Mayo

SCALE CONVEYOR

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.

MODEL 2100 SERIES STRAIGHT SCALE CONVEYOR

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 _____

Conveyor Model _____

Serial Number _____

Delivery Date _____

DEALER INSPECTION REPORT

_____ Tire Pressure Checked
_____ Wheel Bolts Torqued
_____ Inspect Electrical System
_____ 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 Scale Conveyor 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 Number _____

Serial Number _____

TABLE OF CONTENTS

1 INTRODUCTION

Congratulations on your choice of a Mayo Model 2100 Series Straight Scale Conveyor 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 Scale Conveyor requires that you, and anyone else who will be operating or maintaining the Scale Conveyor, read, understand and practice ALL of the Safety, Operation, Maintenance and Troubleshooting recommendations contained within this Operator's Manual.

This manual applies to all Model 2100 Series Straight Scale Conveyors manufactured by Mayo. Certain options may be available to specifically tailor the Scale Conveyor 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 drive end of the Scale Conveyor is the front. All electrical controls are on the right side of the frame.

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 Straight Scale Conveyor 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:

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 Scale Conveyor. **YOU** must ensure that you and anyone else who is going to operate, maintain or work around the conveyor 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 conveyor.

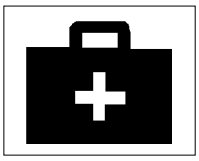
Remember, **YOU** are the key to safety. Good safety practices not only protect you but, also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this machine is familiar with the procedures recommended and follows safety precautions. 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 conveyor.
- Scale Conveyor owners must give operating instructions to operators or employees before allowing them to operate the conveyor, 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!

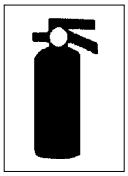
2.1 GENERAL SAFETY

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

2. Only trained, competent persons shall operate the Scale Conveyor. 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, place all controls in their OFF position, shut down and lockout power supply 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 Straight Scale Conveyor 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 conveyor.

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

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, stingers, 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-hand 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.

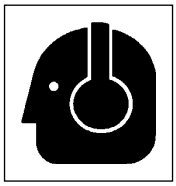
How to Install Safety Signs:

- 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 Scale Conveyor 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 conveyor 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 jewelry 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 Scale Conveyor 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. Extend leg ratchets to level the frame before loading. Use a level to be sure.

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

5. Make certain that sufficient amperage, at the proper voltage and frequency (60Hz) is available before connecting power. All wiring should comply with ANSI/NFPA 70 electrical requirements. If you are uncertain, have a licensed electrician provide power to the machine.

6. If using Scale Conveyor 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 conveyor.

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

4. Do not service or maintain the conveyor unless motors are OFF and the power locked out at the master panel. Keep others away.

2.9 OPERATING SAFETY

1. Make sure that anyone who will be operating the Scale Conveyor or working on or around the unit reads and understands all the operating, maintenance and safety information in the operator's manual. Also read and follow the instructions in the manuals of other equipment in the system.

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

3. Establish a lock-out tag-out policy for the work site. Be sure all personnel are trained in and follow all procedures. Lock-out tag-out all power sources before servicing the unit or working around loading/unloading equipment.

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

5. Replace all worn or failed components immediately.

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

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

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

9. Keep all electrical components tight, dry and in good repair.

10. Extend leg ratchets to level the frame before using.

11. 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.

12. Keep the working area clean and dry.

13. 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 Scale Conveyor.

7. **Do not work on conveyor 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

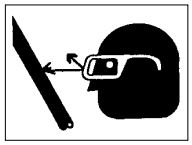
1. Make sure that all the components in the pump system are kept in good condition and are clean.

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. All wiring should comply with ANSI/NFPA 70 electrical requirements.

2. Make certain that the Scale Conveyor is properly grounded at the power source.

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

2. 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.

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

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

5. Raise and secure all jack stands if applicable.

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

7. 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.

8. Be sure that the Conveyor is positively hitched to the towing vehicle. Use a safety cable to assure a safe hitch hook-up when transporting.

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

10. Do not exceed 15 MPH (25 Km/H). Reduce speed on rough roads and surfaces.

11. Do not allow anyone to ride on the Conveyor or towing vehicle during transport.

12. 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 Engineers (ASAE) 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

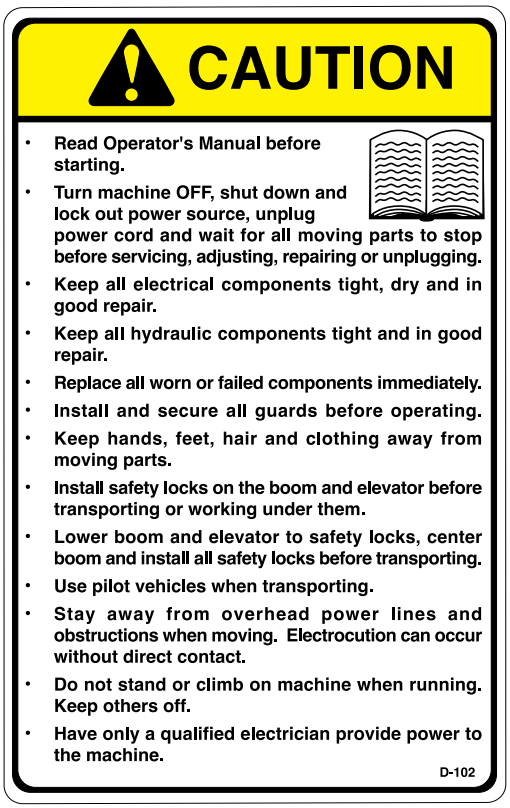
3 SAFETY SIGN LOCATIONS

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

B



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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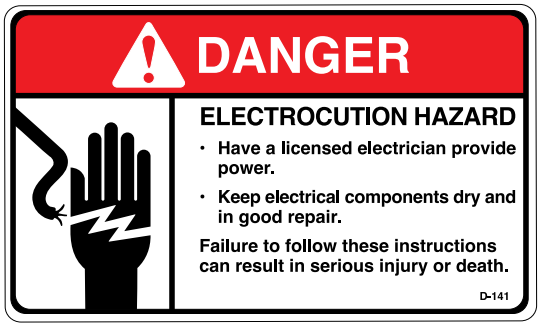
C



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4 OPERATION

OPERATING SAFETY

- Make sure that anyone who will be operating the Scale Conveyor or working on or around the unit reads and understands all the operating, maintenance and safety information in the operator's manual. Also read and follow the instructions in the manuals of other equipment in the system.
- **Turn machine OFF, shut down and lock out power supply (safety lockout devices are available through your Mayo dealer parts department) and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.**
- Establish a lock-out tag-out policy for the work site. Be sure all personnel are trained in and follow all procedures. Lock-out tag-out all power sources before servicing the unit or working around loading/unloading equipment.
- Install and properly secure all guards and shields before operating.
- Replace all worn or failed components immediately.
- 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.
- Keep all electrical components tight, dry and in good repair.
- Extend leg ratchets 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 by following ANSI/NFPA 70 Wiring Standard. If you do not know or are unsure, consult a licensed electrician.
- Keep the working area clean and dry.
- Review safety instructions annually.

4.1 TO THE NEW OPERATOR OR OWNER

The Mayo Manufacturing Scale Conveyor is designed to be used as a stand-alone unit or part of a system to convey potatoes from one location to another. Be familiar with the machine before starting.

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.

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 personnel are not qualified to operate this 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 Scale Conveyor will provide many years of trouble-free service.

4.2 MACHINE COMPONENTS

The Mayo Manufacturing Scale Conveyors are designed with a belted or chain conveyor to move potatoes. The conveyor is powered by a electric motor through a speed-reducing gear box. All controls are mounted on the right side of the frame.

Manual ratchet jacks are used to level the frame or set the height of the machine for minimizing drop height. The conveyor is equipped with a scale system that weighs the stream of potatoes moving over the conveyor. Load cells on each side of the frame monitor the weight and feed the data into the controller and CPU to compile information for the user.

FIG. 1 MACHINE COMPONENTS

4.3 GENERAL OPERATION THEORY

Potatoes are unloaded from transport trucks into the hoppers of the stingers. Here they are carried by chain conveyors up into the hopper of the mainframe conveyor. The chain conveyors are engineered to gently vibrate and rotate the potatoes to remove excess dirt.

The top, belted mainframe conveyor feeds into the bottom, belted mainframe conveyor, which ultimately feeds into the hopper of a bin piler, an additional conveyor or directly into a processing plant for long term storage or processing.

All hopper-to-conveyor and conveyor-to-conveyor transition points are designed for minimum drop to prevent bruising of the potatoes.

The purpose of the telescoping function is to allow for retraction of the conveyor as the attached bin piler or conveyor moves in and out of the warehouse or processing plant during the unloading operation without necessitating movement of the conveyor or transport trucks. Thus the stinger and mainframe sections of the telescoping conveyor can remain stationary as the telescoping section moves in and out inside of the warehouse in conjunction with the piler.

The telescoping action between the top and bottom conveyor mainframes allows for 18 to 22 feet of adjustment between the conveyor and bin piler or additional conveyor before the conveyor must be repositioned.

A scale conveyor can be inserted at any location in the conveying system to monitor the weight of the product being moved. By calibrating the system and interfacing with the controller, real time or total volume can be obtained.

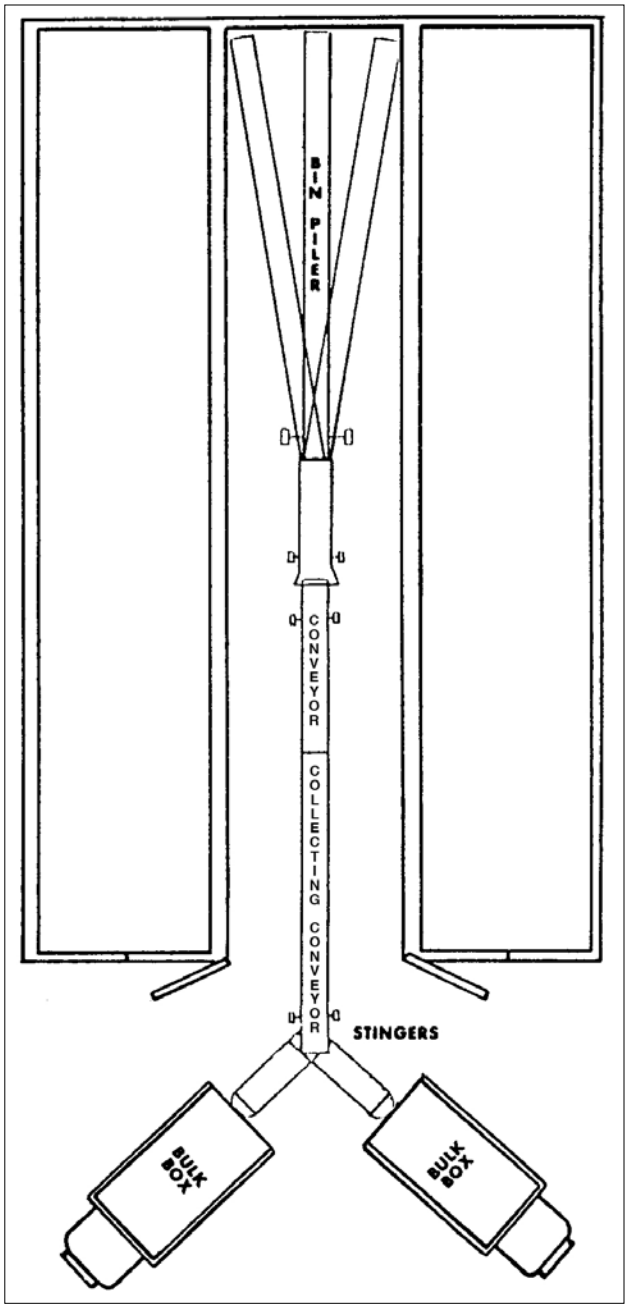


FIG. 2 POSITIONED (TYPICAL)

4.4 MACHINE BREAK-IN

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

A. **Before Starting:**

1. Read conveyor and auxiliary equipment manuals before starting.

2. Turn gearbox breather 1/4 turn to open breather and remove tag.

FIG. 3 BREATHER

B. **Calibrate Scale System** (refer to section 4.7.3)

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

1. Retorque all wheel bolts.

2. Retorque all fasteners and hardware.

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

4. Check the alignment and tension of all conveyor belts/chains. Realign or tighten as required.

5. Check oil level in speed reduction gear box for the drive. Top up as required.

6. Lubricate all grease fittings.

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

1. Retorque all other fasteners and hardware.

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

3. Check the alignment and tension of all conveyor belts/chains. Realign or tighten as required.

4. Check oil level in speed reduction gear box for the drive. Top up as required.

5. Then go to the regular servicing and maintenance schedule as defined in the Maintenance Section.

4.5 PRE-OPERATION CHECKLIST

Safe and efficient operation of your new Scale Conveyor 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 conveyor. The checklist should be performed before operating the conveyor 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. Insure that all safety guards and shields are in good repair and securely in place.

4. Check that the conveyor belt or chain is centered on the head and tail rollers. Adjust if necessary as outlined in the "Maintenance Section".

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

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

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

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.

1. **Operating Mode:**
   This 3 position rotary switch selects the operating mode. Turn the switch fully counter-clockwise to operate in HAND or in manual mode. Turn fully clockwise to place in the AUTO mode when other controls operate the system. Place in center position to turn OFF.

2. **Speed Control:**
   This potentiometer controls the speed of the conveyor. Turn the dial clockwise to increase the conveyor speed and counter-clockwise to slow them. Turn fully counter-clockwise to stop conveyor.

3. **Scale ON/OFF:**
   This 2 position rotary switch controls power to the scale weighing system on the machine. Turn the switch counter-clockwise to turn the scale OFF and counter-clockwise to turn ON.

4. **Emergency STOP:**
   This red push-pull switch is the master ON/OFF switch on the panel itself and should be used as an emergency shut down switch. Push the switch in to turn all the power off. The switch will remain in unless pulled out. It must be pulled out for any of the other controls to work. Turn the switch clockwise and it will be released and pop out.

5. **Scale System Control Panel:**
   This is the control panel for the weighing system. Review the Rice Lake Weighing System manual included with your conveyor for more details. Refer to section 4.7.3 Calibration for the detailed calibration procedure.

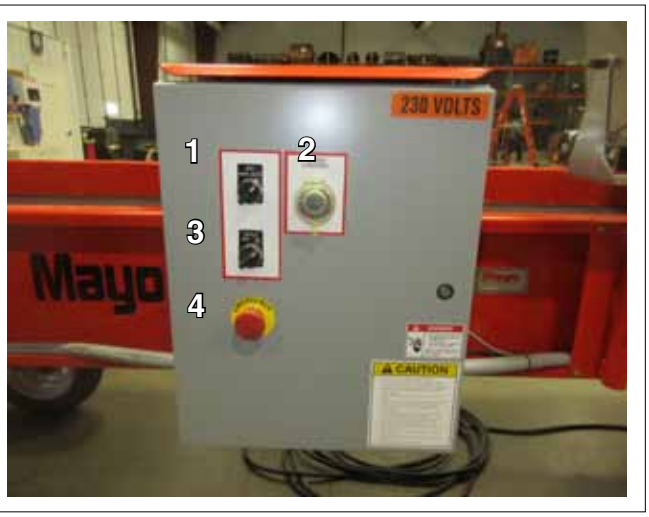


FIG. 4 SCALE CONVEYOR CONTROLS

FIG. 5 WEIGH SYSTEM CONTROL PANEL

4.7 MACHINE PREPARATION

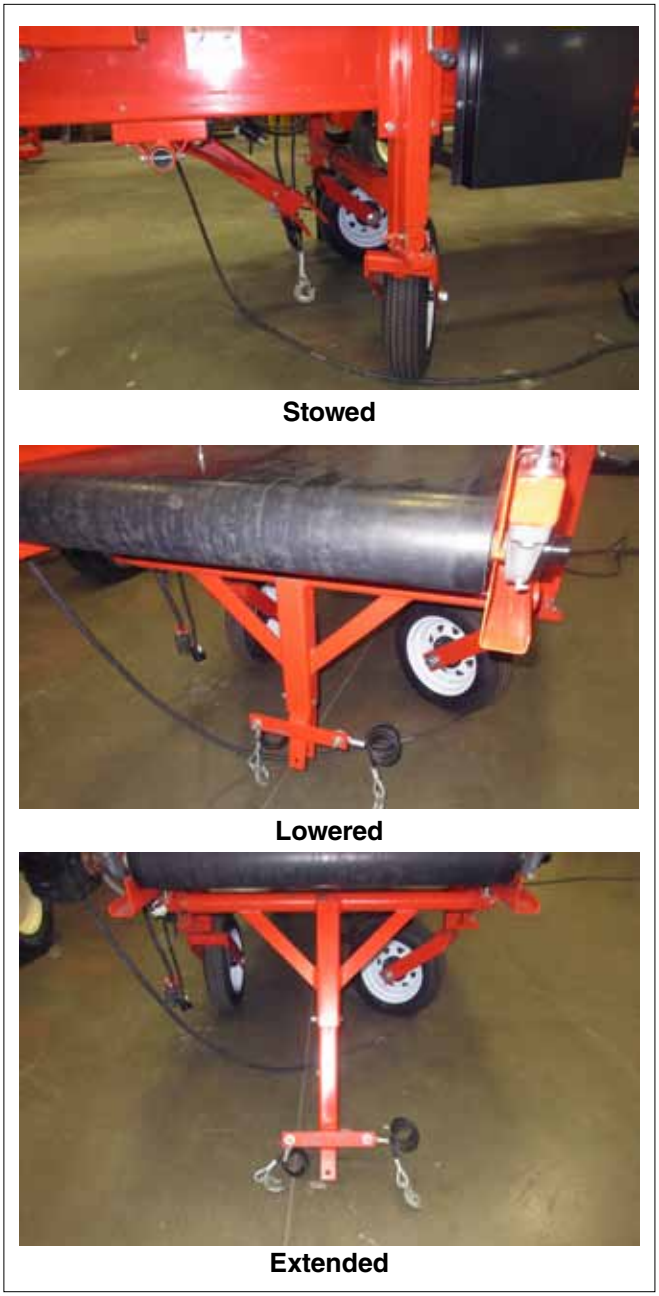
The machine must be properly prepared prior to using. Before starting machine, be sure that the following items are appropriate for your machine and operating requirements:

4.7.1 CONVEYOR - MECHANICAL:

1. **Power:**
   Have a licensed electrician provide power at the required voltage, phase and amperage for your machine by following ANSI/NFPA 70 Wiring Standard. An improper source of power will cause damage to electrical components and could create an electrical hazard to the operator, workers or bystanders.

   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.

2. **Hitch:**
   Scale Conveyors are designed with an extendable, pivoting hitch attached to the front of the frame. Pivot the hitch back and secure with one of the safety cables to position it away from the work area. Release cable and pivot hitch down when towing. Extend the hitch if required to provide clearance for turning.



Stowed

Lowered

Extended

FIG. 6 HITCH

3. **Frame height:**
   Each wheel frame is designed with a jack to raise or lower wheel frame as required. Use the jacks to level the frame or match frame height with an adjacent piece of equipment.

FIG. 6 JACKS

4. **Wheel castors:**
   Each wheel can castor to assist positioning machine at the work site. Hitch end wheels are designed to castor at all times. Intake end wheels are locked in their straight orientation but can castor by removing the locking rod. Install and secure locking rod with retainers when operating.

Hitch End

Locking Rod

FIG. 8 WHEEL CASTORS

5. **Equipment Attachment:**
   Each customer must provide a means of supplying a steady flow of potatoes to the Scale Conveyor. Normally this is done by using another piece of equipment such as a grader, another conveyor or stingers. When the conveyor is used as a component in a conveying system, it is recommended that it be securely attached to the adjacent piece of equipment. An optional over-center clamp is available on one end to attach to another Mayo machine. Adjust the hook bolt to obtain the required position. If connecting to equipment made by other manufacturers, connect securely using a chain, straps or other means.

   Disconnect or stow the hitch and move the other equipment before repositioning or moving the Scale Conveyor.

   By securely attaching to the other adjacent equipment, the adjacent equipment can move and the conveyor will move along with it without having to stop and reposition. Set the height of the equipment for minimal drop height to minimize bruising.

FIG. 9 EQUIPMENT ATTACHED

4.7.2 CONVEYOR - ELECTRICAL

Appropriate electrical power must be provided to the machine for it to function as designed. Always follow these general guidelines when applying electrical power to the machine:

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

   Generally the unit is wired appropriate for the voltage of the application. Specify your specific needs to your supplier and electrician.

2. **System Connection** (Optional):
   Each machine can be equipped with a control system that allows them to be connected into the starting and stopping of a larger system. Connect the system together and place the control panel switch into the "auto" mode.

3. **Scale System Power:**
   Always provide 120 V power to the scale system to obtain the expected results. Turn the dial to "ON" to operate the scale system.

Power Cable

Connections

Scale

FIG. 10 CONTROL PANEL

4.7.3 SCALE CALIBRATION:

The scale system is set and calibrated at the factory but the system must be checked prior to placing into operation. Refer to Scale Operator's manual provided with the machine for more detailed information.

Follow this procedure when checking system:

1. Provide 120 volt power to the system.

NOTE

Have only a qualified licensed electrician supply power. All wiring should comply with ANSI/NFPA 70 electrical requirements.

2. Turn system on.

3. Press "Integration Calibration" soft key. There are three modes of calibration:

   a. Auto Cal.

   b. Material Cal.

   c. Zero Cal.

   All three calibration methods are described in the following sections as are their soft key locations.

4. Press "Zero" soft key on the display.

   a. Remove calibration weights from their storage position on the right rear corner of frame.

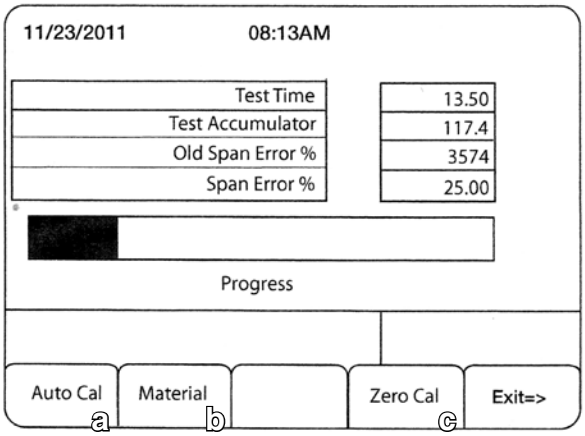
   b. Note their weights (stamped on top of weight).

   c. Attach to weight bar under the load cells.

   d. Enter weight into system.

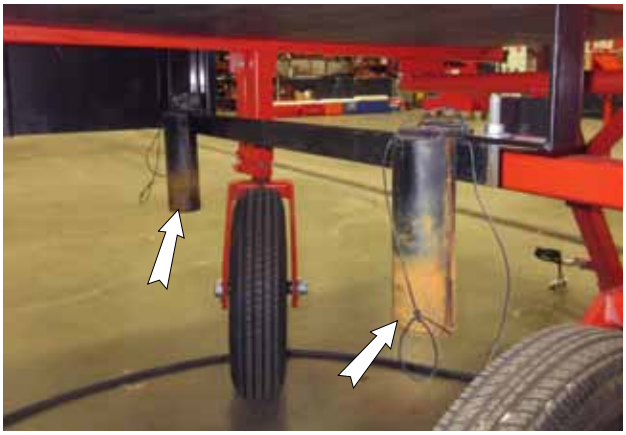
   e. Remove calibration weights and return them to their storage position.

Scale



Display Schematic

Calibration Weight Storage



Weights In Place

FIG. 11 INTEGRATION CALIBRATION

5. **Material Calibration Mode:**
   Use this calibration mode if you want to calibrate the scale with a known amount of material. The material must be pre-weighed or post weighed.

   Use the following steps to perform a material calibration:

   a. Press the **Material** soft key on the integrator display.

   b. The **Span Cal** soft key will initiate the calibration sequence for span calibration. This is similar to the zero cal but material will be passed over the scale during the calibration test.

   c. When the operator will presses **Start**, the integrator will start taking span averages. When ready, the operator will press the **Finish** soft key to end the process.

   d. The integrator will prompt the operator for the amount of material in tons. The operator may key in the new value and press **Enter** or cancel to exit with no changes.

6. Verify the "Material Factor" using the following calibration procedure:

   a. The "Material Factor" automatically adjusts calculated value (from calibration) to the actual value.

   b. Repeat the weight calibration and adjust cycle until the scale and actual are within 2%.

$$\frac{\text{What you want (Truck Scale)}}{\text{What you have (Conveyor Scale)}} = \text{"Material Adjustment Factor"}$$

   c. Multiply the "Material Adjustment Factor" by the existing material factor to obtain the "real time" weight on the scale display.

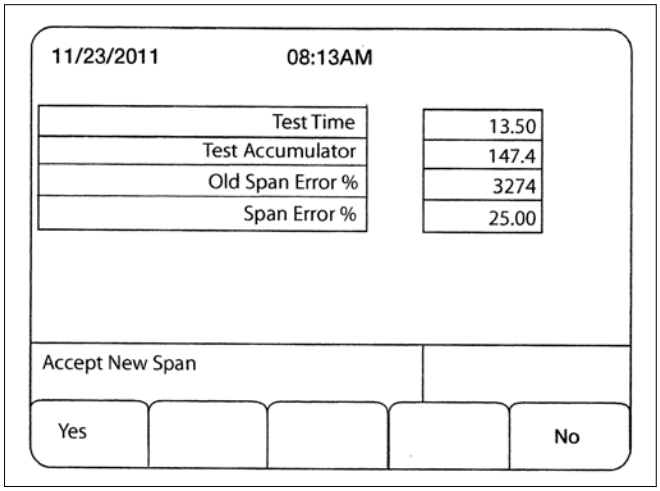


FIG. 12 MATERIAL CALIBRATION

4.7.4 PARAMETER SETTINGS FOR 920i (BCI) INDICATOR:

***** THESE PARAMETERS ARE SET AT THE FACTORY - THIS IS JUST A REFERENCE***

PAR #	DESCRIPTION	SETTING
4.1	ADMINISTRATOR PASSCODE	X
4.2	SCALE CAPACITY IN POUNDS	225
4.3	LOAD CELL MV	2.1665
4.4	TOTAL LOAD CELL BUILD - 20K CELLS	***88***
4.4	TOTAL LOAD CELL BUILD - 50K CELLS	***220***
4.5	RATE UNIT TIME	HR
4.6	NUMBER OF FILTERS	***5***
4.7	FILTER THRESHOLDS	***2***
4.8	SPEED UNIT TIME	MN
4.9	FIXED SPEED	X
4.10	UNIT OF MEASURE	FT
4.11	UNIT OF RATE	LB
4.12	RATE COUNT BY	1
4.13	TOTALIZER COUNT BY	1
4.14	LOAD DISPLAY UNITS	LB
4.15	LOAD COUNT BY	1
4.16	AUTO ZERO TRACKING RANGE (%)	X
4.17	AUTO ZERO TRACKING DEVIATION (%)	X
4.18	DEAD BAND	X
4.19	CALIBRATION TEST WEIGHT	40 LBS
4.20	CALIBRATION TEST CHAINS	X
4.21	CALIBRATION LOAD	X
4.22	MATERIAL FACTOR (DEFAULT IS 100)	VARIES
4.23	SPAN ERROR %	AUTO
4.24	ZERO COUNTS	AUTO
4.25	ZERO ERROR %	AUTO
4.26	IDLER SPACING (INCHES)	***18***
4.27	NUMBER OF IDLERS	***1***
4.28	BELT TEST REVOLUTIONS	10
4.29	PULSES PER REVOLUTION	X
4.30	BELT LENGTH (TOTAL FEET & INCHES)	VARIES
4.31	BELT ANGLE	0
4.32	PULSES PER UNIT MEASURE	X
4.33	TEST DURATION	X
4.34	TONS PER PULSE	X
4.35	PULSE DUTY CYCLE (SECONDS)	X
4.36	LOW RATE ALARM VALUE (%)	X
4.37	MAXIMUM SPEED VALUE	X
4.38	LOW RATE ALARM BIT	X
4.39	HIGH RATE ALARM BIT	X
4.40	SPEED ALARM BIT	X
4.41	TOTALIZER PULSE BIT	X
4.42	FILL OUTPUT BIT	X
4.43	REMOTE PRINT INPUT BIT	X
4.44	PRINT OUTPUT PORT	X
4.45	PRINT FORMAT	X
4.46	STREAM OUTPUT PORT	X

PAR #	DESCRIPTION	SETTING
4.47	STREAM FORMAT	X
4.48	CLEAR TOTALIZER WITH PRINT	X
4.49	REMOTE TOTALIZER RESET INPUT	X
4.50	INTEGRATOR IDENTIFICATION	X
4.51	PREACT LENGTH	X
4.52	ENABLE BATCHING	X
4.53	ANALOG 1 MODE	X
4.54	ANALOG 2 MODE	X
4.55	MASTER TOTALIZER RESET	X
4.56	INTERFACING A PLC TO THE BELT SCALE	X
4.57	SPECIAL SERIAL COMMANDS	X

MATERIALS TEST CALIBRATION PROCEDURE

***** TO BE DONE PRIOR TO THE FIRST LOAD *****

- PRESS **INTEGRATOR CALIBRATION** SOFTKEY
- PRESS **MATERIAL CAL** SOFTKEY ON THE DISPLAY
- PRESS **SPAN CAL** SOFTKEY TO INITIATE SPAN CALIBRATION
- THEN PRESS **START** SOFTKEY *PRIOR* TO LOAD
- *AFTER* THE LOAD IS FINISHED, PRESS **STOP** KEY
- THE INTEGRATOR WILL PROMT THE OPERATOR FOR THE ACTUAL WEIGHT OF THE LOAD. YOU THEN ENTER THAT AMOUNT AND PRESS **ENTER**
- PRESS "TOTAL" THEN "CLEAR" FOR NEXT LOAD

MATERIAL FACTOR CALIBRATION PROCEDURE

***** TO BE DONE AFTER ANY LOAD *****

- THE MATERIAL FACTOR AUTOMATICALLY ADJUSTS THE SPAN VALUE TO CORRECT FOR DYNAMIC LOADING AT THE WEIGH FRAME. THIS VALUE IS COMPUTED DURING CALIBRATION BUT CAN BE ADJUSTED MANUALLY. USE THE FOLLOWING FORMULA:

WHAT YOU WANT (TRUCK SCALE) ***DIVIDE BY***
WHAT YOU HAVE (CONVEYOR SCALE)

MULTIPLY THIS NUMBER TIMES THE EXISTING MATERIAL FACTOR

X = PARAMETER IS EITHER AUTO-CACULATED, OR NOT NEEDED FOR NORMAL OPERATION.

4.7.5 Complete System Calibration Test Used In Conjunction With Integrator Calibration

1. There are two types of tests that are also used in conjunction with calibrating the complete system. They are:

   - Material testing.
   - Maintenance testing.

   Material testing is used only with the material calibration and the simulated load testing is used only with the Auto calibration.

   The following sections describe how to perform a material test and a simulated load test.

2. **Material Testing**
   Material testing is the only known way to establish repeatability and traceable accuracy of a conveyor belt scale system. Normally three or more successive material tests are required to achieve acceptance accuracy and demonstrate repeatability of the belt scale system. Once the material test is complete, one or more methods of simulated testing is also done to ensure accuracy. Material tests should be done at least every six months. Material tests should also be done immediately following any type of conveyor maintenance that may affect the scale.

   The test itself consists of passing previously weighed - or material to be weighed, over the belt conveyor scale. Care must be taken to see that all material is weighed both on the reference scale and on the belt conveyor scale. The two weights are compared, the differences figured, and the error is percentage computed.

   The following steps are involved in doing a material test.

   a. The reference scale (track scale, truck scale, dumper scale, hopper scale, etc) is checked to determine that it is in compliance with the applicable regulatory agency or Handbook 44 and must not leak or be overloaded to the point that material will be lost. According to Handbook 44 instructions, the test shall not be less than 1000 scale divisions, must run at least three revolutions of the belt scale and must run for at least 30 minutes or more (below 41°F, the belt should be run longer).

   b. After running the belt empty (to warm up the belt), a reading is taken from the integrator.

c. The belt is run for a period of time equal to that required to deliver the minimum totalized load, approximately 10 minutes and the reading is again taken. It should not vary more than +/- increment of the scale. If the reading varies more, the zero must be adjusted. This process is repeated until an acceptable zero condition is achieved.

d. After taking the integrator reading, material is introduced onto the scale belt and the rate of flow should be carefully watched to rise to better than 35% of the rated capacity. The ideal operating and weighing range IS 50 to 85% of the rated capacIty. A rule of thumb is if the time the scale IS operated under 35% of rated capacity, after the infeed is opened and closed, doesn't exceed 10% of the running time, acceptable weighing is present.

e. After the weighing has been completed, the belt should be running and empty (do not stop the belt).

f. The reading is taken from the master totalizer again. The "start" figure is subtracted from the "stop" figure, which shows tons (or pounds) weighed. This figure is compared with the printer. The printer may show +/- increment difference.

g. Compute the percent error. If the belt conveyor scale is out of tolerance, adjust the span by the computed error. Repeat the material test again, steps 4-6. If the scale is in tolerance, the accuracy is established; and proceed to step 8. If not, compute the error and again, adjust the belt conveyor span. If the accuracy tolerance cannot be obtained, determine the problem before proceeding.

h. Conduct a final material test following steps 4-7 (do not adjust the span). If the belt scale is in tolerance, its repeatability is established. Note: on the initial verification, two additional test are required, total three to establish repeatability.

i. There are several advantages and disadvantages to material testing. They are listed in Table 1.

Table 1

Material Testing Advantages	Material Testing Disadvantages
This is the only method that can establish traceable conveyor scale accuracy.	Requires availability of accurate static scale.
It readily permits testing at several feed rates to test linearity.	Requires accumulation, transportation to static scales and static weighing of the test load material.
It tests the entire system; electronics, scale carriage and conveyor effects.	

4.8 ATTACHING/UNHOOKING

Follow this procedure when attaching the scale conveyor to a pickup or tractor.

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

2. Make sure there is enough room and clearance to safely back up to the machine.

3. Release hitch from its stowed position and place it in its extended position.

FIG. 13 BACKING UP

4. While backing up, align the hitch and drawbar.

5. Stop pickup or tractor, set park brake, remove ignition key and wait for all moving parts to stop before dismounting.

Aligning

6. Use a drawbar pin with provisions for a mechanical retainer. Install retainer.

Pin/Retainer

FIG. 14 DRAWBAR PIN

7. **Safety Cable:**
Attach safety cable around the drawbar cage or truck frame to prevent unexpected separation.

NOTE

Always cross the cables under the hitch when attaching.

FIG. 15 SAFETY CABLE

8. Connect the wiring harness to the pickup or tractor if transporting on a public road. Be sure to secure hitch and provide sufficient slack for turning.

NOTE

Install the optional lighting bar and connect wiring harness to towing unit.

FIG. 16 ATTACHED

9. Reverse the above procedure when unhooking.

4.9 OPERATING

OPERATING SAFETY

- Make sure that anyone who will be operating the Scale Conveyor or working on or around the unit reads and understands all the operating, maintenance and safety information in the operator's manual. Also read and follow the instructions in the manuals of other equipment in the system.
- **Turn machine OFF, shut down and lock out power supply (safety lockout devices are available through your Mayo dealer parts department) and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.**
- Establish a lock-out tag-out policy for the work site. Be sure all personnel are trained in and follow all procedures. Lock-out tag-out all power sources before servicing the unit or working around loading/unloading equipment.
- Install and properly secure all guards and shields before operating.
- Replace all worn or failed components immediately.
- 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.
- Keep all electrical components tight, dry and in good repair.
- Extend leg ratchets 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 by following ANSI/NFPA 70 Wiring Standard. If you do not know or are unsure, consult a licensed electrician.
- Keep the working area clean and dry.
- Review safety instructions annually.

Follow this procedure when using the Scale Conveyor:

1. Review Section 4.7 Machine Preparation and follow all the instructions.
2. Review and follow the pre-operation checklist (See Section 4.5).
3. Review the location and function of all controls (See Section 4.6).
4. Calibrate the scale system if required.

FIG. 17 CONVEYING SYSTEM (TYPICAL)

5. **Starting Scale Conveyor:**

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

   b. Place all controls in the OFF or neutral position.

   c. Turn the power to the machine and scale ON at the master panel.

   d. Turn scale ON.

   e. Turn dial to select manual or automatic mode.

   f. Turn the main equipment ON that moves potatoes away from the conveyor.

   g. Turn the conveyor ON.

   h. Turn the equipment ON that moves potatoes on the conveyor.

6. **Stopping Machine:**

   a. Turn OFF the equipment that brings potatoes to the Scale Conveyor.

   b. Wait until the potatoes have moved off the end of the conveyor.

   c. Turn the conveyor OFF.

   d. Turn OFF the conveyor that moves potatoes away from the conveyor.

If the machine is wired up as part of a conveying system, wait until all the potatoes have moved through the system. Then turn the system OFF.

7. **Emergency STOP:**

   Depress the red STOP switch on the control panel as required.

   IMPORTANT

   Turn all controls OFF before restarting.

   Turn the switch clockwise to release the STOP switch so the system can run again. If a problem occurred requiring emergency stopping, correct the condition before resuming work.

a. Mode Selector b. Emergency Stop

FIG. 18 CONTROLS

FIG. 19 OPERATING SYSTEM

8. **Equipment Position:**
Each customer must provide a means of supplying a steady flow of potatoes to the Scale Conveyor. Normally this is done by using another piece of equipment such as a grader, another conveyor or stingers. When the conveyor is used as a component in a conveying system, it is recommended that it be securely attached to the adjacent piece of equipment. An optional over center clamp is available on one end to attach to another Mayo machine. Adjust the hook bolt to obtain the required position. If connecting to equipment made by other manufacturers, connect securely using a chain, straps or other means.

Disconnect the hitch and move the other equipment before repositioning or moving the Scale Conveyor.

By securely attaching to the Bin Piler or other adjacent equipment, the adjacent equipment can move and the conveyor will move along with it without having to stop and reposition. Set the height of the equipment for minimal drop height to minimize bruising.

FIG. 20 EQUIPMENT ATTACHMENT

8. **Moving:**
The Scale Conveyor is manually steered and moved in normal conditions. To assist in the moving process, the front wheels are designed to be used for steering. To move the conveyor, follow this procedure:

   a. Release the hitch from its stowed position.

   b. Use the hitch to turn the wheels to the desired position.

   c. After the conveyor has been moved to its desired position, straighten the wheels and secure the hitch in its stowed position.

   d. Place chocks in front of and behind the wheels to unplanned prevent machine movement if appropriate.

   e. Secure to the adjacent pieces of equipment.

   f. If necessary to move the machine laterally:

      - Remove wheel lock rod to allow rear wheels to castor.
      - Move frame into position.
      - Straighten wheels.
      - Install and secure lock rod.

Hitch End

Lock Rod

FIG. 21 STEERING

10. **Unloading Conveyor (Typical):**
A Stinger(s) can be mounted to a conveyor for unloading trucks. Potatoes are unloaded into the Stinger and the Stinger conveys them into the conveyor.

FIG. 22 UNLOADING CONVEYOR

10. **Drop Height:**
Potatoes are sensitive to bruising during the gathering, transporting and handling phases of harvesting. Bruising is kept to a minimum by maintaining a full flow of potatoes through each machine and minimizing all drop heights. Bruising during the conveying phase can be minimized by keeping the drop height between each piece of conveying equipment as small as possible. Use the ratchet jacks on each end of the Scale Conveyor to set the height. Use 2 personnel (one on each jack) when setting the height of an end to prevent frame twisting.

FIG. 23 DROP HEIGHT

11. **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 can expose himself and others to needless hazards.

d. Secure all pieces of equipment together to prevent unexpected movement and separation.

e. Keep the Scale Conveyor as full as possible to minimize bruising during the unloading process.

f. Set the height of each end of the Scale Conveyor so the drop height to the adjacent piece of equipment is at a minimum to prevent bruising.

g. Keep the unit as full as possible during operation. The scale gives the most accurate reading when the conveyor is full.

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

FIG. 24 OPERATING SYSTEM

4.10 TRANSPORT

TRANSPORT SAFETY

- Make certain that you are in compliance with local, state/provincial and federal regulations regarding transporting agricultural equipment on public roadways.
- 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).
- Make certain that all mechanical locks and integral anchor chains are safely and positively connected before loading or transporting.
- Raise and secure all jack stands if applicable.
- Wrap up and bind to the frame all loose 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 Conveyor is positively hitched to the towing vehicle. Use a 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 Km/H). Reduce speed on rough roads and surfaces.
- Do not allow anyone to ride on the Conveyor or towing vehicle during transport.
- Always use hazard flashers on the towing vehicle when transporting.

Mayo Scale Conveyors are designed to be easily and conveniently moved from location to location. The term moving is used to describe the action of moving the machine manually or with the optional wheel drive system and is covered in Section 4.8 Operating. Transporting is used to describe when the machine is being towed by a tractor or other power unit. When transporting, follow this procedure:

1. Disconnect power and remove all auxiliary equipment from the Scale Conveyor and position so the tractor can back up to the front of the machine.
2. Install and secure the lock rod on the castor wheel frame on the intake end.

FIG. 25 LOCK ROD

3. Release the hitch from its stowed position under the front of the frame.

Stowed

4. Place hitch in its extended position to provide clearance when turning.

Extended

FIG. 26 MACHINE PREPARATION - HITCH

5. Mount the optional lighting bar.

6. Place all controls in the OFF or neutral position.

7. Turn the power OFF at the master panel and lock out.

8. Unplug and remove the power cord.

9. Attach the tow hitch to the pickup or tractor. Be sure to use a mechanical retainer through the drawbar pin.

10. Attach the safety cables between the hitch and the drawbar cage to prevent unexpected separation.

11. Connect wiring harness to the tow unit.

FIG. 27 ATTACHED

12. Install an SMV on the rear frame if towing with a tractor.

13. Use pilot vehicles or install optional lighting bar on the machine when transporting.

14. Clean all the reflectors.

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

16. 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.

17. 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.

18. It is not recommended that the machine be transported faster than 15 mph (25 km/hr). Table 2 gives the acceptable transport speed as the ratio of tow vehicle weight to conveyor weight.

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

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

TABLE 2 TRAVEL SPEED VS. WEIGHT RATIO

Road Speed	Weight of fully equipped or loaded implement(s) relative to weight of tow unit
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

4.11 STORAGE

STORAGE SAFETY

- Store the Scale Conveyor 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 conveyor.
- 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 conveyor.

4.11.1 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. Turn the power OFF at the master electrical panel and lock out.
2. Unplug and remove power cord from machine.
3. Lock out power by closing control panel or junction box and padlocking the door shut to prevent electrocution or unauthorized start up of the 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 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.
7. Inspect the conveyor belt. Realign if belt is not tracking in the center of the frame. Replace belt if the edges are damaged from rubbing on frame. Properly tension the belt.
8. Check all rotating parts for entangled material. Remove.
9. Touch up all paint nicks and scratches to prevent rusting.
10. Select a storage area that is dry, level and free of debris.

FIG. 28 STORED (TYPICAL)

4.11.2 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. Electrical systems and components.
   b. Conveyor belts and drive systems.
   c. All hardware. Tighten as required.
   d. Air pressure in tires. Add as required.
3. Replace any defective components.
4. Go through the pre-operation checklist (Section 4.6) 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.
- 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.
- Make sure all guards and doors are in place and properly secured when operating the Scale Conveyor.
- Do not work on conveyor 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 meeting or exceeding the NLGI #2 rating for all requirements.

2. **Speed Reducer Gear Box Lubricant:**
   Use a Browning Worm Gear high-temperature GL32HT lubricant (AGMA Comp. #8) or equivalent.

   Capacitiy: 1 qt (1 liter).

3. **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.

5.1.2 GREASING

Refer to Section 5.1.1 for recommended grease. Use the Maintenance Checklist provide 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 Scale Conveyor. 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 and alignment. Tension or align as required.

FIG. 29 ALIGNMENT (TYPICAL)

2. Inspect electrical system and all components.

FIG. 30 ELECTRICAL (TYPICAL)

3. Check speed sensor for entangled material around the shaft. Remove any entangled material.

FIG. 31 SPEED SENSOR

50 Hours or Weekly

1. Grease Scale Conveyor shaft bearings with one shot of grease (2 locations each shaft).

IMPORTANT

Only sealed bearings are used on the Scale Conveyor shaft. Sealed bearings should never be greased more often than weekly or every 50 hours. Do not over-grease. Do not give bearing more than one 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. Drive.

b. Driven.

Drive

Driven

FIG. 32 SHAFTS

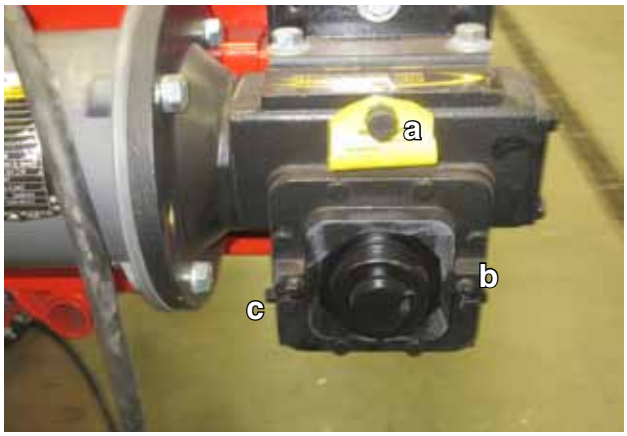
100 Hours or Annually

1. Check the oil level in the speed reducing gearbox in the drive system (1 location).

FIG. 33 LEVEL PLUG (TYPICAL)

500 Hours or Annually

1. Change the oil in the gearbox.
2. Clean the gearbox breather plug.



a. Fill Plug b. Level Plug c. Drain Plug

FIG. 34 GEARBOX (TYPICAL)

3. Repack each wheel bearing.
4. Clean machine.

FIG. 35 WHEELS (TYPICAL)

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 and Alignment																							
IN Electrical System and Components																							
CK Speed Sensor																							
50 Hours or Weekly																							
LU Conveyor Shaft Bearings																							
100 hours or Annually																							
CK Oil Level in Gearbox																							
500 Hours or Annually																							
CH Gearbox Oil																							
CL Gearbox Breather Plug																							
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 ELECTRIC SYSTEM INSPECTION

Electricity provides power to all systems on the Scale Conveyor. 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.

3. Inspect all electrical components looking for:

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.

   a. Physical damage. (Includes all components: starters, switches, enclosures, as well as plugs).

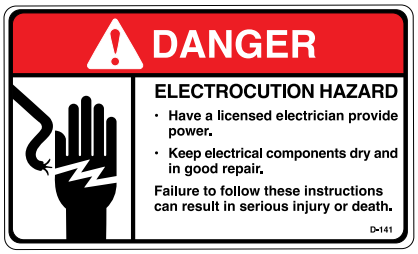
   b. Frayed or loose wires.

   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.



Machine

Scale

Control Panel

Opened

FIG. 36 ELECTRICAL INSPECTION

5.2.2 SPEED REDUCER GEARBOX OIL

The Scale Conveyor is driven by an electric motor that is attached to a high ratio speed reducing gearbox to give the required operating speed. The 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 conveyor until the gearbox is warm. Warm oil will remove more contaminants than cold stagnate oil.

2. Stop the conveyor.

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

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

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.

6. **Changing oil:**

   a. Place a container under the drain plug.

   b. Remove the drain.

   c. Allow 10 minutes to drain.

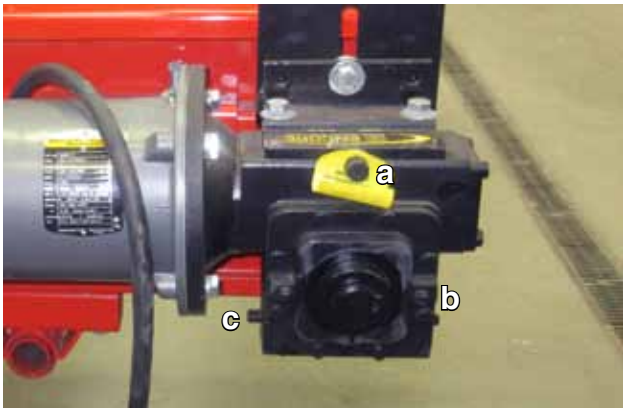
   d. Install and tighten the drain plug.

   e. Remove the level and fill plugs.

   f. Add approximately 1 qt (1 liter) of Browning Worm Gear GL 32HT lubricant or equivalent. Use the level plug to determine the proper amount of oil.

NOTE

It may be necessary to add teflon tape or pipe sealant to the drain plug prior to installation to prevent leaking.



a. Fill Plug b. Level Plug c. Drain Plug

FIG. 37 GEARBOX (TYPICAL)

   g. Check that the air passage through the breather is open.

   h. Install and tighten the fill and level plugs.

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

5.2.3 BREATHER CLEANING

The gearbox is equipped with a breather in the fill plug that vents the internal pressure to atmosphere. As the gearbox temperature increases and decreases during the operating and stopped modes, the pressure in the gearbox will increase or decrease if it is not vented to atmosphere. An increase in internal pressure will cause the shaft seals to leak until the gearbox runs low on or out of oil. To check on or clean the breather, 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. Remove the fill plug/breather from the gearbox.
4. Check that the vent passage through the plug is open.
5. If plugged, soak in a solvent over night.
6. Use a high-pressure air hose to blow the passage open. Use a probe to clear the passage if the hole is caked with dirt.
7. Install and tighten the breather plug.

IMPORTANT

Always clean the breather if any leaks are noticed around shafts.

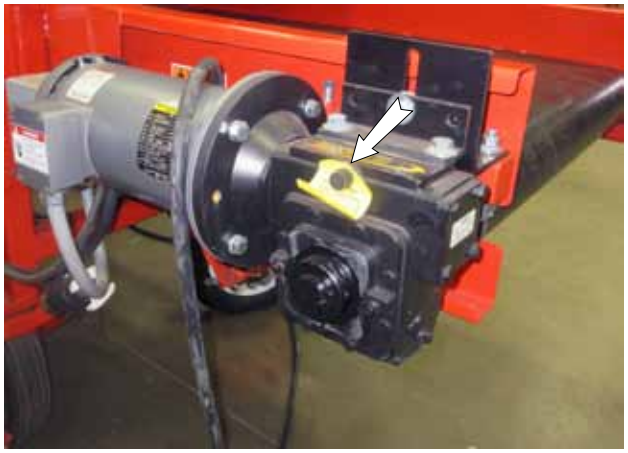


FIG. 38 BREATHER (TYPICAL)

5.2.4 CONVEYOR TENSION/ALIGNMENT OR REPLACEMENT

Flat belts are used to move potatoes with the Scale Conveyor. The tension and alignment of the conveyor should be checked daily to insure proper function. Replace the conveyor 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 lock-out.

3. **Tension:**

   a. **Conveyor Belt:**
   It is tensioned correctly when there is a 1 to 2 inch (25 to 50 mm) sag between the guide rollers on the bottom or slack side of the conveyor during operation.

   b. **Conveyor Chain** (not shown)**:**
   It is tensioned correctly when there is a 3 to 4 inch (75 to 100 mm) sag between the guide rollers on the bottom or slack side of the conveyor during operation.

FIG. 39 TENSION ADJUSTMENT (TYPICAL)

4. **Alignment:**

   a. **Conveyor Belt:**
   It is properly aligned when the belt runs in the center of the frame panels and the shafts. Be sure to run the Scale 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.

   b. **Conveyor Chain:**
   It is properly aligned when the chain links center on the drive sprockets. If the links run on one side or the other, align the chain. 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 drive or driven shafts but always maintain proper tension.

FIG. 40 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.

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

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

   e. Disconnect the old belt 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.

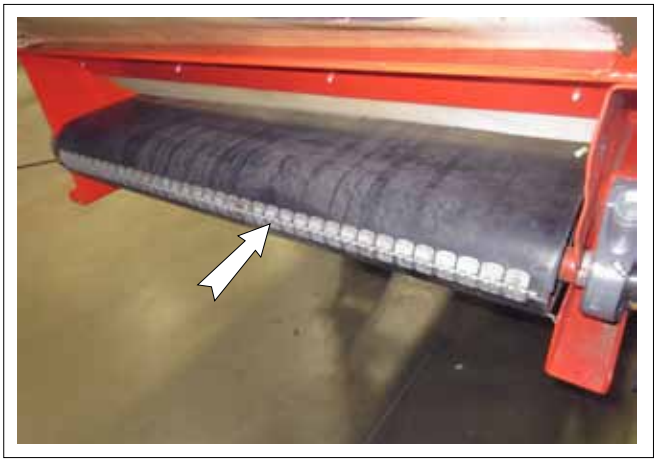


FIG. 41 BELT CONNECTOR (TYPICAL)

6 TROUBLE SHOOTING

The Mayo Scale Conveyor uses a straight design to convey potatoes. 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 from your machine ready.

PROBLEM	CAUSE	SOLUTION
System won't run.	No power.	Turn power ON at master panel.
Conveyor won't run.	No power.	Turn conveyor ON.
	Sheared motor key.	Replace key.
	Sheared reducer key.	Replace key.
	Binding.	Align conveyor.
Scale conveyor doesn't come ON.	No power.	Provide 120 V power to the scale system. Turn scale system ON. Check continuity of power system.
Scale doesn't read properly.	Out of calibration.	Calibrate system.

7 SPECIFICATIONS

7.1 MECHANICAL

	36” x 17’6”	36” x 20’
DIMENSIONS (Typical)		
Length:	17’6”	20’
Width:	36”	36”
Overall Width:	57”	57”
Weight:	1800 LBS	2200 LBS
POWER		
Type:	3ph, 230v, 8.2 amp 3ph, 460v, 4.1 amp	3ph, 230v, 8.2 amp 3ph, 460v, 4.1 amp
Motor:	3 HP	3 HP
TIRES (Typical)		
	SIZE	**PRESSURE**
Castors:	4 Bolt, 12x4, 4.80x12	90 PSI Cold (990 LBS – Max Load)

Scale Conveyor physical dimensions, power specifications & wheel/tire configurations vary substantially for each machine.

Please contact factory at 1-218-773-1234 or 1-800-223-5873 for your machines particular specifications.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

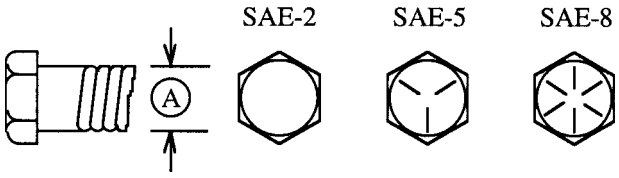
7.2 BOLT TORQUE

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.

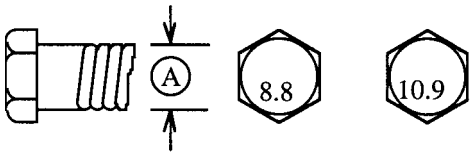
ENGLISH TORQUE SPECIFICATIONS

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	.5	.4	1.8	1.3
M4	3	2.2	4.5	3.3
M5	6	4	9	7
M6	10	7	15	11
M8	25	18	35	26
M10	50	37	70	52
M12	90	66	125	92
M14	140	103	200	148
M16	225	166	310	229
M20	435	321	610	450
M24	750	553	1050	774
M30	1495	1103	2100	1550
M36	2600	1917	3675	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 ELECTRICAL SCHEMATIC

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.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

8 INDEX

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