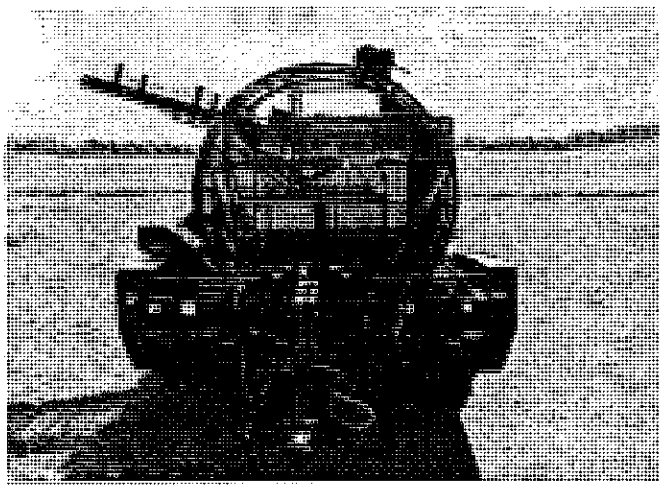
Building on a Art's-Way Tradition of Quality

Model 698 Beet Harvester



Operator's Manual

463140 (-)
$9.95

Art's-Way Manufacturing Co., Inc.

To the Owner

Congratulations on the purchase of your new Art's-Way 698 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, reliable service.

Many people have worked on the design, production, and delivery of this harvester. The information in this Manual is based on the knowledge, study and experience of these people through years of manufacturing specialized farming machinery. This Manual is designed to provide you with important information regarding safety, maintenance and machine operation so you can get the best possible performance from your harvester.

Even if you are an experienced operator of this or similar equipment, we ask you to **read this Manual before running this 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 piece 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 or add improvements to our products without obligation for the equipment previously sold.

Because modifications to this harvester may effect the performance, function and safety of its operation, no modifications are to be made without the written permission of Art's-Way Manufacturing Co., Inc. Any modifications 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 harvester, pay particular attention to the safety alert symbol throughout this Manual.

Art's-Way Manufacturing Co., Inc. Statement Of Product Liability

Art's-Way Manufacturing Co., Inc. recognizes its responsibility to provide its customers with a safe and efficient product. Art's-Way attempts to design and manufacture its products in accordance with all accepted engineering practices in effect 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, as set forth in this Manual, nor will Art's-Way be liable for any such act. In addition, Art's Way assumes no liability for product altered or modified in any way by users or anyone other than an authorized dealer.

Important Warranty Information

The warranty for this harvester appears on page 7 of this Manual. In order to establish proper warranty registration, the Warranty Registration and Dealer Pre-Delivery Checklist 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 Model 698 Sugar Beet Harvester only. It does not replace the Manual(s) for any machine that it may be attached to or used with.

Parts & Service

As the new purchaser of your Beet 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. _____

Enter the Serial Number & Model Number of Your Harvester In The Space Provided Above
(The Serial Number is Located on the Left Front Corner of the Main Frame)

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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) year after the date of delivery to the first 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 which upon manufacture were defective in material or workmanship.
- All parts and repairs under this warranty shall be supplied at an authorized **Art's-Way Manufacturing Co., Inc.** dealer or at the factory, 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 the other manufacturer.
- 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 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 alteration or repair by other than an authorized **Art's-Way Manufacturing Co., Inc.** dealer which affects the product materially and adversely, shall void this 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.** at it's home office.
- 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 specific legal rights and you may have other rights which vary from state to state.

Notes

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.

THIS SYMBOL MEANS ATTENTION!!

BECOME ALERT!

YOUR SAFETY IS INVOLVED!

Figure 1. The Universal Safety Alert Symbol

The American Society of Agricultural Engineers has adopted the **UNIVERSAL SAFETY ALERT SYMBOL** (Figure 1) 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 Manual or on your harvester.***

Art's-Way Manufacturing Co., Inc. strives to make our equipment as safe as it can possibly be. The Art's-Way 698 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 Art's-Way 698 Sugar Beet Harvester are detailed elsewhere in the Operator's Manual. It is the responsibility of the harvester owner to ensure that ***all*** operators read and understand the Manual before they are allowed to operate the machine. ***(Occupational Safety and Health Administration (OSHA) regulation 1928.57)***

Notices of Danger, Warning, and Caution

Signal Words: Note the use of the 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:

⚠ DANGER

Indicates an imminently hazardous situation that, if not avoided, *will* result in death or serious injury. This signal word is limited to the most extreme situations for machine components which for functional purposes cannot be guarded.

⚠ WARNING

Indicates a potentially hazardous situation that, if not avoided, *could* result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

⚠ CAUTION

Indicates a potentially hazardous situation that, if not avoided, *may* result in minor or moderate injury. It may also be used to alert against unsafe practices.

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 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 working on it.

⚠ 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.

During Operation

- Keep hands, feet, hair and clothing away from moving parts.
- Keep all shields and guards in place and in good repair.
- Keep all children and bystanders 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. (See the **Hydraulic Safety** section, below.
- Be careful 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 unplugging the machine, always ensure that the tractor engine is stopped, 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 only the tools, jacks and hoists that are of sufficient capacity for the job.
- Use support blocks or safety stands when changing tires or working under the machine.
- Follow the 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 tight and in good condition.
- Make sure all shields/guards are in place and properly secured when maintenance work is complete.

Hydraulic Safety

- Make sure components in the hydraulic system are kept clean and in good condition.
- Relieve pressure from the hydraulic circuit before servicing or disconnecting from the tractor.

- Keep all hydraulic lines, fittings, and couplers tight 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 by using tape, clamps or cement. The hydraulic system operates under extremely high pressure and temporary repairs may fail suddenly and create a hazardous 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 lines, hoses and couplings are not damaged.

Transportation Safety

- Be sure to comply 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 in place, clean and clearly visible to all oncoming or following traffic.
- **Do not** allow riders while transporting.
- Make sure the harvester is securely attached to the tractor and install a safety chain to the harvester.
- **Do not** fail to latch the tractor brake pedals together.
- **Do not** exceed 20 mph (32km/h) when transporting the harvester. Always reduce speed on rough roads and surfaces, or when going down inclines.
- Drive slowly when turning and always use 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 clearances carefully wherever 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. Electrocution 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.
- Ensure 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 a qualified tire dealer or 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 which could result in serious injury.
- **Do not** substitute tires of lesser road rating and 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 which 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 a qualified tire repair service.

Assembly Safety

- Use adequate manpower to perform assembly procedures safely.
- Assemble the harvester in a 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 in the working area.

Remember:
"The Best Operator is a Safe Operator

Warning Decals

Decal Locations

The different types of safety decals for your 698 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. Refer to the diagrams below for decal locations. The 6 digit number following the description on page 13 is the part number of that decal. (This part number also appears in the lower right corner of the decal.)

Safety awareness is the responsibility of **each** operator of the harvester. Keep safety decals and signs clean and legible and, be sure the replacement parts display current safety decals and signs as well. ***Remember: Always replace missing, damaged or illegible safety decals. New decals and signs are available from your dealer.***

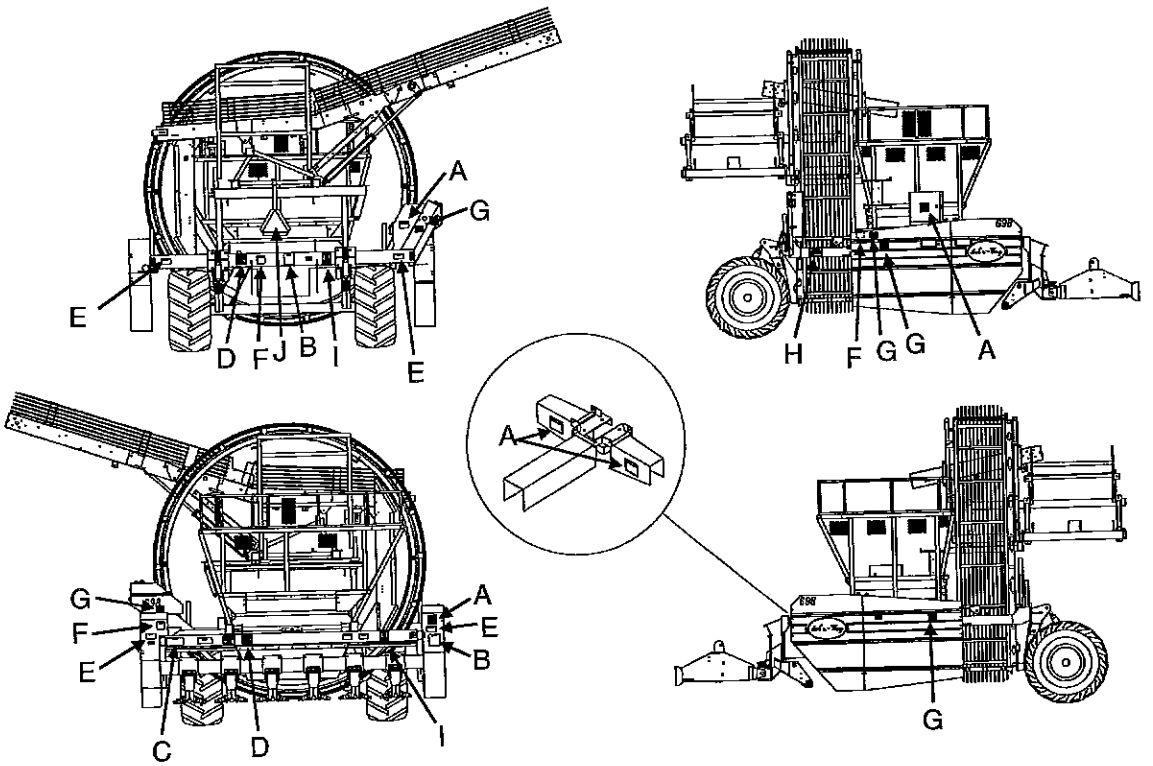
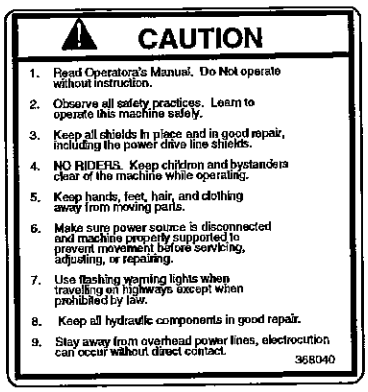


Figure 2. Model 698 Beet Harvester Safety Decal Locations

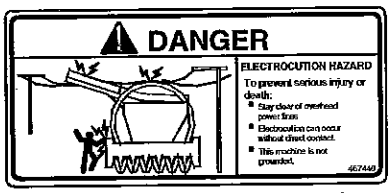
Table 1. Safety Detail Locations			
A	5	467450	Warning- Moving Part hazard
B	2	368040	Caution- Lists Nine Instructions
C	1	467440	Danger - Electrocution Hazard
D	2	346310	Warning - High Pressure Fluid
E	4	467420	Warning - Rider's Falling Hazard
F	3	467410	Danger - Rotating Roll Hazard
G	5	467430	Danger - Shield Missing Hazard
H	1	467470	Warning - Overhead Elevator Hazard
I	2	467400	Warning - Thrown Objects
J	1	E224138	Warning - Slow Moving Vehicle Sign

Decal Identification and Part Numbers

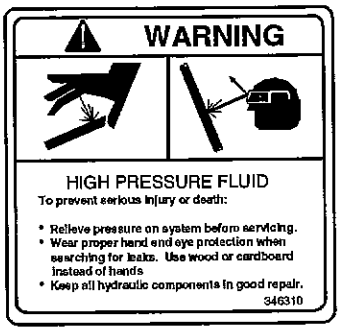
A - "WARNING" - Moving Parts Hazard - Part No. 467450



B - "Caution" - Lists Nine Instructions. Part No. 368040



C - "DANGER" - Electrocution Hazard -Part No. 467440

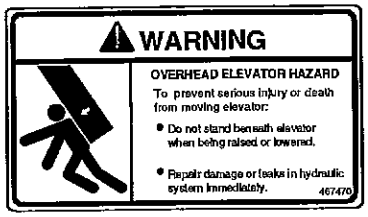


D - "WARNING" - High Pressure Fluid. Part No. 346310

E - "WARNING" - Riders Falling Hazard. Part No. 467420

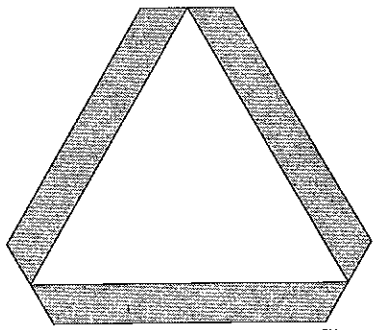
F - "DANGER" - Rotating Roll Hazard. Part No. 467410

G - "DANGER" - Shield Missing Hazard. Part No. 467430



H - "WARNING" - Overhead Elevator Hazard. Part No. 467470

I - "Warning" - Thrown Objects Part No. 467400



J - Slow Moving Vehicle Sign. Part No. E224138

Figure 3. Safety Decals

Note: *Keep all decals clean and free of dirt for maximum visibility. Replace any and all decals that are no longer legible. Read and obey all safety decals.*

Preparing for Operation

Introduction

This manual has been prepared to acquaint you with the proper assembly, operation, adjustment, service, and lubrication of the 698 beet harvester. Take time to better understand the efficient operation and care of your machine. Whenever the terms "Left" and "Right" are used, it should be understood to mean standing behind the machine and facing the direction of the forward travel.

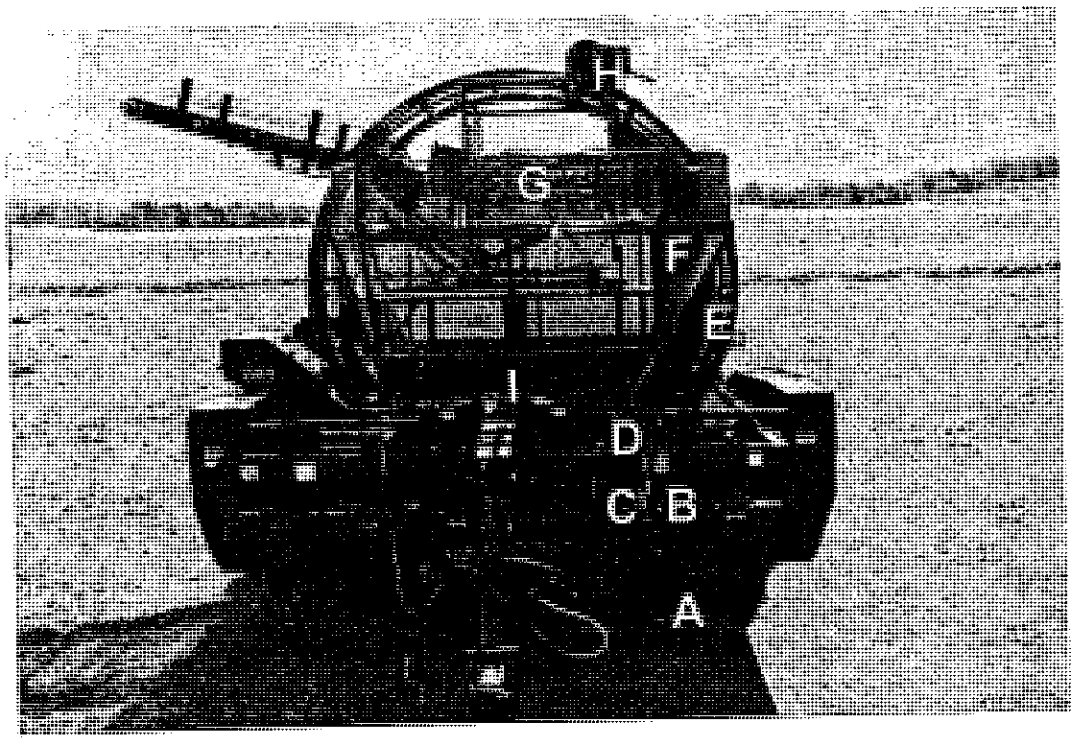


Figure 4. Beet Flow

Beet Flow

The following is a step-by-step description of beet flow through the harvester. Refer to Figure 4.

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

The revolving steel/rubber paddles (B) at the rear upper quarter of the lifter wheels knock off dirt as they move the beets onto the cleaning bed.

The forward section of the cleaning bed consists of conveyer rolls or optional chainbed (C). The separation between the rolls sifts out dirt as the beets are carried back to the grabroll cleaning area (D).

Three spiral grabrolls are paired with three smooth rolls that strip soil and trash from the beets as they are moved into the wheel elevator (E).

The wheel elevator revolves at approximately 11 RPM, (at 1000 PTO RPM) carrying the beets up to the truck elevator. A retainer (F) holds the beets in the wheel until they reach the top, where the beets fall into the elevator (G). A stripper (H) clears the wheel of any rocks or beets that wedge between the elevator rods.

The belted chain conveyer can deliver the beets to a truck or to the holding tank.

The holding tank bottom unloading conveyer (I) is actuated by a hydraulic motor - moving the beets into the wheel elevator and onto the truck elevator.

Inspect the Beet Harvester

Generally inspect the machine for:

- Any loose holts or set screws.
- Proper tensioning of all roller chains, drive belts and draper chains.
- Proper PTO installation and lubrication.
- Proper installation of hydraulic cylinders and hoses.
- Electric wires and hydraulic lines are adequately secured to prevent damage.
- Oil level in gearboxes up to fill plug.
- All shields and guards are in place.
- Proper installation of any options.
- Tires (21.5L-16.1 14 ply) inflated to 36 psi.

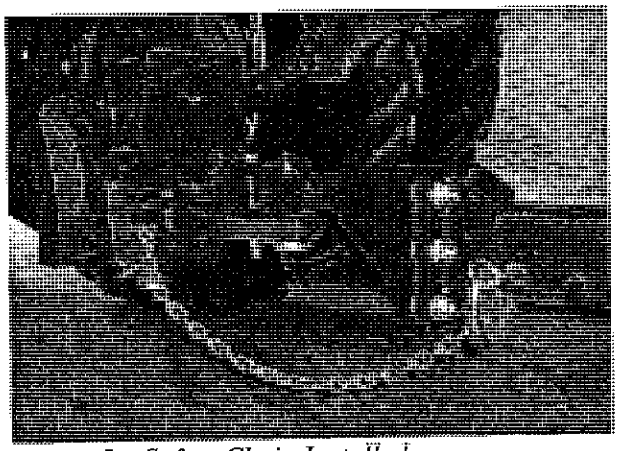


Figure 5. Safety Chain Installed.

Tractor

Art's-Way Sugar Beet Harvesters are designed to be used on large agricultural tractors. To ensure good performance, the following requirements must be met:

Horsepower - In consideration of the size and weight of the harvester, we recommend that the harvester be operated by a tractor with 175 PTO horsepower or larger. 175 PTO HP is the minimum requirement. This recommendation will provide the stability and control necessary for safe operation and highway transport.

Drawbar – Set the tractor drawbar at 16 inches from the end of the PTO to the center of the drawbar attaching hole for 1 3/8" PTO's, and at 20 inches for 1 3/4" PTO's. When connected to the tractor, the driveline should measure between 58 and 68 inches between centers of the universal crosses. Refer to Figure 6 and to Table 2, below.

Table 2. Drawbar and PTO Dimensions

Dimension	Tractor PTO	Dimension
A	1 3/8" - 21 spline	16"
	1 3/4" - 20 spline	20
B	All	58" to 68"

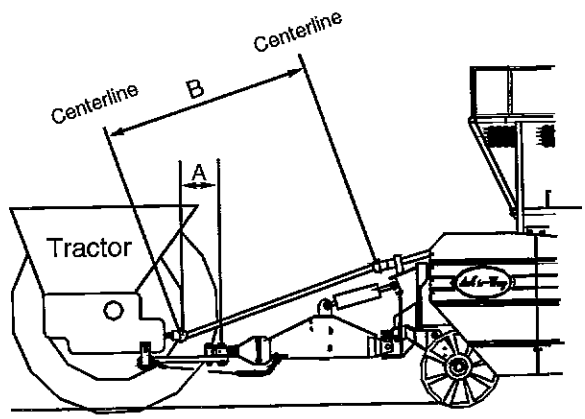


Figure 6. Drawbar Specification.

NOTE

Use of an additional support for the tractor drawbar is recommended. An optional drawbar support kit is available from your Art's Way dealer.

Power Take Off (PTO) – Two PTO shafts are available; a 1000 RPM PTO shaft with a 1-3/8" diameter - 21 spline yoke, or a 1000 RPM PTO shaft with a 1-3/4" diameter - 20 spline yoke.

Tractor Wheel Spacing - Adjust the front and rear wheels of the tractor to fit the desired row spacing

Tractor Hydraulics - Install hydraulic hose ends to match the tractor.

Attaching To The Tractor

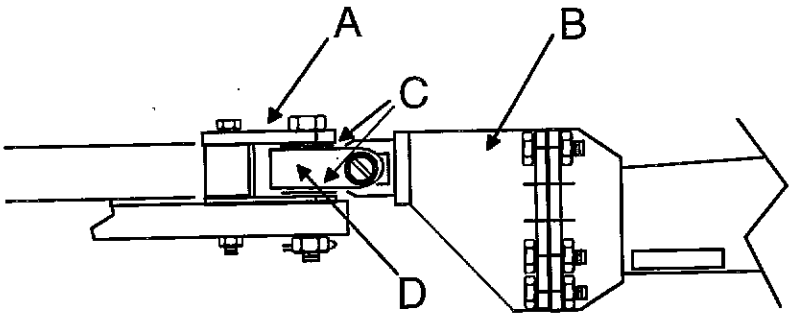


Figure 7. Drawbar Installation

When hooking the harvester to the tractor, refer to Figure 7 and the procedures below.

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 lift cylinder hoses to tractor outlets.
5. Activate the lift cylinder and lift the harvester hitch above the tractor hitch
6. Place all tractor controls in neutral, set the park brake and stop the engine. Remove the ignition key before dismounting.
7. Adjust the tractor drawbar. Refer to Figure 6 and Table 2 on the previous page.
8. Attach the harvester to the tractor with yoke weldment (Figure 7-A) and bolts provided. Be sure to install the hardened washers (C) between the yoke (A) and the hitch clevis (D). The existing tractor clevis may be used if a 3" spacing can be maintained. Install hardened washers (C) to shim the hitch clevis (D) so that it is snug. If the tractor drawbar mounting hole is smaller than 1 3/8", a 1 1/4" pin is available from your Art's Way Dealer (AW Part No. 456220). If the tractor drawbar mounting hole is larger than 1-3/8", a bushing should be installed.

   NOTE: *Additional support for the tractor drawbar is recommended.*

9. Cycle the lift cylinder and observe the lift height. Position the front bolt-on hitch (Figure 7–B) to obtain the desired lift height, while still allowing adequate penetration into the ground.

   NOTE: *The hitch must have at least 3 bolts installed on each side (total of 6 bolts).*

10. Attach the safety chain to the harvester hitch by inserting the large chain eyelet through the chain bracket 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 tractor and harvester without binding. See Figure 5, page 15 in the **Preparing for Operation** section.
11. Clean the splines inside the yoke and on the tractor shaft. Be sure the driveline and safety guard telescope easily and that the guard rotates freely.
12. Retract the slide collar on 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.
13. Be sure there is sufficient clearance between the drawbar, three-point hitch links and driveline to allow maneuvering in the field. Be sure to check the distance between the universal joint centers (see Table 2, page 15).
14. Lower the tractor PTO shield over the universal joint and secure.

9. The Art's-Way 698 Beet Harvester requires four (4) tractor hydraulic circuits to operate. Connect the tractor hydraulics according to the appropriate list that follows, starting with the tractor's priority valves first.

   NOTE: *It is very important to have the lift and main valve on the number one and number two priority valves. Adjust the flow at the tractor to the minimum required to operate all functions.*

10. Connect tractor hydraulics to the harvester as follows:

With Fixed Carrier Wheels

Circuit	Function
1.	Lift cylinder - front of machine.
2.	Main Valve:
	• Truck boom - raise & lower.
	• Tank elevator
	• Truck elevator
	• Tank conveyor
3.	Override side shift.
4.	Row finder valve.

With Steerable Carrier Wheels

Circuit	Function
1.	Lift cylinder - front of machine.
2.	Main Valve:
	• Truck boom - raise & lower.
	• Tank elevator
	• Truck elevator
	• Tank conveyor
3.	Steering and Override side shift.
4.	Row finder valve.

NOTE: *The lift function needs to be connected to the priority outlet of the tractor.*

14. With the hitch pointed straight forward, adjust the side shift cylinder attaching bracket so that the cylinder is in the center of its stroke.

15. Lift the harvester and then cycle the row finder cylinder by moving the row finder arms from side to side. The harvester should move in the same direction as the row finder arms.

⚠ CAUTION

Keep clear of the machine as it shifts sideways.

Electrical Controls:

1. Install the control box in the tractor cab and connect the power cord to a suitable 12 V power supply as shown in Figure 8. (White to Positive, Black to Negative).

   IMPORTANT: *The controls are rated for use with a 12 Volt DC System only. A battery charger should not be used for testing.*

2. Route the main wiring harness through the cab and connect the wires to the control box according to the color of the wires and the color code on the box. See Figure 9.

3. Connect the running lights to the appropriate circuit of the 7 connector plug provided with the hazard lights. See Figure 79, page 59.

4. Connect the control box wiring harness and the valve wiring harness with the 10 connector plug. Make sure all the wires have been properly routed and connected according to color codes and the function on the box.

5. Repeat this procedure for steering control box installation if so equipped.

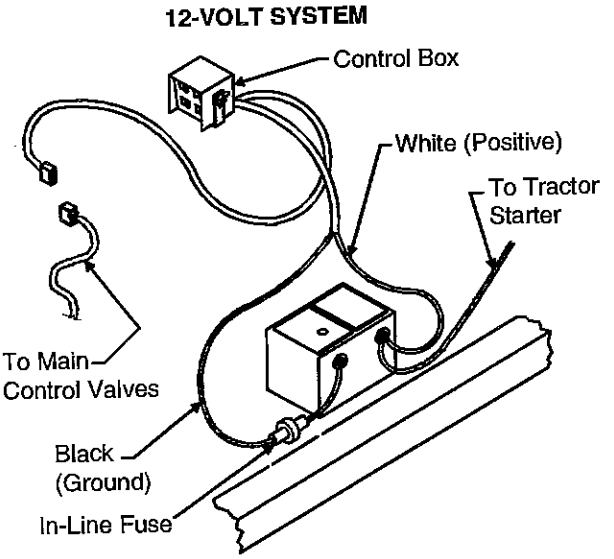


Figure 8. Control Box Power Connection

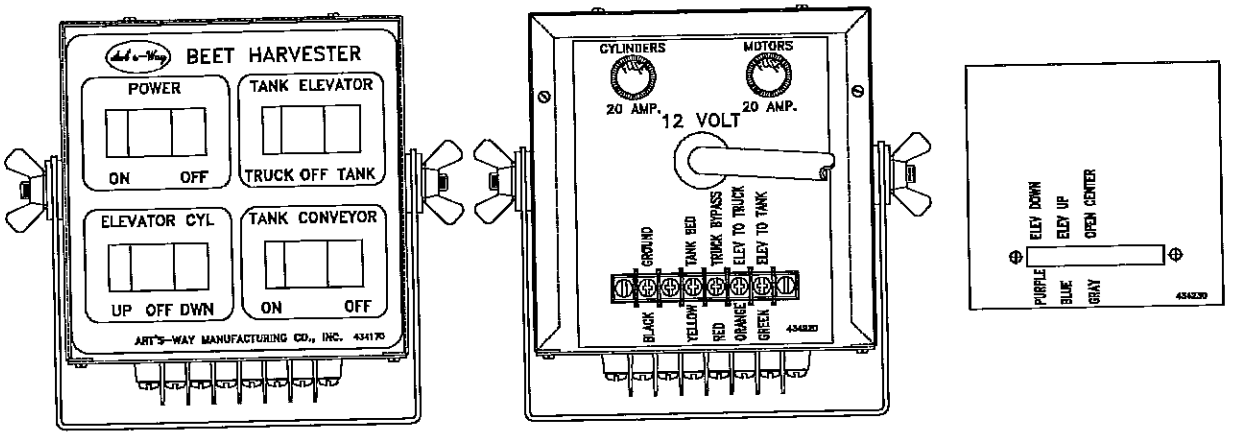


Figure 9. Main Control Box

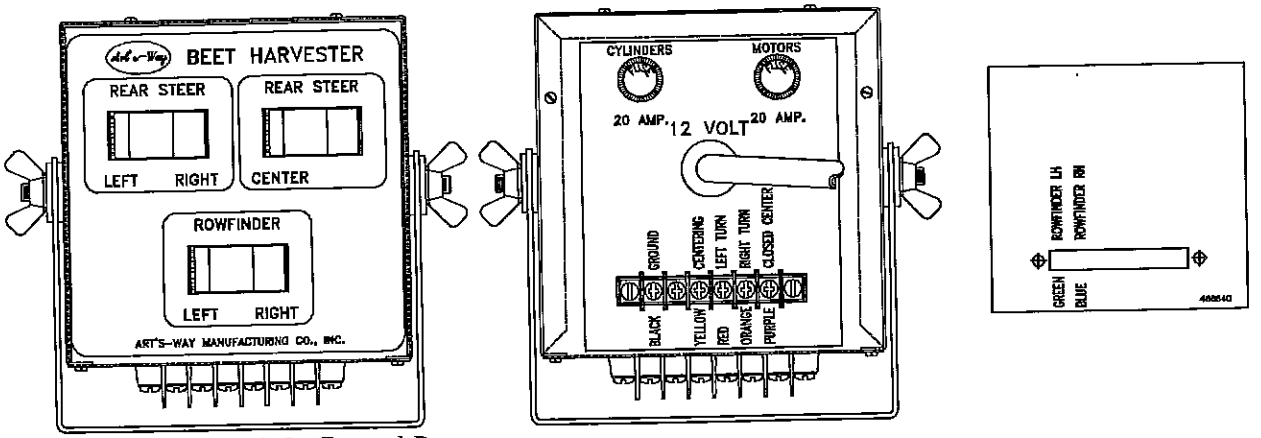


Figure 10. Steerable-Axle Control Box

Wiring Harness and Solenoid Valves

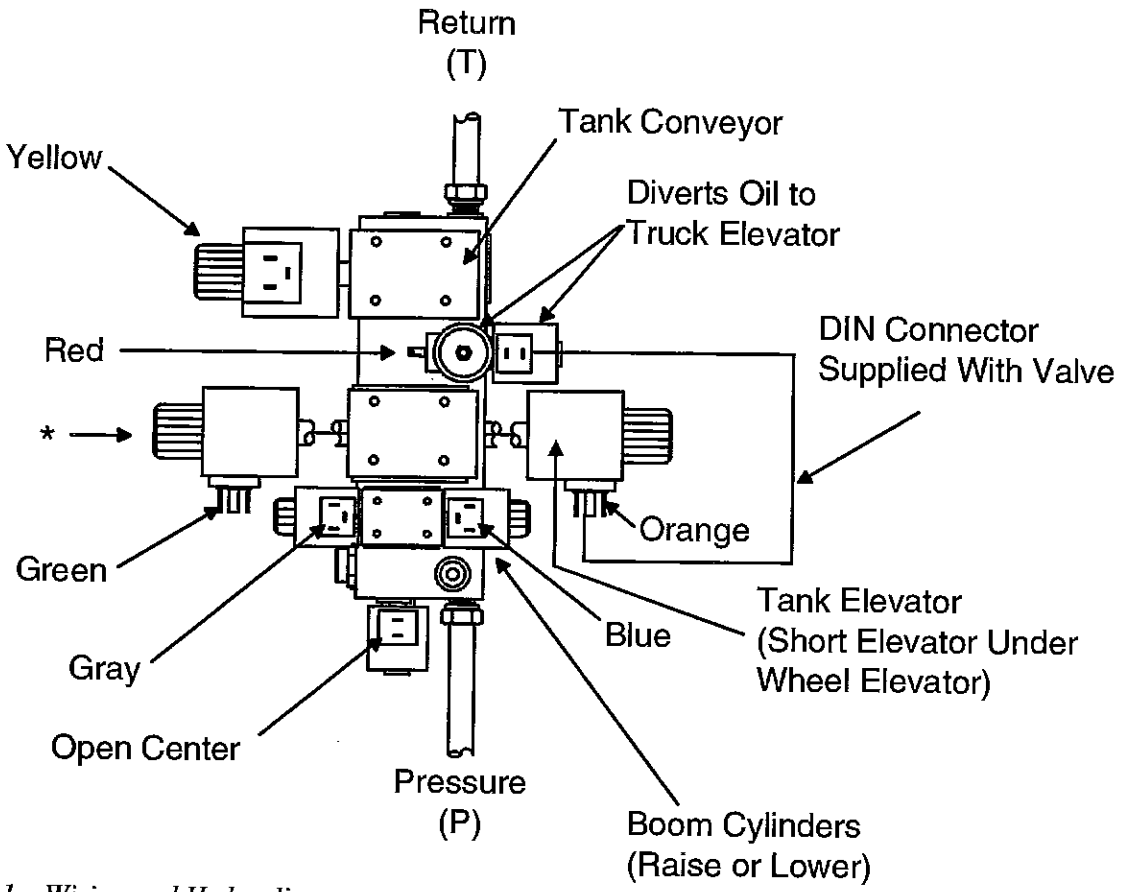


Figure 11. Wiring and Hydraulics

For the procedures below, refer to Figure 11. For a more detailed illustration of the system, refer to Figure 73 on page 53.

1. The solenoid valve on the bottom of the main valve is installed as standard equipment on the 698. This valve provides OPEN center operation of the system. This is for the newer tractors that have the load sense system. A special plug can be installed to switch this to closed center. Refer to Figure 84 on page 64.

   NOTE: *For all older tractors with a true closed center system, the closed center plug must be installed.*

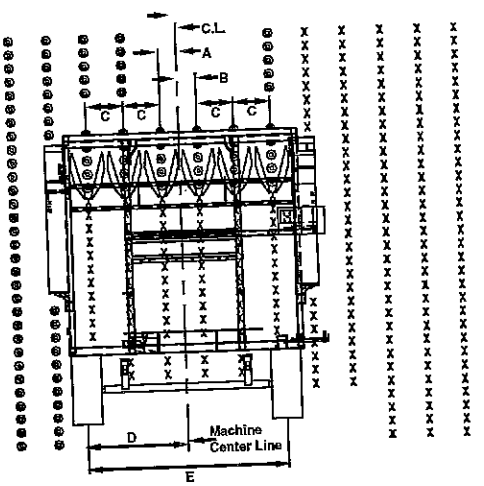
2. The pressure side of the valve is identified in Figure 11 as **(P)**. The tractor valve must be set to provide pressure to this port in the valve.

3. Solenoid valves may be manually overridden by inserting a small drift pin and pushing in. See the location marked by * in Figure 11.

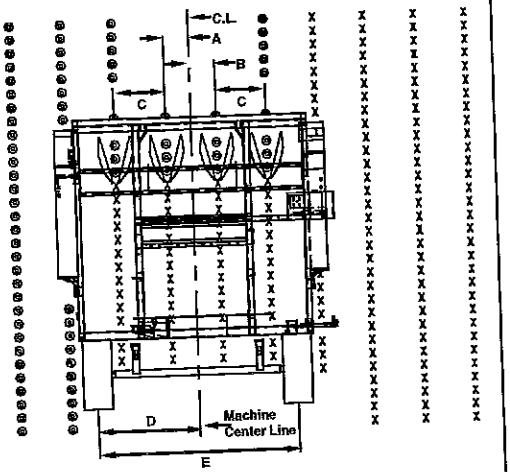
Adjust Row Spacing

Refer to Figure 12 to determine the settings for lifter wheels. Make all measurements for setting lifter wheels from the centerline of the front of the machine to the pinch point on the lifter wheels. Set all lifter wheels at the exact row widths on either side of centerline. Double check the settings.

698 Row and Carrier Wheel Spacing



22" and 24" Six Row



28" and 30" Six Row

Spacing	Center Machine To Lifter Center A	Center Machine To Lifter Center B	Lifter Settings C	Center Of Machine To Center Of Left Tire D	Center Of Left Tire To Center Of Right Tire E
6 Rows					
20"	10"	10"	20"	54.5"	109"
22"	11"	11"	22"	54.5"	109"
24"	12"	12"	24"	59.5"	119"
4 Rows					
28"	14"	14"	28"	54.5"	109"
30"	15"	15"	30"	57.5"	115"

Figure 12. Row and Carrier Wheel Spacing

Carrier Wheel Spacing Adjustment

The lateral position of the *steerable carrier wheels* is preset at the factory, they are not adjustable from side to side.

The hub and spindle assemblies on the *fixed carrier wheels* may be moved in or out by means of the multiple holes in the spindles.

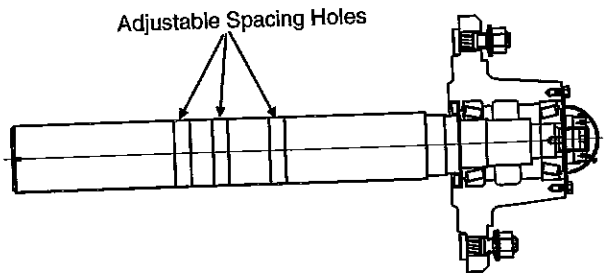


Figure 13. Fixed Carrier Wheel Spindle Adjustment.

Carrier Wheel Adjustments

It is very important that the harvester frame, in the digging position, run as level as possible from side to side and front to back. Depending on soil conditions, it may be preferable to run the machine slightly lower in the back.

⚠ CAUTION

While working on the machine be sure to work safely. Use adequate blocking. Use adequately rated lifting devices. Make sure parts are secured before working under or near them.

Fixed Wheel Height Adjustments

1. To adjust the height, alternately turn the screw jacks (see Figure 14) in small amounts on each side until the desired position is reached.

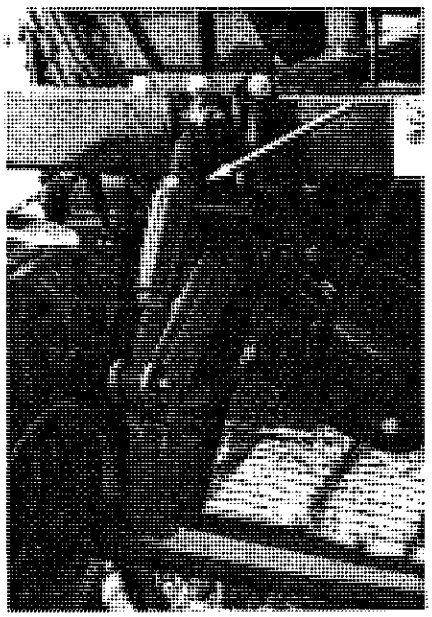


Figure 14. Carrier Wheel Height Adjustment For Fixed Wheels

Steerable Wheel Adjustments

1. To adjust tires to parallel: loosen the jam nut (Figure 15-A) that is located on one end of the tie rod (Figure 15-B). Rotate the tie rod until the tires are aligned and then tighten the jam nut. Allow a slight toe in.

Note: Total toe in should not exceed 1/4 inch.

2. To adjust the tires to straight ahead: remove the yoke pin at the adjustable end of the cylinder (Figure 15-C). Loosen the locknut on the cylinder rod and turn the yoke to set the direction of the tires. Tighten the jam nut on the yoke. Check tracking by observing the machine under actual field running conditions. The sides of the machine should be parallel with adjacent rows. For a more precise determination, measure the distance from the front and rear corners of the machine to an adjacent row center. The measurements should be equal.

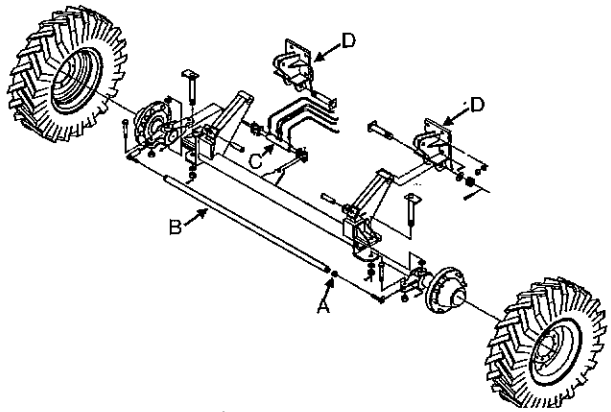


Figure 15. Steerable Carrier Wheels
A) Jam Nut
B) Tie Rod
C) Steering Cylinder
D) Carrier Mounts

3. To adjust the height, first block the harvester frame to prevent slipping. Using an adequate lifting device, raise the harvester frame. Support the rear axle with another lifting device of sufficient capacity. Loosen the four 1" x 8" bolts that secure the carrier mounts (Figure 15-D) to the rear frame. Remove the bolts and raise or lower the carrier mounts to the desired location. Tighten the bolts to the recommended torque. (See table 4, page 49.)

Test Run The Harvester

⚠ CAUTION

Before running the harvester, keep all children and bystanders away from the machine.

1. With the tractor running at low RPM, engage the PTO and check operation of the machine. Slowly increase the RPM to the proper operating speed of 1000 PTO RPM.
2. Check the operation, alignment and clearances of all moving parts. Make any necessary adjustments.

⚠ 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.

3. The first operation of the hydraulic control valve circuit must be to raise the truck elevator to the operating position (the elevators must be off). Raise and lower the elevator boom several times with the tractor at idle. The other hydraulic functions of the control box are tank elevator, the truck elevator, and tank conveyor. The tank elevator runs both directions. The truck elevator stops when the tank elevator is turning forward (toward the tank). The truck elevator runs when the tank elevator is turning rearward (toward the truck elevator). Finally activate the tank conveyor. The tank conveyer will only function if the tank elevator is running or if the tank conveyor switch is on and the truck boom is being raised or lowered.
4. Check the oil level in your tractor after filling the hydraulic lines for the first time.
5. The flow of oil to the control valve circuit is regulated to 14 GPM. It is recommended this flow be reduced to the range of 10 to 12 GPM with the flow control on the tractor. Reduce the flow until the motors just start to slow down, then reduce the flow a bit more. The flow rate can then be adjusted (slightly) under operating conditions to a speed the operator is comfortable with.
6. Run the machine for 10 to 15 minutes. Then, check the machine for any loose hardware and check drive belt tension.

Transporting

⚠ 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. The tractor hitch ***must be*** securely installed.
2. Attach a safety chain to the tractor and to the tongue of the harvester as shown in Figure 5. page 15.

⚠ 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. Know the transport height and width of your harvester. With the truck boom folded, the transport height is 13' 8" and the width is 14' 5" (See the specifications on page 69).
4. Lower the truck elevator before transporting.
5. The harvester weighs approximately 9.5 tons ***empty*** and up to 15 tons when loaded. Transport when empty, if possible.
6. Raise the lifter wheels.
7. Never tow the barvester faster tben 20 mph (32 km/h).
8. The harvester is equipped with road hazard lights, a SMV emblem, (2) red reflectors and (2) red-orange reflectors mounted on the rear, and (4) amber reflectors mounted on the front and sides. Keep the reflectors clean and visible at all times. Turn road hazard lights on when on public roads. Refer to the Caution at the beginning of this section.

Field Operation and Adjustments

Machine Operation

The 698 Sugar Beet Harvester utilizes the revolutionary rear wheel design for harvesting sugar beets faster, easier, and more profitably. This design incorporates the superior pinch point lifter wheels to squeeze the ground and elevate the whole beet out of the ground. The beet size can be matched with adjustments to pinch point height or width and with close-up adjustments to minimize beet loss. The rubber covered steel paddles on the paddle shaft move beets from the lifter wheels through the rubber curtains and onto the cleaning bed rollers. The nine spiral and smooth rollers move the beets out towards the sides, then back and to the center as they move to the rear of the cleaning bed and into the wheel elevator. The wheel elevator elevates the beets directly to the bi-directional tank elevator, which carries the beets either to the truck elevator or to the holding tank for temporary storage.

The 698 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 under various operating conditions. Daily monitoring of the settings 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.

Controlling Beet Flow

Beets are loaded into the tank or truck by the tank elevator and the truck elevator, which are powered by hydraulic motors. Activate the tractor hydraulic lever so pressure is to the pressure port of the main valve (see Figure 11, page 19). Be certain that the truck elevator is raised into position and locked before operating the hydraulic motors. Also be sure to engage the PTO and increase the RPM to adequately handle the volume of beets when emptying the holding tank to avoid plugging the wheel elevator.

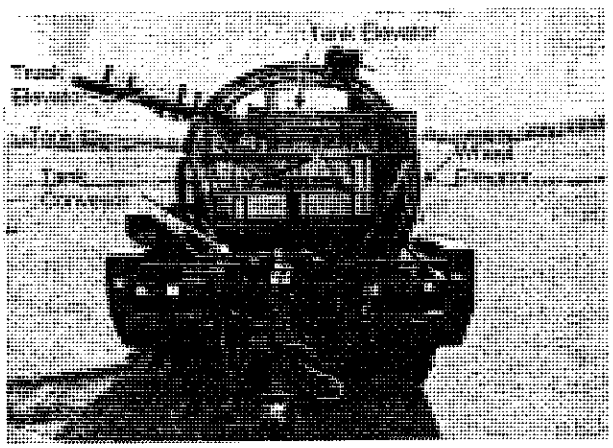


Figure 16. Basic Operations

To **load directly into the truck**, first activate the switch labeled TANK ELEVATOR in the direction marked TRUCK. This will start the hydraulic motors for the elevator over the tank and the truck elevator. The tank elevator will move the beets to the truck elevator, which carries the beets to the truck.

To **fill the holding tank**, activate the switch labeled TANK ELEVATOR to the TANK position. This will reverse the hydraulic motor on the tank elevator, and shut off the hydraulic motor on the truck elevator.

To **empty the holding tank into the truck**, activate the switch labeled TANK ELEVATOR to the TRUCK position. This will start the hydraulic motors on both the tank elevator and the truck elevator. Then activate the switch labeled TANK CONVEYER to the ON position. This will start the hydraulic motor on the bed of the tank. The tank conveyor will move the beets into the wheel elevator which carries them up to the tank elevator. The tank elevator will then move the beets onto the truck elevator which carries the beets to the truck. When the tank is empty, turn off the tank conveyor switch.

Note: *It may be necessary to reduce ground speed if recycling the holding tank through the wheel elevator. Failure to reduce speed may result in overloading the wheel elevator and tank elevator.*

Operating Speeds

The recommended ground speed is 3.5 - 4 mph. Adjust the speed to your conditions.

Maintain 950 RPM minimum output at the PTO shaft.

Note: *The 698 beet harvester is equipped with a constant velocity PTO. For "normal" turns, slow the PTO to approximately 600 RPM or less. When making sharp turns, it is recommended that the harvester be shut off.*

Always engage the PTO with tractor at low RPM and "run-up" to full RPM gradually.

Be sure the tractor drawbar is set as specified in Table 2 on page 15.

Machine Leveling

Note: *It is very important that the harvester frame, in the digging position, run as level as possible from side to side and front to back. Depending on soil conditions, it may be preferable to run the machine slightly lower in the back.*

Set the front of the harvester so maximum lift for transport is maintained and still allows for lowering into the ground as far as necessary. If necessary, separate the two hitch halves and offset them in order to achieve the proper height as shown in Figure 17. Note that at least three bolts must remain in each side of the hitch (total of six bolts).

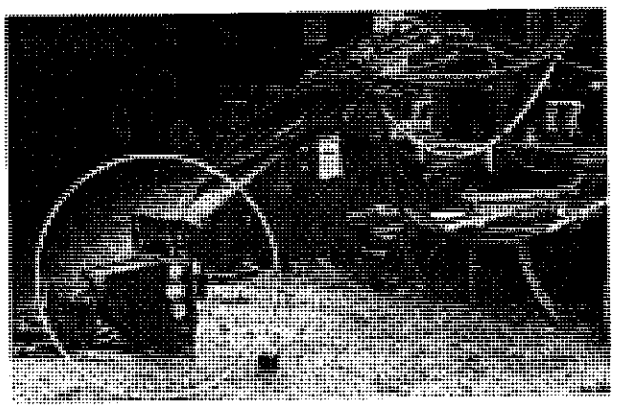


Figure 17. Front Hitch Adjustment.

Note: *For all machine adjustments, tighten all bolts according to the guidelines in Table 4, page 49.*

Lifter Wheel Spacing

Make sure the lifter wheels are located at the proper row widths (**measurement to be taken at the pinch point**) to prevent slicing and breaking the tails off beets.

Spacing Adjustments - Refer to Figure 18. Loosen strut mounting L-bolts (A); paddle bolts (B); and the bolts holding the barriers (C). Adjust the rubber covers (D) so they are centered over the row and routed over the round tube. Slide all to the proper row spacing. Tighten the bolts.

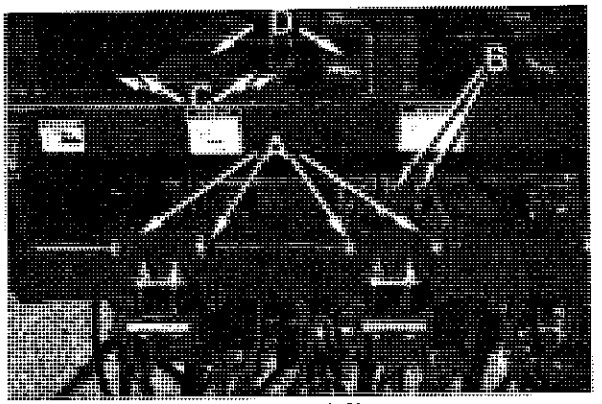


Figure 18. Row Spacing Adjustments.
A) L-Bolts
B) Paddle Bolts
C) Barrier Bolts
D) Rubber Covers

Pinch Point - 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. See the figure below and also Figure 26, page 28. Be sure to set the spacing at the widest position to prevent beet damage. Whenever the lifter wheel pinch point is adjusted, also, adjust the scrapers.

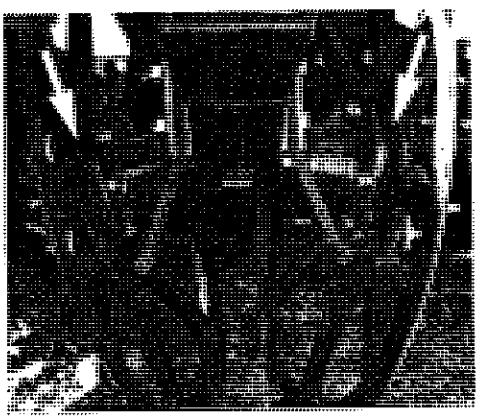


Figure 19. Lifter Wheel Adjusting Shims.

Operating Depth

As a starting point, the lifter wheels should be set to dig approximately 2" to 3-1/2" 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 tails of the beets in extremely hard ground, first 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. Be sure the harvester is not digging across guess rows between rounds.
2. Begin digging as deep as necessary to keep from breaking beet tails.
3. Raise lifter wheels gradually until some beet tail breakage occurs.
4. Lower lifter wheels about 1/4".
5. Set 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. To do this, the cylinder depth must be set with stops. If your tractor has a valve with a float position, connect the lift cylinder to this circuit and make sure the control lever is in the float position when the harvester is in the ground. If your tractor does not have a float valve, a single hose must be plumbed to the lift side of the lift cylinder and the other side of the cylinder must be equipped with a breather (allowing air to enter and escape). Consult your Art's Way dealer for the best method to accomplish this.

Row Finder Operation

The optional row finder helps keep your harvester on the rows. The feeler arms (Figure 20-A) rest astride the row (B) and follow the line of beets - sensing any changes in the direction of the row or the position of the harvester. Sideward movement of the feeler arms actuates the hydraulic valve (C), which controls oil flow to the row finder steering cylinder.

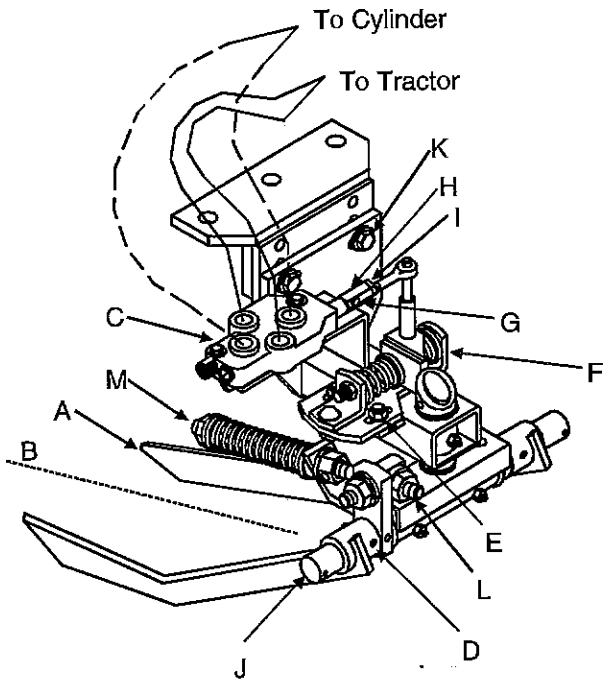


Figure 20. Row Finder.

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 - which is particularly helpful when entering rows.

Be sure the row finder hoses are connected properly. *The harvester should move in the same direction as the tips of the arms.* If the machine moves in the opposite direction as the tips of the arms, switch the pressure and return lines to the row finder.

⚠ CAUTION

Keep clear of the machine as it shifts sideways.

Adjustments

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

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

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 row finder is not damaged.*

1. Feeler Arm Spacing

For this adjustment, refer to Figure 20, page 25. The feeler arms should be set so the largest beets will just pass through the opening, between the tips, while just touching each arm. To adjust the arms, remove the spring pins (D), set the arms to the appropriate width, then install the spring pins.

2. Feeler Arm Centering

Refer to Figure 20, page 25. The horizontal shaft (J) in the row finder must be parallel with the front of the harvester frame to function accurately. Remove pin (G) and loosen the nuts (E), then slide the plate (F) until the shaft is parallel with the frame. Tighten the nuts.

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

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

3. Row Finder Height

Set the row finder height in correct relationship to the lifter wheel working depth to assure proper function. Example: If the lifter wheels will work at a depth of 3", the bottom edges of the feeler arms should be about 3" above the rims of the lifter wheels when operating in the rows. See the Figure below.

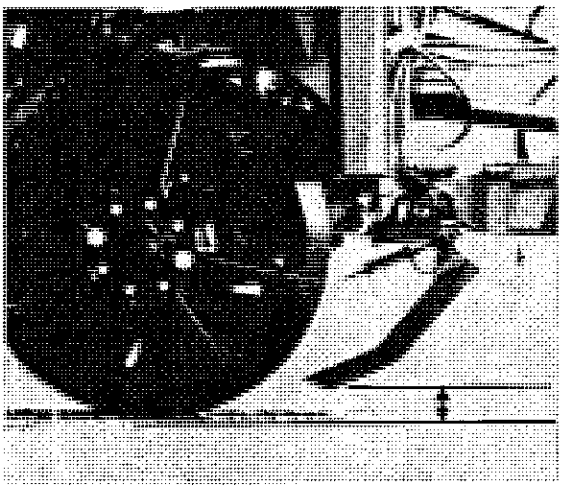


Figure 21. Row Finder Feeler Arm Height Adjustment

The feeler arms should ride along the surface of the ground or just slightly penetrating the surface.

To change the row finder height by more than 1", remove the four (4) bolts (Figure 20-K, page 25) attaching the row finder frame to the support plate. Bolt the row finder to the holes that provide the desired operating height. Tighten the bolts.

NOTE: *For less than 1" height adjustments, raise or lower the feeler arms by adjusting nuts (Figure 20-L).*

4. Feeler Arm Down Pressure

The down pressure of the row finder is factory set at a spring length of 4-1/4". If the beet crowns are below the ground surface, adjust down pressure so the row finder arms penetrate the soil. To increase the down pressure, turn lock nut (Figure 20-M, page 25) to compress the spring.

5. Row Finder Steering Cylinder

The row finder steering cylinder (Figure 22-A), is activated by the rowfinder or by the operator with the tractor control valve.

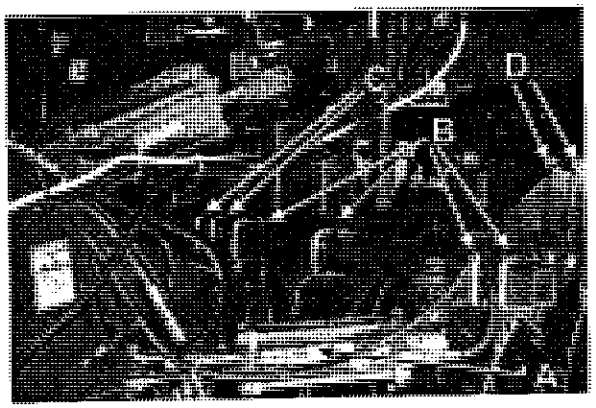


Figure 22. Row Finder Details
A) Cylinder
B) U-Bolts – Tube to Hitch
C) U-Bolts – Rowfinder
D) U-Bolts – Brace to Frame

The main frame attaching bracket of the row finder steering cylinder can be moved left or right to enable use of the full stroke of the cylinder.

If the tractor must be set to straddle three rows, the tongue must be offset 11" for 22" rows or 12" for 24" rows.

To adjust the bracket position, refer to Figure 22 and perform the following:

1. Set the cylinder (A) in the center of its stroke.
2. Loosen the 4 U-bolts (B) that secure the 3x3 tube to the hitch.
3. Loosen the 2 U-bolts (C) that secure the rowfinder.
4. Loosen the 2 U-bolts (D) that attach the outer tube brace to the frame.
5. Move the tongue to the desired offset and tighten the U-bolts.

For offsetting one half row on 24" rows (tractor straddling three rows), move the tractor to the right.

Steerable Axle Operation

The steering control box offers the options of centering or turning as well as overriding the rowfinder steering cylinder.

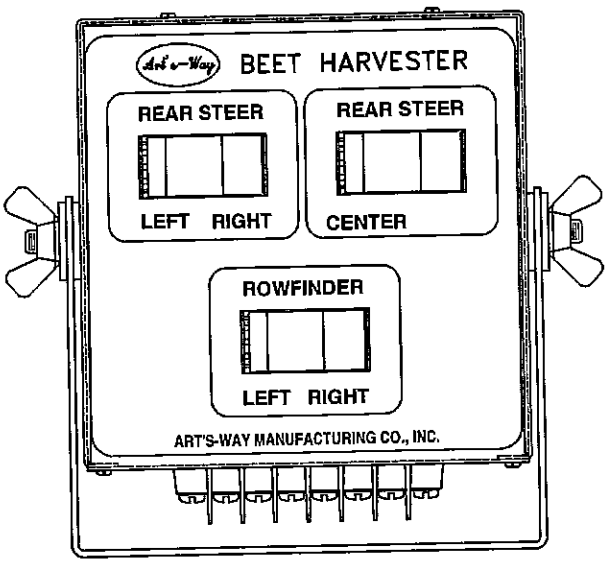


Figure 23. Steering Control Box

Rowfinder - To operate the rowfinder override function, activate the switch labeled Rowfinder to either Left or Right. This will allow the rowfinder steering cylinder on the front hitch to move the machine to the desired position. Hold the switch until the desired alignment with the row is obtained.

Steering - When turning on the ends of the field, activate the switch labeled Rear Steer to either Left or Right. This will allow the rear axle steering cylinder to turn the harvester in the desired direction. Hold the switch until the desired degree of turn is obtained.

Centering - To center the harvester rear axle, activate the switch identified as Rear Steer to Center. This will center the rear axle. Hold the switch until the harvester is centered.

Note: *The switches in the steering control box are momentary and a function is only activated for as long as the switch is engaged. This allows for minor adjustments in steering as well as overriding of the rowfinder.*

Scrapers

Wheel scrapers (see Figure 24) keep dirt and trash from building up on the lifter wheel hubs. Shim the scrapers so they just clear the hub and lifter wheel. Check the scrapers frequently and clean off any accumulated mud and trash.

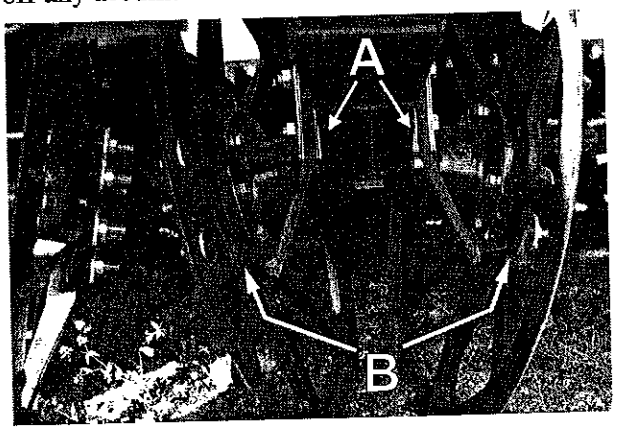


Figure 24. Lifter Wheel Detail.
A) Shims
B) Required Clearance

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 cushions that allow the wheels to open up when a rock is wedged into the pinch point. (See Figure 29, page 29 for information on the rock cushions.)

As a starting position, set the flex strut cushions at 2-7/8" (actual cushion length). Adjust to match conditions as necessary. Flex strut cushions may need to be adjusted to 2-3/4" - 2-5/8" to reduce the amount of flexing on hard ground.

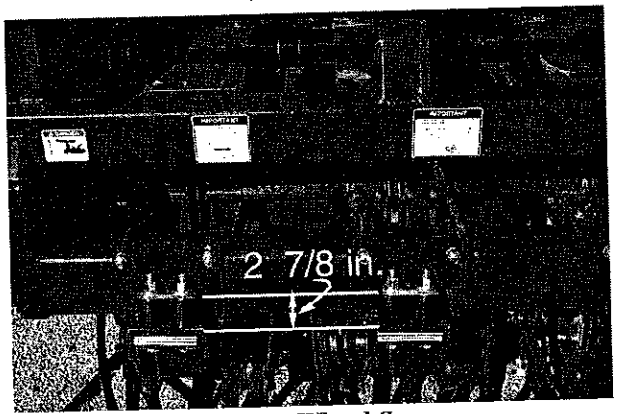


Figure 25. Flex Lifter Wheel Struts

Pinch Point Adjustment

The lifter wheels are adjustable for both pinch point width and height.

Pinch Point Width - To adjust the pinch point width, insert or remove spacer between the lifter wheel and hub (see Figure 26). It is very important to set this as wide as possible and still lift all the beets.

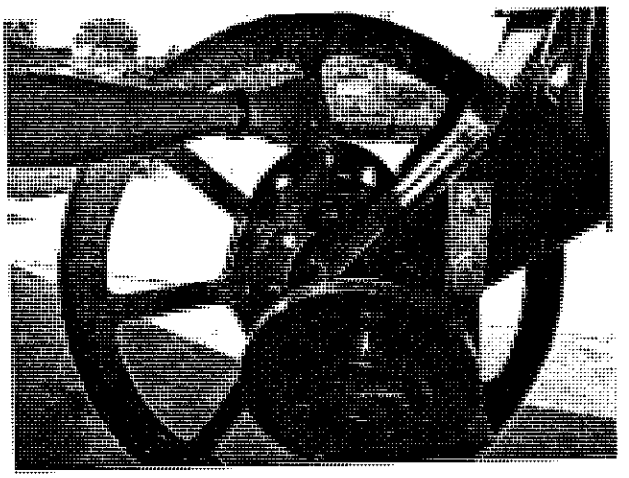


Figure 26. Shims to Adjust Pinch Point Width

Pinch Point Height - To adjust the pinch point height, insert or remove spacers between the upper portion of the strut and the mounting pad (see Figure 27). The pinch point height is factory preset to function well in most conditions.

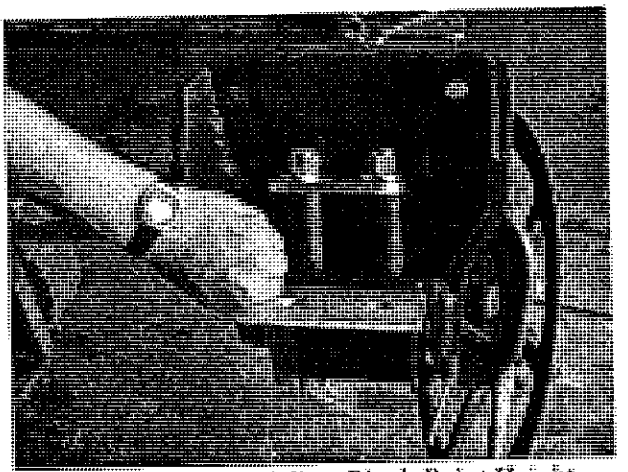


Figure 27. Shims to Adjust Pinch Point Height

Paddle Shaft Paddles And Barriers

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 bearing holes. This will keep the paddle tips in their correct relationship.

Be 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 sbaft 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 rubber paddles are added to bring the active tips of the paddles to the desired positions.

To adjust the barriers, loosen the U-bolts (Figure 28-B); center the barriers between the lifter wheels; then tighten the U-bolts.

The rubber flaps (Figure 28-C) located above the paddles, are *only* effective when they are centered over the paddle clusters and routed over the round tube.

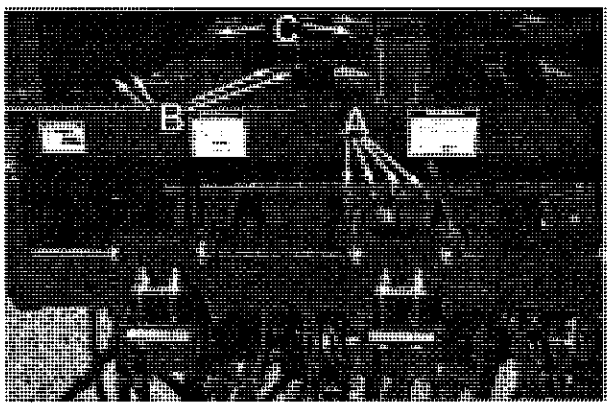


Figure 28. Barrier Adjustment (Shields Removed For Clarity)

Close-Up Attachments

Optional wheel close-ups (Figure 29-A) are available to prevent small beets from falling out between the lifter wheel spokes. Slot adjustments are provided on the close-ups so they may be rotated out of the way as conditions warrant.

Rock Cushions

Optional rock cushions (Figure 29-B) are available (standard on machines with flex struts) that allow the lifter wheels to spread apart when rocks are pinched between the wheels. The cushions are recommended where many small (baseball size) rocks are in the field. If large rocks are also present, the addition of flex struts is recommended. The lifter wheel cushions should be compressed to a height of 1-inch, including the washer.

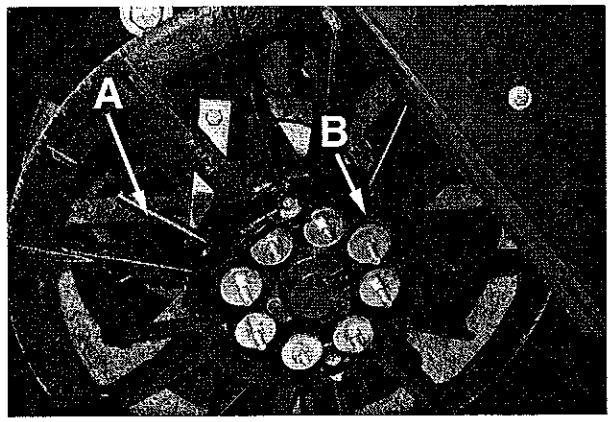


Figure 29. Lifter Wheel Options
A) Close-Ups
B) Rock Cushions

Conveyor & Grabroll Drives

The harvester's grabrolls and conveyor rolls are operated by drive mechanisms located behind the hinged panels on each side of the harvester.

- A 4-band V-belt drives the rollers on the right side of the harvester (Figure 30).
- A 6-band V-belt drives the rollers on the left side of the harvester (Figure 31).

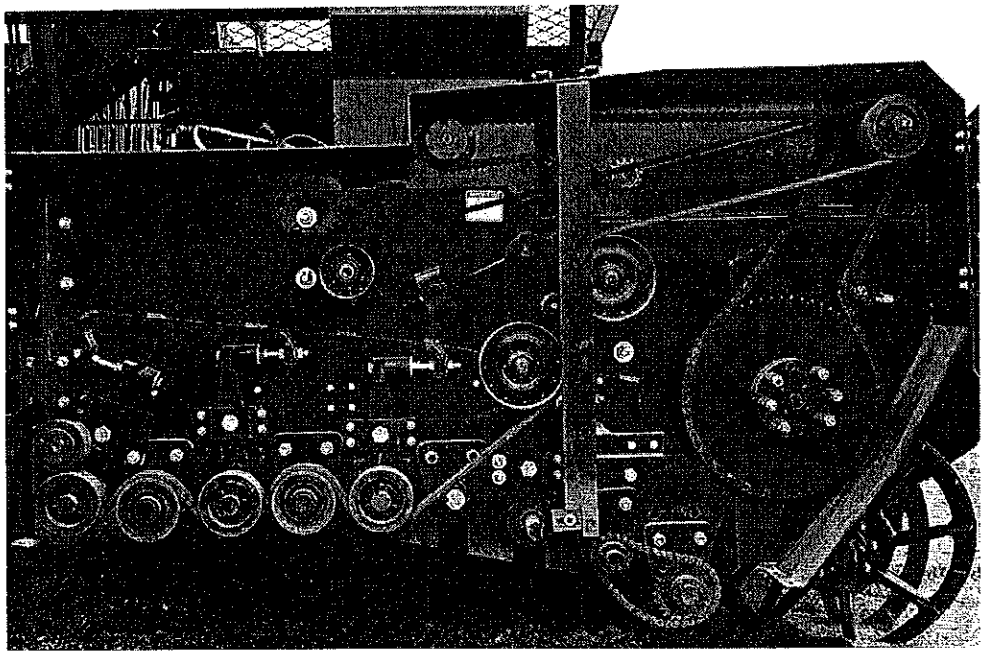


Figure 30. Right-Hand Drive Mechanism (Shields Removed For Clarity)

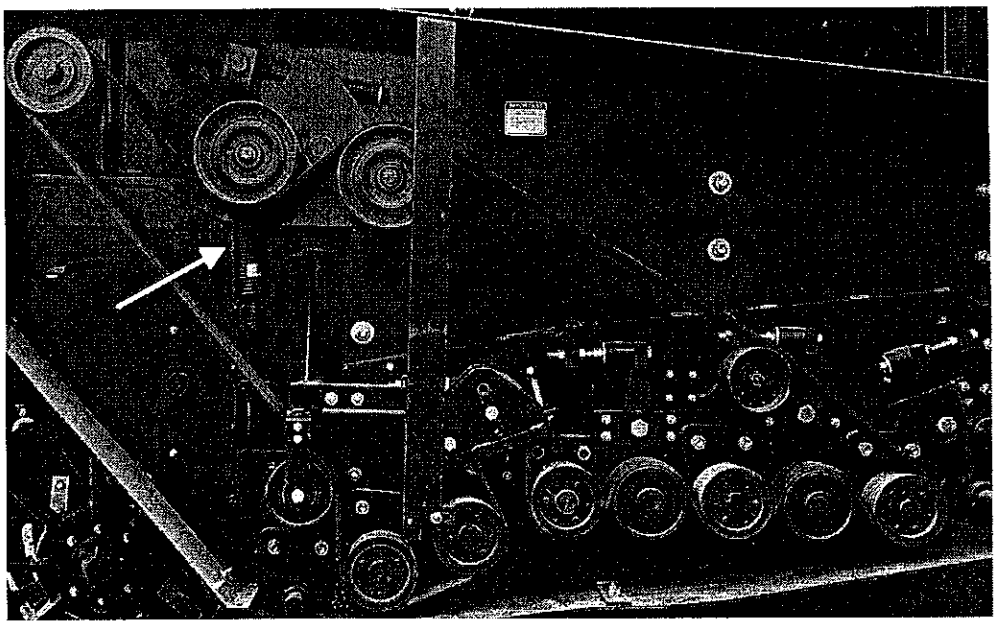


Figure 31. Left-Hand Drive Mechanism (Shields Removed For Clarity); Arrow Shows Assist Spring (Left-Hand Drive Only)

Note: *If the harvester is equipped with a chain bed, also refer to Figures 41 and 42 on page 34.*

Drive Belt Tension

Drive belt tension is maintained by idler springs (Figure 32) on both sides of the machine. Compress the springs to 4-1/2". Check the tension regularly and tighten if required. The assist spring (indicated by the arrow in Figure 31) should be adjusted to 13" (coil end-to-coil end). Set this spring after adjusting the primary drive tension spring. Then check the primary tension spring.

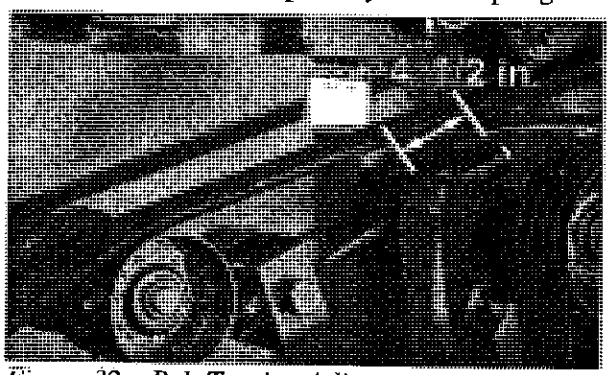


Figure 32. Belt Tension Adjustment

Grabroll Flex Cushion Adjustments

The grabroll bed removes soil and trash from the beets as they are directed to the rear wheel elevator. Protection against rock damage to the grabrolls is provided by flex cushions (Figure 33-B) attached to the arms (Figure 33-A). These cushions allow the grabrolls to move when rocks enter the grabroll bed. Compress the flex cushions to 2-3/4" (including the washer).

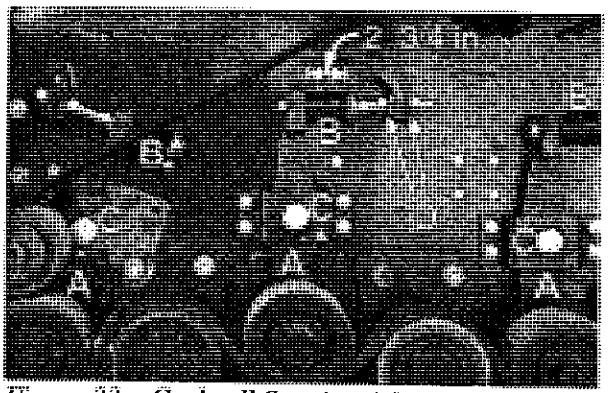


Figure 33. Grabroll Spacing Adjustments.
A) Arms
B) Flex Cushions
C) Pivot Bolts
D) Flex Cushion Adjusting Nut

The 1" arm pivot bolts (Figure 33-C) should be checked occasionally for tightness, and tightened to 760 ft-lbs.

Grabroll Spacing

As a general recommendation, grabroll pairs should normally be equally spaced, 1/4 to 3/8" apart. They must be set parallel.

- For larger beets, or when additional cleaning action is required in heavy and/or muddy soil conditions or in extremely heavy trash, increase the space between the grabrolls.
- For smaller beets, especially early in the season, it may be desirable to use narrower grabroll spacing.

IMPORTANT: *Roll spacing must be set identically on both the right- and left-hand sides of the machine. Measure the distances between the center lines of the shafts.*

The spiral rolls are fixed. The smooth rolls can be adjusted by loosening the nuts (Figure 33-D) that secure the flex cushions to the tabs on the chassis, and then tightening or loosening the nuts to change the position of the flex arms (Figure 33-A) that support the smooth rolls.

Conveyor Roll Spacing

The conveyor roll bed is designed to evenly spread the beets out on the bed, move the beet flow to the sides, and then back to the grabroll bed. Conveyor rolls are factory preset to function well in most conditions. If adjustments are made, ensure that the conveyor rolls remain parallel to each other.

NOTE: *If it is necessary to clean the conveyor rolls, grates may be removed to improve access. To remove the grates, first remove the D-rings that secure them in position. To retain the safety feature of the grates, be certain to replace the grates prior to operating the harvester.*

⚠ 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.

Tilting Grabroll Bed

The conveyor and grabroll bed consists of 8 rolls plus 2 diverter rolls at the rear to direct beets to the wheel elevator. With this design, the slope of the grabroll bed can be changed to increase or decrease the beet cleaning or to improve the flow of the beets. When lowering or raising the grabroll bed, you must first loosen the drive belts on each side. Refer to Figure 34 and perform the following on each side of the machine: Loosen the front bolt (A), loosen the front U-bolt (B) and remove the rear U-bolt (C) that holds the grabroll panel on each side. Loosen the braces (refer to Figure 36) that hold the rear diverter roll supports on each side. Also loosen the center shield support (Figure 34-D) on the right hand side.

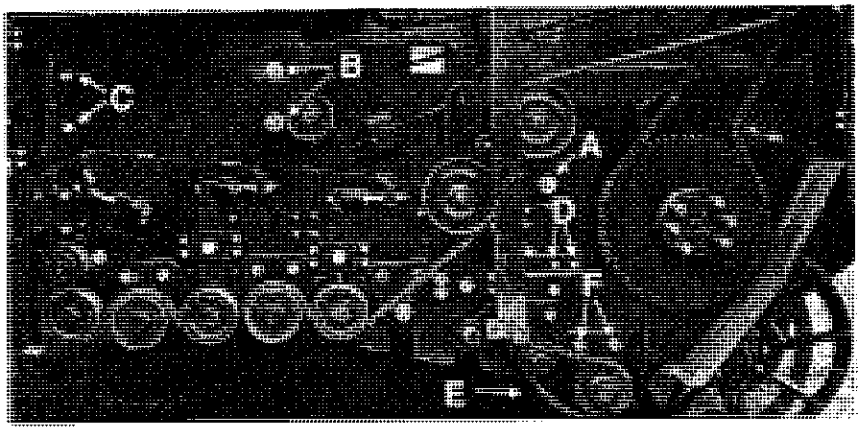


Figure 34. Fasteners That Must be Loosened to Adjust the Grabroll Bed

Using the screw jacks attached to the rear of the grabroll roll panels, raise or lower both sides simultaneously until the desired hole aligns for the rear U-bolt. Tighten all the loosened bolts.

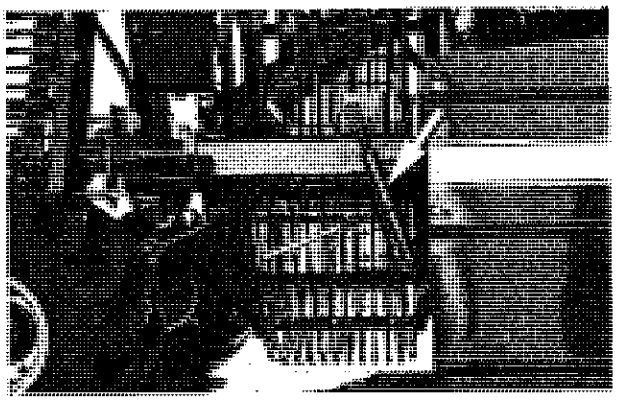


Figure 35. Screw Jacks Used to Raise or Lower the Grabroll Bed

When tilting the bed, check to be sure that there is adequate clearance between the diverter roll and the wheel elevator, and between the diverter roll and the smooth roll below it. To increase clearance, first remove the grate by detaching the D-rings that secure it (Figure 36-B). Then loosen the diverter support bolt (A), and position the assembly as necessary. Tighten all loosened bolts and replace the grates.

***Note:** Always adjust the drive belt tension when the bed is raised or lowered. Refer to Figure 32, page 31.*

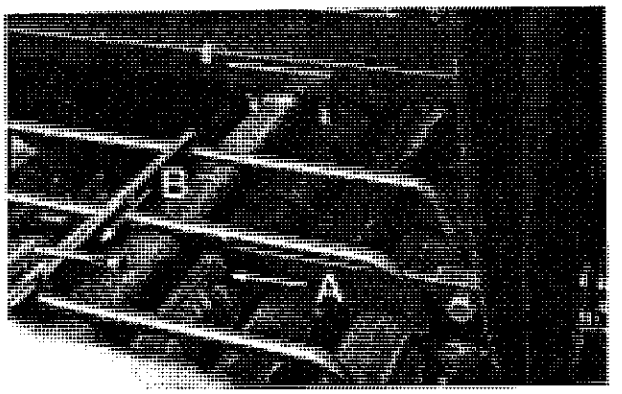


Figure 36. Diverter Roll Support
A) Support Bolt
B) D-Ring

Front Smooth Roll

To move the front smooth roll, remove the drive chain from the right hand side (Figure 34-E). Support the roll with a jack and remove the bearing plate mounting bolts (Figure 34-F). Raise or lower the roll to the desired position. Install and tighten all the bolts and the drive chain.

Paddle Shaft Slip Clutch

The paddle shaft is protected by a slip clutch. Six springs (Figure 37-A) are used to set the tension of this clutch. The recommended setting is 2-3/8" actual length of the springs. Be sure all the springs are the same length. ***Keep jaws free of grease.***

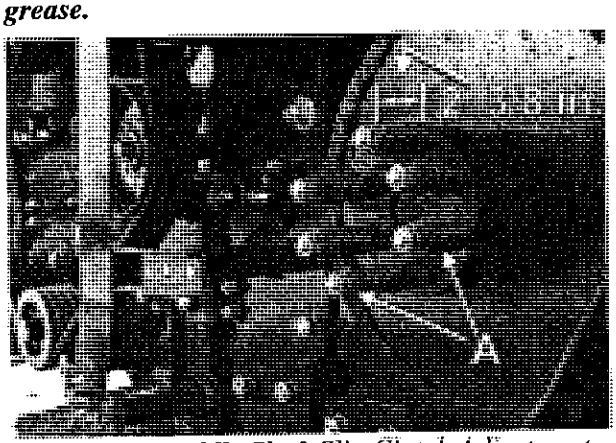


Figure 37. Paddle Shaft Slip Clutch Adjustment

IMPORTANT: *Prior to each season of use, it is recommended to loosen the slip clutches - allow them to slip - then tension the springs to the proper settings.*

Tank Conveyor Chain Tension

To adjust the tension of the draper chain in the tank conveyor, loosen the bracket bolts (Figure 38-A). Using take-up bolts (B), tension both sides equally so the draper chain just clears the guide under the tank. Tighten the bolts. Check tension frequently.

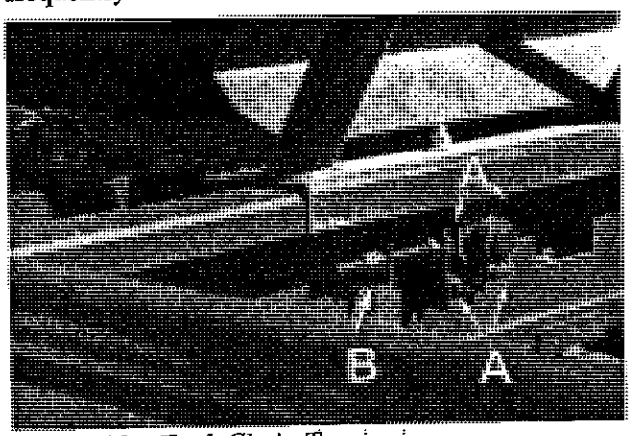


Figure 38. Tank Chain Tensioning
A) Bracket Bolts
B) Take –Up Bolt

Tank Conveyor Drive Chain

Adjust the chain tension with the idler sprocket (see Figure 39). A guideline is to set the tension so that a 20 lb. force will deflect the chain approximately ½ -inch.

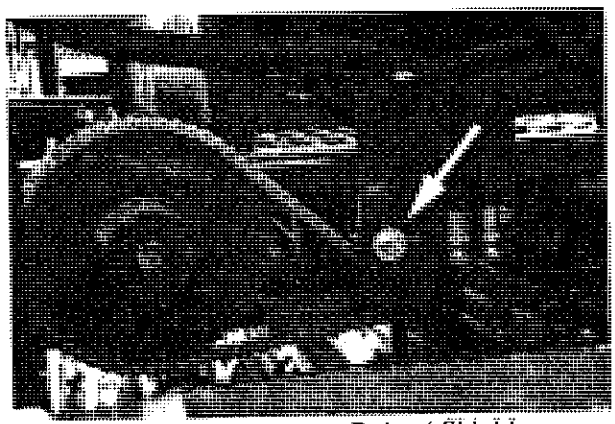


Figure 39. Tank Conveyor Drive (Shields Removed For Clarity)

Holding Tank Discharge Gate

An adjustable gate is provided in the tank discharge opening. Refer to Figure 40. The gate consists of a flexible curtain (A) that is held by an adjustable tube (B). The tube can be raised or lowered to change the rate of discharge to the wheel elevator. Adjust the gate to match various beet sizes, unloading speeds, and operating conditions. To change the discharge rate, remove the D-pins (C) that secure the tube in the available mounting holes (D), and install the tube in a different location. Raising the tube increases the discharge rate, and lowering it reduces the discharge rate.

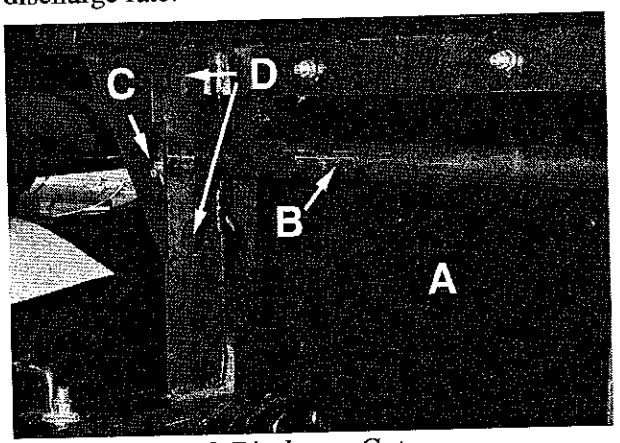


Figure 40. Tank Discharge Gate
A) Flexible Curtain
B) Tube
C) D-Pins
D) Mounting Holes

⚠ WARNING

Do not attempt to make adjustments to the rear discharge opening while the machine is operating or while there are beets in the holding tank. Empty the holding tank as described in the first part of this section, shut off the tractor, place all controls in neutral, set the parking brake, and remove the key. Wait for all movement to stop before approaching the machine.

Optional Chain Bed

An optional chain bed is available in place of the three front rolls. The tension of both the drive chains and draper chains is adjustable.

Adjust the tension in the draper chains by first loosening the carriage bolts in the bearing hanger bracket (See Figure 41-A). Then set the tension by turning the adjusting bolt (B) at the rear of the bracket. The draper chain should have a 2 to 3" deflection in the lower links.

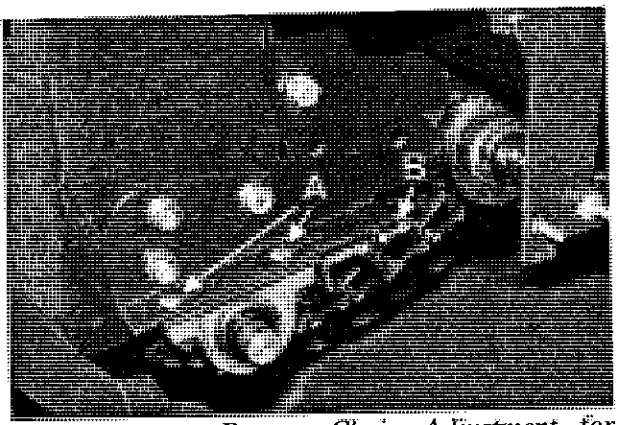


Figure 41. Draper Chain Adjustment for Optional Chain Bed.

The chain bed uses 3 chain drives on the RH side of the machine. The secondary drive chain from the intermediate jackshaft assembly uses a snap idler assembly to tension the chain (see Figure 42). To adjust the tension, remove the nuts securing the sides of the snap idler and relocate the wear strips. Be sure to center the wear strips with the drive chain before replacing the sides of the snap idler.

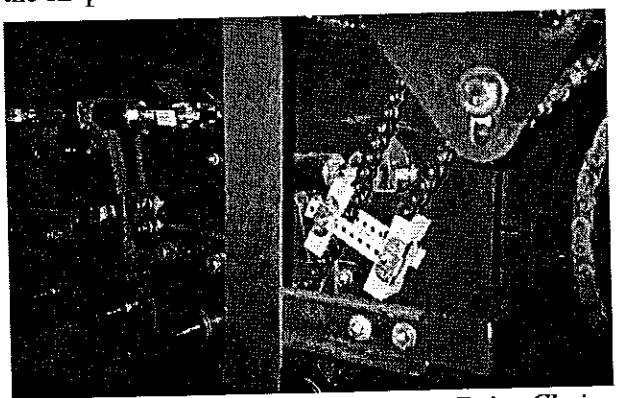


Figure 42. Snap Idler for Adjusting Drive Chain Tension of Optional Chain Bed.

Wheel Elevator

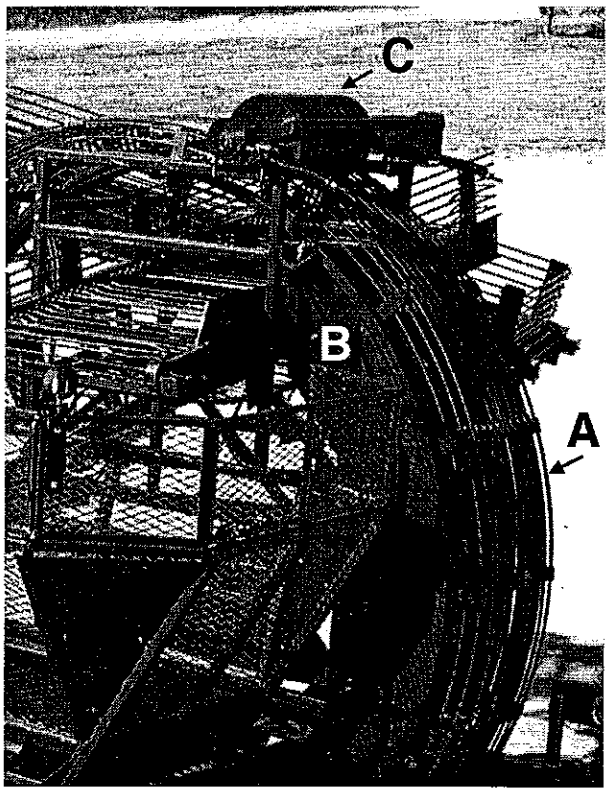


Figure 43. Wheel Elevator Details
A) Elevator
B) Retainer
C) Stripper

The wheel elevator (Figure 43-A) revolves at approximately 11 RPM at 1000 PTO RPM. The wheel elevator carries the beets up to and deposits them in the tank elevator. The retainer (B) holds the beets in the wheel until they get to the top and fall onto the tank elevator. The stripper (C) clears the wheel elevator of any rocks, mud, or beets that get between the wheel rods.

The wheel elevator must turn easily and the chain tension must be adjusted properly. The retainer must be adjusted properly for minimum beet loss and maximum capacity. The stripper must be centered to clear the wheel rods.

Wheel Elevator Drive - Tightening Chain

Check this adjustment by pulling the chain away from the rear of the wheel elevator *on the side of the wheel elevator that is opposite the drive.* A distance of 1/2" indicates that the chain tension is proper.

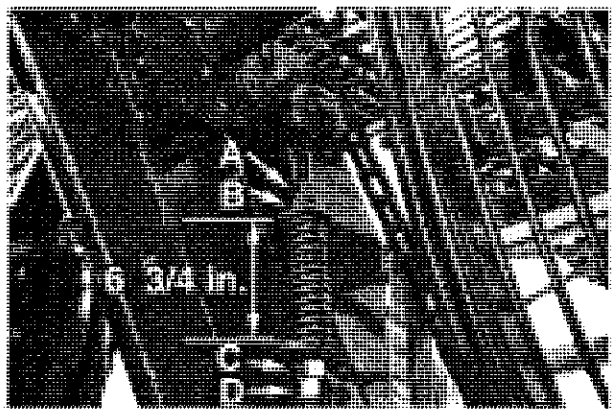


Figure 44. Wheel Elevator Drive
A) Jam Nut
B) Adjusting Nut
C) Adjusting Nut
D) Jam Nut

To adjust the tension, loosen the jam nut (Figure 44-A) and turn the adjusting nut (B). Set the dampener spring length to 6-3/4" by loosening the jam nut (D) and turning the adjusting nut (C). This is factory set and should not need to be changed.

IMPORTANT: *Do not tighten the chain too tight or friction will drive the elevator and the chain will not feed into the slot properly. Do not remove links to tighten. Replace the chain if the tightener sprocket cannot be adjusted to sufficiently tighten the chain.*

Wheel Elevator Alignment

Operate the wheel elevator until the chain connector link is positioned near the drive shaft. Loosen the jam nut (Figure 44-A) and turn the adjusting nut (Figure 44-B) until the maximum chain slack is obtained. Disconnect the chain.

Lay one end of the chain over the other and wire them together so the wheel can be manually turned.

Turn the wheel elevator and check that all the rollers rotate. If the rollers do not turn, repair or replace them.

Check the alignment of the rollers and drive.

1. Four large flanged rollers (two on the left side and two on the right - See Figure 45) must be in alignment and the wheel elevator must be parallel to the frame (within 1/4"). The wheel elevator should just contact the upper front rollers (see Figure 46). Remove or add shims (washers) to the lower rollers if required.

   NOTE: *The wheel must be supported before removing any of the rollers.*

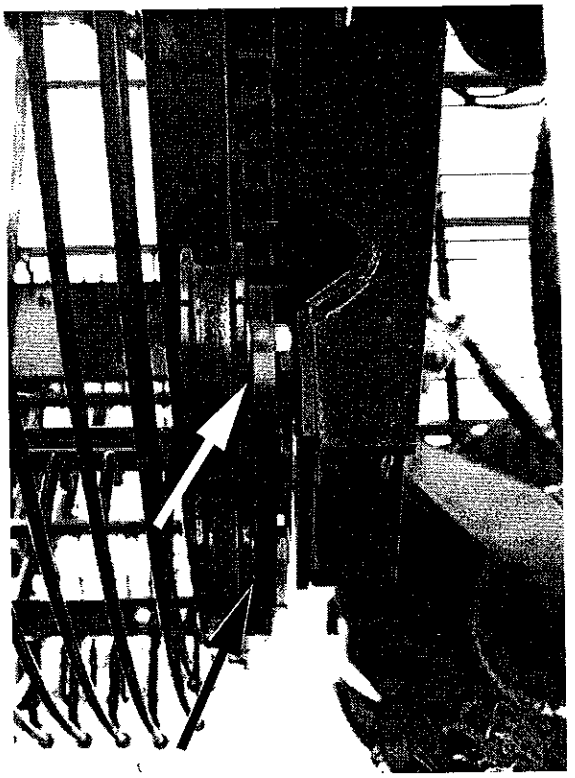


Figure 45. Wheel Elevator Roller Shim Locations

2. Two small solid rollers with bearings (Figure 46) guide the top of the elevator wheel on the front side of the harvester. The elevator wheel should just make contact with these rollers. Note that the roller on the right-hand side of the machine is adjustable.

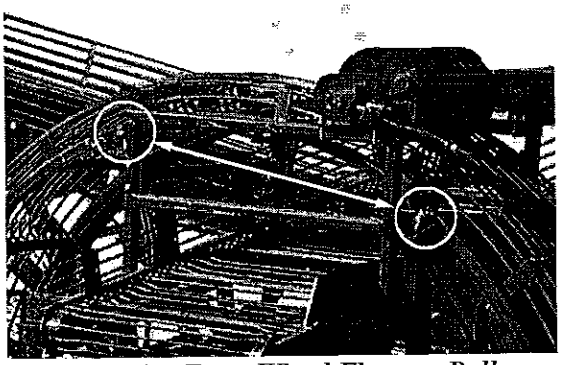


Figure 46. Top Front Wheel Elevator Rollers

3. The two upper guides prevent the wheel elevator from contacting the upper elevator structure. See Figure 47. The guides are bolted into a slot and can be adjusted. Adjust these guides so there is approximately 1/4-inch clearance between the guides and the wheel elevator at the closest point.

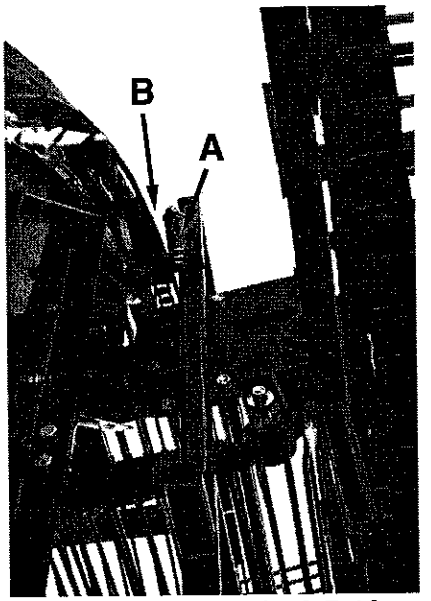


Figure 47. Rear Elevator Wheel Guides
A) Adjustable Rear Guides
B) 1/4-inch Clearance

NOTE: *It is very important that the drive sprocket and idler sprocket (see Figure 44) be in alignment with each other and centered on the slots in the wheel. Make sure they are properly adjusted.*

Wheel Elevator Slip Clutch Adjustment

The elevator drive is protected by a slip clutch (see Figure 48). The four (4) springs set the tension of this clutch. The recommended setting is 2-3/8" actual length of the springs. Be sure all four springs are set at the same length. ***Keep the jaws free of grease.***

IMPORTANT: *Prior to each season of use, it is recommended to loosen the slip clutches - allow them to slip - then tension the springs to the proper settings.*

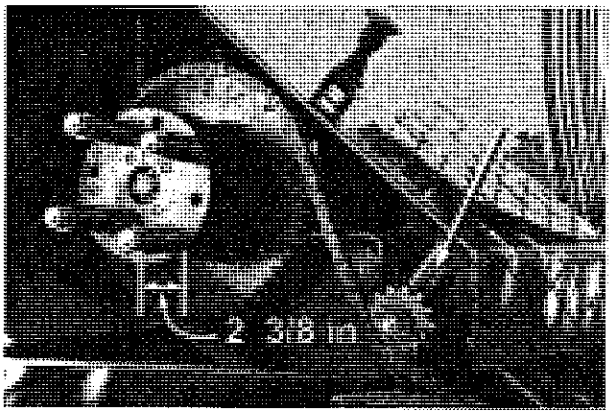


Figure 48. Wheel Elevator Slip Clutch

Stripper

The stripper (Figure 49) consists of a series of disks that run between the rods of the wheel elevator to clean and remove rocks. It can be adjusted to center the disks between the wheel elevator rods by loosening the U-bolts and moving the stripper assembly sideways. It must not be allowed to hit any part of the wheel. The height can be adjusted by adding more washers or by moving the assembly right or left. The spring length should be set to 10-1/2" as indicated by the designation 'A' in the Figure below.

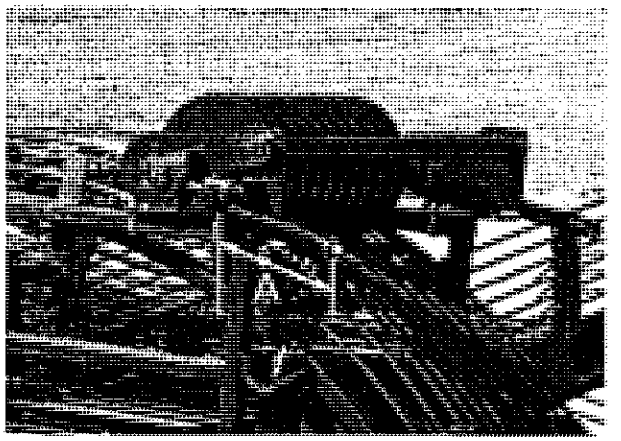


Figure 49. Stripper

Should additional stripper-to-wheel rod clearance he required, bend the wheel rods. *However this should only be necessary if the stripper support adjustment did not provide adequate clearance.* Pay particular attention to ensure that the stripper disks do not contact the wheel elevator joints.

Retainer

The retainer and rods keep the beets from falling out of the wheel elevator pockets as they are elevated to the tank elevator. 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 (Figure 50-A) as it is at the bottom (Figure 50-B). Make sure the retainer does not make contact with the wheel elevator.

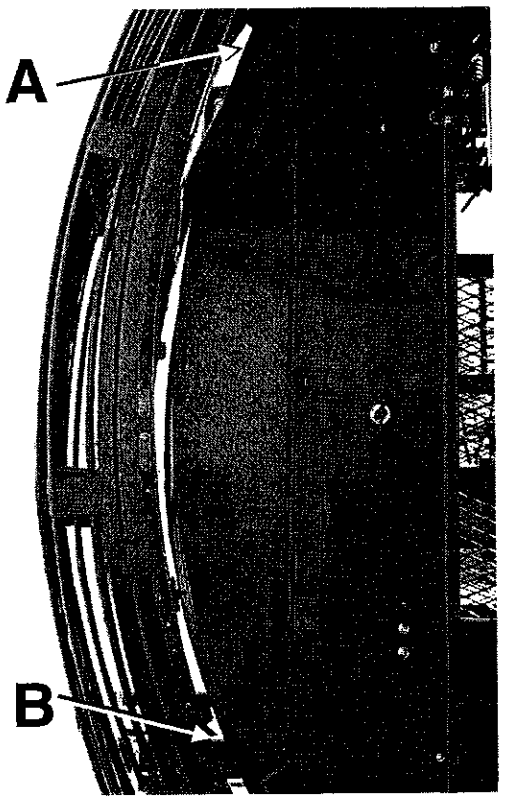


Figure 50. Retainer Assembly Distance From Wheel Elevator.
A) Retainer Clearance At Top
B) Retainer Clearance At Bottom

The retainer rod assembly is flexible so larger beets will not be damaged. Field adjustment is dependent on the beet size and tonnage. The spring adjusting nuts (Figure 51 A and B) are used to adjust the spring tension.

An additional set of holes (Figure 51-C) is provided for the spring bracket if required to reduce tension for large beets.

In muddy conditions, set the springs at location A to full tension.

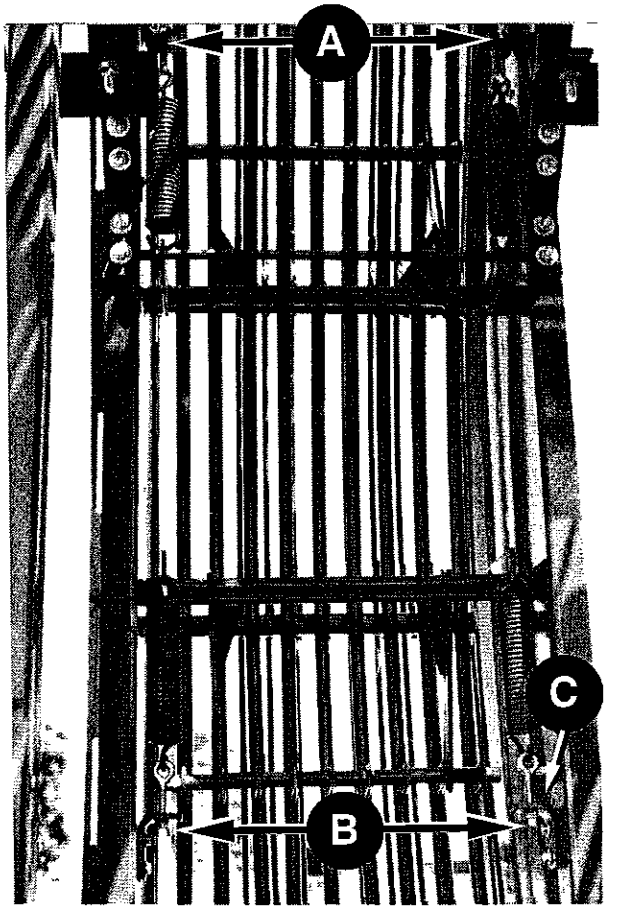


Figure 51. Retainer Spring Adjustments.
A & B) Spring Adjusting Nuts
C) Mounting Holes

Tank and Truck Draper Chain Adjustments

The tank elevator moves beets either to the truck or to the tank. The truck elevator delivers beets from the tank elevator to the truck. The tank elevator and the truck elevator operate in conjunction with each other. When the tank elevator is directed to the tank, the truck elevator is off; when the tank elevator is reversed to deliver beets to the truck elevator, the truck elevator is activated.

Adjustments for the tank elevator draper chain are located at the end of the elevator. The tension adjustment mechanism is similar to the tension adjustment mechanism for the truck elevator shown in Figure 53. Set the tension by loosening the bolts on the flange rollers and the roller scrapers (see Figure 53-A&C), then adjust the bolts (see Figure 53-B). Ensure that the tension is identical on hoth sides of the elevator. Also ensure that there is sufficient tension to prevent the draper chain from dragging on the grate shown as A in Figure 52. Tighten bolts A and C.

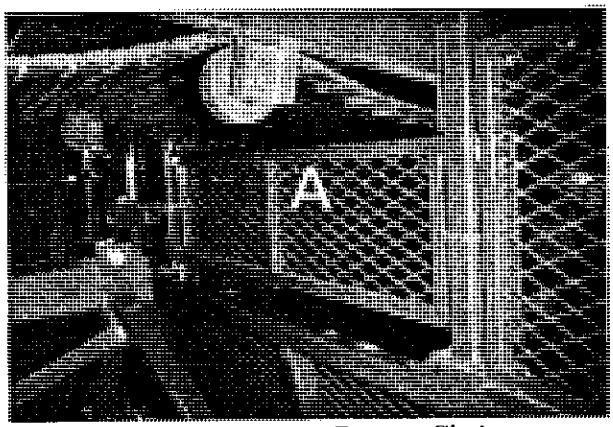


Figure 52. Tank Elevator Draper Chain

Truck Draper Chain Adjustments

The truck elevator must be in the up position before adjusting the tension of the belted draper chain (Figure 53). Set the tension by loosening the bolts on the flange rollers and the roller scrapers (see Figure 53-A&C), then adjust the bolts (B) to set the tension. Tighten bolts A and C.

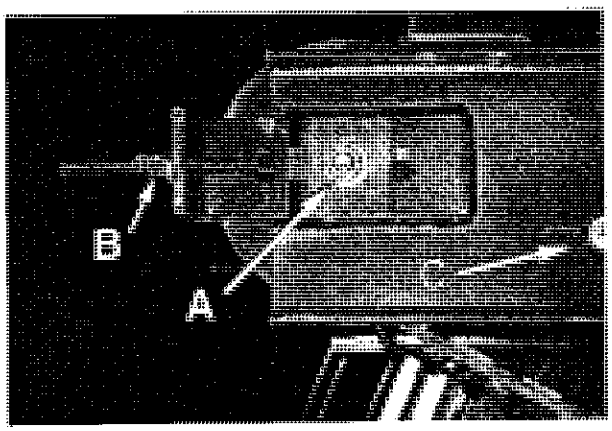


Figure 53. Truck Elevator Tension Adjustments
A) Flange Bolt
B) Adjusting Bolt
C) Roller Scraper Bolt

Large changes in belt tension can be made by changing the positions of the rollers shown in Figure 54. Ensure that tension is identical on both sides of the elevator.

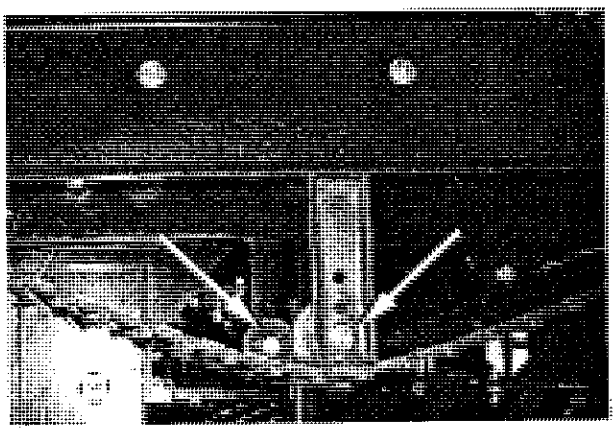


Figure 54. Truck Elevator Tension Adjustments

IMPORTANT: *Maintain equal chain tension on both sides of the conveyor so that the chain will run straight and wear uniformly.*

Truck Elevator Boom Adjustments

1. Up & Down Stop Settings

Setting Boom Height - To adjust the height of the truck elevator boom, raise the boom to the operating position. Install 1" bolts (Figure 55-B) just below the pivot point (A) to secure the boom. Loosen bolts C and remove bolts D on the channels that support the elevator. Operate the cylinders to assist removal of the lower bolts (D) and for positioning the bolts to a different setting. Replace and tighten all bolts and be sure to remove the lower 1-inch bolts (B) before folding the elevator.

Setting Boom Stops- Boom stops (Figure 55-E) MUST be set to prevent the boom from contacting the harvester frame when the boom is lowered. The boom stops are plates that can be installed in several positions. To set the stops, first remove them and then use the cylinders to lower the boom to the down position. Do *not* let the boom contact the frame. Then install the stops in the position that will prevent the boom from contacting the harvester when lowered fully.

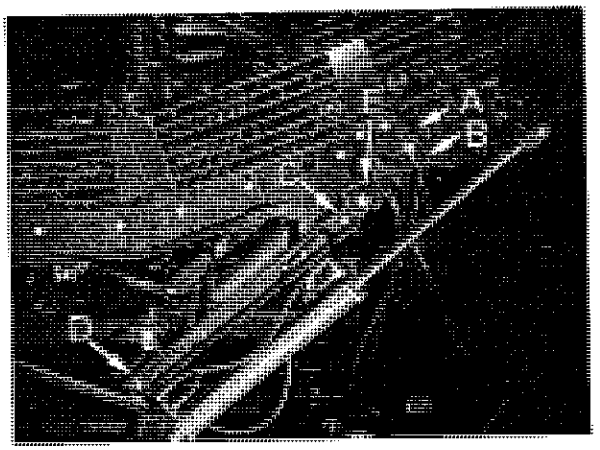


Figure 55. Adjusting the Truck Elevator Height and Boom Stop

A) Pivot Point
B) 1-Inch Bolt
C) Upper Support Channel Bolt
D) Lower Support Channel Bolt
E) Boom Stop

2. In & Out Stop Settings

The truck elevator is factory set to the farthest inward position. When additional reach is desired, or additional truck-to-harvester clearance preferred, it may be moved outward.

NOTE: Moving the truck elevator outward will effect the clearance for driving a truck under the elevator on the second pass when opening a land. It is recommended to make this adjustment in a shop using a hoist.

To adjust the settings, raise the truck boom and install 1" bolts (Figure 55-B) just below the pivot point (A) to secure the boom. Remove the grate(s) from the truck elevator at the point where the tank elevator dumps into it. Attach suitable hoists to support the elevator. Loosen hose bindings at the points where additional length will be required. Remove the six (6) U-bolts that are holding the lower 4"x4" square tubes to the tank frame. The arrows in Figure 56 show 2 of the 6 U-bolts). Slide the elevator and support assembly to the new position. Install the U-bolts that secure the 4"x4" tubes to the frame. Install any grates that were removed. Secure the hoses. Tighten all loosened bolts and remove the lower 1" bolts (B) before folding the elevator.

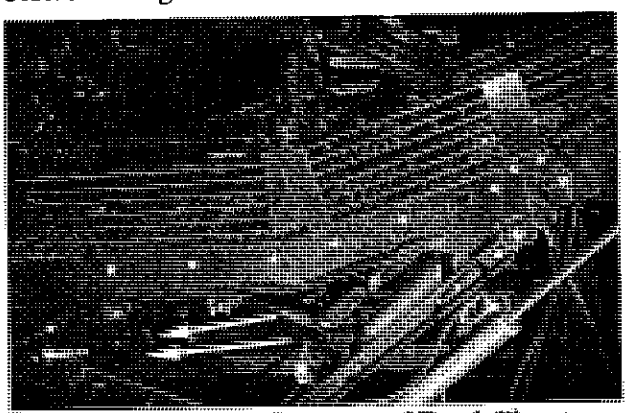


Figure 56. In-Out Adjustment of Truck Elevator; Arrows Show Two of Six U-bolts.

Roller Chain Drives

Roller chain drives are tensioned by moving the idler sprockets in the slots. Check the roller chains frequently and tension them so approximately 20 lbs. of force deflects the chain 1/2".

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

Tire Pressure

Frequently check the tire pressure. Equal pressure should be maintained in all tires. **The recommended pressure for the 21.5Lx16.1 14 ply tires used on the 698 Beet Harvester is 36 psi.**

Installing Tires

⚠ CAUTION

Failure to follow proper procedures when installing a tire on a wheel or rim can produce an explosion which 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 a qualified tire repair service.

When seating tire beads on rims, never exceed 36 psi or the maximum inflation pressure specified by tire manufacturers for installing tires. Inflation beyond this maximum pressure may break the bead, or possibly the rim, with dangerous explosive force. If both beads are not seated when the maximum recommended pressure is reached, deflate and reposition the tire, lubricate the bead, then inflate.

Detailed agricultural tire installation instructions, including the necessary safety precautions, are also available from the Rubber Manufacturers Association and from tire manufacturers.

Tightening Wheel Bearings

Raise the wheel and remove the hub cap (Figure 57-A). Visually inspect the bearing for grease and pack if necessary. Remove the cotter pin from the castle nut and tighten until there is a slight drag on the bearing (while turning the wheel), then back off the nut one slot, insert and spread the cotter pin. There should be a slight drag on the bearing following the adjustment. Replace the hub cap.

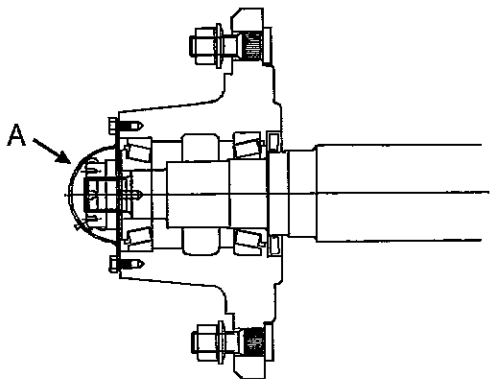


Figure 57. Carrier Wheel Bearings

Lug Nuts

Tighten all lug nuts to 400-450 ft-lbs.

⚠ CAUTION

While working on the machine be sure to work safely. Use adequate blocking. Use adequately rated lifting devices. Make sure parts are secured before working under or near them.

Lubrication and Storage

The Figure below shows the general locations of lubrication and grease points. Lubrication requirements are discussed in detail on pages 43 through 45.

Right Side View **Left Side View**

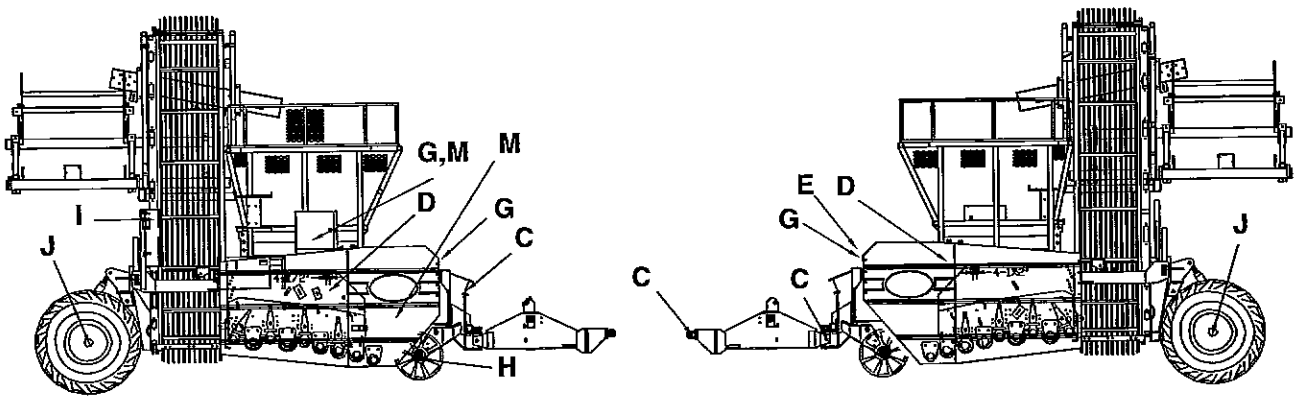


Figure 58. General Location of Lubrication and Grease Points

General

Economical and efficient operation of any machine depends upon regular and proper lubrication of all moving parts with a quality lubricant. Failure to lubricate results in reduced efficiency, premature wear, 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.

Lubricate Every 8 Hours Of Operation:

A. - CV PTO – A high quality general-purpose grease may be used; however, a grease containing 3% Molybdenum Disulfide is recommended.

I. Cross & Bearings (3), until grease is purged around the seal (1-2 pumps).

II. CV Center Housing (1), until grease is evident around the center section disk (4-6 pumps).

III. CV Ball & Socket (1), until grease is evident around the center ball and socket (1-2 pumps).

IV. Telescoping Members (1) until grease fills the telescoping area. Disassemble occasionally to ensure components are adequately greased (4-8 pumps).

IMPORTANT: *When turning frequently or making many sharp turns, grease the CV center housing at 4-hour intervals.*

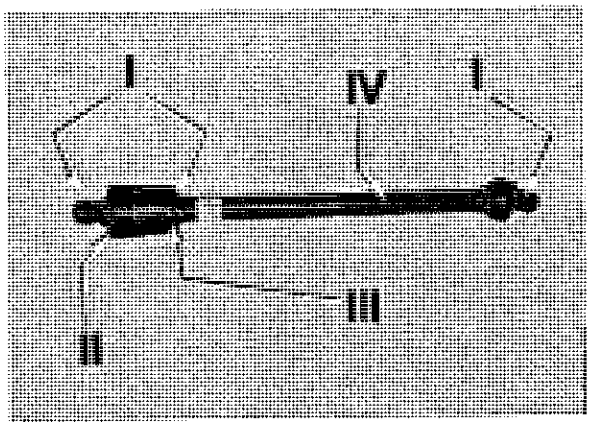


Figure 59. CV PTO

IMPORTANT: *Failure to frequently grease the CV center housing, CV Ball And Socket, and telescoping members will reduce the life of the CV.*

⚠ 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.

Lubricate Every 10 Hours Of Operation:

Lubricate with one, two or three pumps for items B through E below.)

B. - Row Finder - Lubricate every 10 hours with SAE Moly based or multi-purpose grease.

C. - Hitch Components - Lubricate the swivel pins for the steering cylinder, tongue pivots, and hitch bolt as shown in Figure 56.

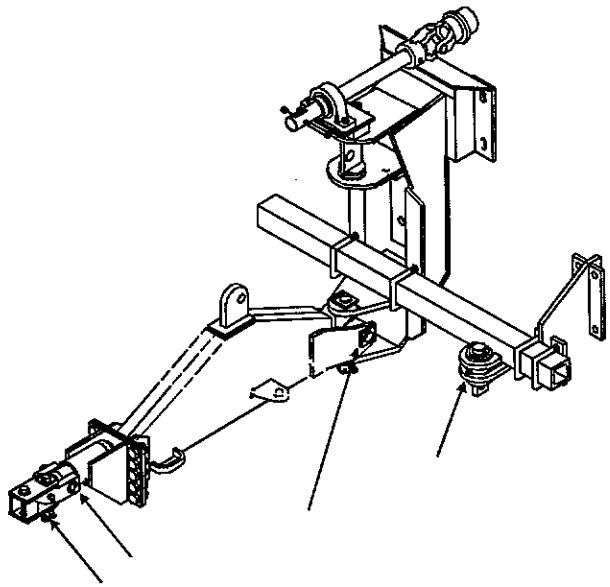


Figure 60. Hitch Lubrication Points

D. - Belt Tensioner Pivots (4) and Take-Up Bolts (2) - Lubricate every 10 hours with SAE Moly based or multi-purpose grease.

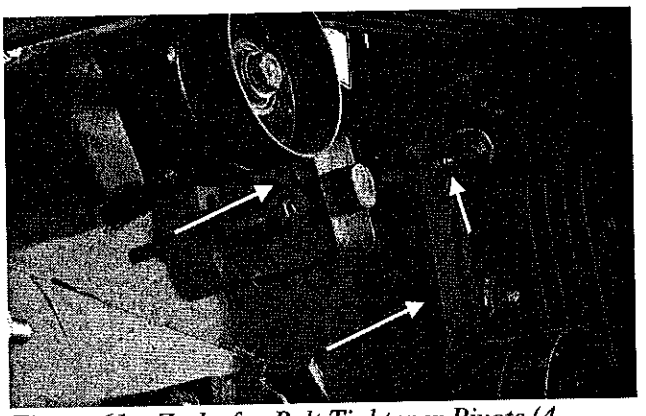


Figure 61. Zerks for Belt Tightener Pivots (4 Locations)

E. - U-Joints on Gear Box Drive Shaft & Front Jackshafts - Lubricate every 10 hours with SAE Moly based or multi-purpose grease.

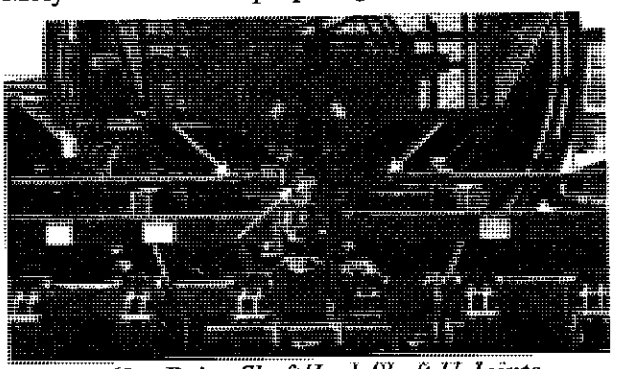


Figure 62. Drive Shaft/Jack Shaft U-Joints

Lubricate Every 20 Hours of Operation

F. - Pillowblock & Flange Bearings - These are sealed bearings. Lubricate sparingly, seal damage may result. One or two pumps every 20 hours maximum. Diesel fuel squirted on seals at the end of the season will help to keep the seals soft and flexible.

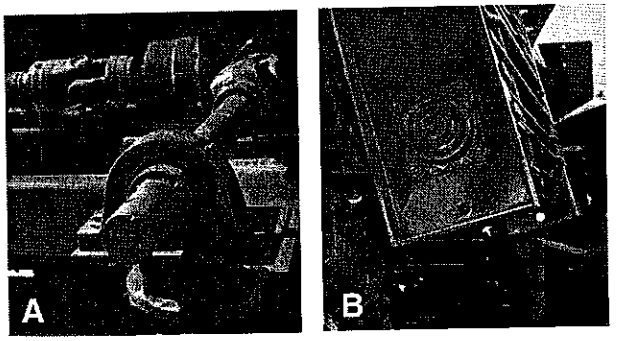


Figure 63. Bearings
A) Pillowblock Bearing
B) Flange Bearing

Lubricate Every 50 Hours of Operation

G. - Gear box Oil Level - The oil level in the gearboxes must be checked every 50 hours. Fill to level plug with SAE EP 90 gear oil.

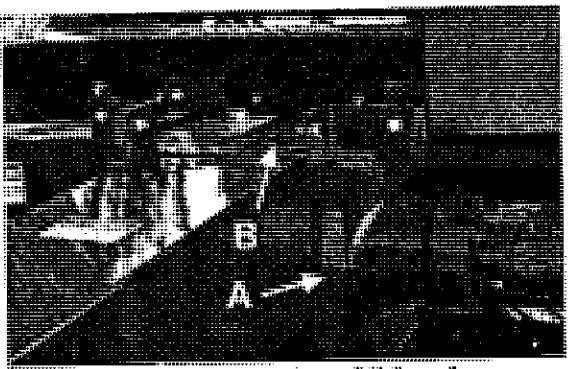


Figure 64. Main Gear Box Oil Level

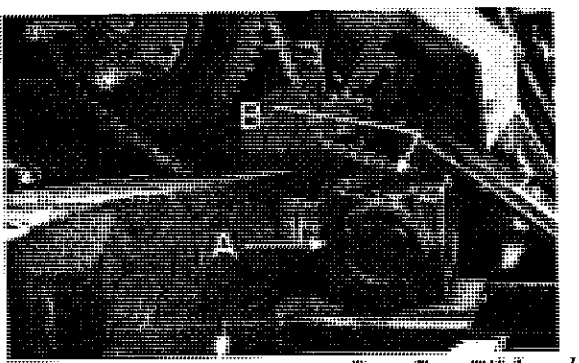


Figure 65. Wheel Elevator Gear Box Oil Level
A) Level Plug
B) Fill Plug

H. - Lifter Wheel Hubs - Grease through zerk with SAE Moly based or multi-purpose grease every 50 hours.

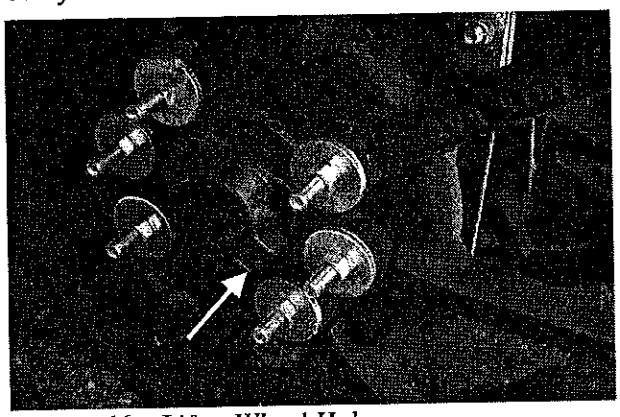


Figure 66. Lifter Wheel Hubs

I. - Wheel Elevator Drive Idler Arm - Grease with SAE Moly based or multi-purpose grease every 50 hours.

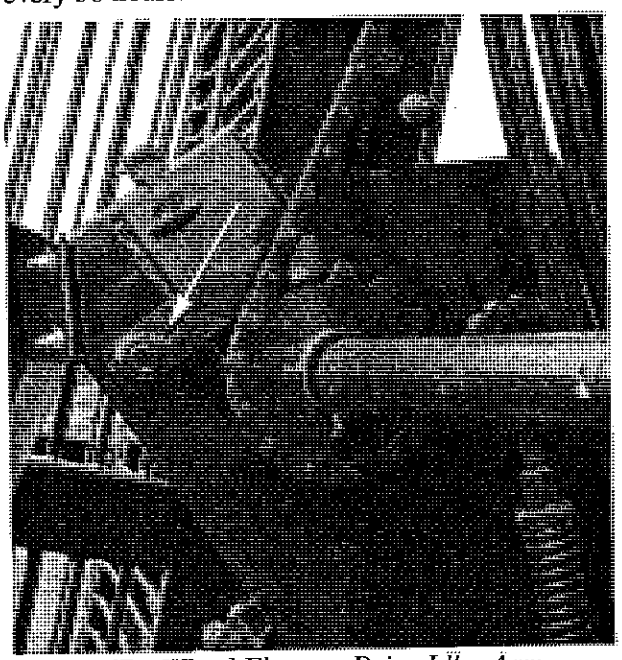


Figure 67. Wheel Elevator Drive Idler Arm

Lubricate Once Every Season or Every 500 Hours

J. - Carrier Wheel Bearings - Clean and pack with wheel bearing grease every 500 hours or each season.

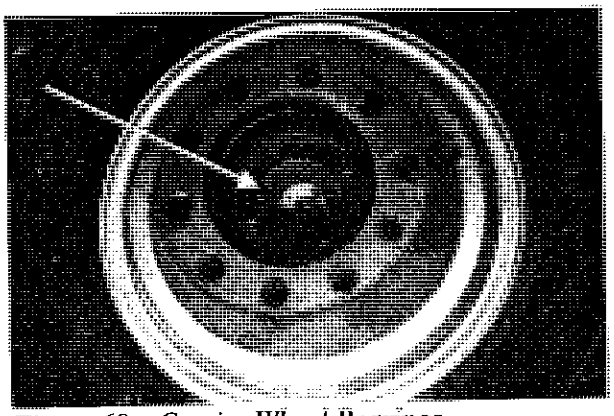


Figure 68. Carrier Wheel Bearings

K. - Roller Chain - Remove, clean and soak in oil every 500 hours or each season.

L. - Change Gear Box Oil - Oil in the gear boxes must be replaced every 500 hours or each season. Refill to the level plug with SAE EP 90 gear grease. Refer to Figures 64 and 65 on the previous page.

M. - Slip Clutches - Lubricate the paddle shaft slip clutch (shown below) and the wheel elevator slip clutch (upper left of Figure 65 on the previous page) with one pump every 500 hours or each season.

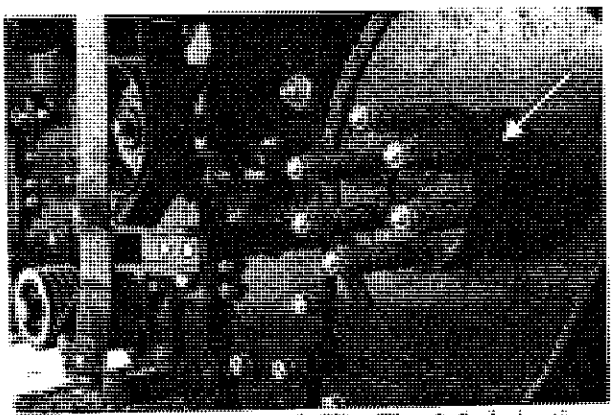


Figure 69. Paddle Shaft Slip Clutch Lubrications

Storage

Proper storage will greatly extend the life of your machine and make it easier to place back into service at the beginning of the next season. Follow the guidelines below to ensure your harvester is protected.

Preparing Harvester for Storage

1. Store the harvester in a dry place.
2. Squirt diesel fuel on seals of the bearing prior to washing with a power washer.
3. Thoroughly clean the harvester.
4. Thoroughly clean drive chains and brush with heavy oil to prevent rust.
5. Lubricate harvester. Grease the threads of adjusting bolts. Run the machine briefly to distribute the grease.
6. Remove belt tension.
7. Repaint all worn parts or coat with light oil to prevent rust.
8. Block up the harvester to remove load from tires, do not deflate the tire. If stored outside, remove the wheels and tires, then store them in a cool, dark, dry place.
9. Store the harvester on a firm and level surface. Block the wheels to prevent the machine from rolling. If the harvester is not stored on a hard surface, place a plank under the lifter wheels to prevent them from sinking into the ground.
10. List the replacement parts needed before the 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 delays at the time of need.
11. If hydraulic cylinders remain on the harvester with the cylinder rods extended, apply grease to the exposed rod ends to prevent rust.
12. If the harvester is not sheltered, the belted elevator chain should be protected from direct sunlight.

Preparing Harvester for the Field

1. Replace the wheels if they were removed and remove the blocking.
2. Inflate the implement tires to the proper pressure; 36 psi for stock 21.5L-16.1 14 ply tires.
3. Clean the harvester thoroughly.
4. Check the drive and conveyor chains, making certain they have the proper tension.
5. Retension the belt drives.
6. Lubricate the harvester; then run at half speed for 10-15 minutes, listening for any unusual noises. Stop the harvester and check the bearings for over heating or excessive looseness. Check the chain tensions.
7. Review the safety and operating instructions in this manual.
8. Inspect all connections and make certain that the hardware is tight and the cotter pins are in place.
9. If the cylinders were stored on the machine with the cylinder rods extended and coated with grease, clean the grease from the exposed rods.
10. Make sure all shields are in place and properly fastened.

Assembly

Unloading from Transport

⚠ CAUTION

A 698 Sugar Beet Harvester weighs approximately 19,800 pounds. Use extreme caution when unloading, handling, supporting and assembling the machine. Carelessness or errors in judgment could result in slippage, causing serious injuries or death.

1. Unloading should be done on a level surface; depending on the transport, a loading dock or access to unload from a step trailer must be available.
2. Make sure safety stands, support blocks and safety straps are of sufficient strength and capacity to safely handle the harvester.
3. Install the carrier wheel and tire assemblies to the hubs with the lug nuts provided. Torque the lug nuts to 400-450 ft-lbs.
4. Have a large capacity tractor available to unload the harvester from the transport.
5. Slowly roll the harvester off onto the ground surface.

Assembly Safety

- Use adequate manpower to perform assembly procedures safely.
- Assemble the beet 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 in the working area.
- Tire safety: **Do not** attempt to install a tire on a wheel or rim unless you have the proper equipment and experience to do the job. Always follow proper procedures when installing a tire on a wheel or rim to prevent an explosion which could result in serious injury. Should a tire shipped with the Art's-Way Beet Harvester require replacement, **do not** substitute tires of lesser load rating and capacity for the original equipment tires.

Assembly Preparation

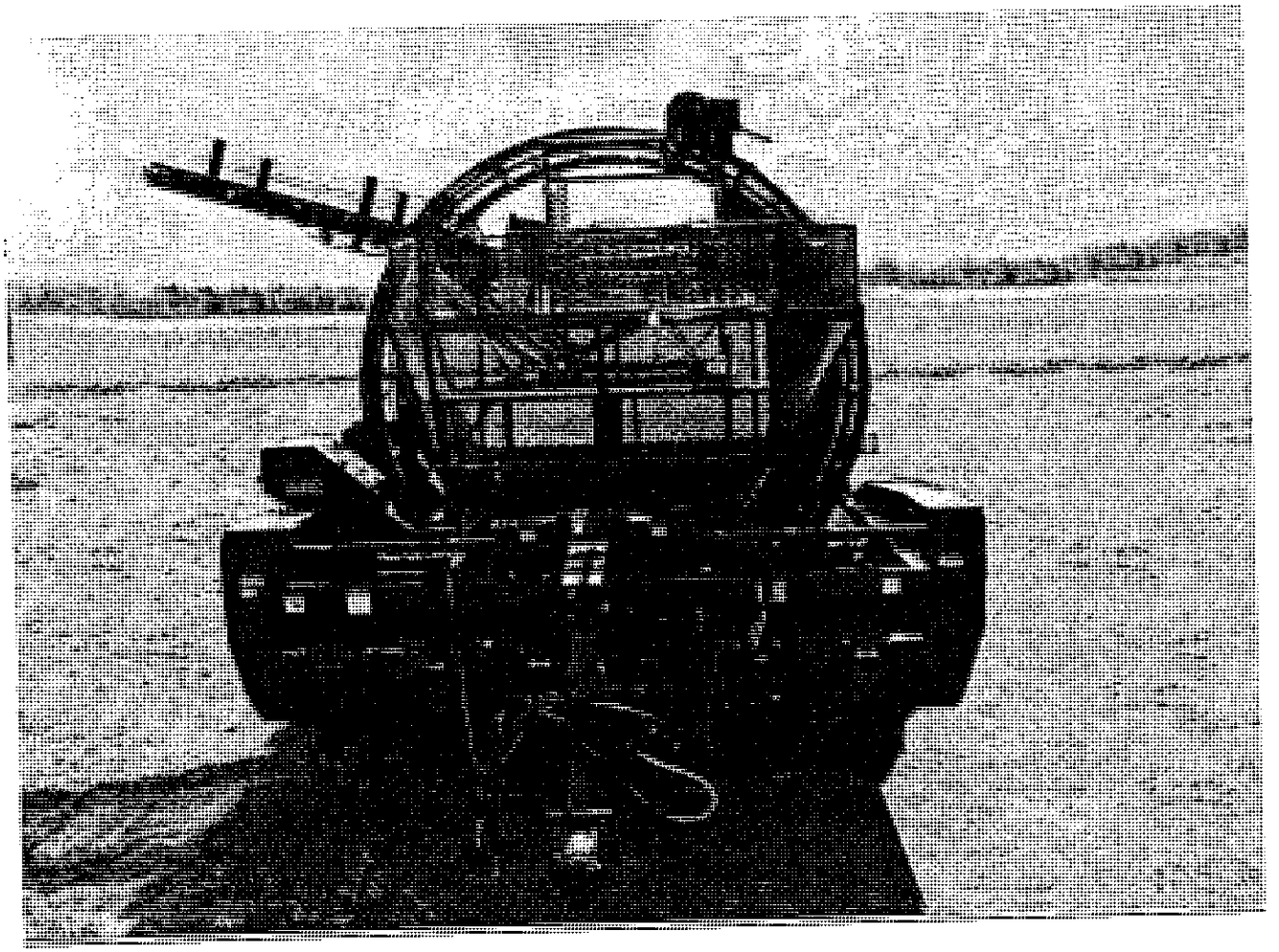


Figure 70. Assembled Harvester

Unpacking - The Harvester is shipped mostly assembled. The tires, hitch assembly, PTO, row finder, and attaching hardware are shipped loose.

Assembly - Follow these step-by-step instructions and guide-lines to prepare the machine safely and efficiently for operation.

References - References to pictures and diagrams showing important attachment elements or drive components are included to make assembly instructions easier to follow.

Bolt Torque - The Torque Specification Table below (Table 4) provides the (non-lubricated) torque values for various bolts and cap-screws. Do not grease or oil bolts or capscrews unless instructed to do so in this manual. When using locking elements, increase the torque values by 5%. Always replace hardware with the same grade bolt.

Table 3. Specific Torque Specifications

Item	Torque
Wheel nuts	400-450 ft.-lbs.
Hitch support hardware (1-1/8")	700 ft.-lbs.

Table 4. Torque Values for Grade 5 Bolts

Bolt Size	Clamp Load	Plain	Plated
¼ - 20 (.250)	2,025	8 ft. lbs.	76 in. lbs.
5/16 - 18 (.3125)	3,338	17 ft. lbs.	13 ft. lbs.
3/8 - 16 (.375)	4,950	31 ft. lbs.	23 ft. lbs.
7/16 - 14 (.4375)	6,788	50 ft. lbs.	37 ft. lbs.
½ - 13 (.500)	9,075	76 ft. lbs.	57 ft. lbs.
9/16 - 12 (.5625)	11,625	109 ft. lbs.	82 ft. lbs.
5/8 - 11 (.625)	14,400	150 ft. lbs.	112 ft. lbs.
¾ - 10 (.750)	21,300	286 ft. lbs.	200 ft. lbs.
7/8 - 9 (.875)	29,475	430 ft. lbs.	322 ft. lbs.
1 - 8 (1.000)	36,625	644 ft. lbs.	483 ft. lbs.
1 - 1/8-7 (1.125)	42,375	794 ft. lbs.	596 ft. lbs.

Table 5. Head Markings of SAE Bolt Grades

Grades 0, 1, and 2 No Markings	
Grade 5 3 radial dashes 120 degrees apart	
Grade 8 6 radial dashes 60 degrees apart	

Tires & Rims - Install the tire and rim assemblies, tighten the lug nuts to 400-450 ft.-lbs., and ensure the tires are properly inflated to their specified pressure.

Tire pressure for the 21.5L-16.1 14 ply tire is 36 psi.

Shields - Make sure that all shields are in place, secured and functioning.

Oil Levels - The 698 harvester has two (2) gearbox assemblies that require oil for lubrication. Check the gearboxes for oil level before operating.

For details, refer to appropriate sections as listed below:

Item	Lube	Page
Main Gearbox	SAE EP 90W	44
Wheel Elevator Gearbox	SAE EP 90W	44

Lubrication - Check that all grease fittings are in place (including the PTO) and have been lubricated. Refer to the **Lubrication Section,** pages 42-45.

698 Harvester Assembly

Hitch Support, Tongue And Power Take Off

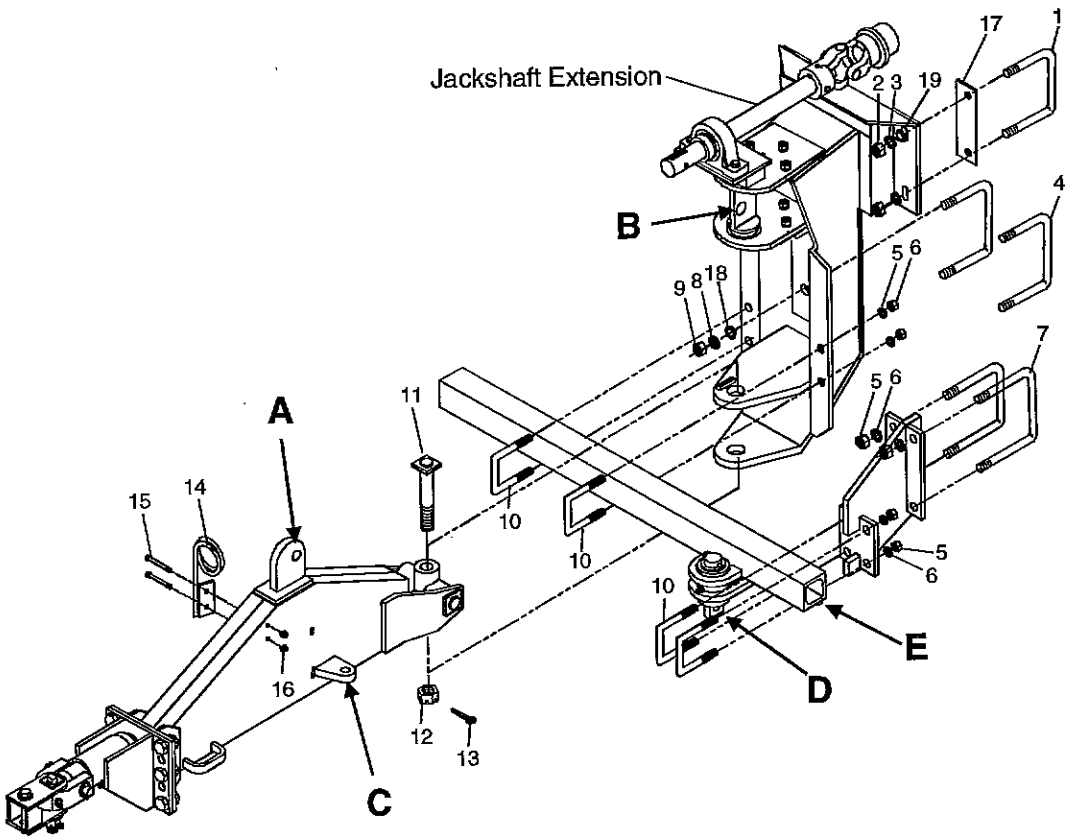


Figure 71. Hitch Installation

Bill of Materials

Item	Quantity	Part Number	Description
1	2	286490	Bolt, U 5/8-ll x 5-1/2 x 6"
2	4	I124589	Nut, Hex 5/8-11
3	4	020440	Washer, Lock 5/8 reg
4	2	460510	Bolt, U 1-8 x 2"
5	12	J14H794	Nut, Hex 3/4-10
6	12	036800	Washer, Lock 3/4
7	2	375070	Bolt,U 3/4-10 x 6-3/4 x 7-1/16
8	4	003350	Washer, Lock 7/8
9	4	J14H805	Nut, Hex 7/8-9
10	4	246120	Bolt, U 3/4-10 x 1-1/2 x 4-1/2
11	1	E580109	Weldment, Pin
12	1	E552084	Nut, Slotted
13	1	E580042	Pin, Cotter 3/16 x 3
14	2	E150004	Hose Carrier
15	2	031020	Bolt, HHCS 3/8-16 x 5-1/2
16	2	E552044	Nut, Lock 3/8-16 Hex
17	2	455540	Strap, Shim
18	4	1107389	Washer, Flat 1"
19	4	020430	Washer, Flat 5/8"

⚠ CAUTION

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.

Hitch And Tongue Assembly

For the following procedures, refer to Figure 71.

If the bolt-on hitch assembly has been removed, install it on the harvester using the provided U-Bolts as noted below.

1. Attach the hitch assembly to the bottom front tube of the main frame using two U-bolts (item 4), hex nuts (item 9) lock washers (item 8), and flat washers (item 18). Do not tighten at this time.

2. Install the hitch to the upper frame tube with two straps (item 17), two U-bolts (item 1), lock washers (item 3), hex nuts (item 2), and flat washers (item 19). Be sure the hitch is centered on the front frame. Tighten the U-bolts that attach the hitch to the frame.

3. Attach the left steering cylinder support to the lower frame tube with two U-bolts (item 7), lock washers (item 6) and hex nuts (item 5). Tighten all hardware. Attach the rowfinder mounting tube with U-bolts (item 10), lock washers (item 5), and hex nuts (item 6). Refer to page 52 on the Rowfinder Assembly.

4. Attach the upper jackshaft support bearing. Install the jackshaft extension and the universal joint to the main gearbox driveshaft using the slide ring collar.

5. Attach the tongue assembly to the hitch using the pivot pin (item 11), slotted nut (item 12) and cotter pin (item 13).

6. Install the two hose carriers (item 14) with their loops toward the hitch centerline) using two hex bolts (item 15) and nuts (item 16).

PTO

1. Attach the PTO to the jackshaft extension using a 3/8" woodruff key, a 3/8" x 1/2" set screw and a 3/8" x 3-1/2" hex bolt and 3/8" lock nut.

   Note: *The harvester is shipped with the PTO loose. When attaching the PTO with the hardware supplied, ensure that the PTO sliding tubes are free of dirt and foreign material. If the halves do not slide easily, premature failure of the universal joints could result. See page 43 for recommended lubrication of the PTO.*

Lift/Rowfinder Cylinder

1. Install the cylinder pin bushings in the appropriate holes.

2. Install the 5" diameter x 8" stroke hydraulic depth control (lift) cylinder. Position the upper cylinder pin (Figure 71-B) so the hole is closest to the front of the machine. Using the clevis pins in the cylinder ends, attach the cylinder's rod end to this pin. Attach the fixed end of the cylinder to mounting hole (Figure 71-A).

3. Install the 4" diameter x 8" stroke hydraulic row finder cylinder by first extending the rod to the center of its stroke. Then position the hitch to the center of the row (or to the right if offsetting one row). Using the clevis pins provided in the cylinder, install the rod end of the cylinder to the harvester tongue (Figure 71-C). Loosen the U-bolts on the steering cylinder mounting tube (Figure 71-E) and adjust the tube left or right until the fixed end of the cylinder can be easily installed in its mounting pin (Figure 71-D). Tighten the U-bolts on the steering cylinder mounting bracket as shown in Figure 22, page 27.

Row Finder Assembly

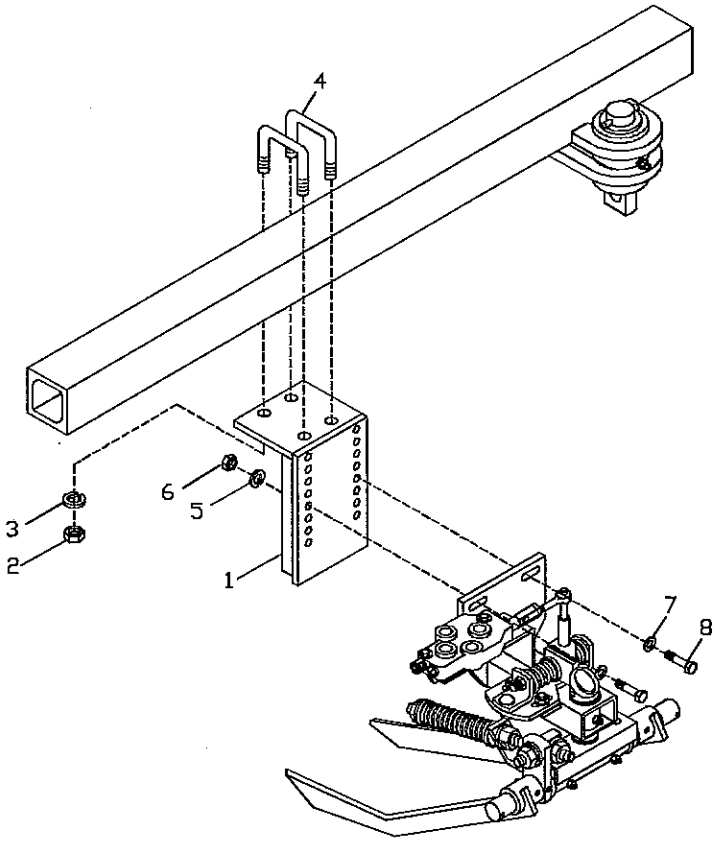


Figure 72. Row Finder Mounting.

Bill of Materials

Item	Quantity	Part Number	Description
1	1	447160	Bracket Weldment, Mounting
2	4	J14H794	Nut, Hex ¾-10
3	4	036800	Washer, Lock ¾
4	2	246120	Bolt, U ¾-10 Gr 5
5	4	005370	Washer, Lock ½
6	4	005360	Nut, Hex ½-13
7	4	005200	Washer, Flat ½ Std
8	4	1770500	Bolt, HHCS ½-13 x 1 ¾ Gr 5

1. Install the mounting bracket using the 3/4" U-bolts that are provided. Tighten the bolts.

2. Use four 1/2" x 1-3/4" hex bolts (item 8), four flat washers (item 7), four 1/2" lock washers (item 5), and four 1/2" nuts (item 6) to mount the row finder assembly to the mounting bracket on the first strut to the right-hand side of the hitch.

Row Finder Adjustments

Refer to pages 26&27 for the procedures to properly adjust the row finder.

Main Control Box, Wiring Harness, and Solenoid Valves

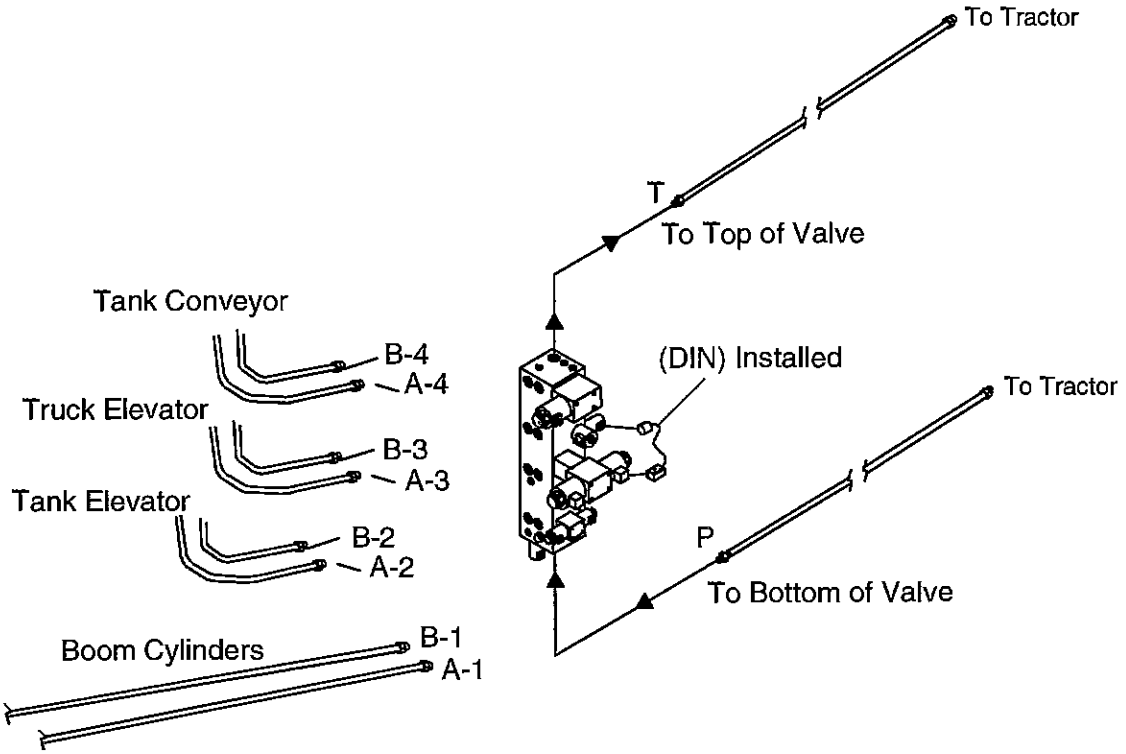


Figure 73. Wiring and Hydraulics

For the procedures below, refer to Figure 73.

1. Connect the wiring harness to the control box by matching the color of the wires to the colors called for on the control box decal. Connect the other end of the harness to the appropriate solenoid valves on the valve assembly. For a detailed illustration of control box wiring, refer to Figures 8 - 10 on page 18. For a detailed illustration of valve wiring, refer to Figure 11 on page 19.

   NOTE: *The DIN Connector to the purple wire is identified by gray tape on the DIN connector. Route and secure the wiring.*

2. The solenoid valve on the bottom of the main valve is installed as standard equipment. This valve provides OPEN center operation of the system. This is OK for the newer tractors that have the load sense system. A special plug can be installed to switch this to closed center (refer to Figure 84, page 64).

   NOTE: *For all older tractors with a true closed center system, the closed center plug must be installed.*

3. Ensure the hoses from the boom elevator to the main valve are connected as shown in the Figure above. Note that the A and B ports of the valve are to be connected to the A and B ports of the hydraulic motors.

   Note: *Model 698's use a reversed inlet hydraulic motor on the truck elevator. Therefore, you must connect B-3 to the A port of the motor and A-3 to the B port of the motor.*

4. For proper operation, the boom cylinders must be operated separately, with all other functions off. The tank elevator must be running before the tank conveyor will operate.

   Note: *Be sure that all other main valve functions are off while the truck boom is being raised or lowered.*

Stripper Assembly

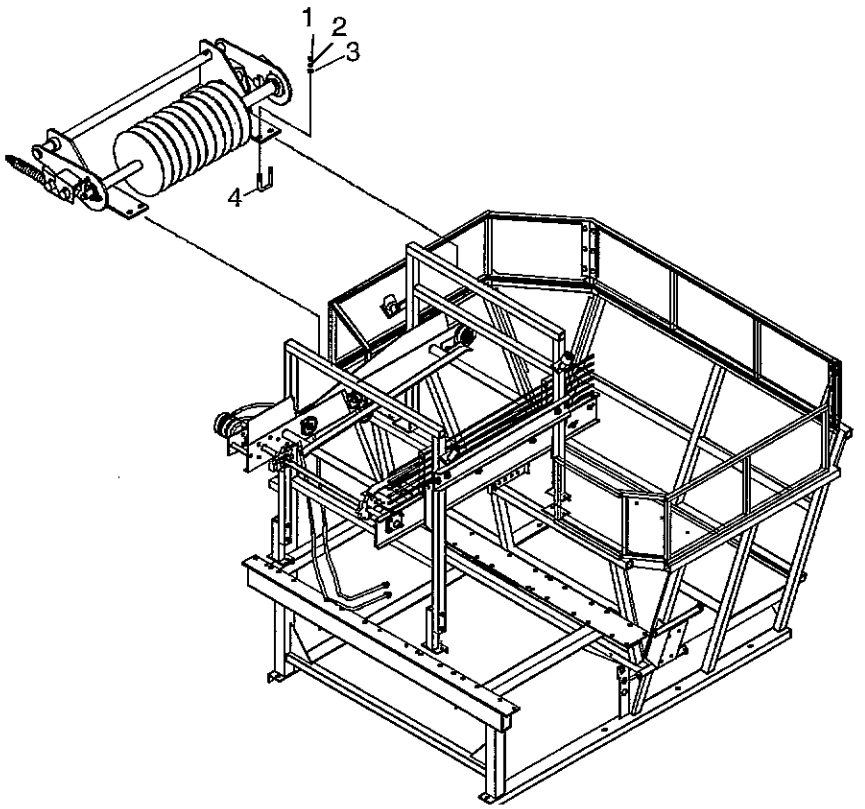


Figure 74. Stripper Installation

Bill of Materials

Item	Quantity	Part Number	Description
1	8	005360	Nut, Hex ½-13 Gr. 5 Zn
2	8	005370	Washer, Lock ½ Zn
3	8	005200	Washer, Flat ½ Std. Zn
4	4	290890	Bolt, U ½-13 x 2.06 x 3.00"

Install the stripper to the left side of the 2"x2" square tubes (as detailed above) at the top of the wheel elevator. Note that the spring protrudes to the left. Refer to Figure 74 and the procedures below.

1. Lift the stripper assembly into position and attach with four 1/2" U-bolts (item 4), eight 1/2" flat washers (item 3), eight 1/2" lock washers (item 2), and eight 1/2" hex nuts (item 1) as shown above. Ensure that the stripper disks clear the cross members of the wheel elevator by approximately 1-inch from side to side.
2. Turn the wheel elevator through one or two complete revolutions and observe the clearances. Slide the stripper mounting supports right or left between the rods as necessary to achieve the proper clearance, and then tighten the U-bolts.

Boom Elevator Hydraulic Cylinders

Install the boom elevator hydraulic cylinders (Figure 75-A) with U-Stops, SMV sign, and boom elevator grates, and connect the boom elevator hydraulic motor as shown in the Figure below. Refer to the bill of materials for a listing of components.

1. Using a hoist, support the truck elevator boom (Figure 75-B).
2. Install the check valves and hoses to the cylinders as shown in Figure 75.
3. Remove the shipping brace for the truck elevator boom and install the hydraulic cylinders (Figure 75-A). Plumb the hoses to the flow divider (Figure 75-C). Using the wire ties provided, secure the boom cylinder hoses to the support channels of the elevator.
4. Install the truck elevator boom grates (Figure 75, Item 6) using the provided 3/8" hardware.
5. After the hydraulic system has been charged with oil, remove the support hoist

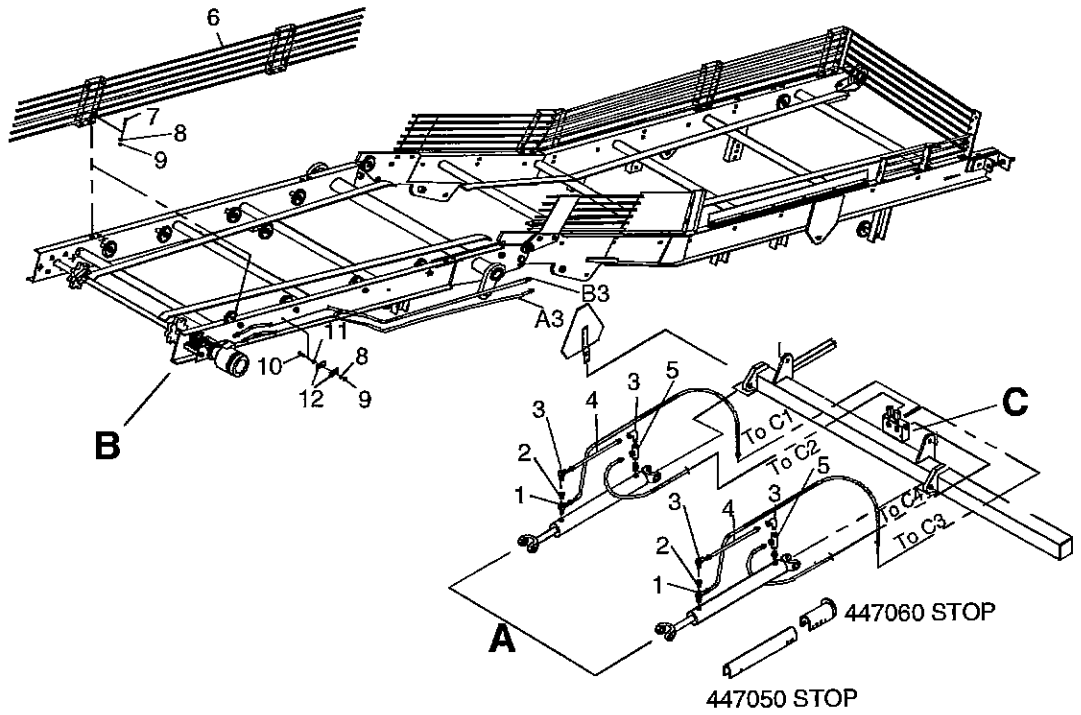


Figure 75. Boom Elevator Cylinders and Grate

Bill of Materials

Item	Quantity	Part Number	Description
1	2	274410	½-14 NPTF Street Tee
2	2	277780	Bushing, Hydraulic Reducer
3	4	V612024	Fitting, 90 Degree Swivel
4	2	401180	Hose, Hydraulic ¼ x 34" 100RI
5	2	407500	Valve, Pilot Check
6	2	433640	Grate, Boom
7	8	006690	Bolt, HHCS 3/8-16 x 1 ¼
8	9	021180	Washer, Lock 3/8
9	9	027260	Nut, Hex 3/8-16 GR5 Zn
10	1	011370	Bolt, HHCS 3/8-16 x 1 ½
11	1	P98458	Spacer
12	2	413050	Hose Clamp

Steerable Axle Assembly

The following steps are required for the operation of the steerable axle. Also refer to the **Preparation For Field Operation** section on **Steerable Carrier Wheels.**

Steerable Axle Cylinder and Valves

For the following procedures, refer to Figure 76.

1. Remove the transport lock on the rear axle. The lock is located between the left spindle and the cylinder mount. Install the steering cylinder (item 3) with the clevis pins provided.
2. Mount the valve as shown below
3. Install all hose fittings on the valve and plumb as shown. The connections must be done in the proper sequence. Refer to Figure 77, page 57.

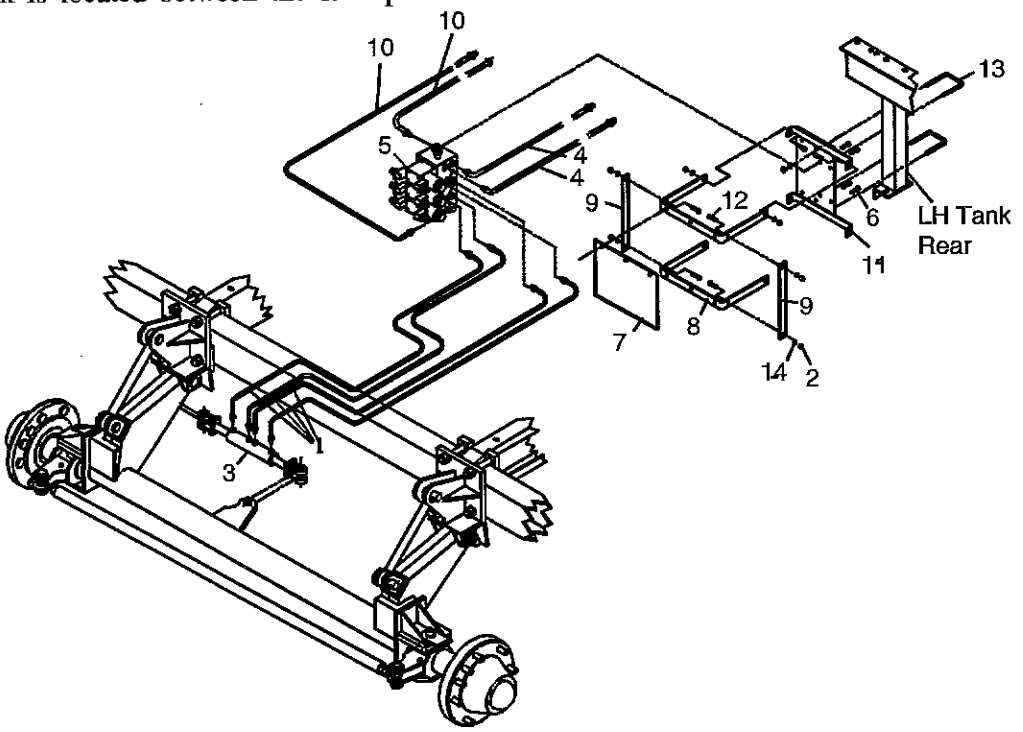


Figure 76. Steerable Axle Assembly

Bill of Materials

Item	Quantity	Part Number	Description
1	4	466730	Hose, Assy., Hyd .5 x 78.0
2	15	032370	Nut, Hex 3/8-16 Gr 5 Zn
3	1	445680	Cyl., Double-Act 3 ½ x 4
4	2	466740	Hose, Assy., Hyd .5 x 180.0
5	1	466760	Valve, Steering
6	4	012260	Bolt, HHCS 3/8-16 x 1" Gr 5
7	1	442880	Flap, Valve
8	2	442890	Bracket, Formed Flap
9	2	466680	Support, Flap Valve
10	2	466750	Hose, Assy., Hyd .63 x 300.0
11	2	466690	Mount, Weldment, Valve
12	11	006690	Bolt, HHCS 3/8 - 16 x 1 1/4 Gr 5
13	2	466570	Bolt, U 3/8 - 16 x 3.06 x 4.00
14	19	021180	Washer, Lock 3/8

Steerable Axle Control Box, Wiring Harness, and Solenoid Valves

For the procedures below, refer to Figure 77.

1. Install the steering control box in the tractor cab and connect to a suitable 12V power supply as shown in Figure 8, page 18. (White to Positive, Black to Negative).

   IMPORTANT: *The control boxes are rated for use with a 12 Volt DC System only. A battery charger should not be used for testing.*

2. Route the main wiring harness through the cab and connect the wires to the control box according to the color of the wires and the color code on the box. See Figure 10, page 18.

3. Connect the steering control box wiring harness and the steering valve wiring harness with the 10 connector plug. Make sure all the wires have been properly routed and connected per the colors and function on the box.

4. The plug on the bottom of the steering valve is installed as standard equipment. This plug provides OPEN center operation of the system. This is for newer tractors with the load sense system and adequate hydraulic capacity. A special closed center solenoid is included with the valve and should be installed for older tractors with a true closed center system, or if the tractor is not of adequate hydraulic capacity. Refer to Figure 84, page 64.

   NOTE: *For all older tractors with a true closed center system, the closed center solenoid must be installed.*

5. Ensure that the hoses are connected to the steering valve as shown in the Figure below.

6. Adjust the tie rod and steering cylinder for proper toe in and tracking. Refer to page 21.

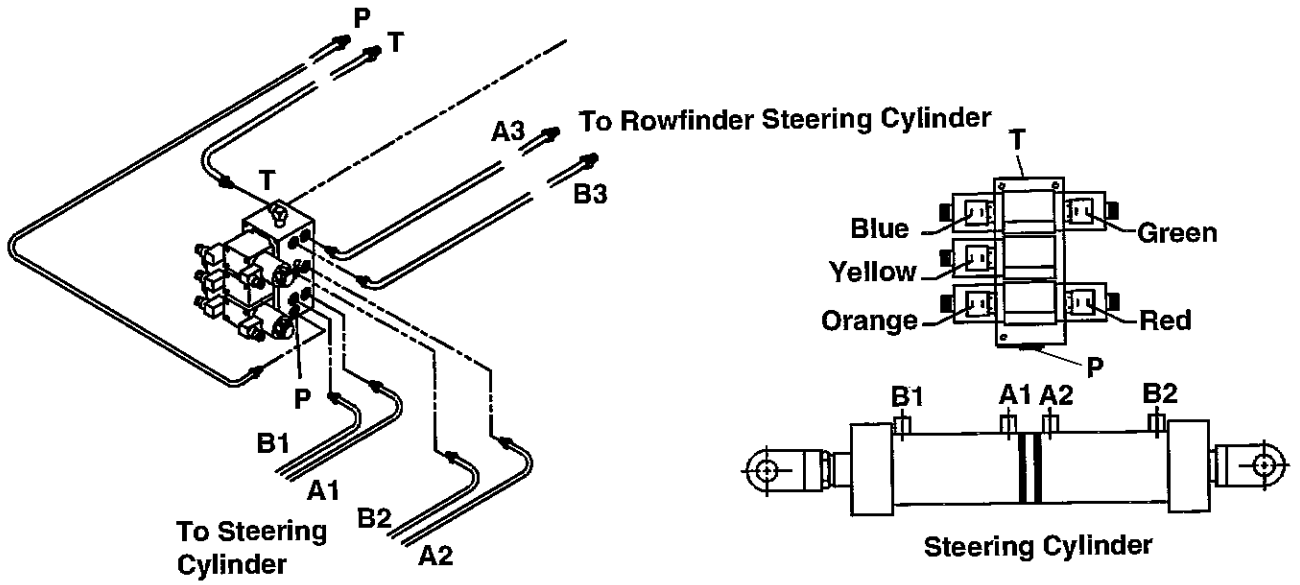


Figure 77. Steerable Axle Valve and Cylinder

Work Light Installation

1. Choose locations where the three lights are desired during operation after dark. Position brackets to mount the lights in chosen locations.

2. Route the wire for the power to the 7-connector plug used for safety lights or directly to the tractor console.

   NOTE: *The bar (item 5, part # 236260) is provided for support when mounting the light to the mesh on the tank.*

   NOTE: *Four lights maximum - 200 watts maximum. Secure all loose sections of wire.*

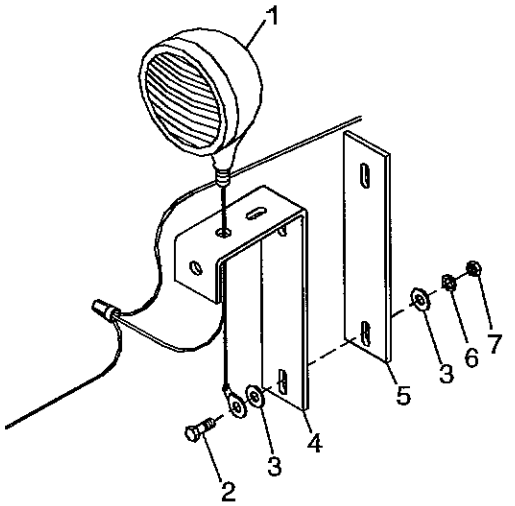


Figure 78. Work Light Components

Bill of Materials

Item	Qty	Part No.	Description
1	3	242110	Lamp, Horiz Mt, Halogen
2	7	011370	Bolt, HHCS 3/8 x 1 ½
3	14	021190	Washer, Flat 3/8
4	3	236250	Bracket, Light Mounting
5	2	236260	Bar, Light Bracket Back Up
6	7	021180	Washer, Lock 3/8
7	7	027260	Nut, Hex 3/8

Road Hazard Light Package Installation

The road hazard light package includes two amber warning lamps, two red tail lamps, a 7-pin connector, and four brackets with mounting hardware.

IMPORTANT: *The harvester road hazard lights are used to satisfy width lighting requirements. The amber lamps must be located within 16" of the lateral extremities of the harvester. Road hazard lamps must be equal distances from the implement centerline; as far to the rear as possible; visible from the front and the rear; and at least 42" from the center of the lamp to ground.*

1. Install the angle brackets (items 13 & 17) to the rear of the harvester frame using the large 3/8" U-bolts that are provided in the kit. Route the wiring harness as shown and secure all loose wires to the harvester frame. Mount the converter module with the #10 screws or with the provided wire ties.

2. Connect the lights directly to the tractor with the 7-pin connector as provided by the tractor manufacturer.

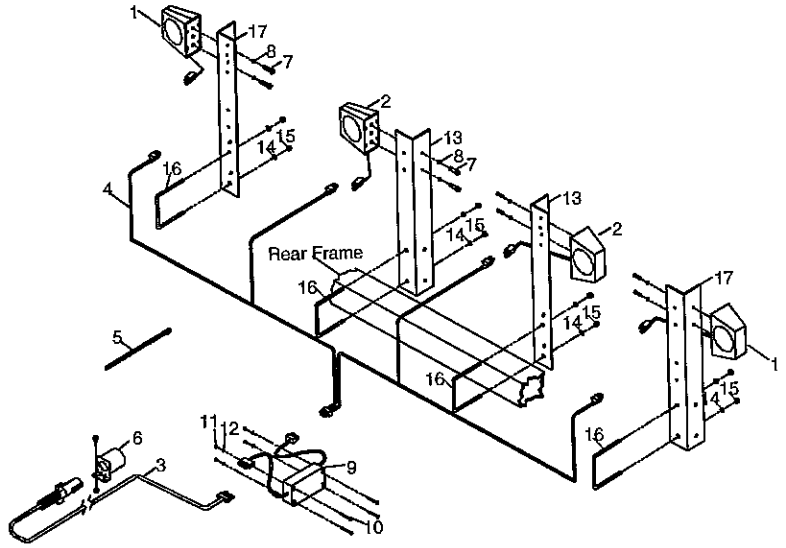


Figure 79. Road Hazard Light Package

Bill of Materials

Item	Qty	Part No.	Description
1	2	476510	Lamp Assembly, Amber
2	2	476520	Lamp Assembly, Red
3	1	476570	Harness, Primary 30'
4	1	476560	Harness, Wishbone
5	6	149670	Tie, 3/16" X 11" Cable
6	1	JPT1296	Bracket, Plug Storing
7	8	012051	Bolt, HHCS 1/4 - 20 X 3/4 GR. 5 ZN
8	8	023620	Washer, Lock 1/4"
9	1	476540	Converter, AG Safety Lights
10	4	476640	Bolt, Hex Slot Machine #10-24
11	4	120590	Nut, Hex #10-24
12	4	120600	Washer, Lock #10
13	2	477910	Angle, Safety Light Mounting
14	8	021180	Washer, Lock 3/8"
15	8	027260	Nut, Hex 3/8" - 16 GR. 5 ZN
16	4	477920	Bolt, U 3/8 - 16 X 7.06 X 6.0
17	2	477890	Angle, Safety Light

Review The Machine

Generally review the harvester for the following items:

- Any loose bolts or set screws.
- Proper tensioning of all roller chains, drive belts and draper chains.
- Proper PTO installation and lubrication.
- Hydraulic cylinders and hoses for proper routing, installation and securing.
- Electric wires for adequate securing to prevent damage.
- Oil level in (2) gear boxes filled to the proper levels.
- All shields and guards for proper installation.
- Proper installation of any options.
- Correct tire pressure (36 psi for 21.5L-16.1 14 ply tires).

Attaching to the Tractor

⚠ CAUTION

When ever possible during hookup procedure, place all tractor controls in neutral, set the park brake and stop the engine. When dismounting, be sure to remove the key from the ignition.

When hooking the harvester up to the tractor, follow this procedure:

1. Clear the area of bystanders.
2. Always follow good shop practices.
3. Block harvester wheels to prevent rolling.
4. Slowly back the tractor up to the harvester, position the hitch so it is above the drawbar and align hitch pin hole.
5. With the carrier wheels and cylinders attached, lift the machine to align the drawbar.
6. Install the hitch pin supplied with the harvester.
7. Attach the safety chain to the harvester hitch by inserting the large chain eyelet through the chain bracket 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 tractor and harvester without binding. See Figure 5, page 15 in the **Preparing for Field Operation** section.

PTO Hookup:

When hooking the harvester up to the tractor's power take off, you must follow this procedure:

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

2. Retract the slide collar on 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.

3. Be sure there is sufficient clearance between the drawbar, three-point hitch links and the driveline to allow maneuvering in the field. Be sure to check the distance between the universal joint centers (refer to Table 2, page 15).

4. Lower the tractor PTO shield over the universal joint and secure.

Hydraulic Hoses

The harvester is NOT furnished with the hydraulic couplers to the tractor. Install couplers on the hoses. Use a quality pipe thread compound or Teflon tape to ensure a leak free connection.

Hydraulic Hookup

1. Use a clean cloth or paper towel to clean dirt and build-up from around the remote receptacle and the male tips.

2. Insert the male tips into the receptacle and make sure that they are securely fastened.

3. Make sure the hydraulic hoses are properly routed along the hitch to provide adequate clearance.

4. Run the hydraulic functions of the harvester to purge the hydraulic system of the machine. Check the hydraulic oil level of the tractor after purging to ensure it maintains the proper level of hydraulic oil.

Pre-Delivery Test Run

⚠ CAUTION

Before test running the harvester, keep all children and bystanders away from the machine.

With the tractor connected after assembly is completed, operate the harvester to ensure it functions properly. Be certain to check and complete the following items during the final run-in process.

1. Clear the area of bystanders.
2. Check that the harvester is clear of foreign objects (nuts, bolts, stones, wood blocks, etc.) and that the elevator chains and belts are free to operate.
3. Engage the PTO with the tractor at low RPM. Observe operation at low speed and listen for any unusual noises. Gradually speed up PTO to a speed of 1000 RPM.
4. Check operation, alignment and clearances of all moving parts. Make any necessary adjustments.

⚠ 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.

5. Cycle the tank and elevator drives and continue to run the machine for 10 to 15 minutes. After running is complete and movement has stopped, check machine for any loose hardware and check drives.
6. Check all hydraulic connections for leaks and tighten if necessary (follow hydraulic safety instructions listed on pages 10 & 11 of the operator's manual).
7. Complete the Dealer Pre-Delivery Checklist included with the Operator's Manual.

Hydraulic System

An "open center" plug is installed in the row finder from the factory. A closed center plug is included with the rowfinder.

NOTE: *The plug must be changed for closed center operation.*

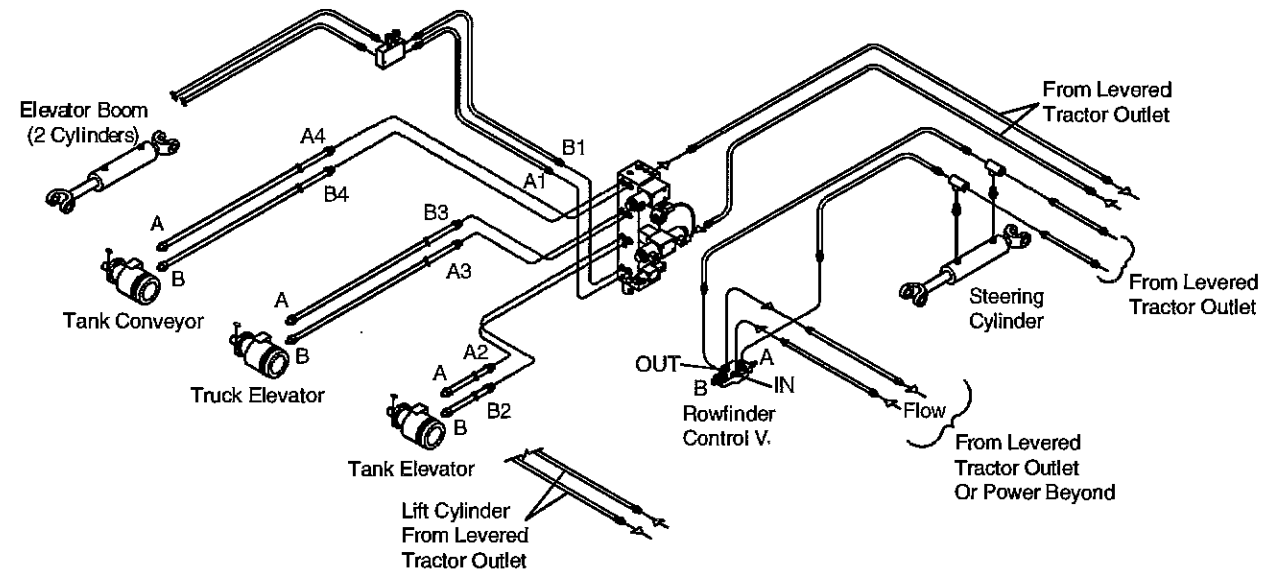


Figure 80. Hydraulic System for Harvester with Fixed Carrier Wheels

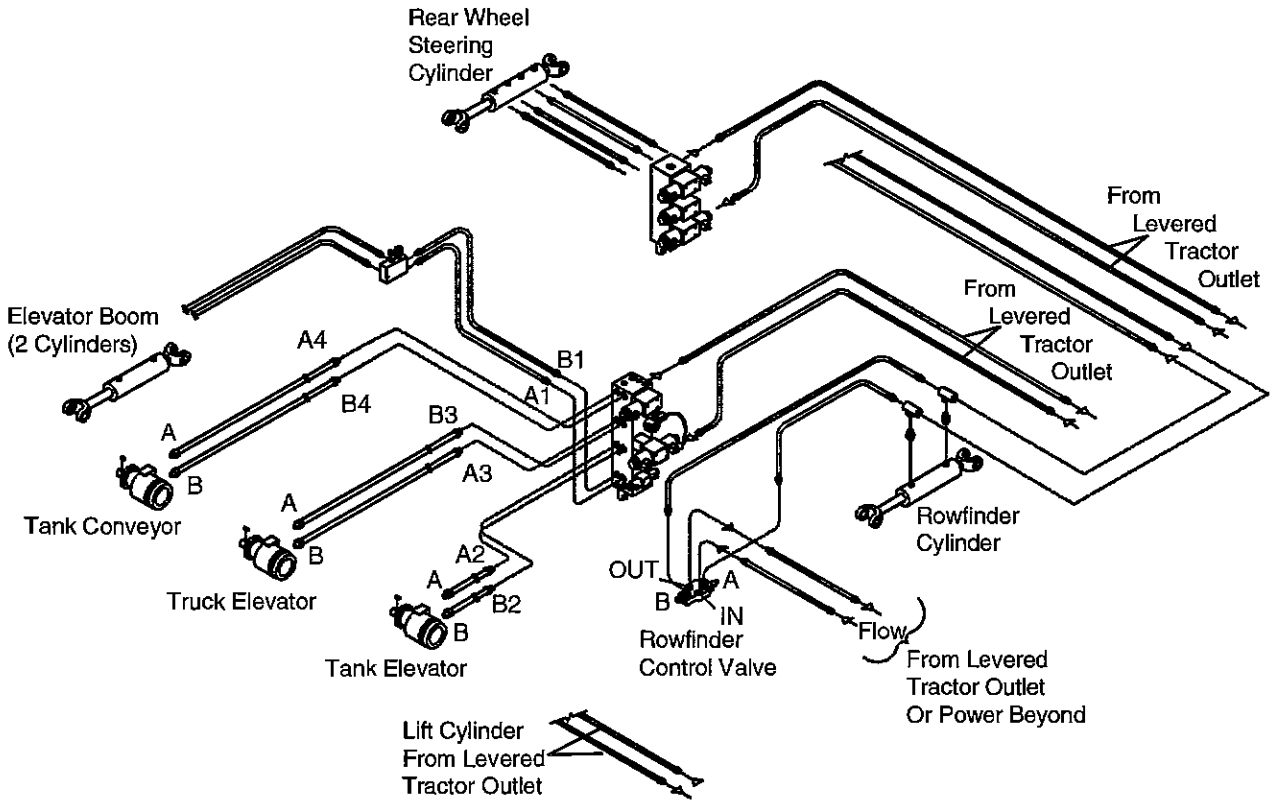


Figure 81. Hydraulic System for Harvester with Steerable Rear Wheels

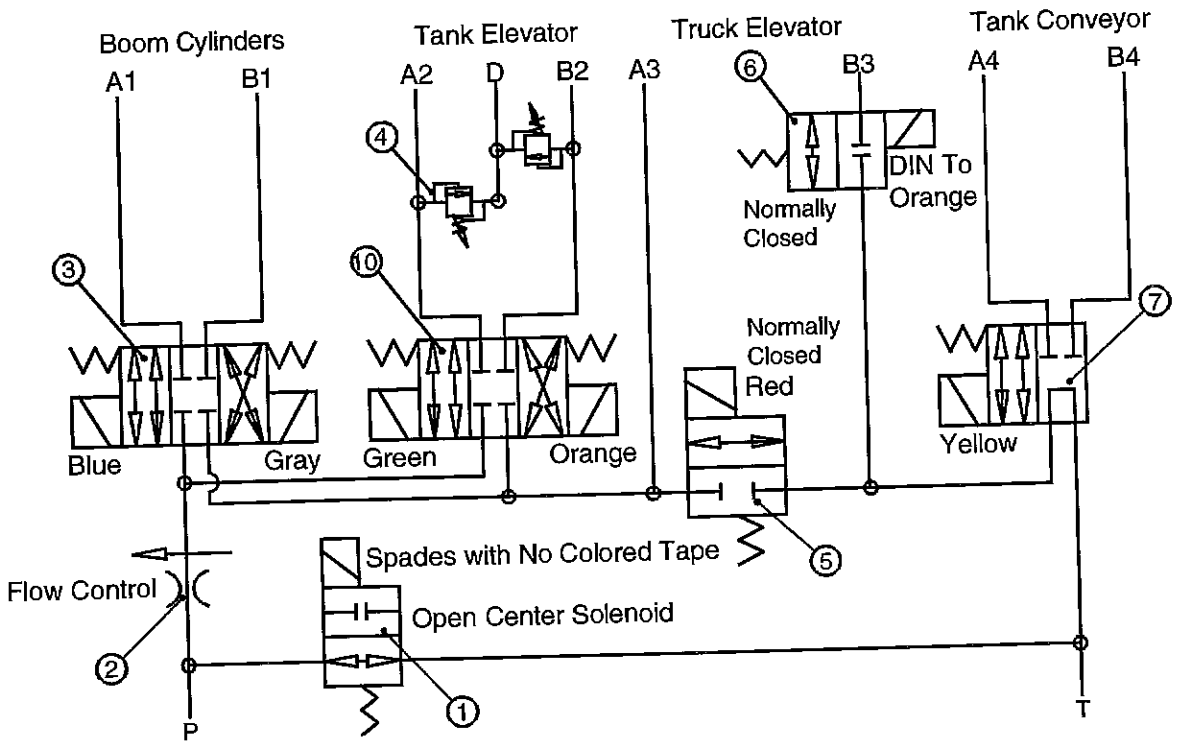


Figure 82. Hydraulic Schematic for Main Hydraulic Valve

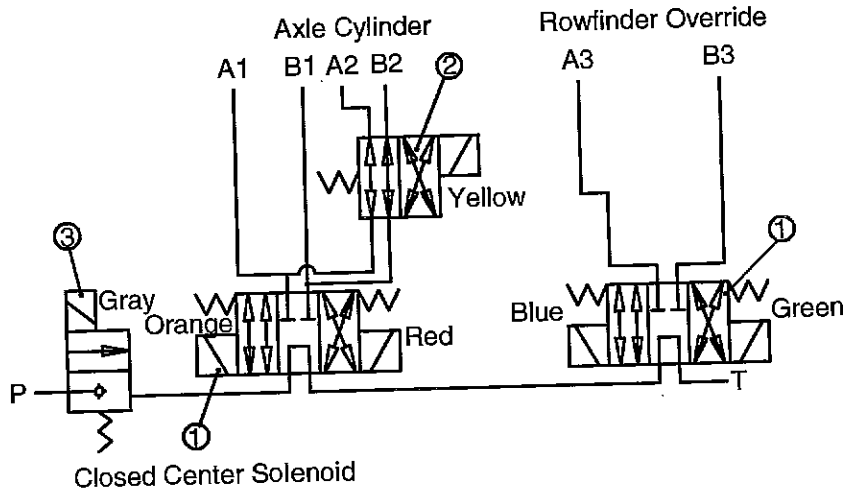


Figure 83. Hydraulic Schematic for Steering Hydraulic Valve

Open/Closed Center

The main hydraulic valve 443680 and the steering hydraulic valve 466760 are shown in Figure 84. Each valve can be configured for either open or closed center tractors. The factory setting for both of these valves is open center.

Main Valve 443680 - To change the main valve from open to closed center, remove the open center solenoid (item 1) from the valve body and replace it with the closed center plug (item 2). The open center solenoid is identified by the letters **SV10-21** on the hexagonal section of the stem (see Figure 84, item A). The closed center plug is identified by the letters **CP10-20** on the head of the plug (see Figure 84, item B).

Steering Valve 466760 - To change the steering valve from open center to closed center, remove the open center plug (item 4) from the valve body and replace it with the closed center solenoid (item 3). The open center plug is a countersunk hex head plug. There are no identifying letters on the head of the plug. The closed center solenoid is identified by the letters **SV10-20** on the hexagonal section of the stem (see Figure 84, item C).

⚠ CAUTION

Stay clear of moving parts. Before making adjustments, shut off the tractor, place all controls in neutral, set the parking brake, and remove the key. Wait for all movement to stop before approaching the machine. Relieve pressure from the hydraulic circuit before servicing or disconnecting from the tractor.

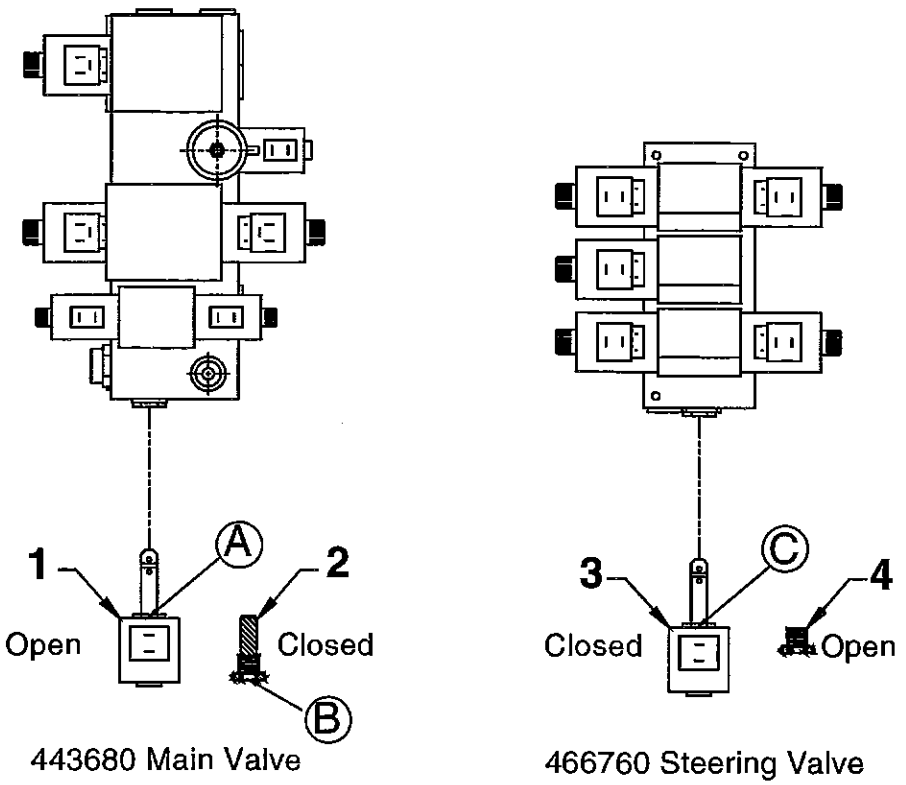


Figure 84. Identifying Open and Closed Center Valve Constructions

Troubleshooting

The Art's-Way 698 Sugar Beet Harvester is designed to provide simple and reliable operation throughout beet harvest. Its full range of adjustments ensure efficiency in varying operating conditions.

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

Basic Machine

Problem	Possible Cause	Possible Remedy
Pulls too hard	Lifter wheels running too deep	Do not run the lifter wheels deeper than necessary
	Tractor too small	Use a larger tractor
	Grabrolls building up with mud	Wait for dry conditions
	Grabroll spacing wrong	Adjust grabrolls - must be parallel between pairs
Gear case runs hot, leaks oil	Dirt buildup around main gearbox	Clean and lubricate the machine to avoid overload
	Lubrication viscosity too light for climate	If weather is hot and problems persist, change to No. 140 gear lube
Hard to keep on rows	Lifter wheel strut assemblies not set properly with rows	Make sure the lifter wheel strut assemblies match the rows at the pinch points of the lifter wheels
	Machine straddling the guess row	Make sure you are not straddling the guess row
	Rowfinder not adjust correctly	Adjust rowfinder
	Conditions suitable for utilization of row finder	Install a row finder for automatic tongue steering

Can't dig deep	Tractor drawbar not set properly	Set tractor drawbar properly
	Front hitch in wrong hole setting	Adjust front hitch to the proper holes
	Improper cylinder being used	Use correct depth control cylinder
	Machine running uneven	Level machine by adjusting the carrier wheels
Premature wear of roller chains	Improper lubricant or infrequent intervals	Lubricate chains with proper oil and more frequently
Looses small beets	Conditions suitable for utilization of close-ups	Install close-ups
	Grabroll spacing too wide	Narrow up grabroll spacing
	Ground speed too slow	Increase ground speed - this may help get the beets to the paddles and onto the cleaning bed
	Lifter wheels too far apart	Space the wheels closer together
	Pinch point too high or too low	Lower or raise pinch point
	Front smooth roll too high or too low	Lower or raise front roll
Breaks the tails off	Lifter wheels not running deep enough	Run lifter wheels deeper
	Lifter wheel strut assemblies not properly spaced	Make sure lifter wheel strut assemblies are spaced to fit rows
	Not steering properly	Adjust steering toe in and/or tracking
	Lifter wheels too narrow, pinch point is too tight	Space wheels further apart
	Row finder not adjusted properly	Adjust row finder arms Adjust down pressure
	Pinch point too high or too low	Lower or raise pinch point
	Front smooth roll too high or too low	Lower or raise front roll
Beet slicing	Row finder not adjusted properly	Adjust row finder arms Adjust down pressure

	Harvester positioned over guess rows	Dig on planted row only
	Lifter wheels too narrow, pinch point is too tight	Space wheels further apart
	Replanted beets	
	Tractor moving beets	Check tire size and spacing
Loads too many clods	Lifter wheels set too deep	Run lifter wheels shallower, if possible without breaking tails
	Grabrolls not set wide enough	Set grabrolls for wider gap
	Very dry soil conditions	Irrigate field or wait for rain
	Grabroll bed too flat	Increase angle of grabroll bed
Beet plugging cleaning bed	PTO speed too slow	Increase PTO speed to a minimum of 950 RPM
	Loading too much dirt	Raise digging depth of machine
	Transfer areas of spiral worn	Respiral rolls or replace
	Ground speed too fast	Decrease ground speed
	Small beets	Space the grabrolls closer together
Excessive trash or dirt in the truck	Cleaning areas built up with mud or trash	Remove mud or trash
	Cloddy, stony field conditions	Space grabrolls further apart
	Improper operation or adjustment	Correct the operating procedures or adjustments

Row Finder

Lifter wheels moving away from beets	Hydraulic hoses incorrectly connected	Check the valve connections at the tractor outlets
Lifter wheels not tracking properly	Feeler arms not centered	Center feeler arms
Lifter wheels jump off rows too early	Not enough down-pressure	Increase down-pressure or lower row finder
	Row finder arms too high	Lower arms
	Drawbar mounting hole greater than 1-1/4"	Insert bushing

Specifications

698 Harvester

4 ROW - 28" or 30" ROW SPACING
6 ROW - 20" to 24" ROW SPACING

General Specifications

Make Model	Art's Way 698
Harvester Type: Rows Operating Speed Lift & Depth Control Steering Hitch Control	Rear Elevator Wheel, Tank Type Harvester 4 - 28" or 30" 6 - 20" to 24" 3.5 - 4.0 mph Hydraulic (5"x8" remote cylinder) Hydraulic (4"x8" remote cylinder)
Overall Dimensions: Transport Operating Tread Width Shipping Dimensions of Machine Weight (approx.)	 13'8"H x 14'5"W x 23'5"L 14'4"H x 20' 5" W x 23'5"L Row spacing pre-set at the factory 12'3"H x 14'W x 14' 2" L* *As shipped, 2 units will fit within 29' with a 3' overhang on a double drop trailer deck 19,800 lbs.
Rear Wheels	Wide Tread Fixed or Steerable (optional) with Heavy Duty Single Axle
Tires: Size Operating Tire Pressure	 21.5L-16.1 14 ply - wide floatation 36 psi.
Lifter Wheels	(2 per row) 28" solid rim, heavy-duty, cast steel
Lifter Struts	Heavy duty tapered roller bearings

Lifter Wheel Scrapers:	To prevent mud buildup on lifter wheels
Paddle Shaft and Drive: Type Drive	 Three rubber covered steel paddles per row Heavy #80H roller chain with heavy duty slip clutch
Center Gearbox: Type Gear lube Capacity	 Heavy, 1-3/4" diameter shafts, 1,000 RPM 5 qts. 90W gear oil
Grabrolls and Drive: Size Type Drive Bed Angle	 59 sq.ft. - Total rollbed area 20 sq.ft. - Front smooth & first two spiral rolls 39 sq.ft. - Rear six rolls and two diverter rolls Five spiral grabrolls with 3/4" spiral rods and Four smooth grabrolls with adjustable spring loading and spacing. Two spiraled diverter rolls (at the rear). Belt drive with spring loaded idlers. Split into two drives for efficiency and more open access to drives. Adjustable to different conditions
Truck to Tank Loading Elevator: Size Type	 Width, 40" 56mm pitch belted chain Electro-hydraulic valve and hydraulic motor driven belted chain, reversible for tank or truck loading, hydraulic fold down for transport.
Tank: Construction Capacity Unloading	 Welded steel 9,000 lbs. Two 30" wide, 5/8" diameter rod, hooked draper chain.
PTO Drive: Type Operating Speed PTO Driveline	 Constant Velocity (CV) - allows turning w/o disengaging 1000 RPM 1-3/8" or 1-3/4" CV (Do not use an adapter shaft)

Tractor Requirements

Recommended Horsepower Rating	175 PTO HP Recommended (min.)
Remote Cylinders	(1) 4"x8" and (1) 5"x8"
Hydraulic Requirements	Tractor must be equipped with four remote hydraulic outlets. The tractor must be capable of supplying 22 gpm flow. If using the "Power Beyond", connect to the rowfinder.
PTO Shaft	Tractors must have 1-3/8" or 1-3/4" diameter 1000 RPM PTO shaft (do not use an adapter shaft).
Front Ballast	Maximum tractor front ballast is required.
Electrical System	12 Volt

Options

Drawbar Support	Additional support RECOMMENDED. Drawbar kit 427490.
Lifter Wheel Close-Ups	To prevent loss of small beets through the lifter wheels spokes.
Lifter Wheel Spacers	To increase the lifter wheel opening by 1/4" increments.
Lifter Wheel Cushions	To protect lifter wheels in rocky soil conditions (standard on flex struts).
Light Package	To light the machine for night operation (3 sealed beam halogen lights).
Rowfinder	To help keep machine centered on rows.

Art's-Way reserves the right to change design, specifications, or add improvements without notice or obligation for equipment previously sold.