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Lockwood assumes no responsibility for the accuracy, completeness, sufficiency, or usefulness of the information contained herein.

SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Lockwood is continually making improvements and developing new equipment. In doing so, we reserve the right to make changes or add improvements to our product without obligation for equipment previously sold.

Because modification to this machine may affect the performance, function, and safety of its operation, no modifications are to be made without the written permission of Lockwood. Part replacements should be with original equipment supplied by Lockwood.

LOCKWOOD STATEMENT OF PRODUCT SAFETY

As a manufacturer of specialized agricultural equipment, Lockwood, fully recognizes its responsibility of providing its customers products that perform their expected use in a reasonably safe manner. Safety considerations shall be an integral and high priority part of all engineering/design analysis and judgments involving Lockwood products. It is our stated policy that our products will be manufactured to comply with the safety standards specified by the American Society of Agricultural Engineers, the National Electrical Code, The Society of Automotive Engineers, and/or any other applicable recognized standards at the time manufactured. However, this statement should not be construed to mean that our product will safeguard against a customer’s own carelessness or neglect in violating common safety practices specified in each product’s manual, nor will we be liable for any such act.

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Any trademarks not directly mentioned are also acknowledged.

Preface
This manual is intended for use with the 473H, 474H and 484H Potato Harvester
Lockwood warrants for each original retail purchaser of new goods from Lockwood or a Lockwood Dealer, that such goods are at the time of delivery to such purchaser, free from defects in material and workmanship.

Electrical components operated on direct current (D.C.) circuits must be operated with respect to proper polarity and not above or below the voltage specified by Lockwood. Electrical components operated on alternating current (A.C.) circuits must be operated at not more than five percent (5%) above or below that voltage and frequency specified by Lockwood. GOODS MUST BE ELECTRICALLY WIRED AND GROUNDED ACCORDING TO N.E.C. REQUIREMENTS AND INSPECTED AND APPROVED BY LOCAL OR STATE INSPECTING AUTHORITIES.

Lockwood’s obligation under this warranty, unless otherwise specified is limited to (1) repairing, or at its option, (2) replacing with factory specified replacement parts, without cost, at a designated Lockwood Dealer, any parts which in Lockwood’s judgment proved defective in material or workmanship within twelve (12) months after date of delivery to the original purchaser, unless the goods are purchased for commercial use, in which event the warranty period will be forty-five (45) days from the date of delivery to the original purchaser. This warranty will not be valid if the goods are not assembled, operated and serviced in accordance with the Operator’s Manual.

SPECIAL PROVISIONS
Lockwood warrants its rod link chain against breakage in the link joint prior to the appearance of wear at such points. Links which Lockwood has determined to be defective will be replaced F.O.B. factory, or the cost thereof credited to the purchaser at Lockwood’s option.

GENERAL PROVISIONS - FIELD EQUIPMENT
The following general provisions are applicable to field equipment. The date of delivery shall be deemed to be the date shown on the delivery and warranty registration form signed by the Purchaser and delivered to Lockwood (which is the date of retail delivery).

No warranty shall apply to (1) normal maintenance, service or adjustments, (2) any Lockwood goods which shall have been repaired or altered in any way so as, in Lockwood’s judgment, to affect adversely their stability, operational characteristics or safety, nor which have been subject to misuse, negligence, accident, poor assembly or improper installation. Non-Lockwood manufactured products and/or components will be subject to warranties of their respective manufactures.

To make this warranty effective, (1) the purchaser’s Warranty Registration form furnished with each piece of equipment must be completed and on file at Lockwood factory, West Fargo, North Dakota prior to submitting any claims, (2) the warranty claim must be completed and the parts claimed to be defective must accompany the completed warranty claim if required.

FREIGHT
Dealer must prepay freight on warranty components returned to Lockwood. The components will be replaced F.O.B. Factory.

LIMITATIONS
This Lockwood warranty is expressly in lieu of other warranties, expressed or implied, including without limitation, warranties of MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, and any other obligation or liability including crop damage or loss of crops for liability for incidental or consequential damages on the part of Lockwood.

There are no warranties on used goods, USED GOODS ARE SOLD AS IS.

Lockwood shall not be liable or responsible in any way or to any extent for property damages, personal Injury, or death resulting from the modification or alteration to Lockwood goods or from the purchaser’s failure to assemble, install, maintain, or operate the goods in accordance with the provisions of the Operator’s Manual.

No statement, representation, agreement or understanding, oral or written, made by an agent, authorized Dealer, Lockwood representative or employee other than an officer of Lockwood in writing, which is not contained in the Warranty and Disclaimer will be recognized or enforceable or binding upon Lockwood.

Any action for breach of any Lockwood warranty must be commenced within one year after date on which such cause of action occurred.
PRE - DELIVERY CHECKLIST

This checklist is provided to identify items to be checked and adjusted if necessary by the dealer prior to delivery of a new machine

Check the following and adjust if necessary

☐ Machine matches sales order (correct serial number and row spacing).
☐ List machine’s serial number on warranty and registration form.
☐ No parts of the unit have been damaged during shipment. Check for such things as dents and loose or missing parts.
☐ The belt sheaves and roller chain sprockets are aligned and idlers are correctly spaced.
☐ Roller chain and V-belt tensions are correct.
☐ Bearing lock collars are secured and tightened in direction of rotation.
☐ All nuts and bolts are tight.
☐ Safety shields and safety decals are on and properly placed.
☐ Wheel lug bolts are tightened to (5/8) 125 to 140 ft-lbs torque, and (3/4) 200-250 ft-lbs.
☐ The side elevator inlet section is properly located relative to the rear cross conveyor and deviner roller.
☐ The rod or belted chain pitches are matched with the sprockets.
☐ Test hydraulic controls for proper operation.
☐ Smooth hydraulic operation with no leaks.

☐ The tire pressure is at the appropriate psi.
☐ Set screws and keys are set and secure.
☐ Hitch pins, spacers, and bushings for Category II & III tractors are attached.
☐ The open center screw and closed center screw on the electro-hydraulics valve are properly oriented to match the tractor hydraulics.
☐ All points are properly lubricated. (See lubrication in the service and maintenance section.)
☐ Attachment of the hydraulic hoses and components is correct.

DELIVERY - CHECKLIST

Review the following with the customer at the time the unit is delivered

☐ Review the operators manual specifically the Safety Precautions.
☐ Explain the importance of thoroughly reading and understanding this manual.
☐ Review the operation section.
☐ Review the Service and maintenance section.
☐ Be sure customer understands the location and function of controls, safety decals and safety devices.
☐ Explain adjustments for machine operation.
☐ Explain the importance of proper lubrication and maintenance.
☐ Explain warranty to customer.
☐ Both dealer and customer must sign the Delivery And Warranty registration form.
# HOW TO REACH US

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<tr>
<td>Lockwood</td>
<td>Mon. - Fri. 8 A.M. to 5 P.M. Central Time</td>
<td>For Parts and Service 1-800-247-7335 Fax: 701-282-9522</td>
<td>For Service: <a href="mailto:serv@crary.com">serv@crary.com</a> For Parts: <a href="mailto:potsales@crary.com">potsales@crary.com</a> Visit our website: <a href="http://www.lockwoodmfg.com">www.lockwoodmfg.com</a></td>
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SERIAL NUMBER LOCATION

Always give your dealer the serial number of your Lockwood 473H, 474H and 484H Harvester when ordering parts, requesting service or other information.

The serial number decal is located on the right side of the machine near the hydraulic control bank (see Figure #1). Please mark the number in the space provided for easy reference. Record the serial number on the Delivery And Warranty Registration form and on this page of your manual.

REPLACEMENT PARTS

Use only genuine Lockwood replacement parts to repair the machine. Your Lockwood Dealer offers Lockwood replacement parts. To obtain prompt, efficient service, remember to give the Dealer the correct part description and serial number of the machine.
1.0 INTRODUCTION

Congratulations on your choice of a new Lockwood 473H, 474H or 484H Harvester to complement your farming operation. This equipment has been designed and manufactured to meet the needs of a discerning agricultural industry for the efficient harvesting of potatoes.

Safe, efficient, and trouble free operation of your harvester requires that you and anyone else who will operate or maintain this machine, read and understand the Safety, Operation, Maintenance, and Trouble Shooting information contained within the Operators Manual. Check each item referred to and acquaint yourself with the adjustments required to obtain efficient operation.

Keep this manual handy for frequent reference and to pass on to new operators or owners. Call your Lockwood dealer or distributor if you need assistance, information, or additional copies of the manuals.

Many people have worked on the design, production, and delivery of this machine. They have used the highest quality of materials and workmanship. The manual’s information derives from the knowledge, study, and experience of these people through years of manufacturing specialized farming machinery.

The machine’s performance depends upon proper maintenance and adjustment. Whether an experienced operator of this or similar equipment or not, we ask you to read the Operators Manual before running the machine. Keep the manual handy for future reference. Lockwood has carefully prepared, organized, and illustrated this manual to assist you in finding the information you need. Your Lockwood dealer will be happy to answer any further questions you may have.

OPERATOR ORIENTATION - The directions left, right, front, rear, as mentioned throughout the manual, are as seen from the driver’s seat of the tractor facing the direction of travel.
2.0 SAFETY

SAFETY ALERT SYMBOL

This Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

The Safety Alert symbol identifies important safety messages on the Lockwood 473H, 474H and 484H Harvesters and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Why is SAFETY important to you?

3 Big Reasons

Accidents Disable and Kill
Accidents Cost
Accidents Can Be Avoided

SIGNAL WORDS:

Note the use of the signal words DANGER, WARNING, CAUTION, IMPORTANT and NOTE with the safety messages. The appropriate signal word for each message has been selected using the following guidelines:

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

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

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

IMPORTANT - Follow instructions to ensure proper installation/operation of equipment.

NOTE - General statements to assist the reader.
## 2.0 SAFETY

The responsibility for **SAFE** operation and maintenance of your Lockwood 473H, 474H or 484H Harvester rests on **YOU**. **YOU** must ensure that those who will operate, maintain or work around this machine familiarize themselves with all operating, maintenance, and **SAFETY** information contained in this manual. This manual discusses good safety practices necessary to safely operate the Lockwood 473H, 474H or 484H Harvester.

Remember, **YOU** are the key to safety. Good safety practices protect you and the people around you. Make these practices a working part of your safety program. Familiarize **EVERYONE** who operates this equipment with the recommended operating and maintenance procedures and ensure they follow all the safety precautions. You can prevent most accidents. Do not risk injury or death by ignoring good safety practices.

- Lockwood 473H, 474H or 484H Harvester owners must review operating instructions to operators or employees before allowing them to operate the machine, and at least annually thereafter per OSHA (Occupational Safety and Health Administration) regulation 1928.57.

- The most important safety device on this equipment is a **SAFE** operator. The operator is responsible to read and understand **ALL** Safety and Operating instructions in the manual and to follow them. You can avoid most accidents.

- A person who has not read and understood all operating and safety instructions does not qualify to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.

- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment.

- Think **SAFETY**! Work **SAFELY**!

### WARNING

Lockwood recommends that you always turn off the hydraulic and electrical power to the Harvester hydraulic valve and control box when towing the Harvester on the road.

## 2.1 GENERAL SAFETY

1. Read and understand the Operator’s Manual and all safety signs before operating, maintaining, adjusting or servicing the Lockwood 473H, 474H or 484H Harvester.

2. Only trained persons shall operate the Lockwood 473H, 474H or 484H Harvester. An untrained operator does not qualify to operate the machine.

3. Have a first-aid kit available for use should the need arise and know how to use it.

4. Provide a fire extinguisher for use in case of an accident. Store in a highly visible place.

5. Do not allow children, spectators or bystanders within hazard area of machine.

6. Wear appropriate protective gear. This list includes but is not limited to:
   - A hard hat
   - Protective shoes with slip resistant soles
   - Protective goggles
   - Heavy gloves
   - Hearing protection
   - Respirator or filter mask

7. Wear suitable ear protection for prolonged exposure to excessive noise.

8. Do not allow riders on the machine.

9. Place all controls in neutral or off, stop tractor engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, repairing, or unplugging.

10. Review safety related items annually with all personnel who will operate or maintain the Lockwood 473H, 474H or 484H Harvester.
2.2 OPERATING SAFETY

1. Install and secure all guards and shields before starting or operating.

2. Clear the area of bystanders, especially small children, before starting the tractor.

3. Place all machine controls in neutral before starting the tractor.

4. Keep hands, feet, hair and clothing away from all moving and/or rotating parts.

5. Keep all hydraulic lines, fittings, and couplers tight and free of leaks before and during use.

6. Clean reflectors and lights before transporting.

7. Review safety related items annually with all personnel who will operate or maintain the harvester.

8. Be careful when operating on uneven terrain, or near ditches to avoid the potential of overturning the machine.

9. Use only recommended tractor sizes with proper weight and equipment for operating the machine.

10. Never stand between the tractor and the machine when the tractor backs up for hookup.

11. Use the correct size hitch pin to prevent unhitching.

12. When backing up the machine, all persons must stand away from the back of the unit due to the operator’s impaired vision.

13. Be careful during field and transport operation not to contact trees, power poles, and electrical lines with the machine’s row marker. Electrocution can occur without direct contact.

14. After using agricultural chemical and seed treatments, thoroughly remove residues and deposits before storing the machine. Refer to the section in this manual regarding chemical safety.

15. Shut the tractor off when connecting or disconnecting the machine hydraulics.

2.3 MAINTENANCE SAFETY

1. Follow ALL the operating, maintenance, and safety information in the manual.

2. Support the machine with blocks or safety stands when changing tires or working beneath it.

3. Follow good shop practices:  
   • Keep service area clean and dry.  
   • Properly ground all electrical outlets and tools.  
   • Use adequate light for the job at hand.

4. Use only tools, jacks and hoists of sufficient capacity for the job.

5. Place all controls in neutral or off, stop tractor engine, set parking brake, remove ignition key, wait for all moving parts to stop; then properly block machine before servicing, adjusting, repairing, or unplugging.

6. Before resuming work, install and secure all guards after completing all maintenance work.

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

8. Clear the area of bystanders, especially small children, when carrying out any maintenance and repairs or making any adjustments.

9. Keep safety decals clean. Replace damaged or unreadable decals.

10. First-class maintenance is a prerequisite for the safest operation of your machine. Perform maintenance, including lubrications, with the machine stopped and properly blocked.
2.4 HYDRAULIC SAFETY

1. Always place all tractor hydraulic controls in neutral before disconnecting from tractor or working on hydraulic system.

2. Keep all components in the hydraulic system in good, clean condition.

3. Relieve pressure before working on the hydraulic system.

4. Replace any worn, cut, abraded, flattened or crimped hoses.

5. Do not attempt any makeshift repairs to the hydraulic fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high pressure. Such repairs will fail suddenly and create a hazardous and unsafe condition.

6. Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to isolate and identify a leak.

7. If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface.

8. Before applying hydraulic pressure to the system, tighten all components and check for damaged lines, hoses, and couplings.

• Think SAFETY! Work SAFELY!

2.5 PTO (POWER TAKE-OFF) SAFETY

1. Keep bystanders, especially children, away from drive shafts.

2. Be extremely careful when working around PTO shafts, drivelines, or other rotating shafts.

3. Do not remove or modify protective shields or guards.

4. Do not step across a PTO or driveline or use it as a step.

5. Keep guards and shields in place at all times while operating.

6. Replace all damaged or missing parts or shields with the correct original manufacturer’s parts.

7. Grease, clean, and maintain PTO components according to original manufacturer’s specifications and information in this manual.

8. Operator must wear fairly tight clothing. Never wear loose-fitting jackets, shirts, or pants when working around the drive shafts. Tie long hair back or put under a cap.

9. Keep hydraulic hoses, electric cords, chains, and other items from contacting the drive shafts.

10. Do not clean, lubricate, or adjust the drive shafts with the PTO engaged and the tractor running.
2.6 TRANSPORT SAFETY

1. Comply with all local regulations regarding transporting equipment on public roads and highways.

2. Ensure the SMV (Slow Moving Vehicle) emblem and all the lights and reflectors required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic. Add extra lights or pilot vehicles when transporting at night or during periods of limited visibility.

3. Ensure that the machine securely attaches to the tractor and all retainer pins are installed.

4. Do not allow riders on any part of the machine during transportation.

5. Towing speed should not exceed 10 MPH due to farm rated tires and wheels. Reduce speed on rough roads and surfaces.

6. Always use hazard warning flashers on the tractor when transporting unless prohibited by law.

7. Be careful when transporting on public highways or roads.

8. Towing vehicle should weigh at least twice as much as the towed machine.

9. Exercise extra caution in keeping the towing vehicle and the machine under control when going down long and/or steep grades.

10. Be careful during field and transport operation not to contact trees, power poles, and electrical lines with the machine’s row marker. Electrocution can occur without direct contact.

2.8 TIRE SAFETY

1. 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.

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

3. Have a qualified tire dealer or repair service perform required tire maintenance.

2.9 SAFETY DECALS

1. Keep safety decals clean and legible at all times.

2. Replace missing or illegible safety decals.

3. Replaced parts that displayed a safety decal should also display the current decal.

4. When replacing decals, put the new decal back in the original location.

5. Safety decals are available from your Dealer or the factory.

2.9.1 HOW TO INSTALL SAFETY DECALS:

- Clean and dry the installation area.
- Be sure temperature is above 50°F (10°C).
- Decide on the exact position before you remove the backing paper.
- Remove the smallest portion of the split backing paper.
- Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal in place.
- Pierce small air pockets with a pin and use a piece of decal backing paper to smooth out the decal.

2.7 STORAGE SAFETY

1. Store the unit in an area away from human activity.

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

3. Store the unit in a dry, level area.
2.10 SAFETY DECAL LOCATIONS

The pictures below show the types of safety decals and locations on the equipment. Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area, or particular function related to the areas that require your SAFETY AWARENESS.

• Think SAFETY! Work SAFELY!

A

⚠️ WARNING PRECAUCION ATENTION

ALL DECALS ON THIS MACHINE ARE IN ENGLISH. OBTAIN ACCURATE TRANSLATION PRIOR TO OPERATING THIS MACHINE. FAILURE TO COMPLETELY UNDERSTAND AND COMPLY WITH ALL INSTRUCTIONS MAY RESULT IN SEVERE OR FATAL INJURY.

LAS INSTRUCCIONES QUE APARECEN EN VARIAS PARTES DE ESTA MAQUINA ESTAN IMPRESAS EN IDIOMA INGLES. OBTenga UNA TRADUCCION CORRECTA ANTES DE OPERARLA. ATENTAR SU USO SIN CONOCER SU FUNCIONAMIENTO O NO SEGUIR FIELMENTE LAS INSTRUCCIONES PUEDE CAUSAR HERIDAS GRAVES O MORTALES.

CHACoE INDICE ICI EST EN ANGLAIS. PROCEureZVOUS DES TRANSDUCTIONS EXACTES AVANT D'OPERER CETTE MACHINE. UNE MANQUE DE COMPRENDRE COMPLETEMENT ET DE SE CONFORMER A CHACOe INSTRUCTION PEUT ABOUTIR A UNE BLESSURE SERIEUSE OU FETALE.

Part # 0732-0383-00

B

⚠️ WARNING

Power driven machinery. Can cause severe injury.
Disconnect power before servicing.
Keep hands, feet, clothing away from power driven parts.
Do not run machine until all shields are in place.
Read operator's manual before servicing.

Part # 0732-0231-00

REMEMBER - If safety decals have been damaged, removed, become illegible or parts replaced without safety decals, apply new decals. The manufacturer or an authorized dealer will have new decals available.
2.10 SAFETY DECAL LOCATIONS

The pictures below show the types of safety decals and locations on the equipment. Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area, or particular function related to the areas that require your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

Fig. # 5 Safety decal location

Fig. # 6 Safety decal location (Shown with optional vine blower)

REMEmBER - If safety decals have been damaged, removed, become illegible or parts replaced without safety decals, apply new decals. The manufacturer or an authorized dealer will have new decals available.
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The pictures below show the types of safety decals and locations on the equipment. Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area, or particular function related to the areas that require your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

Figure #7 Safety Decal Location (blower) (Shown with optional vine blower)

Figure #8 Safety Decal Location (Rear, Right Side) (Shown with optional chopper)

Figure #9 Safety Decal Location (Rear, Left Side) (Shown with optional chopper)

WARNING
MOVING BLADES
Can cause severe injury or death.

Shut off tractor and wait for machinery to stop before working in this area.

Part # 0732-0390-00

REMEMBER - If safety decals have been damaged, removed, become illegible or parts replaced without safety decals, apply new decals. The manufacturer or an authorized dealer will have new decals available.
2.10 SAFETY DECAL LOCATIONS

The types of safety decals and locations on the equipment are shown in the pictures below. Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area, or particular function related to the areas that require your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

REMIND - If safety decals have been damaged, removed, become illegible or parts replaced without safety decals, apply new decals. The manufacturer or an authorized dealer will have new decals available.
2.10 SAFETY DECAL LOCATIONS

The pictures below show the types of safety decals and locations on the equipment. Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area, or particular function related to the areas that require your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

![Fig. # 12 Safety decal location](image1)

![Fig. # 13 Safety decal location](image2)

* Decal is located on both sides (Shown with optional EZRoll Table)

![Part # 0732-0434-00](image3)

![Part # 0732-0441-00](image4)

![Part # 0732-0434-00](image5)

WARNING

GUARDS AND SHIELDS REMOVED FOR ILLUSTRATIVE PURPOSES ONLY; DO NOT OPERATE WITHOUT GUARDS AND SHIELDS IN PLACE AND FUNCTIONING.

REMEMBER - If safety decals have been damaged, removed, become illegible or parts replaced without safety decals, apply new decals. The manufacturer or an authorized dealer will have new decals available.
2.10 SAFETY DECAL LOCATIONS

The pictures below show the types of safety decals and locations on the equipment. Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area, or particular function related to the areas that require your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

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- Think SAFETY! Work SAFELY!
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The pictures below show the types of safety decals and locations on the equipment. Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area, or particular function related to the areas that require your SAFETY AWARENESS.

• Think SAFETY! Work SAFELY!

![Fig. # 21 Safety decal location](image1)

![Fig. # 23 Safety decal location](image2)

![Fig. # 22 Safety decal location](image3)

![Fig. # 24 Safety decal location](image4)

REMINDER - If safety decals have been damaged, removed, become illegible or parts replaced without safety decals, apply new decals. The manufacturer or an authorized dealer will have new decals available.
2.10 SAFETY DECAL LOCATIONS

The pictures below show the types of safety decals and locations on the equipment. Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area, or particular function related to the areas that require your SAFETY AWARENESS.

• Think SAFETY! Work SAFELY!

![Fig. # 25 Safety decal location](image1)

![Figure # 26 Safety Decal Location](image2)

![Fig. # 27 Safety decal location](image3)

**CAUTION**

MOVING DRIVES Can cause severe injury.
Shut off power before removing shields.

![Part # 0732-0575-00](image4)

REMEMBER - If safety decals have been damaged, removed, become illegible or parts replaced without safety decals, apply new decals. The manufacturer or an authorized dealer will have new decals available.
2.10 SAFETY DECAL LOCATIONS

The pictures below show the types of safety decals and locations on the equipment. Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area, or particular function related to the areas that require your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

![Fig. # 28 Safety decal location](image1)
![Fig. # 29 Safety decal location](image2)
![Fig. # 30 Safety decal location](image3)
![Fig. # 31 Safety decal location](image4)

**WARNING**

EXPOSED DRIVE Can cause severe injury.
Keep all shields in place while machine is running.

Part # 0732-0512-00

**WARNING**

Guards and shields are removed for illustrative purposes only; do not operate without guards and shields in place and functioning.

REMEMBER - If safety decals have been damaged, removed, become illegible or parts replaced without safety decals, apply new decals. The manufacturer or an authorized dealer will have new decals available.
2.10 SAFETY DECAL LOCATIONS

The pictures below show the types of safety decals and locations on the equipment. Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area, or particular function related to the areas that require your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

**Fig. # 32 Safety decal location**

**Fig. # 33 Safety decal location**

**M**

![Warning decal M](image)

**WARNING**

FLYING OBJECTS
Can cause severe injury.

Keep clear of fan discharge at all times.

Part # 0732-0505-00

**N**

![Warning decal N](image)

**WARNING**

HIGH PRESSURE OIL
Can cause serious injury or death.
Do not go near leaks.
Relieve hydraulic pressure before loosening fittings.
If injured, seek immediate emergency medical help.

Part # 0732-0631-00

REMEMBER - If safety decals have been damaged, removed, become illegible or parts replaced without safety decals, apply new decals. The manufacturer or an authorized dealer will have new decals available.
2.10 SAFETY DECAL LOCATIONS

The pictures below show the types of safety decals and locations on the equipment. Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area, or particular function related to the areas that require your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

REMINDER - If safety decals have been damaged, removed, become illegible or parts replaced without safety decals, apply new decals. The manufacturer or an authorized dealer will have new decals available.
2.11 REFLECTOR LOCATIONS

The pictures below show types of reflectors and locations on the equipment. The owner is responsible to know the lighting and marking requirements of the highways used and to install and maintain the equipment to provide compliance with the applicable regulations. Add extra lights and or use escort vehicles when transporting during periods of limited visibility.

Fig. # 36 Safety Reflector location

Fig. # 37 Safety Reflector location

Fig. # 38 Safety Reflector location

Fig. # 39 Safety Reflector location

Part # 0732-0092-00 (amber)

Part # 0733-0034-00

REMEMBER - If reflectors have been damaged, removed, become illegible or parts replaced without safety reflectors, new reflectors must be applied. New reflectors are available from the manufacturer or an authorized dealer.
2.11 REFLECTOR LOCATIONS

The pictures below show types of reflectors and locations on the equipment. The owner is responsible to know the lighting and marking requirements of the highways used and to install and maintain the equipment to provide compliance with the applicable regulations. Add extra lights and or use escort vehicles when transporting during periods of limited visibility.

![Figure #40 Safety Reflector Location](image1)
![Figure #41 Safety Reflector Location](image2)
![Figure #42 Safety Reflector Location](image3)
![Figure #43 Safety Reflector Location](image4)

**Part # 0732-0092-00 (amber)**

REMEMBER - If reflectors have been damaged, removed, become illegible or parts replaced without safety reflectors, new reflectors must be applied. New reflectors are available from the manufacturer or an authorized dealer.
2.11 REFLECTOR LOCATIONS

The pictures below show types of reflectors and locations on the equipment. The owner is responsible to know the lighting and marking requirements of the highways used and to install and maintain the equipment to provide compliance with the applicable regulations. Add extra lights and or use escort vehicles when transporting during periods of limited visibility.

![Figure # 44 Safety Reflector Location](image)

![Figure # 45 Safety Reflector Location](image)

**WARNING**

Guards and shields are removed for illustrative purposes only; do not operate without guards and shields in place and functioning.

**Part # 0732-0092-00 (amber)**

REMEMBER - If reflectors have been damaged, removed, become illegible or parts replaced without safety reflectors, new reflectors must be applied. New reflectors are available from the manufacturer or an authorized dealer.
2.11 REFLECTOR LOCATIONS

The pictures below show types of reflectors and locations on the equipment. The owner is responsible to know the lighting and marking requirements of the highways used and to install and maintain the equipment to provide compliance with the applicable regulations. Add extra lights and or use escort vehicles when transporting during periods of limited visibility.

![Figure # 46 Safety Reflector location (back of boom)](image)

![Figure # 48 Safety Reflector location](image)

![Figure # 47 Safety Reflector location (back left side)](image)

![Figure # 49 Safety Reflector Location](image)

Part # 0732-0093-00 (red)

Part # 0732-0094-00 (orange)

REMEMBER - If reflectors have been damaged, removed, become illegible or parts replaced without safety reflectors, new reflectors must be applied. New reflectors are available from the manufacturer or an authorized dealer.
Lockwood follows the general Safety Standards specified by the American Society of Agricultural Engineers (ASAE) and the Occupational Safety and Health Administration (OSHA). Anyone who will operate and/or maintain the equipment must read and clearly understand ALL Safety, Operating and Maintenance information presented in this manual.

Do not operate or allow anyone else to operate this equipment until after reviewing the provided information. Annually review this information before the season start-up.

Make these periodic reviews of SAFETY and OPERATION a standard practice for all of your equipment. An untrained operator does not qualify to operate this machine.

A sign-off sheet is provided for your record keeping to show that all personnel who will work with the equipment have read and understood the information in the Operator’s Manual and have been instructed in the operation of the equipment.

### SIGN-OFF FORM

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3.0 OPERATION

3.1 TO THE NEW OPERATOR OR OWNER

The Lockwood Potato Harvester efficiently and rapidly harvests potatoes. The tractor PTO and hydraulics provide the power. Be familiar with the machine before starting.

The owner/operator is responsible to read this manual and to train all other operators before they start working with the machine. In addition to the design and configuration of equipment, hazard control and accident prevention depend upon the awareness, concern, and prudence of personnel involved in the operation, transport, maintenance and storage of equipment or in the use and maintenance of facilities.

Follow all safety instructions exactly. Safety is everyone’s business. Following recommended procedures will provide a safe working environment for the operator, bystanders and the area around the work site. Untrained operators do not qualify to operate the machine.

Many features incorporated into this machine come from suggestions made by customers like you. Read this manual carefully to learn how to operate the machine safely and how to set it to provide maximum efficiency. By following the operating instructions in conjunction with a good maintenance program, your Lockwood Potato Harvester will provide many years of trouble-free service.

3.2 PRE-OPERATION CHECKLIST

Efficient and safe operation of the Lockwood Potato Harvester requires that each operator reads and understands the operating procedures and all related safety precautions outlined in this section. This manual provides a pre-operation checklist for the operator. To maintain personal safety and a good mechanical condition, follow this checklist.

Before operating the harvester and each time thereafter, check off the following areas:

1. Service the machine per the schedule outlined in the Maintenance section.
2. Use only a tractor of adequate power and specifications to operate the harvester.
3. Check that all guards are installed, secured and functioning as intended. Do not operate with missing or damaged shields.
4. Ensure that the machine properly attaches to the tractor and that mechanical retainers, such as Klik pins, are installed.
5. Check the drives for entangled material.
6. Check the chains and sprockets for proper tension and alignment. Adjust as required.
7. Visually inspect the hydraulic system for leakage, loose fittings, and damaged hoses. Tighten fittings, replace damaged components and wipe up leaked or excess hydraulic fluid.
3.3 MACHINE COMPONENTS

The Lockwood Potato Harvester uses the digger nose and blades to bring the potatoes up from the ground and deliver them onto the primary belted chain. Then potatoes and vines move to the secondary belted chain and the override belted chain. At this point the override belted chain separates the vines from the potatoes. The potatoes then move to the rear cross conveyor by the secondary belted chain and the vines exit out the back of the machine. The rear cross belted chain carries the potatoes to the side elevator. The potatoes then convey by the side elevator upward onto the picking table bulk boom and into the receiving truck box.

A. Main Frame
B. Digger Nose
C. Coulter
D. Primary Belted Chain
E. Secondary Belted Chain
F. Override Belted Chain
G. Fan, Vine Blower (Optional Equipment)
H. Side Elevator
I. Bulk Boom
J. Rear Cross Conveyor
K. Dirt Elimination Options:
   EZ-Roll Table (Shown)
L. Snapper Rollers (Not Shown)
M. Vine Chopper (Optional Equipment)
N. Shaker (Optional)
### 3.4 INITIAL OPERATING PROCEDURE

Although no operational restrictions exist for the Lockwood Potato Harvester when used for the first time, Lockwood recommends that the following mechanical items be checked:

#### 3.4.1 PRE-START INSPECTION

1. Read the Operator’s Manuals.
2. Tighten wheel bolts to (5/8) 125-140 ft-lbs. torque and (3/4) 200-250 ft-lbs torque.
3. Check tires and inflate to their specified pressure.
4. No hydraulic lines and electrical harnesses should contact moving parts. Clip, tape or tie all components securely in place.
5. Check that all guards are installed and secured.
6. Install and tighten all required nuts and bolts to their specified torque.

#### 3.4.2 AFTER OPERATING FOR 2 HOURS

1. Re-torque all the wheel bolts.
2. Re-torque all other fasteners and hardware.
3. Check that all safety decals are installed and legible. Apply new decals if required.
4. Check for any pinched, crimped or rubbing hoses. Reroute as required.
5. Check that the wiring harness is not being pinched, crimped or rubbing. Reroute as required.
6. Check the tension and alignment of all drive chains. Adjust as required.

#### 3.4.3 AFTER OPERATING FOR 10 HOURS:

1. Re-torque all wheel bolts, fasteners and hardware.
2. Check that all guards are installed, secured and functioning as intended. Do not operate with missing or damaged shields.
3. Check safety decals. Install new ones if required.
4. Check the routing of hydraulic lines and the wiring harness. Reroute as required to prevent pinching, crimping, binding, or rubbing.
5. Go to the normal servicing and maintenance schedule as defined in the Maintenance Section.
All operators should review this section of the manual to familiarize themselves with the location and function of all machine controls before starting. Some machines may vary slightly due to custom or optional features.

1. Electrical controls: (Refer to Fig. #52 for the label designations of the following descriptions).

   A. Moves both right and left coulters simultaneously or down. (See fig. #51).

   B. Moves left coulter up or down.

   C. Moves right coulter up or down.

   D. Moves outer boom up or down. (See Fig. #53).

   E. Moves inner boom up or down.

   F. Moves boom to folded position. (Used when transporting only).
3.5 CONTROLS

G. Moves both right and left side of the digger nose simultaneously up or down. (See Fig. # 54).

H. Moves the left side of the digger nose up or down.

I. Moves the right side of the digger nose up or down.

J. This feature changes the steering of the rear harvester wheels to left and right. (See Fig. # 55) The harvester also has an option available that will allow the steering to automatically return to the center position.

K. Moves the EZ-Roll table up or down. (optional equipment). (See Fig. # 57)

NOTE

Steering indicator is not used when equipped with optional return to center steering.

* The toggle marked with the letter “K” may be used for a variety of available options.
3.6 OPERATING

3.6.1 ATTACHING IMPLEMENT TO TRACTOR

Always place the Lockwood Harvester on a hard, dry surface, free of obstacles and debris. When ATTACHING the machine to the tractor, follow this procedure.

1. Clear the area of bystanders, especially small children.

2. Make sure enough clearance exists from obstacles to safely back up to the harvester.

3. Back the tractor up slowly aligning the pintle hitch of the harvester with the tractor drawbar.

4. Jack up the hitch to clear the tractor drawbar.

5. Connect pintle hitch of the harvester to tractor and secure with appropriate hardware.

6. Check the level across the harvester’s main frame.

**WARNING**

Heavy tongue weight can cause severe injury or death. Support the jack and tongue securely. Approximate tongue weight is 10,000 lbs. Refer to tractor manual for drawbar ratings, and follow tractor manufacturer recommendations if drawbar needs additional support.

**IMPORTANT**

For maximum efficiency, level the machine during operation.

7. If the harvester does not sit level, disconnect the harvester from the tractor and adjust the pintle up or down. (Fig. #58).

8. Clean and grease the PTO shaft of the tractor and the implement end of the driveline input connection.

9. Connect the driveline (See Fig. #59) to the tractor by rotating the locking collar and simultaneously pushing the driveline onto the tractor PTO shaft. Properly attach the implement end of the driveline to the harvester and tighten all bolts to their specified torque.

**NOTE**

Check shaft articulation and clearance zone! Joint articulation of more than 70 to 80 degrees leads to damage. Contact between implement input driveline and tractor or implement (e.g. three-point hitch, drawbar, hitch pin, jacks, etc.) leads to damage. Do not use tractors that have a PTO connection point that does not allow the implement input driveline to articulate fully without interference.

**WARNING**

Check the length of the telescoping members to insure the driveline will not bottom out or separate when turning and/or traveling over rough terrain. The implement manufacturer should only modify the length of the implement input driveline.
### 3.6 OPERATING

#### 3.6.1 ATTACHING IMPLEMENT TO TRACTOR (CONT’D)

10. Route and connect the hydraulic lines of the harvester to the tractor. Attach the main control valve and lines to the tractor. (Check the tractor operator’s manual or ask your dealer for information on hookup to the tractor’s hydraulic system.)

11. Mount the electric control box in the tractor cab.

12. Route and connect wiring harness from the harvester to the electronic control box in the tractor cab.

13. Plug control box power cord into auxiliary power port in tractor.

14. Start the tractor, activate hydraulic control valve then operate all control switches to activate each hydraulic system. Extend each cylinder to its maximum length. Check the tractor hydraulic reservoir to replenish the hydraulic oil.

15. Raise and lower the machine a few times to be sure everything is secure, tight, and functioning.

#### 3.6.2 UNHOOKING IMPLEMENT FROM TRACTOR

When UNHOOKING the machine from the tractor, follow this procedure.

1. Clear the area of bystanders, especially small children.

2. Select a level, dry area, free of debris.

3. Position the machine in the location desired.

4. Shut down tractor and relieve the pressure in all hydraulic circuits.

5. Disconnect power leads from electrical boxes.


7. Disconnect all hydraulic lines from the tractor and stow on the hitch. Be sure the ends remain clean and undamaged.

8. Disconnect PTO (See Fig. #60) by rotating the locking collar and simultaneously pulling implement input driveline off of the PTO shaft.


10. Place blocks or a stand under the front of the hitch for support.

### WARNING

Place all controls in neutral or off, stop tractor engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, unhooking, attaching, repairing, or unplugging.

### NOTE

This harvester control valve can be configured to operate as closed center or open center hydraulics. You can change the control valve by changing the cartridge and plug in the valve stack. See decal under valve stack cover for instructions. For most tractors and harvesters with motors, set the valve stack for open center, and set the flow to the valve stack between 2 to 3 gpm. Ask your dealer for instructions.

### IMPORTANT

When engaging or disengaging the PTO, place engine at low idle speed.

---

**Fig. #60 Unhooking PTO**
3.7 TRANSPORTING

The Lockwood Potato Harvesters can easily and conveniently be moved from location to location. When transporting the machine, review and follow these instructions:

### 3.7.1 TRANSPORTING THE HARVESTER

When transporting the machine, follow this procedure:

1. Attach the harvester to the tractor by following the procedure in section 3.6 of the manual.
2. Fold the bulk boom. See section 3.16.
3. Raise the coulters and digger nose.
4. Turn off all hydraulic valves supplying oil to the harvester and unplug control box.
5. Follow procedure for towing equipment outlined in the tractor’s owners manual. Towing speed of the harvester should not exceed 10 mph.

**WARNING**

Be careful during field and transport operation not to contact trees, power poles, and electrical lines with the machine’s blower. Electrocution can occur without direct contact.

### 3.8 DIGGING

The nose and the belted chains have been designed to do the most efficient lifting of any machine in the industry. If necessary, you can make fine adjustments to provide for an efficient harvest.

#### 3.8.1 DIGGER NOSE

Adjust digger nose height (See Fig. #61) by:

A. Relocating the links of the chain on each side of the digger nose.
B. Bolting the plate onto either of the three adjusting holes.

The electronic control panel in the tractor cab adjusts the digger nose.

**CAUTION**

If the nose is adjusted too high, the sides of the nose will hit the harvester frame and cause damage.

<table>
<thead>
<tr>
<th>Travel Speed</th>
<th>Weight of fully equipped or loaded implement(s) relative to weight of towing machine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 10 M.P.H. (16 km/h)</td>
<td>2 to 1, or less</td>
</tr>
<tr>
<td>Do not tow</td>
<td>More than 2 to 1</td>
</tr>
</tbody>
</table>

*Table #1 weight ratio to road speed*

**Fig. #61 Digger Nose Assembly**
3.8 DIGGING

3.8.2 DIGGER BLADE

Blade angle can be changed by loosening the rear bolt of the blade mounting brackets and moving the bolts up or down in one of the holes in the frame (See Figure #62).

Types of Digger blades:
Digger blades are available in narrow and wide digger nose. The narrow digger nose is used with row widths of 32” - 34” and the wide digger nose is used with row widths of 36” - 40”.

A. Semi point blades (See Fig. #63):
This blade works best in sandy or light soil without clods. At the proper digging depth, the blade must cut slightly deeper than the belted chain’s position otherwise, excessive wear will occur on the primary belted chains and rollers. The blade’s pitch should be steep enough not to allow the potatoes to come in contact with the chain until they are carried away.

B. Semi point blade with rod (rock blades) (See Fig. #64): Use this blade in sandy or light soil where rocks may be present. This blade has a wedge on the back edge that pushes rocks down, diverting them from the belted chain as it cycles around the front rollers.

C. Clod blades (See Fig. #65):
This blade works best in heavier soil that may produce clods on the harvester belted chains. Unlike the semi point blades, the clod blade is not sharp at the point but has a 1” bar at the front edge of the blade. This blade breaks the soil and will not leave large clods going up the digger bed. Instead, the blade breaks the large clods into more manageable smaller clods.

E. Combination blades (See Fig. #66):
The harvester can use combination blades in a variety of soil conditions, except light sandy soil. Combination blades have a scoop in the middle of the row where potatoes are present. This scoop harvests all of the potatoes, but doesn’t promote digging excess soil between rows.
3.8 DIGGING (CONT’D)

3.8.3 NOSE ROLLERS

The nose rollers located at the forward end of the primary belted chain can be adjusted up or down and forward or backward by placing the nose roller bolt in the proper holes in the digger frame (see Figure # 67). Make adjustments as needed to change the nose roller position in relation to the digger blades to meet varying soil conditions.

In loose soils, if the nose roller is set too high (See Fig. #68), the primary belted chain will push the soil forward and expose the potatoes to the chain. The top of the blade should be in line with the primary belted chain.

Properly adjusted (See Fig. #70), the digger blades will clear soil away from the front of the primary belted chains. As the blade wears, adjust the nose rollers upward to a new setting to restore proper ground clearance with the blades. This gives you the advantage of longer service life of the digger blades.

For the most effective action in heavy soil, set the nose rollers slightly above the center line of the blades. This raises the soil as it passes over the blade onto the primary belted chain, causing a disintegrating action that begins soil breakup and separation. Use the six holes located on the digger frame when making this adjustment (see Figure #67).

Assuming the blade angle and nose roller relationship is correct, too much sag in the return side of the primary belted chain can cause feed problems (See Fig. #69). Too much sag causes the primary belted chain to drag along the ground, pulling soil back under the nose roller. The entry of this soil into the crop flow pattern causes an obstruction. Dragging the primary belted chain on the ground also greatly reduces chain life.
3.9 COULTERS

The coulters can be set on either side of the digger nose and nose wing. Three different types of blades are available. Larger diameter coulters help prevent boil out.

1) 24" notched coulters: These coulters work well in firm soil to cut vines that may wrap around the digger nose wings (see Figure #71).

2) 24" and 27" waffle coulters: These work best in sandy soil where the coulter may not turn as easily in the soil. The waffle coulter, however, cannot run as close to the nose wing as the straight coulter, increasing the chance of wrapping (see Figure #72).

3) 24" Straight Coulter: The straight coulter is an all purpose coulter. The coulter will work in any soil type (see Figure #73).

The coulters are raised with 2 hydraulic cylinders and can be raised simultaneously or individually.

**NOTE**

Raise the coulters before turning.

**Coulter Adjustment**

The mounted coulters have heavy springs that allow adjustment (See Fig. #74) for the coulter to cross over stones without causing harm to the disc or mounting frames.

To provide more downward pressure: Loosen the jam nut and tighten the adjustment nut.

To provide less downward pressure: Loosen the jam nut and loosen the adjustment nut.

After adding pressure to the coulters, raise them with the hydraulics using the UP switch on the control box. Be careful as you near the top of the cycle to be sure the coulter disc is not hitting the main frame of the harvester. If the disc hits the frame, lower it using the adjusting nut to a position that does not allow it to hit the frame.

After positioning the coulters, check the length of the shaft. The excess shaft could snag and drag vines from the next row. If desired the excess shaft length can be cut off to avoid dragging vines.

![Fig. #74 Coulter adjustment](image)

The coulters serve 3 main functions:

1. Cutting the vines to prevent wrapping on the front edge of the wing.

2. Cutting the soil profile to help funnel material into the digger nose.

3. Prevent drifting on hills.

![Fig. #71 Notched Coulter](image)

![Fig. #72 Waffle Coulter](image)

![Fig. #73 Straight Coulter](image)
3.10 PRIMARY BELTED CHAINS

The primary belted chain is located in the digger section of the harvester (See Fig. #75). The belted chain is either full width or split and is made up of ½” (13mm) rods. The rod comes in various patterns and pitches designed for different soil conditions.

See Section 6.2 for rod and pattern recommendations.

3.11 SECONDARY BELTED CHAINS

The digger (primary) section of the harvester places the potatoes on the override and secondary belted chains (See Fig. #76). The potato has a small drop from the digger section of the harvester to the secondary belted chain. A rubber cushion on the override and secondary belted chains prevent the potatoes from bruising.

The secondary belted chain carries potatoes onto the rear cross conveyor.

If excess dirt exists, have the rollers positioned so that they are touching the rods, as opposed to underneath the belt. This shakes the belted chain and allows excess dirt to fall through the belted chain, without damaging the potatoes.

Secondary Belted Chain Side Elevator Blower Option

The secondary belted chain discharges to two locations. One half of the belted chain discharges to the front of the rear cross conveyor and the other to the rear. This allows the potatoes to spread out on the rear cross conveyor.

Secondary Belted Chain Blower Option

With the vine blower option the secondary belted chains discharge only to the front of the rear cross conveyor.
3.12 OVERRIDE BELTED CHAIN

The override belted chain (See Fig. #77) carries the vines and trash through the harvester onto the ground at the rear of the harvester. The optional snap rollers are designed to pull the clinging potatoes from the vines. The override belted chain runs above the secondary belted chain.

### NOTE
Never allow the override chain to run too close to the ground. This causes vine rolling.

![Override Belted Chain](Fig.#77 Override Belted Chain)

3.13 REAR CROSS CONVEYOR

**WARNING**

Never attempt to clean a running machine.

The rear cross conveyor (See Fig. #78) transports the potatoes to the side elevator.

The front and back of the rear cross is adjustable up and down to allow the potatoes to roll and spread out evenly.

![Rear Cross Conveyor](Fig.#78 Rear Cross Conveyor)

### NOTE
To prevent buildup of trash and dirt on the fenders, adjust the override carry back roller so that the chain just clears the fender.

The rear cross conveyor has two options that place potatoes onto the side elevator. A description of each option follows:

**Spreader Rollers**

This option distributes the potatoes more evenly onto the side elevator.

**Extended Headshaft**

This option distributes the potatoes into the center of the side elevator.
3.14 SIDE ELEVATOR

Side Elevator Tilt:

The side elevator serves as a conveyor to move the potatoes from the rear of the machine, up the side to the picking table. The side elevator has a tilt adjustment to spread the potatoes apart. The rear cross conveyor will place the potatoes in the side elevator. To avoid roll and bruising, the tilt should be minimal.

To adjust the tilt, loosen the locknut, twist the turnbuckle to the desired tilt, and then retighten the locknut. (See Fig. # 79).

Side Elevator Inlet Section Tilt:

Adjust the side elevator inlet section tilt by tightening or loosening the connecting bolt between the inlet section and the side elevator frame (See Fig. # 80). The adjustment helps to keep the drop from the rear cross conveyor as small as possible.

Side Elevator Inside Mount:

The inside adjustment of the side elevator allows adjustment of the side elevator chain as close as possible to the rear cross conveyor allowing minimal drop of potatoes from the rear cross conveyor onto the side elevator. (See Fig. # 81).

To adjust, support the side elevator externally, and move the mount bracket to different holes.
3.15 PICKING TABLE

After passing over the dirt eliminating devices, the side elevator delivers the potatoes to the picking table. The potatoes spread evenly over this area for final inspection before proceeding up the boom to the truck (see Figure #83).

3.16 BULK BOOM

Lockwood harvesters come equipped with a 2 stage boom that allows the operator to place the potatoes in the bottom of the bulk box with very little drop. The boom allows for topping off the load with very little roll back. The machines also come equipped with a fold function for transport. To fold for transport, raise the outer boom to its maximum height. Next, raise the inner boom to its maximum height. Now operate the fold control. When the boom reaches the straight up point, make sure slack exists in the chain before lowering it completely onto the picking table. The chain could be damaged if no slack or very little slack exists in the chain. Pull the connector pin out of the chain if necessary.

NOTE

While folding the boom to the transporting position, have someone watch for clearance of the hydraulic hoses and the chain for slack.
3.17 OPTIONS

Optional equipment is available for your Lockwood Potato Harvester, call your nearest dealer for availability information.

3.17.1 VINE CHOPPER

The vine chopper (See Fig. # 84) mounts on the rear of the harvester and shreds heavy trash and vines. The lifting action of the rotor picks the vines off the override belted chain and cuts them. For more aggressive shredding, install stationary knives into the back of the chopper. Adding stationary knives will increase chopping but will also increase the power required to operate the chopper. The vine chopper reduces blowing of heavy vines into undug rows, vine wrap on truck drive lines, and the “on harvester” unit can eliminate one tractor and disk operation. The even distribution of chopped vines helps eliminate chemical residue carryover and spread of disease because they are not bunched and will decompose faster. The components are designed for long life with heat-treated flails running on hardened bushings. The drive line powers the vine chopper with an overrunning clutch and belt drive. The clutch will “free wheel” when you disengage the tractor PTO. The clutch will pick up smoothly and in combination with the belt drive, eliminate shock loads to the drive assembly. The balanced rotor eliminates vibration during operation. The desired operating speed of rotation of the vine chopper is 1150 R.P.M.

3.17.2 SNAP ROLLERS

Snap rollers are available to help remove potatoes from green vines. The assembly consists of two rollers with the override belted chain running between them. The snap rollers are mounted on a hinged frame allowing the heavy foliage to pass between the rollers.

The top roller pushes the potato down where it pinches from the vine (See Fig. #86). The vine then travels between the two rollers and the potato falls onto the rear cross conveyor. The top rollers have adjusters that can raise them off the override belted chain when digging in dead vine crops. If the roller is not needed to remove potatoes, position it all the way up, out of the way of the vines.

DANGER

Do not enter the vine chopper attachment while the tractor is running. Serious injury or death could result.
3.17 OPTIONS

3.17.2 SNAP ROLLERS (CONT’D)

Snap Roller Adjustment
In order to operate most efficiently, position the upper snap roller near the top of the override belted chain (See Fig. #87). Adjust the position of the upper snap roller by moving the take-up strap or adjusting bolt, to various positions in the chain clip and frame. Lower the roller so that enough pressure is on the override belted chain to make the snap roller turn. To raise the upper snap roller, loosen the bottom nut on the strap clip while tightening the top nut, or move the clip to a different location on the strap.

Figure #88 Manual Hydraulic Shaker

3.17.3 SHAKERS

The harvester can use shakers in the digger section. The crop should lose eighty percent of the dirt in the digger section. The following types of shakers are available.

Hydraulic adjustable manual shakers:

Hydraulic adjustable manual shakers (See Fig. #88) implement a 3 or 4 prong shaker attachment connected to a hydraulic cylinder.

Manual Shaker Adjustment:

When the operator moves the switch on the control box, the hydraulic cylinder extends or retracts and an eccentric raises or lowers the shakers for more or less shake. This type of shaker bounces the potato and will cause damage to the potato if the operator does not use caution.

Oscillating shakers:

Oscillating shakers (See Fig.#89) are a more bruise-free method of separating dirt from potatoes. With the oscillating shakers a hydraulic motor rocks a shaft with rollers on it. This produces a frequency in the belted chain that is used to break up the soil while not bouncing the potatoes. Run the shaker only as fast as necessary, as damage to the potatoes will occur with excess speed.

Figure #89 Oscillating Shaker

Oscillating Shaker Adjustment:

The oscillating shaker is controlled by a wide variety of adjustments. The main adjustment is the speed of the hydraulic motor. You can equip the harvester with an optional hydraulic flow control to change the speed of the shakers with the control box.

If the harvester is not equipped with an optional speed control, the shaker may operate from the remote valve of the tractor. The flow control in the tractor adjusts the shaker speed. More oil flow to the shaker motor provides a higher frequency of agitation, while less oil flow provides lower frequency for more aggressive agitation.
3.17 OPTIONS (CONT’D)

3.17.3 SHAKERS (CONT’D)

Oscillating shakers (cont’d):
Also, the shaker can be adjusted by changing the stroke of the shaker (See Fig. #90). This is adjusted by placing the shaker in the various stroke adjustment holes.

Adjust the shaker to run parallel with the primary belted chain using the centering adjustment (See Fig. #90), otherwise the shaker will not be used to maximum efficiency.

Hydraulic single shaft shakers:
With the hydraulic single shaft shakers, a hydraulic motor turns a shaft with rollers on it. This produces a high frequency that breaks up the soil while not bouncing the potatoes. The shaft can be raised or lowered from each side of the nose by adjusting the take-up bolt. Raising the shaft increases dirt removal. Run the shaft speed only as high as necessary, as damage to the potatoes will occur with excess speed. The speed of the motor can be controlled from the operator control box, or the tractor flow control.

Turning the shaker shaft in the same direction of the primary chain produces less bruise and more separation. Turning the shaker shaft in the opposite direction of the primary chain will provide more separation but can increase bruise.

2. To lower the shaker shaft, turn the upper jam nut counter-clockwise until you have reached the desired height. Then tighten the lower jam nut to its specified torque.

If the harvester is not equipped with an optional speed control, operate the shaker from the remote valve of the tractor with a flow control valve. More oil flow to the shaker motor provides a higher frequency of agitation, while less oil flow provides lower frequency for more aggressive agitation.

To adjust the shaker (See Fig. #91) follow this procedure.

1. To raise the shaker shaft, loosen the lower jam nut, turn the upper jam nut clockwise until you have reached the desired height. Then tighten lower jam nut to its specified torque.
3.17 OPTIONS

3.17.4 CLEANING TABLES

**EZ Roll Table:**

The EZ Roll Table is installed at the top of the side elevator and provides a series of counter rotating rollers. Different styles and size of steel and rubber rollers are optionally available. The EZ Roll table works best in conditions with clods.

During operation, the EZ Roll table (See Fig. #93) has adjustments to meet varying field conditions. These adjustments include fingertip speed control of the cleaning rollers and incline angle at which the best separation occurs. The EZ Roll table is hydraulically driven utilizing the tractor hydraulic system. The speed at which the cleaning rollers run has a direct relationship to its cleaning ability. The flow control valve on the tractor controls the cleaning roller speed. The hydraulic cylinder controls the incline of the table from a 3 degree downward tilt to approximately 10 degree downward tilt. The operator controls the table’s roller speed and incline angle that will produce optimum cleaning efficiency.

The EZ Roll table works best in mature round variety potatoes with the vines killed prior to harvest, which allows the skin to toughen. The table works best with heavy soils that tend to form clods. Supplementary irrigation is advisable if available to pre-condition the soil for easy breakup. The EZ Roll table installs into the tractor hydraulic system. To insure proper application, consult the manufacturer’s specifications of the tractor model used.

**Star Table:**

The star table cleaning device (See Fig. #94) is installed at the top of the side elevator and provides a series of soft rubber finger rollers for trash and clod removal. This table works well when used in trashy, cloddy conditions where the soils are sticky to sandy. The star table will remove dirt, small clods and trash.

The interlocking stars clean themselves in most conditions. Several adjustments are available to enhance the cleaning capability of the star table. To remove materials, adjust spacing between the stars. Loosen the idler sprockets on the drive chain. Locate the square bolt at the end of the star table frame. Using a 5/8" wrench, turn the square bolt to adjust the stars. Turning it clockwise will spread the stars out. Turning it counter-clockwise will allow the stars to close together. Both sides should be adjusted evenly. After adjusting the stars, reset the idlers so the drive chain is the correct tension.
Ellis Table:
The Ellis Table (See Fig. # 95) is mounted at the discharge end of the side elevator and is intended for use in stony or loose dirt conditions. The table features adjustable steel and star rollers. With the rollers spaced apart, small, especially flat stones and soil will separate from the potatoes. The greater the gap, the more small stones will fall through. The steel rollers also feature scrapers that clean the rollers to keep them running free from dirt. The table is powered by a hydraulic motor that is connected into one of the tractor ports. The table becomes more aggressive by slowing the speed. Refer to your tractor’s operators manual for how to adjust the flow of oil from the tractor through the external hydraulic ports.

Adjustment:
Adjust the Ellis Table rollers with the bolts on the rear of the table. Each roller has an adjustment of .5 inches.

Turning the screw increases or decreases the gap between the rubber roller and the steel roller ahead of it. Adjust both sides evenly.

The Ellis table is hydraulically driven. The speed of the table rollers can be adjusted by providing more or less oil flow to the table.

Reverse Roll Table:
The reverse roll table mounted at the discharge end of the side elevator is a very effective option for removing dirt, clods, small stones and trash such as vines and grasses. The table is powered by a hydraulic motor that is connected into one of the tractor ports. The table becomes more aggressive by slowing the speed. Refer to your tractor’s operators manual for how to adjust the flow of oil from the tractor through the external hydraulic ports. The inlet end of the table is adjustable up and down hydraulically with a toggle switch located on the control box in the tractor cab. Lowering the table will make it more aggressive for better cleaning while raising the table will allow the product to pass over the rollers faster with less chance to clean but less chance to skin early potatoes.

The reverse steel rollers are adjustable back and forth with the bolt adjustment on either side of the unit. The reverse steel rollers are also adjustable up and down by using the rod adjustment on top of the unit. When operating in heavy trash and grass conditions you may have plugging between the reverse roll and star roll, if this happens stop the tractor and PTO. Reverse the direction the rolls turn by reversing the control lever that operates the tractor valve. Just a few turns back and forth should clean out the plug. Different types of reverse rollers shafts are available; consult your local Lockwood dealer.

There are other small adjustments that can be made to the table in extreme conditions. Contact your Lockwood dealer for more information.
3.17 OPTIONS

3.17.5 VINE BLOWER (REAR)

The blower (See Fig. #97) eliminates vines and trash that have fallen through the override belted chain. The air discharge orifice sits between the secondary belted chain and the rear cross conveyor. As the material transfers from the secondary belted chain to the rear cross conveyor, the air volume and air velocity created by the fan blows the small trash and vines out through the override belted chain. In order to have maximum efficiency in vine and trash elimination, the secondary belted chain to rear cross conveyor transfer point should separate the majority of the soil.

Adjust the air manifold of the blower so that the top of the manifold sits as close to the secondary belted chain as possible. Also, the top surface should be as steep as possible.

To adjust the manifold, loosen the manifold mount bolts and clamp strap. Position the manifold as needed and retighten bolts and clamp (See Figure #98).

3.17.6 SHAFT MONITOR

A rear cross shaft monitor is available to put on the rear cross conveyor drive. This monitor alerts the operator when the rear cross conveyor stalls and shuts down the drive before the build up causes major problems. When the alarm sounds, shut down and check the following:

1) Check the belted chain for foreign objects lodged in it.
2) Check for a broken, loose or slipping belted chain drive.

Fig. #99 Shaft sensor

Operation Of Shaft Monitor

The monitor has 12 buttons. With the base monitor only channel 1 and 2 are used. The top six buttons are independent RPM channels for up to six different shafts. The bottom six buttons are used for control or calibration. Further information is given below.

The monitor comes preprogrammed with the following values (channels 3 to 6 are deactivated):

<table>
<thead>
<tr>
<th>Channel</th>
<th>HI ALARM</th>
<th>LOW ALARM</th>
<th>CAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel 1 (PTO)</td>
<td>1170</td>
<td>500</td>
<td>1</td>
</tr>
<tr>
<td>Channel 2 (Rear Cross)</td>
<td>150</td>
<td>63</td>
<td>2</td>
</tr>
</tbody>
</table>

Channel Buttons

The Tachometer has six independent channels labeled 1, 2, 3, 4, 5 and 6. To select a channel, press the desired channel button. When selected, the red indicator light above the channel button will light-up.
3.17 OPTIONS

3.17.6 SHAFT MONITOR (CONT’D)

Only one channel can be displayed on the screen, but each channel is continually monitored. During normal operation, only the light above the displayed channel button will be on.

If a HI ALARM or LOW ALARM occurs, the light above the alarming channel button will begin to flash. An audible alarm will accompany the flashing light. After about 10 seconds, the audible alarm stops, but the channel light will continue flashing.

When the HI ALARM, LOW ALARM, or CAL button is selected, the Power button does not work. To complete any calibration, press any of the channel buttons.

HI Alarm Button

The HI ALARM button is used to calibrate the maximum RPM alarm set points for each channel.

To set the HI ALARM, press the HI ALARM button and use the Plus and Minus buttons to set the desired value. Once selected, the red indicator light above the HI ALARM button and the selected channel button will light-up. Set the HI ALARM value to an RPM just above the normal operating RPM.

Low Alarm Button

The LOW ALARM button is used to calibrate the minimum RPM alarm set points for each channel.

To set the LOW ALARM, press the LOW ALARM button and use the Plus and Minus buttons to set the desired value. Once selected, the red indicator light above the LOW ALARM button and the selected channel button will light-up. Set the LOW ALARM value to an RPM just below the normal operating RPM.

Note: The low alarm will stop when channel one (the PTO) stops.

Cal Button

The CAL button is used to set the number of target passes in one revolution.

To program the CAL value, press the CAL button and use the Plus and Minus buttons to set the desired value. The number represents the number of pickups used to calculate the shaft speed. For example, if a single key is used the call number would be “1.” If the teeth on a 12 tooth sprocket is used, the cal number would be 12. Setting the cal number to zero will deactivate the channel. Once selected, the red indicator light above the CAL button and the selected channel button will light-up.

Power Button

The Power button is used to turn off the Tachometer. Pressing any button turns on the Tachometer. The Power button will not operate when the HI ALARM, LOW ALARM or CAL buttons are selected. Only the Tachometer turns-off. All the sensors and the Splitter Box will remain powered.

Splitter Box

The six sensor inputs of the Splitter Box are labeled 1 to 6. The number above the sensor input identifies the monitor channel assigned to that sensor input. For example, if a Shaft sensor was plugged into sensor input number 4, the RPM detected by that Shaft sensor would be displayed on Channel 4.

Testing the Installation

It is recommended to check the Tachometer installation before starting. Turn on the Tachometer. Check that the Splitter Box and Shaft sensor power lights are on.

To test a Shaft sensor, repeatedly pass a spare magnet across the end of the Shaft sensor. This will display a RPM on the corresponding Tachometer channel.
3.18 SLIP CLUTCHES

A slip clutch protects the primary, secondary, and override conveyors on the harvester. The factory assembles these clutches and you **MUST** adjust them in the field to meet load conditions.

**WARNING**

Place all controls in neutral or off, stop tractor engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, unhooking, attaching, repairing, or unplugging.

**WARNING**

Failure to properly adjust the clutches can cause downtime due to broken chains or cause serious injury.

To adjust the slip clutch, turn each bolt clockwise until the head of the bolt contacts the spring. Tighten each bolt two full turns and test. If further adjustment is needed, turn the bolt 1/4 of a turn clockwise. The clutch should be adjusted so that it does not slip under normal operating conditions.

Do not turn the bolt more than 1/4 of a turn without testing the slip clutch.

**NOTE**

Do not overtighten the slip clutch. After long periods of no use, rust and weather can cause the slip clutch to stick. Annually service the slip clutch by releasing the tension on the springs and allow the clutch to slip. Readjust the slip clutch as described above.

**WARNING**

Guards and shields are removed for illustrative purposes only; do not operate without guards and shields in place and functioning.
3.19 REAR WHEELS

The rear wheels (See Fig. #102) adjust to fit a variety of row spacings.

Adjust the steering cylinder when adjusting the spacing. When the tires run straight the cylinder will be positioned in the center of its travel. Use the steering cylinder to keep the harvester tracking straight on a side hill by slightly steering up the hill.

Fig. # 102 Rear Wheels
3.20 OPERATING HINTS

3.20.1 PREPARING SOIL AND CROP

Many people plan their farming operations long before harvest time. The long range planning can well include measures that will increase harvesting efficiency, as well as yields. Here are some reminders and suggestions.

1. If soil is exceptionally rocky, consider clearing the ground before planting to reduce the chance of damage to the harvesting equipment later.

2. When planting and cultivating, avoid soil compaction as much as possible. Proper tillage will reduce clods and speed up decomposition of organic material. Irrigation also helps to reduce clods before harvesting.

3. Weeds and trash reduce harvesting efficiency and can cause mechanical difficulties. Removal through mechanical or chemical means is recommended.

3.20.2 LOADING THE TRUCK

When starting a new load of potatoes, lower the inner boom section so that it just clears the side of the bulk box with the sideboard lowered. Next, lower the outer section to just above the floor of the bulk box to deliver the potatoes gently into the box. As the box fills, raise the outer section accordingly, keeping the discharge end just above the load. Make sure the end of the boom does not dig into the potatoes. To complete the load, raise the inner section in order to raise the sideboard. Maneuver the truck using the tractor operator’s directions to complete an even, full load of potatoes with minimum bruising and damage.

NOTE
At the end of each row, raise the boom quickly for clearing the box as the truck pulls away from the harvester to turn.

If the truck box should hit the boom, the operator can quickly touch the hydraulic control lever and raise the boom out of the way.

A good suggestion is to have a pre-arranged plan that the driver sounds the horn if he accidentally stalls the truck engine, to signal the tractor to stop immediately.

3.20.3 ADVERSE CONDITIONS

Lockwood offers special belted chains designed for harvesting potatoes in varying and extreme conditions. In many cases, changing to one of these special belted chains will enable the machine to keep harvesting when others have stopped.

Primary belted chain is available in pitches of 32 to 60 mm in belted chain for harvesting in various soils conditions wet or extremely heavy soil.
3.20 OPERATING HINTS

3.20.4 HARVESTING EFFICIENCY

Studying procedures and facts of mechanical harvesting can help operate the harvester at maximum efficiency with minimum cost.

A potato harvester normally works under a heavy load. For each 1/2" of depth, a digger blade lifts an average of 150 tons of soil per acre. Harvesting 4 rows at a speed of 2 m.p.h. with the digger blades at a depth of 4" means that the belted chains lift an average of 12 to 20 tons of soil per minute. Operating just 1/2" deeper requires the belted chains to lift another 2 tons or more of soil per minute. Each ton of dirt lifted requires more power and fuel expended and may produce only a few more potatoes. Thus, maximum harvesting efficiency and economy may mean recovering less than 100% of the crop. The additional power, fuel, and time required to lift an extra inch or two of soil, plus the probability of reducing the separating efficiency, may be more expensive than the value of a few potatoes left in the field. For example, harvesting 98% of your potatoes may result in more net profit than digging two inches deeper and harvesting 100%. Consider this factor as you begin harvesting. Compare costs of maximum recovery and maximum efficiency in determining the most efficient digging depth in your situation.

Regardless of digging depth, blades should scour freely for best digging action. Watch for spill-out around the ends of the blades. Excessive spill-out may require the use of another type of blade or that the speed of the primary belted chain is too slow relative to forward travel speed.

Carry the soil two-thirds or three-fourths of the way up the primary belted chains. This provides maximum protection for the potatoes. The pitch and speed of the belted chain and the amount of shaker agitation determines soil separation.

The belted chain normally used is 45 - 56 mm pitch chain on the primary digger section and 45 mm - 50 mm pitch with rubber covering on the secondary section. The design of these pitches provide for the best separation under the widest range of conditions. Your Lockwood Dealer has other patterns and pitch lengths available.

3.21 GENERAL LOW DAMAGE POTATO HARVESTING

Lockwood has always recognized that potato bruising concerns the grower greatly and constantly searches for improved methods of bruise reduction. Proper operator training has the most effect on potato bruising and is the most controllable. The following section on low damage harvesting contains suggestions for the operator and discusses machine functions which you may use to maximize the qualities built into the Lockwood harvester.

3.21.1 DIGGER BLADES

The performance and depth control of the digger blades will help control bruising. Adjust the blade, regardless of type, for the proper digging angle to allow correct feeding of potatoes onto the primary belted chain. Adjust blades so that potatoes do not bump into the front of the primary belted chain. Keep the blades scoured and sharp to maintain even flow of dirt and potatoes into the primary area. Improper blade angle or poor scouring will cause the potatoes to "boil" ahead or spill out the sides of the digger nose.

Digging too deeply will result in carrying much more dirt into the machine than necessary and will increase the amount of power required to pull the harvester.

Operating at too shallow of a depth will cause the blades to cut potatoes or miss them entirely. Check the digging depth at the beginning to verify proper harvesting of the crop.

3.21.2 BELTED CHAINS:

The belted chains in the harvester perform two major functions: they convey the dug material and provide separation of the soil and trash from the potatoes. The belted chain pitch determines the capacity of the belted chains. The belted chain speed and forward harvester ground speed affects the material volume the belted chain can carry. In order to obtain the lowest crop damage possible, maintain proper loading onto the belted chains. Provide potatoes with a "cushion" to minimize damage while eliminating as much dirt and trash as possible to achieve proper loading. Varied engine RPM and gear selection will change the belted chain speed relative to the ground.
3.21 GENERAL LOW DAMAGE POTATO HARVESTING

3.21.2 BELTED CHAINS (CONT’D)

Primary Belted Chains:

The primary belted chain elevates the potatoes out of the ground. The process of separating dirt and trash from potatoes begins on the primary belted chain. The primary belted chain should eliminate at least 80% of the soil by the time the potato reaches the secondary belted chain. The soil carried up the primary belted chain will provide a slight cushion for the potatoes. Changing either the belted chain speed or the forward ground speed will change the amount of dirt carried up the primary belted chain.

Use chain patterns in the primary belted chain to carry potatoes with a minimal amount of roll-back. Do not use a one up, one down chain pattern that pinches potatoes when concerned about bruising.

Run the primary belted chain speed slightly faster than the forward ground speed, usually at a ratio of 1.0 - 1.2 for sandy soils and 1.3 - 1.5 for heavier soils. Operators may have to adjust these speeds to keep the belted chains full, depending on harvesting and yield conditions. Adjust speeds by changing the hexagonal bore sprockets on the primary drive, or varying engine RPM.

In heavier soil conditions, use shakers. Adjust shakers to allow desired amount of shaking action.

Secondary Belted Chains:

The secondary belted chain provides additional soil separation and has a rubber covering to provide protection from bruising. The secondary belted chain normally has a pattern that includes down rods to prevent rollback and to carry the potatoes up the steeper conveyor.

The primary belted chain will eliminate most of the soil by the time the potatoes reach the secondary belted chain. Therefore, run the secondary belted chain much slower than the primary belted chain. Place the belted chain speed to ground speed ratio for the secondary belted chain at about .5; however, the secondary belted chain speed should never run slower than 1.1 mph (96 feet per minute) to provide proper loading onto the rear cross conveyor. The operator sets the secondary belted chain speed to keep it as full as possible without affecting delivery onto the rear cross belted chain. Adjust speeds by changing the hexagonal bore sprockets on the main drive.

Rear Cross Belted Chains:

The rear cross belted chain is the first change of direction for the potatoes in the harvester. The rear cross belted chain maintains proper loading procedures, since a high percentage of bruising occurs at drops where flow direction changes.

Recommended belted chain speed to ground speed ratio for rear cross belted chains should be about .5. Keep the rear cross belted chain as full as possible without allowing spill-out or roll-back under the secondary belted chain.

Rear cross belted chains should always have some type of rubber covering. See section 6.5 on chain covering and descriptions.

Bulk Boom Belted Chains:

The bulk boom belted chain changes the potato flow direction for the last time on the harvester. Belted chains in the bulk boom conveyor should always have a rubber covering.

The outer two sections of the bulk boom conveyor both hinge with hydraulic cylinder controls. This allows the operator to keep the conveyor angle as low as possible to prevent roll-back and to lower the end of the boom as far as possible into the truck box.

Keep belted chain speeds for the bulk boom conveyor slow enough to keep the conveyor full but not slower than 1.1 mph (96 feet per minute). Make adjustments by changing sprocket sizes or hydraulic flow.
3.21 LOW DAMAGE OPERATING HINTS

3.21.3 Hex Bore Sprockets

The harvester comes with easy to change hex bore sprockets. These hex bore sprockets drive the primary and secondary chains (See Fig.#103). The speed of these sprockets can affect potato bruising by changing how much dirt the primary and secondary chains carry. The chain speed to ground speed ratio can change by removing the hex bore sprockets and replacing with the desired number of tooth sprockets. When changing the hex bore sprockets, follow this procedure:

1. Loosen the chain tension by loosening the anchor bolt on chain idler.
2. Loosen and remove the two nuts securing the hex bore sprockets.
3. Slide the sprocket or sprockets off the hub to be changed. See chart (Table #2) to determine what number of tooth sprocket to use.
4. Replace with desired number of teeth sprocket and route chain around sprocket.
5. Move the chain idler to give the required chain tension (1/4" to 1/2" sag).

**NOTE**

Chain may need links added or subtracted to acquire the correct tension.

6. Tighten the chain idler anchor bolt to it’s specified torque.

If the driver and driven sprockets are known, you can find the ratios. Using the equation in section 3.22, the adjusted ratio for increase or decrease in speed will specify the number of teeth to use.

**WARNING**

Place all controls in neutral or off, stop tractor engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, unhooking, attaching, repairing, or unplugging.

1. Loosen the chain tension by loosening the anchor bolt on chain idler.
2. Loosen and remove the two nuts securing the hex bore sprockets.
3. Slide the sprocket or sprockets off the hub to be changed. See chart (Table #2) to determine what number of tooth sprocket to use.
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**NOTE**

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6. Tighten the chain idler anchor bolt to it’s specified torque.

If the driver and driven sprockets are known, you can find the ratios. Using the equation in section 3.22, the adjusted ratio for increase or decrease in speed will specify the number of teeth to use.
3.22 EQUATION:

The following equation can be used to calculate the primary and secondary belted chain speed for the 473H, 474H and 484H.

PRIMARY BELTED
CHAIN SPEED (MPH) = \( \frac{(PTO \ RPM)(\# \ HEX \ SPROCKET \ TEETH)(\# \ WEB \ SPROCKET \ TEETH)(WEB \ PITCH)}{2471952} \)

SECONDARY BELTED
CHAIN SPEED (MPH) = \( \frac{(PTO \ RPM)(\# \ HEX \ SPROCKET \ TEETH)(\# \ WEB \ SPROCKET \ TEETH)(WEB \ PITCH)}{4237633} \)

EXAMPLE:
GIVEN: In this example we will use a tractor PTO rpm speed of 1000 rpm, a ground speed of 2.50 mph. The harvester has a hex drive sprocket of 17 teeth, a primary web sprocket of 8 teeth and a web chain pitch of 50 mm for the primary belted chain.

FIND: Primary belted chain speed (mph).

SOLUTION: PRIMARY BELTED CHAIN SPEED (MPH) = \( \frac{(1000)(17)(8)(50mm)}{2471952} \) = 2.75

The primary belted chain speed is 2.75 (mph)

At this point the primary belted chain speed to ground speed ratio can be determined by simply dividing the primary belted chain speed (which is 2.75 mph) by the ground speed (which in this case is 2.50 mph).

<table>
<thead>
<tr>
<th>Primary belted chain speed</th>
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<tbody>
<tr>
<td>speed to ground</td>
<td>2.50</td>
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<tr>
<td>speed ratio</td>
<td>1.10</td>
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</table>
### 3.23 BELTED CHAIN SIZES FOR THE LOCKWOOD 473H, 474H AND 484H HARVESTER

<table>
<thead>
<tr>
<th></th>
<th><strong>473H</strong></th>
<th><strong>474H</strong></th>
<th><strong>484H</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Primary Chain Wide Nose</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Split Chain Option</td>
<td>Qty. 3 - 33.5&quot; wide X 19.52' long</td>
<td>Qty. 4 - 33.5&quot; wide X 19.52' long</td>
<td>N/A</td>
</tr>
<tr>
<td>Full Width Option</td>
<td>N/A</td>
<td>Qty. 2 - 68.5&quot; wide X 19.52' long</td>
<td>N/A</td>
</tr>
<tr>
<td>Split Chain/Full Width Chain Option</td>
<td>Qty. 1 - 33.5&quot; wide X 19.52' long, Qty. 1 - 68.5&quot; wide X 19.52' long</td>
<td>N/A</td>
<td>Qty. 2 - 33.5&quot; wide X 19.52' long, Qty. 1 - 68.5&quot; wide X 19.52' long</td>
</tr>
<tr>
<td><strong>Secondary Chain</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Head Shaft Option</td>
<td>Qty. 1 - 68.38&quot; wide X 22.64' long, Qty. 1 - 33.5&quot; wide X 22.64' long</td>
<td>Qty. 2 - 68.38&quot; wide X 22.64' long, Qty. 1 - 33.5&quot; wide X 22.64' long</td>
<td>Qty. 1 - 68.38&quot; wide X 22.64' long, Qty. 1 - 68.38&quot; wide X 22.64' long</td>
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<td>Staggered Head Shaft Option</td>
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<td>N/A</td>
</tr>
<tr>
<td><strong>Rear Cross Chain</strong></td>
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<tr>
<td>Extended Head Shaft Chain Option</td>
<td>Qty. 1 - 42&quot; wide X 25.4' long</td>
<td>Qty. 1 - 42&quot; wide X 31.45' long</td>
<td>Qty. 1 - 42&quot; wide X 31.45' long</td>
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<tr>
<td>Spreader Rollers Option</td>
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<td>Qty. 1 - 42&quot; wide X 29.04' long</td>
<td>Qty. 1 - 42&quot; wide X 29.04' long</td>
</tr>
<tr>
<td><strong>Override Chain</strong></td>
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<tr>
<td>Standard Override Chain</td>
<td>Qty. 1 - 68.38&quot; wide X 35.93' long, Qty. 1 - 33.5&quot; wide X 35.93' long</td>
<td>Qty. 2 - 68.38&quot; wide X 35.93' long, Qty. 1 - 33.5&quot; wide X 35.93' long</td>
<td>Qty. 1 - 68.38&quot; wide X 35.93' long, Qty. 1 - 33.5&quot; wide X 35.93' long</td>
</tr>
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<td><strong>Side Elevator Chain</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning Table Option</td>
<td>Qty. 1 - 42&quot; wide X 37.89' long</td>
<td>Qty. 1 - 42&quot; wide X 37.89' long</td>
<td>Qty. 1 - 42&quot; wide X 37.89' long</td>
</tr>
<tr>
<td>Side Elevator Blower</td>
<td>Qty. 1 - 42&quot; wide X 41.34' long</td>
<td>Qty. 1 - 42&quot; wide X 41.34' long</td>
<td>Qty. 1 - 42&quot; wide X 41.34' long</td>
</tr>
<tr>
<td><strong>Bulk Boom Chain</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35&quot; Bulk Boom Chain</td>
<td>Qty. 1 - 35&quot; wide X 54.0' long</td>
<td>Qty. 1 - 35&quot; wide X 60.04' long</td>
<td>Qty. 1 - 35&quot; wide X 60.04' long</td>
</tr>
</tbody>
</table>

*Table #3*
3.24 STORAGE

After the season's use, inspect the machine thoroughly and prepare for storage. Repair or replace any worn or damaged components to prevent any unnecessary down time at the start of next season.

3.24.1 POST SEASON MAINTENANCE

To insure a long, trouble free life, follow this procedure when preparing the unit for storage.

1. Clear the area of bystanders, especially small children.

2. Thoroughly wash the entire machine using a pressure washer to remove all dirt, mud, debris or residue. Be careful not to force water into bearings. If components stick or corrosion appears, clean more frequently. During the final rinse, add a good disinfectant to the pressure washer tank to disinfect the machine.

3. Inspect the following components:

   Soil Engaging Components:
   A. Check for worn or damaged coulters.
   B. Check digger blades for excessive wear.
   C. Check nose wing for excessive wear.
   D. Check all chain types and sprockets for excessive wear.

   Electrical system:
   A. Check the wiring harness and all wiring for damaged or worn areas. Check for cracked or worn insulation. Replace any components that have come in contact with moving parts and route to prevent damage in the future.

   B. Check all hydraulic solenoids for loose or damaged wires. Repair or replace as required.

4. Make a list of all parts needed for repairs and order them immediately. Perform repairs when time permits and prevent unnecessary down time at the start of next season.

5. Relieve roller chain and V-belt tension.

6. Lubricate all grease points to remove any water residue from the washing and prevent rusting during the storage period. Rotate all moving parts to distribute lubricant to all surfaces.

7. Coat each roller chain with a good quality chain lubricant to prevent rusting. Rotate the roller chain slowly by hand to cover all surfaces.

8. Remove material that has become entangled in any drives.

9. Apply a light coat of grease on all bare metal shafts.

10. Touch up all paint nicks and scratches to prevent rusting.

11. Retract cylinder rods to protect them from damage or corrosion.

12. Select an area that is dry, level, and free of debris.

13. Move the machine to its storage area.

14. Place planks or blocks to properly block the machine where appropriate.

15. Unhook the machine from the tractor.

16. Place all wiring harness and hydraulic line components in a safe place on the hitch to prevent damage or getting dirty during the storage period.

17. Block up the machine and take off the wheels. Store inside or under a tarp. Long exposure to weather will cause the tires to crack and the fabric to break down, ruining the ply of the tires. Pack wheel bearings with grease.

18. Rubber covered belted chains should be removed and stored inside to protect the rubber covering.
19. If the machine cannot be stored inside, cover with a waterproof tarp and tie securely in place.

20. Store out of the way of human activity.

21. Do not allow children to play around stored unit.

### 3.24.2 REMOVING FROM STORAGE / PRE-SEASON MAINTENANCE:

When removing from storage and preparing to use, follow this procedure:

1. Clear the area of bystanders, especially small children.

2. Remove the tarp from the machine if covered.

3. Clean off accumulated trash and dirt.

4. Reassemble all parts taken off during post-season maintenance.

5. Review and perform pre-delivery and run-in checklists and daily maintenance.

6. Check for any attachment available that will assist in a better performance of the machine.

7. Install all safety shields and review safety precautions with operators and other personnel involved in the operation.

8. Check:
   a. Tire pressure. Add as required.
   b. Retorque all wheel bolts.
   c. Retorque all hardware.
   d. Adjust the routing and securing of all hydraulic lines and wiring harness as required.

9. Rotate all components and systems by hand to check for any seized parts. Loosen any seized components with penetrating oil before starting.

10. Retighten any loose bolts to their specified torque.

11. Lubricate all grease points, roller chains, and shaft surfaces with sliding sprockets.

12. Check all chains for correct tension and alignment.

13. Check for excessive wear on all moving parts.

14. Grease wheel bearing hub on rear transport wheels.

15. Tighten all hydraulic connections and mounts, replace o-rings, fittings, or connectors subject to leaking.

16. Slip Clutch: - Release bolts, run to let slip, and reset per instructions in the maintenance section of the manual.

17. Review Initial Operating Procedure.

18. Review and follow all items on the Pre-Operation Checklist and Pre-Start inspection before starting.
4.0 SERVICE AND MAINTENANCE

4.1 SERVICE

Along with a servicing interval, perform a visual inspection. Maintenance personnel can often detect potential problems from any unusual sounds made by such components as shafts, bearings, drives and belts.

4.1.1 FLUIDS AND LUBRICANTS

1. Grease: Use an SAE multipurpose high temperature grease with extreme pressure (EP) performance meeting or exceeding the NLGI #2 rating for all requirements. Also acceptable is an SAE multipurpose lithium based grease.

2. Gearbox Lube: Use synthetic based gear oil equivalent to or exceeding the following specifications.

   Conoco SYNCON HP Synthetic Gear Oil 80W-140; API GL-5 and MT-1; MIL-L-2105E

3. Roller chain lubricating oil: SAE 30 or Chain Lube

4. Storing Lubricants: Your machine can operate at top efficiency only if you use clean lubricants. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture and other contaminants.

4.1.2 GREASING

Use the Service Record Checklist provided to keep a record of all scheduled maintenance.

1. Use a hand-held grease gun for all greasing.

2. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt and grit.

3. Replace and repair broken fittings immediately.

4. If fittings will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.
## 4.2 SERVICE RECORD

See Lubrication and Maintenance sections for details of service. Copy this page to continue record.

**Note:** This service record recommendations are based on normal operating conditions. Severe or unusual conditions may require more frequent attention.

<table>
<thead>
<tr>
<th>ACTION CODE:</th>
<th>CHECK OR INSPECT</th>
<th>CLEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LUBRICATE</td>
<td>CHANGE</td>
</tr>
</tbody>
</table>

### MAINTENANCE

<table>
<thead>
<tr>
<th>HOURS</th>
<th>SERVICED BY</th>
</tr>
</thead>
</table>

#### 8 HOURS

- L CROSS JOURNAL ZERKS

#### 16 HOURS

- L DRIVELINE INNER TUBES

#### 40 HOURS

- L DRIVELINE DISCONNECT MECHANISM
- L DRIVELINE SHIELD RETAINING BEARING

#### DAILY

- ✓ FOR MISSING BOLTS OR COMPONENTS
- ✓ WHEEL LUG BOLTS
- ✓ TIRE AIR PRESSURE
- ✓ TENSION AND ALIGNMENT OF BELTS AND ROLLER CHAIN
- ✓ FOR EXCESSIVE COMPONENT WEAR

- CL REMOVE CROP RESIDUE AND MUD BUILD-UP
- L DRIVE TRAIN UNIVERSAL JOINTS
- L DIGGER NOSE LIFT
- ✓ BELT IDLERS

#### WEEKLY

- ✓ GEARBOX OIL LEVEL
- ✓ BEARINGS
4.3 MAINTENANCE

4.3.1 PTO SERVICE

The machine requires frequent lubrication. Grease the driveline parts after the number of hours as shown on the diagram below. Clean and grease the implement input driveline before each prolonged period of non-use. Telescoping members must have lubrication to operate successfully regardless of whether a grease fitting is provided for that purpose. Pull telescoping members without fittings apart and add grease manually.

Every 8 Hours

Lubricate cross journal zerks, rotate the flexible cone to align the access hole (See Fig. #104). After greasing the joints, close the access hole. Repeat process for both ends of the PTO.

![Fig. #104 Driveline lubrication](#)

Every 16 Hours

Grease the internal drive tube and reassemble the shielding on the driveshaft.

Every 40 Hours

Grease the shield retaining zerks and the driveline disconnect mechanism.

4.3.2 PREVENTIVE MAINTENANCE

WARNING

Place all controls in neutral or off, stop tractor engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, unhooking, attaching, repairing, or unplugging.

WARNING

Do not attempt to clean trash out of drive chains while the harvester is running.

Preventive maintenance spots potential trouble and allows the owner to fix it before it occurs.

1. Whenever stopping the machine for lubrication and at row ends, workers should clean vines and trash from the return side of the belted chains and from sprockets. Cleaning will prevent buildup of materials and unnecessary trouble.

2. When lubricating, check sprockets, idlers and bearings. Inspect sprockets for proper alignment.

3. Keep roller chains clean to prevent them from getting “stiff” or losing their flexibility. A “stiff” roller chain will cause excessive sprocket wear.

4. Periodically, check to make sure that the return side of the primary belted chain does not drag on the ground.

5. When replacing belted chains because of wear, check the sprockets carefully. Replace worn sprockets at the same time or they will cause rapid wear of the new belted chain.

6. Always maintain the hydraulic fluid at the proper level in the tractor hydraulic reservoir.

7. Check all chains for correct tension and alignment.

8. Check for excessive wear on any of the machine components. Inspect for loose or missing bolts or components.

9. Tighten wheel lug nuts and inflate rear ground wheels correctly.

10. Visually check hydraulic systems for fluid leaks. Tighten, if necessary, any hydraulic connections. Inspect hoses and tubing for any damage or wear.
4.3 MAINTENANCE (CONT’D)

4.3.3 DRIVE CHAIN TENSION

Adjust the drive chains for the appropriate amount of slack. With the idler in place and tightened, measure the slack in the part of the drive chain that will run in tension. Using a straight edge across the driving sprockets, press the span of the drive chain down in the center and measure the sag as in the diagram. Use the following table to determine the correct tightness.

WARNING

Place all controls in neutral or off, stop tractor engine, set parking brake, remove ignition key, wait for all moving parts to stop, then properly block machine before servicing, adjusting, unhooking, attaching, repairing, or unplugging.

<table>
<thead>
<tr>
<th>SPROCKET CENTER TO CENTER DISTANCE (IN INCHES)</th>
<th>20&quot;</th>
<th>30&quot;</th>
<th>40&quot;</th>
<th>50&quot;</th>
<th>60&quot;</th>
<th>70&quot;</th>
<th>80&quot;</th>
<th>90&quot;</th>
<th>100&quot;</th>
<th>125&quot;</th>
<th>150&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHAIN SAG (IN INCHES)</td>
<td>1/2&quot;</td>
<td>5/8&quot;</td>
<td>7/8&quot;</td>
<td>1&quot;</td>
<td>1-1/4&quot;</td>
<td>1-1/2&quot;</td>
<td>1-5/8&quot;</td>
<td>1-7/8&quot;</td>
<td>2&quot;</td>
<td>2-1/2&quot;</td>
<td>3&quot;</td>
</tr>
</tbody>
</table>

Schematic: chain tension

4.3.4 DRIVE BELT TENSION

Do not pull V-belts exceedingly tight to obtain the proper tension. Tighten V-belts only enough to drive the load. Tighten adjustment eye bolt so a 1/32” - 1/16” gap exists between the coils of the spring.

Keep belts free of oil and sunlight as much as possible. Mineral oil is especially harmful. To clean, use a dry cloth or soap and water and rinse well. If grease or oil has come in contact with a belt, clean with carbon tetrachloride. Never use belt dressing.

4.3.5 BELTED CHAIN

To prevent major breakdowns or failures, periodic checks should include inspection of worn clips, worn master links, worn chain, broken rod links, missing rivets, loose rivets, defective rollers, worn sprockets, and torn or cracked belting.

Connector clips and connecting master links (See Fig. #105) will usually wear out first. Check connector clips and master links and change on a regular basis. A web chain may last through two or three sets of connector clips. A spare web chain will reduce down time.

Proper adjustment of the slip clutches will prevent serious damage to the machine. Tighten slip clutches only enough to carry the load. Excessively tight clutches will not slip and could cause extensive damage to the belting should a foreign object get caught in the chain. The slip clutches also protect other components in the drive train from damage due to excessive power surge requirements.

Change all defective rollers immediately to prevent damage to the belting.

You can double sprocket life by changing the sprockets side for side so both faces of the tooth wear an equal amount.

Fig. #105 Belted chain
When a belted chain needs repair, change out the entire chain and replace it with a spare. Repairs then can be made more easily in the shop rather than in the field.

A. When removing the belted chain from a machine, slowly turn the chain until the master link sits on the bottom where the most slack exists. Pull the connector clips together and remove the master link.

B. Do not pound on the ends of the master link with a hammer. Pounding will flatten the ends and make later removal more difficult.

C. Assemble in the same manner, checking to see that the male connector clip rests properly on the master link.

D. When replacing a rod or clip, the heads of the rivets will have to be cut or ground off. When replacing clips be sure to replace them in pairs to avoid unequal length belts. When replacing rods, use correct length, diameter, style and rivet size. Use new backing plates when replacing rods.

E. Use a line punch or similar tool and align the holes in the belt with the clip or rod and backing plate (See Fig. #106). Clamp materials together tightly.

F. Use the proper length and diameter of rivet for the application, making certain the rivet is properly seated. Pound the rivet to reassemble (See Fig. #106).
4.3 MAINTENANCE

4.3.7 CHANGING HYDRAULIC OIL FILTER USED ON THE ELECTRO-HYDRAULIC VALVES

**WARNING**

Hydraulic fluid under pressure can pierce the skin, causing injury or death. Do not expose bare skin to pressurized hydraulic fluid. Use eye protection and appropriate protective clothing to prevent injury. If skin is punctured, seek medical help immediately.

The major cause of hydraulic valve failure is contaminants such as dirt, rust, metal filings or sludge. Contaminants cause valve spools to stick, plug small passages, or erode components until the valve leaks. When servicing the valves take extreme measures to keep the valve components clean.

To prevent hydraulic valve failure, **REPLACE THE FILTER ELEMENT** at the beginning of every season. (See Fig. #107)

To change the hydraulic oil filter:

1. Using a 5/8” wrench, remove plug #1.
2. Remove the old filter, taking the spring out.
3. Place the spring into the new filter.
4. Insert the new filter.
5. Replace plug and tighten

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>SEAL KIT PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14148-00</td>
<td>FILTER, HYDRAULIC VALVE</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>14151-00</td>
<td>CARTRIDGE, DUMP VALVE</td>
<td>14353-00</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>PLUG, CAVITY</td>
<td>14350-00</td>
</tr>
</tbody>
</table>

**WARNING**

Injury or death may result if a cylinder loses pressure and suddenly retracts or extends. Block up or lower the nose lift and the coulters. Move the control switches to release the pressure in the system before disconnecting any hydraulic connections.

---

![Diagram of hydraulic valve](image)

---

**NOTE:** VALVE SHOWN IN OPEN CENTER (STANDARD) CONFIGURATION. FOR CLOSED CENTER OPERATION, SWITCH CARTRIDGE #10 AND PLUG #14.

SEE YOUR DEALER FOR LOAD SENSING OPERATIONS.

---

**Fig. #107**
Periodically air may become trapped in the hydraulic system. After working with the hydraulic system, “bleed” air from the system. Where hydraulic oil will not compress, air will compress. Therefore if any air pockets or bubbles exist in the cylinder, it will become “spongy” and will not hold its position. Cycle cylinders completely several times to purge air. If air still sits in the cylinders, bleed them as follows:

1. Begin this operation by first loosening the clevis end (“B”) fitting about one full turn (Fig. #108). Cover this fitting with a towel or rag to prevent the spray from hitting you or the machine.

2. Activate the appropriate switch to retract the cylinder. Release switch to its neutral position when fluid starts to spray from the loose fitting. Tighten this fitting and retract the cylinder fully by activating the appropriate switch.

3. Loosen the plunger end (“A”) fitting and repeat the procedure as used on the retraction only extend the cylinder this time.

4. After completing the system bleeding, check the fluid reservoirs for oil level.

After the system is bled, adjust the flow control of the tractor’s remote hydraulic outlet to the appropriate flow rate. The electro-hydraulic valve is supplied all by the remote tractor outlet. Excessive flow will potentially overload the tractor with heated hydraulic oil that could damage the tractor’s hydraulic system.

### 4.3.9 NON-STEERABLE, ADJUSTABLE AND STEERABLE AXLE ADJUSTMENTS

The steerable axle has a hydraulic cylinder to turn the axle left or right.

Use the long tie rod to adjust the amount of toe-in. The proper range of toe-in is from 1/4" to 7/8". Toe-in is the difference between the front center-line and the rear centerline of each tire. (Measurement C minus measurement B).

After performing the axle adjustment and centering the tires, check the axle gauge to see if the indicator pointer is centered if equipped. If the indicator is not centered, adjust the cable mount or clevis to center the indicator.
## 5.0 TROUBLE SHOOTING

In the following section, we have listed many of the problems, causes and solutions to the problems that you may encounter.

If you encounter a problem that is difficult to solve, even after having read through this trouble shooting section, please call your local Lockwood dealer or distributor. Before you call, please have this Operator’s Manual and the serial number from your machine ready.

### BEFORE YOU CALL

Please Have the following information available:

<table>
<thead>
<tr>
<th>Serial # (see page #1 for location)</th>
</tr>
</thead>
</table>

### 5.1 HARVESTER TROUBLESHOOTING

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too much soil carried up digger apron.</td>
<td>Digging too deep.</td>
<td>Raise digger blade until it begins to cut potatoes then lower it slightly.</td>
</tr>
<tr>
<td></td>
<td>Travel speed too fast for speed of digger chain.</td>
<td>Slow travel speed or increase speed of chains. (Change hex sprockets)</td>
</tr>
<tr>
<td></td>
<td>Insufficient agitation.</td>
<td>Adjust optional shaker.</td>
</tr>
<tr>
<td></td>
<td>Wrong type of digger blade.</td>
<td>Change type of blade, depending on set of the potatoes.</td>
</tr>
<tr>
<td></td>
<td>Chain pitch too narrow.</td>
<td>Change digger apron to wide pitch chain.</td>
</tr>
<tr>
<td>Slip clutches beginning to slip.</td>
<td>Foreign object in machine.</td>
<td>Check which clutch is slipping. Find and remove foreign object. Beware of chain tension and release if possible.</td>
</tr>
<tr>
<td></td>
<td>Machine overloaded.</td>
<td>Check for excessive amount of dirt or trash.</td>
</tr>
<tr>
<td></td>
<td>Broken part in unit.</td>
<td>Check unit and drive system for malfunctioning part.</td>
</tr>
<tr>
<td></td>
<td>Slip clutch too loose.</td>
<td>Tighten slip clutch until the unit carries the required load. 1/4 turn at a time on slip clutch.</td>
</tr>
<tr>
<td></td>
<td>Excessive build-up of vines.</td>
<td>Clean vines from roller, sprockets, and chains.</td>
</tr>
<tr>
<td></td>
<td>Hydraulic fittings leaking.</td>
<td>Check fittings and tighten if loose.</td>
</tr>
<tr>
<td></td>
<td>Hydraulic cylinders leaking.</td>
<td>Tighten packing nuts on end of cylinder. If still leaks, repair cylinder.</td>
</tr>
<tr>
<td></td>
<td>Leakage around cartridges in main control valve or openings are plugged.</td>
<td>Clean cartridges, replace cartridge seals.</td>
</tr>
</tbody>
</table>
## 5.1 HARVESTER TROUBLE SHOOTING

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine does not respond to</td>
<td>Broken hydraulic hose.</td>
<td>Replace or repair hose</td>
</tr>
<tr>
<td>operation of hydraulic control levers.</td>
<td>Hydraulic fittings leaking.</td>
<td>Check fittings and tighten if loose.</td>
</tr>
<tr>
<td></td>
<td>Hydraulic cylinders leaking.</td>
<td>Check fittings and tighten if loose.</td>
</tr>
<tr>
<td></td>
<td>Leakage around the cartridges in main control valve</td>
<td>Clean cartridges, replace cartridge seals.</td>
</tr>
<tr>
<td></td>
<td>or openings are plugged.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hydraulic cylinders leaking.</td>
<td>Tighten packing nuts on end of cylinder. If</td>
</tr>
<tr>
<td></td>
<td></td>
<td>still leaking, repair cylinder.</td>
</tr>
<tr>
<td></td>
<td>No power to control box.</td>
<td>Check all electrical connections.</td>
</tr>
<tr>
<td></td>
<td>Hydraulic hoses not fully plugged in.</td>
<td>Check hoses plugged into tractor. Be sure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>they are engaged.</td>
</tr>
<tr>
<td></td>
<td>The tractor valve is shut off.</td>
<td>Turn tractor valve off.</td>
</tr>
<tr>
<td>Squealing sound from the valve bank.</td>
<td>Oil flow too high.</td>
<td>Reduce oil flow.</td>
</tr>
<tr>
<td>Clods not being removed.</td>
<td>Field conditions too dry.</td>
<td>Irrigate field.</td>
</tr>
<tr>
<td></td>
<td>Not enough agitation in primary.</td>
<td>Engage shaker or add shaker option.</td>
</tr>
<tr>
<td></td>
<td>Clod elimination option not appropriate for</td>
<td>Consider additional clod removal options.</td>
</tr>
<tr>
<td>conditions. (optional)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clod blades required.</td>
<td>Install clod blades.</td>
</tr>
<tr>
<td>Pointer indicator does not show correct</td>
<td>Indicator linkage out of adjustment.</td>
<td>Adjust the rod type linkage between the tie</td>
</tr>
<tr>
<td>turn of steering rear axle. (optional)</td>
<td></td>
<td>rod and indicator dial, align wheels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>straight ahead, and set pointer to center</td>
</tr>
<tr>
<td></td>
<td></td>
<td>position and retighten.</td>
</tr>
<tr>
<td>Trash and vines not removed by override.</td>
<td>Override belted chain pitch too wide.</td>
<td>Use narrow pitch override belted chain.</td>
</tr>
<tr>
<td></td>
<td>Vegetation removed before harvest</td>
<td>Do not chop vines.</td>
</tr>
<tr>
<td></td>
<td>Grass clumps and roots not being removed by override.</td>
<td>Consider trash removal options.</td>
</tr>
<tr>
<td></td>
<td>Override not agitating correctly.</td>
<td>Check override for agitation. (Remove 5&quot; x 1&quot; Rollers.)</td>
</tr>
</tbody>
</table>
## 5.2 PREVENTABLE DAMAGE TO PTO DRIVE SHAFT

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yokes warped under upsetting impacts. Take-off shaft bent. Damage to</td>
<td>Excessive shaft length.</td>
<td>Adjust tractor hitch</td>
</tr>
<tr>
<td>shaft connections and link-up shaft bearings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shaft falling apart. Telescopic sections damaged.</td>
<td>Shaft too short.</td>
<td>Adjust tractor hitch</td>
</tr>
<tr>
<td>Abrasion yoke surfaces. Damage to guard cones. Noisy while running</td>
<td>Excessive articulation angle.</td>
<td>Stop take-off shaft before turning.</td>
</tr>
<tr>
<td>Damage to yokes and cross bearings e.g. by hammer blows.</td>
<td>Forced coupling due to dirty or damaged P.T.O.</td>
<td>Clean and de-burr sections. Mount guard on P.T.O. shaft</td>
</tr>
<tr>
<td></td>
<td>shaft profile.</td>
<td>when not in use.</td>
</tr>
<tr>
<td>Deformation of telescopic sections. Heavy contamination.</td>
<td>Incorrect coupling due to disconnected sliding</td>
<td>Connect drive shaft to P.T.O. shaft after coupling of</td>
</tr>
<tr>
<td></td>
<td>profiles.</td>
<td>implement.</td>
</tr>
<tr>
<td>Overheating of joint. Yokes and telescopic sections warped. Increased</td>
<td>Excessive torque</td>
<td>Reduce working speed.</td>
</tr>
<tr>
<td>sliding resistance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universal joint shaft or shaft connection warped. Shaft length</td>
<td>Angular sweep restricted.</td>
<td>Change shaft arrangement by shifting of hitch points. Remove</td>
</tr>
<tr>
<td>compensation more difficult.</td>
<td></td>
<td>interfering linkage parts, such as clevis, drawbar and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>crossbar.</td>
</tr>
<tr>
<td>a) Bearings heat up and/or get damaged. Sliding resistance increased.</td>
<td>Inadequate maintenance.</td>
<td>a) Follow lubrication instructions. b) Check clutch</td>
</tr>
<tr>
<td>b) Changed torque limit of overload clutch.</td>
<td></td>
<td>operation. Study operation manual.</td>
</tr>
<tr>
<td>Safety chain torn and/or guard bearing defective.</td>
<td>Wrong chain attachment.</td>
<td>Adjust chain length to swivel angle when fixing safety</td>
</tr>
<tr>
<td></td>
<td></td>
<td>chain.</td>
</tr>
<tr>
<td>Shaft entangles objects. Guard starts to rotate with shaft.</td>
<td>Insufficient guarding.</td>
<td>Maintain and replace worn shielding.</td>
</tr>
</tbody>
</table>
### 5.3 SHAFT MONITOR TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Problem</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>When power is supplied, the Tachometer does not power-up.</td>
<td>First, check the 3 ampere fuse. Second, check that there is at least 10 volts at the accessory plug. Third, replace the tachometer.</td>
</tr>
<tr>
<td>With the splitter box connected, the tachometer will not power up.</td>
<td>First, check that there is power to the splitter box (power light). Second, check that the arrow of the main harness cables are properly aligned. Third, replace the main harness extension cable. Fourth, replace the splitter box.</td>
</tr>
<tr>
<td>The tachometer displays no RPM on one or more channels.</td>
<td>First, check that the Shaft sensor is plugged in and powered (power light). Second, check that the magnet is still on the shaft. Third, check that the shaft sensor is still in-line with the target. Fourth, check that the Shaft sensor is within the required distance from the target (magnet = 1/2&quot; metal = 1/8&quot;) Fifth, check that the Hi alarm, Low alarm, and Cal values are set as needed. *See below Sixth, swap the sensor cable. Seventh, replace the shaft sensor.</td>
</tr>
</tbody>
</table>

*Hi Alarm - Press the Hi Alarm button and use the plus and minus buttons to set the desired value. Once selected, the red indicator light above the Hi Alarm button and the selected channel button will light-up. This speed should be just greater than the operating speed.

Low Alarm - Press the Low Alarm button and use plus and minus buttons to set the desired value. Once selected, the red indicator light above the Low Alarm button and the selected channel button will light-up. This speed should be just a little less than the operating speed.

Cal Button - To program, press the Cal button and use the plus and minus buttons to set the desired value. Once selected the red indicator light above the Cal button and the selected channel will light-up. This value will be equal to the number of targets on the shaft. Set to zero to disable the channel.
### 5.3 SHAFT MONITOR TROUBLESHOOTING (CONT’D)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>When a shaft stops turning, the tachometer does not indicate an alarm, but an RPM is displayed.</td>
<td>Check that the Low Alarm value has not been set to zero. If the shaft Low value is zero, the alarm is disabled.</td>
</tr>
<tr>
<td>The tachometer always indicates alarm even when the shaft is turning.</td>
<td>First, check that the Low Alarm value is not higher than the operating shaft RPM. Second, check that the Hi Alarm value is not lower then the operating shaft RPM. Third, check the Cal Value. It should equal the number of targets passed in one revolution.</td>
</tr>
<tr>
<td>The shaft sensor produces an RPM, but is is erratic and incorrect.</td>
<td>First, check the Cal Value. Ensure that the correct number of targets are programmed, otherwise the RPM will not read correct. Second, check that there is constant power to the shaft sensor (power light), And the sensor cables are plugged in fully. Third, ensure that the shaft sensor is still pointing toward the target. Fourth, ensure that the shaft sensor is within the required distance from the target (magnet = 1/2&quot;, metal = 1/8&quot;). When the shaft sensor is at an extreme distance limit, this problem may occur. Fifth, check the sensor cable. Set the channel's Cal value to zero, and the Hi Alarm value to one (like setting a bin sensor to alarm on empty). Align a magnet in front of the shaft sensor, and begin flexing and shaking the sensor cable. This should not produce an alarm condition. Sixth, swap the sensor cable. Seventh, replace the shaft sensor.</td>
</tr>
</tbody>
</table>
## 6.0 SPECIFICATIONS

### 6.1 GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>GENERAL SPECIFICATIONS</th>
<th>474H/484H Harvester</th>
<th>473H Harvester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OVERALL DIMENSIONS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height of the Harvester (Transport position)</td>
<td>13' 3&quot;</td>
<td>13' 3&quot;</td>
</tr>
<tr>
<td>Width of Harvester (transport position)</td>
<td>19' 4&quot;</td>
<td>16' 4&quot;</td>
</tr>
<tr>
<td>Length of harvester</td>
<td>32' 6&quot;</td>
<td>32' 6&quot;</td>
</tr>
<tr>
<td><strong>WEIGHT (AVERAGE SHIPPING)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight of the Harvester</td>
<td>30,000 lbs.</td>
<td>25,000 lbs.</td>
</tr>
<tr>
<td>(Approximate minimum) Weight on tongue (min.)</td>
<td>9,500 lbs.</td>
<td>7,000 lbs.</td>
</tr>
<tr>
<td><strong>TRACTOR REQUIREMENTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tractor Power</td>
<td>200 hp</td>
<td>175 hp</td>
</tr>
<tr>
<td>Tractor PTO rpm (1-3/4&quot; - 20 spline)</td>
<td>1000 rpm</td>
<td>1000 rpm</td>
</tr>
<tr>
<td>Tractor hydraulics</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OPERATION REQUIREMENTS (SHAKER OPTION)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HYDRAULIC SYSTEM (POWER SOURCE*)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil flow at max. motor rpm.</td>
<td>13 gpm</td>
<td>13 gpm</td>
</tr>
<tr>
<td><strong>OPERATION REQUIREMENTS (EZ ROLL TABLE OPTION)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HYDRAULIC SYSTEM (POWER SOURCE*)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil flow at max. motor rpm.</td>
<td>20 gpm</td>
<td>20 gpm</td>
</tr>
</tbody>
</table>

* When connecting auxiliary equipment to the tractor hydraulic system for power source, consult the tractor manufacturer’s specifications to be sure of the type of system and pump delivery capacity to prevent damage. The Lockwood 473H, 474H and 484H Harvester can be configured for closed center or open center hydraulics.
6.2 CHAIN PITCH AND ROD CONFIGURATIONS

The belted chain comes in various pitches, configurations and patterns. These options will help to increase or decrease soil elimination, maximize conveying capacity, and protect potatoes from damage.

In the figures below, the circles represent the rods in a belted chain. The center to center distance between the rods defines the chain pitch. The “A” measurement represents the opening between the rods that dictate the size of objects such as clods, stones and small potatoes to be removed.

Use rod configurations in straight, offset up and offset down “patterns” to accomplish a purpose based on field conditions.

The two belted chains with belt dimensions of 60mm (2.36”) are the full width chain and the single chain. The single chain has 2 plys of polyester nylon and the full width chain has 3 plys of polyester nylon. A third type of belted chain, the flex chain, has 2 plys of polyester nylon, with a center ply that measures 120mm. These 3 belted chain designs provide the combination of strength and flexibility required for all applications.

### STRAIGHT ROD TO STRAIGHT ROD

<table>
<thead>
<tr>
<th>Pitch</th>
<th>7/16”</th>
<th>1/2”</th>
<th>5/8”</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>1.22</td>
<td>1.15</td>
<td>1.03</td>
</tr>
<tr>
<td>45</td>
<td>1.33</td>
<td>1.27</td>
<td>1.15</td>
</tr>
<tr>
<td>50</td>
<td>1.53</td>
<td>1.47</td>
<td>1.34</td>
</tr>
<tr>
<td>56</td>
<td>1.77</td>
<td>1.7</td>
<td>1.58</td>
</tr>
</tbody>
</table>

*Fig. #110 Straight Rod*

### STRAIGHT ROD TO DOWN ROD

<table>
<thead>
<tr>
<th>Pitch</th>
<th>7/16”</th>
<th>1/2”</th>
<th>5/8”</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>1.27</td>
<td>1.23</td>
<td>1.14</td>
</tr>
<tr>
<td>45</td>
<td>1.39</td>
<td>1.34</td>
<td>1.25</td>
</tr>
<tr>
<td>50</td>
<td>1.58</td>
<td>1.53</td>
<td>1.44</td>
</tr>
<tr>
<td>56</td>
<td>1.81</td>
<td>1.76</td>
<td>1.67</td>
</tr>
</tbody>
</table>

*Fig. #111 Straight Rod to Offset rod*
6.2 CHAIN PITCH AND ROD CONFIGURATIONS (CONT’D)

DOWN ROD TO UP ROD

<table>
<thead>
<tr>
<th>Pitch</th>
<th>7/16&quot;</th>
<th>1/2&quot;</th>
<th>5/8&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>1.43</td>
<td>1.43</td>
<td>1.45</td>
</tr>
<tr>
<td>45</td>
<td>1.54</td>
<td>1.53</td>
<td>1.54</td>
</tr>
<tr>
<td>50</td>
<td>1.72</td>
<td>1.71</td>
<td>1.71</td>
</tr>
<tr>
<td>56</td>
<td>1.93</td>
<td>1.92</td>
<td>1.91</td>
</tr>
</tbody>
</table>

Fig. # 112 Offset Rod

Example Pattern Description:
2D1S = a pattern of 2 offset down rod & 1 straight rod.
Three different types of belted chains are available. The single chain assembly uses two belts with various rods (links) connected to the belts with rivets. The second type is a full width chain assembly consisting of two belts with an additional third belt in the middle. The full width rods are also riveted to the middle web (See Fig. #114). The third type is the flex chain assembly consisting of two rods connected to three belts. The two rods are riveted to the middle belt, which is 120mm wide.
6.3 CHAIN PATTERNS

“Pattern” chain is a combination of straight and/or offset links arranged in various repetitive sequences. The purpose of a “pattern” is to meet various conveying, cleaning or damage prevention conditions.

An all straight link pattern creates a flat surface for minimum separation. Use this pattern in loose soil conditions to carry soil as far as possible up the belted chain, thereby minimizing potato bruising.

An all down link pattern has the same characteristic as all straight in that it creates a flat surface for minimum separation. Again it carries the soil further up the chain for potato protection.

![Diagram of belt chain patterns](image)

Fig. #115
6.3 CHAIN PATTERNS (CONT’D)

Using a combination of up/down links will create deeper pockets. Notice in fig. 116 the up/down pattern creates more of an opening between the rods than the straight/up link pattern does. On a 50mm (1.96”) pitch chain: a straight/up pattern the opening is 1.53” while an up/down pattern provides a 1.71” opening.

Figure #116
6.4 CHAIN PATTERNS

The straight/down/down pattern creates a shallow pocket. This pattern helps prevent rollback.

Use of two down rods extends the length of the pocket. Using an up rod with the down rods creates a maximum opening between the links. This up/down/down pattern breaks the surface and makes the belted chain more aggressive in soil removal.

A long deep pocket such as created by the straight/down/straight/up will hold a considerable amount of material. This is commonly used in rocky areas. The use of the straight link in the pattern cuts down on soil separation and closes the opening versus the up/down pattern.

In general, when conditions are wet, more separation between soil and potatoes is desirable. Increase the pitch in wet conditions to reduce the soil build up on the rods. Use all straight to carry more soil. Carrying more soil acts as a cushion protecting potatoes from damage by the steel rods.

Fig. #117 Examples
6.5 CHAIN COVERINGS

6.5.1 PEGS

Pegs are rubber fingers that stick up off the rod that prevent rollback of the potatoes. These pegs stick up 2.5 inches from the top of the rod and are spaced 3.38 inches apart. See figure below.

![Figure #118 Pegs](image1)

6.5.2 FLIGHTS

Flights are rubber flaps that extend the length of the rod. Two flight types are used; B flight and C flight. Each respective flight has a different height measurement; B flight has a height of 2.5 inches from the top of the rod and the C flight has a height of 1.5 inches from the top of the rod. See figure below.

![Figure #119 Flight](image2)
6.5 CHAIN COVERINGS

Using chain patterns enhances the primary belted chain’s ability to separate soil from the potatoes. Once the potatoes reach the secondary belted chain much of the soil is eliminated. At this point, various belted chain coverings in combination with chain patterns are used to help convey and reduce bruising of the potatoes. The following is a description of available coverings, with illustrations, to show the openings between the links based on common belted chain pitches. Rod diameter, pitch, and coverings will change the opening between the rods.

6.5.3 RUBBER COVER

The rubber cover (See Fig. #120) is an extruded rubber tube which is applied over the chain rod. The tubing has a wall thickness of 1/8” to 3/16”. The covering is simple but effective for use where protection is desirable but ultra soft handling isn’t necessary. Note how the combination of the rubber cover and belted chain pitch can vary the opening between the rods.

![Diagram of rubber cover and belted chain](image)

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6.5 CHAIN COVERINGS (CONT’D)

6.5.4 PILLOW CUSHIONS

Pillow cushions (See Fig. #121) are extruded double wall rubber tubing with four continuing air shafts that run the entire length of the tubing. It was designed so that no matter how the potato hits the tubing, the tubing will flex. This flexibility also gives it self-cleaning ability. Note how the rod opening can be varied by combining the rod covering with different chain pitch in the example below.

---

**Figure #121**

---

<p>| STRAIGHT ROD, BABY PILLOW CUSHION (.81 IN OD) |</p>
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<p>| STRAIGHT ROD, LARGE PILLOW CUSHION (1.62 IN OD) |</p>
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</table>
6.5 CHAIN COVERINGS

6.5.5 C-FLEX
The illustrations below show how ‘C’ flex cushion, and pitch differences affect the rod opening. ‘C’ flex has desirable attributes when it comes to potato protection and self-cleaning characteristics. The ‘C’ flex profile protects the potatoes even under extreme cold conditions when the rubber becomes stiffer.

![Diagram of C-FLEX (CF)](image)

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<tr>
<td>56</td>
<td>1.58</td>
<td>1.58</td>
<td>1.58</td>
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</tbody>
</table>
6.5 CHAIN COVERINGS

6.5.6 EARS

Ears are flaps that line the edge of the rod. These flaps prevent rollback of potatoes off the side belts. Ears are available on the following chain coverings; C-Flex, Pegs, and Flights. See figures below.

Figure #123 Ears
## 6.6 BOLT TORQUE

### CHECKING BOLT TORQUE:
The table shown below is for reference purposes only and its use by anyone is entirely voluntary, unless otherwise noted. Reliance on its contents for any purpose is at the sole risk of that person. Lockwood is not responsible for any loss claim or damage arising therefrom. In developing these tables, Lockwood has made a determined effort to present the contents accurately.

Torque figures indicated above are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

* Torque value for bolts and capscrews are identified by their head markings.

### METRIC TORQUE SPECIFICATION

#### Bolt Torque* (UNC)

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### ENGLISH TORQUE SPECIFICATION

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### METRIC TORQUE SPECIFICATION

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6.7 HYDRAULIC FITTING TORQUE

TIGHTENING FLARE TYPE TUBE FITTINGS *

1. Check flare and flare seat for defects that might cause leakage.
2. Align tube with fitting before tightening.
3. Lubricate connection and hand tighten swivel nut until snug.
4. To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body and with the second tighten the swivel nut to the torque shown.

* The torque values shown are based on lubricated connections as in reassembly.

<table>
<thead>
<tr>
<th>Tube Size O.D</th>
<th>Nut Size Across Flats</th>
<th>Torque Value*</th>
<th>Recommended Turns To Tighten (After Finger Tightening)</th>
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</table>

TIGHTENING O-RING FITTINGS *

1. Inspect O-ring and seat for dirt or obvious defects.
2. On angle fittings, back the lock nut off until washer bottoms out at top of groove.
3. Hand tighten fitting until back-up washer or washer face (if straight fitting) bottoms on face and O-ring is seated.
4. Position angle fittings by unscrewing no more than one turn.
5. Tighten straight fittings to torque shown.
6. Tighten while holding body of fitting with a wrench.

* The torque values shown are based on lubricated connections as in reassembly.

<table>
<thead>
<tr>
<th>Tube Size O.D</th>
<th>Nut Size Across Flats</th>
<th>Torque Value*</th>
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Manual Improvement Program

If you have a suggestion on how to improve this manual, send it to us. Participants whose ideas are implemented will receive a free pair of Crary genuine leather gloves.

Send your suggestions to:
Crary Company
C/O Technical Writer
237 NW 12th St. Box 849
West Fargo, ND 78078

Suggestions: ________________________________

______________________________

______________________________

Name: ________________________________
Address: ________________________________
Phone Number: ________________________________
Email (if applicable): ________________________________
Product purchased: ________________________________
Manual part number: ________________________________