

**PARMA COMPANY
BEET HARVESTER OPERATION
TECHNICAL GUIDE
MODEL SERIES 900 / 910**

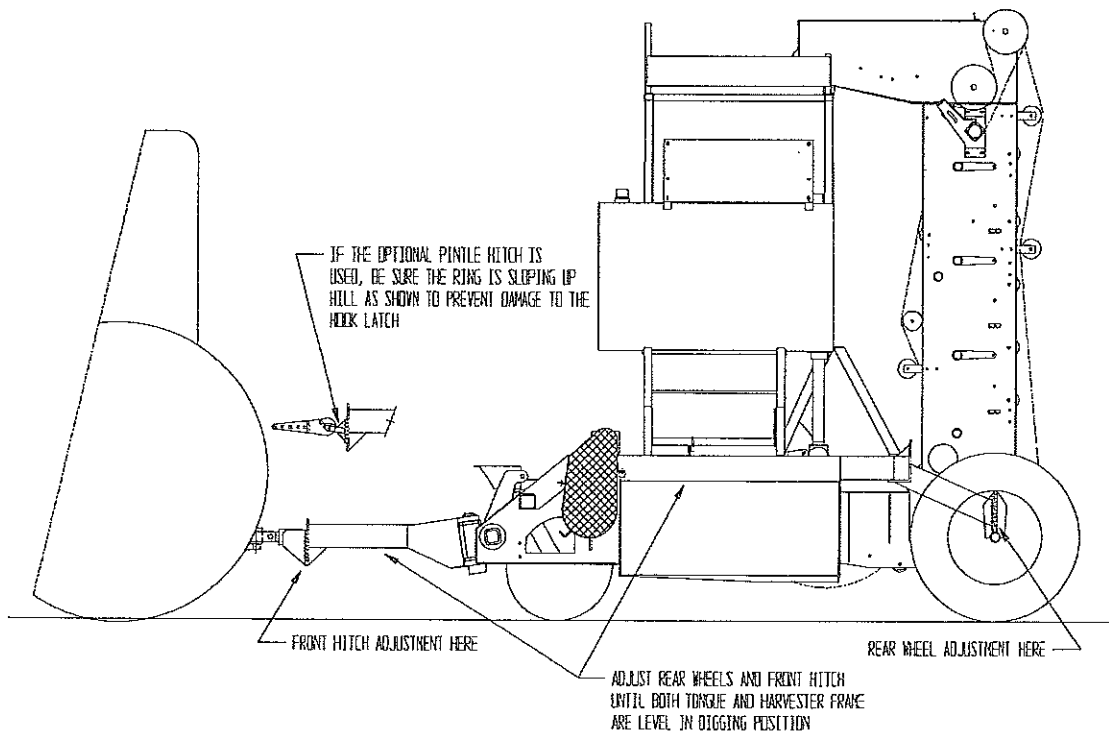
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INITIAL SETUP AND ADJUSTMENTS

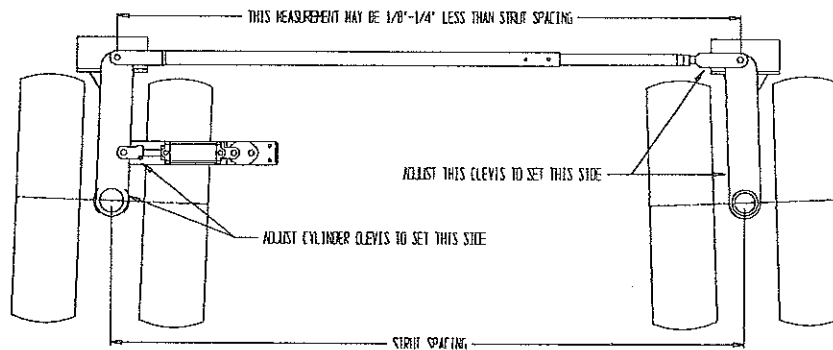
MACHINE TO BE LEVEL:

It is important that the harvester is **approximately level** front to back during operation. Final adjustment may have to be necessary after the machine gets to the field to accomplish this. Refer to the illustration below for additional explanation.

If the pintle hook hitch option is used, be sure the ring portion attached to the tongue slopes **up rather than down** or the safety latch on the hook will be damaged.



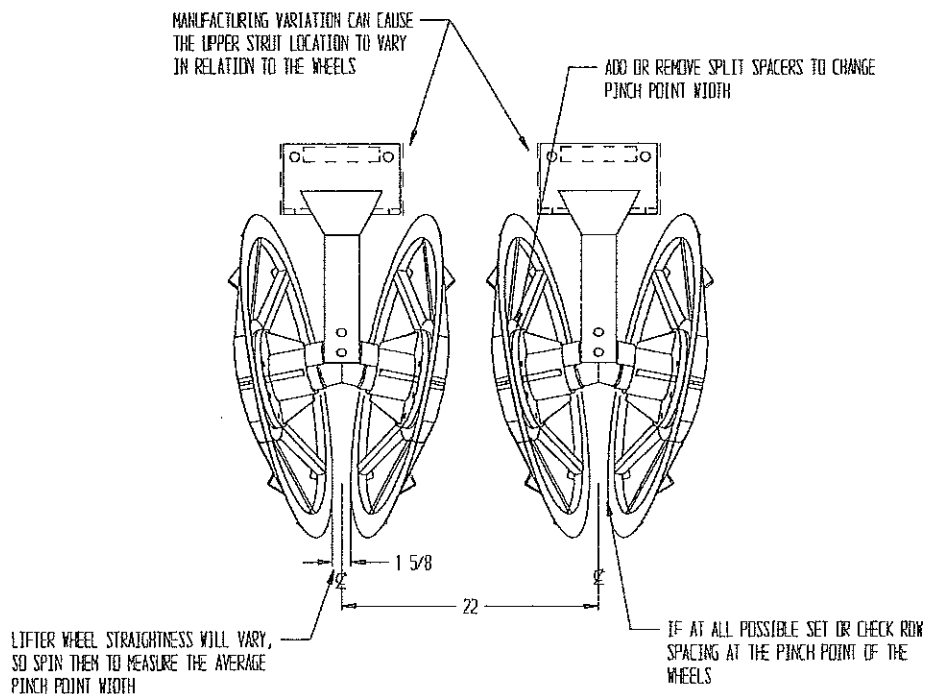
CHECK REAR WHEEL TRACKING:



In addition to being sure that the rear steerable wheels are set at the proper spacing, we have found that in some conditions, if some toe-in is set on both sides, the harvester will track better.

CHECK LIFTER WHEEL PINCH POINTS:

The lifter wheel pinch point width and accuracy of the row spacing between the lifter wheel struts can be a **major cause of beet breakage and amount of dirt being lifted** into the harvester. This illustration shows the desirable way to check spacings to help assure the best performance in lifting of beets without breakage: (For information on dirt haul back, see pg. 8.) It is most important that all the pinch point widths on the harvester be the same within 1/4".



ROW FINDER OPERATION:

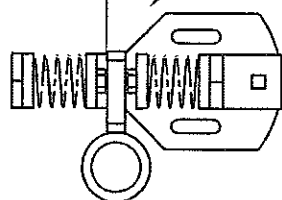
During the operation of the harvester, the row finder, if used, plays the largest single part in keeping the machine on the row and allowing the lifting of beets without breakage. Therefore it is essential that it be set and adjusted correctly, and the operator fully understands its operation. The following illustrations show how to make these settings and the order in which they should be done: (each item number is identified with a balloon)

1. Mounting the row finder on the machine.
2. Adjusting the centering springs.
3. Align the fins with the lifter wheels.
4. Adjusting the width of the fins to fit the beet size.
5. Adjusting the vertical position of the fins.
6. Adjusting the fin down pressure.
7. Adjusting the pressure relief on the valve.

③ MOVE THE TENSION PLATE UNTIL THE FINS ARE DIRECTLY IN LINE WITH THE LIFTER WHEEL PINCH POINT. THEN REATTACH THE TURNBUCKLE. BE SURE TO ADJUST IT SO THERE IS NO PRESSURE AGAINST THE VALVE SPOOL.

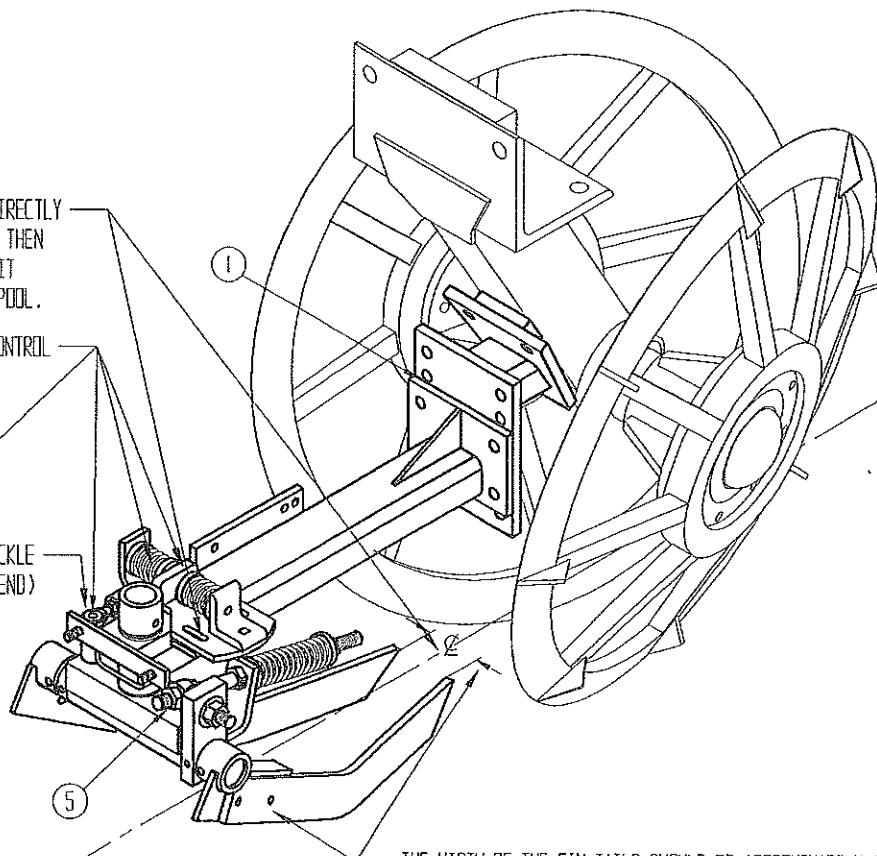
② DISCONNECT THE TURNBUCKLE ATTACHED TO THE CONTROL VALVE AND ADJUST CENTERING SPRINGS TO HAVE MINIMAL CLEARANCE TO THE CONTROL ARM AND SO THE SPRINGS ARE THE SAME LENGTH

MINIMAL CLEARANCE

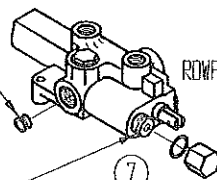


TOP VIEW OF SPRINGS

TURNBUCKLE (ROD END)



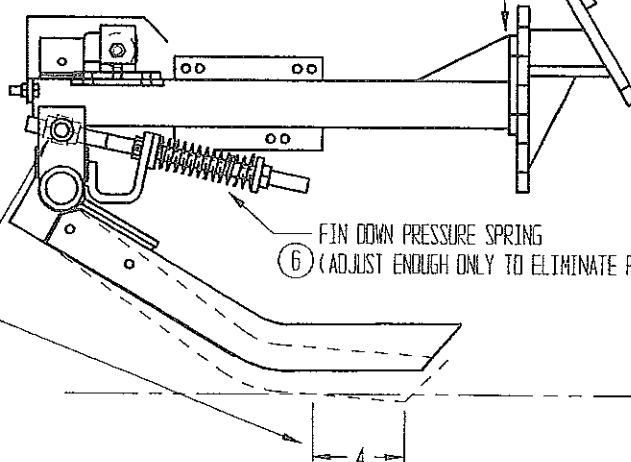
FOR OPERATION USING OPEN CENTER HYDRAULICS, REMOVE THIS 3/8" PLUG FROM THE "OUTLET" PORT OF THE VALVE.



ROWFINDER VALVE

④ THE WIDTH OF THE FIN TAILS SHOULD BE APPROXIMATELY 1/2" WIDER THAN THE AVERAGE BEET SIZE AT GROUND LEVEL. TO ADJUST THE WIDTH, LOOSEN THE MOUNTING BOLTS AND ADD WASHERS TO THE INSIDE OF THE LOWER BOLTS AS REQUIRED.

① PLACE THE ROWFINDER ON THE MOUNTING BRACKET SO THE FIN TAILS CAN BE ADJUSTED AS DESCRIBED BELOW. THE POSITION MAY VARY DEPENDING ON THE DESIRED LIFTER WHEEL DIGGING DEPTH. THE POSITION SHOWN ASSUMES A DIGGING DEPTH OF APPROXIMATELY 3'.



FIN DOWN PRESSURE SPRING

⑥ (ADJUST ENOUGH ONLY TO ELIMINATE FIN BOUNCING)

⑦ THIS SCREW ADJUSTS THE PRESSURE RELIEF SETTING OF THE VALVE. THE SETTING MAY BE LESS THAN WHAT THE TRACTOR IS SET AT AND A "SQUEELING" SOUND MAY BE HEARD OR THE ROWFINDER MAY BE MALFUNCTIONING.

IF SO, REMOVE THE CAP AND TURN THE SCREW IN UNTIL THE "SQUEELING" SOUND THAT YOU MAY HEAR STOPS.

⑤ USING THE UP/DOWN ADJUSTING NUTS, MOVE THE FIN TAILS TO HAVE APPROXIMATELY 4" OF GROUND CONTACT. MORE CONTACT THAN THAT MAY CAUSE THE CONTROL OF THE ROW FINDER TO BE ERRATIC.

ROW FINDER SETUP AND ADJUSTMENTS

HYDRAULIC SYSTEM MODELS 900 & 910

FRONT CONTROL VALVE BANK:

The valve bank is an optional item that can operate all the hydraulic cylinders on the harvester. The amount of valves required will depend on the harvester model and the amount of hydraulic outlets available from the tractor.

It is a unit made of precision parts and its performance can be affected most commonly by four things:

1. **Oil flow from the tractor is in excess of the capacity of the valves and causes the valve spools to float and malfunction.** The maximum flow allowable through the valves is **10 GPM**. Most tractors provide in excess of 20 GPM so check the flow prior to operation. Back pressure, due to excess flow, against some tractor systems can cause malfunctioning in the secondary remotes. **Make sure that the amount of flow going into the valve circuit is only enough to do the job, and no more.**

In most cases the harvester lift cylinders are connected to the priority remote, and valve bank should be connected to the secondary remote on the tractor. If the steering cylinder (or row finder override) is connected directly to the tractor, it should be connected to the secondary remote and the valve bank to the third remote.

2. Oil from the tractor can flow through the valve bank in only one direction without causing a malfunction. The valve ports are marked with **"P" for pressure and "T" for tank**. It is important that the lines from the tractor are connected correctly.

3. The valve bank is set for open center hydraulics but the tractor system is closed center. **Some tractors have systems that are advertised to be useable as both open or closed which may cause problems.** The dealer and farmer should be aware of the limitations of the tractor system and how the harvester needs to be plumbed before going to the field.

4. Dirt contamination in the oil (even the smallest speck sometimes) can cause the spools to stick.

The next page shows illustrations and notes of and about the valve bank. Review it and even highlight some of the important items such as:

1. Pressure and return ports.
2. Location of screws that allow the valve to operate with open or closed center tractor hydraulic systems.
3. Removal and reassembly of the valve spool. **Don't forget the small pin which can be lost easily.**
4. Oil cleanliness.

UNFILTERED PARTICLES IN THE OIL MAY CAUSE THE VALVE SPOOLS TO MALFUNCTION. THE SPOOLS CAN BE REMOVED AS ILLUSTRATED, CLEANED AND REINSTALLED. TAKE CARE NOT TO INTRODUCE MORE CONTAMINATION OR LOSE THE SMALL PIN.

THE SPOOLS IN THE VALVES MUST HAVE NOTCHES IN THE RINGS HERE AS SHOWN. THE INCORRECT SPOOL WILL CAUSE THE VALVE TO MALFUNCTION. THE NOTCHES ALLOW INTERNAL OIL TO BY PASS WHEN THE PILOT OPERATED CHECK VALVES ARE USED.

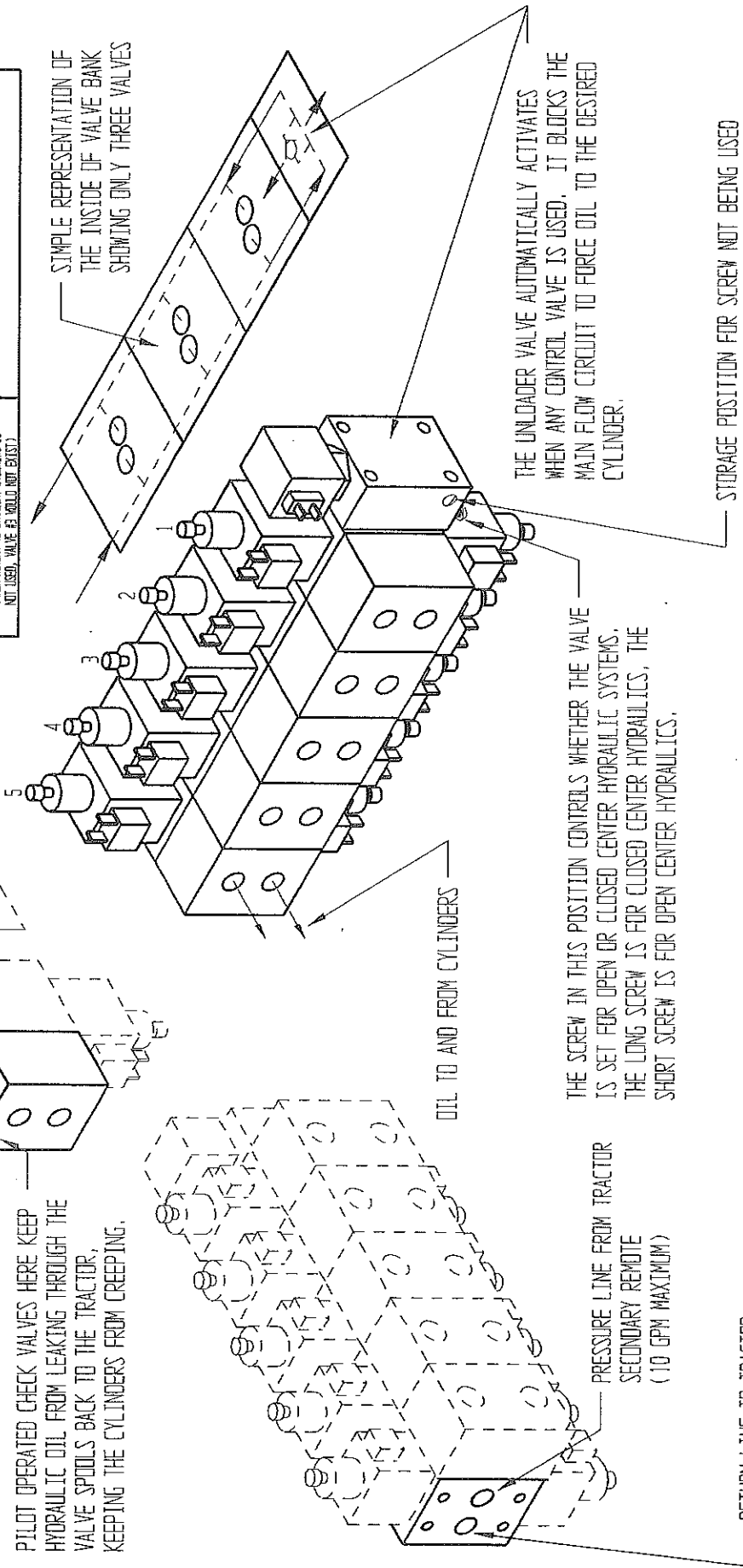
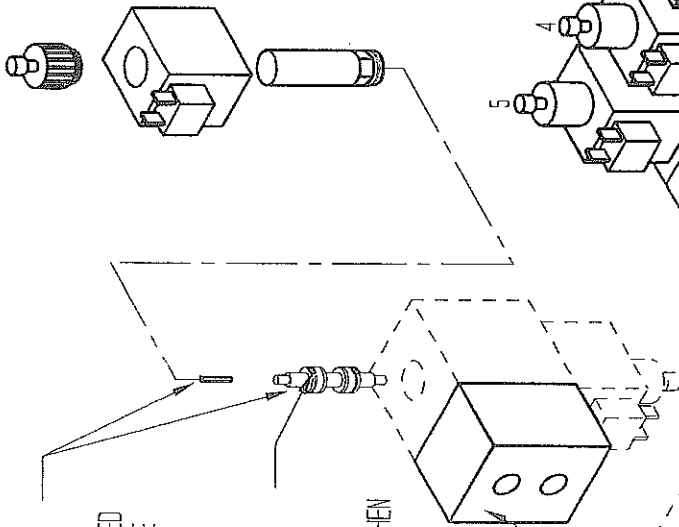
PILOT OPERATED CHECK VALVES HERE KEEP HYDRAULIC OIL FROM LEAKING THROUGH THE VALVE SPOOLS BACK TO THE TRACTOR, KEEPING THE CYLINDERS FROM CREEPING.

5	N/A	ROD/FINDER
4	ROD/FINDER	STEERING
3	STEERING	STEERING
2	STEERING	BOOM
1	BOOM	YANE
VALVE	MODEL 910	MODEL 900
STANDARD VALVE FUNCTIONS (USED RETURN IN STRAIGHT STEERING IS NOT USED, VALVE #3 WOULD NOT EXIST)		

REMEMBER:

OIL FLOW RATE IN EXCESS OF 10 GPM AND OIL CONTAMINATION ARE THE PRIMARY CAUSES FOR VALVE MALFUNCTION.

TURN THE FLOW DOWN!
KEEP THE OIL CLEAN!

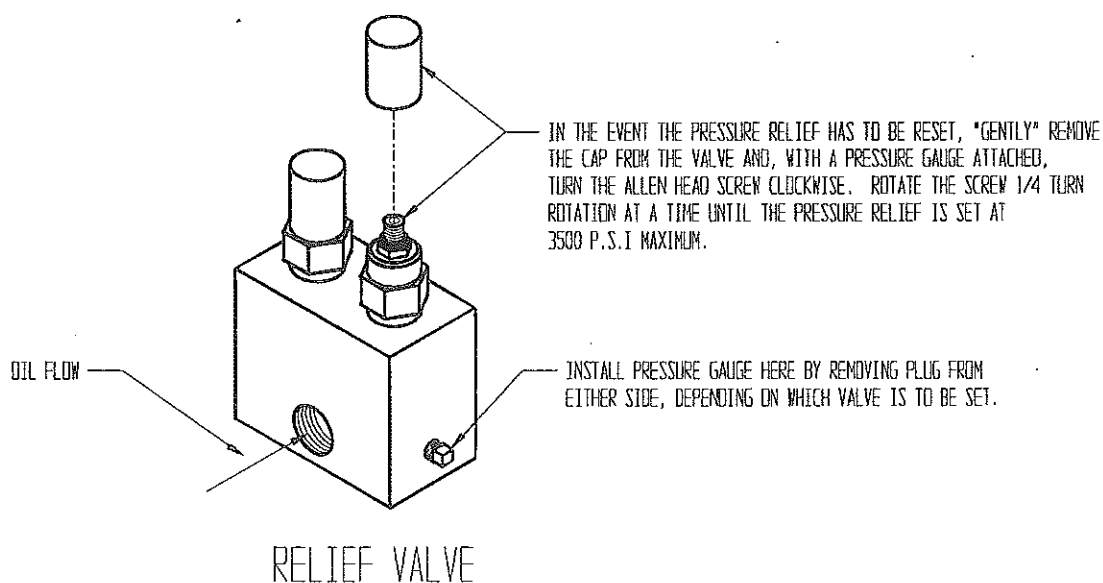


FRONT CONTROL VALVE BANK OPERATION

HARVESTER SYSTEM RELIEF VALVES:

The harvester system relief valves should be set to 3500 P.S.I. from the factory. Periodically, we have found one that is not and would be set at 1500-2000 P.S.I. In most cases, when this happens, the valve has to be reset for the harvester to operate correctly. This illustration below shows how to do it.

Be aware that the valve has the capability of reaching 4500 P.S.I. relief pressure and it is crucial that caution be taken, if readjustment is required, that the setting not exceed 3500 P.S.I. or damage may occur to the hydraulic components. Please be sure that after the adjustment is made, the cap be replaced to prevent random adjustment by someone that may not know the consequences of the action.



PUMP AND MOTOR PERFORMANCE:

If a hydraulic motor unexpectedly slows down or operates substantially slower under heavy load (extreme digging conditions) it may be caused by several conditions:

1. The relief valve pressure setting is too low.
2. The relief valve is defective.
3. The harvesting conditions are causing loads against the system that are exceeding its capabilities.
4. The motor is defective
5. The pump is defective

Pump and motor performance continued:

The cause of the problem can be found easily by following these steps:

1. With a pressure gauge installed in the appropriate port shown above, either hydraulic circuit can be "stalled" by disconnecting the motor discharge hose at the reservoir end. Look at the oil dripping out of the motor. If it has metallic substance in it, the **motor is likely excessively worn** and may have to be replaced.

2. Cap the hose, then very slowly engage the tractor PTO and read the pressure setting on the gauge. If the reading is at 3500 PSI, or the relief valve can be adjusted to get that reading, **then the system is OK** and likely the harvesting conditions are causing excess loads above the rated capacity of the system.

If you cannot adjust the pressure with the valve screw as shown above to the proper setting, then **one of the components in the circuit may be defective** or worn. In most cases the relief valve is the problem.

3. Replace the valve cartridge and check the pressure again. If it cannot be adjusted to the proper level, **then either the motor or the pump is bad.**

4. Reconnect the hose and disconnect the hose at the inlet side of the motor. Again cap the hose, and very slowly engage the tractor PTO and read the pressure setting on the gauge. If the reading is OK, **the pump is good and the motor is excessively worn or defective.**

5. If the pressure is low **the pump section is excessively worn or defective.** In past history, the pump is seldom bad.

It is possible that contaminated oil, or oil at an extremely low level, may have caused the problem, so before you run the harvester again, please check it and replace the oil filter as well as the oil if necessary.

HARVESTING PROBLEMS

TAIL BREAKAGE:

The Parma line of beet harvesters has a reputation for lifting beets without breaking tails. If this is happening there are a number of things to look for and adjustments that can be made:

1. Pinch point width and/or lifter wheel spacing not correct, or inconsistent. (refer to page 3 for explanation)
2. The digging depth of the lifter wheels may be too shallow. If the depth needs to be maintained, it may be possible to add spacers to the lifter wheels to eliminate the breakage.
3. The harvester may not be pulling square:
 - a. First check to be sure that the rear wheels are set to the correct dimensions on the frame and if you have steerable wheels, **check to be sure both sets are aligned and square** with the frame. Adjust if necessary.
 - b. In some ground conditions, especially when it is muddy, the wheels may track into the dug row causing the rear of the harvester to be offset. **If you have the non steerable wheels, the left wheel assembly can be moved right** to track in the dug row which will eliminate the problem.
 - c. To accommodate rear steering with our narrow design, the steerable wheels must be set to follow the tractor tires. In this case **you may have to correct the problem with the steering.** In some conditions, **adjusting the wheels to have some toe-in will help the harvester to track better.**
 - d. If you have a row spacing that requires the tractor to pull the harvester offset with the center of the frame, in ~~some~~ conditions the harvester will have a side draft.

4. The spacing between the grab rolls may be too wide. **The wider the spacing between the smooth and the spiralled rolls, the more aggressive they are on the beets**, so set the width as narrow as possible while still having an acceptable dirt haul back. It's a good idea for the dealer to check the spacing before the machine is delivered.

The farmer should **recheck the spacing at the beginning of each season to verify that the setting is OK** for the initial ground conditions. Be sure to readjust if necessary through the season as the conditions change. **Also keep in mind that tractor power consumption is much higher when the spacing is wider.**

5. The paddle shaft height setting, paddle shaft speed, and ground speed can all have an affect on beet breakage.

The factory setting of the paddle shaft speed and height will operate effectively in most conditions with a ground speed of 3-5 MPH. However, **in some conditions like heavy mud, very small beets, very large beets, slower or faster ground speed, changes may have to be made.** Also, the rubber backing paddle option may be recommended in some conditions.

See the chart on the next page for easy reference on recommendations. Keep in mind that because of so many varying beet sizes and conditions, there are no definite settings. Adjustments must be made to suit each set of conditions.

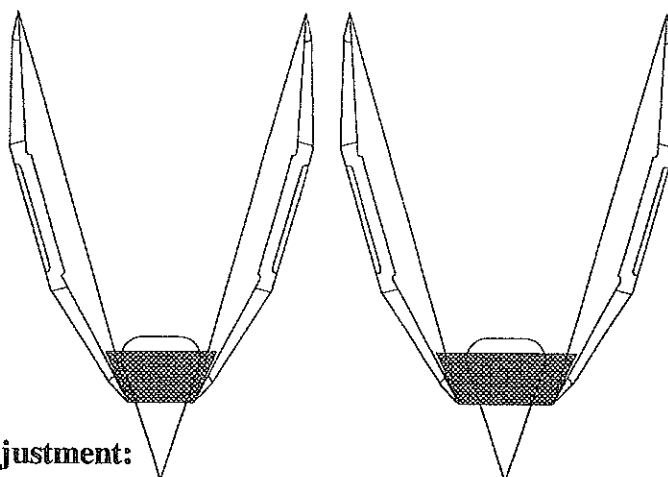
Tail breakage continued:

PADDLE SHAFT HEIGHT / SPEED ADJUSTMENT CHECK								
	SPEED	SPEED	TONS	TONS	SIZE	SIZE	MUD	ROCKS
	-3MPH	+5MPH	+35	-20	-5"	+8"		
PADDLE HEIGHT	LOWER	-----	RAISE	LOWER	LOWER	RAISE	LOWER	RAISE
PADDLE SPEED	RAISE	----	----	----	LOWER	RAISE	RAISE	----
RUBBER EXTENSIONS	----	----	NO	YES	YES	NO	YES	YES
**PLEASE NOTE THAT THE ABOVE INFORMATION IS INTENDED ONLY FOR POSSIBLE SOLUTIONS TO PROBLEMS AND NOT DEFINITE ANSWERS.								

EXCESS DIRT/TRASH HAUL BACK:

There are many adjustments that can be made to reduce haul back if it is necessary. Among them are:

1. Lifter wheel digging depth
2. Pinch point adjustment
3. Grab roll spacing
4. Harvester not pulling square
5. Ground speed
6. Paddle rubber backing paddles
7. Paddle speed
8. Rear elevator scrub
9. Hugger arm springs.



Lifter wheel pinch point adjustment:

This illustration shows how the band of dirt being lifted can change as pinch point widths differ. In general, the wider the pinch point is, the deeper the digging depth has to be and the more dirt will be lifted.

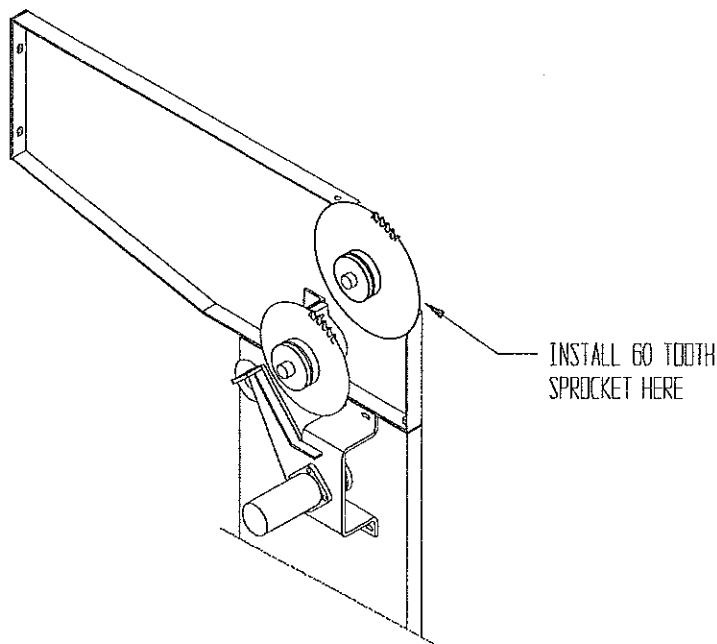
Excess dirt / trash haul back continued:

Grab roll spacing:

The normal setting for distance between the spiralled and smooth grab rolls is 7" between the center of each pair of shafts (#1 & #2, #3 & #4, etc.). In muddy or other more extreme conditions, the distance should be increased. Remember the **wider the spacing between the smooth and the spiralled rolls, the more aggressive they are on the beets**, and it will take more power to operate the harvester, so set the width as narrow as possible while still having an acceptable dirt haul back. When changing the spacing, do it in approximately 1/4" increments (because it doesn't take much change to make a lot of difference). Also, the pair of grab rolls nearest the lifter wheels sees most of the dirt, so sometimes you can accomplish what you need by only adjusting that pair. It's a good idea for the dealer to check the spacing before the machine is delivered.

Rear elevator scrub:

The rear elevator draper chain speeds, **both hooked and belted**, can be set to be in a "scrub" mode in extreme mud and heavy ground conditions (**belted chain on '94 harvesters cannot be in the scrub mode because of the offset link pattern**). The most effective method found so far to accomplish this is to slow down the outside chain by replacing the existing 48 tooth sprocket with a 60 tooth sprocket. See the following illustration. The belted chain offset pattern for '95 has changed and will provide more effective scrubbing action than the hooked chain. We recommend its use if the need for scrubbing action is anticipated.



Rear elevator hugger arm springs:

The **hugger arm springs** on the rear elevator can be adjusted in **some conditions** to help increase the cleaning of the beets. If the tension on the lower two springs is maintained properly, the two top springs can be loosened which will create more of a tumbling action in the beets. Start with adjusting the top spring only. Only Attempt this if conditions are severe enough that the other adjustments aren't effective enough. In higher tonnage or very large beets it is usually best to keep tension on all springs or the beets may stop moving entirely and jam in the elevator.

BEET DELIVERY FROM THE GRAB ROLLS TO THE REAR ELEVATOR:

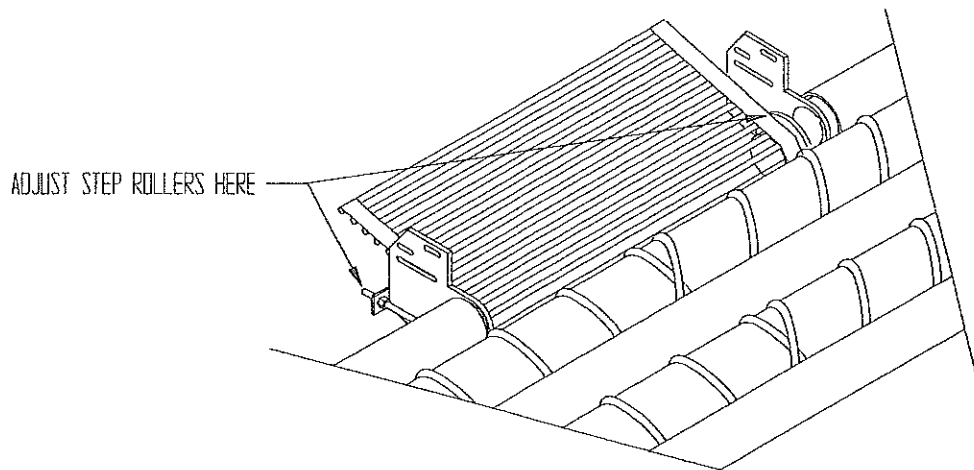
It is critical that the grab roll spirals not be allowed to wear extensively. It has been proven that, especially in muddy conditions or in terrain that has hills, if the spirals get worn the beets will not feed properly into the elevator and may require the ground speed to be reduced and may eventually cause the beets to pile up and jam on the grab rolls.

The spirals have been hard surfaced by the factory, however you should check the spirals regularly through the season, and if more than 1/8" of the top is worn off the spirals should be built up again with hard surfacing rod.

LOSS OF SMALL BEETS:

If this is occurring, it can usually be eliminated or greatly reduced by doing or checking the following:

1. Install lifter wheel fillers.
2. Reduce the spacing between the grab rolls.
3. Check the spacing between the rear elevator draper chain and the last spiralled grab roll. If the spacing is more than 2" adjust it closer by moving the step rollers. See the illustration below:



P A R M A C O M P A N Y

MODEL 900/910 SERIES

TANK

BEET HARVESTER

OPERATOR'S MANUAL

SERIES

M & L

Manual Number 090994-900

P.O. BOX 190 101 MAIN STREET

PARMA, IDAHO 83660

(208) 722-5116 FAX (208) 722-6012

INTRODUCTION

This manual has been prepared to acquaint you with the operation and maintenance of your PARMA Model 900/910 Series Sugar Beet Harvester, and to provide important safety information. We urge you to read this manual carefully. The recommendations will help assure the safe and trouble free operation of your harvester.

When it comes to service, keep in mind that your dealer knows your harvester well and is interested in your complete satisfaction. Your dealer invites you to call him for your service needs both during and after the warranty period.

We thank you for choosing a PARMA product and want to assure you of our continuing interest in your satisfaction.

WARRANTY POLICY

PARMA COMPANY warrants to each purchaser from an authorized dealer of new equipment manufactured by PARMA COMPANY, that such equipment is, at the time of delivery to such purchaser, free from defects in material and workmanship under normal use, if serviced in accordance with the recommendations of the Operator's Manual. All PARMA COMPANY products are warranted for a period of one year from the date of the original purchase from an authorized PARMA dealer unless otherwise specified. (See special provisions listed below.) On parts purchased by PARMA COMPANY and produced by other manufacturers, PARMA will assist customers in making claims to the manufacturer by completing all necessary warranty claim documents, but assumes no responsibility. The ultimate responsibility for warranty of these purchased parts rests with the original manufacturer.

PARMA COMPANY'S obligation under this warranty is limited to repairing, or at its option, replacing any part that, in PARMA'S judgement, proved defective together with reimbursement of such labor charge as deemed to be reasonable by PARMA at hourly rates set by PARMA from time to time. However, the warranty claim must include supporting documentation for any labor claims and must not include any request for travel time or travel expense. Under the terms of the warranty, PARMA COMPANY assumes no responsibility for any travel costs involved in removal of defective parts, of installation of new parts, or of any service charges.

All warranty claims are to be initiated through the authorized PARMA dealer from whom the goods were purchased within 30 days of the date of failure. The dealer must submit to PARMA an ADJUSTMENT REQUEST form with all sections filled out and signed. After all information and/or material is received, PARMA will approve or deny the claim within 30 days. PARMA COMPANY may ask for the defective part to be returned to the factory; therefore, hold all warranty claim parts for 30 days from the date of requested credit from PARMA. The dealer will be advised if the part is needed. If so, ship prepaid and, if approved, send copy of freight bill along with a copy of the completed adjustment request form.

To make this warranty effective, the owner's Warranty Registration Form, furnished with each unit, must be on file at PARMA COMPANY, Parma, Idaho at the time of receipt of the Warranty Claim. The warranty claim must be submitted within thirty (30) days of the claimed failure.

SPECIAL PROVISION FOR HARVESTING EQUIPMENT

Due to the varied field conditions and use of harvesting equipment, the warranty period is limited to one year (365 days) from date of delivery or 800 acres harvested with the harvester, whichever occurs first.

**DISCLAIMER OF ALL OTHER WARRANTIES
AND CONSEQUENTIAL DAMAGES**

THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THE PRODUCTS. THE LIABILITY OF PARMA COMPANY IS EXPRESSLY LIMITED TO REPAIRING, OR AT ITS OPTION, REPLACING ANY PART THAT IS RETURNED, TRANSPORTATION PREPAID, TO PARMA COMPANY, PARMA, IDAHO, THAT IN PARMA'S JUDGEMENT PROVED DEFECTIVE DURING THE WARRANTY PERIOD, TOGETHER WITH SUCH LABOR CHARGE DEEMED TO BE REASONABLE BY PARMA. NO REPRESENTATIVE OF PARMA COMPANY, NO DEALER OR DEALER'S REPRESENTATIVE OR ANY OTHER PERSON HAS AUTHORITY TO WAIVE, ALTER, VARY OR ADD TO THE TERMS HEREOF WITHOUT PRIOR APPROVAL IN WRITING SIGNED BY AN OFFICER OF PARMA COMPANY. PARMA COMPANY WILL NOT BE LIABLE FOR ANY OTHER EXPENSE, INJURY, LOSS OR DAMAGE WHETHER DIRECT OR CONSEQUENTIAL, ARISING IN CONNECTION WITH THE SALE OR USE OF OR INABILITY TO USE, ANY PRODUCT OF THE COMPANY FOR ANY PURPOSE.

SAFETY PRECAUTIONS



Look for this symbol to point
out important safety precautions.
It means--ATTENTION! BECOME ALERT!
YOUR SAFETY IS INVOLVED!

Always disengage PTO and shut off engine before:

1. Leaving Tractor Seat
2. Lubricating
3. Cleaning the machine
4. Adjusting the machine

Always block wheels before working on or under the machine.

Always disengage PTO when turning at the end of a field.

Always keep safety shields in place.

Always use adequate lights or safety warnings when transporting machine on public roads and after dark. Check with your local law enforcement agencies for specific requirements.

Limit towing speed to 20 mph.

Never allow others to ride harvester during operation.

Never check chains while machine is running.

Never stand behind or to the right side of the machine while it is running.

Always engage PTO drive slowly.

Before roading the machine, check wheel bolts to make certain they are tight.

Before roading or transporting the machine, install an SMV emblem.

Before working under a hydraulically supported assembly, block it securely or lower it to lowest position.



I M P O R T A N T ! !



FOR YOUR SAFETY, PARMA BEET HARVESTERS ARE EQUIPPED WITH VARIOUS
SAFETY DECALS. IF ANY OF THESE DECALS SHOULD BECOME LOST
OR WORN, THEY SHOULD BE REPLACED. YOU CAN FIND THE DECAL AND
THEIR RESPECTIVE PART NUMBERS FOR ORDERING ON THE FOLLOWING PAGE.

FACTORY TOW AWAY

Harvester setup for tow away from the factory is available to the dealer. Depending on varying highway restrictions, the harvester discharge boom and draper chain may have to be removed from the harvester.

The front tongue on the 900 series harvester requires a tractor-style drawbar or a special towing ring which is available through PARMA COMPANY or can be furnished by the dealer.

The harvester as set up for towing is not field ready and the dealer will have to perform the final adjustments and test run as indicated on pages 12 & 13.

Warning: Implement tires are not rated for towing at highway speeds. The maximum towing speed is 20 mph. If the towing distance is greater than approximately 15 miles, the implement tires should be replaced with appropriate road tires. PARMA COMPANY will not assume any responsibility or liability for any damage done or accidents that occur while towing PARMA equipment. Tow at your own risk!

UNLOADING THE MACHINE

When the Model 900 Series M & L Harvesters are shipped by truck, most of the component parts are either attached to the basic frame assembly, or bundled into the holding tank. Some exceptions to this may be the tongue assembly, rear carrier wheel option, and draper chain. Unloading of the machine from the truck will require two forklifts rated at 10,000 lbs. lift minimum.

Caution: Use extreme care in lifting the machine from the truck, or personal injury and/or damage to the machine may occur. Keep the forklifts as close to the machine as possible when lifting.

LIFTING POINTS

Figure (1) shows an example of the forklift positions to unload the machine.

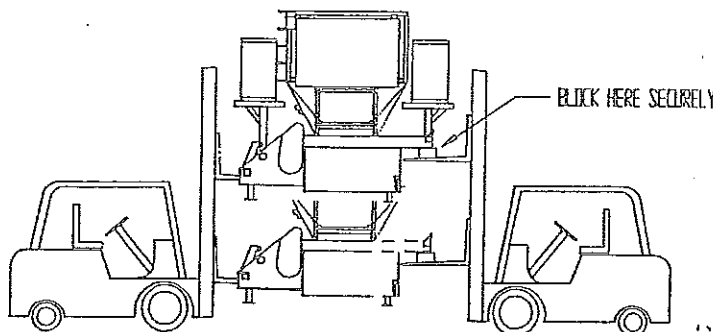


FIGURE 1

SETUP INSTRUCTIONS (M & L 900)

Figure (2) displays the various shipping bundles and parts and their approximate positions when being assembled to the machine. The following steps will help guide you through the assembly process.

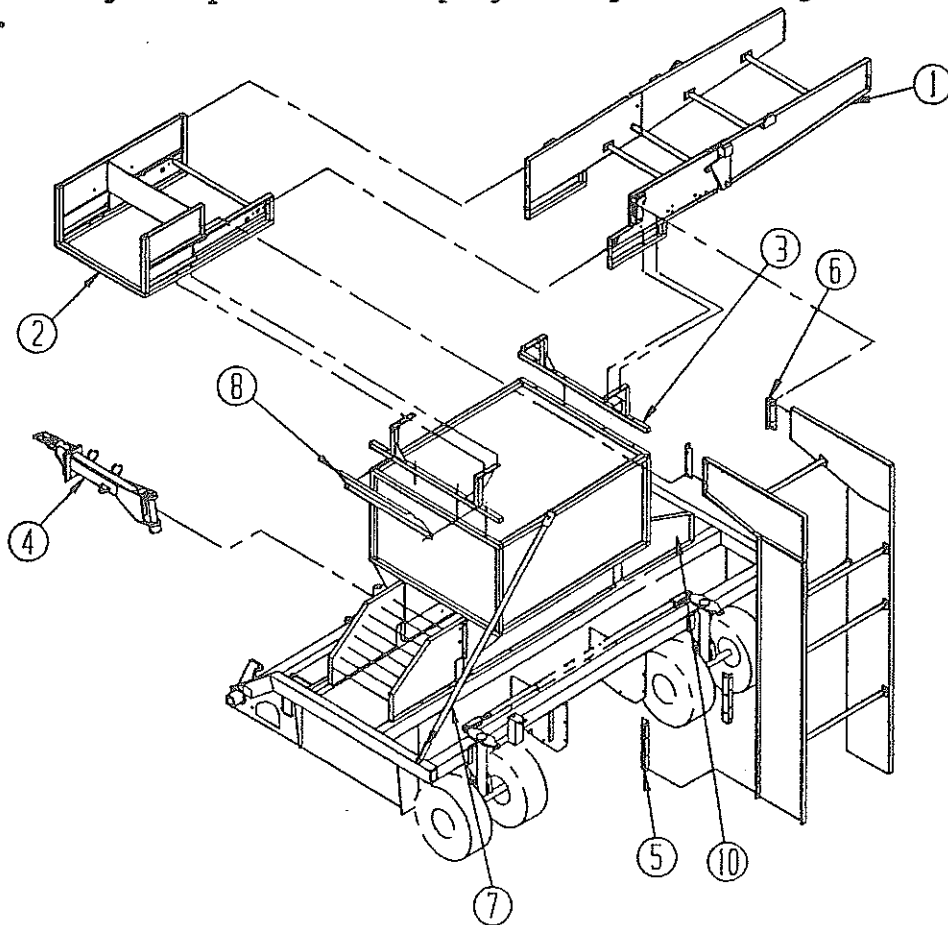


FIGURE 2

Step 1: Install tongue assembly (Item #4). Also install rear carrier wheel option using (8) $3/4$ eye bolts and (8) $3/4 \times 8 \frac{1}{2}$ hex cap screws with hex nuts and lock washers. Refer to tire and lifter wheel spacing diagram page 14 and tractor tire and tongue position diagrams pages 15 and 16 for correct dimensions. Remove all shipping stands.

Step 2: Bolt discharge boom (Item #1) and vane assembly (Item #2) together using (5) $5/8 \times 3$ hex cap screws, hex nuts, and lock washers. Then install rear $2 \frac{1}{2} \times 24$ " boom cylinders included in the box of parts.

Step 3: Bolt (2) support frames (Item #3) to completed discharge conveyor using (8) $1 \frac{1}{2} \times 3$ hex cap screws, hex nuts and lock washers, leaving the nuts loose for now.

Setup Continued:

Step 4: Install (36) links of draper chain in the vane portion of discharge conveyor and (118) links of draper chain in the discharge portion of the discharge conveyor. Refer to Figure (3).

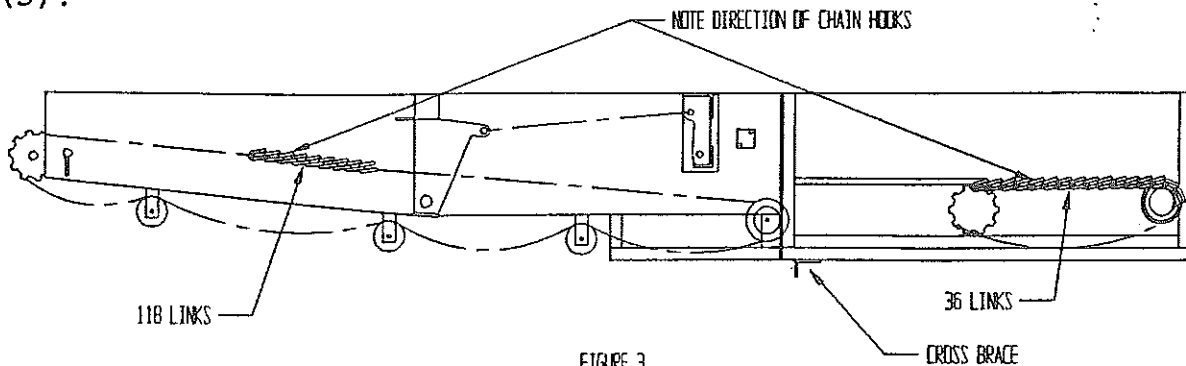


FIGURE 3

Step 5: Lift completed discharge conveyor assembly into position on top of holding tank and bolt on with (8) 1/2 x 5 hex cap screws, hex nuts and lock washers. Now fully tighten both these bolts and the bolts referred to in Step 3, and remove the cross brace as noted in Figure (3).

Step 6: Remove roller chain from drive motor on squeeze chain elevator and turn (2) return rollers on inside of the elevator side panels around and tighten into proper position.

Step 7: Install (137) links of draper chain on the inside of the squeeze chain elevator and (169) links of draper chain on the outside of the elevator. Refer to Figure (4) or the decal placed on the side of the elevator panel. Reinstall roller chain onto hydraulic motor drive.

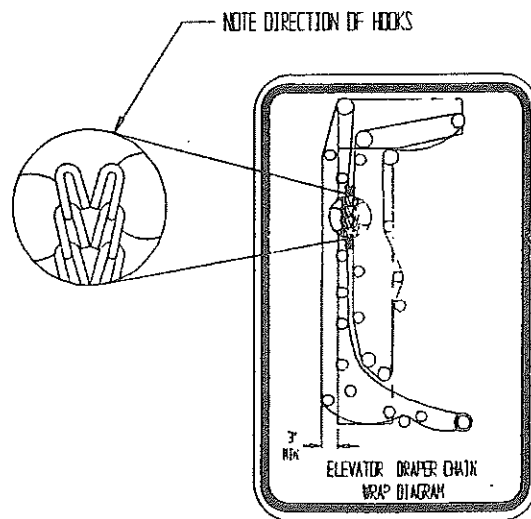


FIGURE 4

Step 8: Bolt support angles (Figure 2, Item #5) onto bottom squeeze chain elevator panels with (8) 1/2 x 1 1/2 hex cap screws, hex nuts, lock washers and flat washers. Leave the nuts loose.

Setup Continued:

Step 9: With the use of a fork lift or other suitable means of lifting, lift squeeze chain elevator into place and attach with (6) 5/8 x 1 3/4 hex cap screws, (4) 1/2 x 1 1/2 hex cap screws, hex nuts, lock washers, flat washers, and (2) attaching angles. (Figure 2, Item #6). Now tighten all bolts and nuts securely.

Step 10: Wrap lower end of squeeze chain elevator draper chain around step rollers per diagram Figure (4) or decal on the side elevator panel. Install all hugger springs per Figure (5). Add or remove links to hold the 3" minimum dimension shown in Figure (4) after springs are installed.

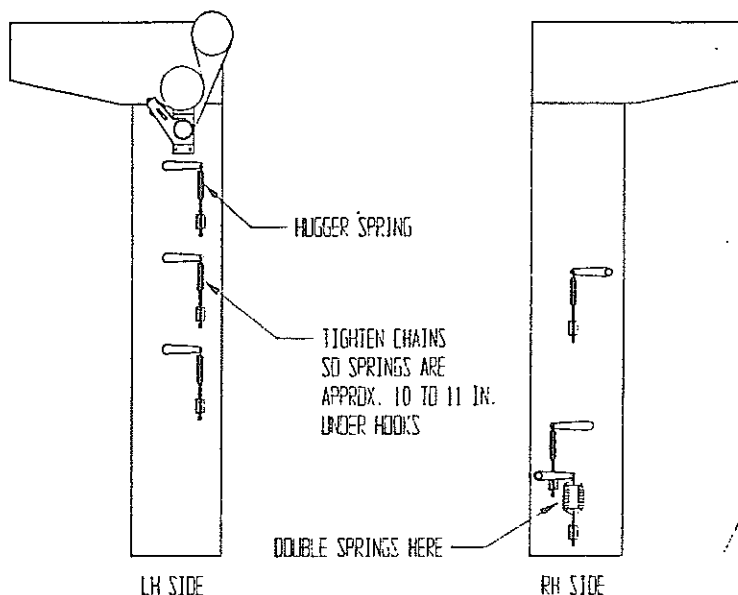


FIGURE 5

Step 11: Install elevator support rod assembly (Figure 2, Item #7) on left hand side of frame using (2) 5/8 x 1 3/4 hex cap screws, hex nuts and lock washers.

Step 12: Install reservoir shield (Figure 2, Item #8) using (2) 3/8 x 2 1/2 hex cap screws, hex nuts, lock washers and flat washers.

Step 13: Reinstall right hand chute panel which has been removed and attached to opposite panel for shipping purposes. Install (6) right hand chute rods (Figure 2, Item #10) included in box of parts.

Step 14: Install all lifter wheels and wheel spacers using (16) 7/16 x 2 3/4 hex cap screws, hex nuts, lock washers, and (2) pair spacers per row. (See page 21 for additional information on pinch point width adjustment.) For rock cushion option installation, see instructions inclosed with option.

Step 15: Install lifter wheel scrapers using (2) 1/2 x 5 hex cap screws, hex nuts and lock washers per row.

Setup Continued:

Step 16: Connect all hydraulic hoses and check fittings for tightness. Be sure the pressure line from the tractor is connected to the "P" port of the harvester valve bank or the system will not work properly.

Note: The Model 900 Series Harvester solenoid valve bank is furnished from the factory set up for closed center tractor hydraulic systems. To convert the valve bank for use with open center hydraulic systems, remove long screw located in the top of the spool cover of the unloader valve and replace it with the short screw located in the body of the valve. Then attach the electrical wire coming out of the unloader valve solenoid to the terminal block as shown in the electrical schematic on page 36. Do not attach this wire if the valve bank is to be used as a closed center hydraulic systems. See page 18 & 19 for use of open/closed center hydraulics with the rowfinder.

These previous steps will complete the assembly of the basic machine. For two way steering instructions, see page 20.

SETUP INSTRUCTIONS (M910)

Figure (6) displays the various shipping bundles and parts and their approximate positions when being assembled to the machine. The following steps will help guide you through the assembly process.

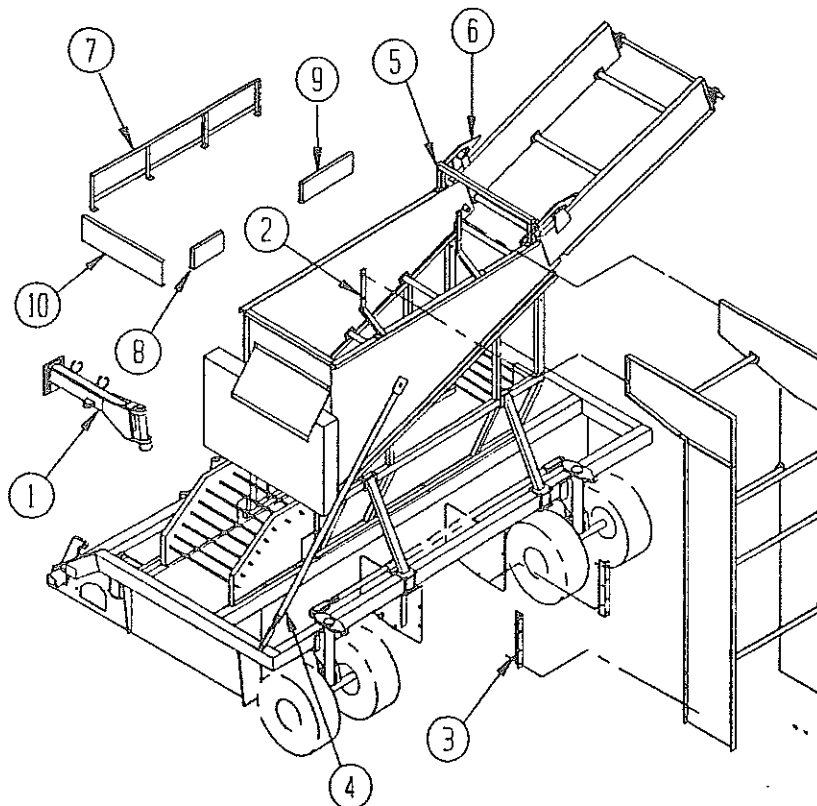


FIGURE 6

Setup Continued:

Step 1: Install tongue assembly (Item #1). Also install rear carrier wheel option using (8) 3/4 eye bolts and (8) 3/4 x 8 1/2 hex cap screws with hex nuts and lock washers. Refer to tire and lifter wheel spacing diagram page 14 and tractor tire and tongue position diagrams pages 15 and 16 for correct dimensions.. Remove all shipping stands.

Step 2: Attach rear elevator support (Item #2) to rear hopper panel using (4) 1/2 x 3 hex cap screws with hex nuts and lock washers.

Step 3: Remove roller chain from drive motor on squeeze chain elevator and turn (2) return rollers on inside of the elevator side panels around and tighten into proper position.

Step 4: Install (137) links of draper chain on the inside of the squeeze chain elevator and (169) links of draper chain on the outside of the elevator. Refer to Figure (4) or the decal placed on the side of the elevator panel. Reinstall roller chain onto hydraulic motor drive.

Step 5: Bolt support angles (Item #3) onto bottom squeeze chain elevator panels with (8) 1/2 x 1 1/2 hex cap screws, hex nuts, lock washers and flat washers. Leave the nuts loose.

Step 6: With the use of a fork lift or other suitable means of lifting, lift squeeze chain elevator into place and attach with (6) 5/8 x 1 3/4 hex cap screws, (4) 1/2 x 1 1/2 hex cap screws, hex nuts, lock washers, flat washers. Now tighten all bolts and nuts securely.

Step 7: Wrap lower end of squeeze chain elevator draper chain around step rollers per diagram Figure (4) or decal on the side elevator panel. Install all hugger springs per Figure (5). Add or remove links to hold the 3" minimum dimension shown in Figure (4) after springs are installed.

Step 8: Install elevator support rod assembly (Item #4) on left hand side of frame using (2) 5/8 x 1 3/4 hex cap screws, hex nuts and lock washers.

Step 9: Attach hopper end support (Item 5) and safety latch (Item 6) using (4) 3/8 X 2 1/2 and (4) 1/2 x 3 hex cap screws, hex nuts and lock washers.

Step 10: Install hopper railings (Items 7, 8, 9, & 10)

Step 11: Install all lifter wheels and wheel spacers using (16) 7/16 x 2 3/4 hex cap screws, hex nuts, lock washers, and (2) pair spacers per row. (See page 21 for additional information on pinch point width adjustment.) For rock cushion option installation, see instructions inclosed with option.

Setup Continued:

Step 12: Install lifter wheel scrapers using (2) 1/2 x 5 hex cap screws, hex nuts and lock washers per row.

Note: The Model 910 Harvester solenoid valve bank is furnished from the factory set up for closed center tractor hydraulic systems. To convert the valve bank for use with open center hydraulic systems, remove long screw located in the top of the spool cover of the unloader valve and replace it with the short screw located in the body of the valve. Then attach the electrical wire coming out of the unloader valve solenoid to the terminal block as shown in the electrical schematic on page 35. Do not attach this wire if the valve bank is to be used as a closed center hydraulic systems. See page 18 & 19 for use of open/closed center hydraulics with the rowfinder.

These previous steps will complete the assembly of the basic machine. For two way steering instructions, see page 20.

FINAL ADJUSTMENTS AND TEST RUN

1. Check row spacing at lifter wheels to be sure the harvester is set correctly for the customer's needs. The measurements should be taken at the "pinch point" location of the lifter wheels. (Refer to the diagram on page 14.)
2. Check oil reservoir level with the use of the dip stick in the fill cap. If oil is not visible on the dip stick, add 10 gallons of multi grade hydraulic oil (Refer to page 24 for Maintenance Schedule Item Information, Item #1), or until oil is approximately 4" from the top. The total capacity of the reservoir is approximately 60 gallons.
3. Install PTO driveline and connect to 1000 RPM tractor PTO.

WARNING! Measure the length of the PTO driveline after installation. The operating length range is 60" min - 70" max on the standard PTO and 60" min - 65" max on the constant velocity PTO. Adjust the tractor drawbar if necessary. Be sure all personnel are clear of the machine, then slowly engage PTO at idle engine speed. The pump will begin pumping immediately. However, it may take the squeeze chain elevator and discharge elevators approximately 20-30 seconds to start. If this does not occur, there will most likely be air in the hydraulic lines. Loosen a fitting down stream from the last hydraulic motor in the circuit to release the air, then retighten the fitting. Be sure the ball valve beneath the reservoir is turned on with the valve handle pointing down.

If any of the conveyors are turning backwards, stop the machine and reverse the motor hoses.

Final Adjustments Continued:

4. Recheck oil reservoir level and add oil as necessary.
5. Check electrical circuits by operating control switches on switch box. If any problems are present, refer to electrical schematics on page 36 & 37.
6. Check on-off operation of discharge conveyor when the hydraulic cylinder on the sliding vane is activated. With the vane in the open position, the discharge conveyor should be stopped. When the vane cylinder is activated, the vane will move to the closed position. Approximately halfway through the cylinder stroke, the micro switch on the conveyor panel will be activated and the rotation discharge conveyor should start. (Not applicable on the Model 910)
7. Dry run the harvester for 20-30 minutes to allow the hydraulic system to de-aerate and the drive belts, roller chains, and draper chains to "seat in." When the run-in is complete, readjust all drives and chains. For grab roll drive belt adjustment, see Fig. 7.

TO TIGHTEN BELTS: BACK OFF THE UPPER HEX NUTS TO ALLOW 1"-2" CLEARANCE. TIGHTEN THE SPRING UNTIL ALMOST FULLY COMPRESSED. RUN THE DRIVE TO SEE THAT THE BELTS ARE SEATED INTO THE SHEAVE GROOVES. RETIGHTEN THE SPRING UNTIL ALMOST FULLY COMPRESSED AND RETIGHTEN THE HEX NUTS.

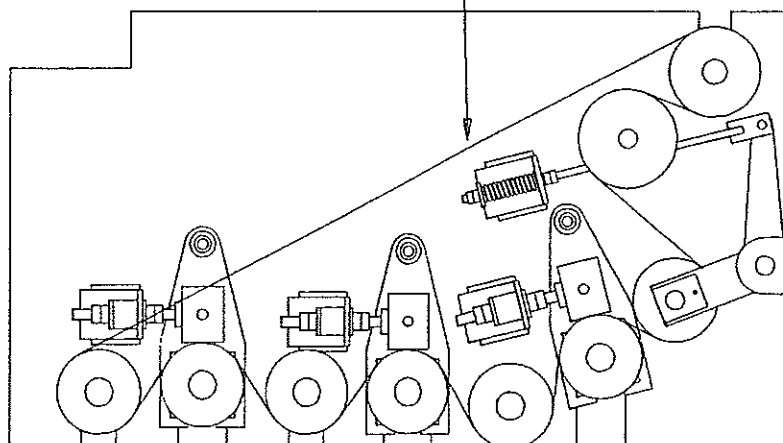
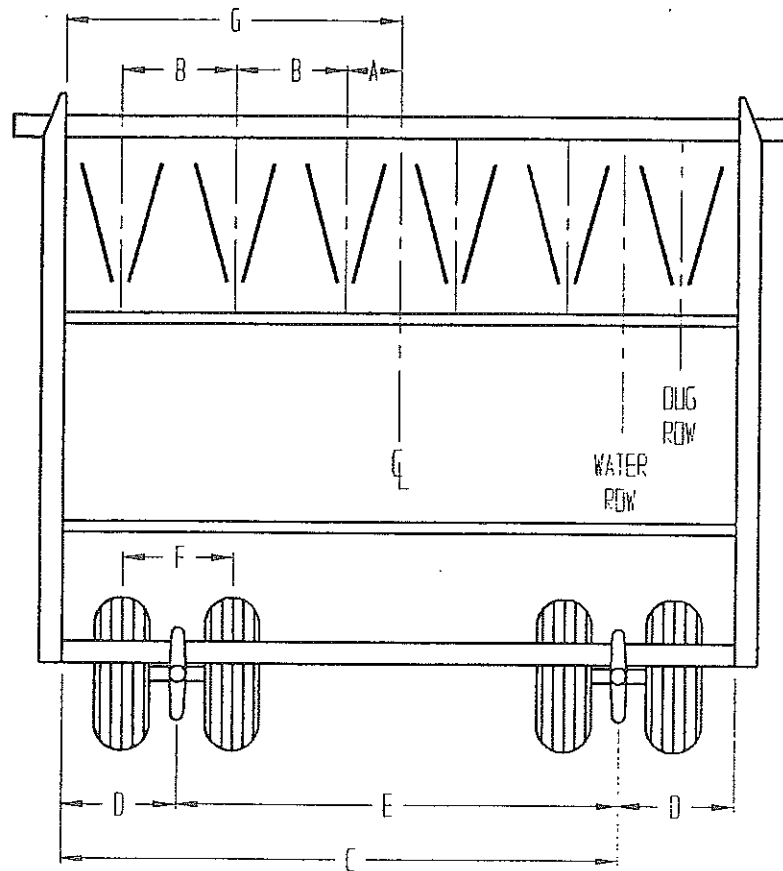


FIGURE 7

8. After the run-in is complete, review all of the lubrication check points listed on the maintenance schedule on page 24 and lubricate the entire harvester according to the item explanations. **Important:** Be sure the slide joint on the PTO driveline is thoroughly greased before the machine is delivered to the customer. This is often overlooked. Lack of grease in this area will cause premature failure in the joints.

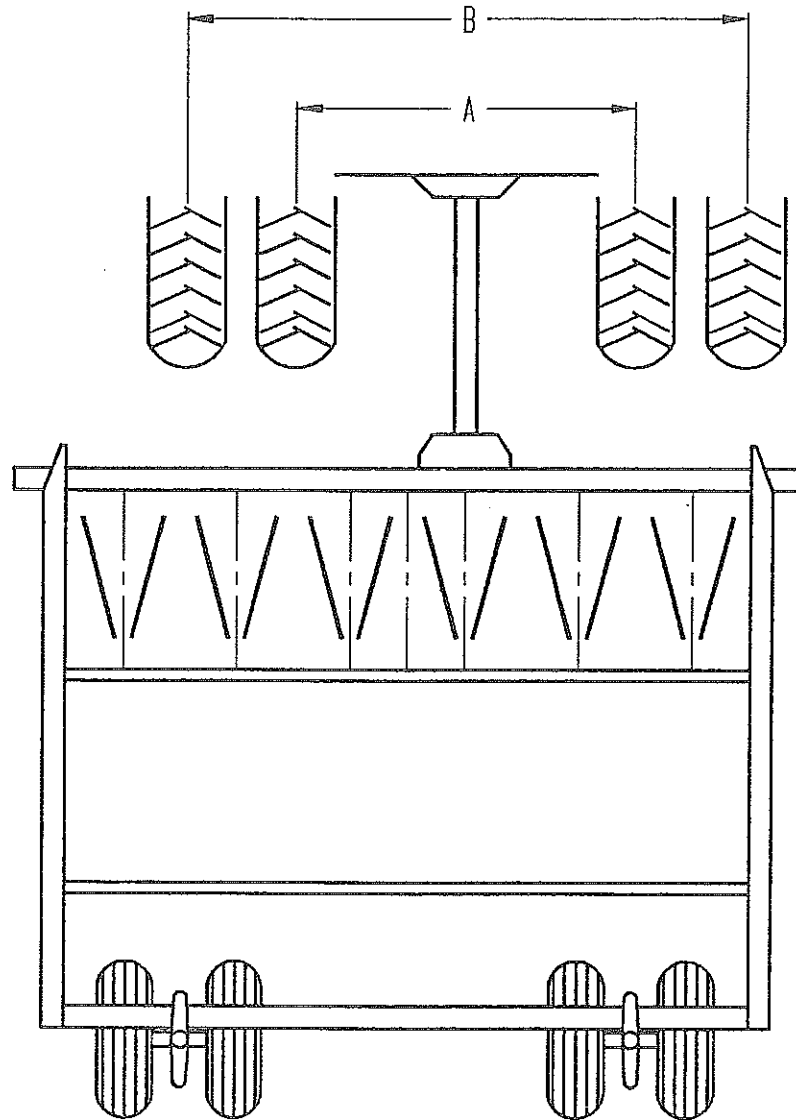
CARRIER WHEEL AND LIFTER WHEEL SPACING



SPACING	A	B	C	D	E	F	G
4-30	15"	30"	117"	27"	90"	30"	72"
6-22	11"	22"	127"	17"	116"	22"	72"
6-21	10 1/2"	21"	124"	19 1/2"	105"	22"	72"
6-24	12"	24"	132"	12"	120"	24"	72"
6-26	13"	26"	124"	20"	104"	24"	78"
6-30	15"	30"	153"	32"	120"	30"	92"
8-22	11"	22"	158"	26"	132"	22"	92"

TRACTOR TIRE & TONGUE POSITION

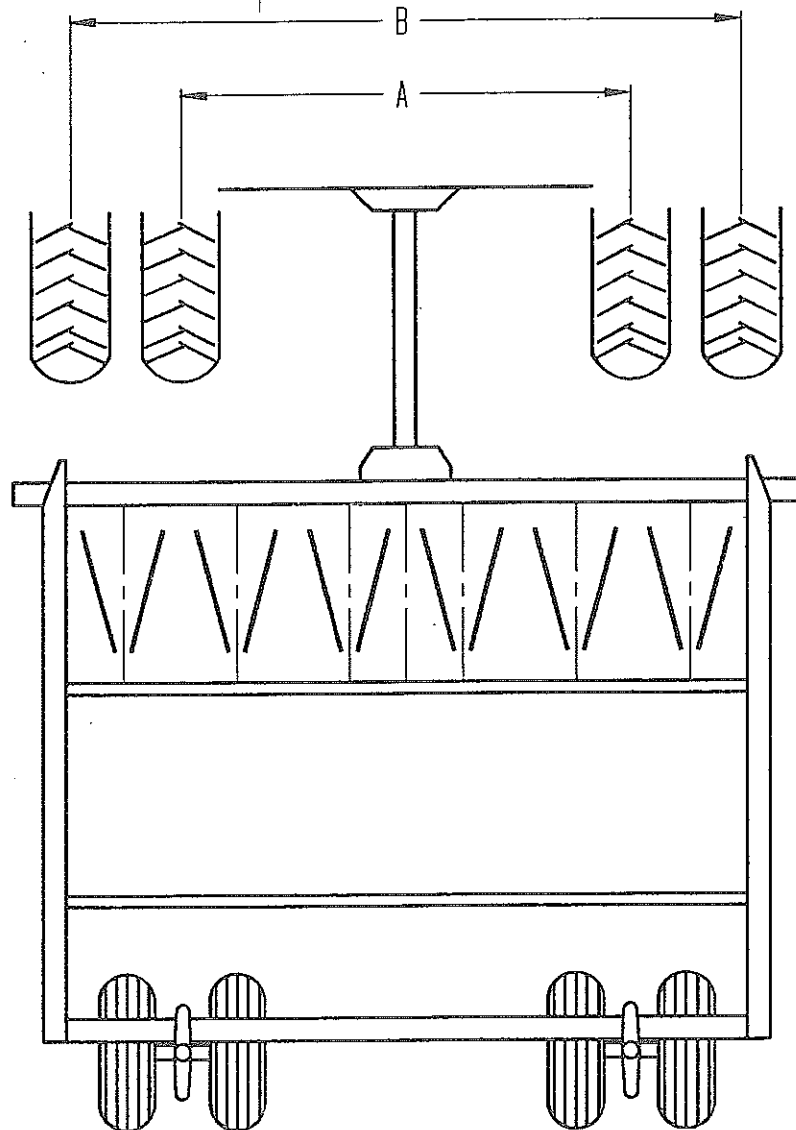
Dimensions shown are for 6 rows at 21", 22", and 24".
Also 4 rows for short axle tractors.



SPACING	A	B
21"	63"	105"
22"	66"	110"
24"	72"	120"
30"	90"	150"

TRACTOR TIRE & TONGUE POSITION

Dimensions shown are for 6 rows at 21", 22" and 24".
Also 4 row 30".



SPACING	A	B
21"	84"	126"
22"	88"	132"
24"	96"	144"
30"	120"	180"

OPTIONS SETUP AND ADJUSTMENTS

Rowfinder

The most preferred location of the rowfinder is attached to the lifter wheel strut next to the tongue on the right hand side.

Bolt the mounting bracket, furnished with the rowfinder, to the top scraper mounting bolt and clamp the top of the mounting bracket to the lifter wheel strut with the clamp plate and 1/2 x 6 1/2 hex cap screws furnished with the rowfinder. See Figure (8).

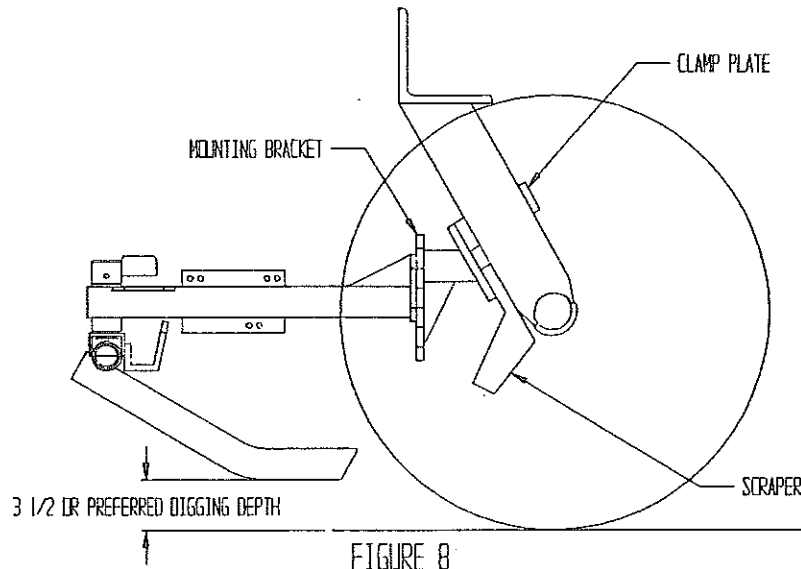


FIGURE 8

The vertical height of the rowfinder should be set so the fins are level and just touching the ground near the beets when the lifter wheels are at a 3 1/2" or other preferred digging depth.

To adjust the angle of the fins to be level, loosen or tighten the nuts on the horizontal adjusting bolt shown in Figure (9). When the correct position of the fins is obtained, tighten the nuts against the springs only enough to remove any play or looseness there may be. Do not use the springs to apply down pressure on the fins to the ground. Excessive spring pressure will hinder the performance of the rowfinder.

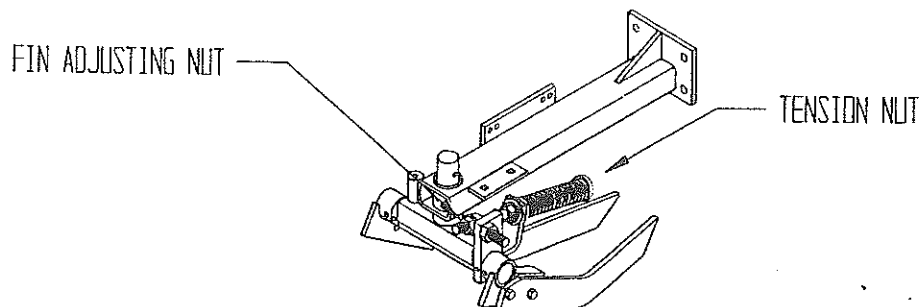


FIGURE 9

Rowfinder Continued:

If hard ground conditions exist, sometimes the hard ground rather than the beets will move the fins. If this is occurring, it may be necessary to raise the rowfinder and adjust the fins so that just the tail ends touch the ground.

The width of the tail ends of the fins should be set at approximately 1/2" wider than the average size of the beets being harvested. This setting may take some time obtaining during the first few rounds of operation, but in most cases the rowfinder accuracy will depend on it and beet breakage caused by the lifter wheels will be kept to a minimum. Change the adjustment of the fins by moving to the inside or outside of the fin mounting brackets, or use flat washers to space to the desired width.

Be sure the tails of the fins are centered directly in line with the lifter wheel pinch point. This adjustment is made as shown in Figure (10).

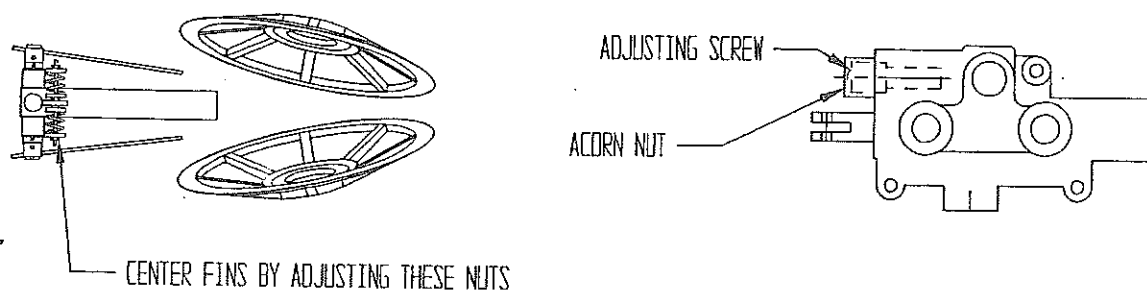
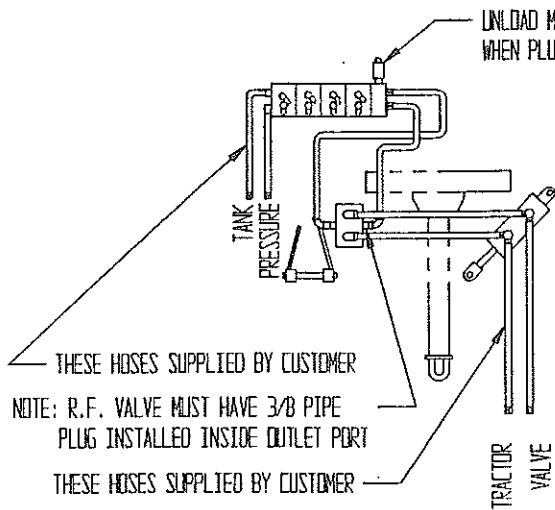


FIGURE 10

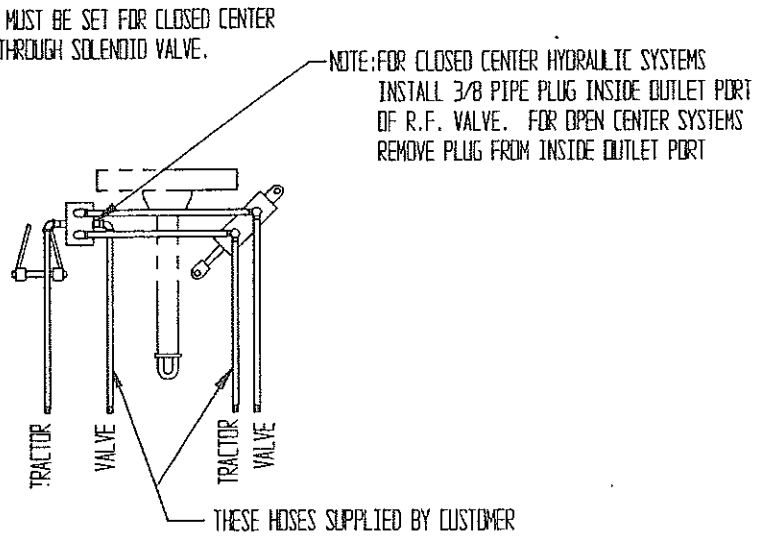
The rowfinder valve will work for both open and closed center hydraulic systems. The valve is furnished for use with closed center hydraulics. To convert to open center, remove the hose and fittings from the outlet side of the rowfinder valve and remove the 3/8" Allen hex head pipe plug from the port in the valve body. Reinstall the fittings and hose. To convert back to closed center, reinstall the same plug to the port that it was taken from.

See page 19 for rowfinder plumbing, open or closed center hydraulics.

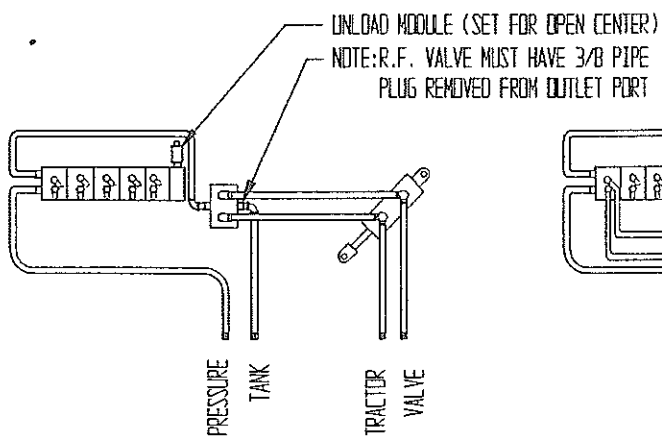
The hydraulic valve on the row finder has had the internal pressure relief preset at 1500 psi. On most tractors, the hydraulic pressure is 2000 psi or above. If you experience a squealing sound in the valve (pressure bypass) adjust the valve pressure relief until the squealing sound stops. The relief pressure is adjusted by removing the acorn nut, Fig. 10, and turning the adjusting screw. Turn the screw clockwise to increase the pressure and counter clockwise to decrease the pressure.



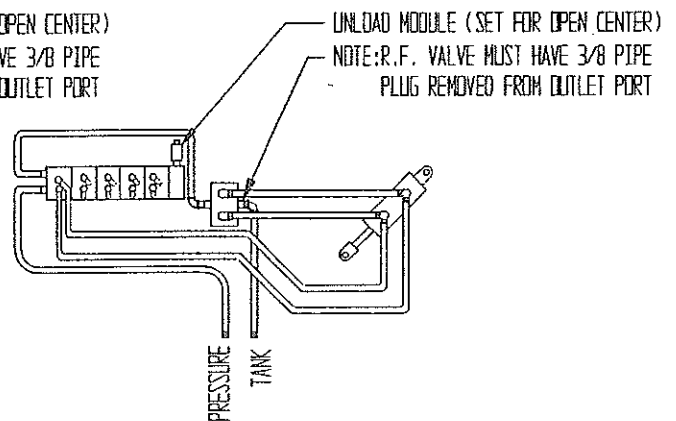
CLOSED CENTER PLUMBING



OPERATE DIRECTLY FROM TRACTOR



OPEN CENTER PLUMBING



OPEN CENTER PLUMBING W/STACK VALVE OVERRIDE
(OVERRIDE PLUMBING SAME FOR CLOSED CENTER)

Options Setup and Adjustment Continued:

Rear Carrier Wheel Return to Straight Steering

Rear harvester steering on the harvester is offered in both 15" and 24" wheel sizes and can be either one-way or two-way steering. When two-way steering is desired, the return to straight option is recommended. It is a simple double rod cylinder control that is operated through a selector valve by a switch on the switch box.

Mount the selector valve in a convenient location on the rear elevator side panel near the double rod cylinder. Holes for the valve mounting are not provided so will have to be drilled.

Connect the 30" lg. hoses from the cylinder to the valve. See Fig. 11 for proper port connection.

Connect the hoses furnished from the front valve bank tube assemblies to the selector valve. Note: The selector valve can also be connected directly to one of the tractor outlets if preferred, but the required hoses will have to be furnished by the dealer or customer. If this is done, one less valve bank on the harvester is required.

Refer to the electrical schematics shown on pages 36 & 37 for electrical connection of the selector valve.

For correct operation, the cylinder must have one clevis rod fully extended and one clevis rod fully compressed when the carrier wheels are straight. One clevis is adjustable for making fine straightness adjustments.

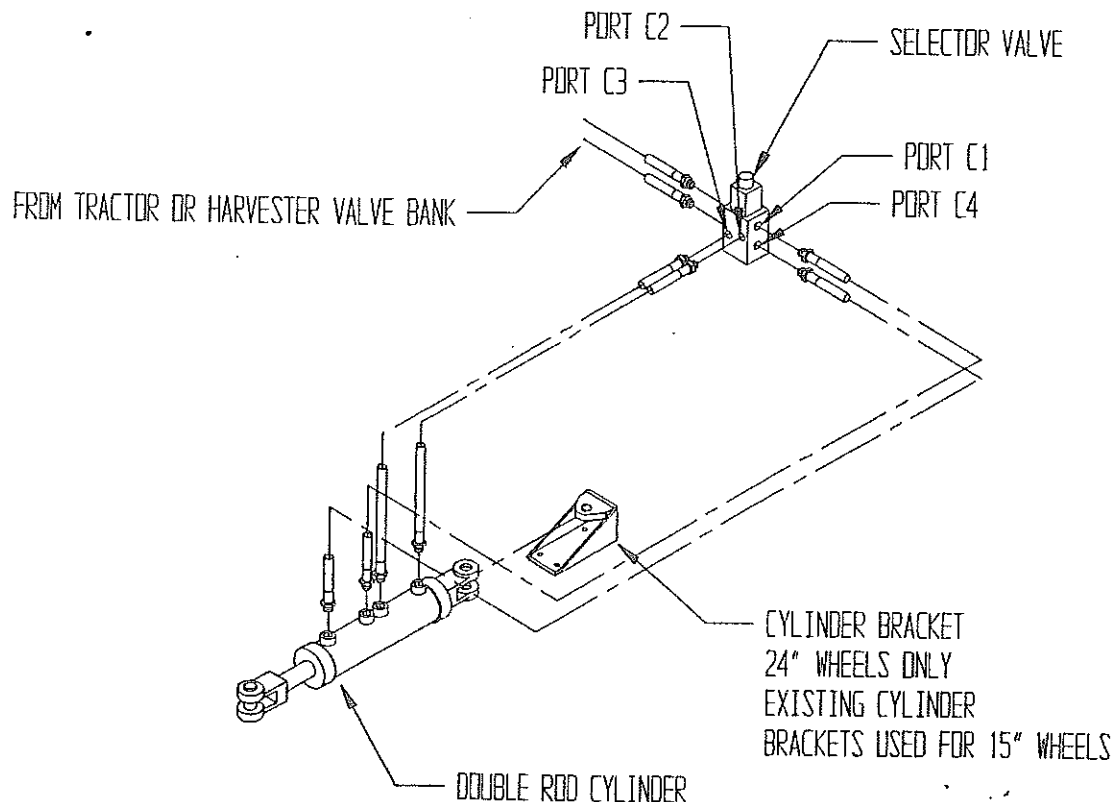


FIGURE 11

FIELD ADJUSTMENTS

Tractor PTO, RPM and Horsepower Requirements

It is important that our customers understand that the shaft speeds of the harvester (that has been determined to be correct for the best harvesting operation) requires the tractor PTO to run at a full 1000 RPM or what is considered tractor "PTO speed." If the PTO is not operated at 1000 RPM, excessive beet spillage, beet damage, potential harvester plugging, and excessive power consumption may occur.

It is also important to understand that if the tractor is underpowered and engine RPM is allowed to drop, resulting in slower PTO speed, the same problems may occur. The recommended minimum PTO horsepower for the Model M900/910 Harvesters is 130 HP minimum and the Model L900 Harvester is 150 HP minimum.

Lifter Wheel Pinch Point Width and Digging Depth

As assembled at the factory, the lifter wheel pinch point will be $1 \frac{3}{4} \pm \frac{1}{8}$ " with one pair of wheel spacers in each wheel. This spacing with a digging depth of approximately $3 \frac{1}{2}$ " is a good average setting to lift beets with a sufficient amount of soil to keep tail breakage and other beet damage to a minimum.

If possible, a minimum row speed of 4-5 miles per hour should be maintained for best root recovery and minimum spillage on the ground.

Ground conditions and texture vary greatly, and as a result these settings may have to be changed or set differently to obtain optimum performance of the harvester. If the beet tonnage exceeds 25 tons per acre or if the average beets exceed 6" in diameter, extra lifter wheel spacers may have to be installed to keep from breaking tails.

The digging depth can be varied by adjusting the stops on the lift cylinders. Adjust the stops equally to ensure even digging depth.

Paddle Shaft Height Adjustment

For average beet conditions, the paddle shaft position should be set so there is approximately $\frac{3}{4}$ " clearance between the 3" square tubing corners and the lifter wheels.

The paddle shaft should be raised if the beets are larger than normal and breakage is occurring. If flexible rock struts are used, the paddle shaft should also be raised so the lifter wheels don't hit the shaft tube when they flex. Rubber paddle extensions should also be installed when flexible rock struts are used to make up for the raised position of the shaft.

The outside paddle shaft bearings are mounted on adjustable bearing plates that are simple to raise up or down. The paddle shaft is split and is mounted on bearings in the center of the machine also. These bearings must also be adjusted when the position of the shaft is changed.

The drive chain on the left side may have to be lengthened or adjusted as the shaft position changes.

Field Adjustments Continued:

Rear Carrier Wheel Height Adjustment

The carrier wheels need to be set at a height that places the frame of the harvester level with the ground when in digging position. This height will vary in different areas because of different cultivating and irrigating practices. The dealer should estimate the correct position when the machine is being set up, but it should be checked in the field and reset in the field if necessary.

Rowfinder Adjustment

See Options Setup and Adjustment on Page 17.

Grab Roll Spacing Adjustment

The grab roll bed plays the single largest part in the cleaning and potential damage of the beets during harvesting. As a result, proper adjustment of the grab rolls is vitally important. If trash and mud removal is not an issue, keep the rolls adjusted so there is approximately 1/4" clearance between the spiral on the large grab roll and the smooth roll. As trash and mud removal become more important, the roll spacing should be widened. Important: As the spacing gets wider, potential damage to beets and beet loss gets greater, and tractor power requirements become greater. Therefore, while making adjustments, move the smooth roll in small increments until the desire position is obtained. For severe "gumbo" condition, an optional mud flap kit is available to keep the beets on the grab roll longer.

Please note: When beet tops freeze and become ropey and tough, it is important that the beets are properly topped because the harvester "will not" remove the top and potential plugging problems may occur. If this condition exists, keep the grab roll spacing closer to help prevent plugging and lower power consumption. See Figure (12) for adjustment explanation.

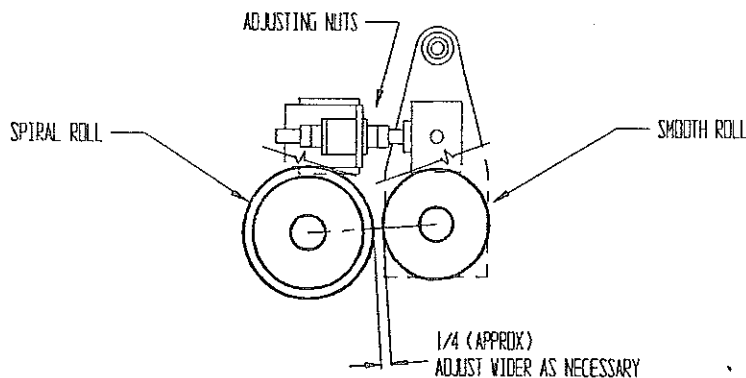


FIGURE 12

Field Adjustments Continued:

Squeeze Chain Elevator

When severe mud condition occur and additional cleaning is desired, the draper chain speed can be changed to have a "scrubbing" effect. To make this change, remove the 48 tooth sprocket from the outer chain head shaft and replace it with a smaller sprocket to increase the speed of this chain only. The speed change can be from 10%-30% depending on the condition that exists. This sprocket is supplied by the customer.

Under some conditions, beet "roll back" may occur in the vertical portion of the elevator or increased capacity may be required. This can be controlled in most cases by increasing the spring pressure on the holding arms. See maintenance schedule page 27, Item 21 for further explanation.

MAINTENANCE SCHEDULE						
Itm no.	Service*	4hr	Dly	Wkly	Mthly	Yrly
1	Reservoir Oil Level Check		X			
2	Filter Replacement	X				X
3	Hydraulic Oil Change					X
4	Suction Strainer Cleaned					X
5	Gear Box & Reduction Box Oil Level			X		
6	Lifter Wheel Bearing Lubrication			X		
7	Step Roller Bearing Lubrication**					
8	Rubber Roller Bearing Lubrication**					
9	Pillow Block & Flanged Bearing Lube					X
10	Carrier Wheel Bearing Repack					X
11	Roller Chain Lubrication	X				
12	Tongue Bushing Lubrication		X			
13	Elevator Idler Arm Lubrication		X			
14	Discharge Boom Pivot Lubrication		X			
15	Steering Strut Lubrication		X			
16	PTO Driveline & Other U-Joint Lube		X			
17	Grab Roll Hanger Bracket Lube			X		
18	Draper Chain Adjustment/Check		X			
19	Roller Chain Adjustment/Check	X				
20	Grab Roll Drive Belt Tightener Adj.	X		X		
21	Elevator Hugger Spring Tension***					
22	Bolt & Nut Tightness Check	X		X		
*For explanation of the above items refer to pages 25 thru 27 **See explanation of items #7 & #8 on pages 25 & 26. ***See explanation page 27, Item #21						

MAINTENANCE SCHEDULE ITEM EXPLANATION

- Item 1: The reservoir has been filled at the factory with Texaco 1540 Rando Hydraulic Oil HDZ-36 HVI. It must be refilled after the initial run-in to the mark on the dip stick or approximately 4" from the top of the reservoir. Check daily. Be sure to clean around the fill cap thoroughly before removing.
- Item 2: The filter element must be replaced after the initial run-in with the extra filter furnished with the harvester. Then change the element at the end or beginning of each season or after each 600 acres has been harvested.
- Item 3: The hydraulic oil should be changed at the beginning or end of each season or after each 600 acres has been harvested. Thoroughly flush out the reservoir to remove all sediment and thoroughly clean the suction strainer. Use a good grade of hydraulic oil with a running viscosity range of 70-250 SUS. The reservoir capacity is approximately 60 gallons.
- Item 4: The suction strainer is located in the reservoir at the discharge port above the pump. Clean the strainer at the same time the hydraulic oil is being changed. To remove the strainer, loosen the hose clamps on the suction hose above the pump and remove the hose. Cover the suction port of the pump with a rag to protect against contaminants. With the use of a pipe wrench, unscrew the strainer leaving the pipe reducer and king nipple attached. Clean with a solvent and reinstall.
- Item 5: To check the oil level in the main gear box, remove the pipe plug in the back of the housing. The oil level should be at the level of the hole. If it is not, fill through the top hole until oil starts to run out of the back. Use a good grade of 90 weight gear oil. The reduction gear box that drives the hydraulic pump has a similar pipe plug just below the pump and the oil level should be at the level of the hole.
- Item 6: Check to be sure the lifter wheel hubs are fully packed with grease before initial use of the harvester. Apply grease with a gun until grease is visible coming out of the inner seal. The hubs should be greased on a weekly basis and repacked with new grease at the beginning or end of each season.
- Item 7: The cast step rollers in the elevator, tank, and discharge conveyor are sealed and need not be greased.

Item Explanation Continued:

- Item 8: The heavy duty rubber rollers in the elevator and tank have a grease zerk in them. However, they do not need to be greased because the heavy duty bearing is sealed and will not accept grease. The roller manufacturer offers optional bearing styles, some of them are greasable. PARMA COMPANY has chosen to use the highest quality heavy duty bearing which is sealed.
- Item 9: The pillow block and flanged bearings are greasable; however, too much grease will damage the seals and adversely affect the life of the bearings. To lubricate, apply about a half a stroke of grease from the grease gun after the initial dealer run-in of the harvester. Then apply about a half a stroke of grease at the end of each season or every 600 acres of use.
- Item 10: Carrier wheel bearings should be repacked and the seals replaced at the beginning of each season.
- Item 11: Apply oil to all roller chains twice daily during operation.
- Item 12: There are two areas of lubrication on the front tongue. One is at the pivot near the harvester and one is at the pivot near the tractor. Grease these two areas daily.
- Item 13: The chain tightener arms in the elevator have grease points at each end. Grease these daily.
- Item 14: There is one lubrication point at the center of the discharge boom pivot tube. Grease daily.
- Item 15: There are two grease points on each rear steering strut. Grease these daily.
- Item 16: The PTO driveline slip joint must be greased thoroughly prior to initial use and at the beginning of each season. Pull the driveline apart and apply grease by hand on the male shaft then reassemble. During operation, this slide as well as the U-joints on the driveline should be greased daily. The other U-joints mounted on the main gear box (there are three) should be greased daily.
- Item 17: Grease the hanger bracket pivot points at each end of the smooth grab rolls on a weekly basis.
- Item 18: The draper chain in the squeeze chain elevator should be checked for tightness daily. When links are removed

Item Explanation Continued:

from the chain, be sure not to tighten the chain to less than 3" from the face of the tightener roller edge of the elevator panel as shown in Figure (4) on page 8 or on the decal placed on the side of the elevator panel. Excessive tightness will cause jamming of beets in the elevator when it is loaded during operation.

- Item 19: The roller chain drives should be checked twice daily for tightness and sprocket alignment. Excessive slack in the chain will cause premature wear in the chain and sprockets. Remove links as necessary.
- Item 20: Initially the idler arm tightener should be adjusted so the spring is compressed so that there is approximately 1/8" clearance between the coils. (Refer to page 13, Figure 7) This compressed distance should be maintained. Once the drive belts have been "run in", the belt stretch should be minimal but "Check often" to prevent belt slippage.
- Item 21: The required tension of the elevator hugger springs may vary according to ground wetness conditions and/or beet size variation and tonnage. If excessive roll back is noticed in the elevator, the springs should be tightened. The bottom tightener arm springs usually play a larger part in solving this problem. In many cases, adjustments made here may be the only ones required. Be careful not to over tighten the upper springs because this can also hinder the beet flow in some conditions. (Refer to page 9, Figure 5.)
- Item 22: PARMA COMPANY employees are concerned with the quality of the product they produce. Sometimes, however, improperly tightened bolts may occur. Also, quite often, vibration during initial harvesting operation may cause bolts to loosen. If they are checked after the first few hours of operation and then periodically during the first season, potential problems can be eliminated.

TROUBLE SHOOTING - HYDRAULIC SYSTEM

The PARMA hydraulic harvester uses high quality hydraulic components to drive the holding tank, discharge conveyor, paddle shaft, and squeeze chain elevator. With proper maintenance this system will provide many years of trouble free service.

The two major causes of hydraulic problems are oil contamination and heat. It is important to keep these from occurring.

Oil Contamination

The hydraulic system is protected by three types of filters which trap oil contaminants. The fill strainer is located in the top of the hydraulic reservoir. It is a "SEMI-COARSE" filter intended to remove larger pieces of contaminants which may fall into the reservoir when checking oil level or filling with oil. The suction strainer is located at the bottom of the reservoir at the suction port just above the hydraulic pump. It is a "COARSE" filter intended to remove large pieces of contaminants which may have gotten into the reservoir. The in-line return filter is a "SPIN ON" type of filter mounted on the top of the reservoir. It is a "FINE" filter intended to remove fine (10 micron) pieces of contaminants from the system during operation. It is easily replaced. Refer to the maintenance schedule, page 24, for replacement or cleaning intervals of all filters.

Heat

Excessive heat generation in the PARMA harvester hydraulic system rarely occurs. If it does it may be attributed to one or more of three items.

- 1: Harvesting row speed or other conditions that cause the harvester to be overloaded beyond its capacity causing a relief valve to open allowing oil bypass. The hydraulic system is designed to continuously operate at a maximum of 3000 psi which has been sufficient to drive the harvester in even the more difficult conditions. The relief valves are pre set at the factory to allow this amount of operating pressure. However, if the harvester is subjected to severe mud conditions which place load requirements that cause the system to exceed 3500 psi, the relief valves will open to relieve the pressure. If this happens, heat may be generated that may exceed the dissipating capabilities of the reservoir. If heat continues to rise to an unacceptable level, aeration of the oil may occur which can cause damage to the hydraulic components. If this condition is occurring and it cannot be corrected by adjusting row speed or conditions changing, consult your dealer for assistance.

Trouble Shooting Continued (Hydraulics):

- 2: High ambient temperatures during operation. Normally the harvester hydraulic system operates satisfactorily during hot days. However, a combination of hot days and high load requirements may cause excessive heat generation.
- 3: A defective hydraulic component may allow excessive oil bypass, thus causing heat generation.

WARNING!! To avoid hydraulic system damage, always operate the harvester at a low idle speed to circulate and warm the hydraulic oil before operating. Use the following for an approximation of warm-up time:

Ambient temperature above 50 degrees: 10 minutes.
Ambient temperature below 50 degrees: 20 minutes.

TROUBLE SHOOTING CONTINUED (HYDRAULICS)

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Hydraulic system won't operate (one or both circuits) or speeds are erratic.	No flow from pump.	Check on-off valve at reservoir.
	Relief valve pressure setting too low.	Consult dealer or factory.
	Pump defective.	Replace.
	Overload or jam.	Check all areas for jam or blockage and remove.
Discharge boom will not start and stop correctly	Micro switch defective.	Replace or disassemble and clean contacts.
	Electrical power not getting to micro switch.	Check for poor connections or broken wire.
	Defective dump valve.	Remove spool and clean or replace.
	Discharge vane open.	Activate switch to close vane.
Tank unloading conveyors don't operate.	Discharge vane open and dump valve open.	Tank conveyors will not operate unless discharge conveyors are operating.
	Switch off.	Turn switch on.
	Defective dump valve.	Remove spool and clean or replace.
	Relief valve pressure setting too low.	Consult dealer or factory.
Rear elevator and paddles won't turn.	See "Hydraulic System Won't Operate" at beginning of this section.	

TROUBLE SHOOTING CONTINUED (HYDRAULICS)

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Solenoid valve bank not operating correctly.	Flow and pressure from tractor too high.	Turn flow rate down to 10 GPM maximum.
	Tractor hydraulics (open/closed) do not match valve bank or rowfinder configuration.	Valve bank and/or rowfinder needs to be set for open or closed hydraulic system to match tractor system. (See page 10 for instructions on valve bank and page 18 for instructions on rowfinder.)
	Pressure/tank ports on valve bank don't match pressure/tank outlets on tractor	Switch hydraulic lines. "P" and "T" ports are indicated on valve bank.
	Contamination exists in one or more valves or valve is defective or damaged.	Remove and clean or replace spool in valve, or replace valve.
	Wiring hookup may be wrong.	Check electrical schematic on pages 36 & 37
	Fuse burned out in switch box.	Replace.
The vane, discharge boom, or rear steering cylinders creep.	These circuits are controlled by oil passing through to the solenoid valve. Each valve must have motor spools and cross over check valves.	Be sure motor spools and cross over check valves are installed on each valve (consult with factory). Remove and clean or replace spools.
The discharge boom creeps up after being lowered.	Open center valve bank setup with closed center tractor hydraulics	Switch screws in unloader valve on valve bank. (Refer to page 10.)

TROUBLE SHOOTING CONTINUED (HYDRAULICS)

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Oil in reservoir is aerated (may bubble out of reservoir), oil appears milky.	Air leak in suction line.	Tighten clamps and/or suction fittings or replace.
	Relief valve pressure setting too low.	Consult dealer or factory
	Water in oil.	Loosen drain plug until leak appears to verify. Water will be on the bottom.
		Drain oil, flush out system and replace with new oil as specified on pg. 25, Item #3.

TROUBLE SHOOTING (HARVESTING)

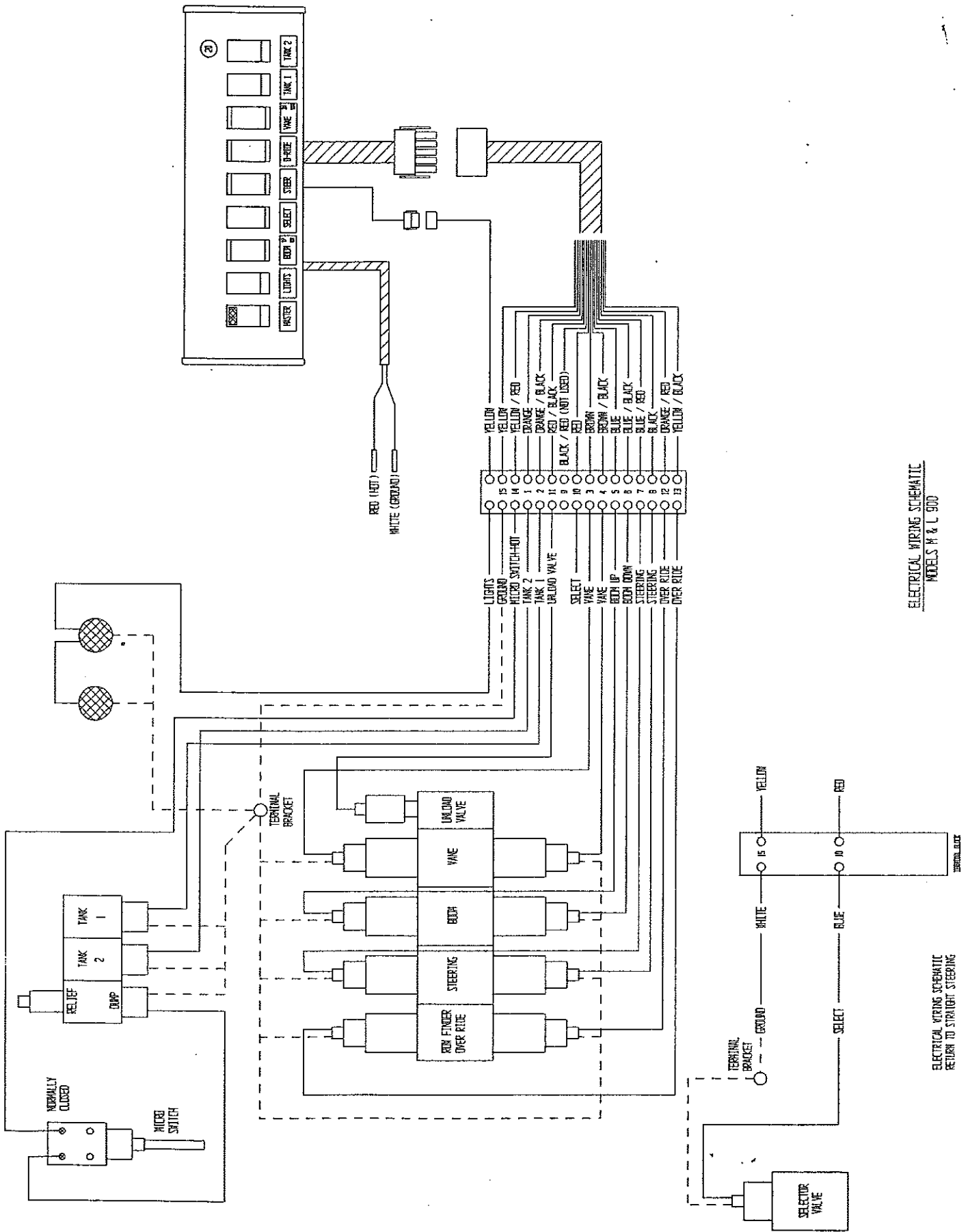
SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Harvester not staying on row.	Rowfinder not operating or adjusted correctly.	See rowfinder adjustments pg. 17.
	Rear steering not set properly and harvester trails crooked; or rear wheels not set on correct spacing.	Straighten steering by adjusting cylinder clevis. If return to straight option is being used, refer to pg. 20 for adjustment. Refer to pg. 14 for row settings.
	Harvesting over a guess row.	Recount rows and start again.
	With some tractor tire spacings, the tongue is offset to the right hand side. The tongue should be straight rather than set on an angle.	Check and reset if necessary. See pages 15 & 16 for correct settings.
	Lifter wheels not set at correct row spacing.	See Lifter Wheel Spacing Chart on pg. 14.
Beet tails are breaking and staying in ground.	Digging depth may be too shallow and/or pinch point width may be too narrow.	Change digging depth or add spacers to lifter wheels to widen pinch point or both.
	Refer to "Harvester not staying on row"	
	Lifter wheel spacing not correct	See page 14.
	Ground is dry and hard.	Increase digging depth. Irrigate before harvesting.

TROUBLE SHOOTING CONTINUED (HARVESTING)

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Beet tail breakage continued.	Rear tractor tires too large for row spacing or are spaced incorrectly.	See pages 15 & 16 for correct spacing.
Beet tails are being lifted, but beets are being broken in or dropped through harvester.	Paddle shaft too high for small beets.	Lower paddle shaft. Install optional rubber paddle extensions.
	Small beets falling through lifter wheel spokes.	Increase row speed to 4-5 mph. Install optional filler spokes. Increase digging depth.
		Lower paddle shaft.
	Beets rolling back over lifter wheel hubs.	Decrease row speed to 4-5 mph. Lower paddle shaft. Install optional rubber paddle extensions.
	Grab roll spacing too wide and beets being broken or pulled through rolls.	Adjust grab roll spacing. See pg. 22 for instructions.
	Rear of harvester may be too high (frame not level).	Readjust rear carrier wheels.
	Beets rolling back too much in rear elevation.	Tighten hugger springs. See pg. 27, Item 21 for instructions.

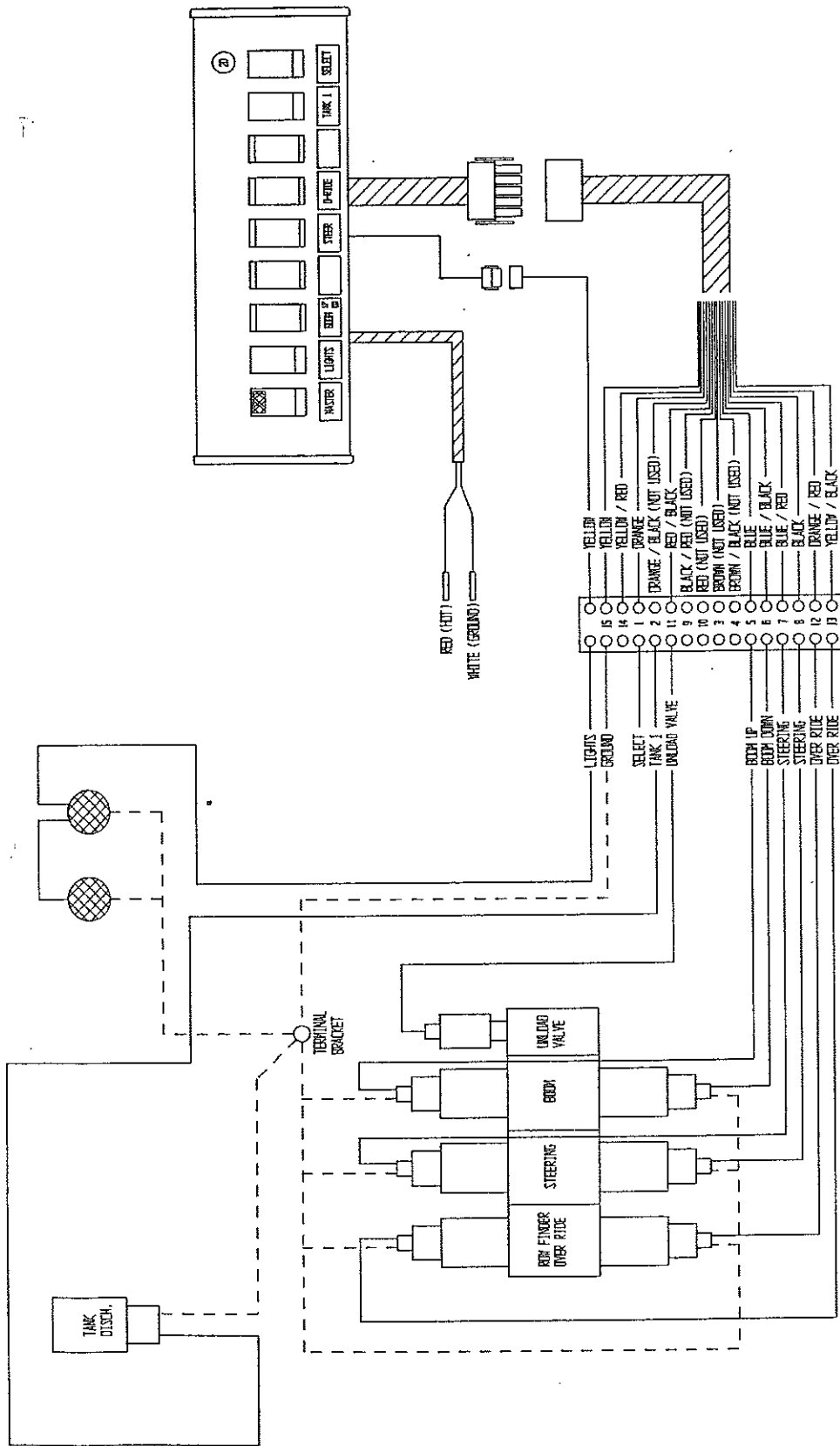
TROUBLE SHOOTING CONTINUED (HARVESTING)

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Damage to harvester or jamming occurring due to rocks or stones in field.	Rock protection option for lifter wheels, struts, and grab rolls not installed.	See your local dealer for available options. <u>Please Be Aware</u> that the available options do not eliminate all problems or damages encountered with harvesting in rocky conditions. They only minimize the problems or damage.
Excess dirt and or tops being loaded into truck.	Digging depth too deep.	Raise machine. If beets start breaking when this happens, pinch point width can be increased to possibly stop the breakage.
	Grab roll spacing too close.	Adjust grab roll spacing. See pg. 22 for instructions.
	Rear elevator draper chain speeds can be changed to compensate for severe mud conditions.	See pg. 23 for changes to obtain "Scrubbing" effect.
	Beet tops not being removed and/or swept from top of row adequately.	This is a common problem with many harvesting operations and often overlooked as a cause for excessive tear and/or plugging problems.

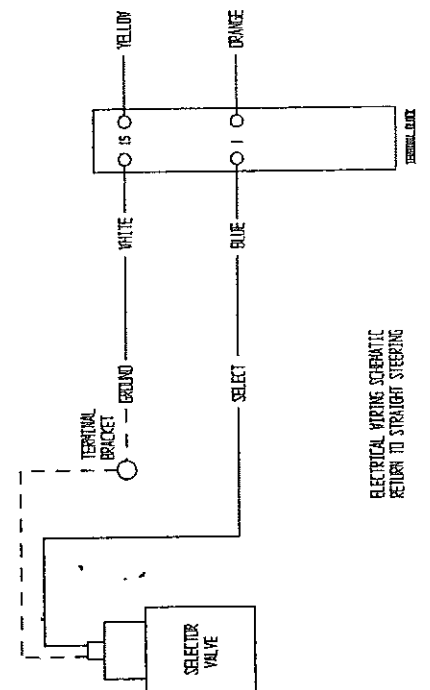


ELECTRICAL WIRING SCHEMATIC
MODELS M & L 900

ELECTRICAL WIRING SCHEMATIC
RETURN TO STRAIGHT STEERING



ELECTRICAL WIRING SCHEMATIC
MODEL 910



ELECTRICAL WIRING SCHEMATIC
RETURN TO STRAIGHT STEERING

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