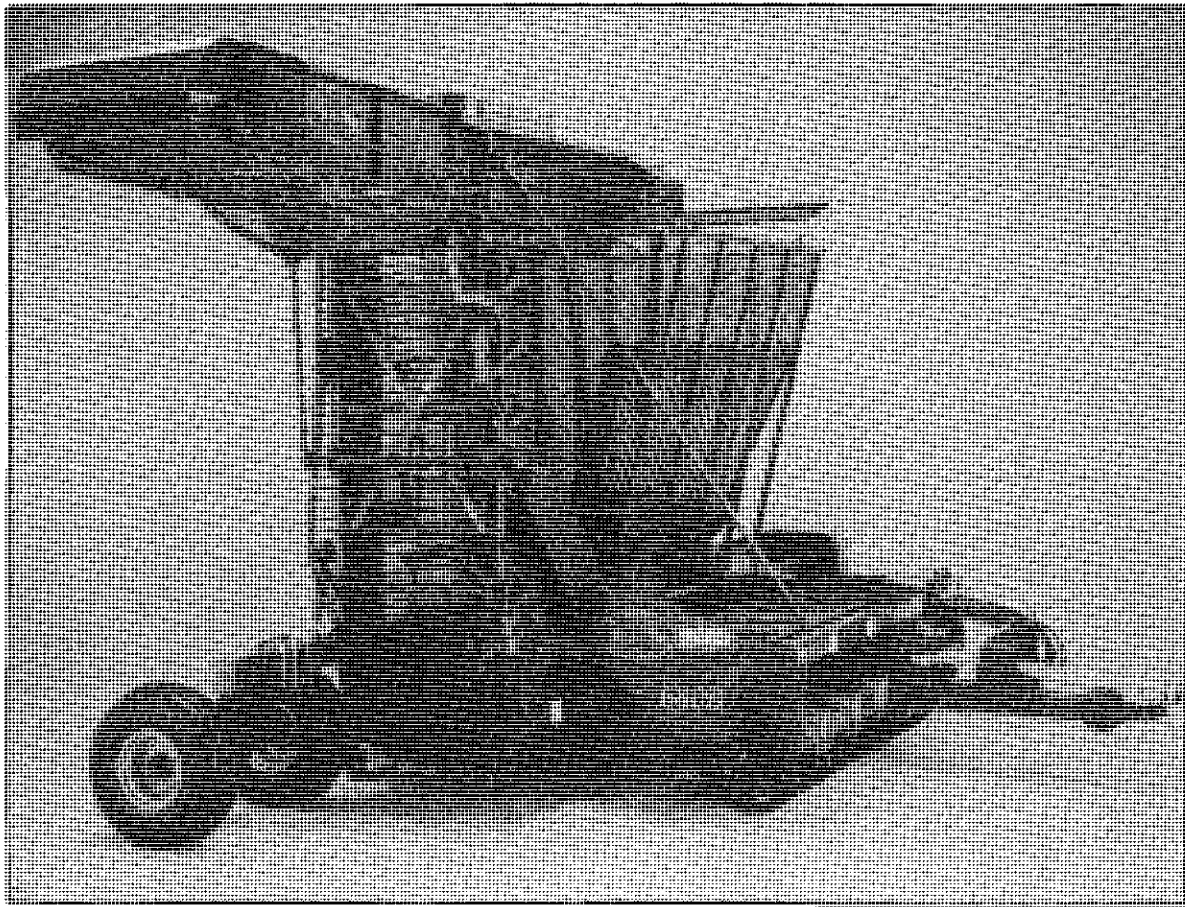


Model 680B

Beet Harvester

OPERATORS MANUAL





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TO THE OWNER

Congratulations on the purchase of your new Art's-Way 680B Sugar Beet Harvester. You have selected a top quality machine designed and built with pride to give you many years of efficient, reliable service.

Many people have worked on the design, production, and delivery of this machine. 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 machine.** 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 equipment previously sold. Because modifications to this machine 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.**

In the interest of continued safe operation of the machine, 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 it's responsibility to provide it's customers with a safe and efficient product. Art's-Way makes every attempt to design and manufacture it's products in accordance with all accepted engineering practices in effect at 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.

NOTICE TO THE CUSTOMER

The warranty for this machine appears on page 1 of this manual. **The warranty registration form inserted in the back of this manual must be completed and returned to the factory in order to establish proper warranty. Failure to comply will result in reduced warranty allowances.**

This manual contains operating instructions for this machine only. It does not replace the manual(s) for any machine that it may be attached to or used with.

PARTS AND SERVICE

The wise purchaser of a new machine gives consideration to 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 sugar beet harvester. Parts for your machine may be ordered through our dealers. When placing a parts order, please have the model and serial numbers 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 and serial numbers and date of purchase as well as your dealership name and address.

OWNERS NAME _____

OWNERS ADDRESS _____

MODEL NUMBER _____

SERIAL NUMBER _____

PURCHASE DATE _____

DEALER NAME _____

DEALER ADDRESS _____

DEALER TELEPHONE NUMBER _____

Building on a
Art's-Way
Tradition of Quality

SERIAL NO.

MODEL NO.

Manufactured By
Art's-Way Manufacturing Co., Inc.
Armstrong, IA

MACHINE SERIAL NUMBER LOCATION
(LEFT FRONT CORNER OF THE MAIN FRAME)

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NOTES

LIMITED WARRANTY

Art's-Way Manufacturing Co., Inc. warrants 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 expense of delay and the **Company's** liability is limited to repair or replacement of defective parts as set forth herein the warranty.
- Any improper use, including operation after discovery of defective or worn parts, operation beyond rated capacity, substitution or 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 its 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.

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 and can anticipate situations which may produce problems and make necessary corrections before problems develop.

It is important that *all* individuals who will be operating the Harvester read this Manual carefully, paying special attention to the safety instructions which are marked by this symbol:



The American Society of Agricultural Engineers has adopted this symbol as an universal **SAFETY ALERT SYMBOL** 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 machine.*

Art's-Way Manufacturing Co., Inc. strives to make our equipment as safe as it can possibly be. The 680B Sugar Beet Harvester conforms to all applicable safety standards at time of manufacturing. A safety conscious equipment operator makes an effective accident-prevention program complete.

Safety features and instructions for the Art's-Way Model 680B Sugar Beet Harvester are detailed elsewhere in the Operators 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*)

***Watch for these words on machine decals and in this Manual
to alert you to important safety messages:***

- DANGER:** Immediate and specific hazard which **will** result in severe personal injury or death if proper precautions are not taken.
- WARNING:** Specific hazard or unsafe practice **could** result in severe personal injury or death if proper precautions are not taken.
- CAUTION:** A reminder of good safety practices. Personal injury **could** result if proper procedures are not followed.



SAFETY GUIDELINES



Remember, A Careful Operator is the Best Insurance Against an Accident.



READ and Understand the Operators Manual and all the safety decals before operating the machine. Review 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 machine.

Be sure that the correct implement drive line parts are used and that they are properly secured.

Install safety chain when attaching machine 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 PTO before starting (follow starting instructions according to your tractor manual).

Operate machine only while seated on the tractor seat.

Lower the lifter wheels when harvester is not in use.

Make sure the unit is adequately blocked before working on it.

DURING OPERATION

Keep hands, feet, hair and clothing away from moving parts.

Keep all shields and guards in place.

Keep all children and bystanders away from the machine while in operation.

Do not allow riders while machine is in operation.

Do not attempt to unclog, clean or adjust machine while it is running.

Before servicing, adjusting, repairing or unplugging the machine, stop the tractor engine, lower the machine to the ground, place all controls in neutral, set parking brake, remove ignition key and wait for all moving parts to stop.

Stay away from overhead power lines. Electrocutation can occur even without direct contact.

Keep all hydraulic lines, fittings and couplers tight and free of leaks. (see “Hydraulic Safety” section of this Manual).

MAINTENANCE SAFETY

Follow all operating, maintenance and safety instructions found in this Manual.

Before servicing, adjusting, repairing or unplugging the machine, stop the tractor engine, lower the machine to the ground, place all controls in neutral, set parking brake, remove ignition key and wait for all moving parts to stop.

Use only 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 good shop practices of keeping service area clean and dry and using 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.

Relieve pressure from hydraulic circuit before servicing or disconnecting from tractor.

Make sure all shields/guards are in place and properly secured when maintenance work is complete.

HYDRAULIC SAFETY

Make sure all components in the hydraulic system are kept clean and in good condition.

SAFETY GUIDELINES

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 cements. 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 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 harvester is securely attached to the tractor and install a safety chain to the harvester.

Do not fail to latch the tractor brakes together.

Do not exceed 20 mph when transporting the harvester - 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 other traffic.

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

Check clearances carefully wherever machine is towed.

Always raise the lifter wheels before transporting.

Swing elevator into transport position before transporting harvester on the highway.

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

STORAGE SAFETY

Store the harvester in an area away from human activity.

Do not permit children to play on or around the stored machine.

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

TIRE SAFETY

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

Do not attempt to mount a tire unless you have the proper equipment and experience to do the job.

Follow proper procedures when mounting a tire on a 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.

ASSEMBLY SAFETY

Use adequate manpower to perform assembly procedures safely.

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

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

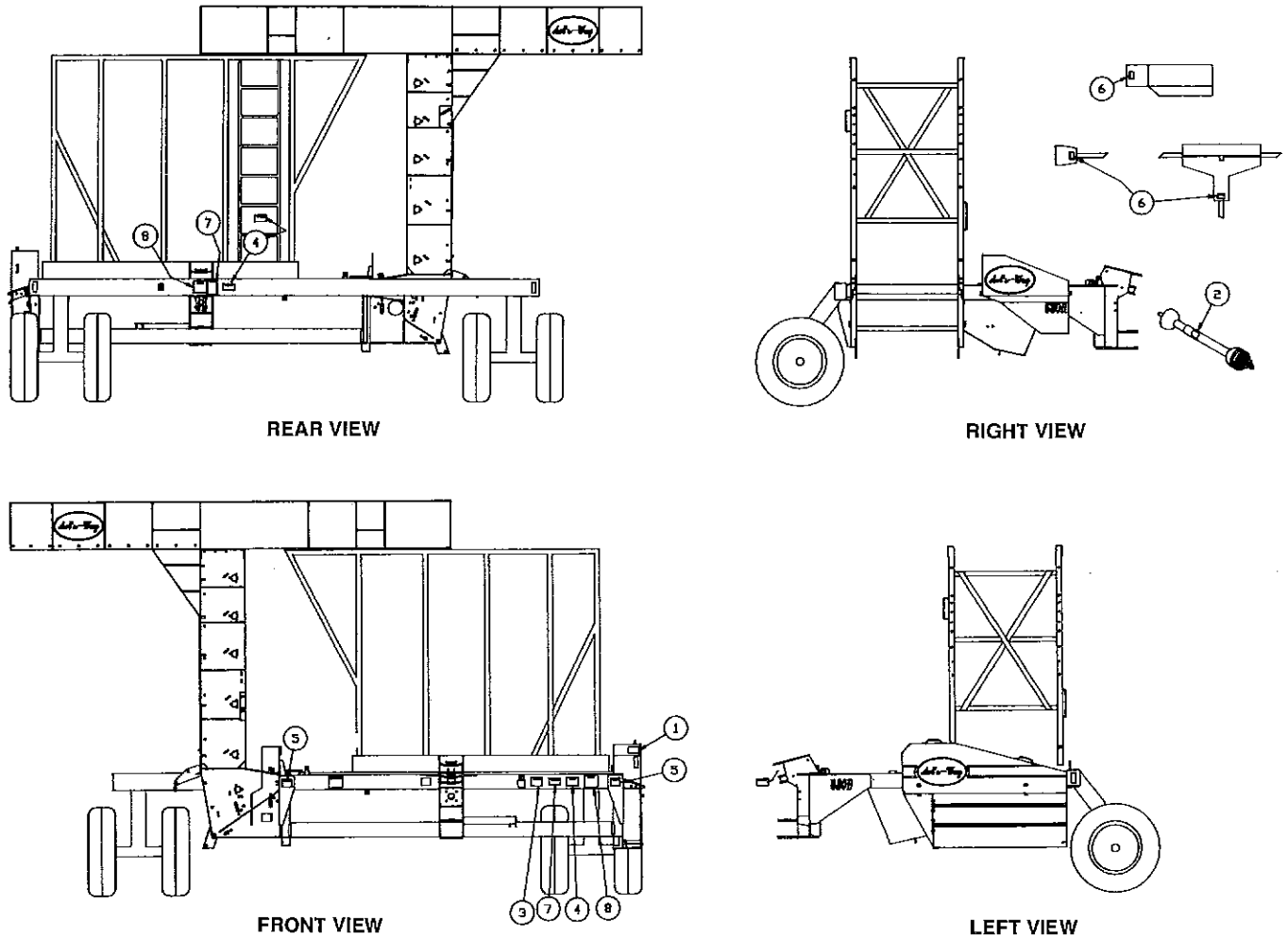
Do not allow spectators in the working area.

Remember:

“The Best Operator is a Safe Operator”

SAFETY DECALS

680B SAFETY DECAL LOCATIONS



| Item | Qty. | Drawing No. | Description |
|------|------|-------------|------------------------------------|
| 1 | 2 | 234340 | Decal, Caution-8 Instructions |
| 2 | 1 | 268860 | Decal, Danger Rotating Driveline |
| 3 | 1 | E224071 | Decal, Caution Shields |
| 4 | 3 | E224072 | Decal, Warning Stand/Ride |
| 5 | 2 | E224032 | Decal, Warning Hood |
| 6 | 5 | 148190 | Decal, Caution Shields-Protection |
| 7 | 2 | 234360 | Decal, Danger Rotating Rolls |
| 8 | 2 | 234350 | Decal, Danger Check Elec Clearance |

FIGURE 1 - 680B SAFETY DECAL LOCATIONS

SAFETY DECALS



! **CAUTION**

1. READ OPERATOR'S MANUAL. LEARN TO OPERATE MACHINE SAFELY.
2. KEEP ALL SHIELDS IN PLACE, INCLUDING PTO SHIELDS.
3. DISENGAGE POWER TAKE OFF, SHUT OFF ENGINE, AND PLACE THE KEY IN YOUR POCKET BEFORE SERVICING, CLEANING, OR CLEARING A PLUGGED MACHINE.
4. WAIT FOR ALL MOVEMENT TO STOP BEFORE SERVICING THE MACHINE.
5. KEEP HANDS, FEET, AND CLOTHING AWAY FROM POWER DRIVEN PARTS.
6. USE FLASHING WARNING LIGHTS WHEN OPERATING ON HIGHWAYS EXCEPT WHEN PROHIBITED BY LAW.
7. MAKE CERTAIN EVERYONE IS CLEAR OF MACHINE BEFORE STARTING ENGINE OR OPERATION.
8. NO RIDERS.

234340

No. 1 - "CAUTION" - Lists 8 items to follow and observe while operating this machine. Part No. 234340.



! **CAUTION**

1. KEEP HANDS AWAY FROM ALL MOVING PARTS.
2. KEEP SHIELDS AND GUARDS PROPERLY MAINTAINED AND IN PLACE.

E224-071

No. 3 - "CAUTION" - Keep hands away from all moving parts. Part No. E224071.



! **DANGER**



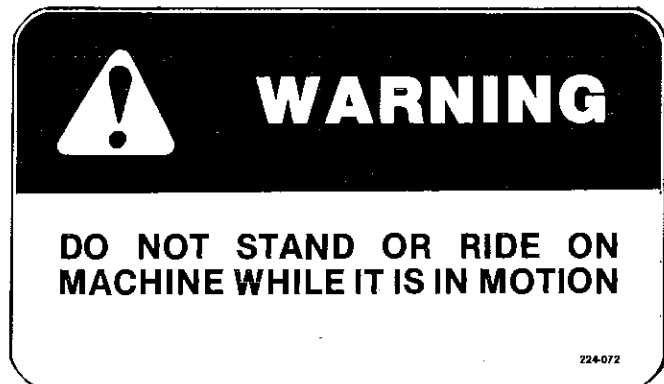
**ROTATING DRIVELINE
CONTACT CAN CAUSE DEATH
KEEP AWAY!**

DO NOT OPERATE WITHOUT —

- ALL DRIVELINE, TRACTOR AND EQUIPMENT SHIELDS IN PLACE
- DRIVELINES SECURELY ATTACHED AT BOTH ENDS
- DRIVELINE SHIELDS THAT TURN FREELY ON DRIVELINE

L1 WEASLER 13-10021-00

No. 2 - "DANGER" - Rotating drive line. Located on PTO. Part No. 268860.

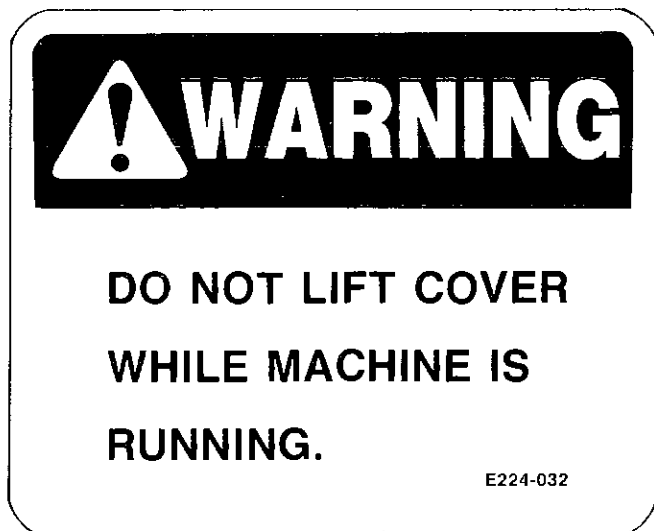


! **WARNING**

**DO NOT STAND OR RIDE ON
MACHINE WHILE IT IS IN MOTION**

E224-072

No. 4 - "WARNING" - Stay off machine when it is running. Part No. E224072.



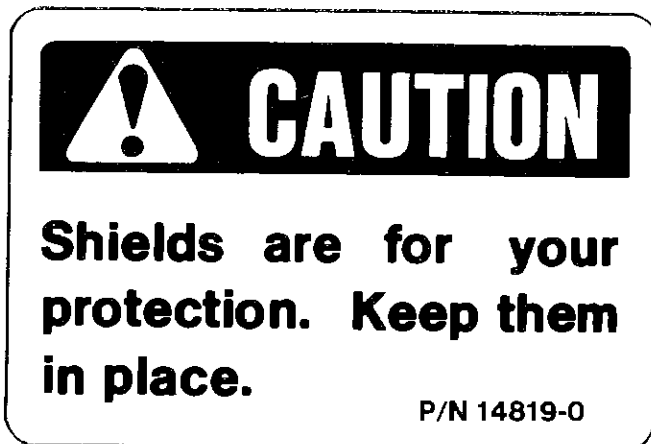
! **WARNING**

**DO NOT LIFT COVER
WHILE MACHINE IS
RUNNING.**

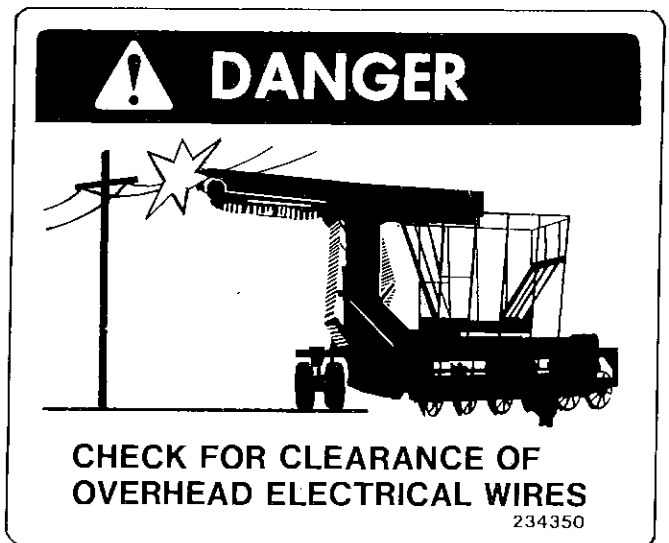
E224-032

No. 5 - "WARNING" - Do not lift cover while in operation. Part No. E224032.

SAFETY DECALS



No. 6 - "CAUTION" - Shields are for your protection. Part No. 148190.



No. 8 - "DANGER" - Check for clearance of overhead wires. Part No. 234350.



No. 7 - "DANGER" - Rotating Rolls. Part No. 234360.

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.

INTRODUCTION

This manual has been prepared to acquaint you with the proper assembly, operation, adjustment, service, and lubrication of the 680B 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.

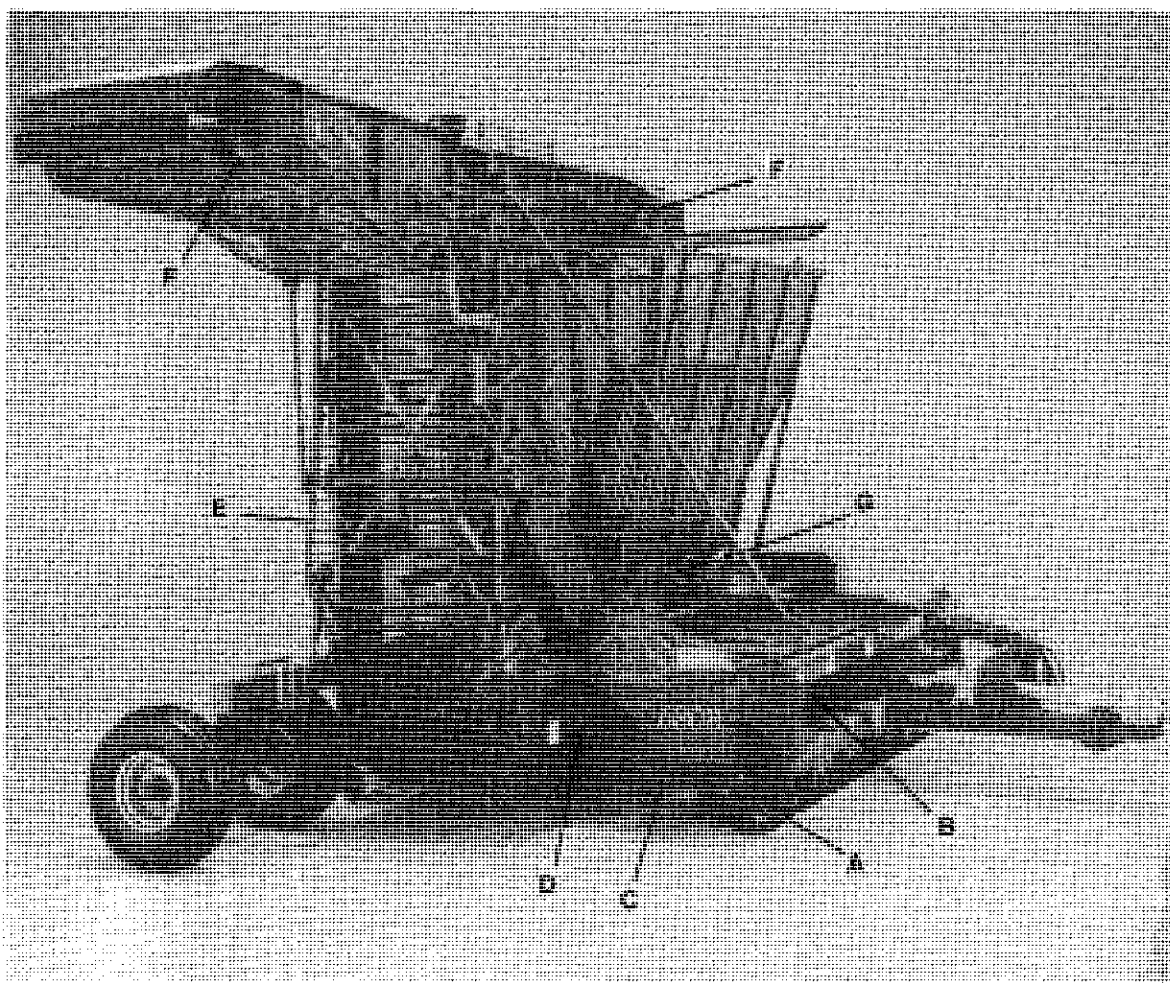


FIGURE 2 - BEET FLOW

BEET FLOW

The 680B Beet Harvester is designed to efficiently lift, clean and load sugar beets. The lifter wheels (A) lift the beets, as they come up from the lifter wheels, they are ejected by paddles (B) rearward where the draper chain bed (C) conveys them back onto the grab rolls (D). The grab rolls continue to clean the beets and move them to the right toward the elevator. The 40" wide elevator (E) conveys them upward, held between two draper chains, running at different speeds to provide a scrubbing and cleaning action.

The beets may be directed to the right into a truck or wagon or to the left into a holding tank. The beets are directed to the truck or tank by use of electric clutches (F) that control the elevator drives. A single switch moved one way directs beets to the truck and moved the other way directs beets into the tank. To unload the tank the hydraulic motor (G) on the tank conveyor is activated. When unloading the tank, beets must be directed to the truck.

PREPARING FOR FIELD OPERATION

REVIEW THE MACHINE

Generally review the machine for:

- Any loose bolts or set screws.
- Proper tensioning of all roller chains, drive belts and draper chains.
- Proper PTO installation (see figure 3).
- Hydraulic cylinders and hoses being properly installed.
- Electric wires being adequately secured to prevent damage.
- Oil level in gear box up to fill plug.
- All shields and guards being in place.
- Proper installation of any options.
- Check tire pressure, inflate implement tires to 45 psi and traction tires to 25 psi.

HITCHING TO THE TRACTOR

Adjust front and rear wheels of the tractor to fit desired row spacing.

Install hydraulic hose ends to match the tractor.

Position tractor near harvester hitch, attach lift cylinder hoses to the tractor outlets, activate cylinder and lift harvester hitch above tractor hitch (see figure 3).

Set tractor drawbar at 16" (as close as possible) from end of PTO to center of drawbar attaching hole for both 1-3/8" and 1-3/4" PTO's. The driveline when hooked to tractor should measure between 70" and 80" between centers of universal crosses (see figure 3).

Attach harvester to tractor with Yoke Weldment (A) and bolts provided. See figure 4 for proper installation. The existing tractor clevis may be used if a 3" spacing can be maintained. If tractor drawbar mounting hole is larger than 1-1/4" a bushing should be installed.

NOTE: It is recommended to use additional support for the tractor drawbar.

Cycle Lift Cylinder (B), observe lift height. Reposition Front Bolt-on Hitch (C) to obtain desired lift height.

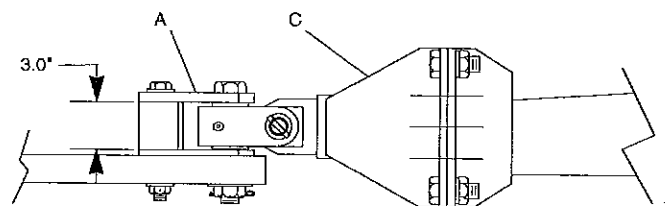


FIGURE 4 - HITCH INSTALLATION

Install safety chain from loop on harvester to tractor drawbar.

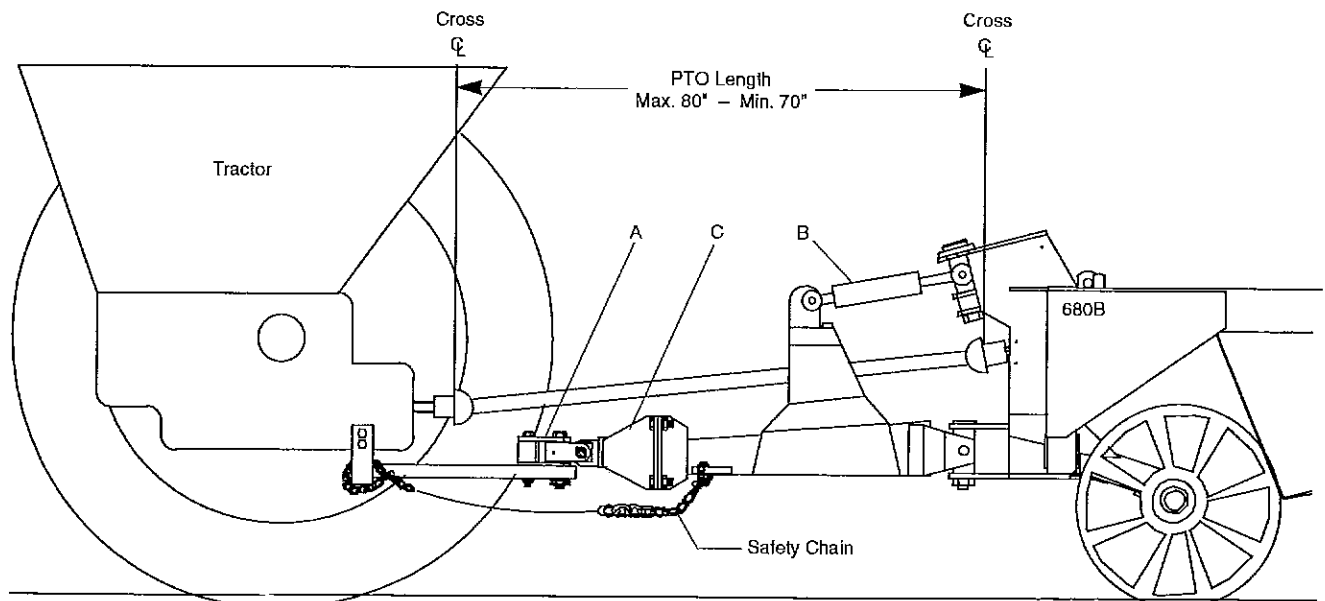


FIGURE 3 - HITCHING TO TRACTOR

PREPARING FOR FIELD OPERATION

Connect PTO driveline to 1000 RPM tractor PTO shaft. Note required PTO length.

Connect hydraulic hoses for steering hitch cylinder circuit, and tank and row finder circuit to the tractor outlets (*for hydraulic schematic and plumbing instructions – see page 34*).

NOTE: With hitch in desired position, adjust cylinder attaching bracket so the cylinder is in the center of it's stroke.

Set flow divider for row finder valve to 3-5 on manual adjustment. (Set so steering cylinder responds as required). The remaining flow runs the tank drive.

Lift harvester and cycle row finder cylinder.



CAUTION: Keep clear of machine as it shifts sideways. Move row finder arms from side to side. Harvester should move in the same direction as the tip of the arm.

Install control box in cab of tractor and connect the power cord to a suitable 12V power supply. See figure 5 for direct connection of battery, make sure a proper connection is made.

MUST BE HOOKED TO 12V POWER SOURCE.

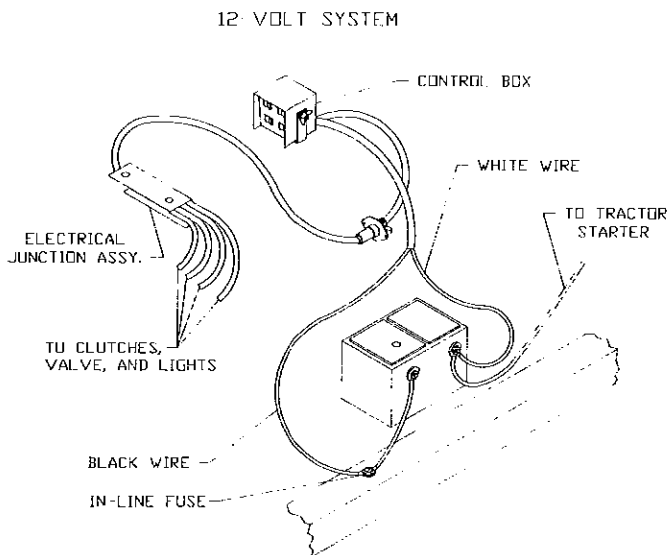


FIGURE 5 - CONTROL BOX POWER CONNECTION

Route main wiring harness through cab and connect to control box (see figure 6). Connect valve wire to junction box. Also connect light wires if so equipped (see

figure 7). No more than two lights should be used per wire from the junction box. Bolt junction box in place and secure all wiring harnesses (see figure 8).

Note: Four lights maximum - 200 watts maximum.

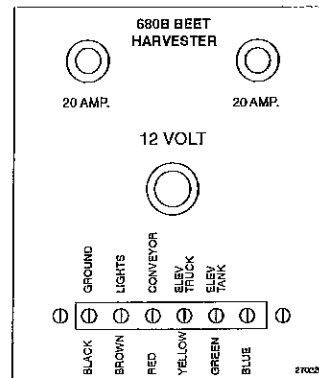


FIGURE 6 - CONTROL BOX DECAL

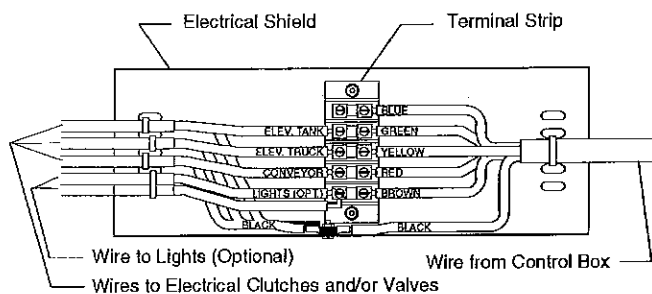


FIGURE 7 - JUNCTION BOX

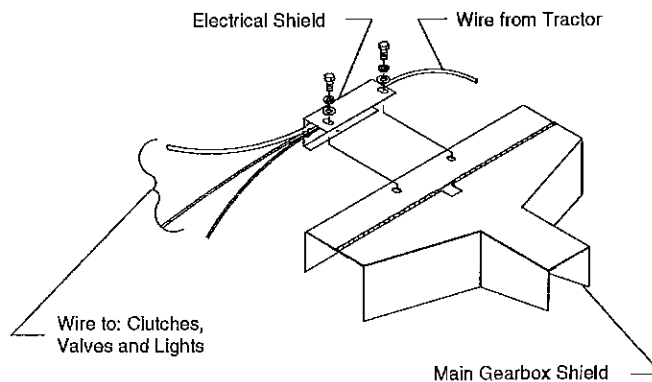


FIGURE 8 - ELECTRICAL JUNCTION ASSEMBLY

Route wires to clutches, valve and lights.

PREPARING FOR FIELD OPERATION

ADJUST ROW AND CARRIER WHEEL SPACING

Use figure 9, to determine 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 exact row widths on either side of centerline.

After adjusting the lifter wheels, see figure 9, to set the rear carrier wheels.

It is recommended that the left carrier wheel be set to run in the far left dug row. The right wheels may be set to run in the dug rows (except for opening new lands or irrigated field) or to straddle the row. The diagram shows the wheels straddling the row. If the

wheel setting desired is different than the diagram, subtract or add the appropriate half row space from the dimension given. Position the left carrier wheels first.

Adjust height of carrier wheels so main frame runs parallel to ground at digging depth (side to side and front to back). See page 15 for adjustment instructions. See page 12 for adjustment procedure of steerable wheels.

For harvesters equipped with a third carrier strut it is recommended to raise the spindle support bracket one hole on the center strut. This is needed to prevent the harvester from pivoting on the center strut and may affect the lifter wheel depth.

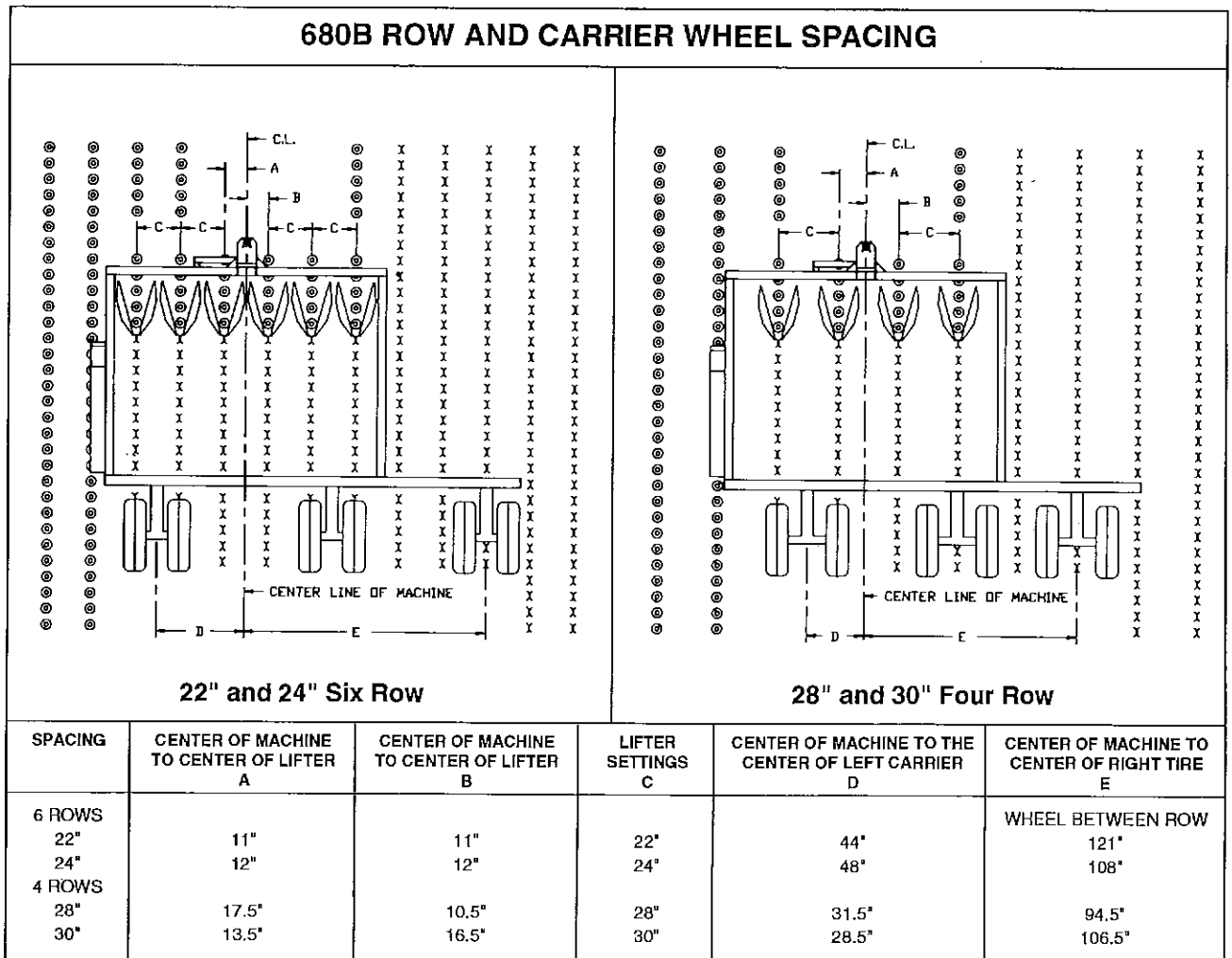


FIGURE 9 - ROW AND CARRIER WHEEL SPACING

PREPARING FOR FIELD OPERATION

STEERABLE CARRIER WHEELS

It is important that the harvester frame, in the digging position, runs as level as possible, front to back and side to side. To adjust carrier wheels and steering mechanism see figure 10.

1. Lift rear of harvester with a safe lifting device.
2. Remove steering tie rod (A) and steering cylinder (B) at one end.
3. Loosen the four (4) 1" x 8" bolts on each carrier strut (C), slide carrier struts to proper position and height for row spacing desired. Retighten bolts.
4. Set both carrier struts in straight ahead position (square to machine and parallel to each other).
5. Locate the steering cylinder bracket (D) in proper position on the right side of machine. Be sure right carrier wheels are in straight ahead position (square to the machine). For a left turn, locate cylinder bracket (D) so that cylinder is fully retracted and pinned in hole 1. For a right turn, locate cylinder bracket (D) so that cylinder is fully extended and pinned in hole 2.
6. Install steering tie rod (A), adjust to proper length. To adjust length; remove screws from taper lock bushing (E) and loosen bushing. Slide tie rod to proper length. Replace screws in original position and tighten taper lock bushing (E). Install tie rod to steering arms.
7. To adjust left carrier wheels to run parallel to right wheels; loosen jam nuts (F) on both ends, rotate center of tie rod until wheels are aligned. Tighten jam nuts.
8. For harvesters equipped with a third carrier strut it is recommended to raise the center strut one mounting hole. This is needed to prevent the harvester from pivoting on the center strut and may affect the lifter wheel depth.

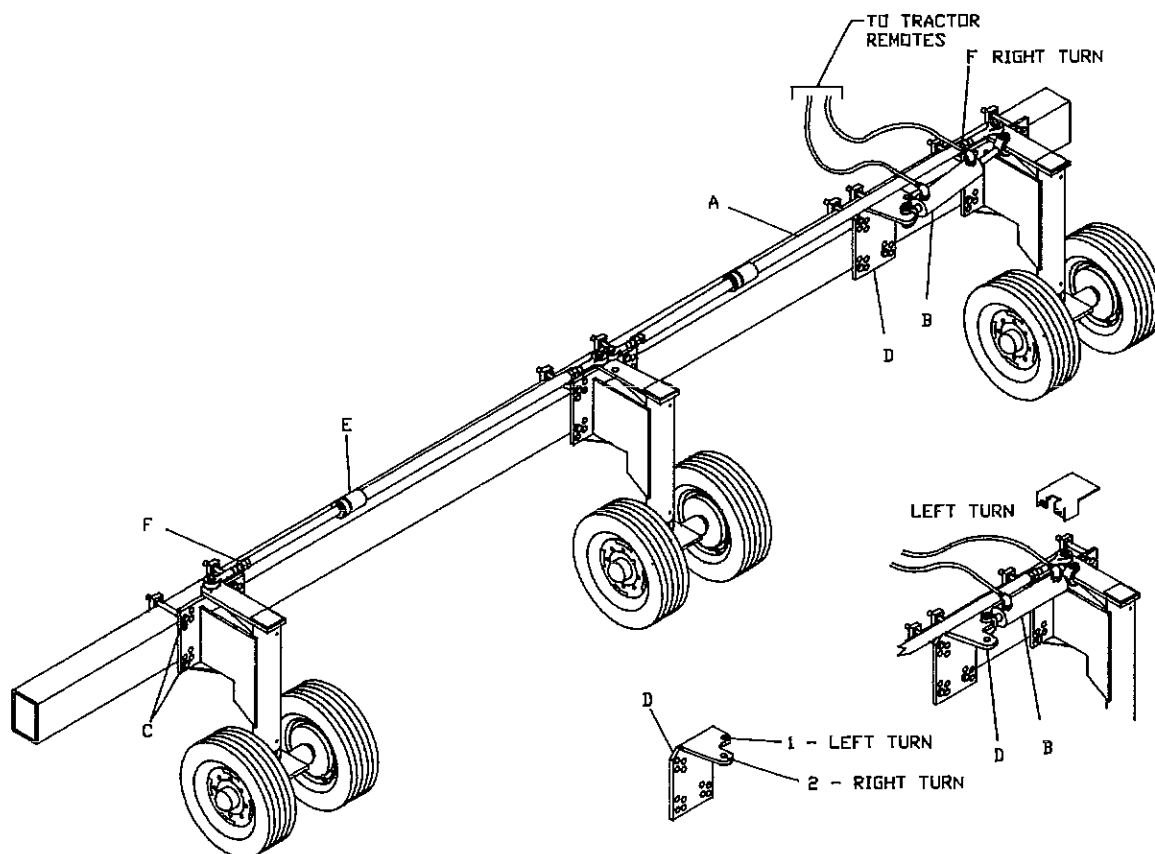


FIGURE 10 - STEERABLE CARRIER WHEELS

PREPARING FOR FIELD OPERATION

TEST RUN HARVESTER



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

Run tractor at low RPM, slowly engage PTO. Check operation of machine at low RPM. Slowly increase RPM's to proper operating speed of 1000 RPM.

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 tractor and place key in pocket while making adjustments. Wait for all movement to stop before approaching machine.

Cycle tank and elevator drives, continue to run machine for 10 to 15 minutes. After running is complete, re-check machine for any loose hardware and re-check drives.

TRANSPORTING



CAUTION: Use of flashing warning lights and turn signals is recommended when towing this equipment on public roads unless prohibited by state or local regulations. An implement safety lighting kit is available from your dealer.

1. Tractor hitch *must be* securely installed.
2. Attach safety chain from tractor to drawbar (see figure 3, page 9).



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 support 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 conveyor in stored position, transport height is 13'9" and the width is 18'4".
4. Harvester weighs approximately 7.5 tons **EMPTY** and up to 13 tons when loaded. Transport empty, if possible.
5. Raise lifter wheels.
6. Never transport harvester faster than 20 mph.
7. Harvester is equipped with a SMV emblem, two (2) red reflectors mounted on rear and two (2) amber reflectors mounted on left side. Keep them clean and visible at all times.

FIELD OPERATIONS AND ADJUSTMENTS



CAUTION: Keep well clear of moving parts. Be sure to shut off tractor and place key in pocket while making adjustments. Wait for all movement to stop before approaching machine.

The 680B Beet Harvester is designed for simplicity and trouble free operation. Art's-Way Manufacturing Co., Inc. has provided a wide range of adjustments on this machine to allow the best operation in all operating conditions. It is essential that *all adjustments* be set for your operating conditions. Continual review during harvest must be done for optimum performance. When field or crop conditions change, re-check your harvesting operation and adjustments. The following explains the operation and adjustment of the machine. See your dealer if questions arise.

BASIC CONTROLS

Beets are diverted to tank or truck by use of two electric clutches (see figure 11). One on the outer end of the truck elevator (A) and one on the outer end of the tank elevator (B). The tank unloading conveyor is operated by a hydraulic motor (C).

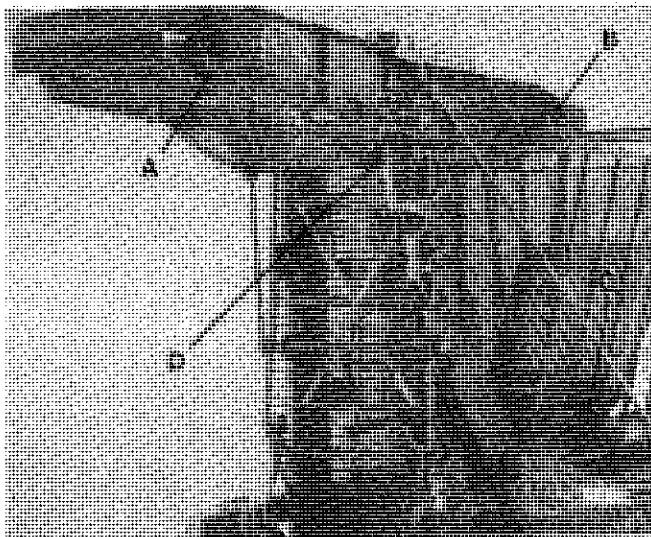


FIGURE 11 - ELECTRIC CLUTCHES

To *Load directly into the truck* activate the switch labeled elevator to the truck position, which will engage the electric clutch (A) at the end of the truck elevator.

To *fill the holding tank* activate the switch labeled elevator to the tank position, which will engage the electric clutch (B). Make sure the switch labeled tank

conveyor is in the off position, which activates the hydraulic motor (C).

To *empty the holding tank*, the electric clutch at the end of the truck elevator (A) *must be* activated first to convey beets into the truck. Beets are conveyed from the tank onto grab rolls, where they go up the chain elevator and into the truck. When tank is empty, turn off the tank conveyor switch (beets may be recirculated back into tank to remove extreme mud, do not lift beets while recirculating) then activate the motor on tank conveyor (C).

OPERATING SPEED

Recommended working speed is 4-1/2 to 6 MPH. Adjust speed to your conditions. Maintain the full 1000 RPM output at the PTO shaft.

The 680B is equipped with a *constant velocity PTO*. It is *not necessary to shut off the PTO* for a 'normal' turn. It is recommended in tight turns to *shut off the PTO*. Engage PTO with tractor at low RPM and "run-up" to full RPM gradually.

Be sure tractor drawbar is set so that PTO driveline runs at the length specified (see figure 3, page 9).

MACHINE LEVELING

It is important that the harvester frame, in the digging position, runs as level as possible, front to back and side to side (see figure 12).

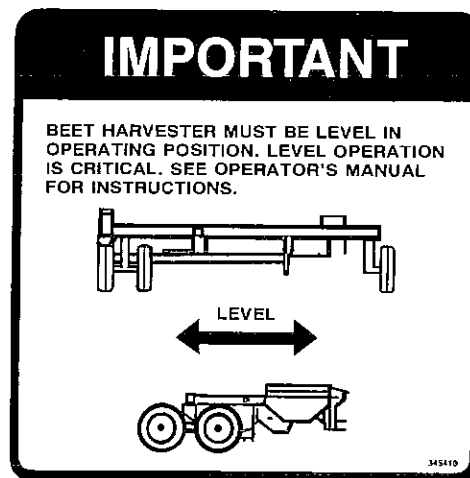


FIGURE 12 - MACHINE LEVELING

FIELD OPERATIONS AND ADJUSTMENTS

For harvesters equipped with a third carrier strut, it is recommended to raise the spindle support bracket one hole on the center strut. This is needed to prevent the harvester from pivoting on the center strut and affecting the lifter wheel depth.

To level machine, move spindle support bracket (A) (see figure 13) up or down on struts.

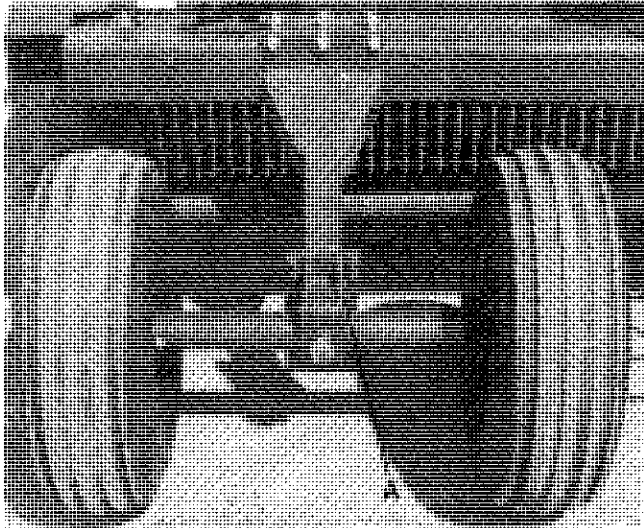


FIGURE 13 - OSCILLATING CARRIER WHEEL

Set the front hitch of harvester (see figure 14) so maximum lift for transport is maintained and still allows lowering into ground as far as necessary. Move the bolt-on hitch (A) to best position.

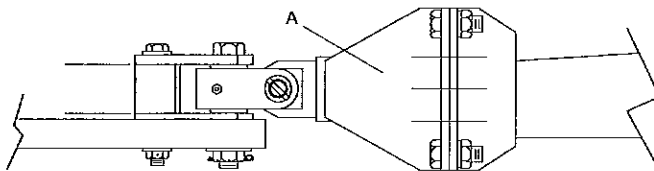


FIGURE 14 - FRONT HITCH ADJUSTMENT

For steerable wheel adjustment, move entire strut up or down on both sides (see figure 10, page 12 for instructions).

LIFTER WHEEL SPACING

Make sure lifter wheels are located at proper row widths, *measured at pinch point*, to prevent slicing and breaking tails of beets.

To adjust lifter wheel row widths (see figure 15), loosen strut mounting bolts (A), paddle bolts (B), and barrier bolts (C). Slide all to proper row spacing (see

figure 9, page 11). Tighten all bolts equally. Be sure all bolts are torqued correctly.

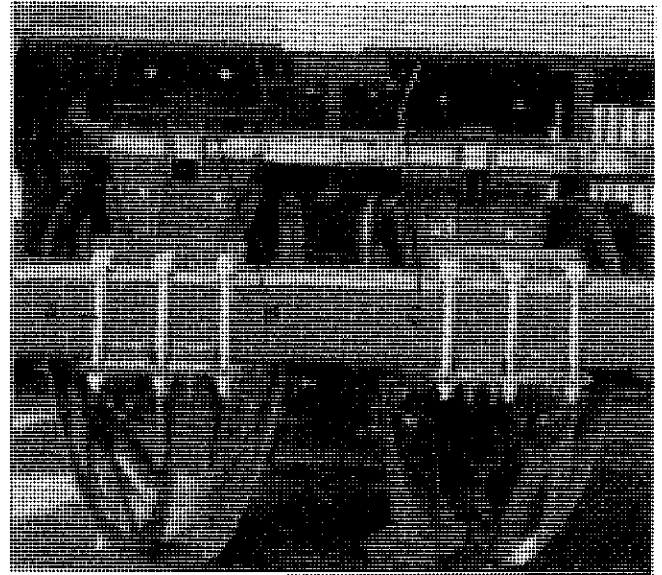


FIGURE 15 - LIFTER WHEEL SPACING

PINCH POINT

The lifter wheels may be moved *out* for larger beets, or *in* for smaller beets and soil conditions, by inserting or removing spacers between the lifter wheel and hub (see figure 16).

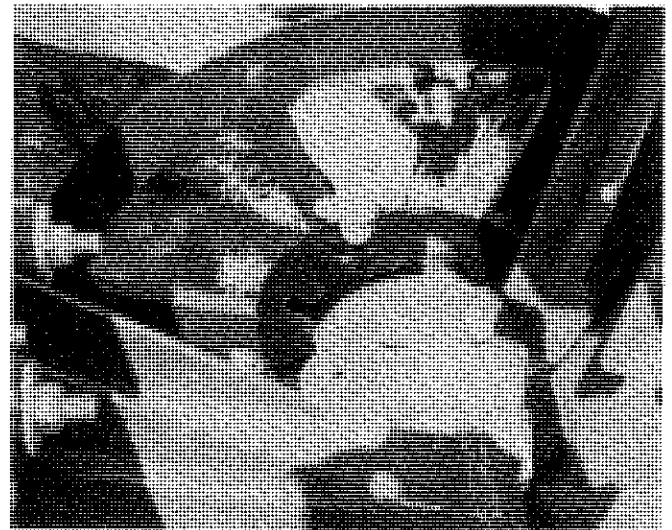


FIGURE 16 - LIFTER WHEEL WIDTH

OPERATING DEPTH

Lifter wheels should be set to dig approximately 2" to 3-1/2" deep. Set lifter wheels to run as shallow as possible to prevent lifting excessive amounts of dirt and

FIELD OPERATIONS AND ADJUSTMENTS

to reduce power requirements. Extremely hard ground may require going deeper to prevent breaking tails of the beets. Set a stop on the lift cylinder to help maintain proper digging depth.

PROCEDURE FOR FINDING CORRECT DEPTH

1. Begin digging as deep as necessary to keep from breaking beet tails.
2. Raise lifter wheels gradually until some beet tails start to break.
3. Lower lifter wheels about 1/4".
4. 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 float position, connect lift cylinder to this circuit and make sure control lever is in 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 equipped with a breather to allow air to enter and escape. Consult your dealer for the best method to accomplish this.

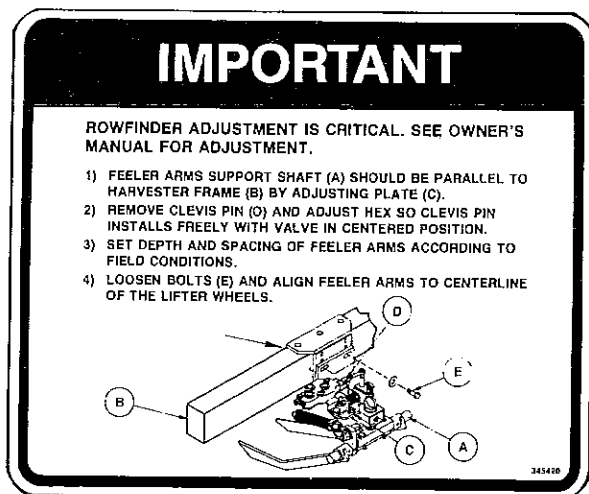


FIGURE 17 - ROW FINDER ADJUSTMENT

ROW FINDER OPERATION

The optional row finder helps keep your harvester on the rows. The feeler arms (A) rest astride the row (B) and follow the line of beets - sensing any change in the direction of the row or the position of the harvester (see figure 18). Sideward movement of a feeler arm actuates the hydraulic valve (C), which controls oil flow to the beet harvester steering cylinder.

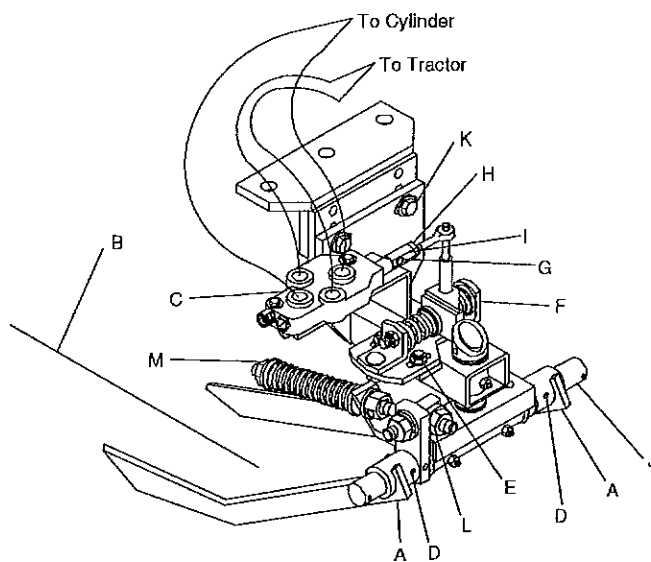


FIGURE 18 - ROW FINDER

The steering cylinder extends or retracts as determined by 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 row finder hoses are connected properly. To check, lift the front of machine, engage hydraulic circuit.



Caution: Keep clear of machine as it shifts sideways. Move row finder arms from side to side. Harvester should move in the same direction as the tip of the arms.

The row finder is adjustable to beet size, bed 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.

FIELD OPERATIONS AND ADJUSTMENTS

Beets must be harvested in the same multiple as they were 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 harvester when backing up so row finder is not damaged.

1. FEELER ARM SPACING

The arms should be set so the largest beets will just pass through the opening, between the tips of the arms, without touching either arm. To adjust arms, remove spring pins (D), set both arms the same distance from center line of row for desired width setting, then reinstall spring pins.

2. FEELER ARM CENTERING

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

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

The feeler arms must be centered with the gap between the lifter wheels to function accurately. Do this by loosening bolts (K) and sliding the entire assembly in the mounting slots until centered. Tighten bolts.

3. ROW FINDER HEIGHT

Set row finder height in correct relationship to the lifter wheel working depth to assure proper function. Example: If 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 row.

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

To change the height of the row finder more than 1", remove the four (4) bolts (K) attaching the row finder frame to the support plate. Bolt the row finder to the holes which provide the desired operating height.

Tighten bolts.

NOTE: For less than 1" height adjustments, raise or lower the feeler arm by adjusting nuts (L).

4. FEELER ARM DOWN PRESSURE

The down pressure of the row finder is factory set. If beet crowns are *below* ground surface, adjust down pressure so row finder arms penetrate the soil. To increase down pressure, turn lock nut (M) to compress spring.

5. STEERING CYLINDER

The row finder controls the operation of the steering cylinder, unless overridden with the tractor control lever.

The harvester can be operated without a steering cylinder if a screw jack or stiff member is used to hold the hitch rigid and row finder is not used.

The main frame attaching bracket of the steering cylinder can be moved left or right to enable use of the full stroke of the cylinder, when the tongue is offset for 28" - 30" rows.

To do this - set the cylinder in the center of its stroke, loosen the U-bolts on the bracket, then move the tongue to the desired offset and re-tighten the U-bolts.

FLEX STRUTS

In rocky conditions, flex lifter wheel struts are recommended. The struts are mounted with flex cushions which help absorb the shock loads when large rocks are hit, allowing 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. Set the flex strut cushions at 2-7/8", including a washer on the longer cushions and at 1-1/8", including both washers on the shorter cushions. Set the lifter wheel cushions at 1" including the washer (see figure 19 page 18).

FIELD OPERATIONS AND ADJUSTMENTS

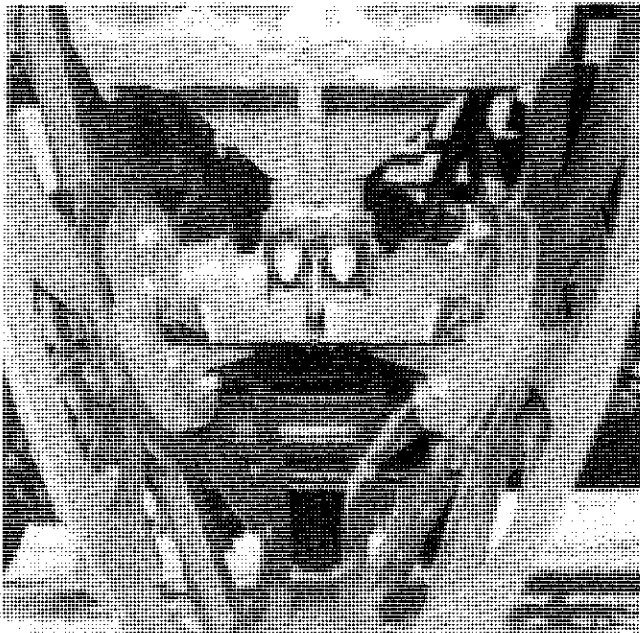


FIGURE 19 - FLEX LIFTER WHEEL STRUTS

SCRAPERS

Wheel scrapers keep dirt and trash from building up on the lifter wheel hubs (see figure 19).

Check scrapers frequently and clean off accumulated mud and trash.

PADDLE SHAFT SLIP CLUTCH

Prior to each seasons use, it is recommended to loosen the slip clutches - allow them to slip - then tension springs to proper setting.

The paddle shaft is protected by a slip clutch (A) (see figure 20). The four (4) springs (B) set the tension of this clutch. The setting recommended is 2-3/8" actual length of springs. Be sure all four springs are the same length. Keep jaws free of grease.

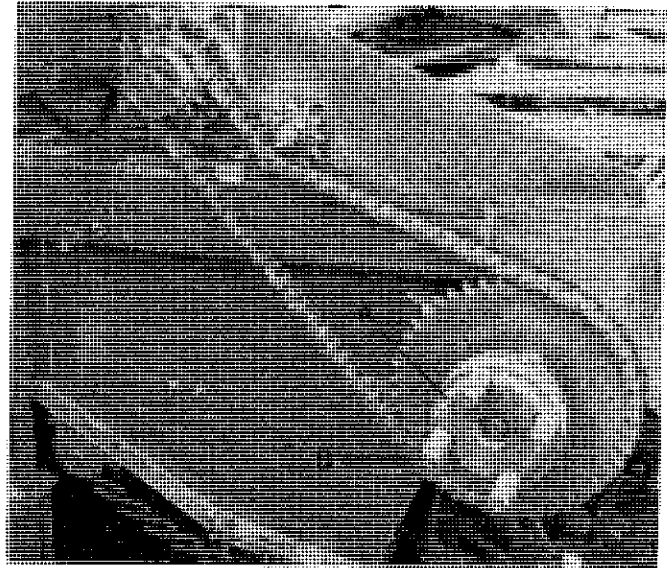


FIGURE 20 - PADDLE SHAFT SLIP CLUTCH
(Shield removed for clarity)

PADDLE SHAFT PADDLES AND BARRIERS

The rubber paddles may be removed if desired (except on flex struts). If removed, lower paddle shaft to lower set of bearing holes to keep paddle tips in their correct relationship. Adjust the split paddles outward to just clear lifter wheels when machine is running. In this position, the paddles help keep the lifter wheels clean.

In rocky conditions, some space must be left to prevent rocks from wedging. Be sure paddles are spiraled around the paddle shaft so adjacent paddles contact beets at 90° intervals. This avoids excessive shock loads to the paddle shaft and drives.

When flex lifter wheel struts are used, the paddle shaft bearings must stay in the *top* holes and rubber paddles are 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 between the lifter wheels, loosen the clamps, center barriers between lifter wheels, and tighten bolts.

FIELD OPERATIONS AND ADJUSTMENTS

Optional wheel close-ups (A) are available to prevent small beets from falling out between the lifter wheel spokes. Slots are provided in close-ups to allow rotating them out of the way when conditions warrant (see figure 21).

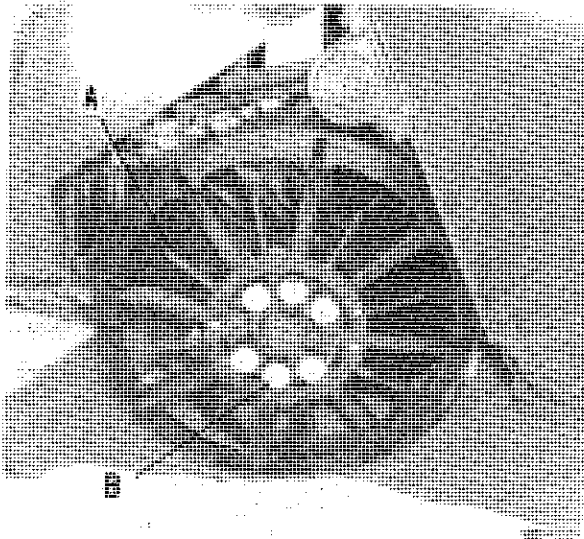


FIGURE 21 - CLOSE-UPS

ROCK CUSHIONS - ATTACHMENTS

Optional cushions (B) are available (standard on 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 (see figure 21).

BED DRAPER CHAIN

The bed draper chain (see figure 22) is tensioned by loosening two pillow block bearings (A) immediately behind lifter wheels. Adjust both sides equally with take-up bolt (B), so the draper chain sags approximately 1". Make certain tension is equal on right and left hand sides. If end of adjustment is reached, loosen draper chain and remove link.

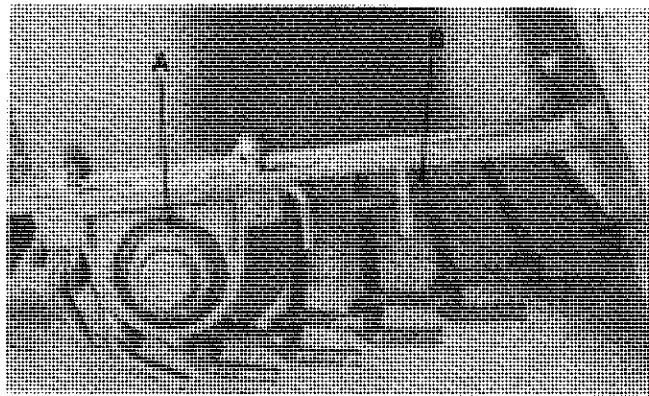


FIGURE 22 - BED DRAPER CHAIN

The bed chain drive, #60H roller chain (see figure 23), is protected with a friction clutch (A). The clutch is set by tightening all of the bolts snug and loosening each bolt two revolutions. Readjust as necessary by turning each bolt in 1/4 turn increments until bed chain will carry the load.

NOTE: All bolts must be adjusted to the same setting.

NOTE: Rust and weather can cause clutches to stick between harvest seasons. Prior to harvest, release all spring tension and allow clutch to slip. Readjust as directed above.

NOTE: Make sure no grease or oil gets on friction discs.

GRAB ROLL DRIVE BELTS

The primary grab roll belt drive (B) and final grab roll belt drive (C) (see figure 23) are tensioned by spring loaded idlers. These should be tightened so springs (D) are compressed to 5-1/4" for primary and 4-1/2" for final drive. These must be further tensioned if any belt slippage occurs.

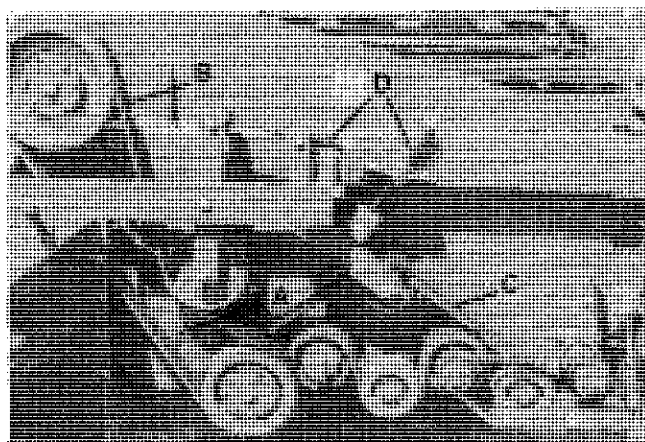


FIGURE 23 - BED CHAIN & GRAB ROLL DRIVE
(Shield removed for clarity)

FIELD OPERATIONS AND ADJUSTMENTS

GRAB ROLL SPACING

The grab rolls are designed to move the beets to the elevator and to provide additional cleaning before they enter the elevator.

Protection against rock damage to the grab rolls is provided by the rubber insert (A) (see figure 24) on discharge end, allowing the grab rolls to move when rocks enter the grab roll bed.

The grab rolls at the drive end can be set in two positions.

1. #2 & #4 (smooth) grab roll in a raised position, which results in a more aggressive cleaning action. (Depending on soil type.)
2. #2 & #4 (smooth) grab roll in a lowered position, which results in a less aggressive cleaning action. (Depending on soil type.)

The machine is set up in one of these configurations. Kits with the proper sheaves and belts are available for changing configurations if field conditions require.

Grab roll pairs should normally be spaced so that they nearly touch on drive end and are a 1/4" wider, up to maximum distance (for large beets) apart on the discharge end. Bearings can be moved on drive end of #2 & #4 smooth rolls when in the raised position.

IMPORTANT: Do not run rolls narrower at discharge end than at drive end, excessive power will be required. Beet damage will occur.

When additional cleaning action is required in heavy and/or muddy-soil conditions or in extremely heavy trash, increase space between grab rolls at the drive and discharge end.

NOTE: Always maintain at least 1/4" more gap at the discharge end.

To maximize cleaning and reduce loss, increase spacing for larger beets and reduce spacing for small beets. To adjust (see figure 24) remove spacer (B) to increase gap and add spacers to reduce the gap between rolls #1 & #2 and between rolls #3 & #4. Do not space too wide, beets could fall through grab rolls.

In dry conditions with small beets, a beet keeper rod is available to prevent loss of small beets at discharge end of grab rolls.

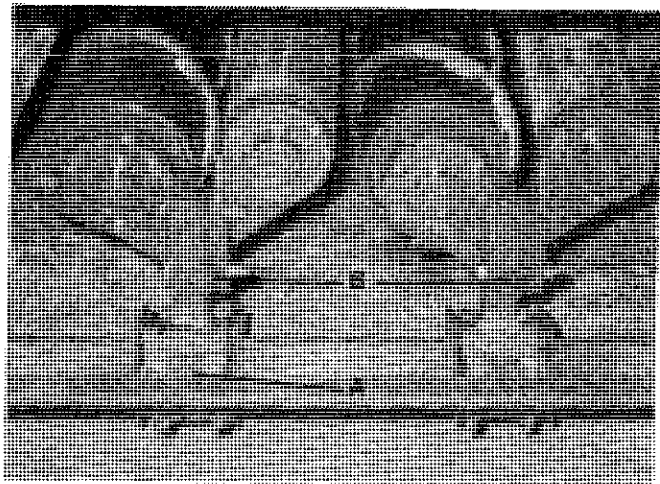


FIGURE 24 - GRAB ROLL DISCHARGE END

HOLDING TANK CONVEYOR DRAPER CHAIN

To adjust draper chain in tank conveyor (see figure 25), loosen angle bolts (A). Using take-up bolts (B), tension both sides equally so draper chain just clears guide angles under tank. Reinstall and tighten bolts.

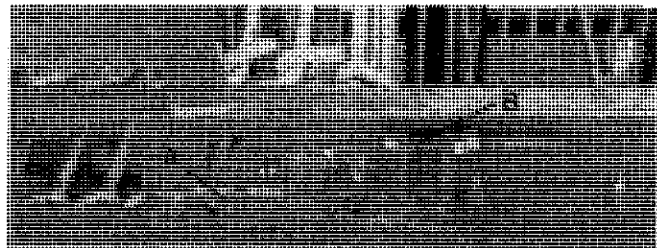


FIGURE 25 - TANK CONVEYOR ADJUSTMENT

TANK CONVEYOR DRIVE

Adjust chain tension with idler sprocket (see figure 26, page 21).

FIELD OPERATIONS AND ADJUSTMENTS

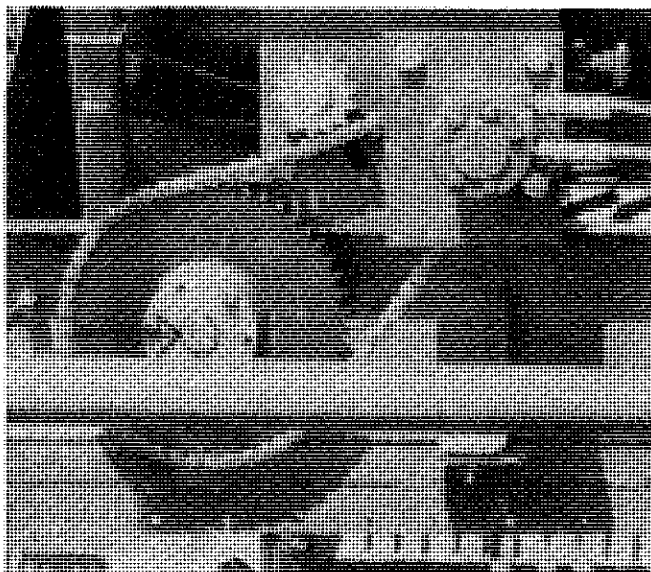


FIGURE 26 - TANK CONVEYOR DRIVE
(Shield removed for clarity)

HOLDING TANK GATE

A sliding gate is provided in the tank discharge opening. This can be raised or lowered to vary the beet discharge rate from the tank for various beet sizes and operating conditions (see figure 27).

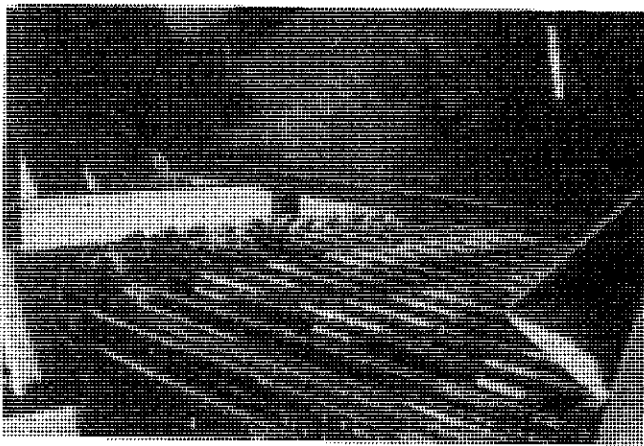


FIGURE 27 - TANK DISCHARGE GATE

HOLDING TANK DOOR

An access door (A) is provided in the holding tank (see figure 28). This door is opened by loosening latches (B) and moving them outward to release door.



WARNING: Keep clear of door when latches are moved. Be sure to keep clear when opening door.

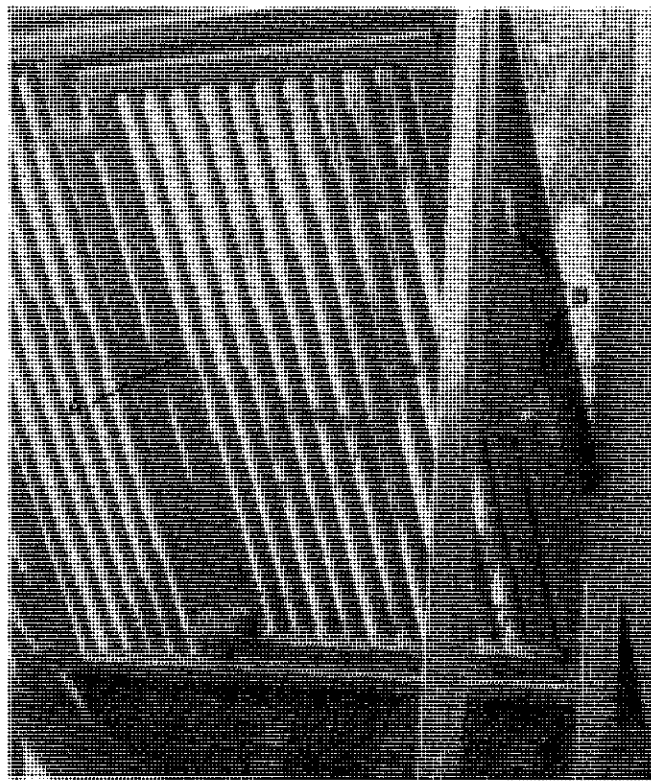


FIGURE 28 - ACCESS DOOR IN HOLDING TANK

ELEVATOR DRAPER CHAIN

To tension the elevator draper chain (see figure 29, page 22). Run draper chain taut over extended tightener arms (A). Hook spring in shorter chain links (B) to increase tension. Keep tightener arms (A) at about 45° as shown. If necessary remove links from draper chain to maintain this angle. Be sure to turn draper chain so beveled breaker link is in a convenient location for breaking chain, when removing a link.

Adjust the truck elevator conveyor chain by moving the rubber roller (D) down in the slotted bracket. Do not over tighten. Remove links if necessary.

The 680B Beet Harvester is equipped with a “hugger” elevator to provide efficient elevation of beets and to provide additional cleaning if necessary.

Additional cleaning is achieved by running the inside draper chain slightly faster than the outside. This provides a rolling ‘scrubbing’ action to the beets as they are elevated.

FIELD OPERATIONS AND ADJUSTMENTS

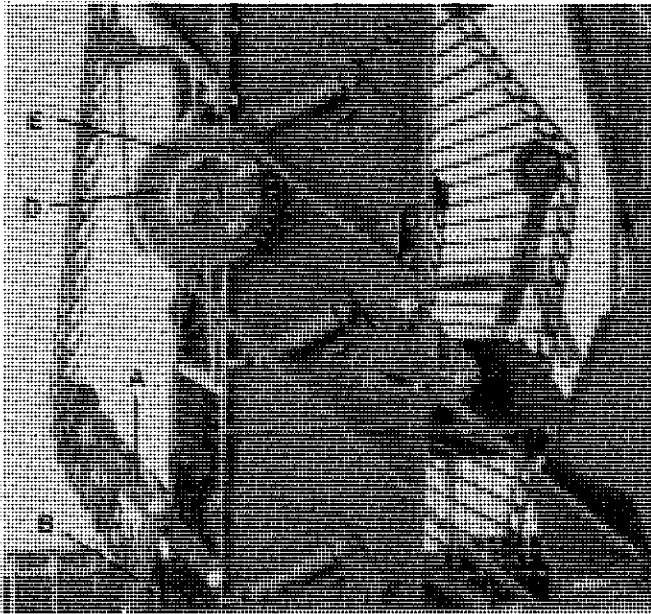
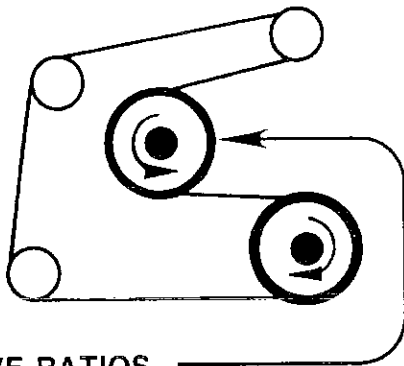


FIGURE 29 - ELEVATOR DRAPER CHAINS
(Shield removed for clarity)

The inside draper chain speed can be changed by changing the sprocket on the rear top vertical elevator shaft. Sprockets are provided for both scrubbing and non-scrubbing action (see figure 30).

PROPER CHAIN PATH



DRIVE RATIOS

SCRUBBING - 1.2:1 20T E740120
NONSCRUBBING - 1:1 24T E740169

FIGURE 30 - CHAIN PATH AND DRIVE RATIO

Pressure of the inside draper chain on the outer draper chain can be regulated by the location of the spring on the hugger arm (C) (see figure 29).

Locate the spring closer to the pivot to decrease pressure, farther from the pivot to increase pressure. Under most conditions hook the spring in the center hole. Apply more pressure if beets are small and yield is low or if beets don't feed into the elevator smoothly.

ELECTRIC CLUTCHES

Do not allow dirt or debris to build up around electric clutches. If slippage occurs, check distance between sprocket armature and outer shell (see figure 31). This should be $1/32$ " to $3/32$ ". Remove or add spacer bushings between sprocket armature and outer shell to get this dimension.

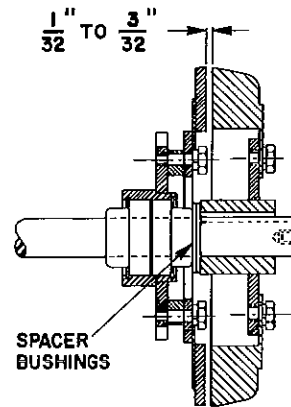


FIGURE 31 - CLUTCH GAP

ELEVATOR DRIVE SLIP CLUTCH

Prior to each seasons use, it is recommended to loosen the slip clutches - allow them to slip - then tension springs to proper setting.

The elevator is protected by a slip clutch (D) (see figure 29). The four (4) springs (E) set the tension of this clutch. The setting recommended is $2-3/8$ " actual length of springs. Be sure all four (4) springs are the same length. Keep jaws free of grease.

FIELD OPERATIONS AND ADJUSTMENTS

SWINGING TRUCK ELEVATOR

The 680B Beet Harvester is equipped with a truck elevator that folds over the tank for easy transport and storage.



CAUTION: Do not run the Harvester when the elevator is in the stored position.

To swing the elevator from the operating position to the stored position:

1. Turn off tractor and remove key.
2. Remove truck elevator drive chain from inner sprocket by removing the spring from the spring loaded idler (A) (see figure 32). Hang chains over idlers.



CAUTION: No one should be standing below the truck elevator during this step.

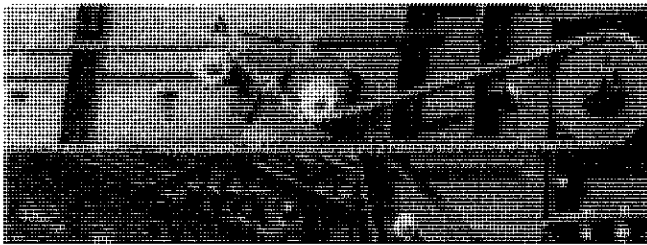


FIGURE 32 - SPRING LOADED IDLER

3. Loosen the screw jack, at the back of the elevator, until it swings free of the tab on the truck elevator (see figure 33).

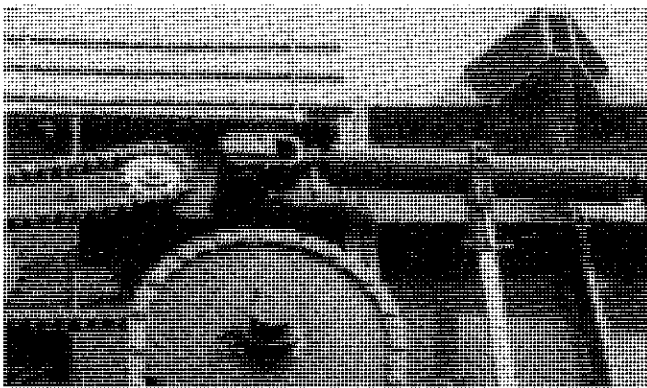


FIGURE 33 - SCREW JACK



CAUTION: Do not lean or stand on truck elevator when screw jack is loosened.

4. Swing elevator into position over the tank by using the rope (see figure 34).
5. Secure elevator to elevator support using the latch and then lock with pin provided.

To swing elevator from stored position to the operating position, reverse the above procedure.

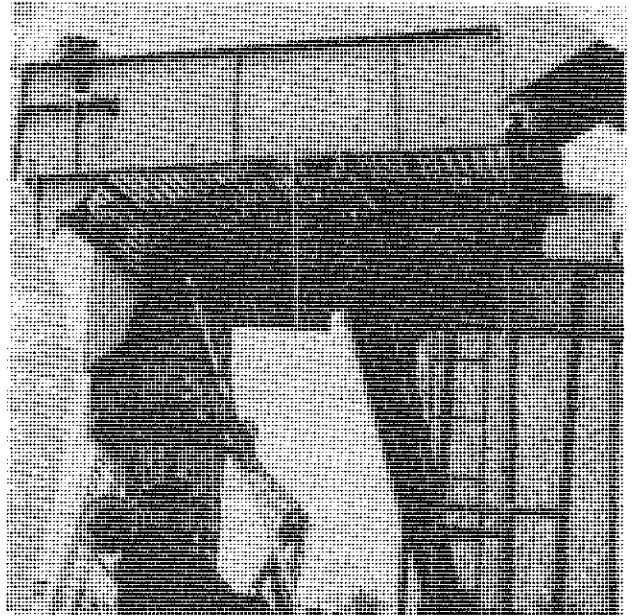


FIGURE 34 - ELEVATOR IN STORED POSITION

ROLLER CHAIN DRIVES

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

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

FIELD OPERATIONS AND ADJUSTMENTS

TIRE PRESSURE

Frequently check tire pressures. Equal pressure should be maintained in all tires. Figure below lists recommended pressure for tires used on 680B Beet Harvester.

| | |
|-------------------|--|
| 11.00-16 - 12 PLY | - 45 PSI RECOMMENDED - 50 PSI MAXIMUM |
| 13.50X16.1-6 PLY | - 25 PSI RECOMMENDED - 30 PSI MAXIMUM |

FIGURE 35 - TIRE PRESSURE

MOUNTING TIRES



CAUTION: Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious

injury or death. Do not attempt to mount 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 maximum inflation pressures specified by tire manufacturers for mounting tires. Inflation beyond this maximum pressure may break the bead, or even the rim, with dangerous explosive force. If both beads are not seated when the maximum recommended pressure is reached, deflate, reposition tire, relubricate bead, and reinflate.

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

TIGHTENING WHEEL BEARINGS

Raise wheel and remove the hub cap (bold arrow). Remove the cotter pin from the slotted nut and tighten the slotted nut until there is a slight drag on the bearing, while turning the wheel; then back off the nut one slot and insert and spread cotter pin. There should be a slight drag on the bearing following the adjustment. Replace hub cap.

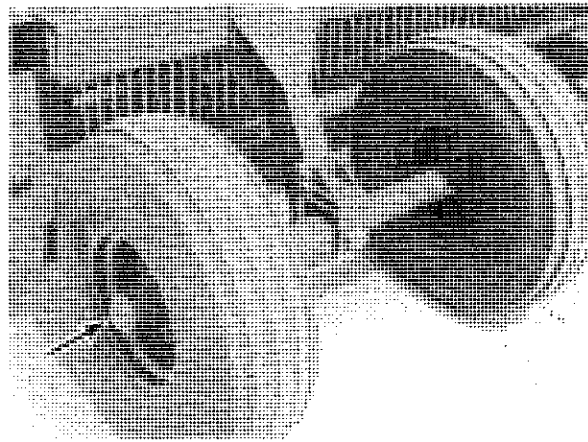


FIGURE 36 - CARRIER WHEEL BEARINGS

LUG NUTS

Tighten all lug nuts to 130 ft. lbs. (175N m).

LUBRICATION

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



CAUTION: Disengage drive, shut off tractor, and place key in pocket before lubricating the machine.

LUBRICATE ACCORDING TO THE FOLLOWING SCHEDULE:

EVERY 8 HOURS, One, two or three pumps for B - H

- A. CV PTO - CV portion requires 20-30 pumps each time it is greased.
- B. PTO U-joints & slip tube (zerk exposed at 70").
- C. Row finder.
- D. Swivel pins for lift & steering hydraulic cylinders.
- E. Tongue pivot tube and hitch bolt.
- F. Belt tightener pivots.
- G. U-joints on gear box drive shafts.
- H. Hugger arm bearings.

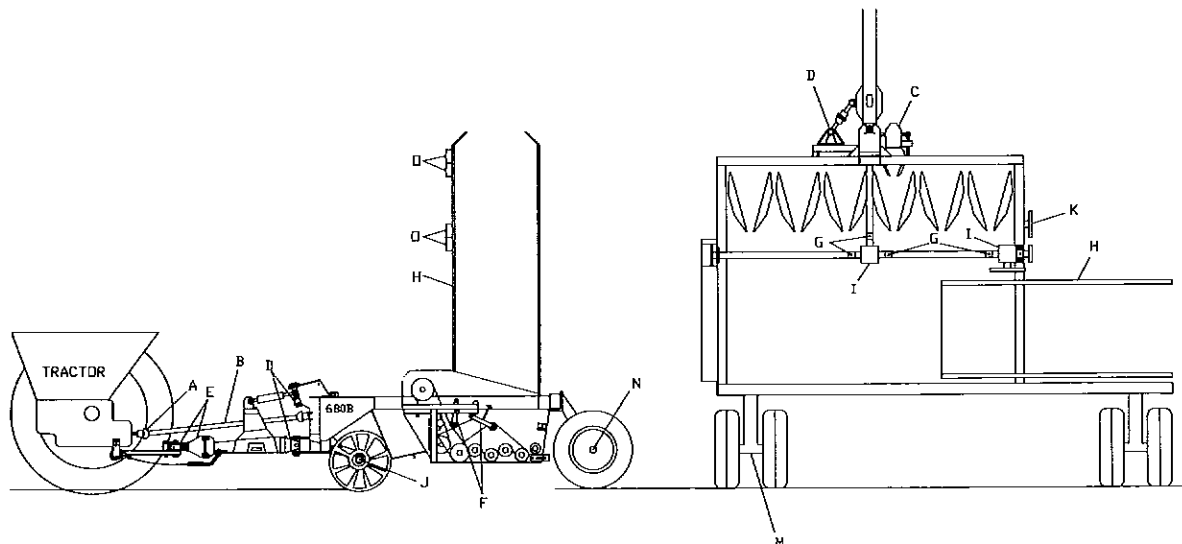
EVERY 50 HOURS

- I. Gearbox. Fill to check plug with SAE 90W gear oil.
- J. Lifter wheel hubs - grease through zerk . If any looseness in wheel, tighten lifter wheel hub bearings, as required.
- K. Paddle shaft and elevator shaft slip clutches.
- L. Idler shaft bearings-tank conveyor (not shown).
- M. Oscillating wheel pivots.

EVERY 500 HOURS OR ONCE A SEASON

- N. Carrier wheel bearings - clean and repack.
- O. Elevator hinges - 2 to 3 pumps of grease.
- P. Roller chain – remove, clean and soak in oil.

NOTE: Pillowblock and flange bearings: These are sealed bearings. Lubricate sparingly, seal damage may result. One or two pumps every 20 hours maximum.



STORAGE

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

PREPARING HARVESTER FOR STORAGE

1. Store harvester in a dry place.
2. Squirt diesel fuel on seals of bearings prior to washing with power washer.
3. Clean harvester thoroughly.
4. Clean drive chains and brush with heavy oil to prevent rust.
5. Lubricate harvester. Grease threads of adjusting bolts. Run harvester briefly to distribute grease.
6. Remove belt tension.
7. Scrape and repaint all worn parts or coat with light oil to prevent rust.
8. Block up harvester to remove load from tires. **DO NOT** deflate tires. If stored outside, remove wheels and tires and store in a cool, dark dry place.
9. Place a plank under lifter wheels so they do not sink into ground, if harvester is not stored on a hard surface.
10. List the replacement parts needed before next season and order early. Your dealer can give better service in the off season. Replacement parts can be installed in your spare time - no delay at time of need.
11. If hydraulic cylinders remain on the harvester and cylinder rods are extended, apply grease to exposed rod end.

REMOVING HARVESTER FROM STORAGE

1. Replace wheels if they were removed and remove blocking.
2. Inflate tires, implement tires to 45 psi and traction tires to 25 psi.
3. Clean harvester thoroughly.
4. Check drive and conveyor chains making certain they have proper tension.
5. Clean slip clutches. Check and adjust spring lengths as necessary.
6. Retension belt drives.
7. Lubricate harvester; then run at half speed for 10-15 minutes listening for any unusual noises. Stop harvester and check bearings for over heating or excessive looseness. Recheck chain tension.
8. Review safety and operating instructions in this manual.
9. Inspect all connections and make certain that hardware is tight and cotter pins are in place.
10. If cylinders were stored on machine and cylinder rods were extended and coated with grease, clean grease from exposed rods.
11. Make sure all shields are in place and properly fastened.

TROUBLESHOOTING

| Trouble | Possible Cause | Possible Remedy |
|--|--|--|
| Pulls too hard. | Machine dirty - not lubricated | Clean and lubricate machine |
| | Lifter wheels running too deep | Do not run lifter wheels deeper than necessary |
| | Tractor too small | Use larger tractor |
| | Grab roll spacing wrong | Adjust grab rolls |
| Gear case runs hot, leaks oil | Machine dirty - not lubricated | Clean and lubricate machine to avoid overload |
| | Lubricant viscosity too light for climate | If weather is hot and problem persists, change to No. 140 gear lube |
| Hard to keep on rows | Lifter wheel strut assemblies are not set properly with rows | Make sure lifter wheel strut assemblies match the rows |
| | Machine straddling the guess row | Make sure you are not straddling the guess row |
| | Conditions suitable for utilization of row finder | Install row finder for automatic tongue steering |
| Can't dig deep | Tractor drawbar not set properly enough | Make sure tractor drawbar is not higher than 15 inches |
| | Front hitch in wrong hole setting | Adjust front hitch to proper holes |
| | Improper cylinder being used | Use correct depth control cylinder |
| | Machine running uneven | Level machine by adjusting carrier wheels |
| Premature wear of roller chains | Improper lubricant or infrequent intervals. | Lubricate chains with proper oil and more frequently |
| Loses small beets | Conditions suitable for utilization of closeups | Install closeups |
| | 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 wheels closer together |
| | Front of primary conveyor too far back | Add chain link and move forward |
| Breaks tails off beets | Lifter wheels not running deep enough | Running lifter wheels deeper |
| | Lifter wheel strut assemblies not spaced properly | Make sure lifter wheel strut assemblies are spaced to fit rows |
| | Not steering properly | Steer more accurately or install a row finder |
| | Lifter wheels too narrow, pinch point is too tight | Space wheels farther apart |

TROUBLESHOOTING

| Trouble | Possible Cause | Possible Remedy |
|---|--|--|
| Beets slicing | Row finder not adjusted correctly | Adjust centering of row finder arms |
| | | Adjust down pressure |
| | Harvester positioned over guess row | Dig on planted row only |
| | Lifter wheels too narrow, pinch point is too tight | Space wheels farther 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 |
| | Grab rolls not set wide enough | Set grab rolls for wider gap |
| | Very dry soil conditions | Irrigate field or wait for rain |
| | | Space lifter wheels closer together |
| Beets plugging cleaning bed | PTO speed too slow | Increase PTO speed to 1000 rpm |
| | Ground speed too fast | Decrease ground speed |
| | Small beets | Space grab rolls closer together |
| Excessive trash or dirt in truck | Cleaning areas plugged with trash and/or stones | Remove stones and trash |
| | Cloddy, stony field conditions | Space grab rolls farther apart |
| | Improper operation or adjustment | Correct operating procedures or adjustments |

ROW FINDER

| | | |
|---|---|--|
| Lifter wheels moving away from beets | Hydraulic hoses incorrectly connected | Check connections at valve and tractor outlets |
| Lifter wheels not tracking properly | Feeler arms not centered | Center feeler arms |
| Lifter wheels jump off rows too easily | 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 |

ASSEMBLY OF BEET HARVESTER



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.

NOTE: A hoist or lift truck is necessary to assemble the Beet Harvester.

Set the frame on a level area to assemble. Unless the assembly is done on concrete set the lifter wheels on a board so they do not penetrate into the ground.

Remove parts from main unit, holding tank, and boxes and bags. Generally review and familiarize yourself with the various parts provided. See packing lists for listing of parts.

NOTE: All bolts are hex head unless otherwise noted.

SETTING CARRIER WHEEL SPACINGS

Raise the rear frame bar with a jack or hoist. Use figure 9, page 11, to determine settings for carrier wheels. It is recommended that the left carrier wheel be set to run in the far left dug row. The left wheels may also be set to run straddling the dug rows, depending on field conditions. Install wheels, with valve stems *in* for 22" and 24" row spacing, and *out* for 28" and 30" row spacing. If the wheel setting desired is different than figure 9, page 11, add or subtract the appropriate half row spacing from the dimension given. Position the left carrier wheels first. Adjust height of carrier wheels by moving spindle support bracket (A) so machine runs parallel to ground at digging depth (2" to 3-1/2") (see figure 37).

For harvesters equipped with a third carrier strut, it is recommended to raise the spindle support bracket one hole on the center strut. This is needed to prevent the harvester from pivoting on the center strut and affecting the lifter wheel depth.

Now position the right carrier wheels according to figure 9, page 11. If the wheel setting desired is different, add or subtract the appropriate half row spacing from the dimension given. Adjust height of carrier wheels by moving spindle support bracket (A) so the machine runs parallel to the ground at digging depth (2" to 3-1/2") (see figure 37). For steerable wheel assembly see figure 10, page 12.

NOTE: Machine should be parallel to the ground, front to back and side to side when operating in the field, adjust carrier wheels accordingly.

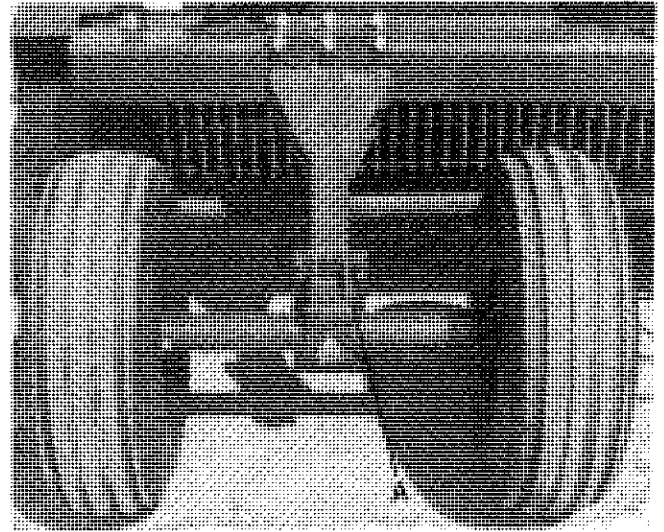


FIGURE 37 - OSCILLATING CARRIER WHEEL

For traction tires, a 3" wheel strut extension is added (bolted to A) to give more clearance from the tires to the frame of the harvester.

TANK ASSEMBLY

See figure 45-48, page 34-37. Attach long (A) and short (B) guide angles (also use spacer bars (AW) between angles and rear channels) to rear channels and front brackets. Angles should be butted together and flush over the center 4" x 4" tube. The bar that holds the rubber flap at the right rear must be loosened and bolts replaced with 1/2" x 2" carriage bolts.

See figure 38, page 31A. Assemble hydraulic motor (A) to mounting plate (B) with four (4) 3/8" x 1" hex bolts and spring tooth washers. Install #60-12T sprocket (C) flush with end of hydraulic motor shaft. Install assembly to tank mounting plate. Align #60-48T sprocket and hub (C) with sprocket on hydraulic motor. Install #60 roller chain, 159100 (69P, 51.75" long) and idler sprocket. Align sprockets. Attach hydraulic unions and tees to valve assembly (E). Install valve assembly to tank (Port "A" to top) with four (4) 3/8" x 1" carriage bolts, lock washers and nuts. Assemble two (2) 24" hydraulic hoses (F) to hydraulic motor and valve assembly. Hoses attach "A"

ASSEMBLY OF BEET HARVESTER

port to "A" port, "B" port to "B" port. Install shield (G).

See figure 38, page 31A. Lift holding tank (C) into position onto main frame of Beet Harvester. Align holes and use square washers so that tank is solid to frame. Install at least two 1/2" x 2" bolts. **DO NOT TIGHTEN AT THIS TIME.**

NOTE: If third carrier strut is installed, part of the tank mounting brackets may have to be removed depending on row spacing.

VERTICAL ELEVATOR ASSEMBLY

See Figure 38, page 31A. Lift vertical elevator assembly (D) onto dirt box of machine. Secure with 1/2" x 1-1/2" hex bolts. Make sure inside surfaces of dirt box and vertical elevator are flush.

Attach front and rear bracket weldments (E) to vertical elevator with two (2) 1/2" x 1-1/4" carriage bolts.

Install tightener arm assembly (F), one inside and one outside, with center bolt closest to lower edge. Install with 1/2" x 4" bolts provided in assembly.

TANK ELEVATOR ASSEMBLY

See figure 38, page 31A. Remove baffles (G) from tank elevator (H), turn so long lip projects up as shown. Do not tighten bolts as shown for shield and grate bracket.

Install 10" diameter electric clutch (I) with #60-30T sprocket on shaft at left end of elevator. Use washers to set the distance between the clutch armature and the outer shell to 1/32" to 3/32". Align 30T sprocket with idler sprockets. Secure magnet onto shaft with lock collar and two (2) 3/8" x 5/16" allen head set screws with nylon lock. Attach brush holder to end of shaft, see figure 38. Install shields (AJ & AI).

Install roller idler brackets (J) to lower flange of elevator on each side with 1/2" x 1-1/4" bolts. Install draper chain (62 links) with all straight links. Install draper chain in elevator as shown in diagram. Install 5" rubber roller assembly (K), includes spacer, 5/8" bolt, nut and 2 flat washers, tighten draper chain. Install handle (AU) on rear of tank elevator (H) with 5/16" x 1-1/2" bolts.

Lift tank elevator (H) into position on top of holding tank (C) and vertical elevator (D). Secure tank elevator with at least three (3) 5/8" x 1-3/4" bolts. Reposition holding tank (C) on main frame, if necessary to line up holes. Use square shim washers where necessary between tank and frame brackets to ensure that the tank is bolted solidly to the frame. Use four (4) 1/2" x 2" bolts (front right corner 1/2" x 2-1/2" bolt. Do Not tighten) and three (3) 3/4" x 6-1/2" bolts in U-brackets. Finish securing tank elevator with 5/8" x 1-3/4" bolts. Tie front left corner of tank elevator to the front of the holding tank with tie angle (L).

IMPORTANT: Use shim washers so there is not space between tank elevator & mounting brackets. Make sure inside edges of elevator are flush.

Attach tank elevator support (M2) to vertical elevator (D) and tank elevator (H) using 5/8" x 1-3/4" bolts and one (1) 1/2" x 2" flat head countersunk bolt at the top.

Check straightness of hinge tubes and shim tank elevator support (M2) if needed. Install liner retainer strip (M1) at top of vertical elevator (D) using 5/16" x 1" bolts. Be sure that plastic liners are under strips. Align and tighten tank, vertical elevator and tank elevator.

TRUCK ELEVATOR ASSEMBLY

See figure 38, page 31A. Install 10" diameter clutch (R) on end shaft, as described under tank elevator assembly. Install roller assembly (K) in lower holes. Install straight link draper chain (80 links) in truck elevator. Route as shown.

Install hood assembly (S) to the outer end of the truck elevator (P). Install guard and shield over electric clutch. Tie rope to truck elevator as shown.

Lift truck elevator into position with its hinge tubes above the hinge tubes on the tank elevator (H) and support (M2). Place two thrust washers (T) and a bronze bearing (V) between the two pipes and secure with hinge pin (W) and a cotter pin. Repeat assembly for lower hinge. Attach the ratchet jack (X) into the tab on the tank elevator (H) and slide the other end of the ratchet jack (X) on the tab on the truck elevator (P) and tighten. Lower lifting device and let elevator rest on hinges.

ASSEMBLY OF BEET HARVESTER

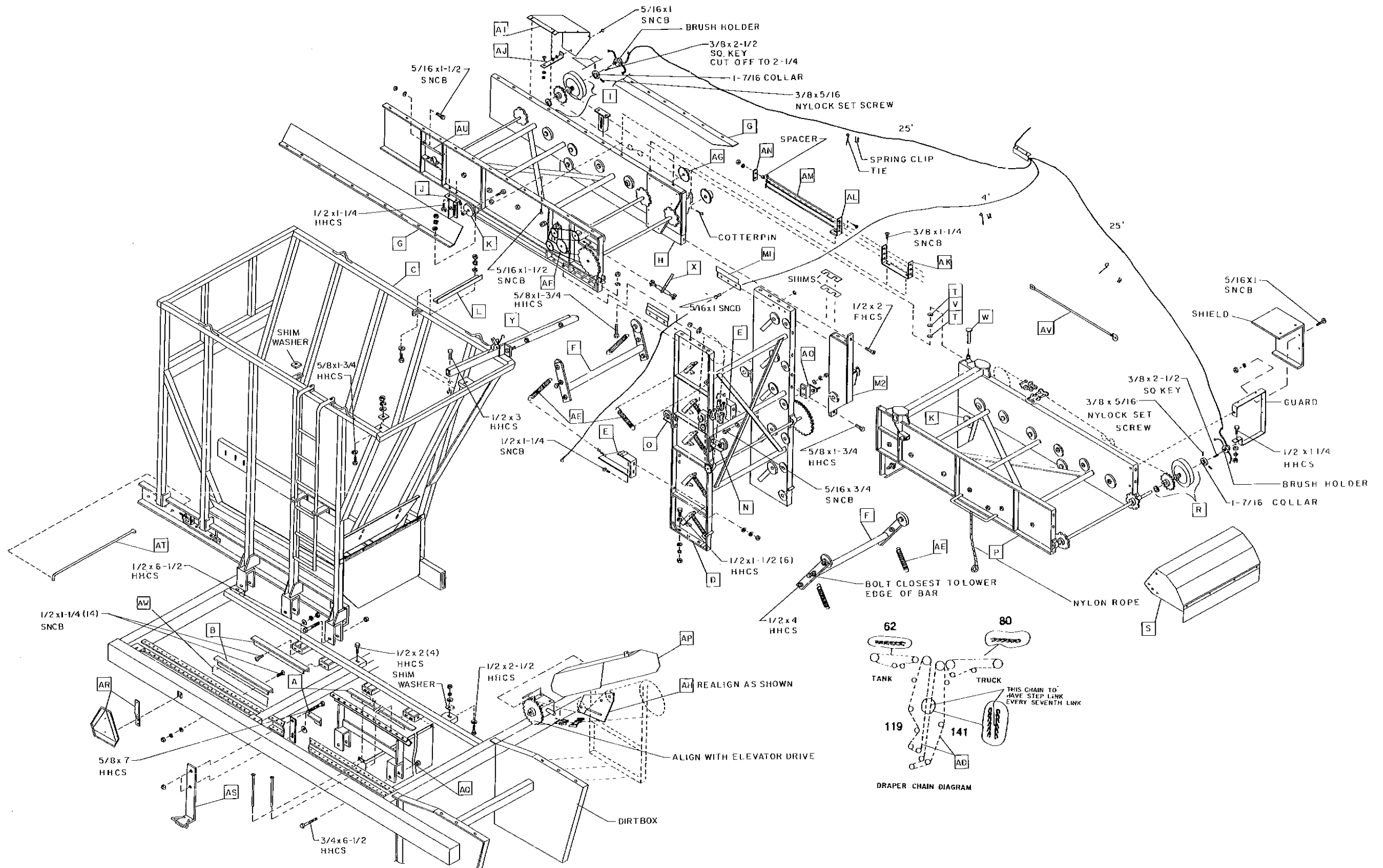


FIGURE 38 - BEET HARVESTER ASSEMBLY

ASSEMBLY OF BEET HARVESTER

Loosen ratchet jack (X), pull end away from tab on truck elevator and swing elevator (P) using rope, note any binding. If binding occurs, it may be necessary to shim tank elevator support (M2). Swing elevator back into operating position and reattach and tighten ratchet jack (X).

Install elevator support assembly (Y) onto tab on holding tank (C) and to tank elevator (H) with 1/2" x 3" and 1/2" x 2" bolts. Loosen bolts holding angle to front on support assembly. Swing elevator into stored position, adjust so that angle contacts bottom of elevator.

Install brace assembly (AV) to tank elevator and front right corner of frame with two (2) 3/4" x 2" bolts, lock washers & nuts.

VERTICAL ELEVATOR CHAIN INSTALLATION

See figure 38, page 31A. Install elevator draper chains (AD) as shown (inner chain has 119 straight links).

NOTE: Outer chain to have step link every 7th link (141 links total). Take care to install draper chain between outer rollers and hugger arm rollers.

NOTE: Truck elevator (P) may be swung into stored position and locked there to ease draper chain installation, if desired.

Install two (2) roller supports (O) and one roller support long (N) with 1/2" x 1-1/4" HHCS. Install 5" rubber roller assemblies to three supports and front hinge support.

Install sixteen (16) springs (AE), twelve (12) on outer hugger arms and dirt box; four (4) on inner and outer tightener assemblies.

Adjust clearance between draper chains by loosening bearings of vertical chain drive shafts. Adjust so vertical draper chains just clear tank and truck draper chains.

ELEVATOR DRIVES

See figure 38, page 31A. Install 60B20T, 1-7/16" bore sprocket (AF) to the rear on upper center elevator shaft.

NOTE: 20T sprocket increases speed of inside draper chain 20%. If 1:1 ration (no scrubbing) is desired install 60B24T sprocket in above location.

Align sprocket with idlers and 60B24T sprocket on outer shaft. Install #60 roller chain, 241160 (125P, 93-3/4" long). **NOTE:** Routing of chain. This is "back-wrap" type drive.

On the other end of this shaft install 60B24T, 1-7/16" bore sprocket (AG). This must align with tank elevator drive. Install #60 roller chain, 241170 (198P, 148-1/2" long) on this drive to tank elevator. Route as shown.

Install #60 roller chain, 241180, (272P, 204" long) to drive truck elevator. Route as shown.

Install #80 drive chain (142P, 142" long) running from jack shaft to upper elevator shaft at rear of machine and from jack shaft to gearbox on front of elevator. Route chains as shown. **NOTE:** Idler bracket (AH) for front chain must be removed and reoriented as shown.

Install clutch guards and upper grate.

Install U-bracket (AK), L-bracket (AL) and grate rods (AM) at top of vertical elevator. Remove appropriate bolts and secure brackets in positions shown. Secure grate rods (AM) in place with plate (AN) and spacers as shown.

Install upper bracket (AO) (leave loose) for lower drive shield (AP). Install lower drive shield (AP) onto pin of gearbox bracket (gearbox bracket may need to be loosened). Align and tighten upper bracket (AO).

Install rear grate guard (AQ) over rear frame tube. Install thirteen (13) grate rods into upper channel of guard.

Install SMV & bracket (AR).

Install step weldment (AS), position to allow easy step to ladder on holding tank.

Install four (4) grate rods (AT) in left channels of holding tank. **NOTE:** Install from the inside, formed end into hole.

ASSEMBLY OF BEET HARVESTER

HITCH ASSEMBLY

Attach hitch assembly to pivot point on main frame using pivot pin, slotted nut and cotter pin (see figure 39). Attach the PTO to the front input shaft using a 3/8" x 2" square key, a 3/8" x 1-1/4" square head set screw with jam nut and a 3/8" x 4" hex bolt and 3/8" lock nut. Install PTO shield with four (4) 1/2" x 1-1/2" hex bolts, four 1/2" lock washers and four (4) 1/2" nuts. Install hose carrier (loop toward hitch centerline) to the hitch assembly with two (2) 3/8" x 1-1/2" hex bolts, two (2) 3/8" lock washers and two (2) 3/8" nuts.

Install a 5" diameter x 8" stroke or 5" diameter x 10" stroke hydraulic lift cylinder (maximum closed length 22-1/4") and 4" diameter x 8" stroke steering cylinder and hoses (not included).

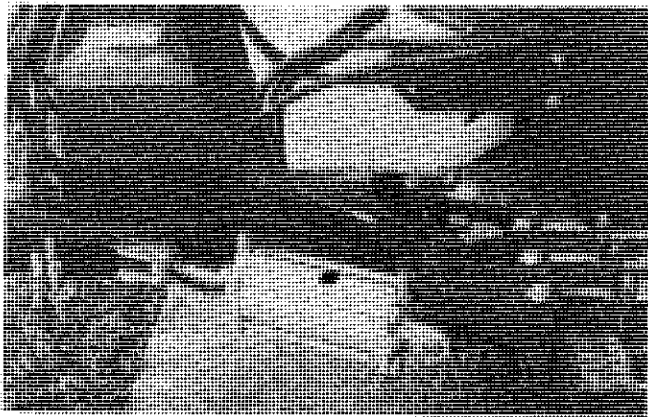


FIGURE 39 - HITCH INSTALLATION

NOTE: Upper mounting for lift cylinder is to be turned with hole closest to the front. Cylinder to have rod end mounted to the machine.

Adjust the steering cylinder to the center of its stroke. Position the hitch to the center of the row or where desired. Tighten U-bolts on the steering cylinder bracket.

ROW FINDER ASSEMBLY

Loosen upper lifter wheel strut mounting bolts on the first strut to the right of the hitch and install mounting bracket. Tighten bolts.

NOTE: If row finder is mounted on second or third strut to the right, interference with rear tractor tires can result.

Use four (4) 1/2" x 1-3/4" hex bolts (A), four (4) 1/2" lock washers and four (4) 1/2" nuts to mount row find-

er assembly to mounting bracket on first strut to right-hand side of hitch (see figure 40).

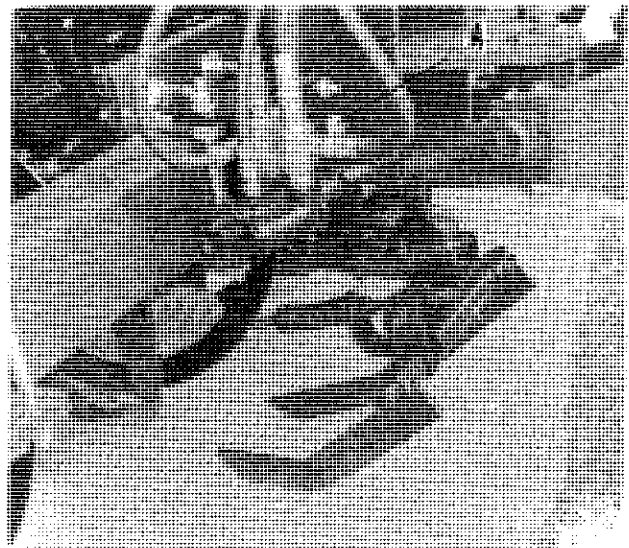


FIGURE 40 - ROW FINDER MOUNTING

FEELER ARM CENTERING

The horizontal shaft (A) in row finder must be parallel with the front of the harvester frame to function accurately. Remove pin (B) and loosen nuts (C) slide plate (D) until shaft is parallel with frame. Tighten nuts (see figure 41).

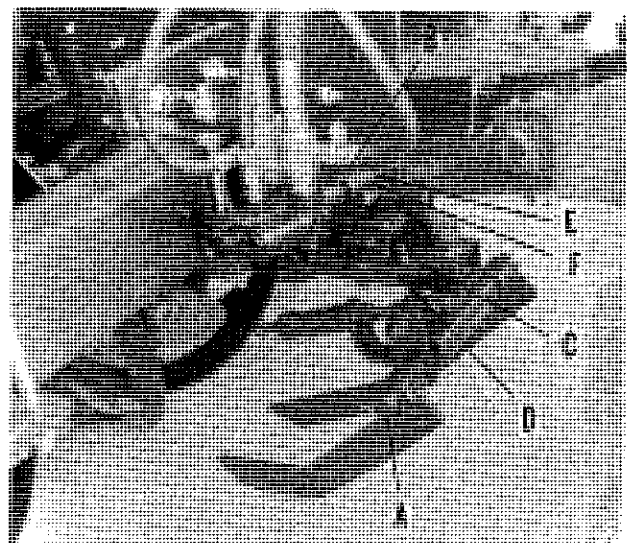


FIGURE 41 - CONTROL VALVE CENTERING

The hydraulic control valve must be centered each time the shaft is adjusted. Loosen nut (E) adjust nut (F) until pin (B) can be inserted freely through nut (F) and valve spool. Tighten the lock nut (E) and check to be sure the link pin is still free.

ASSEMBLY OF BEET HARVESTER

The feeler arms must be centered with the gap between the lifter wheels to function accurately. Do this by loosening bolts (A) and sliding the entire assembly in the mounting slots until centered. Tighten bolts (see figure 42).

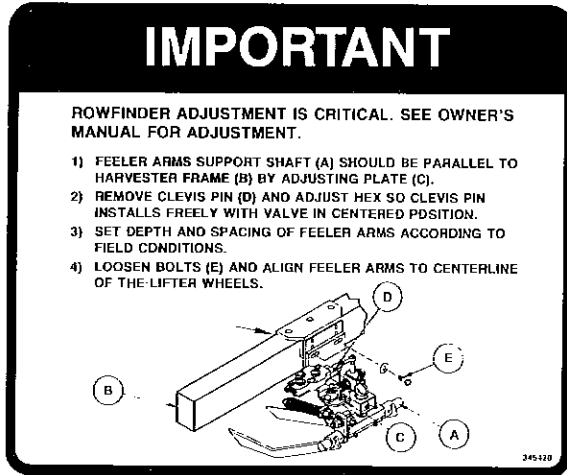


FIGURE 42 - ROW FINDER HEIGHT ADJUSTMENT

ROW FINDER HEIGHT

Set row finder height in correct relationship to the lifter wheel working depth to assure proper function. Example: If 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 row. The feeler arms should ride along the surface of the ground, or just slightly penetrating the surface (see figure 43).

To change the height of the row finder more than 1", remove the four (4) hex bolts (A) attaching the row finder assembly to the support plate. Bolt the row finder to the holes which provide the desired operating height (see figure 42).

NOTE: For less than 1" height adjustments, raise or lower the feeler arm by adjusting nuts (B).

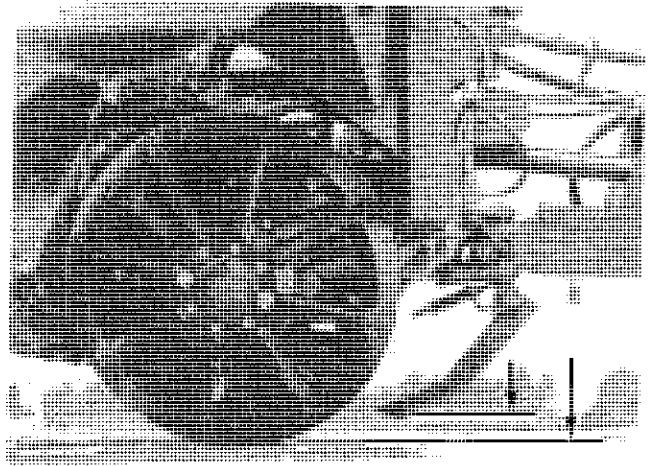


FIGURE 43 -ROW FINDER HEIGHT

ASSEMBLY OF BEET HARVESTER

HYDRAULIC SYSTEMS

The following pages are relating to the schematics (figures 44 thru 48) which illustrate various systems. These sequences and plumbing instructions are Art's-Ways recommendations, which have been tested at the factory.

GENERAL INFORMATION

Hose Installation

Install elbows to flow control valve and attach to frame hitch support. Install 26" hydraulic hose from flow control valve to "IN" port on row finder valve.

Install two (2) hose assemblies (96" and 120") from the valve assembly on the tank to the out ports on row finder and flow control valve as shown. Install hydraulic hoses (120" and 146") in row finder valve and flow control valve as shown and route through hose carrier on hitch to tractor.

Install hydraulic hose ends to match the tractor. Install hydraulic hoses (79") in row finder valve to steering cylinder as shown.

PFC AND OPEN CENTER SYSTEMS

Plumbing hydraulics of 680B Beet Harvester on Case IH Magnum or other PFC (Pressure and Flow Compensated Systems) and open Center Systems.

An "Open Center Plug" should be installed in the row finder. New Art's-Way row finders are shipped that way.

Note: Change tank valve to Normally Open for PFC and Open Systems (see figure 44).

Tractors with 5 Remotes

(see figure 45, page 35 - PFC and Open).

- A. #1 Remote - is a priority outlet, plug in the harvester hitch lift cylinder or the steering cylinder. For flow adjustment, use the tractor's outlet control.
- B. #2 Remote - plug in whichever cylinder that was not plugged into #1 remote. For flow adjustment, use the tractor's outlet control.
- C. #3 Remote - plug in tank chain valve. For flow adjustment, use the tractor's outlet control.

This valve is designed with a reversible spool for ease of field conversion, from Normally Closed to Normally Open or Normally Open to Normally Closed, by just reversing the spool. The addition of two spacers (0.19" I.D. x 0.44" O.D. x 0.180" Thick) is also required when converting a normally closed valve to a normally open valve. P/N is 359050 for the spacer.

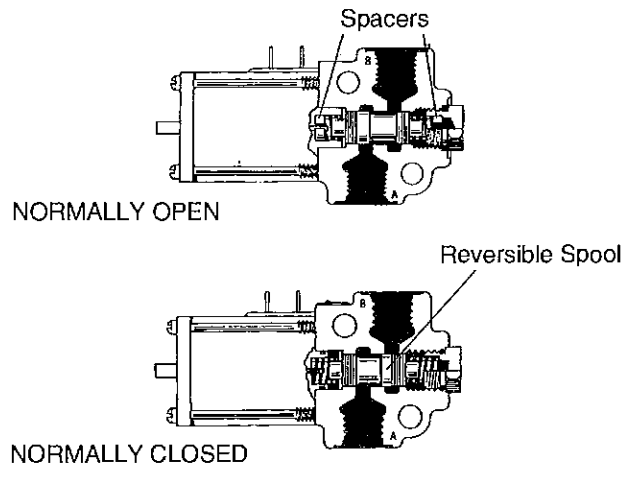


FIGURE 44: TANK VALVE

- D. #4 Remote - plug in row finder, do *not* use auxiliary divider go direct into the row finder and return direct to the tractor remote. For flow adjustment, use tractor's outlet control.
- E. #5 Remote - plug in steerable wheels. For flow adjustment, use the tractor's outlet control.

Option: C and D can be operated out of one remote, if auxiliary flow divider is used. Plumbing has to be according to figure 46, page 35 (PFC and open).

Tractors with 4 Remotes

(see figure 45, page 35 - PFC and Open).

- A. #1 Remote - is a priority outlet, plug in the harvester hitch lift cylinder or the steering cylinder. For flow adjustment, use the tractor's outlet control.
- B. #2 Remote - plug in whichever cylinder that was not plugged into #1 remote. For flow adjustment, use the tractor's outlet control.
- C. #3 Remote - plug in tank chain valve. For flow adjustment, use the tractor's outlet control.
- D. #4 Remote - plug in row finder, make sure an "Open Center" plug is installed. Do *not* use auxiliary divider, go direct into the row finder and

ASSEMBLY OF BEET HARVESTER

return direct to the tractor remote. For flow adjustment, use tractor's outlet control.

If steerable wheels are used, C and D can be operated out of one (#3) remote if auxiliary flow divider, is used. Plumbing has to be according to figure 46.

Tractors with 3 Remotes (see figure 46 - PFC and Open).

A. #1 Remote - is a priority outlet, plug in the harvester hitch lift cylinder or the steering

cylinder. For flow adjustment, use the tractor's outlet control.

B. #2 Remote - Plug in whichever cylinder that was not plugged into #1 remote. For flow adjustment, use the tractor's outlet control.

C. #3 Remote - Plug in combined system of tank chain valve with row finder. Use auxiliary flow divider.

Note: Steerable wheels can not be used with only 3 remotes.

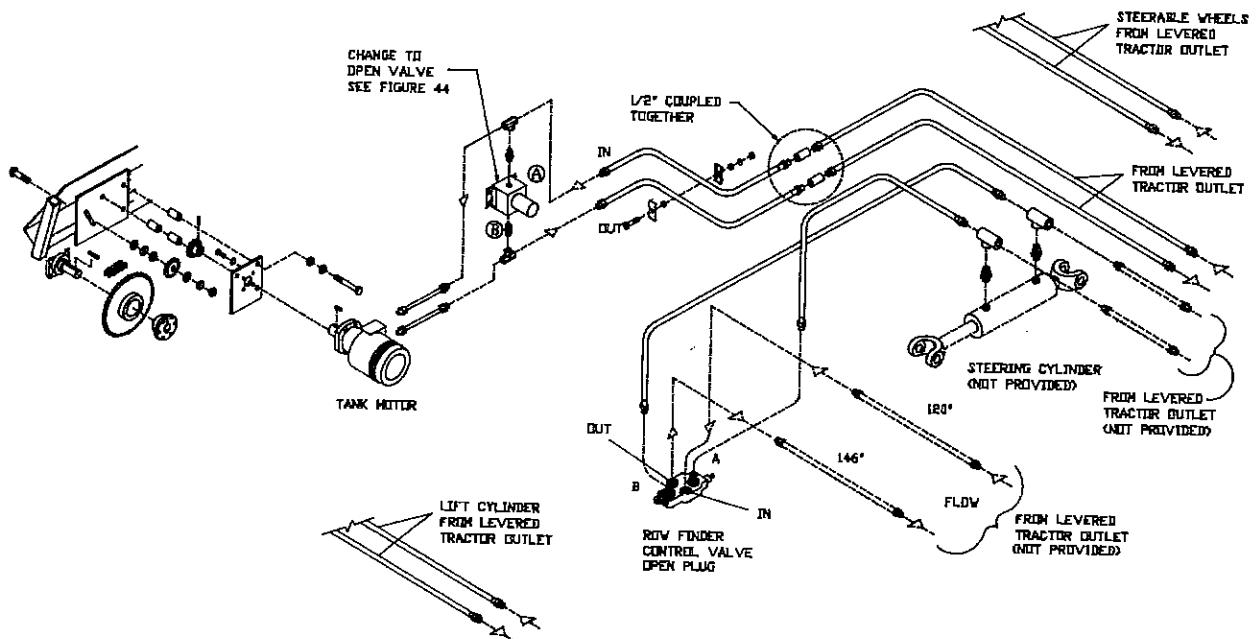


FIGURE 45 - PFC AND OPEN SYSTEMS

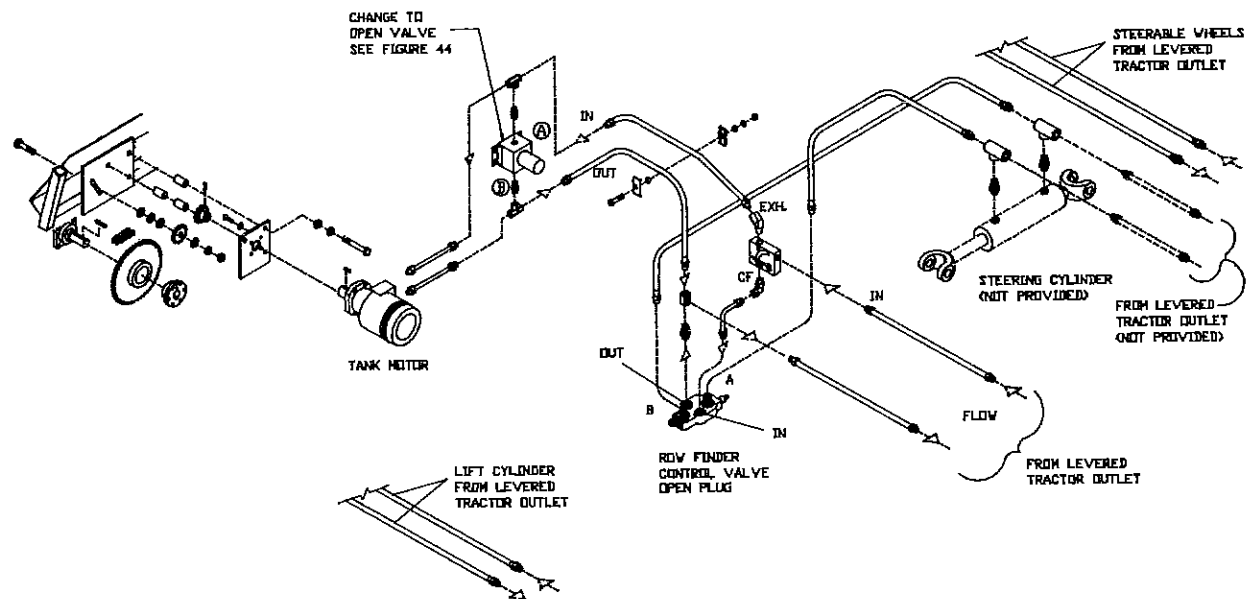


FIGURE 46 - PFC AND OPEN SYSTEMS

ASSEMBLY OF BEET HARVESTER

CLOSED CENTER SYSTEMS

Plumbing hydraulics of the 680B Beet Harvester on John Deere and similar systems (Closed Center Systems).

A "Closed Center Plug" should be installed in the row finder whenever it is separated from the elevator and tank circuit.

Tractors with 4 Remotes and Power Beyond (see figure 47, page 37 - Closed).

- A. #1 Remote - Plug in hitch lift cylinder. For flow adjustment, use the tractor's outlet controls.
- B. #2 Remote - Plug in hitch steering cylinder (override). For flow adjustment, use the tractor's outlet control.
- C. #3 Remote - Plug in tank chain valve. For flow adjustment, use the tractor's outlet control.
- D. #4 Remote - Plug in steerable wheels. For flow adjustment, use tractor's outlet control.
- E. Power Beyond - Plug in row finder. Use flow divider to set function speed.

Tractors with 4 Remotes (see figure 48, page 37 - Closed).

- A. #1 Remote - Plug in hitch lift cylinder. For flow adjustment, use the tractor's outlet controls.
- B. #2 Remote - Plug in hitch steering cylinder (override). For flow adjustment, use the tractor's outlet control.
- C. #3 Remote - Plug in combined system of chain valve with row finder. For flow adjustment, use the tractor's outlet control.
- D. #4 Remote - Plug in steerable wheels.

If steerable wheels are not being used, the #4 remote can be used for the row finder, while a separate pair of hoses is used for the tank chain valve (see figure 47, page 37).

Tractors with 3 Remotes and Beyond (see figure 48, page 37 - Closed).

- A. #1 Remote - Plug in hitch lift cylinder. For flow adjustment, use the tractor's outlet controls.

- B. #2 Remote - Plug in hitch steering cylinder. For flow adjustment, use the tractor's outlet control.
- C. #4 Remote - Plug in steerable wheels. For flow adjustment, use the tractor's outlet control.
- D. Power Beyond - Plug in a combined system of tank chain valve with row finder. For flow adjustment, use the tractor's outlet control.

If steerable wheels are not being used, the #3 remote can be used to plug in the tank chain valve, while Power beyond is used for the row finder. Adjust flow with the flow divider (see figure 47, page 37 closed).

Tractors with 3 Remotes (see figure 48, page 37 - Closed).

- A. #1 Remote - Plug in hitch lift cylinder. For flow adjustment, use the tractor's outlet controls.
- B. #2 Remote - Plug in hitch steering cylinder. For flow adjustment, use the tractor's outlet control.
- C. #3 Remote - Plug in combined system of chain valve with row finder. For flow adjustment, use the tractor's outlet control and flow divider.

Note: Steerable wheels can not be used with only 3 remotes.

Tractors with 2 Remotes and Power Beyond (see figure 48, page 37 - Closed).

- A. #1 Remote - Plug in hitch lift cylinder. For flow adjustment, use the tractor's outlet controls.
- B. #2 Remote - Plug in hitch steering cylinder. For flow adjustment, use the tractor's outlet control.
- C. #3 Remote - Plug in combined system of chain valve with row finder. For flow adjustment, use flow divider.

Note: Steerable wheels can not be used with only 2 remotes and Power beyond.

ASSEMBLY OF BEET HARVESTER

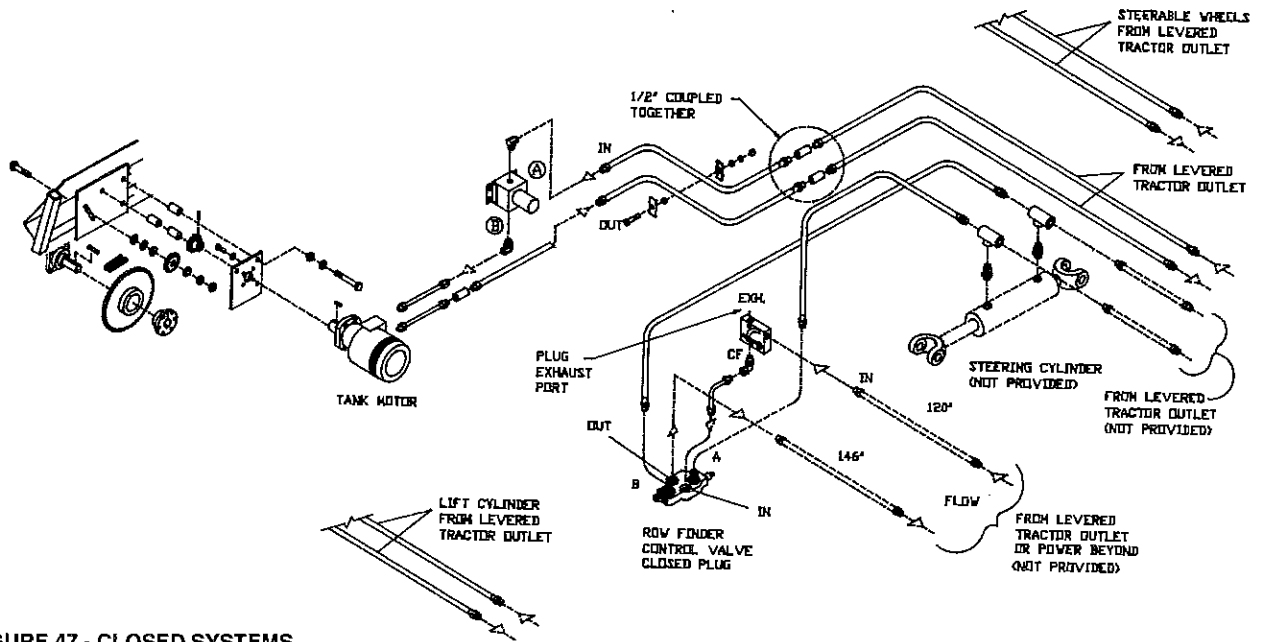


FIGURE 47 - CLOSED SYSTEMS

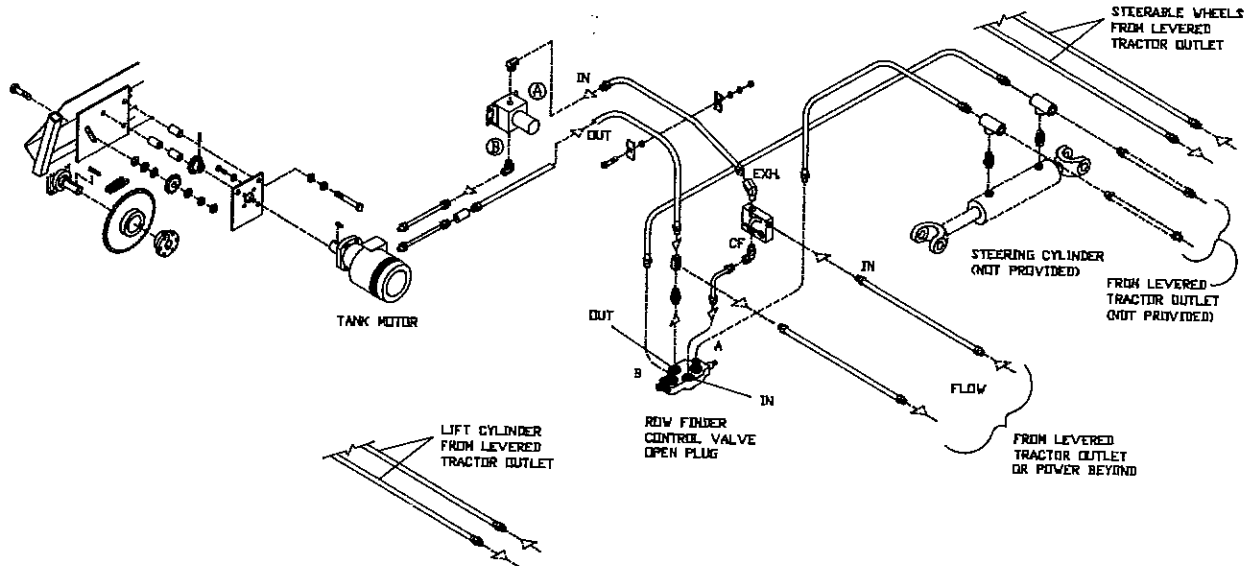


FIGURE 48 - CLOSED SYSTEMS

ASSEMBLY OF BEET HARVESTER

INSTALLING CONTROL BOX ON TRACTOR

Place the control box in a location that is convenient to the operators seat on the tractor.

NOTE: Control box may be permanently installed if so desired.

Route cable to battery, fastening it securely in all areas where it could create a hazard. Connect the white wire to the "HOT" side of battery. Connect black wire from cable to electrical ground on tractor (see figure 49).

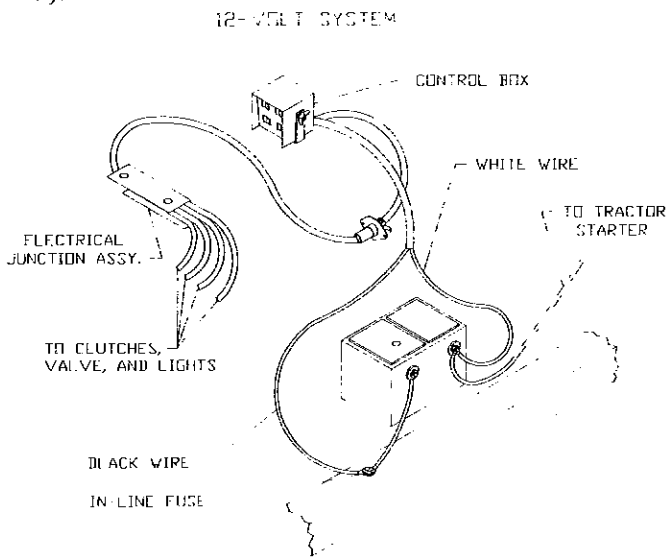


FIGURE 49 - CONTROL BOX POWER CONNECTION

IMPORTANT: The control box is rated for use with a 12 VOLT DC SYSTEM ONLY. Follow the illustration below for correct wiring.

With main power switch in off position, connect wire from harvester as indicated on the back panel of control box (see figure 50). Mount quick attach plug on tractor to a convenient location that will still allow wire to reach junction box on harvester. Secure all loose sections of wire.

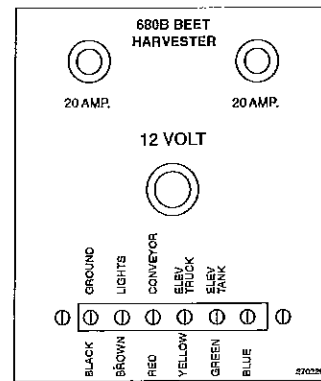


FIGURE 50 - CONTROL BOX DECAL

INSTALLING ELECTRICAL JUNCTION SHIELD ON HARVESTER

Attach valve assembly wire and electric clutch wires to junction box as shown (see figure 51). Attach the black and brown wires to the ground on shield using the 1/4" machine screw. Strap wires to electrical shield with nylon straps and attach junction box to main gearbox shield as shown (see figure 52).

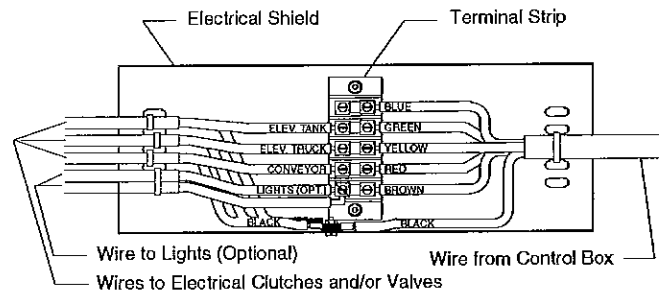


FIGURE 51 - JUNCTION BOX

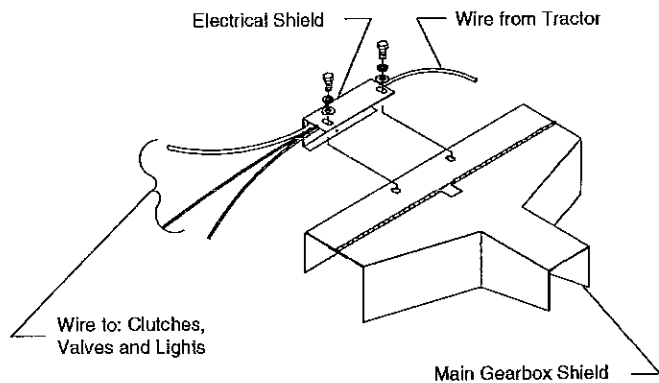
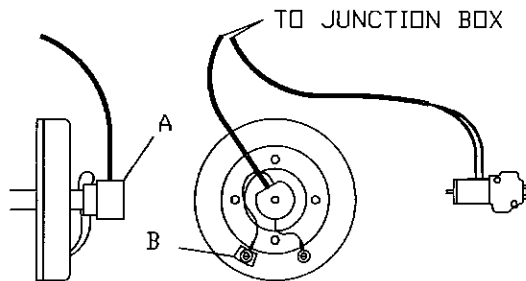


FIGURE 52 - ELECTRICAL JUNCTION ASSEMBLY

ASSEMBLY OF BEET HARVESTER

Route wires from junction box to valve assembly and electric clutches. Connect as shown (see figure 53). Secure all loose sections of wire.



NOTE:
(A) BRUSH HOLDER ASSEMBLY, WRENCH TORQUE NOT TO EXCEED 15 FT.-LBS.
(B) REMOVE GROUND STRAP IF PROVIDED.

FIGURE 53 - ELECTRICAL CONNECTION

INSTALLING LIGHTING PACKAGE

Choose locations where light is desired during operation after dark. Position brackets to mount lights in chosen locations.

NOTE: Bar is provided for support when mounting to mesh on tank.

Drill 13/32" (.406) dia. holes where necessary and attach brackets (holes are provided for bracket on front and back of truck elevator). Install lights through 17/32" (.531) dia. holes in brackets and secure in position. Crimp 3/8" ring terminals for 18 ga. wire on one wire of each light. Ground all ring terminals to frame bolts on light brackets.

Connect black wires between lights using wire cap nuts (no more than two lights per wire run). Attach the lead end of the light wire to the brown wire on the terminal strip located behind main gearbox shield (see figure 51, page 38).

NOTE: Light wire must be attached to brown wire from tractor.

NOTE: Four lights maximum - 200 watts maximum.

Secure all loose sections of wire.

REVIEW THE MACHINE

Generally review the machine for:

- Any loose bolts or set screws.
- Proper tensioning of all roller chains, drive belts and draper chains.
- Proper PTO installation (see figure 3, page 9).
- Hydraulic cylinders and hoses being properly installed.
- Electric wires being adequately secured to prevent damage.
- Oil level in gear box up to fill plug.
- All shields and guards being in place.
- Proper installation of any options.
- Check tire pressure, inflate implement tires to 45 psi and traction tires to 25 psi.

TEST RUN HARVESTER

Run tractor at low RPM, slowly engage PTO. Check operation of machine at low RPM. Slowly increase RPM's to proper operating speed of 1000 RPM.

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 tractor and place key in pocket while making adjustments. Wait for all movement to stop before approaching machine.

Cycle tank and elevator drives and continue to run machine for 10 to 15 minutes. After running is complete, re-check machine for any loose hardware and re-check drives.

SPECIFICATIONS

680B BEET HARVESTER GENERAL DESCRIPTION

OVERALL DIMENSIONS

Transport 13'9"H x 18'4"W x 17'4"L
 Operating 13'9"H x 24"W x 17'4"L
 Machine Weight 15,000 lbs

TIRES

Tread Width Adjustable to row spacing
 Tires Implement 11.00-16 12 Ply
 Traction 13.50 x 16.1 6 Ply
 Operating Pressure 45 psi (implement)
 25 psi (traction)

TANK:

Construction Welded steel
 Capacity 11,000 pounds
 Unloading Chain type conveyor, actuated
 by electro-hydraulic valve and
 hydraulic motor

ROW SPACING

4 rows 28" to 30"
 6 rows 22" to 24"
 Operating Speed 4.5 to 6 mph
 Lift and Depth Control* Hydraulic
 Steering Hitch Control** Hydraulic

*Requires 5" x 8" remote cylinder (not furnished)

**Requires 4" x 8" remote hydraulic cylinder (not furnished)

LIFTER WHEELS

(2 per row) 28" solid rim heavy duty cast steel

LIFTER STRUTS

Heavy duty tapered bearings

LIFTER WHEEL SCRAPERS

To prevent mud buildup on lifter wheels

PADDLE SHAFT AND DRIVE

Type Three steel per row
 Drive Heavy #80 roller chain with
 heavy duty slip clutch

BED CHAIN AND DRIVE

Size 25 sq.ft.
 Type Three 42" wide draper chains
 Drive #60H roller chain with
 friction clutch protection

GRAB ROLLS AND DRIVE

Size 35 Sq. Ft.
 Type Three 6-5/8" grab rolls with
 3/4" spiral rods and three 5"
 smooth grab rolls
 Drive Belt drives with spring
 loaded idlers

GEARBOX

Center Heavy, 1-3/4" diameter shafts
 Capacity - 5 Qts 90W gear oil
 Right Heavy 1-3/8" diameter shafts
 Capacity - 2 Qts 90W gear oil

ELEVATOR

Size Width, 40" draper chain
 Hugger action
 Type Electric clutch controlled,
 fold away for transport

TIGHTENING TORQUE GUIDE, SAE GRADE 5 - COARSE THREAD

| SIZE | CLAMP LOAD | PLAIN | PLATED |
|------------------|------------|--------------|--------------|
| 1/4 - 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. |
| 1/2 - 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. |
| 3/4 - 10(.750) | 21,300 | 266 ft. lbs. | 200 ft. lbs. |
| 7/8 - 9(.875) | 29,475 | 430 ft. lbs. | 322 ft. lbs. |
| 1 - 8(1.00) | 38,625 | 644 ft. lbs. | 483 ft. lbs. |
| 1-1/8 - 7(1.125) | 42,375 | 794 ft. lbs. | 596 ft. lbs. |

IDENTIFICATION OF SAE BOLT GRADES; HEAD MAKINGS

Grades 0, 1, and 2 no markings



Grade 5: 3 radial dashes 120° apart



Grade 8: 6 radial dashes 60° apart



SPECIFICATIONS

TRACTOR REQUIREMENTS

RECOMMENDED HORSEPOWER RATING

Tank 140 PTO HP (minimum)

REMOTE CYLINDERS: (NOT FURNISHED)

(1) 4" x 8" and (1) 5" x 8"

HYDRAULICS REQUIREMENTS

Tractor must be equipped with three remote hydraulic outlets, four remotes if equipped with steerable wheels. The tractor must be capable of supplying 20 gpm. If using the "Power Beyond", connect to the row finder and tank drives.

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.

DRAWBAR SUPPORT (RECOMMENDED)

ELECTRICAL SYSTEM

12-Volt

ATTACHMENTS

ROW FINDER

To keep the harvester on the row.

LIFTER WHEEL CLOSE-UPS

To prevent loss of small beets through lifter wheels.

LIFTER WHEEL SPACERS

To increase lifter wheel opening by 1/4" increments.

LIFTER WHEEL CUSHIONS

To protect lifter wheels in rocky soil conditions (standard on flex struts).

CONSTANT VELOCITY PTO

Allows turning without disengaging PTO.

FLASHING WARNING LIGHT KIT

Recommended where regulations allow when towing harvester. Order JTY15263.

LIGHT PACKAGE

To light machine for night use (3 sealed beam halogen lights).

FIXED OR STEERABLE WHEELS

EXTRA FIXED OR STEERABLE CARRIER STRUT

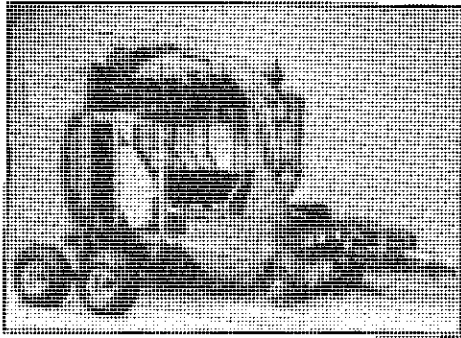
Helps flotation in very wet conditions.

SPRING LOADED #2 GRAB ROLL

Allows #1 and #2 grab rolls to move apart on drive end.



"A Total Sugar Beet Harvesting System"

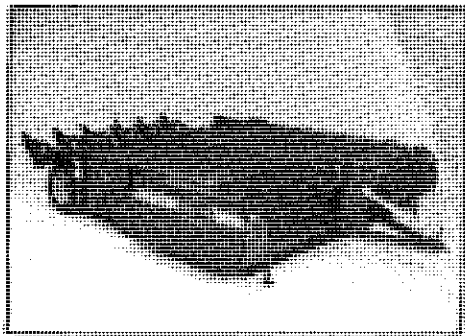
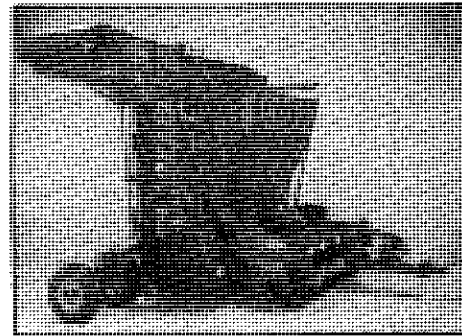


690 Series - Wheel Harvester

The Wheel Harvester offers you low maintenance and high capacity while being gentler on beets. Fewer moving parts ensure many years of trouble free performance.

680 Series - Scrubber Chain Harvester

When looking for a harvester with excellent versatility, look to the 680 Series. The trouble free mechanical driven design has proven reliable and easy to maintain.



630, 784A & 786A Defoliators

Art's-Way defoliators offer reliability and ease of adjustment. Their heavy duty design provides you with low maintenance and years of trouble free operation.

Art's-Way Manufacturing Co., Inc.

Armstrong, Iowa 50514
(712) 864-3131