MAYO

Surge Hopper

Operators Manual

MAYO MANUFACTURING, INC. LIMITED WARRANTY

THE FOLLOWING WARRANTIES FOR MACHINERY, EQUIPMENT OR PARTS SOLD BY MAYO MANUFACTURING, INC. ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, OR THOSE WARRANTIES IMPOSED BY STATUE, INCLUDING, BUT NOT LIMITED TO ANY AND ALL IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND OF ANY AND ALL OTHER WARRANTY OBLIGATIONS ON THE PART OF MAYO MANUFACTURING, INC. (The Company).

The Company warrants the machinery, equipment or parts delivered against faulty workmanship or the use of parts delivered against faulty workmanship or the use of defective materials for a period of one (1) year from the date of shipment.

The Company's warranties set forth above are the only warranties made by the Company and shall not be enlarged, diminished or affected by, and no obligation or liability shall arise out of the Company's rendering technical or other advice or service in connection with the machinery, equipment or parts.

Parts or components furnished to the Company by third persons are guaranteed only to the extent of the original manufacturer's guarantee to the Company, a copy of which will be supplied to the Purchaser upon written request to the Company.

LIABILITY

THE COMPANY'S SOLE AND EXCLUSIVE MAXIMUM LIABILITY, AND PURCHASER'S SOLE AND EXCLUSIVE REMEDY under the above warranty shall be, at the Company's option, the repair, or replacement of the machine, equipment or part which is found to be defective due to faulty workmanship or defective materials, and is returned by the Purchaser to the Company within the warranty period. Shipment both ways and in transit damage shall be at the purchaser's risk and expense. If the Company elects to repair or replace the machine, equipment, or part, the Company will have a reasonable time within which to do so.

The remedies set forth above are available upon the following conditions:

1. Purchaser has promptly notified Company upon discovery that the machinery, equipment, or parts are defective due to faulty workmanship or defective materials; and
2. Purchaser provides Company with a detailed description of the deficiencies; and
3. Company's examination discloses that the alleged deficiencies exist and were not caused by accident, fire, misuse, neglect, alteration, or any other hazard or by Purchaser's improper installation, use or maintenance.

Such repair or replacement shall constitute fulfilment of all Company's liability to Purchaser, whether based on contract or tort.

This warranty does not apply to any machine that has been altered outside the factory in any way so as, in the judgement of Mayo, to affect its operation, reliability or safety, or which has been subject to misuse, neglect or accident.

In the event the Company breach any other provisions of the Purchase Agreement, the Company's EXCLUSIVE MAXIMUM LIABILITY AND PURCHASER'S EXCLUSIVE REMEDY, whether in contract or tort, otherwise shall not in any event exceed the contract price for the particular machine, piece of equipment or parts involved.

IN NO EVENT SHALL COMPANY BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY PROVISIONS OF THIS CONTRACT OR WARRANTY. SUCH EXCLUDE DAMAGES INCLUDE, BUT ARE NOT LIMITED TO, costs of REMOVAL AND REINSTALLATION OF ITEMS, Loss of GOODWILL, LOSS OF PROFITS, LOSS OF USE OR INTERRUPTION OF BUSINESS.

WARRANTY VOID IF NOT REGISTERED

MAYO MANUFACTURING, INC.

SURGE HOPPER MODEL 475

WARRANTY REGISTRATION FORM & INSPECTION REPORT

WARRANTY REGISTRATION

This form must be filled out by the dealer and signed by both the dealer and the customer at the time of delivery.

Customer's Name _____

Address _____

City, State/Prov., Code _____

Phone Number (_____) _____

Dealer's Name _____

Address _____

City, State/Prov., Code _____

Surge Hopper Model _____

Serial Number _____

Delivery Date _____

DEALER INSPECTION REPORT

_____ Tire Pressure Checked
_____ Wheel Bolts Torqued
_____ Inspect Electrical System
_____ Oil Reservoir Full
_____ Hydraulic Hoses Free
_____ Hydraulic Fittings Tight
_____ Lubricate Machine
_____ Conveyor Tensioned and Aligned
_____ Speed Reducer Gearbox Oil Level Checked

SAFETY

_____ All Decals Installed
_____ Lights, Reflectors and SMV Clean
_____ Review Operating and Safety Instructions

I have thoroughly instructed the buyer on the above described equipment which review included the Operator's Manual content, equipment care, adjustments, safe operation and applicable warranty policy.

Date _____ Dealer's Rep. Signature _____

Signature _____

The above equipment and Operator's Manual have been received by me and I have been thoroughly instructed as to care, adjustments, safe operation and applicable warranty policy.

Date _____ Owner's Signature _____

WHITE	YELLOW	PINK
MAYO MFG., INC.	DEALER	CUSTOMER

SERIAL NUMBER LOCATION

Always give your dealer the serial number of your Mayo Surge Hopper when ordering parts or requesting service or other information.

The serial number plate is located where indicated. Please mark the number in the space provided for easy reference.

SERIAL NUMBER LOCATION

Model _____

Serial Number _____

TABLE OF CONTENTS

1 INTRODUCTION

Congratulations on your choice of a Mayo Surge Hopper and welcome to Mayo's quality line of potato handling equipment. This equipment is designed and manufactured to meet the needs of a discriminating buyer in the agricultural industry for the loading, unloading, processing and storing of harvest yields.

Safe, efficient and trouble free operation of your new Mayo Surge Hopper requires that you, and anyone else who will be operating or maintaining the Surge Hopper, read, understand and practice ALL of the Safety, Operation, Maintenance and Trouble Shooting recommendations contained within this Operator's Manual.

This manual applies to the Surge Hopper Model 475 manufactured by Mayo. Certain options may be available to specifically tailor the Surge Hopper to your operation and may not be included in this manual. Please contact the manufacturer regarding additional information about these options. Use the Table of Contents and Index as a guide to find specific information.

Keep this manual handy for frequent reference and so that it will be passed on to new operators or owners. Call your Mayo dealer if you need assistance, information or additional copies of this manual.

MACHINE ORIENTATION - The hopper end of the Surge Hopper is the front. All electrical and hydraulic controls are on the left side.

2 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 your Mayo Surge Hopper 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 You Money
Accidents Can Be Avoided

SIGNAL WORDS:

Note the use of the signal words **DANGER, WARNING** and **CAUTION** with the safety messages. The appropriate signal word for each message has been selected using the following guide-lines:

A AIGUIEN QUE SI LO LEA PARA QUE LE TRADUZCA LAS MIDIDAS DE SEGURIDAD.

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.

If you have any questions not answered in this manual or require additional copies or the manual is damaged, please contact your dealer or Mayo, P.O. Box 497, Bus Highway 2, East Grand Forks, Minnesota, 56721. (Telephone) 218-773-1234, (FAX) 218-773-6693 or toll free at 1-800-223-5873.

SAFETY

YOU are responsible for the **SAFE** operation and maintenance of your Mayo Surge Hopper. **YOU** must ensure that you and anyone else who is going to operate, maintain or work around the Surge Hopper be familiar with the operating and maintenance procedures and related **SAFETY** information contained in this manual. This manual will take you step-by-step through your working day and alerts you to all good safety practices while operating the Surge Hopper.

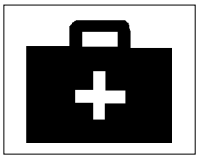
Remember, **YOU** are the key to safety. Good safety practices not only protect you but, also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this machine is familiar with the procedures recommended and follows safety precautions. Remember, most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

- Read and understand the Operator's Manual and all safety signs before supplying power to, operating, maintaining or adjusting the Surge Hopper.
- Surge Hopper owners must give operating instructions to operators or employees before allowing them to operate the Surge Hopper, and at least annually thereafter.
- The most important safety device on this equipment is a SAFE operator. It is the operator's responsibility to read and understand ALL Safety and Operating instructions in the manual and to follow these. Most accidents can be avoided.
- A person who has not read and understood all operating and safety instructions is not qualified to operate this 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!

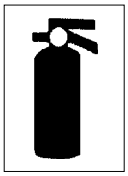
2.1 GENERAL SAFETY

1. Read and understand the Operator's Manual and all safety signs before supplying power to, operating, maintaining or adjusting the Surge Hopper.

2. Only trained, competent persons shall operate the Surge Hopper. An untrained operator is not qualified to operate this machine.
3. Provide a first-aid kit for use in case of an accident. Store in a highly visible place.



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



5. Install and properly secure all guards and shields before operating.
6. Wear appropriate protective gear. This list includes but is not limited to:

   - Protective shoes with slip resistant soles
   - Protective glasses or goggles
   - Heavy gloves
   - Hearing protection
7. Turn machine OFF, shut down and lockout power supply, relieve hydraulic pressure and wait for all moving parts to stop before servicing, adjusting, maintaining, repairing or cleaning. (Safety lockout devices are available through your Mayo dealer parts department).
8. Know the emergency medical center number for your area.
9. Review safety related items with all operators annually.

2.2 EQUIPMENT SAFETY GUIDELINES

1. Safety of the operator and bystanders is one of the main concerns in designing and developing a machine. However, every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling equipment. You, the operator, can avoid many accidents by observing the following precautions in this section. To avoid personal injury or death, study the following precautions and insist those working with you, or for you, follow them.

2. In order to provide a better view, certain photographs or illustrations in this manual may show an assembly with a safety shield removed. However, equipment should never be operated in this condition. Keep all shields in place. If shield removal becomes necessary for repairs, replace the shield prior to use.

3. Replace any safety sign or instruction sign that is not readable or is missing. Location of such safety signs is indicated in this manual.

4. Never use alcoholic beverages or drugs which can hinder alertness or coordination while operating this equipment. Consult your doctor about operating this machine while taking prescription medications.

5. **Under no circumstances should young children be allowed to work with this equipment. Do not allow persons to operate or assemble this unit until they have read this manual and have developed a thorough understanding of the safety precautions and of how it works.** Review the safety instructions with all users annually.

6. This equipment is dangerous to children and persons unfamiliar with its operation. The operator should be a responsible, properly trained and physically able person familiar with farm machinery and trained in this equipment's operations. If the elderly are assisting with farm work, their physical limitations need to be recognized and accommodated.

7. Never exceed the limits of a piece of machinery. If its ability to do a job, or to do so safely, is in question - **DON'T TRY IT.**

8. Do not modify the equipment in any way. Unauthorized modification result in serious injury or death and may impair the function and life of the equipment.

9. In addition to the design and configuration of this implement, including Safety Signs and Safety Equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of the machine. Refer also to Safety Messages and operation instruction in each of the appropriate sections of the auxiliary equipment and machine Manuals. Pay close attention to the Safety Signs affixed to the auxiliary equipment and the machine.

2.3 STORAGE SAFETY

1. Store the Surge Hopper on a firm level surface.

2. If required, make sure the unit is firmly blocked up.

3. Make certain that all mechanical locks are safely and positively connected before storing.

4. Store away from areas of human activity.

5. Do not allow children to play on or around the stored Surge Hopper.

6. Lock out power by turning off master control panel or junction box and padlocking the door shut to prevent electrocution or unauthorized start up of the Surge Hopper.

7. If equipped with an optional power pack, stop engine, remove ignition key, and unplug power cord to prevent unauthorized start-up of Surge Hopper.

2.4 SAFETY TRAINING

1. Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by a single careless act of an operator or bystander.

2. In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of this equipment.

3. 
It has been said, "The best safety feature is an informed, careful operator." We ask you to be that kind of an operator. It is the operator's responsibility to read and understand ALL Safety and Operating instructions in the manual and to follow these. Accidents can be avoided.

4. **Working with unfamiliar equipment can lead to careless injuries. Read this manual, and the manual for your auxiliary equipment, before assembly or operating, to acquaint yourself with the machines. If this machine is used by any person other than yourself. It is the machine owner's responsibility to make certain that the operator, prior to operating:**

   a. Reads and understands the operator's manuals.

   b. Is instructed in safe and proper use.

5. Know your controls and how to stop pilers, conveyors and any other auxiliary equipment quickly in an emergency. Read this manual and the one provided with your other equipment.

6. Train all new personnel and review instructions frequently with existing workers. Be certain only a properly trained and physically able person will operate the machinery. A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death. If the elderly are assisting with farm work, their physical limitations need to be recognized and accommodated.

2.5 SAFETY SIGNS

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

2. Replace safety signs that are missing or have become illegible.

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

4. Safety signs displayed in Section 3 each have a part number in the lower right corner. Use this part number when ordering replacement parts.

5. Safety signs are available from your authorized Distributor or Dealer Parts Department or the factory.

How to Install Safety Signs:

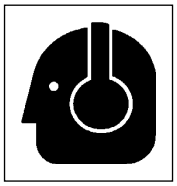
- Be sure that the installation area is clean and dry.
- Be sure temperature is above 50°F (10°C).
- Determine exact position before you remove the backing paper. (See Section 3).
- Remove the smallest portion of the split backing paper.
- Align the sign over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the sign in place.
- Small air pockets can be pierced with a pin and smoothed out using the piece of sign backing paper.

2.6 PREPARATION

1. Never operate the Surge Hopper and auxiliary equipment until you have read and completely understand this manual, the auxiliary equipment Operator's Manual, and each of the Safety Messages found on the safety signs on the Surge Hopper and auxiliary equipment.

2. Personal protection equipment including hard hat, safety glasses, safety shoes, and gloves are recommended during assembly, installation, operation, adjustment, maintaining, repairing, removal, or moving the implement. Do not allow long hair, loose fitting clothing or jewelery to be around equipment.

3. **PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS!** Motors or equipment attached can often be noisy enough to cause permanent, partial hearing loss. We recommend that you wear hearing protection on a full-time basis if the noise in the Operator's position exceeds 80db. Noise over 85db on a long-term basis can cause severe hearing loss. Noise over 90db adjacent to the Operator over a long-term basis may cause permanent, total hearing loss. **NOTE:** Hearing loss from loud noise (from tractors, chain saws, radios, and other such sources close to the ear) is cumulative over a lifetime without hope of natural recovery.



4. Clear working area of debris, trash or hidden obstacles that might be hooked or snagged, causing injury, damage or tripping.

5. Operate only in daylight or good artificial light.

6. Be sure machine is properly anchored, adjusted and in good operating condition.

7. Ensure that all safety shielding and safety signs are properly installed and in good condition.

8. Before starting, give the machine a "once over" for any loose bolts, worn parts, cracks, leaks, frayed belts and make necessary repairs. Always follow maintenance instructions.

2.7 INSTALLATION SAFETY

1. Disconnect and remove all mechanical locks, anchor chains and any other transport devices that would hinder or prohibit the normal functioning of the Surge Hopper upon start up. Serious damage to the machine and/or personal injury to the operator and bystanders may result from attempting to operate the machine while mechanical locking devices are still attached.

2. Position the machine on firm, level ground before operating.

3. Use the frame jacks to level the frame before using. Use a level to be sure.

4. Have at least one extra person available to assist when elevating, moving or positioning to other equipment.

5. Make certain that sufficient amperage, at the proper voltage and frequency (60Hz) is available before connecting power by following ANSI/NFPA 70 Wiring Standard. If you are uncertain, have a licensed electrician provide power to the machine.

6. If using Surge Hopper as part of material handling system, anchor securely to other equipment before starting.

2.8 LOCK-OUT TAG-OUT SAFETY

1. Establish a formal Lock-Out Tag-Out program for your operation.

2. Train all operators and service personnel before allowing them to work around the Surge Hopper.

3. Provide tags at the work site and a sign-up sheet to record tag out details.

4. Do not climb on unit unless motors are OFF and the power locked out at the master panel. Never perform any maintenance or service work while power is connected. Keep others away.

5. If equipped with an optional power pack, stop engine, remove ignition key, and unplug power cord to prevent unauthorized start-up of Surge Hopper.

2.9 OPERATING SAFETY

1. Read and understand the Operator's Manual and all safety signs before operating, maintaining, adjusting or repairing the Surge Hopper.

2. Turn machine OFF, shut down and lock out power supply (safety lockout devices are available through your Mayo dealer parts department), relieve hydraulic pressure and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.

3. Install and properly secure all guards and shields before operating.

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

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

6. Make sure all control switches are in the off position before connecting power supply.

7. Use frame jacks to level the frame before using.

8. Before supplying electrical power to the machine, be sure that you have adequate amperage at the proper phase and voltage to run it by following ANSI/NFPA 70 Wiring Standard. If you do not know or are unsure, consult a licensed electrician.

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

10. Stay away from overhead obstructions and power lines when moving the machine. Electrocution can occur without direct contact. Post an observer at the discharge end to guide the machine.

11. Do not stand between the frame and other structures or machines when moving frame or extending boom. Keep others away.

12. Keep the working area clean and dry.

13. Contact Mayo at (218) 773-1234 or 1 (800) 223-5873 if you have any questions.

14. Review safety instructions annually.

2.10 MAINTENANCE SAFETY

1. Read and understand all the information contained in the Operator's Manual regarding operating, servicing, adjusting, maintaining and repairing.

2. Turn machine OFF, shut down and lock out power supply (safety lockout devices are available through your Mayo dealer parts department), relieve hydraulic pressure and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.

3. Exercise extreme caution when working around, or with, high-pressure hydraulic systems. Depressurize the system before working on it.

4. Follow good shop practices:

   - Keep service area clean and dry.
   - Be sure electrical outlets and tools are properly grounded.
   - Use adequate light for the job at hand.

5. Wear heavy gloves and eye protection when searching for suspected hydraulic leaks. Use a piece of wood or cardboard as a backstop instead of hand to isolate and identify a leak. A high pressure concentrated stream of hydraulic fluid can pierce the skin. If such happens, seek immediate medical attention as infection and toxic reaction could develop.

6. Make sure all guards and doors are in place and properly secured when operating the Surge Hopper.

7. Do not work on Surge Hopper electrical system unless the power cord is unplugged or the power supply is locked out. Lock-out tag-out power source before performing any maintenance work.

2.11 HYDRAULIC SAFETY

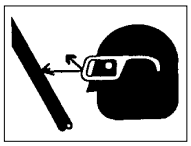
1. Make sure that all the components in the hydraulic system are kept in good condition and are clean.

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

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

4. 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.

5. 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.



2.12 ELECTRICAL SAFETY

1. Have only a qualified licensed electrician supply power.

2. Make certain that the Surge Hopper is properly grounded at the power source.

3. Make certain that all electrical switches are in the OFF position before plugging the Surge Hopper in.

4. **Turn machine OFF, shut down and lock out power supply (safety lockout devices are available through your Mayo dealer parts department), relieve hydraulic pressure and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.**

5. Disconnect power before resetting any motor or breaker overload.

6. Replace any damaged electrical plugs, cords, switches and components immediately.

7. Do not work on Surge Hopper electrical system unless the power cord is unplugged or the power supply is locked-out tagged-out.

2.13 TIRE SAFETY

1. Inflate tires to proper pressure as specified on the side wall of each tire. Do not overinflate or under-inflate.

2. 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.

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

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

2.14 TRANSPORT SAFETY

1. Make certain that you are in compliance with local, state/provincial and federal regulations regarding transporting agricultural equipment on public roadways. Install auxiliary light bar on rear of frame and turn lights on before moving.

2. Use pilot vehicles ahead of and behind the unit when transporting on a public highway.

3. Make certain that all wheels and tires are in good repair and that tires are inflated to proper pressure. Do not under-inflate or overinflate.

4. Make certain that all wheel bolts/lug nuts are tightened to proper torque specifications (refer to specification chart in Section 7.2).

5. Fully retract the telescoping boom, install lock and rest on support before transporting.

6. Make certain that all mechanical locks and integral anchor chains are safely and positively connected before loading or transporting.

7. Raise and secure the frame jacks/outriggers.

8. Disengage front power gears if towing.

9. Lower elevator/hopper to the fully down position before moving or transporting.

10. Wrap up and bind to the frame all loose hydraulic and electrical ends.

11. Be sure that any necessary SMV (slow moving vehicle) signs, reflectors and lights required by law are in proper place and are clearly visible to oncoming and overtaking traffic.

12. Be sure that the Surge Hopper is positively hitched to the towing vehicle. Use a proper safety cable to assure a safe hitch hook-up when transporting.

13. Adhere to local regulations regarding maximum weight, width and length.

14. Do not exceed 15 MPH (25 KpH). Reduce speed on rough roads and surfaces.

15. Do not allow anyone to ride on the Surge Hopper or towing vehicle during transport.

16. Always use hazard flashers on the towing vehicle when transporting.

2.15 EMPLOYEE SIGN-OFF FORM

Mayo Manufacturing, Inc. follows the general Safety Standards specified by the American Society of Agricultural and Biological Engineers (ASABE) and the Occupational Safety and Health Administration (OSHA). Anyone who will be operating and/or maintaining a Mayo built machine 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 such information has been reviewed. 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. We feel that an untrained operator is unqualified to operate this machine.

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

SIGN-OFF FORM

DATE	EMPLOYEE'S SIGNATURE	EMPLOYER'S SIGNATURE

3 SAFETY SIGN LOCATIONS

The types of safety signs and locations on the equipment are shown in the illustrations that follow. Good safety requires that you familiarize yourself with the various Safety Signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

A

CAUTION

- Read Operator's Manual before starting.
- Turn machine OFF, shut down and lock out power source, unplug power cord and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
- Keep all electrical components tight, dry and in good repair.
- Keep all hydraulic components tight and in good repair.
- Replace all worn or failed components immediately.
- Install and secure all guards before operating.
- Keep hands, feet, hair and clothing away from moving parts.
- Install safety locks on the boom and elevator before transporting or working under them.
- Lower boom and elevator to safety locks, center boom and install all safety locks before transporting.
- Use pilot vehicles when transporting.
- Stay away from overhead power lines and obstructions when moving. Electrocution can occur without direct contact.
- Do not stand or climb on machine when running. Keep others off.
- Have only a qualified electrician provide power to the machine.
- Review safety instructions annually.

D-101

B

DANGER

MISSING GUARD HAZARD

Install and secure guard before operating.

D-125

REMEMBER - If Safety Signs have been damaged, removed, become illegible or parts replaced without safety signs, new signs must be applied. New safety signs are available from your authorized dealer.

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C

D

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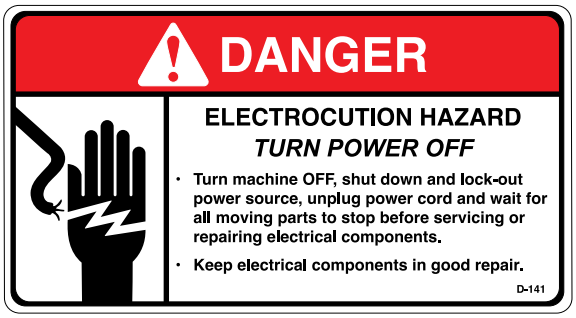
E



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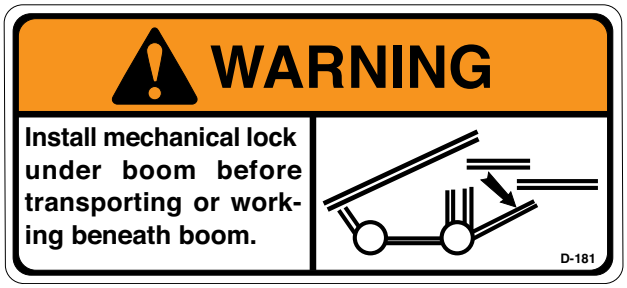

REMEMBER - If Safety Signs have been damaged, removed, become illegible or parts replaced without safety signs, new signs must be applied. New safety signs are available from your authorized dealer.

The types of safety signs and locations on the equipment are shown in the illustrations that follow. Good safety requires that you familiarize yourself with the various Safety Signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

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- Think SAFETY! Work SAFELY!

REMEMBER - If Safety Signs have been damaged, removed, become illegible or parts replaced without safety signs, new signs must be applied. New safety signs are available from your authorized dealer.

4 OPERATION

OPERATING SAFETY

- Read and understand the Operator's Manual and all safety signs before operating, maintaining, adjusting or repairing the Surge Hopper.
- Turn machine OFF, shut down and lock out power supply (safety lockout devices are available through your Mayo dealer parts department), relieve hydraulic pressure and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.
- Install and properly secure all guards and shields before operating.
- Keep hands, feet, hair and clothing away from all moving parts.
- Clear the area of bystanders, especially small children, before starting.
- Make sure all control switches are in the off position before connecting power supply.
- Use frame jacks to level the frame before using.
- Keep the working area clean and dry.
- Before supplying electrical power to the machine, be sure that you have adequate amperage at the proper phase and voltage to run it by following ANSI/NFPA 70 Wiring Standard. If you do not know or are unsure, consult a licensed electrician.
- Before applying pressure to the hydraulic system, make sure all components are tight and that all steel lines, hoses and couplings are not damaged.
- Stay away from overhead obstructions and power lines when moving the machine. Electrocution can occur without direct contact. Post an observer at the discharge end to guide the operator.
- Do not stand between the frame and other structures or machines when moving frame or extending boom. Keep others away.
- Contact Mayo at (218) 773-1234 or 1 (800) 223-5873 if you have any questions.
- Review safety instructions annually.

4.1 TO THE NEW OPERATOR OR OWNER

The Mayo Manufacturing Surge Hopper is designed as a conveyor with a large tank to hold potatoes going through a handling system that allows transport vehicles to continue to unload if the conveying system must be stopped. Potatoes are accumulated in the large compartment until the conveying system starts again. Be familiar with the machine before starting.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of this equipment. It is the responsibility of the owner or operator to read this manual and to train all other operators before they start working with the machine.

Follow all safety instructions exactly. Safety is everyone's business. By following recommended procedures, a safe working environment is provided for the operator, bystanders and the area around the worksite. Untrained operators are not qualified to operate the machine.

Many features incorporated into this machine are the result of 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 Surge Hopper will provide many years of trouble-free service.

4.2 MACHINE COMPONENTS

The Mayo Manufacturing Surge Hopper consists of a receiving hopper, elevator, telescoping boom and large hopper/ unloading conveyor for accumulating potatoes in a conveying system. Transport trucks can continue to unload and fill the accumulating hopper if the conveying line stops.

The telescoping conveyor starts by placing the potatoes on the unloading conveyor close to the discharge area. Sensors monitor the pile height and automated controls raise or lower the telescoping conveyor to track the pile. Controls will retract the telescoping conveyor when maximum pile height is achieved. The telescoping conveyor will continue to retract until the accumulating hopper is full or will extend when sensors monitor the pile height moving toward the discharge end of the accumulating hopper. This allows the trucks to continue to unload and the surge Hopper accumulates the unloaded product until they are needed by the processing part of the harvesting process.

3 outriggers on each side of the frame are used to level and support the frame as it is filled. All feet must be lowered and supported before filling the unit.

The master control panel is mounted on the left side of the frame along with the hopper height control, outrigger position, hydraulic system selector, boom height and discharge conveyor control.

The hydraulic system pump is on the left side of the frame and the reservoir is on the right. Hydraulic motors power the variable speed discharge conveyor, hydraulic controls operate the telescoping conveyor extend / retract and up / down functions, infeed hopper height, outriggers, and stinger up / down functions (if present). Electric motors power the elevator drive, top and bottom boom conveyors, and stinger conveyor (if present). Sensors on the top conveyor frame monitor the position of the boom.

Optional tarp strap anchors are available for mounting on both sides of the frame. An observation ladder is mounted on the left side to allow personnel to monitor the machine during operation.

A Stingers
B Hopper
C Elevator
D Top Conveyor
E Boom
F Discharge Conveyor
G Discharge
H Hydraulic Pump
J Hydraulic Reservoir
K Outriggers
L Ladder
M Tarp Strap Anchors
N Discharge Controls
O Boom Position Sensors
P Storage Bin
Q Pile Sensors
R Master Controller

FIG. 1 MACHINE COMPONENTS


Mayo
A
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4.3 GENERAL OPERATION THEORY

Mayo Surge Hoppers are used to accumulate potatoes in a conveying line and maintain an even flow of product to the next piece of equipment. Transport trucks place a large quantity of potatoes into the conveying system in a very short time. Then there are no potatoes placed into the system until the next truck unloads.

The Surge Hopper is designed to accept a large quantity of potatoes very quickly and store them while discharging an even flow into the next machine.

The machine is designed with a frame for attaching Stingers on the front for unloading transport trucks. Electric and hydraulic power is also provided on the front for the Stingers.

Loading

Discharge

FIG. 2 SURGE HOPPER OPERATION

4.4 MACHINE BREAK-IN

Although there are no operational restrictions on the Surge Hopper when used for the first time, it is recommended that the following mechanical items be checked:

A. Read Surge Hopper and auxiliary equipment manuals before starting.

B **Before starting:**

1. After connecting the power wires, it is recommended that a 'bump' test be done to determine if the hydraulic pump is turning in the required direction. When wired up, bump the on switch momentarily to determine the direction of rotation. The motor should be turning clockwise when observing the end of the motor. If it isn't, reverse the power leads.

2. Verify the gearbox breather vent is in the open position. To open the vent, make a ¼ turn counter clock-wise.

FIG. 3 PUMP ROTATION

FIG. 4 GEARBOX BREATHER (TYPICAL)

C. **After operating for 1/2 hour:**

1. Retorque all wheel bolts and fasteners.

2. Check that all electrical connections are tight and cords are routed out of the way or protected.

3. Check for leaks in hydraulic system. Retorque fittings that leak.

4. Check that no hydraulic lines are being pinched or crimped. Reroute as required.

5. Check oil level in hydraulic reservoir. Top up as required.

6. Check the alignment and tension of the conveyor belt. Realign or tighten as required.

7. Check oil level in each speed reduction gearbox for each drive. Top up as required.

8. Lubricate all grease fittings.

D. **After 2, 5 and 10 hours of operation:**

1. Retorque all wheel bolts and fasteners.

2. Check that all electrical connections are tight and cords are routed out of the way or protected.

3. Check for leaks in hydraulic system. Retorque fittings that leak.

4. Check that no hydraulic lines are being pinched or crimped. Reroute as required.

5. Check oil level in hydraulic reservoir. Top up as required.

6. Check the alignment and tension of the conveyor belt. Realign or tighten as required.

7. Check oil level in each speed reduction gearbox for each drive. Top up as required.

8. Lubricate all grease fittings.

9. Go to regular servicing and maintenance schedule as defined in the Maintenance Section.

4.5 PRE-OPERATION CHECKLIST

Safe and efficient operation of your new Surge Hopper requires that each operator reads and follows all safety precautions and operating procedures contained in this section. Performing the following pre-operation checklist is important for personal safety as well as for continued mechanical soundness and longevity of your new Mayo Surge Hopper. The checklist should be performed before operating the Surge Hopper and prior to each operation thereafter.

1. Lubricate the machine according to the schedule prescribed in the "Maintenance Section".

2. Insure that proper protective gear is in good repair and available for use by each operator. Make certain that each operator uses the protective gear. Protective gear includes but, is not limited to:

   - Leather gloves
   - Safety glasses or face shield
   - Full length protective clothing
   - Steel toed boots with slip resistant soles.

3. Check the oil level in the hydraulic reservoir as prescribed in the "Maintenance Section".

4. Check for hydraulic leaks. Tighten fittings or reroute hoses as required to maintain a leak-free system.

5. Insure that all safety guards and shields are in good repair and securely in place.

6. Check that the conveyor belts are centered on the head and tail rollers. Adjust if necessary as outlined in the "Maintenance Section".

7. Make sure that all electrical switches are in the OFF position before supplying power.

8. Check that all electrical connections are tight and cords are routed out of the way or protected.

9. Be sure the working area is clean and dry to prevent tripping or slipping.

10. Check fluid levels in speed reducing gearboxes and hydraulic reservoir. Top up as required.

4.6 CONTROLS

It is recommended that all operators 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 features but they are similar and all controls are labelled.

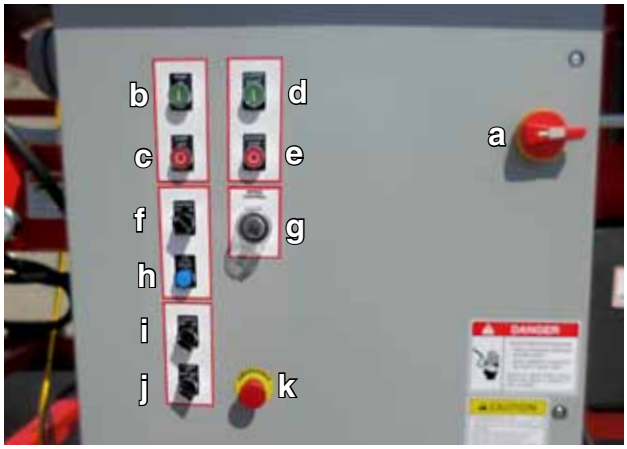


FIG. 5 ELECTRICAL CONTROLS

1. **Electrical Panel Controls:**

   a. **Local Disconnect Off / On:**
   This large red handle controls the electrical power to the control box. Turn the handle to its vertical position to turn power ON and horizontal to turn OFF.

   NOTE
   Turn the handle clockwise to its vertical position to turn power on.

   b. **Pump ON:**
   This green push-button switch controls the power to the electric motor to the hydraulic pump. Depress to turn pump ON.

   c. **Pump OFF:**
   This red push-button switch controls the power to the electric motor to the hydraulic pump. Depress to turn power OFF.

   d. **System Start:**
   This green push-button switch controls the start mode for the program that controls the automated functions of the machine. Depress to enable the automatic loading of the accumulating hopper. The Control Off / On switch (Item (f)) must be in the On position for the automatic functions to run.

   e. **System Stop:**
   This red push-button switch controls the stop mode for the program that controls the automated functions of the machine. Depress to disable the automatic loading of the accumulating hopper. The Control Off / On switch (Item (f)) must be in the On position for the automatic functions to operate.

   f. **Control OFF/ON:**
   This 2 position selector switch enables the automatic functions for loading of the accumulating hopper. Turn clockwise to enable the automatic system. Turn counter-clockwise to disable the automatic system.

   g. **Speed Control:**
   This variable potentiometer controls the elevator and boom conveyor speeds. Turn clockwise to increase conveyor speed and counterclockwise to decrease. The speed can be set from 0 to 100% of range.

   h. Auto System Running:
   This blue light indicator is lit when the System Start switch is depressed to turn system ON, It goes out when the system is OFF.

   i. **Light Switch:**
   This 2 position rotary switch controls the power to the optional lights. Turn the switch clockwise to turn the lights ON and counter-clockwise to turn OFF.

   j. **Stinger Manual: OFF: Auto:**
   This 3 position rotary switch controls the operation of the Stinger. Turn fully counterclockwise to operate Stingers manually. Turn until the indicator is pointing up to turn stingers OFF. Turn fully clockwise to operate in "Auto" mode.

   k. **Emergency Stop:**
   This red push/pull button is the emergency STOP control for the machine and stops all electrical and hydraulic functions. Push the control in for emergency STOP. Place all the individual controls in their OFF position. Before the machine can be restarted, the emergency STOP button must be turned clockwise to release it before it can be pulled out.

2. **Discharge Conveyor Controls:**
The controls for the discharge conveyor are mounted on the left side of the frame above the discharge. The pumps must be turned ON before the conveyor can be operated.

a. **Discharge Conveyor Hand/OFF/Auto:**
This 3 position rotary switch controls the discharge conveyor operating mode. Turn fully counterclockwise to operate in the HAND (manual) mode. Turn clockwise so the pointer is pointing vertical to turn the conveyor off. Turn fully clockwise to enable automatic operation of the discharge belt. The Control Off / On switch (Item (f)) must be in the ON position for the automatic functions to operate.

b. **Interlock OFF/ON:**
This 2 position selector switch determines control of the discharge conveyor by downstream equipment. Turn clockwise to enable interlock. With interlock enabled, a closed downstream contact will start the discharge conveyor. The discharge conveyor will stop when those contacts are open. Turn the Interlock switch clockwise to operate the discharge conveyor manually with the Discharge Conveyor Hand/ Off/ Auto switch.

c. **Emergency Stop:**
This red push/pull button is the emergency STOP control for the machine and stops all electrical and hydraulic functions. Push the control in for emergency STOP. Place all the individual controls in their OFF position. Before the machine can be restarted, the Emergency STOP button must turned clockwise to release it before it can be pulled out.

d. **Discharge Belt Speed Control:**
This Adjustable Flow Control Valve varies the speed of the discharge belt. Rotate the handle clockwise to vary the flow from 0 flow to maximum controlled flow. Adjust the set bolt to maintain valve position.

e. **Pressure Gauge:**
This gauge displays the pressure in the discharge belt drive system. Generally it should not take more than 700 to 1000 psi to power this system.

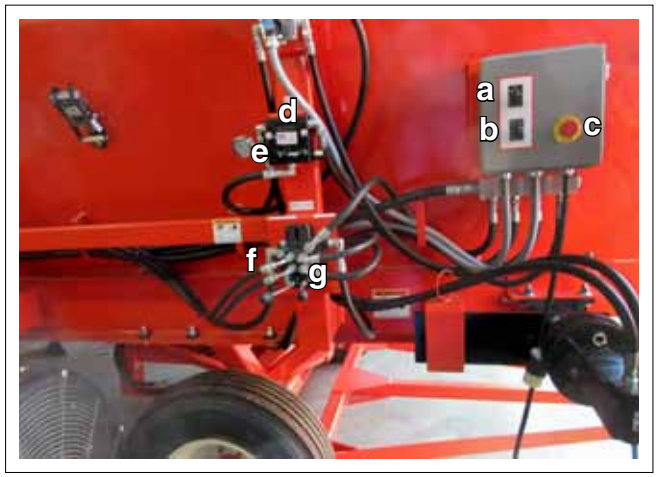


FIG. 6 DISCHARGE END CONTROLS

f. **Tractive Drive:**
This 3 position spring-loaded-to-neutral-center controls the machine tractive drive. Lift and hold the lever to move the machine forward. Release the lever and it will return to its centered neutral position and the movement will stop. Push the lever down and hold to move the machine rearward. Release the lever and the machine will stop moving.

g. **Steering:**
This 3 position spring-loaded-to-neutral-center controls the machine steering. Lift and hold the lever to turn the front wheels to the right. Release the lever and the front wheels will stop turning. Push down and hold to turn the front wheels to the left. Release the lever and the wheels wills top turning.

3. **Center Hydraulic Valves:**

   a. **Boom UP/DOWN:**
   Replace with, “This 3 position solenoid operated valve with manual override lever controls the height of the boom. Operation of this valve is controlled either by the program, when the Control Switch is in the “ON” position, or by the manual override levers with the Control Switch in the “Off” position. Verify Selector Valve is in the left-hand position for operation, see Section 4.6.4.

   Raise and hold the lever until it reaches the required height. Release the lever and the boom will stop moving. Push down and hold to lower the boom. Release the lever and the boom will stop moving.

   b. **Boom IN/OUT**
   This 3 position solenoid operated valve with manual override lever controls the extending and retracting of the boom. Operation of this valve is controlled either by the program, when the Control Switch is in the “ON” position, or by the manual override levers with the Control Switch in the “Off” position. Verify Selector Valve is in the left-hand position for operation, see Section 4.6.4.

   c. **Pressure Gauge:**
   This gauge displays the pressure in the boom extend/retract drive system. Generally it should not take more than 700 to 1000 psi to power this system.

4. **Selector Valve:**
   Raise and hold the lever to retract the boom. Release the lever and the boom will stop moving. Push down and hold the lever to extend the boom. Release the lever and the boom will stop moving.

FIG. 7 CENTER VALVES AND GAUGES

Jacks

Other

FIG. 8 SELECTOR VALVE

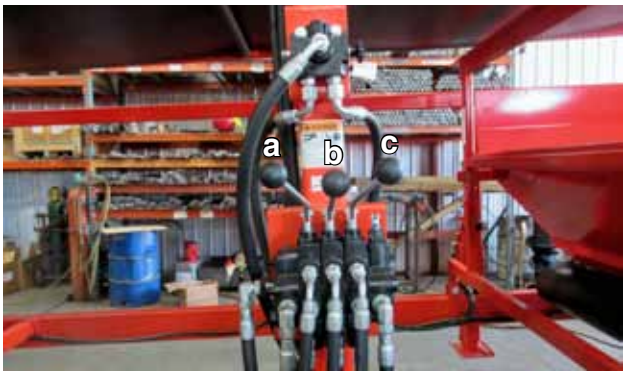
5. **Outrigger Position:**
A 3 valve bank of hydraulic valves is mounted on each side of the frame to raise and lower the outriggers. Each lever corresponds to the outrigger on that side of the frame.

   a. Left lever - Left outrigger.

   b. Center lever - Center outrigger.

   c. Right lever - Right outrigger.

   Each lever functions the same: Each is a spring-loaded-to-center-neutral to move the outrigger. Move lever up and hold to raise the outrigger. Release the lever and the outrigger will stop move. Move lever down hold to lower outrigger. Always lower all the outriggers to the ground before loading machine.



Right

Left

FIG. 9 OUTRIGGER POSITION

6. **Emergency Stop:**
An emergency stop switch is provided on the front of the frame for an operator standing next to the hopper. This red push/pull button is the emergency STOP control for the machine and stops all electrical and hydraulic functions. Push the control in for emergency STOP. Place all the individual controls in their OFF position. Before the machine can be restarted, the Emergency STOP button must be turned clockwise to release it before it can be pulled out.

FIG. 10 FRONT EMERGENCY STOP

7. **Turnbuckles (If machine is equipped with stinger mounts.):**
The machine is equipped with 3 turnbuckles between the front frame and the each Stinger mounting frame to set the frame angle. Extend or retract the turnbuckles to provide the required mounting frame angle appropriate for the application.

FIG. 11 TURNBUCKLE (TYPICAL)

8. **Proximity Sensor:**
The Surge Hopper is designed with 2 proximity sensors mounted to the end of the boom and senses the position of the pile of potatoes in the hopper. It is connected to the machine computer to keep the end of the boom close to the potatoes to minimize drop height and keep hopper full.

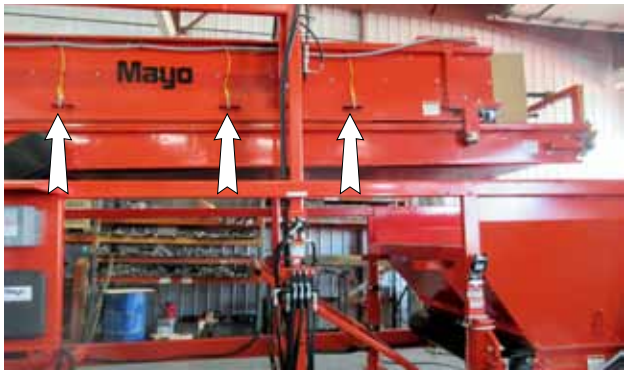


FIG. 12 PROXIMITY SENSOR

9. **Boom Position Sensors:**
The left side of the boom frame is equipped with 4 magnetic proximity sensors to allow the machine computer to determine the position of the boom. By knowing the position of the boom and the height of the pile of potatoes, the hopper is kept full. Always maintain a 1/16 inch (2 mm) clearance between sensor and base for the best results.

FIG. 13 BOOM POSITION SENSOR

10. **Elevator Height:**
This 3 position spring-loaded-to-neutral-center hydraulic valve controls the height function of the elevator. Move the lever UP and hold to raise the elevator and move DOWN and hold to lower it. Release the lever and it will return to its neutral position and the elevator will stop moving.

FIG. 14 ELEVATOR HEIGHT

11. **Stinger Height:**
This 3 position spring-loaded-to-neutral-center hydraulic valve controls the height of the Stinger. Move the lever UP and hold to raise the Stinger and move DOWN and hold to lower it. Release the lever and it will return to its neutral position and the Stinger will stop moving.

FIG. 15 STINGER HEIGHT (TYPICAL)

12. **Stingers:**

a. **ON/OFF:**
This 2 position rotary switch controls the power to the Stinger drive. Turn counterclockwise to turn OFF and clockwise to turn ON.

b. **Emergency Stop:**
This red push/pull button is the emergency STOP control for the machine and stops all electrical and hydraulic functions. Push the control in for emergency STOP. Place all the individual controls in their OFF position. Before the machine can be restarted, the Emergency STOP button must turned clockwise to release it before it can be pulled out.

FIG. 16 STINGER CONTROLS (TYPICAL)

4.7 MACHINE PREPARATION

The machine must be properly prepared prior to use. Before starting the machine, be sure that the following items are appropriately set for your machine by following ANSI/NFPA 70 Wiring Standard.

1. **Power:**
   If the machine will be used in a location with power, have a qualified electrician install the wiring system to provide power at the required voltage, phase and amperage for your machine.

   Be sure to use an extension cord of the correct specifications for the power being carried. Route the cord so that it does not interfere with the working area. Provide appropriate protection when people or equipment must go over the cord. Inspect the cord occasionally to be sure it is not damaged. Replace immediately if it is damaged.

   If a generator set is used to provide power, be sure the set can supply the required power at the appropriate voltage, phase and amperage. An improper source of power will cause damage to the electrical components and could create an electrical hazard to the operator, worker or bystanders.

2. **Hitch:**
   A solid or hitch is attached to the rear of the frame. It is recommended that hitch be removed when operating to prevent interfering with the working area.

3. **Frame Jacks:**
   All machines are equipped with mechanical jacks for supporting the frame during operation and storage. Raise the jacks into their fully UP position before moving or transporting.

4. **Training:**
   Establish a lock-out tag-out policy for your worksite and train everyone in how it is implemented. Do not allow anyone to operate the machine on the worksite unless they follow the lock-out tag-out policy.

FIG. 17 HITCH REMOVAL

Left Side

Right Side

FIG. 18 FRAME JACKS

4.8 OPERATING

OPERATING SAFETY

- Read and understand the Operator's Manual and all safety signs before operating, maintaining, adjusting or repairing the Surge Hopper.
- Turn machine OFF, shut down and lock out power supply (safety lockout devices are available through your Mayo dealer parts department), relieve hydraulic pressure and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.
- Install and properly secure all guards and shields before operating.
- Keep hands, feet, hair and clothing away from all moving parts.
- Clear the area of bystanders, especially small children, before starting.
- Make sure all control switches are in the off position before connecting power supply.
- Use frame jacks to level the frame before using.
- Before supplying electrical power to the machine, be sure that you have adequate amperage at the proper phase and voltage to run it. If you do not know or are unsure, consult a licensed electrician.
- Before applying pressure to the hydraulic system, make sure all components are tight and that all steel lines, hoses and couplings are not damaged.
- Stay away from overhead obstructions and power lines when raising the discharge end. Electrocution can occur without direct contact. Post an observer at the discharge end to guide the operator.
- Do not stand between the frame and other structures or machines when raising or swinging the Surge Hopper. Keep others away.
- Keep the working area clean and dry.
- Contact Mayo at (218) 773-1234 or 1 (800) 223-5873 if you have any questions.
- Review safety instructions annually.

Follow this procedure when using the Surge Hopper:

1. Review Section 4.6 Machine Preparation and follow all the instructions.
2. Review and follow the pre-operation checklist (See Section 4.4).
3. Review the location and function of all controls (See Section 4.5).
4. Move the machine into its operating position with the discharge end over the hopper of the other equipment appropriate to the application.

FIG. 19 POSITIONED

5. **Starting:**

   a. Clear the area of bystanders. Know where everyone is before starting.

   b. Place all controls in the OFF or neutral position, including the remote controls (if so equipped).

   c. Turn the power to the machine ON at the master panel if connected to a hard wired power source.

   d. Start the generator set and bring to its full power output (if powered by generator).

   e. Turn ON equipment that moves potatoes away from Surge Hopper.

   f. Turn the control panel master switch ON.

   g. Turn the pump ON.

   h. Turn the machine systems ON (Refer to Section 4.7 Controls).

   i. Turn the machine ON to start conveyors and provide power to all hydraulic functions.

   j. Turn Stingers ON and start unloading trucks.

   k. Turn the operating mode switch to HAND or AUTO for manual or remote control per your conditions and configuration.

6. **Stopping:**

   a. Turn OFF the equipment that brings material to the Surge Hopper and Stingers.

   b. Wait until the material has moved off the end of the discharge conveyor.

   c. Turn the conveyors OFF.

   d. Turn the hydraulic pumps OFF.

   e. Turn machine system OFF.

   f. Turn generator OFF (if powered by generator).

   An alternative is to depress one of the red STOP buttons on one of the control boxes or on the hopper frame. But then all controls must be turned OFF.

7. **Emergency STOP:**
   Depress the large red STOP button on one of the control boxes or on the hopper frame. This will stop all conveyors, hydraulic pumps and shut down the machine computer.

Master Control Box

Discharge Control Box

Hopper Frame

Stinger

FIG. 20 STOP CONTROLS

8. **Surge Hopper Program Controls:**
The machine is designed with a program to control the position of the boom and keep the accumulating hopper filled. Rotating the Control Switch to "ON" will allow the program to operate the boom position. Depress the "System Start" switch to enable the program and start the machine.

The system is programmed to fill the accumulating hopper, even if there are no potatoes being unloaded on the discharge conveyor.

Sensors monitor the height of the potatoes and position the boom/conveyor to raise/lower or extend/ retract the boom to maintain the pile in the accumulating hopper.

Sensors monitor the pile height and the automated controls raise or lower the telescoping conveyor to track the pile. After being fully extended, controls will retract the telescoping conveyor when maximum pile height is achieved. The telescoping conveyor will continue to retract until the accumulating hopper is full or will extend when sensors monitor the pile height moving toward the discharge end of the accumulating hopper.

a. Potato sensor detects potatoes:
Retracts boom to preserve 6 inch (150 mm) clearance.

b. Potato sensor does not detect potatoes:
Extends boom until potatoes are detected. If no potatoes are detected, boom extends fully and operation proceeds.

ON Switch

Potato Sensor

Boom Sensors (Typical)

Operating

FIG. 21 SURGE HOPPER COMPUTER

9. **Hitch:**
   A solid hitch is attached to the rear of the frame. It is recommended that the hitch be removed when operating to prevent interference in the work area.

FIG. 22 HITCH

10. **Boom Sensors:**
    The boom is equipped with 4 sensors evenly spaced along the left side of the frame to sense the boom position during operation. A signal is sent to the computer via the magnetic sensor that indicates the position of the boom and a "beep" sounds. When the boom contacts the front sensor, there is a double "beep".

    Always maintain the clearance between the sensor and metal plug at 1/16 inch (2 mm) or the thickness of a nickle for the best results.

Sensors

Clearance

FIG. 23 BOOM SENSORS

11. **Viewing Ladder:**
A ladder to see inside the hopper compartment is provided to allow personnel to visually inspect the inside of the compartment.

NOTE

This is just a viewing ladder. Not an access or working ladder.

Ladder

Viewing

FIG. 24 VIEWING LADDER

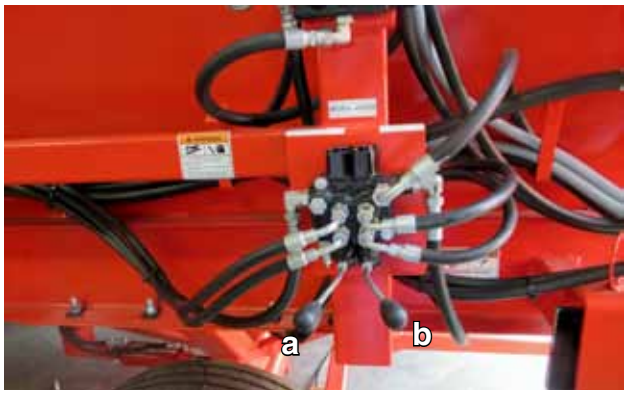
12. **Tractive Drive:**
Each machine is designed with power gears on the front wheels to move the unit short distances around the worksite. Depress the rods on the power wheel cover to engage the driving gears. Pop the rods out to disengage power wheels if towing.

    a. **Moving Machine:**
    This 3 position spring-loaded-to-neutral-center hydraulic valve controls the movement of the machine. Move the lever up and hold to move the machine forward and move down and hold to go in reverse. Release the lever and it will return to its neutral position and the machine will stop moving.

    b. **Steering:**
    This 3 position spring-loaded-to-neutral-center hydraulic valve controls the steering of the front wheels. Move the lever up and hold to turn the wheels to the right and down to turn left. Release the lever and it will return to its neutral position and the front wheels will stop turning.

Engaged

Disengaged



Controls

FIG. 25 TRACTIVE DRIVE

13. **Boom Extending:**
The boom can be extended manually by using the rear hydraulic valve closest to the main control panel. Move the lever UP and hold to retract boom and DOWN and hold to extend. The Control Switch must be turned to the “OFF” position to operate the manual override levers for the extend / retract functions and the pumps turned ON before the boom can be moved manually.

Control Lever

Extender Drive

Retracted

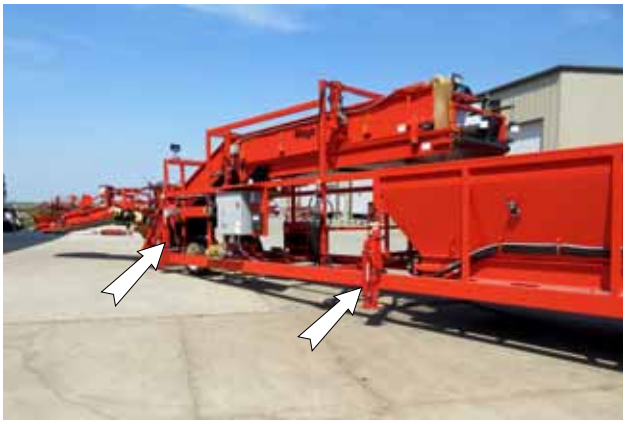
Extended

FIG. 26 BOOM EXTENDING

14. **Frame Jacks/Outriggers:**
Always support the machine on the frame jacks/outriggers to provide the necessary stability during operation. 3 Jacks/outriggers are located on each side of the frame. All must be on the ground to support the frame and prevent overloading.

IMPORTANT

Be sure to level the machine fore/aft and left/right for proper loading of the accumulating hopper. If not leveled, product spillage may occur.



Left

Right

FIG. 27 FRAME JACKS/OUTRIGGERS (TYPICAL)

15. **Operating hints:**

a. Be sure that all workers and operators are supplied with and use the required safety gear.

b. Keep the working area clean and dry to prevent slipping and tripping.

c. Train all operators before starting. An untrained operator is not qualified to operate this machine and exposes himself and others to needless hazards.

d. Use the automatic boom movement function to keep the end of the boom as close to the pile in the hopper compartment as possible to minimize the drop height.

e Establish a Lock-out Tag-out program for your operation and require all employees to follow it.

FIG. 28 OPERATING

4.9 TRANSPORT

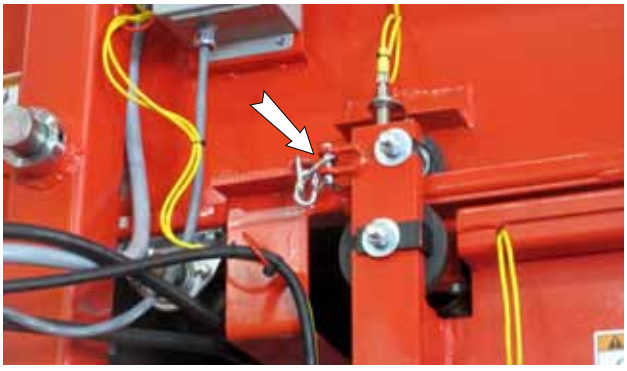
TRANSPORT SAFETY

- Make certain that you are in compliance with local, state/provincial and federal regulations regarding transporting agricultural equipment on public roadways. Install auxiliary light bar on rear of frame and turn lights on before moving.
- Use pilot vehicles ahead of and behind the unit when transporting on a public highway.
- Make certain that all wheels and tires are in good repair and that tires are inflated to proper pressure. Do not under-inflate or overinflate.
- Make certain that all wheel bolts/lug nuts are tightened to proper torque specifications (refer to specification chart in Section 7.2).
- Fully retract the telescoping boom, install lock and rest on support before transporting.
- Make certain that all mechanical locks and integral anchor chains are safely and positively connected before loading or transporting.
- Raise and secure the frame jacks/outriggers.
- Disengage front power gears if towing.
- Lower elevator/hopper to the fully down position before moving or transporting.
- Wrap up and bind to the frame all loose hydraulic and electrical ends.
- Be sure that any necessary SMV (slow moving vehicle) signs, reflectors and lights required by law are in proper place and are clearly visible to oncoming and overtaking traffic.
- Be sure that the Surge Hopper is positively hitched to the towing vehicle. Use a proper safety cable to assure a safe hitch hook-up when transporting.
- Adhere to local regulations regarding maximum weight, width and length.
- Do not exceed 15 MPH (25 KpH). Reduce speed on rough roads and surfaces.
- Do not allow anyone to ride on the Surge Hopper or towing vehicle during transport.
- Always use hazard flashers on the towing vehicle when transporting.

Mayo Surge Hoppers are designed to be easily and conveniently moved from location to location. The machine can be towed by a tractor or other power unit in a yard or work site. Each machine is equipped with an integral drive system that is designed to move the unit short distances around the work site. The driving gears in the power wheels must be disengaged if towing. When transporting a long distance, it is recommended that it be loaded on a transport truck.

1. Install optional auxiliary light bar if so equipped on rear of frame and turn lights on before moving.
2. Use pilot vehicles ahead of and behind the unit when transporting on a public highway.
3. Disconnect and remove all auxiliary equipment from the Surge Hopper and position so the tow unit can back up to the back of the machine.
4. Stay away from overhead power lines. Electrocution can occur without direct contact.
5. Retract the boom to its shortest position.

Retracted



Anchor Chain

FIG. 29 BOOM RETRACTED

6. Raise and stow all jacks/outriggers into their fully UP positions.

7. Unplug and stow the power cord.

FIG. 30 JACKS/OUTRIGGERS FULLY UP

8. Raise the boom support and rest the boom on it. Secure support with anchor pins.

FIG. 31 BOOM SUPPORT

9. Disengage power wheel driving gears. Pop rod out.

10. Disconnect steering cylinder.

FIG. 32 POWER WHEELS

11. Attach to the tow unit with a drawbar pin and retainer. Attach a safety cable.

FIG. 33 HITCH/SAFETY CABLE

12. Connect wiring harness.

13. Install an SMV on the rear frame.

14. Use pilot vehicles and install auxiliary lights on the machine when transporting.

15. Clean all the reflectors.

16. Be sure all bystanders are clear of the machine.

17. Keep to the right and yield the right-of-way to allow faster traffic to pass. Drive on the road shoulder, if permitted by law.

18. Make sure the SMV (Slow Moving Vehicle) emblem and all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic.

19. It is not recommended that the machine be transported faster than 15 mph (25 km/hr). Table 1 gives the acceptable transport speed as the ratio of tractor weight to Surge Hopper weight.

20. Do not allow riders on the machine or tractor.

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

Table 1 Travel Speed vs Weight Ratio

Road Speed	Weight of fully equipped or loaded implement(s) relative to weight of tow vehicle.
Up to 15 mph (25 kph)	1 to 1 or less
Up to 10 mph (16 kph)	2 to 1 or less
Do not tow	More than 2 to 1

22. **Truck Transporting:**
Prepare for loading by:

    a. Raising jacks, retracting boom, removing Stingers, stowing power cord and removing hitch.

    b. Use 2 forklifts with at least 10 ton capacity to lift the frame.

    c. Back the trailer under the machine.

    d. Lower the jacks and support the weight of the machine on them.

    e. Tie down securely.

    f. Attach all flags, signs and placards required by transport authorities.

4.10 STORAGE

STORAGE SAFETY

- Store the Surge Hopper on a firm level surface.
- If required, make sure the unit is firmly blocked up.
- Make certain that all mechanical locks are safely and positively connected before storing.
- Store away from areas of human activity.
- Do not allow children to play on or around the stored Surge Hopper.
- Lock out power by turning off master control panel or junction box and padlocking the door shut to prevent electrocution or unauthorized start up of the Surge Hopper.

4.10.1 PLACING IN STORAGE

At the end of the season, the machine should be thoroughly inspected and prepared for storage. Repair or replace any worn or damaged components to prevent any unnecessary down time at the beginning of the next season. Follow this procedure:

1. Start the hydraulic pumps and run for 10 minutes to bring the oil to operating temperature. Change the hydraulic oil if appropriate as specified in the Maintenance Section.
2. Inspect the conveyor belts. Realign if the belts are not tracking in the center of the frame. Replace if the edges are damaged from rubbing on the frame. Properly tension each belt.
3. If plugged into hard wiring:
    a. Turn the power OFF at the master electrical panel and lock out.
    b. Unplug and remove power cord from machine.
4. Thoroughly wash the machine using a pressure washer to remove all dirt, mud, debris or residue.
5. Lubricate all grease fittings. Make sure all grease cavities have been filled with grease to remove any water residue from the washing.
6. Inspect all the hydraulic hoses, lines, fittings and cylinders. Tighten any loose fittings. Replace any hose that is badly cut, nicked, abraded or separating from a fitting. Replace any damaged components.
7. Inspect all the electrical cords, lines, junction boxes and motors. Tighten any loose connections. Replace any cord that is badly cut, nicked or abraded. Replace any damaged components.
8. Inspect the conveyor drive systems.
9. Check all rotating parts for entangled material. Remove.
10. Touch up all paint nicks and scratches to prevent rusting.
11. Select a storage area that is dry, level and free of debris.

FIG. 34 STORED (TYPICAL)

4.10.2 REMOVING FROM STORAGE

When preparing to use the machine at the start of the season, follow this procedure:

1. Transport or move to the working area.
2. Check
    a. Hydraulic tank oil level.
    b. Hydraulic and electrical systems and components.
    c. Conveyor belt and drive system.
    d. All hardware. Tighten as required.
3. Replace any defective components.
4. Go through the pre-operation checklist (Section 4.4) before starting.

5 SERVICE AND MAINTENANCE

MAINTENANCE SAFETY

- Read and understand all the information contained in the Operator's Manual regarding operating, servicing, adjusting, maintaining and repairing.
- Turn machine OFF, shut down and lock out power supply (safety lockout devices are available through your Mayo dealer parts department), relieve hydraulic pressure and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.
- Exercise extreme caution when working around, or with, high-pressure hydraulic systems. Depressurize the system before working on it.
- Follow good shop practices:
  - Keep service area clean and dry.
  - Be sure electrical outlets and tools are properly grounded.
  - Use adequate light for the job at hand.
- Wear heavy gloves and eye protection when searching for suspected hydraulic leaks. Use a piece of wood or cardboard as a backstop instead of hand to isolate and identify a leak. A high pressure concentrated stream of hydraulic fluid can pierce the skin. If such happens, seek immediate medical attention as infection and toxic reaction could develop.
- Make sure all guards and doors are in place and properly secured when operating the Surge Hopper.
- Do not work on Surge Hopper electrical system unless the power cord is unplugged or the power supply is locked out. Lock-out tag-out power source before performing any maintenance work.

5.1 SERVICE

5.1.1 FLUIDS AND LUBRICANTS

1. **Grease:**
   Use an SAE multi-purpose high temperature grease with extreme pressure (EP) performance rating meeting or exceeding the NLGI #2 rating for all requirements per ISO 32, Food Grade, NSF-H1.

2. **Roller Chain Lubricating Oil:**

Chain Type *	Ambient Temperature Range		
	14°F-32°F	32°F-104°F	104°F-122°F
RS-50 - less	SAE 10	SAE 20	SAE 30
RS-60/RS-80	SAE 20	SAE 30	SAE 40
RS100	SAE 20	SAE 30	SAE 40
RS120/more	SAE 30	SAE 40	SAE 40

   * Stamped on chain link side plate.

3. **Hydraulic Oil:**
   Use Mobil DTE FM32 Hydraulic Oil or equivalent.

   Reservoir Capacity: 30 US gallons (110 L)

4. **Speed Reducer Gearbox Lubricant:**
   Per SAE GL-5 75W90, use Mobil Deluxe Synthetic 75W90 lubricant or equivalent.

   Capacities: 17 oz 0.5 qt each gear box.

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

5.1.1.1 RECOMMENDED LUBRICANTS

MAYO MFG. RECOMMENDS THE FOLLOWING MOBIL PRODUCTS OR THEIR EQUIVALENTS				
Lubricant Type	**Component**	**Specification**	**Recommended Lubricant**	**Recommended Temperature / Service Interval**
Hydraulic Oil	Hydraulic Reservoir	ISO 32, Synthetic Food Grade, NSF-H1	DTE FM 32	All Temperatures/Oil sample guidance or 12 months
	Hydraulic Reservoir	ISO 32, Food Grade, NSF-H1	Mobil DTE FM 32	10F to 140F/Oil sample guidance or 12 months
Grease	Greased Bearings/ Points	Food Grade	Mobilgrease FM 222	All/Weekly or as needed
	Greased Bearings/ Points	Non-Food	Mobilgrease XHP 222	
Gear Oil	Winsmith Worm Gear Reducer	Poly Alkylene Glycol (PAG) ISO 460 NSF H1	Mobil Glygoyle 460	All/See Manual Note: Do not Substitute
	Browning Helical Gear Reducer	Synthetic, PAO Type ISO 220 NSF H1	Mobil SHC 630 or Mobil SHC Cibus 220 (NSF H1)	All/Change Every Two Years
	Auburn Planetary Wheel Drives	SAE GL-5 75w90	Mobil Delvac Synthetic 75w90	All/Change Every Two Years

5.1.2 GREASING

Refer to Section 5.1.1 for recommended grease. Use the Maintenance Checklist provided to keep a record of all scheduled maintenance.

1. Use only a hand-held grease gun for all greasing. Air powered greasing systems can damage the seals on bearings and lead to early bearing failure.

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 a fitting will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.

5. **Conveyor Bearings:**
   Only sealed bearings are used on the conveyor bearings. Sealed bearings should never be greased more often than weekly or every 50 hours. Do not over-grease. Do not give bearing more than 1 shot of grease each time it is greased (Once the bearing seal is broken, the bearing must be greased each day or the bearing will fail.).

5.1.3 SERVICING INTERVALS

8 Hours or Daily

1. Check the conveyor tension. Adjust as required.

Elevator

Boom

Stingers

FIG. 35 CONVEYOR TENSION (TYPICAL)

2. Check conveyor alignment. Adjust as required.

Discharge

Elevator

Boom

Stingers

FIG. 36 CONVEYOR ALIGNMENT

3. Inspect hydraulic system and all components.

4. Inspect electrical system and all components.

Weekly or 50 Hours

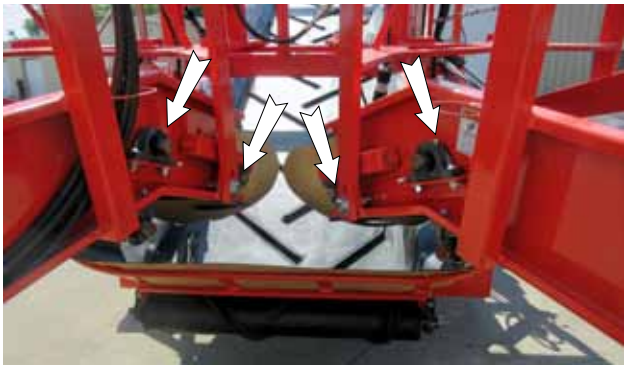
1. Grease conveyor shaft bearings with 1 shot of grease.

IMPORTANT

Only sealed bearings are used on the conveyor bearings. Sealed bearings should never be greased more often than weekly or every 50 hours. Do not over-grease. Do not give bearing more than 1 shot of grease each time it is greased. Once the bearing seal is broken, the bearing must be greased each day or the bearing will fail.

a. Stinger drive, driven and dogleg.

Drive



Driven

FIG. 37 STINGERS

b. Elevator drive, driven and guide shafts (2 locations each shaft).

c. Boom drive and driven shafts (2 locations each shaft).

Drive

Driven

FIG. 38 ELEVATOR (TYPICAL)

d. Discharge drive and driven (2 locations each shaft).

Drive

Driven

FIG. 39 DISCHARGE (TYPICAL)

e. Elevator dogleg.

Left

Right

FIG. 40 ELEVATOR DOG LEG (TYPICAL)

2. Oil boom extend/retract roller chain.

FIG. 41 ROLLER CHAIN

100 Hours or Annually

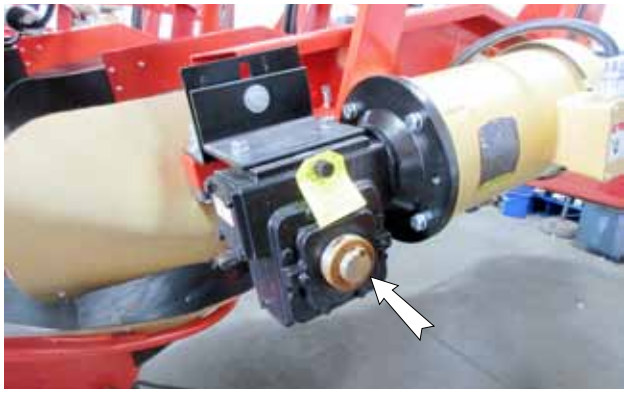
1. Check the oil level in the hydraulic reservoir using sight glass.

FIG. 42 HYDRAULIC OIL LEVEL SIGHT GLASS

2. Grease steering system plate.

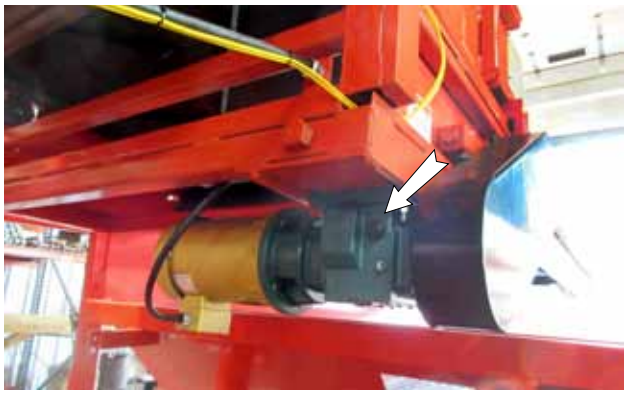
FIG. 43 STEERING SYSTEM PLATES

3. Check the oil level in each speed reducing gear box in the drive systems (1 location each gear box).



Left Stinger

Right Stinger



Boom

Discharge

FIG. 44 GEARBOXES (TYPICAL)

500 Hours or Annually:

1. Change the hydraulic system filter (2 locations).
2. Change the oil in the hydraulic system.

FIG. 45 HYDRAULIC SYSTEM FILTERS (TYPICAL)

3. Repack each wheel bearing.

FIG. 37 WHEELS (TYPICAL)

4. Clean machine.

5.1.4 SERVICE RECORD

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

ACTION CODE:	CK	CHECK	CH	CHANGE	CL	CLEAN
	LU	LUBRICATE	RE	REPACK	IN	INSPECT

Maintenance

Hours																						
Serviced by																						
8 Hours or Daily																						
CK Conveyor Tension																						
CK Conveyor Alignment																						
IN Hydraulic System and Components																						
IN Electrical System and Components																						
50 Hours or Weekly																						
LU Conveyor Shaft Bearings																						
LU Boom In/Out Chain																						
100 hours or Annually																						
CK Hydraulic Oil Level																						
LU Steering System Plate																						
CK Gearbox Oil Level (1 location per gearbox)																						
500 Hours or Annually																						
CH Hydraulic System Filters																						
CH Hydraulic System Oil																						
RE Wheel Bearings																						
CL Machine																						

5.2 MAINTENANCE

By following a careful service and maintenance program on your machine, you will enjoy many years of trouble-free use.

5.2.1 HYDRAULIC MAINTENANCE

A hydraulic system provides power to move the machine. The system consists of an electrically powered pump, reservoir, lines, hoses, solenoid valves, directional valves, motors and cylinders. To maintain the integrity of the system and provide a safe working environment for the operator, it is important that a daily inspection be done to make sure that the entire system and all components are in good working condition.

When inspecting the hydraulic system and components, follow this procedure:

1. Place all controls in the OFF or neutral position.
2. Turn power OFF at the master panel and lock-out before starting the inspection.
3. Inspect all hydraulic components looking for:
    a. Leaks.
    b. Damaged hoses or lines.
    c. Damaged or leaking cylinders.
    d. Leaking motors or fittings.
    e. Damaged or leaking solenoid and directional valves.
    f. Leaking pump or fittings.
4. Tighten any leaking fittings and replace any damaged components.
5. Change the hydraulic oil and filter every 500 hours or annually per the Service schedule. Change more frequently if operating in harsh conditions such as extreme heat or cold, extreme dust or dirt, and/or extreme humidity.

5.2.2 ELECTRICAL SYSTEM INSPECTION

Electricity provides power to all systems on the Surge Hopper. To maintain the integrity of each system and provide a safe working environment for the operator, it is important that a daily inspection be done to make sure that all systems and components are in good working condition. To provide a safe working environment, have a licensed electrician provide power to the machine.

When inspecting the electrical system and components, follow this procedure:

1. Place all controls in the OFF or neutral position.
2. Turn power OFF at the master panel and lock-out before starting the inspection.

IMPORTANT

Do not operate the machine unless the master panel is equipped with a lock-out device. Always engage lock-out device before performing any maintenance work. Lock-out devices are available from your dealer or the factory.

3. Inspect all electrical components looking for:
    a. Damaged plugs.
    b. Frayed wires.
    c. Cut or cracked insulation.
4. Replace any damaged components immediately.
5. Be sure all components are grounded.
6. Be sure there is no water or moisture in any junction box or enclosure. Dry the components before turning power on. Be sure that all compartments seal properly when closed.

5.2.3 ELECTRIC MOTOR RESTART

A magnetic starting system is used on the Surge Hopper and the restart procedure is covered in this section. It is recommended that only a licensed electrician perform maintenance work on the electrical system.

1. **Magnetic Starter:**
   All electric motors are supplied with power through an individual circuit that includes a circuit breaker, switch, contactor and overload relay that are all incorporated into a single electrical component inside the control panel. The contactor is the main connecting device for power to the motor. If the current is greater than the adjustable dial of the relay, the relay will trip and cut off power to the coil of the contactor. When this happens, the contactor dial will move to a new position and indicate the cause of the overload. It must be reset before the motor can be restarted.

   When a motor will not start:

   a. Depress the OFF button.

   b. Depress the ON button.

   c. If the motor will not start, turn machine OFF and lock out power at the master control panel before opening the control panel.

   d. Verify the overload is tripped, the OFF button will be depressed. Reset the overload by depressing the ON button.

   e. Close and secure the panel door and turn the power to the machine ON.

   f. If the motor still will not start you have one of the following conditions:

      i. The motor is hot and must cool a period of time before attempting to restart.

      NOTE

      If your conveyor utilizes single phase motors, chances are good that the motor has a thermal overload located on the electrical junction box of the motor itself. If this is the case then, fully depress the reset button to make certain that the overload circuit is closed.

      ii. The overload is adjusted incorrectly for the amperage of the motor and must be properly adjusted.

FIG. 47 MOTOR RESTART

      iii. The overload and/or contactor has fulfilled its service life and is in need of replacement.

      iv. The motor is bad and needs replacing.

      v. An electrical short exists somewhere in the circuit.

5.2.4 CHANGING HYDRAULIC OIL & FILTERS

Every 500 operating hours or annually, whichever comes first, the oil in the hydraulic system and filter should be changed. To change the oil and filter, follow this procedure:

1. Run the hydraulic pump until the oil is warm. Warm freshly agitated oil removes more contaminants when drained than cold stagnate oil.

2. Stop the pump and place all controls in their OFF or neutral position.

3. Turn the power OFF at the master panel and lock-out.

4. Place a container under the drain plug.

5. Remove the drain plug and allow the system to drain for 10 minutes.

IMPORTANT

The reservoir contain 30 gallons of oil. Be sure to have several containers to hold the oil from the tank when draining.

6. Use an oil filter wrench to remove the filters.

7. Apply a light film of oil to the O-ring on the new filters and install. Hand tighten and then turn another quarter turn.

8. Install and tighten the drain plug. Use teflon tape or pipe sealant compound on the plug to prevent leaking.

9. Dispose of the used oil in an environmentally safe manner.

10. Fill with Mobil Deluxe Synthetic 75W90 lubricant or equivalent. Refer to Lubricant Recommendations in Section 5.1.1.4 Table for details.

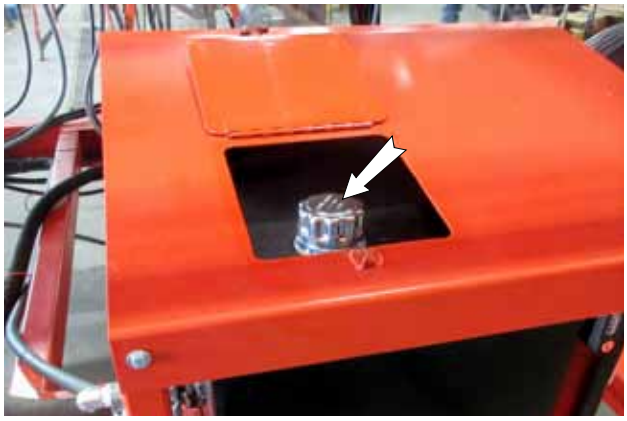
11. Add to the oil level until it comes up to the level of the sight glass.

12. Install the fill cap and close and secure cover.

13. Start and run the system and check for leaks.

14. Tighten any fitting that leaks.

Filters



Fill Cap

FIG. 48 HYDRAULIC SYSTEM (TYPICAL)

5.2.5 SPEED REDUCER GEARBOX OIL

Each conveyor is driven by an electric motor that is attached to a high ratio speed reducing gearbox to give the required operating speed. Each gearbox is equipped with a drain, level and fill plug. Every 100 hours, the oil level should be checked. Every 500 operating hours or annually, whichever comes first, the oil should be replaced. Check more frequently if there are leaks around any of the plugs or shaft seals. When checking oil level or changing oil, follow this procedure.

1. Run the hydraulic system and conveyors until each gearbox is warm. Warm oil will remove more contaminants than cold stagnate oil.

2. Stop the conveyors and pump.

3. Place all controls in their OFF or neutral position.

4. Turn the power OFF at the master panel and lockout.

5. **Checking oil level:**

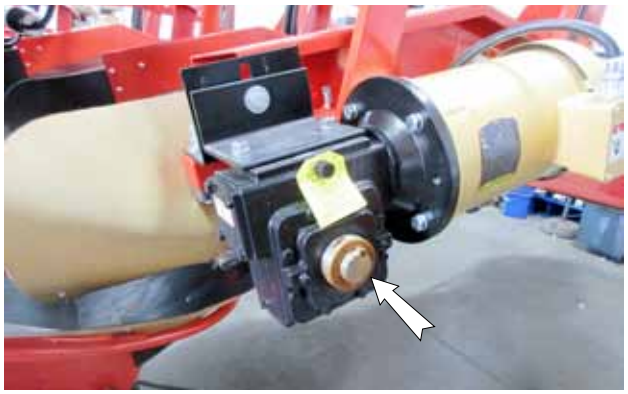
   a. When the gearbox is cold, remove the level plug from the side of the gearbox.

   b. When the oil just fills the threads of the level plug, it is at the correct level.

   c. Add oil through the fill plug as required.

   d. Install and tighten level and fill plugs.

Elevator



Left Stinger

Right Stinger

Discharge

FIG. 49 GEARBOXES (TYPICAL)

5.2.6 CONVEYOR BELT TENSION /ALIGNMENT OR REPLACEMENT

Rubber belts are used to convey material with the Surge Hopper. The tension and alignment of the conveyors should be checked daily to insure proper function. Replace the conveyor belt when damaged or badly worn. To maintain conveyor, follow this procedure:

1. Place all controls in their OFF or neutral position.

2. Turn the power OFF at the master panel and lockout.

3. **Tension:**
   They are tensioned correctly when there is a 1/2 to 1 inch (12 to 25 mm) sag between the guide rollers on the bottom or slack side of the conveyor during operation.

Elevator

Boom

FIG. 50 CONVEYOR TENSION (TYPICAL)

4. **Adjusting Conveyors:**

a. Elevator

b. Boom

c. Discharge

d. Stingers

Elevator - Driven

Boom (Typical)

Discharge

Stinger (Typical)

FIG. 51 TENSION ADJUSTMENT (TYPICAL)

4. **Alignment:**
It is properly aligned when the belt runs in the center of the frame panels and the shafts. Be sure to run the conveyor a full revolution to check the entire belt. The belt can move from side-to-side while it is turning as long as it doesn't contact the sides. If it contacts the sides, it must be aligned. Align by loosening the shaft bearing assembly on the tight side or tightening the bearing assembly on the loose side. Move the bearing assemblies on either the drive or driven shafts to align the conveyor but always maintain the proper tension.

Elevator

a. Boom b. Discharge

Stinger

FIG. 52 CONVEYOR ALIGNMENT (TYPICAL)

5. **Replacement:**

   a. Move one or both of the shafts into their loosest position.

   b. Open the conveyor by removing the connecting rod on the belt lacing.

   c. Attach the replacement conveyor to the end of the old conveyor.

   d. Slowly pull the old conveyor out of the machine and thread the new one into position.

   e. Disconnect the old conveyor and connect the ends of the new one together.

   f. Move the shaft into position to set the tension of the conveyor and secure the bearing assemblies.

   g. Check the tension and alignment of the conveyor frequently during the first 10 hours of operation and set as required. Then, go to the regular maintenance schedule. Normally a conveyor will seat itself during the first 10 hours of operation and then require less adjustment.

Boom

Discharge

FIG. 53 BELT CONNECTOR (TYPICAL)

5.2.7 EXTENDING / RETRACTING ROLLER CHAIN

An anchored roller chain is used to extend and retract the boom. The roller chain must be oiled on a weekly basis and the tension and alignment checked monthly during the season. When maintaining the roller chain, follow this procedure:

FIG. 54 TELESCOPING ROLLER CHAIN

1. **Weekly oiling:**

   a. Place the boom in its fully down position.

   b. Use a brush to apply oil to the chain.

WARNING

Use special care when working around exposed moving parts.

   c. Refer to the following table for oil type.

Chain Type *	Ambient Temperature Range		
	14°F-32°F	32°F-104°F	104°F-122°F
RS-50 - less	SAE 10	SAE 20	SAE 30
RS-60/RS-80	SAE 20	SAE 30	SAE 40
RS100	SAE 20	SAE 30	SAE 40
RS120/more	SAE 30	SAE 40	SAE 40

* Stamped on chain link side plate.

   d. Install and secure all the guards.

2. **Weekly sprocket alignment:**

   a. Check alignment by visually sighting across the faces of the sprockets. If sprockets are in the same plane, they are aligned.

   b. Loosen set screw in sprocket hub if alignment is required.

   c. Move sprocket to required position.

   d. Tighten set screw to its specified torque.

   e. Install and secure all the guards

WARNING

Machine is shown with guards removed for illustrative purposes only. Do not operate with guards removed.

3. **Weekly roller chain tension:**
   Check the tension when the machine is OFF and not moving. The chain should be snug when it is at rest. When checking spring tension, follow this procedure:

   a. Turn power OFF at the master panel and lock-out before performing any maintenance work.

   b. Check the chain tension.

   c. Loosen jam nuts on roller chain.

   d. Use the position nut to set the chain tension.

   e. Tighten jam nut to its specified torque.

   f. If the anchor bolt is at the end of its adjustment, remove a half link, full link or more until the chain can be properly tensioned.

   g. Install and secure guards.

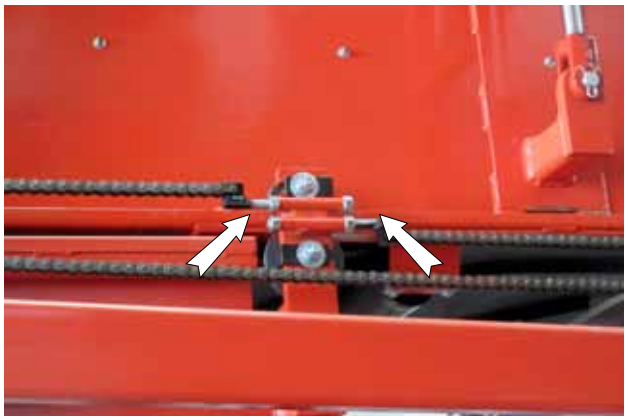


FIG. 55 ANCHOR BOLT ADJUSTMENT

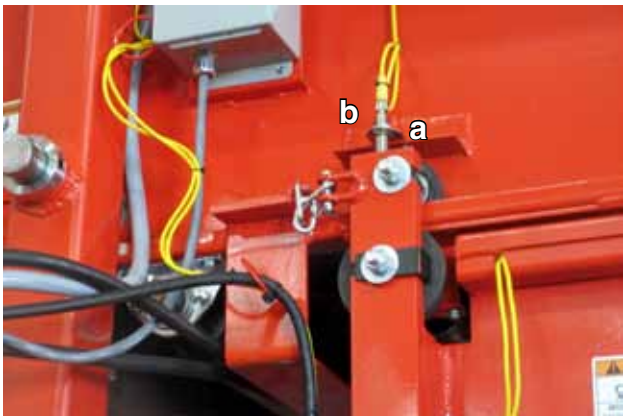
WARNING

Turn power OFF at the master panel and lock-out before performing any maintenance work.

5.2.8 PROXIMITY SENSOR SETTINGS

The boom is equipped with a series of proximity sensors mounted along the frame to identify the position of the boom during operation. There must be a 1/16" (2 mm) spacing (thickness of a nickle) between the sensor and frame. To adjust sensor position, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Start the hydraulic pumps.
3. Check sensor spacing when boom is fully retracted.
4. Slowly extend boom and check spacing at each sensor.
5. To adjust spacing:
    a. Loosen sensor jam nut.
    b. Use position nut to move sensor to provide the required spacing.
    c. Tighten jam nut to its specified torque.



Spacing

Sensors

FIG. 56 POSITION SENSOR (TYPICAL)

6 TROUBLE SHOOTING

The Mayo Surge Hopper uses an elevator and extendable boom to convey potatoes into a large compartment where they are discharged evenly into the adjacent machine. It is a simple and reliable system that requires minimum maintenance.

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 contact your local Mayo dealer or the factory. Before you call, please have this Operator's Manual and the serial number from your machine ready.

PROBLEM	CAUSE	SOLUTION
Surge Hopper won't run.	No power.	Turn power ON at master panel.
	Tripped overload on starter.	Reset starter.
Conveyor won't run.	No power.	Turn hydraulic pumps ON.
	Binding.	Align conveyor.
	Low oil.	Add oil to hydraulic reservoir.
	Oil filters plugged.	Replace oil filters.
Boom won't extend.	Roller chain loose.	Set tension on extend chain.
	Position sensor not functioning.	Adjust or replace position sensor.

7 SPECIFICATIONS

7.1 MECHANICAL

DIMENSIONS			
	Length:	Surge Hopper only	52' 0"
		With hitch	57’ 4”
		Witch hitch and stingers	67’ 4”
	Width:		9’ 10”
	Height:		11’ 7”
POWER			
	Surge Hopper		480 V 3 Ph, 30 A 240 V 3 PH, 60 A
	Stinger (each)		480 V 3 PH, 5 A 240 V 3 PH, 10 A
HYDRAULIC SYSTEM			
	Hydraulic Power		10 HP
	Speed		1750 RPM
	Flow	Tandem	7 GPM / 3 GPM
	Hydraulic Relief Set Point		2250 psi
	Hydraulic Tank Capacity		30 Gallons

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

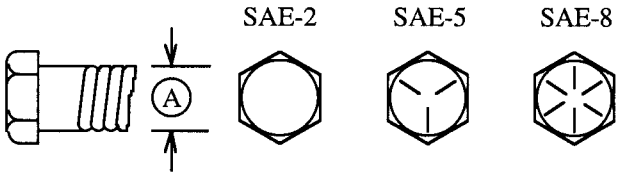
7.2 BOLT TORQUE

CHECKING BOLT TORQUE

The tables shown below give correct torque values for various bolts and capscrews. Tighten all bolts to the torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt torque chart as a guide. Replace hardware with the same strength bolt.

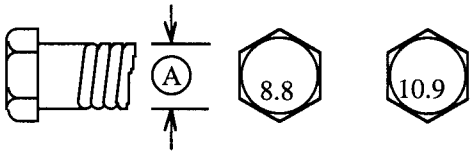
ENGLISH TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque* SAE 2 (N.m.)	(lb-ft)	SAE 5 (N.m.)	(lb-ft)	SAE 8 (N.m.)	(lb-ft)
1/4"	8	6	12	9	17	12
5/16"	13	10	25	19	36	27
3/8"	27	20	45	33	63	45
7/16"	41	30	72	53	100	75
1/2"	61	45	110	80	155	115
9/16"	95	60	155	115	220	165
5/8"	128	95	215	160	305	220
3/4"	225	165	390	290	540	400
7/8"	230	170	570	420	880	650
1"	345	225	850	630	1320	970



METRIC TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque 8.8 (N.m.)	(lb-ft)	10.9 (N.m.)	(lb-ft)
M3		.4		1.3
M4		2.2		3.3
M5		4		7
M6		7		11
M8		18		26
M10		37		52
M12		66		92
M14		103		148
M16		166		229
M20		321		450
M24		553		774
M30		1103		1550
M36		1917		2710



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.

7.3 HYDRAULIC FITTING TORQUE

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.

Tube Size OD (in.)	Nut Size Across Flats (in.)	Torque Value* (N.m)	(lb-ft)	Recommended Turns To Tighten (After Finger Tightening) (Flats)	(Turn)
3/8	1/2	8	6	2	1/3
7/16	9/16	12	9	2	1/3
1/2	5/8	16	12	2	1/3
9/16	11/16	24	18	2	1/3
3/4	7/8	46	34	2	1/3
7/8	1	62	46	1-1/2	1/4
1-1/16	1-1/4	102	75	1	1/6
1-3/16	1-3/8	122	90	1	1/6
1-5/16	1-1/2	142	105	3/4	1/8
1-5/8	1-7/8	190	140	3/4	1/8
1-7/8	2-1/8	217	160	1/2	1/12

7.4 ELECTRICAL SCHEMATIC

7.4.1 Line Phasing

Line phasing, line voltage, control voltage, and accessory options can vary substantially for each machine. Please contact factory at 1-800-223-5873 for your machine's specific electrical layout.

7.5 HYDRAULIC SCHEMATIC

Accessory options can vary for each machine. Please contact factory at 1-800-233-5873 for your machine's specific hydraulic layout.

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