use (3 sealed beam halogen lights)

**Fixed or Steerable Wheels**

**Wheel Elevator Stripper**

**Polyethylene Covered Grab Rolls**

**Gage Wheels**
- Optional on 6R28/30, and 8R22
- Standard on 8R28/30 and 12R22
- Front Gage Wheel Mounts (Optional)
ART’S-WAY MANUFACTURING CO., INC.
TECHNICAL MANUALS

Manuels are available from your local dealer or Art’s-Way Manufacturing Co., Inc. for the operation, service, and repair of your machine. For prompt convenient service, contact your local dealer for assistance in obtaining the manuals for your machine.

Your local dealer can expedite your order for operator manuals, illustrated parts catalogs, service manuals, and maintenance records.

Always give the Machine Name, Model, and Serial Number so your local dealer can provide the correct manuals for your machine.

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