



U-Trough FS Unload for 14' - 74' Diameter Grain Bins



Owner/Operator's Manual and Installation/Maintenance Guide

NORSTAR INDUSTRIES LIMITED WARRANTY

Norstar Industries expressly warrants each new U-Trough Unload to be free from defects in material and workmanship under normal use and service for a period of one year after delivery to the original retail purchaser or first user of the product.

Norstar Industries U-Trough Unloads are designed for free flowing materials and are not warranted for other distribution or substances. Other use will void the warranty.

Our obligation under this warranty is limited to repairing and/or replacing, at our option, any part or parts within the applicable one year period, as set out above, which shall be returned by the owner to any authorized dealer or to the factory and which upon examination shall prove to be defective. Labour costs associated with the replacement or repair of the U-Trough Unload is not covered by the Manufacturer.

We may, as an option, elect to grant adjustments in the field through an authorized representative and may thereby elect to waive the requirement that parts be returned to our factory.

A new warranty period is not established for replacements. Replacements are warranted for the remaining portion of the one-year original warranty period.

The provisions of this warranty do not apply to any product or parts, which have been subject to misuse, negligence or accident, or which have been repaired or altered outside of the manufacturer. Neither does this warranty apply to normal maintenance service and parts, or to normal deterioration due to wear and exposure.

The Manufacturer shall not be liable for any consequential or special damage which any purchaser may suffer or claim to suffer as a result of any defect in the product. "Consequential" or "special damages" as used herein include, but are not limited to, lost or damaged products or goods, costs of transportation, lost sales, lost orders, lost income, increased overhead, labour and incidental costs and operational inefficiencies.

The foregoing is in lieu of all other warranties, expressed or implied, including any warranty of merchantability is expressly excluded.

**WARRANTY VOID IF NOT REGISTERED
WITHIN 30 DAYS OF PURCHASE DATE**

NORSTAR INDUSTRIES LTD.

PO Box 119 RR1 • Morris, Manitoba R0G 1K0 • Canada

Toll Free: (855) 746-8200 • Phone: (204) 746-8200 • Fax: (204) 746-8074

e-mail: info@norstarindustries.ca • Internet: <http://www.norstarindustries.ca>

Support Information

Norstar Industries products are designed for **free flowing** materials. **Using this equipment for any other purpose or in a way not within the operating recommendations specified in this Manual will void the Warranty and may cause injury or death.** This Manual is designed to provide comprehensive planning and construction information for the Norstar Industries product. The Table of Contents provides a convenient overview of the information in this Manual.

Please keep this Manual in a clean, dry place for future reference.

NORSTAR INDUSTRIES U-TROUGH UNLOAD

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 _____ Dealer's Name _____

Address _____ Address _____

City, Prov/State, Code _____ City, Prov/State, Code _____

Phone Number (____) _____

U-Trough Model _____

Delivery Date _____

DEALER INSPECTION REPORT

- All Sections/Fasteners Tightened
- Oil in Gearbox(s)
- Lubricate Machine
- Belts Tight and Secure

SAFETY REPORT

- Belt Guard Installed
- All Decals Installed
- Review Operating and Safety Instructions

Form must be completed with dealer inspection and signature as well as owner's signature. By not completing the form, you may be voiding the warranty.

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 _____

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 _____

Table of Contents

Warranty Information	2-3
Warranty	2
Support Information	3
Warranty Registration	3
Introduction	6
About This Manual and Your Shipment.	7-8
Definition of Terms and Pictures	7
Identification of Parts and Hardware	7
Measurements	7
Inspect Your Unload Shipment	8
Tools and Equipment Needed for Installation	8
Safety	9-20
Recognize SAFETY Information	9
Understand Signal Words	9
Introduction to Safety	10
General Safety	10-11
Operation Safety	11
Maintenance Safety	12
U-Trough Unload Area Safety	12
Proper Wiring by Qualified Electricians	12
Install Emergency Start and Shut-off Devices	13
Grain Bin Safety	13-16
Sign-off Form	17
Safety Decals	18-20
Safety Decal Placement	21
U-Trough Overview	22
U-Trough Unload Features	22
Standard Specifications	22
Unload Installation	23-34
Concrete Floor	23
Aeration Floor	24
Anchor Bolts	24
Shifter Handle	25
U-Trough Gearbox	25-26
U-Trough Section Connection	26-27
Flighting	27
54'-74' Sweep	28
14'-50' Sweep	29
Incline	29-31
Powerhead	31-34

U-Trough Adjustment 35-37
 Adjusting the Gearbox Shifter Rod 35
 Adjusting the Rear Caster Wheel 36-37
 Adjusting the Sweep Extension 37

Sweep Stop Installation 38

Electrical Installation. 39
 Controls 39
 Wiring 39
 Switch Box. 39

Operation 40-41
 Operator Instruction. 40
 Start-up 40
 Break In Period 40
 Operation Requirements 41
 Operation Procedure 41

Maintenance. 42-44
 Instruction of Personnel. 42
 Basic Maintenance Rules 42
 Electrical Wear 42
 Material Build-up, Wear and Damage 43
 Lubricants 44
 Additional Maintenance Tips 44

Troubleshooting 45
 General Troubleshooting 45
 Electrical Troubleshooting 45

Spec Sheet 46-47
 U-Trough 14'-50' 46
 U-Trough 54'-74' 47

Bolt Torque. 48

Exploded View and Parts List 49-81
 U-Trough 14'-50' 50-57
 U-Trough 54'-74' 58-63
 Sweep 14'-50' 64-67
 Sweep 54'-74' 68-69
 Incline 70-71
 Electric Powerhead 72-79
 Hydraulic Powerhead 80-81

Introduction

Congratulations on your purchase of a Norstar Industries U-Trough Unload to complement your grain handling and storage system. This equipment has been designed and manufactured to meet the needs of the farm and commercial users for the efficient cleaning out of grain bins.

Safe, efficient and trouble free operation of your U-Trough Unload requires that you and anyone else who will be operating or maintaining the Unload, read and understand the Safety, Operation, Maintenance and Troubleshooting information contained within the Operator's Manual.



This manual covers the 8 and 11 inch U-Trough Unload distributed by Norstar Industries. Use the Table of Contents to find specific information.

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

OPERATOR ORIENTATION - The directions left and right, as mentioned throughout the manual, are as seen when standing facing the Belt Guard.

About This Manual and Your Shipment

The purpose of this manual is to help in the following areas regarding your Norstar Industries U-Trough Unload.

- Instructions for safe installation, operation and maintenance
- Step-by-step installation procedures
- Easy reference if you have questions in a particular area
- Parts identification



It is important to read all instructions in this Manual, carefully, BEFORE starting the installation. Particularly, pay attention to all safety information on pages 9-21 of this Manual

Unsafe practices could result in equipment damage and serious injury or death. Failure to read this Manual is considered a misuse of the equipment.

Warranty information is included on the inside front cover of this Manual.

Definition of Terms and Pictures

- “Front,” “rear/back,” and “top” refer to the Unload as it is standing.
- The directions left and right, as mentioned throughout the manual, are as seen when standing facing the Belt Guard.
- Names of components and parts have been capitalized throughout the Manual (i.e. Flighting, 1/2” Nylon Locknut) to call attention to them in the installation.
- Some Guards have been removed from the pictures for illustrative purposes only. Figures/Illustrations may vary slightly from actual models.
- An asterisk (*) and arrow/line may be used in an image to reference a particular hole or position mentioned in the accompanying text.

Identification of Parts and Hardware

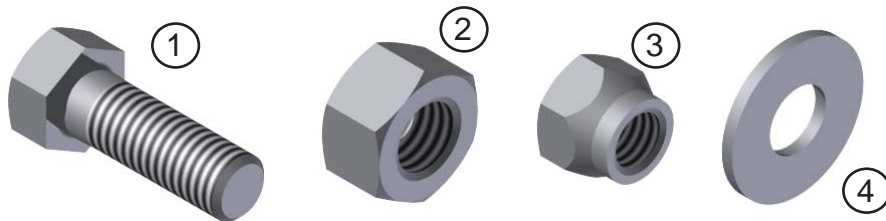


IMPORTANT! No hardware substitutions are permitted unless noted.

Diagrams are provided throughout the Manual to identify Parts and Hardware used in that application. Parts and basic components are identified in Figures and their accompanying Tables as “Items” with a black number in a white circle. A Description field will accompany the item number to aid in identifying a component. When necessary, quantities of items may be listed in the instructions. When this occurs, quantity will be listed as a word followed by a bracketed letter or number (i.e. A, B, two (2), three (3)).



IMPORTANT! ALL NUTS & BOLTS USED ARE GRADE 5 UNLESS OTHERWISE STATED!



Item	Description
1	1/2" x 1 1/2" Bolt
2	5/8" Hex Nut
3	1/2" Nylon Locknut
4	1/2" Flatwasher

**Figure 1
Hardware Identification**

Measurements

The symbol (") equals inches and (') equals feet in English measurements. Metric measurements, in millimeters, may be shown in italics and square brackets following.

For example: 15' [4 572] 90' [27 542]

Metric equivalents are not always repeated throughout the Manual.

Inspect Your U-Trough Shipment

Be sure to check all components and assemblies to your packing slip, ensuring that all components are present. Any discrepancies should be taken care of immediately. If any components are missing or damaged in transit, a claim should be filed or the issue reported to the carrier as soon as possible. Norstar Industries' responsibility for damaged equipment ends with your acceptance of the delivery. It is recommended to save all paperwork and documentation with any of the U-Trough components.

Your U-Trough Unload shipment should include all the assemblies in **Figure 2**:

1. U-Trough Unload Assembly
2. Sweep Assembly
3. Powerhead Assembly
4. Parts Box
5. Incline (**optional**)(*not shown*)

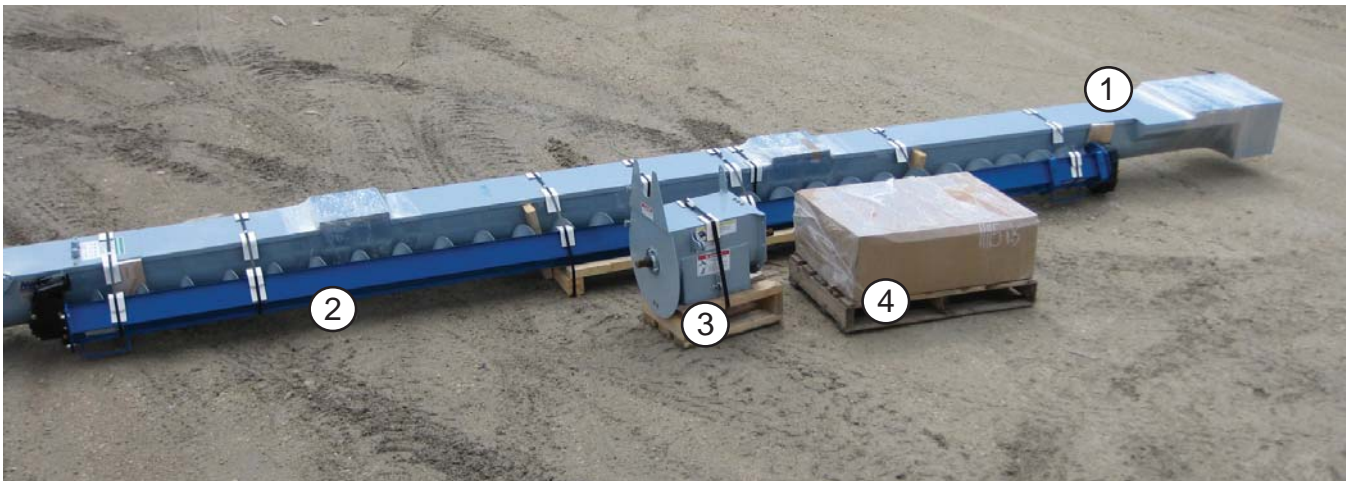


Figure 2
Shipment Parts Identification

Tools and Equipment Needed for Installation

- Safety Glasses
- Steel-toe safety shoes
- Gloves
- Hard Hat
- Forklift truck (to lift components)
- Crane/Hoist (to lift/raise components)
- Floor Jack
- Wrench Set
- Ratchet Set
- Air Ratchet
- Impact Wrench
- Deepwell Sockets
- Shallow-well Sockets
- Punch



CAUTION! Inventory all tools and pieces of hardware near the Construction Site during installation or servicing. Tools lost in the U-Trough Unload may cause damage or injury at a later time. Use the proper tools to prevent injury.

Safety

Recognize SAFETY Information



This is the Safety-Alert Symbol. When you see this symbol on your equipment or in this Manual, be alert to the potential for personal injury.

Signal words **DANGER**, **WARNING**, or **CAUTION**, are used with the Safety-Alert Symbol.

Be sure to follow **all** National and Local SAFETY Standards governing each installation site.



This is the Attention-Alert Symbol. When you see this symbol in this Manual, be alert to information that could be pertinent to the Safety of personnel or the Operation of the Equipment.

Signal words **IMPORTANT** or **ATTENTION** are used with the Attention-Alert Symbol.

Be sure to follow all notices during the installation and operation of your equipment.

Understand Signal Words



DANGER indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.



WARNING indicates a potentially hazardous situation which, if not avoided, **COULD** result in death or serious injury.



CAUTION indicates a general hazardous situation which, if not avoided, **MAY** result in minor or moderate injury.



ATTENTION or **IMPORTANT** indicates vital information or instructions, highly recommended and/or pertinent, for the safe installation or operation of your equipment.



ATTENTION! Work Site Contractor, Installer, Owners, Operators: Read and Follow This Manual - Especially This SAFETY Section!

Do NOT operate this equipment before reading and understanding this Operations Manual. For operation, maintenance and servicing of your U-Trough Unload, read and understand this Manual. Untrained operators subject themselves and others to serious risks. Read and follow all precautions and recommended SAFETY practices. Failure to read this Manual by owners, operators and supervisors is a misuse of the equipment and could result in death, serious injury, and/or equipment damage.

Read this Manual carefully before servicing or repairing! This Manual is supplementary to any law or code covering fire or health regulations.

It is the **responsibility** of the Contractors, Installers, Operators, Owners and Supervisors to:

- Read this Manual, SAFETY Instructions, and SAFETY Decals herein
- **Know** proper operating precautions, practices and requirements to comply with all federal, state/provincial and local laws and ordinances and applicable safety codes
- **Make the above known** to all who may work with the equipment or be in the working area.

Keep this Manual in a safe, dry place where the Bin Unload Operator can easily obtain it. Contact your Norstar Industries Dealer or Norstar Industries to replace this Manual should it become lost or damaged.

NORSTAR INDUSTRIES LTD.

PO Box 119 RR1 • Morris, Manitoba R0G 1K0 • Canada

Toll Free: (855) 746-8200 • Phone: (204) 746-8200 • Fax: (204) 746-8074

e-mail: info@norstarindustries.ca • Internet: <http://www.norstarindustries.ca>

Safety

Introduction to Safety

YOU are responsible for the **SAFE** operation and maintenance of your Norstar Industries U-Trough Unload. **YOU** must ensure that you and anyone else who is going to operate, maintain or work around the Unload be familiar with the operation and maintenance procedures and related **SAFETY** information contained in this Manual. This Manual will take you step-by-step through your working day and alert you to good safety practices that should be adhered to while operating the Unload.

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 equipment is familiar with the recommended operating and maintenance procedures and follows all the safety precautions. Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

- Unload owners must give operating instructions to operators or employees before allowing them to operate the machine, and at least annually thereafter per OSHA (Occupational Safety and Health Administration) regulation 1928.57.
- The most important safety device on this equipment is a **SAFE** operator. It is the operator's responsibility to read and understand ALL Safety and Operating instructions in the Manual and to follow them. All accidents can be avoided.
- 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.
- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety, could affect the life of the equipment, and will void the warranty.
- Think **SAFETY!** Work **SAFELY!**

General Safety

1. Read and understand the Operator's Manual and all safety signs before operating, maintaining, adjusting or unplugging the Unload.
2. Only trained, competent persons shall operate the Unload. An untrained operator is not qualified to operate the machine.
3. Wear appropriate protective gear. This list includes but is not limited to:



Hard Hat



Protective Eye-wear



Protective Foot-wear



Hearing Protection



Work/Heavy Gloves



Respirator or Filter Mask

4. Have a first-aid kit available for use should the need arise and know how to use it.
5. Do not allow children, spectators or bystanders within the hazard area of the machine.
6. Stop the motor, turn off all controls and wait for all moving parts to stop before servicing, adjusting, repairing, or unplugging the machine.
7. Establish a **Lock-out Tag-out** policy for the work site. Be sure all personnel are trained in and follow all procedures.
8. Review safety related items annually with all personnel who will be operating or maintaining the Unload.

Safety

9. Do not enter a bin unless the motor is off. Do not enter a bin if it has stored material in it.
10. Do not place hands, feet, or any part of your body into the Unload while it is running. Long hair should be tied back and loose clothing should not be worn in close proximity to any moving components on the Unload.
11. Do not walk or stand on or in front of the Unload.
12. To avoid being struck, do not poke or prod material in the Auger or other moving Unload parts with a bar, stick or other instrument.

Operation Safety

Refer also to the Operation section on **Pages 40-41** of this Manual

Norstar Industries U-Trough Unloads are built with your Safety in mind. However, accidents can happen with improper installation or use.

Anyone who will be operating or working around this equipment should be trained in the proper operational and safety procedures required. It is recommended to read and understand the Operator's Manual and all safety signs before using the equipment. Only Operators completely familiar with both the Unload and this Manual and its Safety/Operational practices should be permitted to operate this Unload. Always operate the Unload in accordance with the instructions in this Manual and Unload Safety Decals.

Always ensure that all covers and guards are in place and secured on the Unload before operation.



WARNING! Do NOT attempt to clear an Unload jam until power has been LOCKED OUT.



DANGER! If the Unload is to be inspected, cleaned, serviced, adjusted or observed, all Unload motors are to be LOCKED OUT electrically in such a way that they CANNOT be restarted by anyone remote from the area. If applicable, eliminate all sources of stored power to ensure that no components will move while being without main power.

Never operate the Unload if intoxicated or under the influence of alcohol or drugs.

Any worker who is tired and/or under pressure is more apt to have an accident. Give extra breaks and/or varied jobs to all workers. If necessary, delay operation of this equipment until the Operator is adequately rested.

Never start the Unload until all persons are clear of the equipment.

Make certain a **qualified operator** is in attendance at all time while the Unload is operating. Never leave the Unload running unattended.



CAUTION! Under no circumstances should horseplay be permitted near the Unload. Do not run around or climb on the Unload. To do so may cause injury.

Schedule and maintain a Safety training and operations program for all Unload Operators. All Operators should perform periodic reviews of those procedures. Initially, and periodically thereafter, insist that all operating personnel review the Safety sections of this Manual.

Do not adjust, service, lubricate, clean, unclog or move this equipment while in operation.

The Norstar Industries U-Trough Unload is not manufactured or designed to handle materials that are hazardous. Hazardous materials are those that are explosive, flammable, toxic or otherwise dangerous to personnel if they are not completely and thoroughly contained in the Unload. Do not overload the Unload or use it for anything except its intended use. The Unload is designed for free flowing, dry materials. Using the machine for any other purpose may break or damage the Unload.

Unload equipment shall be used to convey only the specified commodities or materials within the rated capacity and the rated speed. Where special use is not indicated, or ratings are not available, good industry practice shall be used.



WARNING! Using this equipment for any other purpose or in a way not within the operating recommendations specified in this Manual will void the Warranty and could cause injury or death.

Safety

Maintenance Safety



DANGER! Use extreme **CAUTION** around electrical components. Always shut off, disconnect and **LOCK OUT** and **TAG OUT** all power before adjusting, servicing, cleaning, repairing or doing any maintenance on the U-Trough Unload. If applicable, eliminate all sources of stored power. Failure to follow these instructions will result in death or serious injury.

Review the Operator's Manual and all safety items before working with, maintaining or operating the U-Trough Unload.

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

Visually inspect the U-Trough Unload prior to operation. Correct any hazardous situation. Repair any faulty equipment.

Use suitable precautionary measures when repairing or replacing equipment parts to prevent injury.

Ensure that motors are operating at the proper speed.

Mount controls for any electric motor at a convenient place, at a safe distance from the machine. Make sure controls are readily accessible in the event of an emergency.

Schedule and keep a Maintenance Checklist to ensure optimum U-Trough Unload operation.

Before resuming work, install and secure all guards when maintenance work is completed.



IMPORTANT! Refer to the more detailed Maintenance section in Pages 42-44 of this Manual.

U-Trough Unload Area Safety

Entrance to **enclosed areas** may expose persons to operational or environmental hazards and should only be entered by authorized personnel with proper safety equipment. Provide adequate fencing and security of restricted areas. Prohibit untrained personnel, visitors, and children from entering the U-Trough Unload area. Designate a **SAFETY Zone** for unauthorized personnel or visitors.

Keep children and other unqualified personnel out of the working area at **all times**.

Post signs, clearly, in areas where there are points of **access**.

Be sure the designated area is clear before turning power on to the U-Trough Unload.

Proper Wiring by Qualified Electricians



DANGER! All electrical wiring should be done by a Qualified Electrician.

Use extreme Caution around electrical components. Your Installer should have your electric company check the transformer and lead wires. Be sure the wires are an adequate gauge to carry the load of your U-Trough Unload's Motor, including starting and full load operating conditions. Failure to follow these instructions will result in death or serious injury.

Norstar Industries assumes no responsibility for the electrical wiring used with this U-Trough Unload. Norstar Industries will not be liable for failure of the U-Trough Unload because of improper electrical installation or use.

Motor overload protection, electrical disconnects and over-current protection are not supplied with the equipment.



IMPORTANT! In selecting Electrical Control Equipment to be used with any installation, the purchaser must use equipment conforming to applicable Local and National codes or regulations.

A LOCK-OUT/TAG-OUT DEVICE must be installed on Control enclosures containing hazardous voltage. This should be done at the time of the U-Trough Unload installation to prevent the machine from starting during a Safety check, maintenance, etc.

All electrical equipment must be **grounded**.

Safety

Install Emergency Start and Shut-off Devices

All Safety devices, including wiring of electrical devices, shall be arranged to operate such that a power failure or failure of the device itself will not result in a hazardous condition.

An **emergency shut-off** switch with power **LOCK OUT / TAG OUT** provisions must be provided at the Auger Drive of the U-Trough Unload.



WARNING! *To prevent a hazardous condition, the machine **MUST** be prevented from restarting on its own after a power failure when power returns. Failure to follow this instruction could cause death or serious injury.*

U-Trough Unload controls shall be so arranged that, in case of Emergency Stop, manual reset or start at the location where the Emergency Stop initiated shall be required for the U-Trough Unload(s) and associated equipment to resume operation.



IMPORTANT! *It is the responsibility of the Contractor, Installer, Owner and Operator to supplement the U-Trough Unload furnished by Norstar Industries with any necessary electrical or structural items to make the U-Trough Unload installation comply with Local and Federal codes, laws and ordinances.*

*Disconnect electrical power, **LOCK OUT** and **TAG OUT** power, **BEFORE** inspecting or servicing the U-Trough Unload.*

Components supplied for the system but not manufactured by Norstar Industries, and added as a part of the U-Trough Unload system, are not the responsibility of Norstar Industries.

Determine the cause of stoppage before restarting the U-Trough Unload. The starting device shall be **LOCKED OUT** and **TAGGED OUT** before any attempt is made to remove the cause of the stoppage, unless operation is necessary to determine the cause or to safely remove the stoppage.

To ensure positive performance and minimum maintenance, it is the Manufacturer's recommendation that this equipment be observed by an operator during the complete unloading operation. Position the Operator **outside** the Grain Bin,

Under no circumstances shall the safety characteristics of the U-Trough Unload be altered if such alterations would endanger personnel.

Routine inspections and corrective maintenance measures shall be conducted to ensure that all Guards and safety features are retained and function properly.

Personnel should be alerted to the potential hazard of entanglement in the U-Trough Unload caused by items such as long hair, loose clothing, and jewelry.

U-Trough Unloads shall not be maintained or serviced while in operation unless proper maintenance or service requires the U-Trough Unload to be in motion. In which case, personnel shall be made aware of the hazards and how the task may be safely accomplished.

Grain Bin Safety

U-Trough Unload installations shall meet the National Fire Protection Association Standard 61B for the prevention of fires and explosions in grain elevators and facilities handling bulk raw agricultural commodities.



DANGER! ***NEVER** enter the Grain Bin Tank while the U-Trough Unload is unloading. Make sure the U-Trough Unload power source is shut off and **LOCKED OUT** before entering the Grain Bin. Do not, under any circumstance, enter the Grain Bin while the U-Trough Unload is in operation. Failure to follow these instructions will result in death or serious injury.*



IMPORTANT! *If you should need to enter the Grain Bin, enter only if you:*

1. Shut off, **LOCK OUT** and **TAG OUT** all power.
2. Use a safety harness and a safety line.
3. Wear proper breathing equipment.
4. Avoid the center of the Grain Bin.
5. Station people to help from **OUTSIDE** of the Grain Bin.

Safety



DANGER! You **CAN** suffocate under material in a Grain Bin/Tank. Entry into **ANY** Grain Bin is a potential hazard. **NEVER** enter the tank during loading or unloading. Failure to follow these instructions will result in death or serious injury.

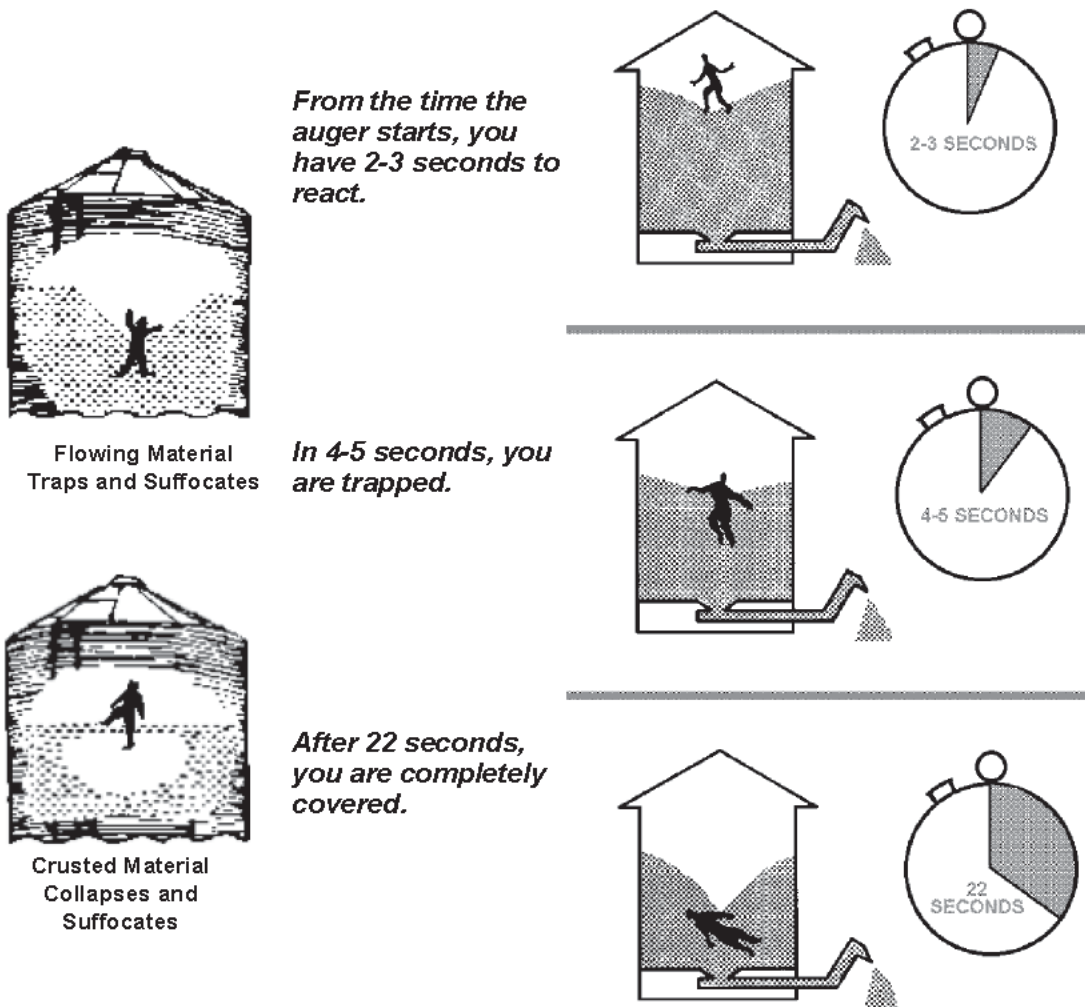


Figure 3
Suffocation Hazards

Bin Safety Hazards and Recommendations

1. **Never** enter a Grain Bin of flowing grain.
2. **Never** enter a Grain Bin when unloading equipment is **running**, whether or not grain is flowing.
3. **Never** enter a Grain Bin that has automatic unloading equipment without **LOCKING OUT** the control circuit.
4. **Never** enter a Grain Bin that you do not know the nature of previous grain removal, especially if there is any crusting evident.
5. **Always** be cautious before walking on any surface crust.
6. It is **always** advisable to have three people involved, two on the outside and one inside, when entering a questionable Grain Bin/storage circumstance. The person in the Grain Bin should be secured or fastened to a safety rope with the two persons outside capable of lifting that person out without entering the Grain Bin. One person outside cannot do this, and cannot go for help and maintain preliminary aid.
7. **Never** work in obviously dusty-moldy grain without a respirator. Never work in such conditions, no matter what the protection, without a second person on safety standby. Use a respirator capable of filtering fine dust.

Safety

8. Be aware that your tolerance to a given material may be limited, and that you should not deliberately and knowingly expose yourself on the idea that "it won't hurt me." Later in life, you may have used up all of your tolerance.
9. **Always** be cautious when you are working with grain that is not in good condition. You can have molds, blocked flow, cavities, cave offs, crusting-it is time to be alert.
10. **Never** depend on a second person, either on the Grain Bin roof, on the ground, or any other remote point to whom you shout instructions to start or stop equipment.
 - a) Equipment noise can block out commands or cries for help.
 - b) The second person may fall or over-exert in the panic and haste of getting off the Grain Bin or running to the control point.

If you must enter a Grain Bin with evident danger, use a rope and safety harness to support and lift you in the event of trouble.



DANGER! *Be sure to advise your children, your co-workers, and your neighbors about the above safety information. Failure to follow proper assembly and operational procedures may cause damage to equipment and could result in injury or death. For operation and use of your U-Trough Unload, read and understand the Owner's/Operator's Manual and the procedures in this Safety section.*

There are Inhalation Dangers in Grain!



DANGER! *Carbon Dioxide (CO₂): Wet grain will ferment when it is stored, producing carbon dioxide (CO₂), a colorless, odorless gas. CO₂ pushes air out of the Grain Bin, resulting in an oxygen-deficient atmosphere. If you enter a Grain Bin where CO₂ is present, it can cause breathing difficulties, drowsiness, headaches, and possibly death.*

In order to avoid this hazard, follow these precautions:

- Do **not** enter the Grain Bin if you suspect CO₂ (carbon dioxide) is present.
- Open all manholes and all doors and purge the Grain Bin with fresh air. If the Grain Bin does not contain a fan, the only way to purge the Grain Bin is to unload the material and open all manholes and doors.

If a co-worker enters the Grain Bin and is overcome by CO₂, do not attempt a rescue unless you are wearing an adequate self-contained breathing apparatus. Contact emergency medical/rescue service immediately. Before entering the Grain Bin, follow all safety precautions as outlined on pages 9-21 of this Manual.

Dust

All feed and grain contains a certain amount of dust. However, spoiled material can release excessive dust and mold spores into the air during handling (especially during clean-out), which can cause serious long-term respiratory problems.

In order to avoid this hazard, follow these precautions:

- Always wear an adequate dust mask or respirator, and ventilate the work area.
- Never work alone when inside a Grain Bin or during clean-out.
- Always turn off, LOCK OUT and TAG OUT all power when entering the Grain Bin, and follow all other applicable safety instructions addressed in this Manual and on all safety decals.

Fumigants

Fumigants used to destroy insects are usually highly toxic substances and cause serious injury when inhaled, swallowed, or absorbed through the skin. In addition, under certain conditions, some fumigants can be explosive.

- Always read and follow the fumigant label recommendations.
- Post warning signs to alert others of dangers during fumigation.
- It may be more cost-efficient and safer to have stored grain fumigated by a licensed professional fumigator. In some locations, the law may require the use of licensed fumigators.

Safety

Considerations that may result in a hazard or damage to your Grain Bin/U-Trough Unload and/or void your Warranty

Norstar Industries U-Trough Unload and related accessories are offered in several models for specific uses. In order to maintain your Warranty on this equipment and not damage your Grain Bin, the appropriate type U-Trough Unload or accessory must be used. Consult Norstar Industries or your Norstar Dealer.

Damage to a U-Trough Unload or Grain Bin can occur due to improper installation. Grain Bin foundations, floors, and aeration floors must be level and installed correctly before a U-Trough Unload is installed.

1. Read and understand this Owner/Operator's Manual and all Safety Decals..
2. Use **all Hardware** specified in the instructions and make no substitutions.
3. Do not modify or attach any other equipment to the U-Trough Unload.
4. Use the U-Trough Unload only for loads, speeds, and materials it is designed to safely carry.



WARNING! *Using this equipment for any other purpose or in a way not within the operating recommendations specified in this Manual will void the Warranty and could cause serious injury or death.*

Safety

Safety Decals



IMPORTANT! Along with your shipment will be DANGER, WARNING and CAUTION Decals which will be placed on the U-Trough Unload. Read and follow all Safety Decal information in this Manual. Confirm that all Safety Decals are in place and secure before operating the U-Trough Unload. To replace lost or missing Decals, contact your local dealer or Norstar Industries.

Safety information has been provided by the Manufacturer to help ensure the safe and proper use of this product. This Safety information has been placed on components throughout the structure to provide proper access and instruction to the user.

Ensure that Safety Decals are clean and legible at all times. Replace damaged or missing Decals immediately.

The following Safety Decals are located on the U-Trough Unload as shown in the Manual drawings.

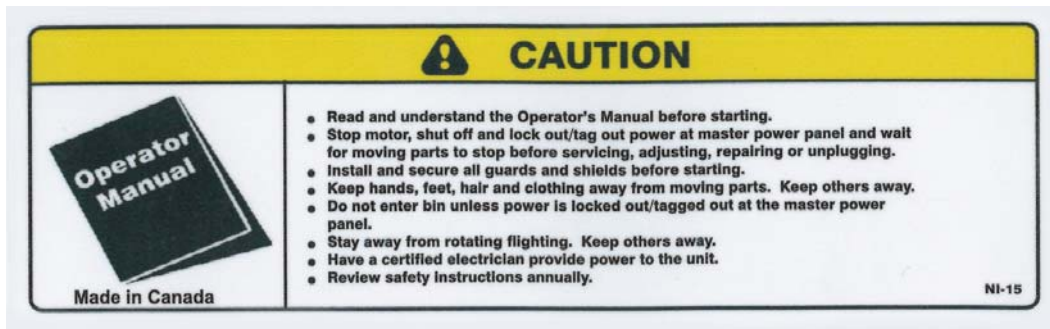


Figure 4
Operator's Manual
Decal NI-15

Operator's Manual

The Operator's Manual Decal NI-15 in **Figure 4** is located on the side of the Powerhead. It states some information found within this Manual, but, otherwise recommends to read and understand the information and instructions within the Manual before operating the machine.

Electrocution Hazard



DANGER! Use extreme Caution around electrical components. SHUT OFF, LOCK OUT and TAG OUT electrical power BEFORE inspecting or servicing the U-Trough Unload. Failure to do so will result in death or serious injury.

The Electrocution Hazard Decal NI-20 in **Figure 5** is located on the side of the Powerhead. In addition, this decal should be placed at any and all locations where there is potential exposure to electric power for the U-Trough Unload.



Figure 5
Electrocution Hazard Decal NI-20

Missing Guard Hazard



DANGER! Before starting or operating the machine, ensure that all guards or covers are in place and secure.

The Missing Guard Hazard Decal NI-17 in **Figure 6** is located inside the Belt Guard. Operation of the U-Trough Unload with Guards off exposes parts that could cause severe personal injury. DO NOT operate the equipment without these Guards properly secured.



Figure 6
Missing Guard Hazard Decal NI-17



IMPORTANT! If Safety Decals have been damaged, removed, become illegible or parts replaced without decals, new decals must be applied. New decals are available from your authorized dealer

Safety



Figure 7
Rotating Flight Hazard NI-18

The Rotating Flighting Hazard Decal NI-18 in **Figure 7** is located on the back side of the Bin Sweep at the gearbox and at the end of each Bin Sweep Section. It is also on the side of the Powerhead. This Decal should be placed at any location where the Bin Sweep Flighting is exposed. Some moving parts, such as the Flighting and Drive Wheels, must remain exposed. Avoid contact with moving parts while the U-Trough Unload is in operation. Never wear loose fitting clothing or flowing scarves or jewelry around moving parts or equipment.

Rotating Flighting and Rotating Part Hazard



WARNING! DO NOT allow the U-Trough Unload to run while adjustments are being made. SHUT OFF, LOCK OUT and TAG OUT all electrical power BEFORE working on or near the U-Trough Unload. Keep hands, feet, hair and clothing away from flighting and other moving parts. Failure to shut off, LOCK OUT and TAG OUT power to the U-Trough Unload could lead to personal injury or death.

The Rotating Part Hazard Decal NI-16 in **Figure 8** is located on the Belt Guard. This decal should, additionally, be placed at any location where there is a rotating or moving part that could cause injury or death.



Figure 8
Rotating Part Hazard Decal NI-16

Avoid contact with moving parts while the U-Trough Unload is in operation. Never wear loose-fitting clothing or flowing scarves/jewelry around moving parts or equipment.

Engage/Disengage Decal



WARNING! Do not stand or walk on covers and gratings. Covers and gratings are protecting from moving components and contact can result in serious injury or death.

The Standing on covers/gratings Decal NI-41 in **Figure 9** is located on the side of the Powerhead. Covers and gratings are used to protect from moving components. Avoid standing or walking on covers to eliminate the risk of coming into contact with moving components.



Figure 9
Standing on Covers/Gratings NI-41

Engage/Disengage Decal



WARNING! SHUT OFF, LOCK OUT and TAG OUT all electrical power BEFORE engaging or disengaging the Gearbox. Failure to shut off, LOCK OUT and TAG OUT power to the U-Trough Unload will cause damage to the Gearbox.

The Engage/Disengage Decal NI-19 in **Figure 9** is located on the top of the U-Trough at the Gearbox Control Handle. When using the Clutch Handle, it is important to stop the motor before beginning. Once the motor is off, engage or disengage the gearbox/sweep by pulling or pushing the handle. Before turning the motor back on, confirm that the Gearbox has been engaged or disengaged.

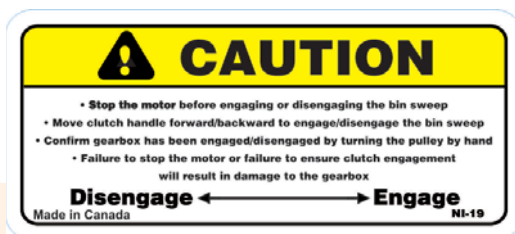


Figure 9
Engage/Disengage NI-19



IMPORTANT! If Safety Decals have been damaged, removed, become illegible or parts replaced without decals, new decals must be applied. New decals are available from your authorized dealer

Safety

Gate Control/Operation



WARNING! Failure to follow these instructions could result in damage to the Bin or Unload.

The Gate Control Decal NI-23 in **Figure 10** is located on the top of the U-Trough Unload at the Gate Controls. When unloading a Bin, open the center gate first. Keep unloading the grain until it stops flowing. At this point, open the intermediate gates until the grain stops flowing. It is important to stop the motor before engaging the Bin Sweep. Once the motor is off, engage the gearbox/sweep by pushing the handle forward. Before turning the motor back on, confirm that the Gearbox has been engaged or disengaged. This can be done by manually turning the Pulley on the Powerhead. Let the U-Trough Unload run until no more grain comes from the Bin. Close all of the U-Trough Gates. Stop the motor and disengage the gearbox/sweep by pulling the handle backwards.

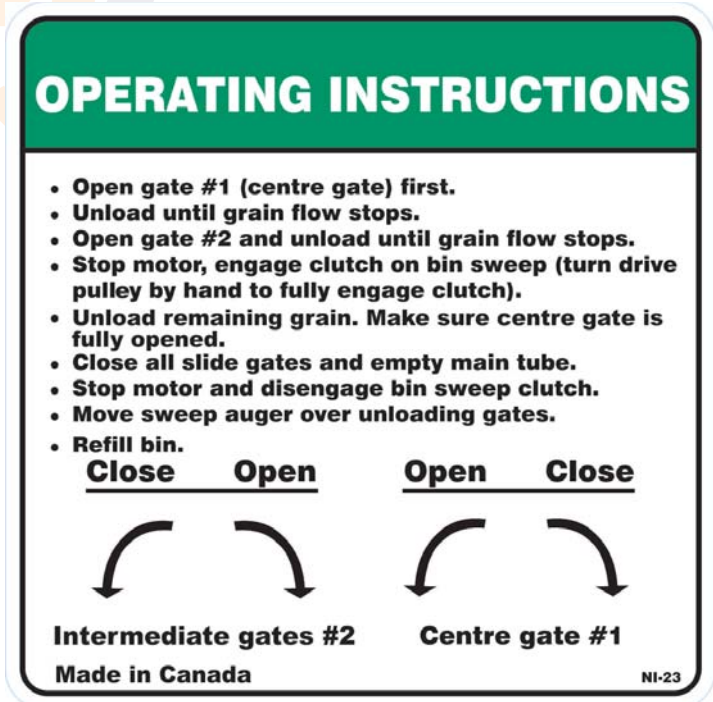


Figure 10
Gate Control NI-23

Gate Control/Operation



WARNING! Failure to follow these instructions could result in damage to the Unload.

The Gate Operation Decal NI-29 in **Figure 11** is located on the top of the U-Trough Unload at the Gate Controls. When the Bin Sweep is operating, it is important that the Center Sump Gate is fully open. A partially open gate will cause material to pile up, will damage the equipment and will void the warranty.

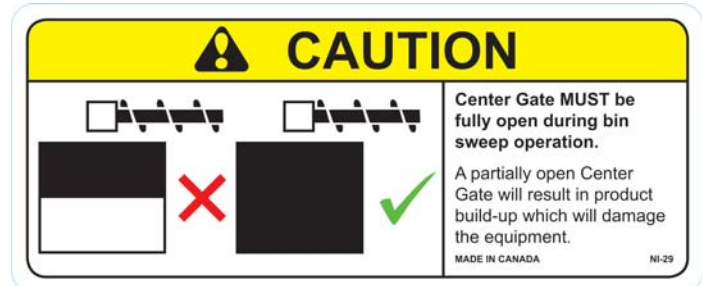


Figure 11
Gate Operation NI-29

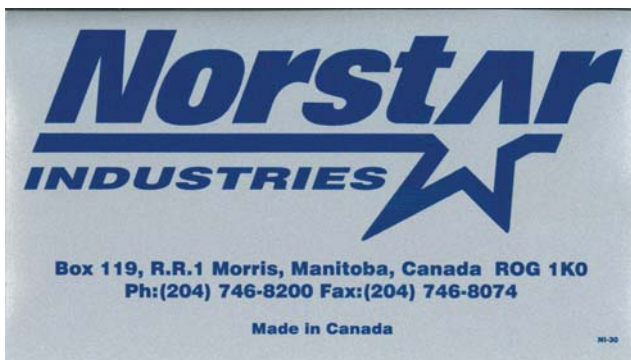


Figure 12
Norstar Info NI-30



Figure 13
Serial Number

Norstar Info

The Norstar Info Decal NI-30 in **Figure 12** is located on side of the U-Trough Unload. It contains contact information for Norstar Industries.

Serial Number

The Norstar Serial Number Sticker in **Figure 13** is located on side of the U-Trough Unload. It contains the Serial Number of the U-Trough



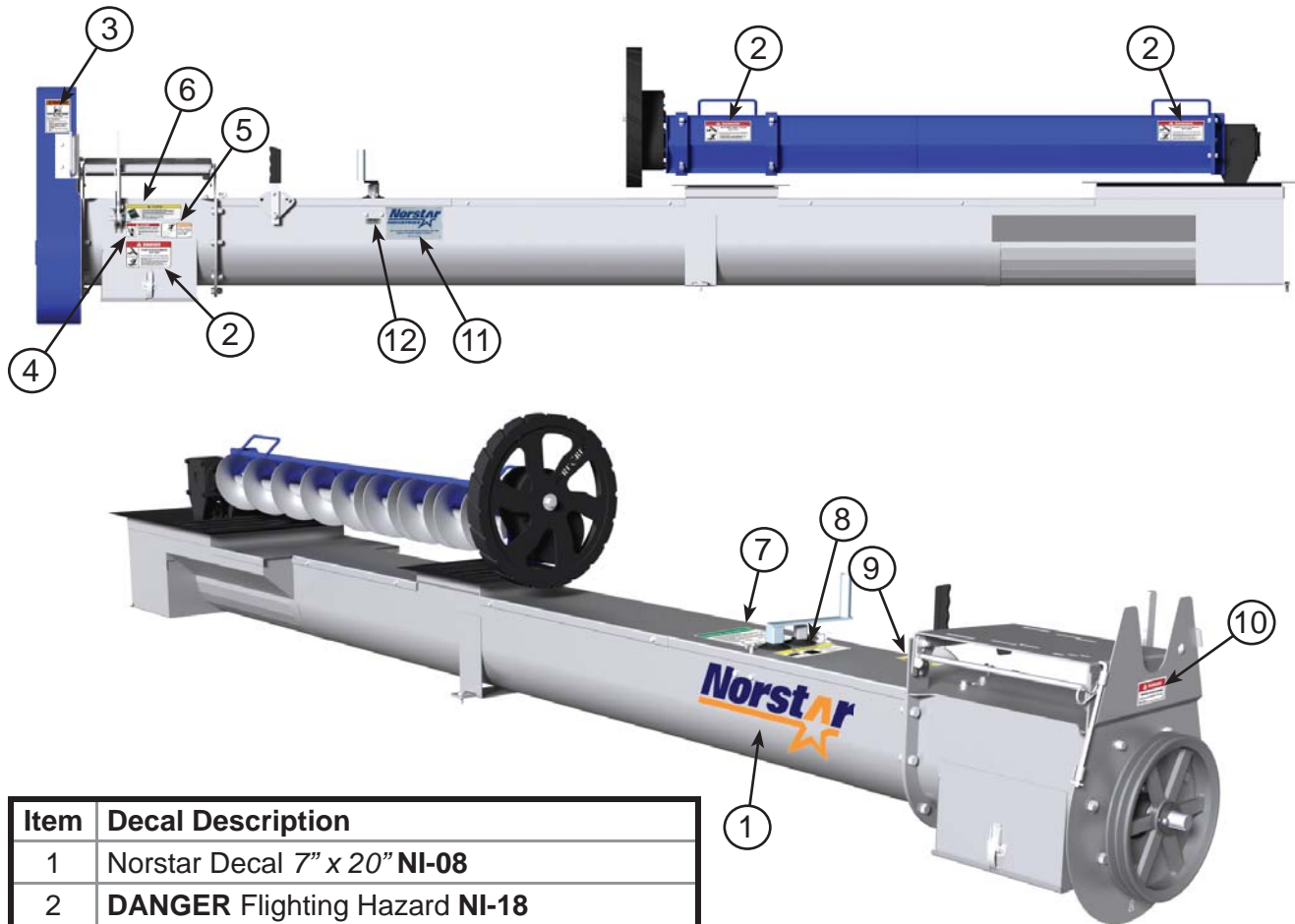
IMPORTANT! If Safety Decals have been damaged, removed, become illegible or parts replaced without decals, new decals must be applied. New decals are available from your authorized dealer

Safety

Safety Decal Placement



IMPORTANT! Check equipment for **WARNING, DANGER and CAUTION** decals and their proper placement, **BEFORE** equipment is operated. **NEVER** use equipment if signs are missing, hidden, improperly placed, damaged or altered. Keep them clean and grease-free. Contact your Norstar Dealer for replacements.



Item	Decal Description
1	Norstar Decal 7" x 20" NI-08
2	DANGER Flighting Hazard NI-18
3	WARNING Rotating Part Hazard NI-16
4	DANGER Electrocution Hazard NI-20
5	WARNING Standing on Covers NI-41
6	CAUTION Read Operator's Manual NI-15
7	Gate Control NI-23
8	CAUTION Gate Operation NI-29
9	CAUTION Engage/Disengage NI-19
10	WARNING Missing Guard Hazard NI-17
11	Norstar Info NI-30
12	Serial # Sticker

Figure 13
U-Trough Decal Locations



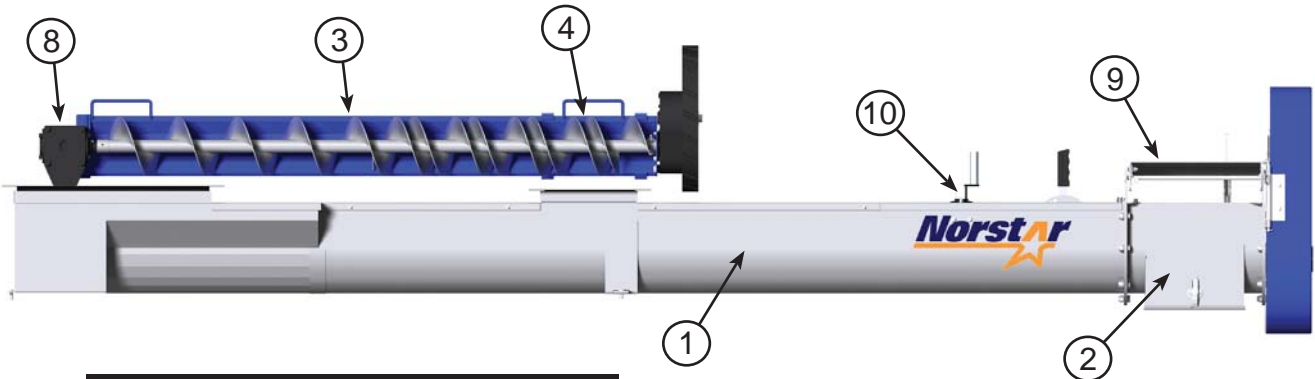
IMPORTANT! If Safety Decals have been damaged, removed, become illegible or parts replaced without decals, new decals must be applied. New decals are available from your authorized dealer

U-Trough Unload Overview

U-Trough Unload Features

- Ratchet-adjustable Motor Mount
- Easy-to-remove Motor Mount
- SureGrip® 20:1 gear reduction wheel
- Oil-impregnated Hanger Bearing
- Wide-mouth center sump
- Rack and Pinion Gate Controls

Standard Specifications



Item	Description
1	U-Trough
2	Powerhead
3	Sweep
4	Sweep Extension
5	SureGrip Wheel
6	Center Sump
7	Intermediate Sump
8	Sweep Gearbox
9	Motor Mount Plate
10	Gate Controls
11	Gearbox Shifter Handle
12	Motor Mount Ratchet
13	Belt Guard
14	Incline

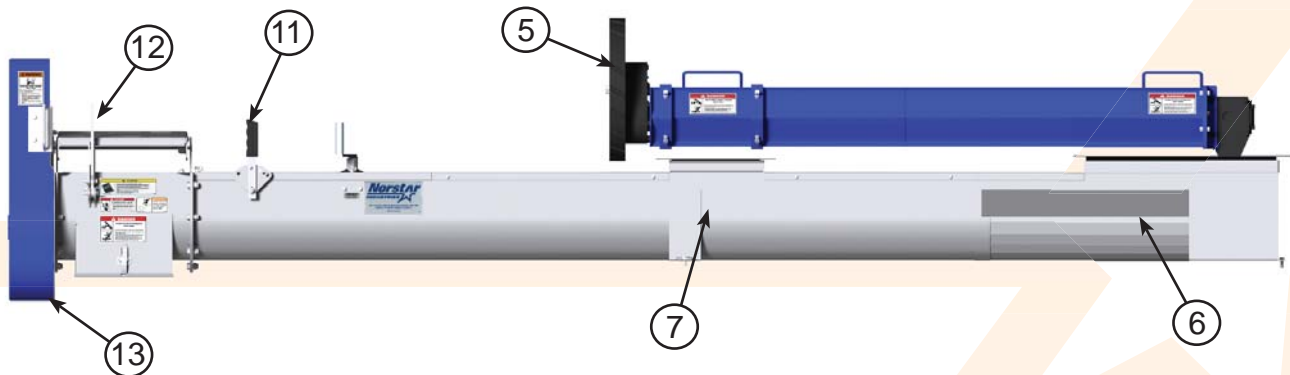


Figure 14
U-Trough Unload Components

Unload Installation



IMPORTANT! *The U-Trough Bin Unloading system can be installed in a new or an existing facility. Be familiar with the complete instructions before starting the installation.*

Concrete Floor

One option, for U-Trough Unload installation, is to form a trough in the concrete when the foundation for the Bin is poured. See **Figure 15** for dimensions on the trough's size. This will allow for placement of the unload beneath.

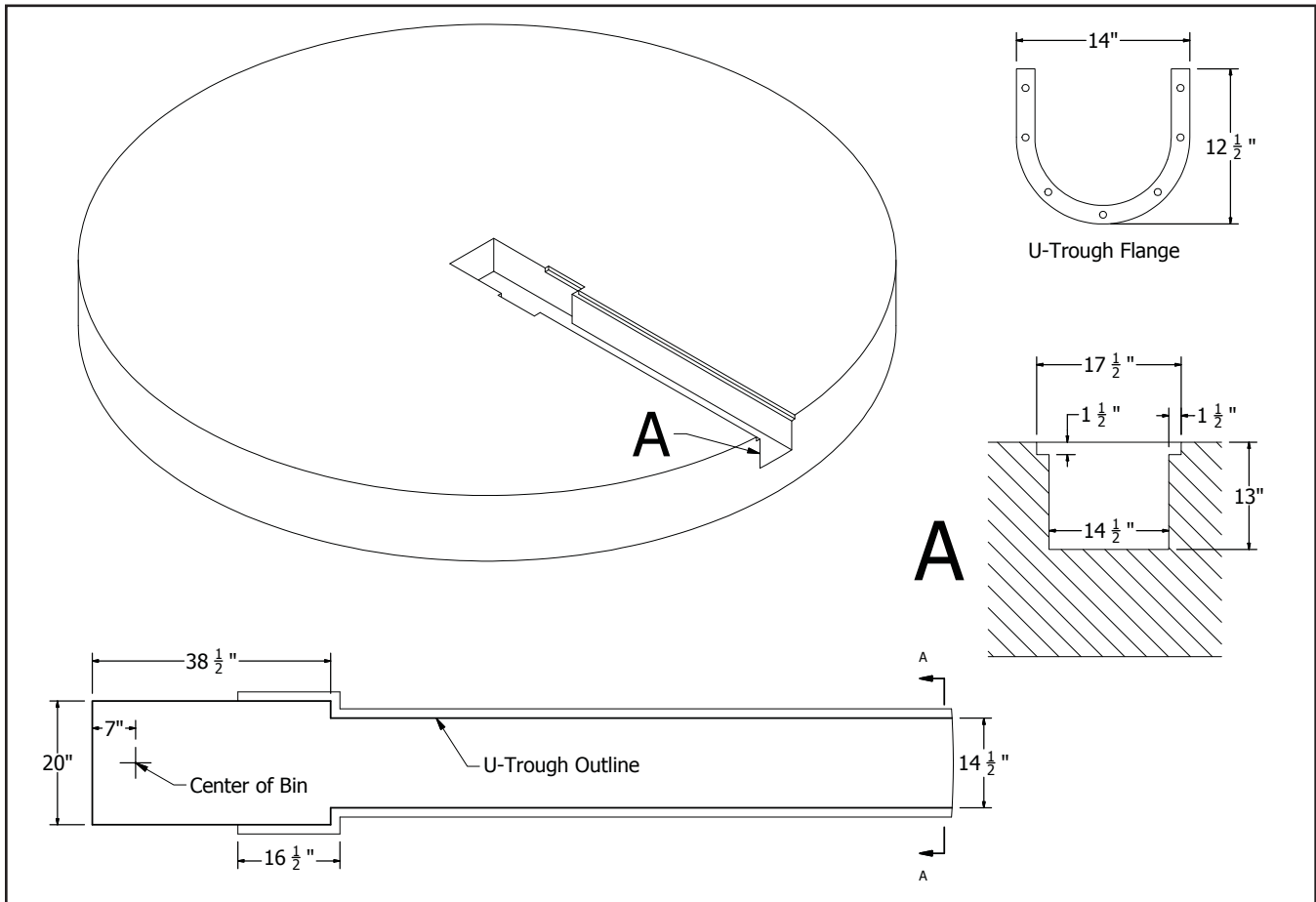


Figure 15
U-Trough Concrete Forming

Place the U-Trough Unload into the base of the bin. Center the gearbox output shaft with the center of the bin. Once the gearbox output shaft is centered to the bin, drill anchor holes into the foundation through the holes at the back of the Center Sump section. Secure the U-Trough into position with anchor bolts (See **Figures 19-20** on **Page 24**).



CAUTION! *It is important that the Gearbox Output Shaft is placed at the center of the Bin. Failure to do so could damage the Bin and/or Bin Sweep.*

Install planking/flooring across the U-Trough to cover the U-Trough and the gaps in the concrete flooring. Install the Sump Grates. It is recommended to screw the Grates into the floor. Be sure to apply sealant around the Grates to seal the edges.

Attach the Upper and Lower Bin Flashing Plates to the foundation, around the U-Trough, to seal it from the outside. Be sure to use sealant between the Flashing Plates and the concrete to prevent leaks. (See **Figure 18** on **Page 24**)

Aeration Floor

Another option, for U-Trough Unload installation, is to put an aeration floor over the entire Unload. If the U-Trough Unload is being installed in a pre-existing site, remove the aeration floor from the door area to the center of the bin.

Cut a hole, approximately 15" wide by 13.5" tall, in the bin wall below the door. Bring the U-Trough into the Bin and slide the discharge end through the hole. Center the gearbox output shaft with the center of the bin. Once the gearbox output shaft is centered to the bin, drill anchor holes into the foundation through the holes at the back of the Center Sump section. Secure the U-Trough into position with anchor bolts. (See Figures 19-20)



Figure 16
Cutting Floor



CAUTION! *It is important that the Gearbox Output Shaft is placed at the center of the Bin. Failure to do so could damage the Bin and/or Bin Sweep.*



Figure 17
Installing Grating

Reinstall the aeration floor across the U-Trough to cover the U-Trough. Cut holes in the aeration floor to provide openings for the U-Trough Sumps. Install the Sump Grates. It is recommended to screw the Grates into the floor. Be sure to apply sealant around the Grates to seal the edges.

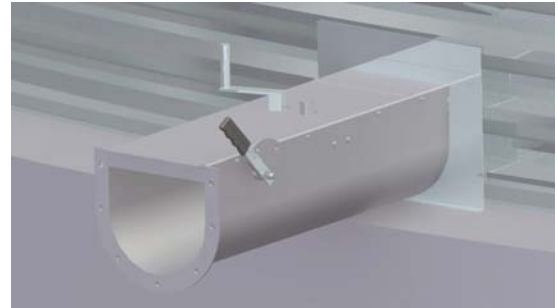


Figure 18
Bin Flashing

Attach the Upper and Lower Bin Flashing Plates to the Bin Wall, around the U-Trough, to seal it from the outside. Be sure to use sealant between the Flashing Plates and the Bin Wall to prevent leaks. (See Figure 18)

Anchor Bolts

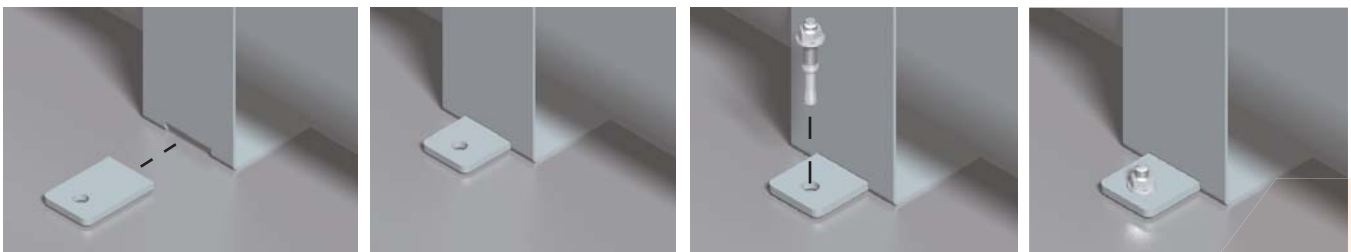


Figure 19
Stabilizer Leg Anchor Bolts

Locate the Anchor Tabs and the 3/8" Anchor Bolts from the parts box. Place one Anchor Tab on each side of the U-Trough and slide it into the slot on the U-Trough's Stabilizer Leg. Drill a hole into the concrete and drive in the 3/8" Anchor Bolts. (See Figure 19)

Behind the Center Sump is a flange with two (2) holes. Drill a hole into the concrete and drive in the 3/8" Anchor Bolts. (See Figure 20)



Figure 20
Center Sump Anchor Bolts

Shifter Handle



Figure 21
Shifter Handle

Locate the Shifter Handle and the Shifter Rubber Grip from the Parts Box.

Slide the Rubber Grip onto the Shifter Handle on the side that **doesn't** have holes or slots.

Once the Handle has been assembled, locate one (1) 3/8" Nylon Locknut and one (1) 3/8" Flatwasher. Place the Shifter Handle onto the Threaded Stud protruding from the Shifter Handle Locking Plate. Tighten the Locknut to secure the Shifter Handle into place. (See **Figure 21**)

U-Trough Gearbox



IMPORTANT! *The following instructions apply only to U-Trough Unloads to fit 54' to 74' bin diameters. If your unit is not a 54' to 74' U-Trough, please proceed to the next section.*

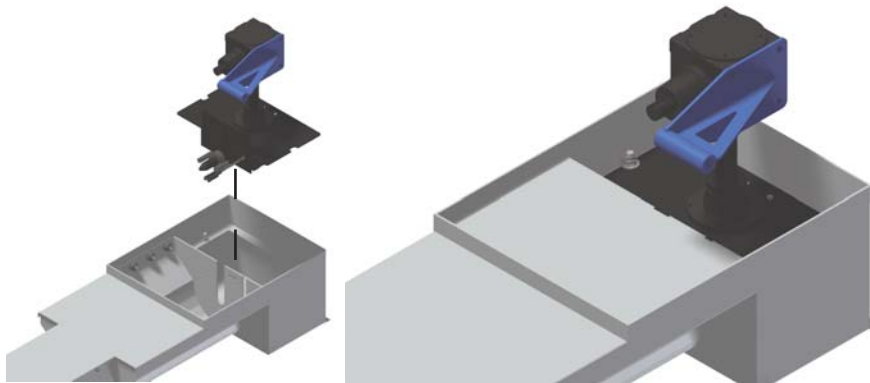


Figure 22
54'-74' U-Trough Gearbox Installation

Locate the 54'-74' U-Trough Gearbox Assembly from the Parts Box.

Lower it into the U-Trough's Center Sump section (see **Figure 22**). There will be two (2) studs, on the sides, that the Gearbox Assembly will fit on top of.

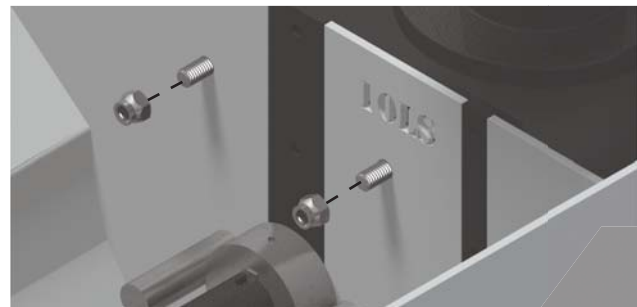
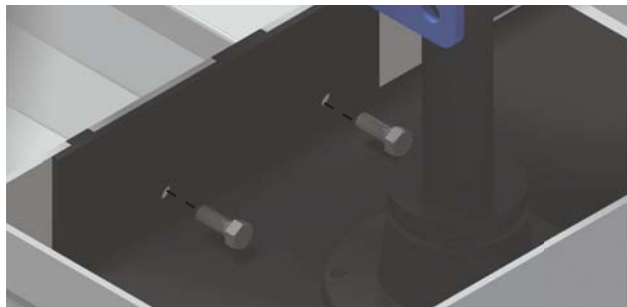


Figure 23
Securing the Gearbox

Using two (2) 3/8" x 1" Bolts and two (2) 3/8" Nylon Locknuts, secure the Gearbox Assembly to the U-Trough Assembly. The connection is made through the holes on the Front Plate of the Gearbox Mounting Plate and the Plate on the U-Trough separating the Center Sump from the Gearbox's Mounting Location. (see **Figure 23**)

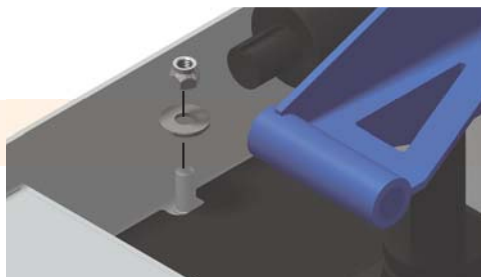


Figure 24
Securing the Gearbox

Further secure the Gearbox Assembly to the U-Trough using two (2) 1/2" Flatwashers and two (2) 1/2" Nylon Locknuts. The connection location is the two (2) studs that are sticking up through the Gearbox Assembly.

Place the Flatwasher onto the stud and then tighten the Locknut onto the stud to secure the Gearbox. (see **Figure 24**)

U-Trough Gearbox Cont'd

To complete the Gearbox Installation, the Shifter Arm needs to be connected to the U-Trough Assembly.

Using one (1) 3/8" X 1 1/4" Bolt and one (1) 3/8" Nylon Locknut, tighten the Shifter Arm's Clevis to the U-Trough's Shifter Rod (see **Figure 25**).



IMPORTANT! *It is important that the bolt is installed so that the excess threading is pointing away from the Flighting. Failure to follow these instructions WILL result in damage to the Unload.*

Once the Bolt is secure, tighten the Jam Nut against the Clevis to lock it into position.

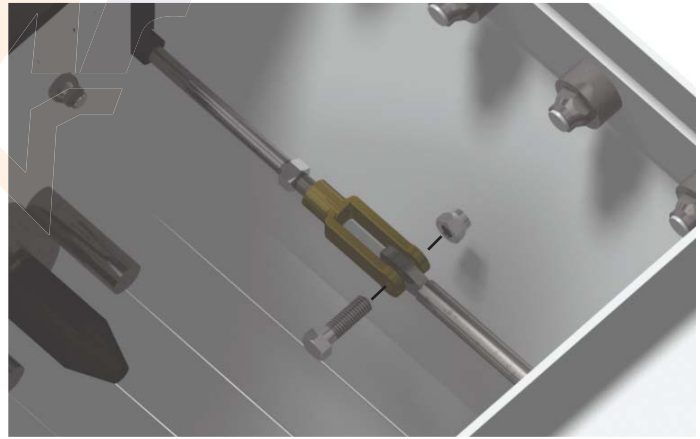


Figure 25
Gearbox Clevis

U-Trough Section Connection



IMPORTANT! *The following instructions apply only to U-Trough Unloads to fit 54' to 74' bin diameters. If your unit is not a 54' to 74' U-Trough, please proceed to the next section.*

Remove the U-Trough cover at the joint end of the Extension section. (see **Figure 26**)

Move the Extension section into the bin and place it up against the Center Sump section.

Align the clevises on the Center Sump section with the rods on the Extension section. Using one (1) 3/8" x 1 1/4" Bolt and one (1) 3/8" Nylon Locknut, per connection, secure the clevises to the rods. (see **Figure 27**)



IMPORTANT! *It is extremely important that the correct Clevis' Bolts are used and do not stick down into the way of the Flighting. Failure to follow these instructions WILL result in damage to the Unload.*

Once the clevises have been secured, use six (6) 1/2" x 1 1/2" Bolts and six (6) 1/2" Nylon Locknuts to secure the U-Trough Sections together.

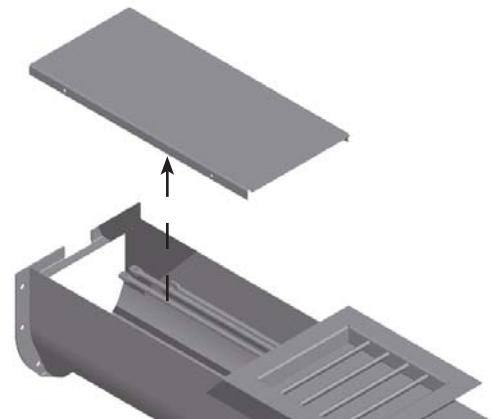


Figure 26
Extension Lid

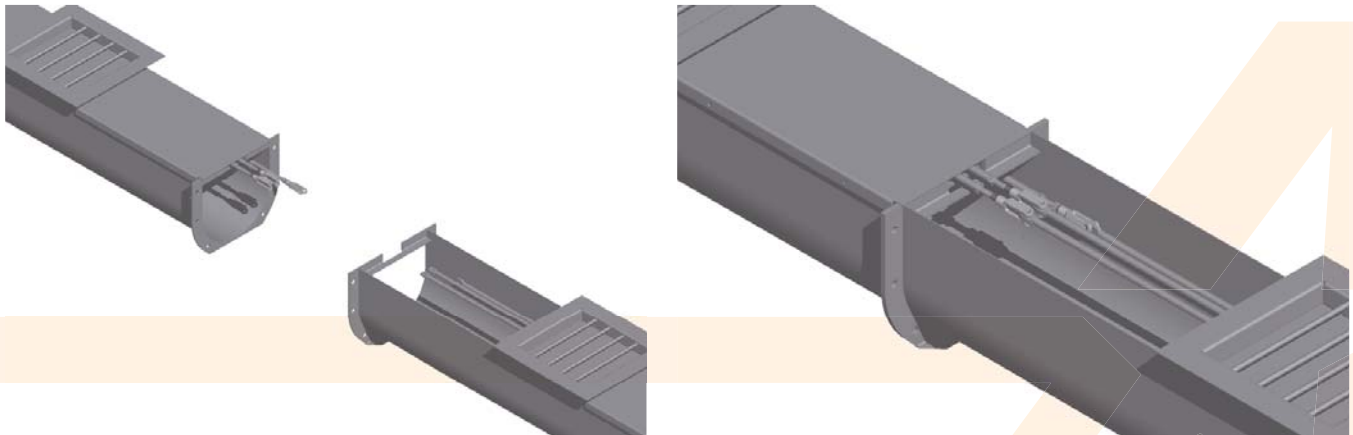


Figure 27
Assembling Sections

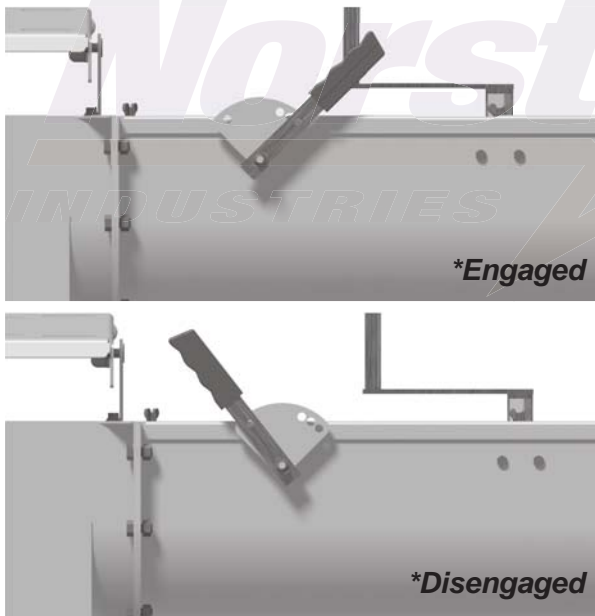


Figure 28
Engaging/Disengaging Gearbox

Once the clevis and U-Trough connections have been made, it is important to make sure that the gates open and close and that the gearbox engages and disengages.

To make clevis adjustments, loosen the jam nut by the clevis and then either extend or retract the clevis. Once the clevis is in the desired position, tighten the jam nut.

To set the Gearbox Engage rod, go to the Gearbox and fully engage it. When engaged, the Gearbox output shaft will spin. Set the Engage Lever handle into the '**engaged**' position.

Of the three (3) holes on the engaged lever side, use the one closest to the end of the U-Trough.

Adjust the clevises and make sure that Engage Rod is tight. Move the Engage Lever handle to the '**disengaged**' position to ensure that the Gearbox disengages. When disengaged, the Gearbox output shaft will **NOT** spin.

Replace the U-Trough cover onto the Extension section to seal the Unload.

Flighting

Locate the Flighting weldment.

For U-Trough Unloads to fit 54' to 74' bin diameters, locate the two (2) Flighting weldments and the connection shaft. Using four (4) 1/2" x 3" Bolts and four (4) 1/2" Nylon Locknuts, attach the connector shaft to the Flighting sections. (see **Figure 30**)

Slide the Flighting into the U-Trough



CAUTION! *It is important to handle the Flighting with care to ensure that the Flighting does not get bent or damaged. It is recommended to handle all Flightings with two (2) or more people. Failure to do this will damage the flighting and void the Warranty.*

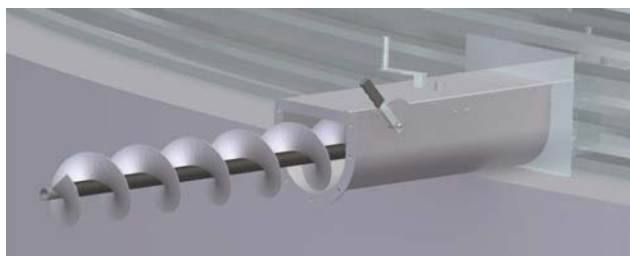


Figure 29
14'-50' Flighting



Figure 30
54'-74' Flighting

54'-74' Sweep



IMPORTANT! *The following instructions apply only to U-Trough Unloads to fit 54' to 74' bin diameters. If your unit is not a 54' to 74' U-Trough, please proceed to the next section.*

Locate the Sweep Assembly and move it into the Bin.

Place the Bracket on the Sweep onto the Plate bolted onto the Gearbox. Slide the Sweep Pivot Pin through the Bracket and secure it in place with a Hitch Pin. (see **Figure 31**)

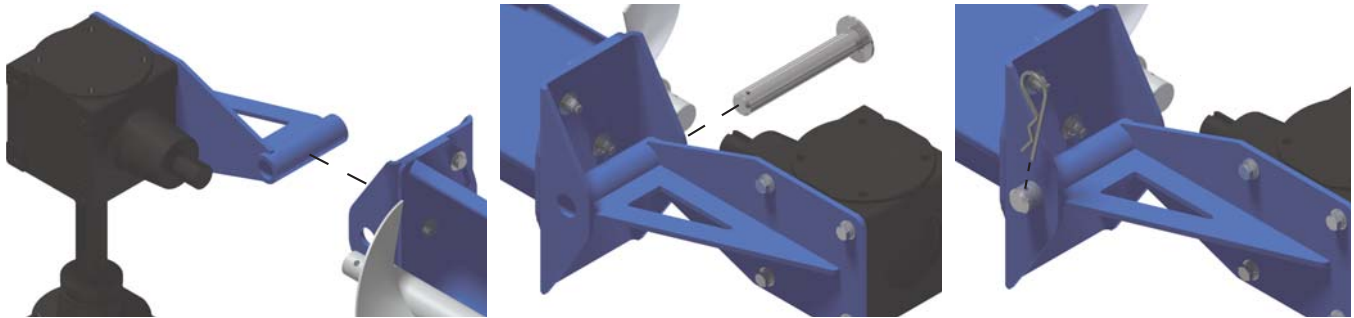


Figure 31
Gearbox Pivot Pin

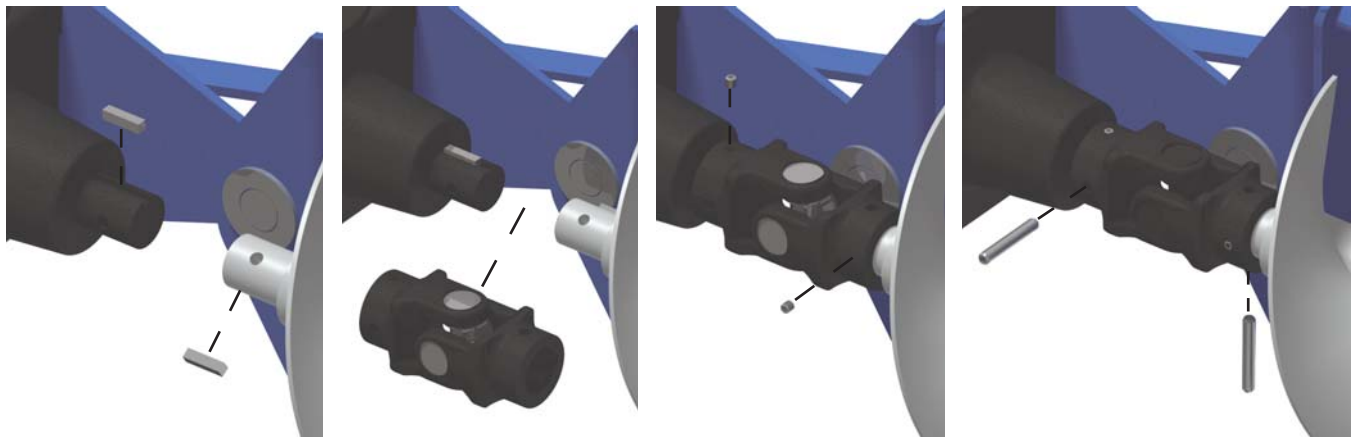


Figure 32
Gearbox U-Joint

Locate two (2) 1/4" x 1" Keys. Place one key into the key-slot on the Gearbox Shaft and place the other key into the key-slot on the Flying Shaft. (see **Figure 32**, far left)

Place the U-Joint onto the Gearbox and Sweep Shafts, ensuring that the keys stay, roughly, centered to the Set Screw holes. (see **Figure 32**, middle left)

Using two (2) 3/8" setscrews (*these should come with the U-Joint*), thread and tighten them into the U-Joint to secure the keys into place. (see **Figure 32**, middle right)

Finally, insert two (2) 5/16" x 2" Spring Pins into the remaining holes on the U-Joint to secure it into place. (see **Figure 32**, far right)

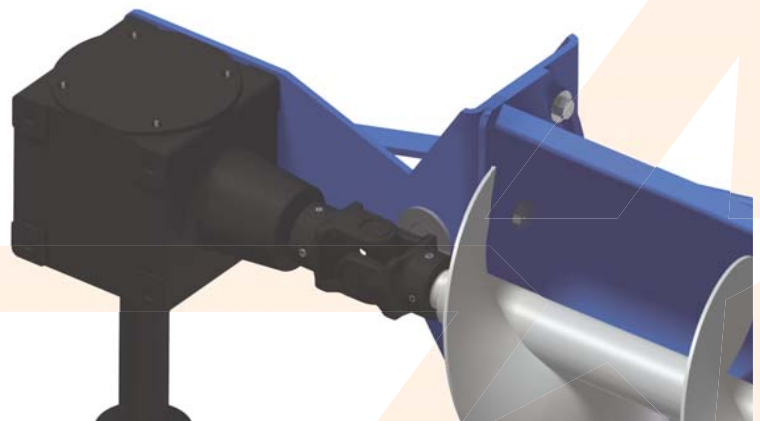


Figure 33
Sweep Gearbox

14'-50' Sweep

Locate the Sweep Assembly and move it into the Bin.

Place the Sweep Gearbox onto the U-Trough Gearbox output shaft. Using a 3/8" x 3 1/2" Bolt and a 3/8" Nylon Locknut, secure the Sweep to the U-Trough



Figure 34
Sweep

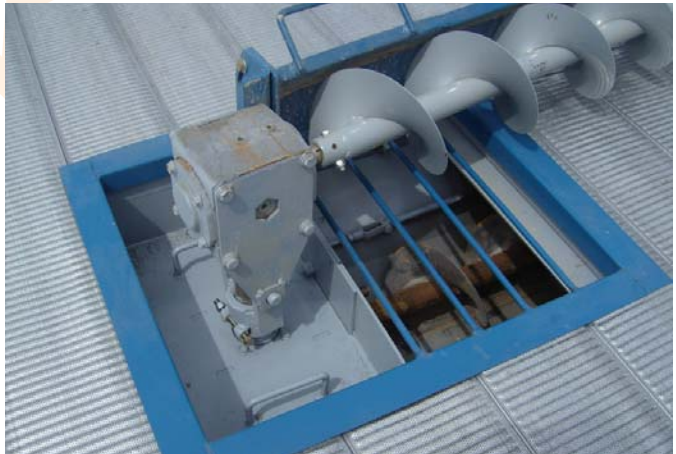


Figure 35
Gearbox Coupling

Incline



IMPORTANT! *The following instructions apply only to U-Trough Unloads with Inclines. If your unit does not have an incline, please proceed to the next section.*



Figure 36
Incline Installation



CAUTION! *During installation, it is important to support the Incline so that no weight is on the Flighting. Failure to do this will damage the flighting and void the Warranty.*

Pull the flighting, approximately, 12" [305] out of the U-Trough.

Locate the Incline Assembly and slide the Incline driveshaft into the U-Trough Flighting. (see Figure 36)

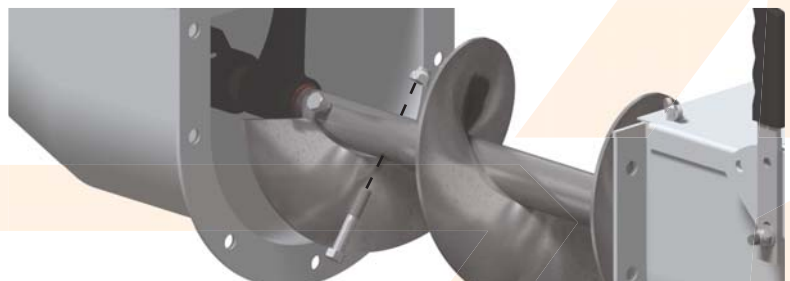


Figure 37
Flighting Attachment

Using two (2) 7/16" x 2 1/2" Bolts and two (2) 7/16" Nylon Locknuts, secure the U-Trough Flighting to the Incline shaft. (see Figure 37)

Slide the Incline against the U-Trough also pushing the Flighting back into the U-Trough.

Using seven (7) 1/2" x 1 1/2" Bolts and seven (7) 1/2" Nylon Locknuts, secure the Incline Assembly to the U-Trough. (see **Figure 38**)

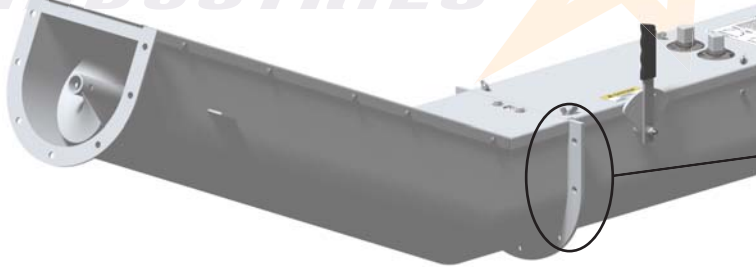


Figure 38
Incline Bolting

Locate the Top and Bottom Incline Stand weldments. Slide the Top Incline Stand into the Bottom Incline Stand. Ensure that the Cradle on the Top Incline Stand slopes downwards and away from the Weldnut on the Bottom Incline Stand. (see **Figure 39**)

Place the Incline Stand up against the Incline Assembly. Adjust the Incline Stand so that it is set to the desired height. Place one (1) 1/2" x 1 1/2" Bolt into the Weldnut on the Bottom Incline Stand. Tighten it to lock the Top Incline Stand into position. (see **Figure 40**)



Figure 39
Incline Stand Assembly

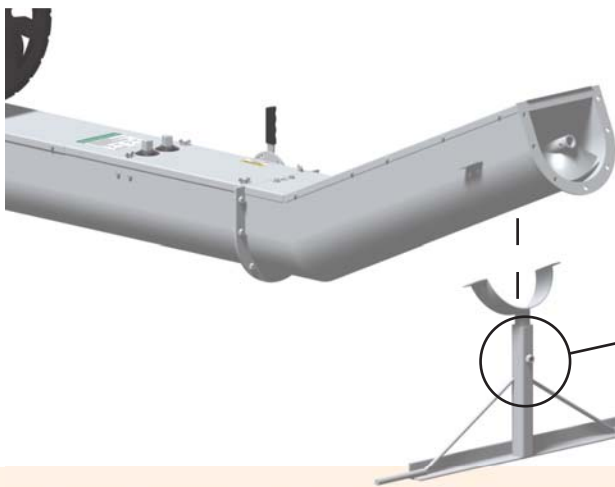


Figure 40
Incline Stand Installation

Once the Incline Stand is positioned, locate four (4) 3/8" x 2 1/2" Bolts, four (4) 3/8" Nylon Locknuts, and eight (8) 3/8" Flatwashers. Secure the Incline Stand to the Incline Assembly. (see **Figure 41**)

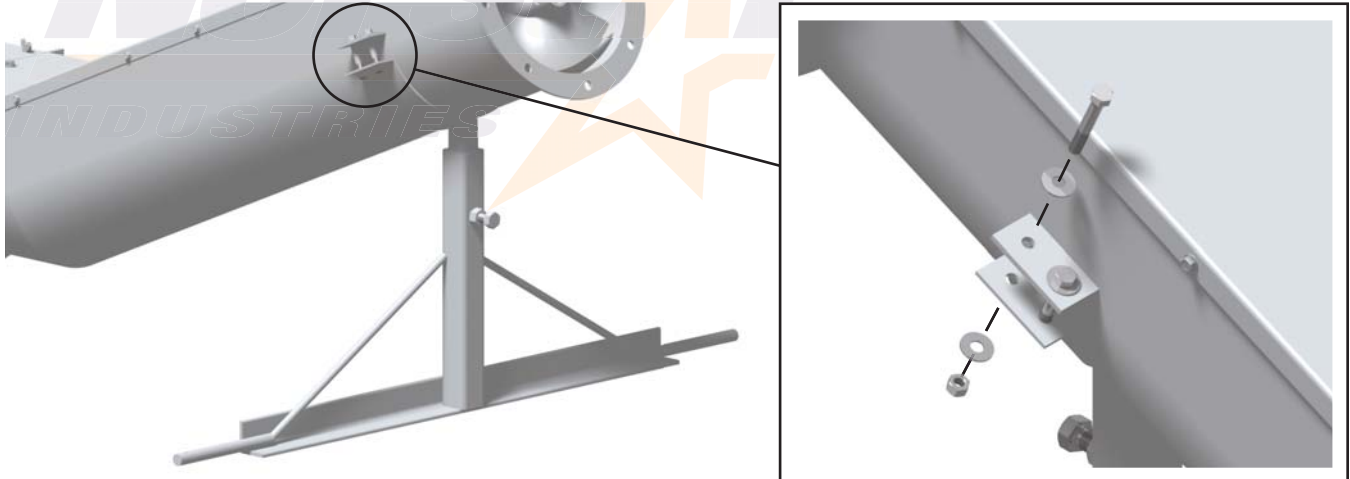


Figure 41
Incline Stand Security

Powerhead



CAUTION! During installation, *it is important to support the Powerhead so that no weight is on the Flighting.* Failure to do this will damage the flighting and void the Warranty.

Pull the flighting, approximately, 12" [305] out of the U-Trough.

Locate the Powerhead Assembly and slide the Powerhead driveshaft into the U-Trough Flighting. (see **Figure 42**). Using two (2) 7/16" x 2 1/2" Bolts and two (2) 7/16" Nylon Locknuts, secure the U-Trough Flighting to the Powerhead shaft. (see **Figure 42**)

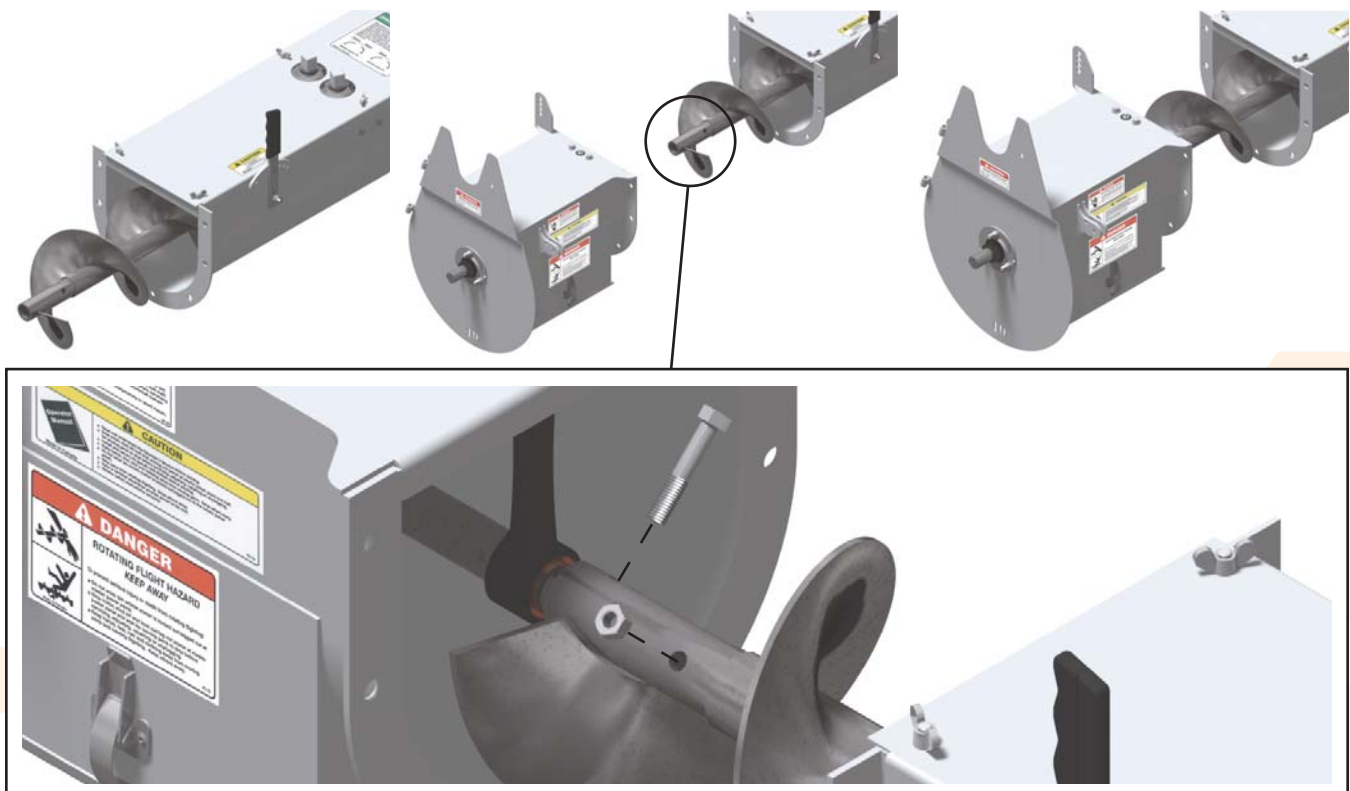


Figure 42
Powerhead Installation

Slide the Powerhead against the U-Trough also pushing the Flighting back into the U-Trough.

Using seven (7) 1/2" x 1 1/2" Bolts and seven (7) 1/2" Nylon Locknuts, secure the Powerhead Assembly to the U-Trough. (see **Figure 43**)

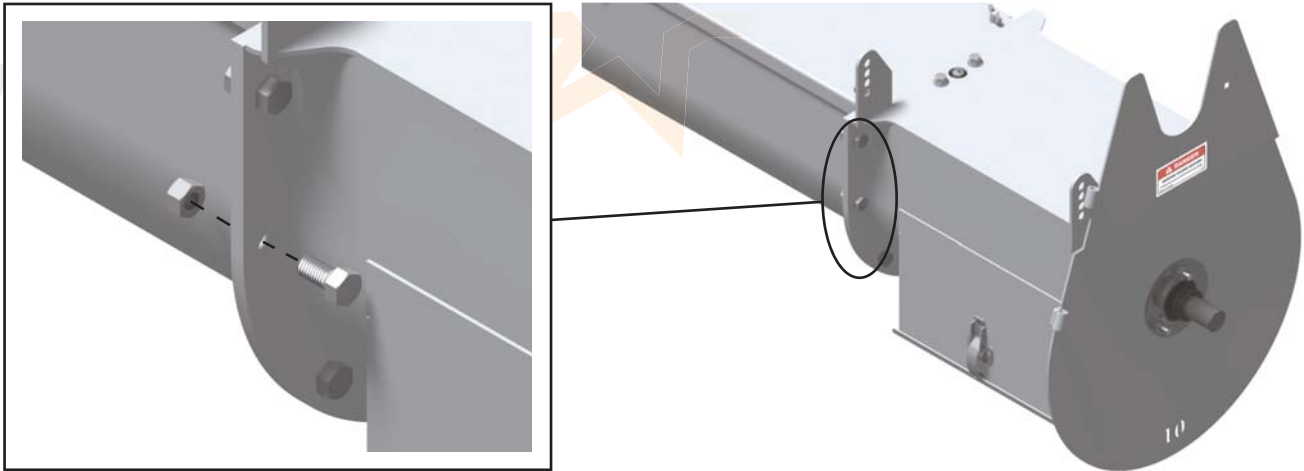


Figure 43
Powerhead Security

From the Parts Box, locate the Ratchet Adjustment Bracket, the Ratchet Handle and three (3) 3/8" x 1 1/2" Bolts and three (3) 3/8" Nylon Locknuts.

Using one (1) 3/8" x 1 1/2" Bolt and one (1) 3/8" Nylon Locknut, secure (*but NOT tighten*) the Ratchet Handle and Ratchet Bracket together. Once the Bolt and Nut have been attached, the Ratchet Adjustment Bracket should still be able to pivot on the Bolt. (see **Figure 44**)

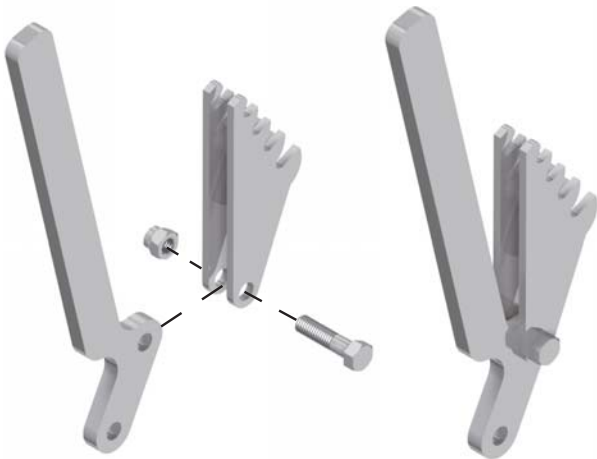


Figure 44
Ratchet Assembly

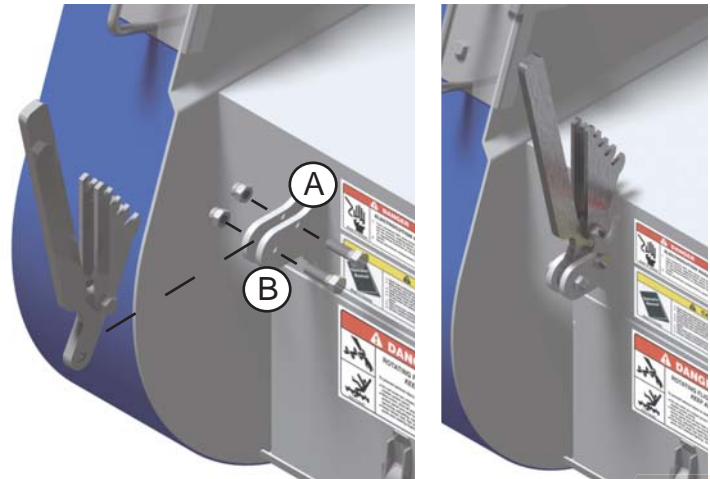


Figure 45
Ratchet Installation

Once the Ratchet Assembly has been put together, it will need to be installed onto the Powerhead.

Using one (1) 3/8" x 1 1/2" Bolt and one (1) 3/8" Nylon Locknut, secure these to the back hole (*Hole A*) on the Ratchet. This bolt acts as a stop for the Ratchet Assembly.

Using the remaining one (1) 3/8" x 1 1/2" Bolt and one (1) 3/8" Nylon Locknut, secure the Ratchet Assembly into place on the Head Section. The bottom hole on the Ratchet Assembly should be aligned with the front hole (*Hole B*) on the Ratchet Mounting Plates. (see **Figure 45**)

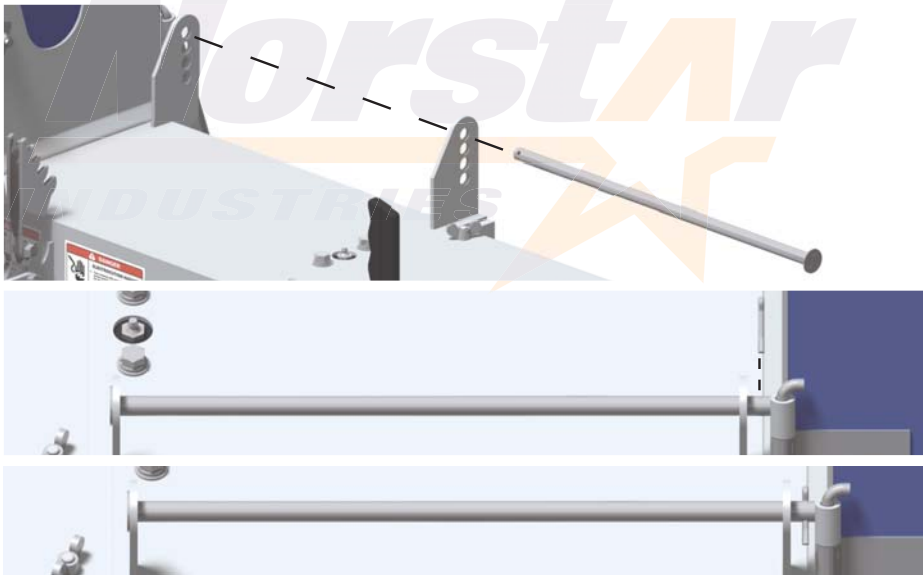


Figure 46
Motor Mount Pin

Locate the Motor Mount Pin from the Parts Box. There are four (4) holes that the Motor Mount Pin can be placed in. Use the hole that best suits the Motor.

Take the Motor Mount Pin and slide it into the desired holes on the Powerhead Motor Mount ears.

Once the pin is in place, locate a 1/8" Cotter Pin from the Parts Box. Slide the Cotter Pin into the small hole at the end of the Motor Mount Pin. Bend the ends of the Cotter Pin to secure the Motor Mount Pin in place. (see **Figure 46**)

Locate the Motor Mount Plate from the Parts Box. Place the Motor Mount Plate onto the Motor Mount Pin. (see **Figure 47**)

The Motor Mount Safety Clip is designed as a safety mechanism to prevent the Motor Mount Plate from being removed from the Powerhead. It also acts as a quick release when removing the Motor Mount Plate.

From the Parts Box, locate one (1) 3/8" x 1 1/4" Carriage Bolt, one (1) 3/8" Flatwasher, one (1) 3/8" Nylon Locknut, and one (1) Motor Mount Safety Clip.

Place the Carriage Bolt on the outside of the Motor Mount Plate so that the square shoulder on the Bolt sits into the square hole on the Motor Mount Plate.

Place the Motor Mount Safety Clip onto the Carriage Bolt, followed by the Flatwasher and the Locknut.

Secure (*but NOT tighten*) the Motor Mount Safety Clip to the Motor Mount Plate so that the Clip can pivot on the Carriage Bolt and latch onto the Motor Mount Pin. (see **Figure 48**)

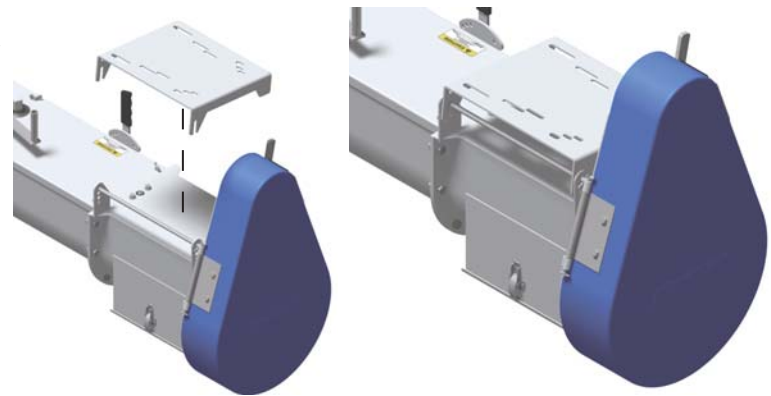


Figure 47
Motor Mount Installation

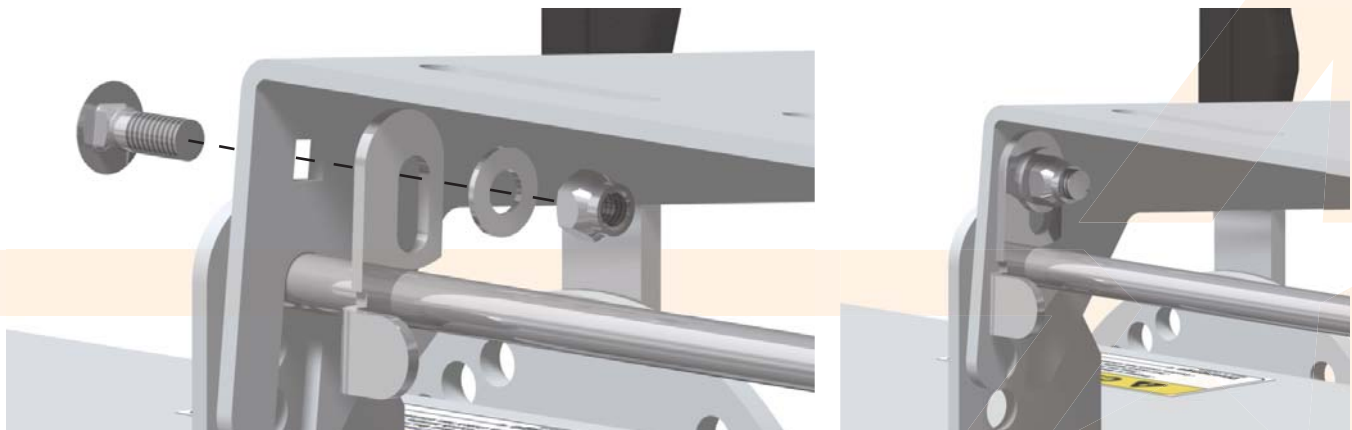


Figure 48
Motor Mount Safety Clip

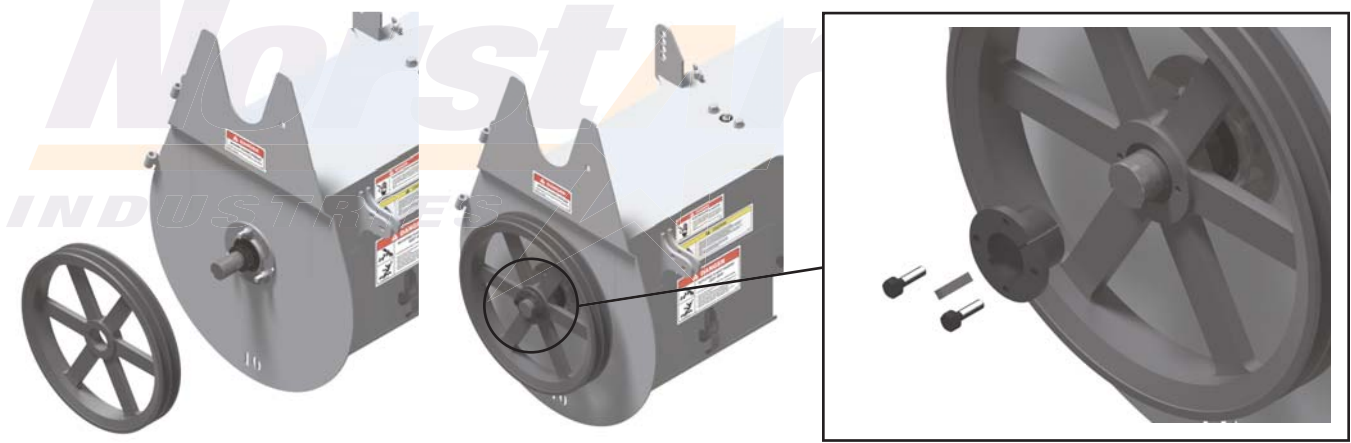


Figure 49
Pulley Installation



IMPORTANT! *It is important to check with the Parts List to ensure the right Pulleys are being used.*

Locate the Pulley and the Pulley Hub from the Parts Box. Using the key and bolts that come with the Hub, secure the Pulley onto the driveshaft (see **Figure 49**). Once the Pulleys have been installed. Locate the Belts and place them onto the Pulley.



Figure 50
Belt Guard Installation

Once the motor has been installed and the Belts are tight, locate the Belt Guard from the Parts box and slide it onto the Powerhead. Locate the Belt Guard Pin, from the Parts Box, and slide it through the Hinges to secure the Belt Guard to the Powerhead. (see **Figure 50**)

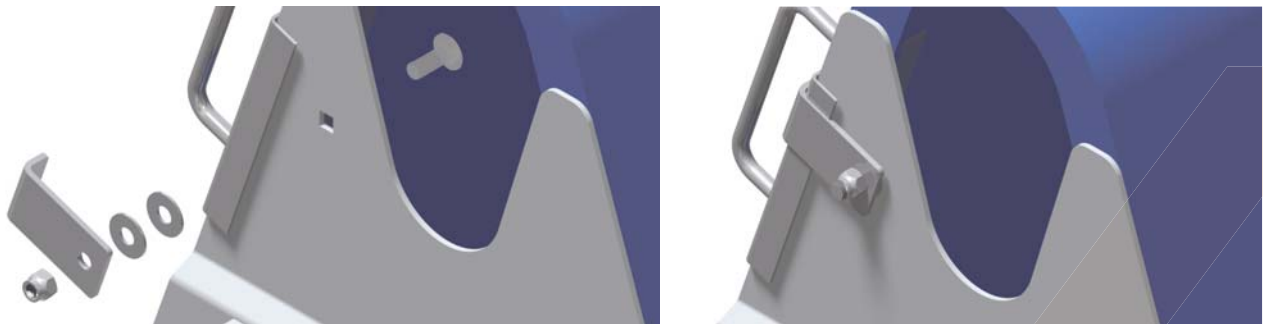


Figure 51
Belt Guard Locking Clip

From the Parts Box, locate one (1) 3/8" x 1 1/4" Carriage Bolt, two (2) 3/8" Flatwasher, one (1) 3/8" Nylon Locknut, and one (1) Belt Guard Locking Clip.

Place the Carriage Bolt on the front plate of the Powerhead so that the square shoulder on the Bolt sits into the square hole on the Powerhead. Place the Flatwashers onto the Carriage Bolt, followed by the Locking Clip and the Locknut.

Secure the Locking Clip to the Powerhead to prevent the Belt Guard from opening.

U-Trough Adjustment

Adjusting the Gearbox Shifter Rod



IMPORTANT! *The Gearbox Shifter Rod needs to be properly adjusted to ensure the gearbox fully engages and disengages. Failure to follow these instructions, and properly adjust the rod, could result in damage to the Unload and/or Gearbox.*



Figure 52
Shifter Handle Clevis

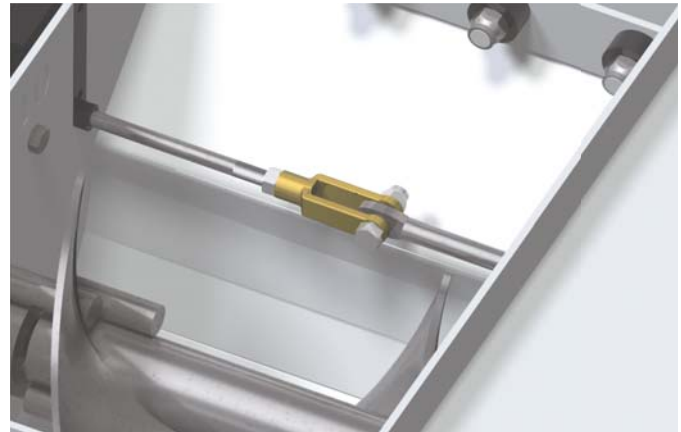
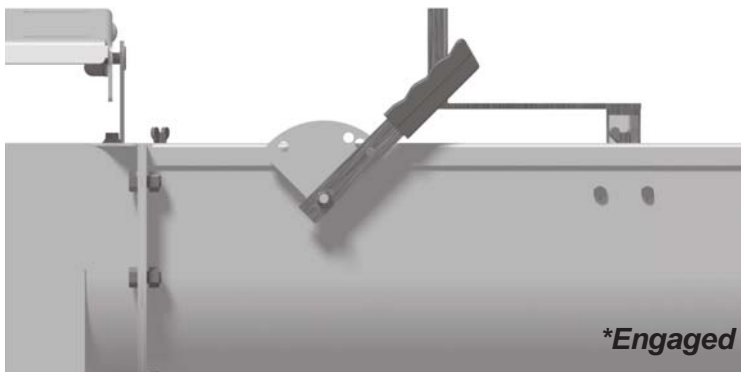


Figure 53
Gearbox Clevis

It is important to make sure that the gearbox engages and disengages.

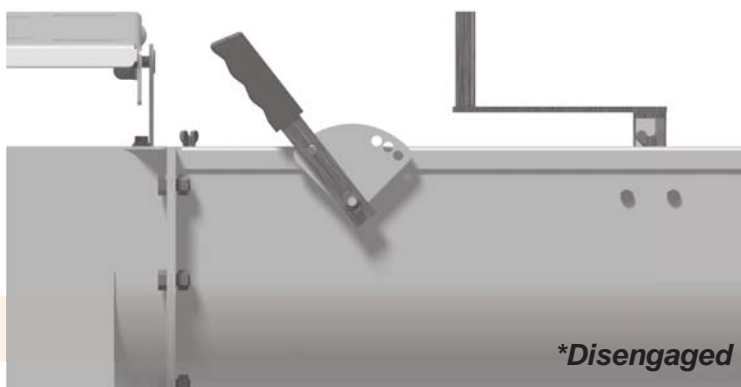
There are two (2) clevises on the U-Trough Unload. The first Clevis is at the Gearbox end (see **Figure 53**) and the other is at the Discharge End (see **Figure 52**). To make clevis adjustments, loosen the jam nut by the clevis and then either extend or retract the clevis. Once the clevis is in the desired position, tighten the jam nut.



**Engaged*

To set the Gearbox Engage rod, go to the Gearbox and fully engage it. When engaged, the Gearbox output shaft will spin. Set the Engage Lever handle into the '**engaged**' position. (see **Figure 54, top**)

Of the three (3) holes on the engaged lever side, use the one farthest away from the end of the U-Trough.



**Disengaged*

Adjust the clevises and make sure that Engage Rod is tight. Move the Engage Lever handle to the '**disengaged**' position to ensure that the Gearbox disengages (see **Figure 54, bottom**). When disengaged, the Gearbox output shaft will **NOT** spin.

Figure 54
Engaging/Disengaging Gearbox

Sweep Adjustment

Adjusting the Rear Caster Wheel (42/43 - 48/50)



IMPORTANT! *The Rear Sweep Wheel is NOT meant to roll along the floor. It is a safety feature to protect the Bin Floor. In the case that the floor is uneven, the Wheel is designed to keep the Backboard or Flighting from hitting or dragging along the bin floor. Failure to follow these instructions will result in machine or bin floor damage. Norstar Industries is not liable for any damage caused by the failure to follow these instructions.*

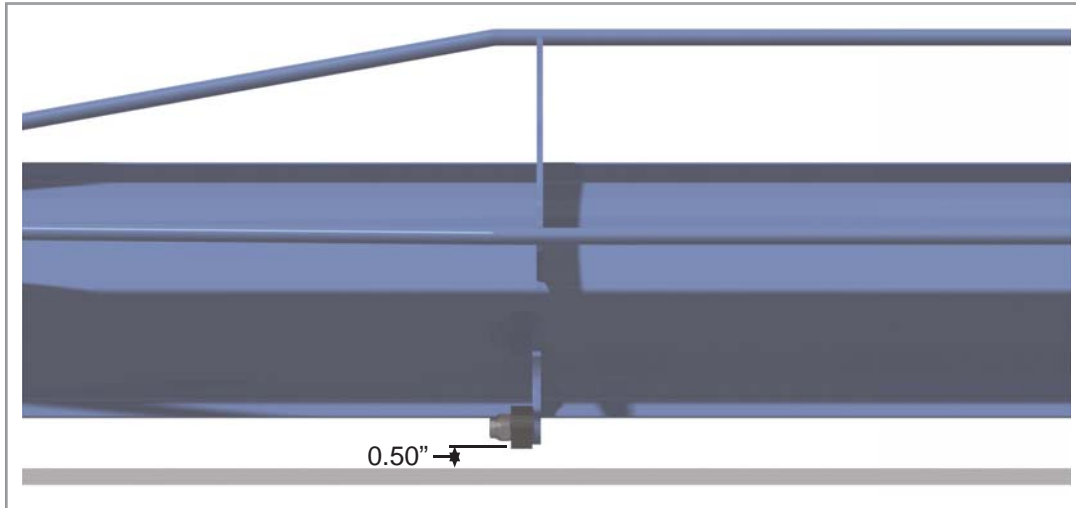


Figure 55
Rear Caster Height

The Rear Sweep Wheel should be adjusted so that it is approximately 1/2" above the bin floor.

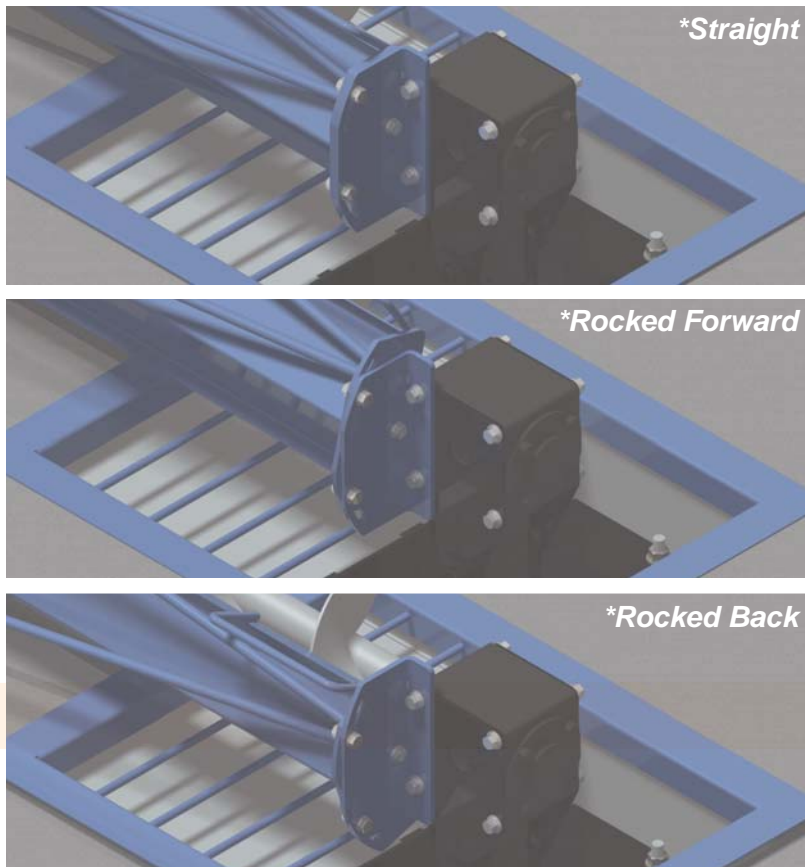


Figure 56
Backboard Rocking

The first step to adjust the backboard and the rear wheel is to loosen the bolts connecting the Head Section Mounting Plate and the Sweep Backboard.

The Factory assembled Sweep is oriented at a level position where the slots on the Head Section Mounting Plate and the Backboard are aligned (see **Figure 56 left top**).

In the case that the Wheel needs to be higher, the Backboard must be rocked forward (see **Figure 56 left middle**). Rocking the backboard forward too far forward will leave the floor susceptible to damage from the flighting.

In the case that the Wheel needs to be lower, the Backboard must be rocked backwards (see **Figure 56 left bottom**). Rocking the backboard too far backward will leave the wheel too close or on the floor which could cause damage to the floor.

Once the wheel is in the correct position, the bolts securing the Gearbox Mounting Plate should be tightened.

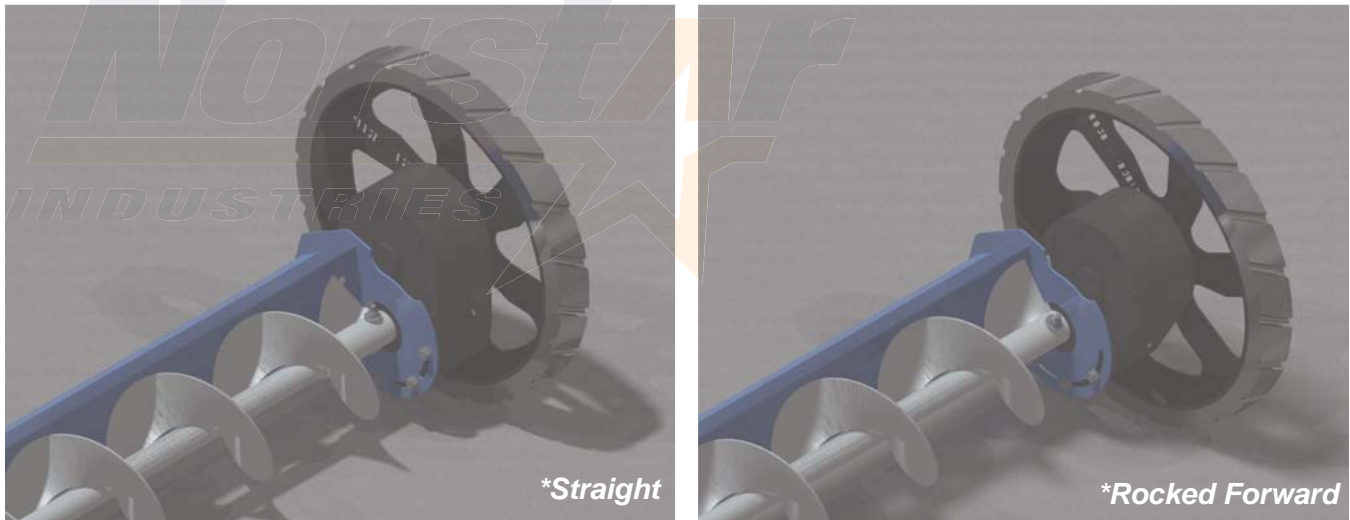


Figure 57
SureGrip Wheel Rocking

The second step to adjust the backboard and the rear wheel is to loosen the bolts securing the SureGrip Gearbox to the Sweep Extension.

The Factory assembled Sweep Extension is oriented with the gearbox positioned at its highest position (see **Figure 57, above left**).

In the case that the Rear Sweep Wheel needs a little more height, the Gearbox can be rocked forward or backward. Loosen the bolts securing the Gearbox to the Sweep Extension. Rock the Gearbox forward or backward into the desired position (see **Figure 57, above right**). Once the Gearbox is positioned, tighten the bolts to re-secure the Gearbox to the Sweep Extension.

Adjusting the Sweep Extension

Once your Bin Sweep has been installed into the Bin, the Sweep Extension will need to be set to bring the Flighting as close as possible to the Bin Wall.

On the rear side of the Sweep Backboard, there are four (4) setscrews with jam nuts. Loosen the jam nuts and setscrews and extend or retract the Sweep Extension flighting to place the rubber wheel 1" to 2" [25.4 to 51.8] from the edge of the Bin Wall.

Once the Sweep Extension has been set to the desired position, retighten the setscrews and jam nuts to completely secure the Sweep Extension to the Bin Sweep. (see **Figure 58**)



Figure 58
Sweep Extension

Sweep Stop Installation

Installing the Sweep Stop



IMPORTANT! *Ensure the Sweep Stop is set so that the paddle is positioned at the center of the Wheel to prevent the wheel from running below the paddle or climbing over the paddle.*

Locate the Sweep Stop and Sweep Stop Cable Assembly from the Parts Box. Determine at what location the Sweep Stop will be installed. **The Sweep Stop should be set to a point approximately two (2) to three (3) feet behind the intermediate sumps** (see **Figure 59**). It is recommended to mark the hole locations from the Sweep Stop so that the holes are drilled at the correct location. Once the holes have been drilled, bolt the Sweep Stop to the Bin Wall.

On the Sweep Stop Cable Assembly, remove the 1/2" Nylon Locknut, the 5/16" x 1" Bolt, the 5/16" Nylon Locknut and set them aside for later. Determine where the Cable Assembly will be passing through the Bin Wall.



IMPORTANT! *From the estimated Bin Wall entry location, ensure that the Cable assembly will be able to reach the Sweep Stop.*



Figure 59
Sweep Stop Location



Figure 60
Sweep Stop Cable

Drill a hole in the Bin Wall allowing for a 1/2" Bolt. From the outside of the Bin, pass the Sweep Stop Cable through the hole. Place the 1/2" Cable Bolt into the hole and secure into place with the 1/2" Nylon Locknut that was set aside.

Relocate the 5/16" x 1" Bolt and 5/16" Nylon Locknut. Place the loop at the end of the Sweep Stop Cable onto the hole at the top of the Sweep Stop Paddle. Using the 5/16" x 1" Bolt and the 5/16" Nylon Locknut, secure the Sweep Stop Cable to the Sweep Stop.

Test the Sweep Stop to ensure that the Sweep will be able to pass by the Sweep Stop. Make any adjustments, if necessary.

It is recommended to apply sealant between the bin and the frame to prevent leaks

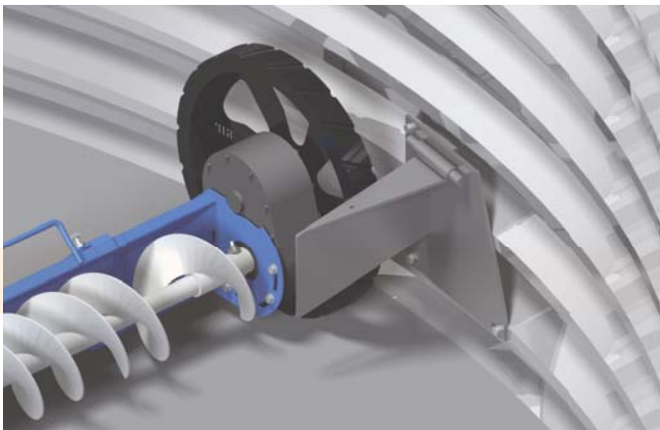


Figure 61
Sweep Stop

Electrical Installation



IMPORTANT! *Inclusion of these electrical procedures is a precaution by the Manufacturer to help ensure that safety requirements are met both for the country of manufacture and the countries of usage. Inclusion of these procedures, outside the normal OPERATION of this equipment by a trained USER, does NOT in any way imply that these procedures are to be used BY unqualified personnel or in substitution FOR qualified electrical or service personnel.*



DANGER! *Electricity can KILL! Use extreme CAUTION around electrical components. Have the providing electric company check the transformer and lead wires to be sure they are an adequate gauge to carry the starting requirements and full load of your U-Trough Unload Motor.*

Controls

The Owner must provide the appropriate electrical controls (ex. motor controller, etc.) that meet all specifications of the Norstar Industries U-Trough Unload. The Manufacturer does not provide or take any responsibility for electrical controls or safety devices.

Wiring

All electrical wiring must be installed by a qualified and/or certified electrician in accordance with all applicable local and national electrical codes.



IMPORTANT! *To guard against electrical shock, all U-Trough Unloads shall have a GROUND connection. Make sure electrical equipment and the U-Trough Unload are properly installed and grounded by a qualified and/or certified electrician according to the National Electrical Code and all other applicable codes and regulations. Parts should be purchased locally.*



IMPORTANT! *Norstar Industries will not be liable for the electrical wiring used with this U-Trough Unload or failure of equipment due to improper electrical installation.*

All electrical devices used with this U-Trough Unload shall be arranged to operate in a "FAIL SAFE" manner; that is, if power failure or failure of device occurs, a hazardous condition must not result. The machine must not restart by itself after a power failure, etc., when power returns, or the jam is cleared.

Switch Box (not supplied by Norstar Industries)

This should be located with stop button and lock-out and/or tag-out features to supply power to the Motor that drives the U-Trough Unload. The Switch Box should be kept away from livestock, but placed at a location as convenient as possible for the operator. The operator should be able to view the entire U-Trough Unload from the Switch Box location. The Switch Box area must remain unobstructed. The Switch Box must be clearly marked as to its function.

Operation

Operator Instruction

Operator training must include:

- The reading of this Manual, with particular emphasis on the section “**Safety**” on pages 9-21 of this Manual.
- The reading and following of all SAFETY notices in this Manual and any other applicable local, regional or national regulations.
- Instruction in U-Trough Unload operation under normal conditions.
- Instruction in U-Trough Unload stopping / location in emergency situations.

Personnel should be alerted to the potential hazard of entanglement in the U-Trough Unload caused by items such as long hair, loose clothing and jewelry.



IMPORTANT! Make sure applicable SAFETY Signs are posted in all conspicuous areas. If SAFETY Signs become damaged or unreadable, contact the manufacturer immediately for replacements.

Start-up



DANGER! Make certain power is OFF, LOCKED OUT and TAGGED OUT before working on or inside the U-Trough Unload. Failure to heed this warning will result in serious injury or death.

It is advisable to have two (2) trained persons (one to operate the U-Trough Unload and one for Safety) present during each start-up of the U-Trough Unload.

Before operating the Unload and each time thereafter, the following areas should be checked off:

- Use only an electric motor of adequate power to operate the machine.
- Check that the power line to the electric motor is secure and away from moving parts.
- Check that all guards are installed, secured and functioning as intended. Do not operate with missing or damaged shields.
- Check worksite. Clean up working area to prevent slipping or tripping.

Break In Period

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

After operating for 1/2 hour:

- Re-torque fasteners and hardware.
- Check that all safety decals are installed and legible. Apply new decals if required.
- Check that no power lines are pinched or rubbing on moving parts. Re-align as required.
- Check that all guards are installed and working as intended.
- Check drive belt tension and alignment. Adjust as required.

After operating for 5 hours and 10 hours:

- Re-torque all fasteners and hardware.
- Check power line routing.
- Check that all guards are installed and are working properly.
- Check safety decals. Install new ones if required.
- Check drive belt tension and alignment.

Operation Requirements

To ensure positive performance and minimum maintenance, it is the Manufacturer's recommendation that this equipment be observed by one (1) Operator during the U-Trough Unload operation.

Use the U-Trough Unload only for loads it is designed to handle safely. U-Trough Unload equipment shall be used to convey only the specified commodities or materials within the rated capacity and the rated speed. Where special use is not indicated, or ratings are not available, consult the Manufacturer.

- Do **NOT** leave the U-Trough Unload running unattended.
- Should any damage to the U-Trough Unload occur, shut off, lock out and tag out power immediately.
- Do **NOT** restart the U-Trough Unload until necessary inspections and repairs have been made.
- Shut off, lock out and tag out all power after using the U-Trough Unload.

Operation Procedure

1. Remove Powerhead's bottom cover and start the U-Trough Unload.
2. Withdraw grain at "gravity-rate" through the center floor sump.
3. Withdraw material through the next floor sumps when facing the outer wall.
4. Stop the motor before engaging the Sweep. The Sweep can be confirmed to be engaged by hand turning the Driveshaft Pulley. From outside of the grain bin, start Sweep rotation and allow the grain to flow into these openings.



WARNING! It is important that the Center Sump Gate is fully open. A partially open gate will cause material to pile up, will damage the equipment and will void the warranty.

5. Run the system as long as required or until the Grain Bin is empty.
6. When the Bin is empty, close all gates and park the Bin Sweep one (1) to two (2) feet behind the intermediate sumps so that when grain is gravity withdrawn, the sweep will be mostly uncovered.



IMPORTANT! *If the U-Trough Unload is to be inoperative for a prolonged period of time, before shutting down, operate the U-Trough Unload until material no longer discharges. This is very important as the conveyed material may become hard over a period of time.*

Maintenance

Cleanliness is essential. Material build-up causes tracking problems and edge damage. Routine inspections and corrective maintenance measures shall be conducted to ensure that all Guards and safety features are retained and function properly.

Establish a MAINTENANCE SCHEDULE to prolong the life and SAFETY of your U-Trough Unload. Practice safe maintenance.

Check for dirt around the Drive Section at least biweekly. Dirt/material build-up is one of the biggest reason that U-Trough Unload Belts become worn and need replacement.

Instruction of Personnel

Only qualified and trained personnel should service the Unload. Maintenance training must include:

- The reading of the Manual, with particular emphasis on the section “**Safety**” on pages 9-21 of this Manual.
- The reading and following of all SAFETY notices in this Manual and any other applicable local, regional or national regulations.

It is a requirement to be properly trained and to have read and understand this Installation/Operator’s Manual before operating, servicing, or otherwise handling this U-Trough Unload.

U-Trough Unloads shall not be maintained or serviced while in operation unless proper maintenance or service requires the U-Trough Unload to be in motion. In either case, personnel shall be made aware of the hazards and how the task may be safely accomplished.

Basic Maintenance Rules



DANGER! Disconnect, LOCK OUT and TAG OUT electrical power before inspecting, adjusting, or servicing equipment unless maintenance instructions specifically state otherwise. Failure to heed this warning will result in serious injury or death.



IMPORTANT! Comply with all applicable SAFETY WARNINGS discussed in this Manual.



WARNING! The Motor and all moving parts must stop BEFORE any adjustments are made to the equipment or before it is left unattended. Failure to follow this warning may lead to personal injury or death.



IMPORTANT! DO NOT attempt to remove adhering material manually unless the U-Trough Unload has been STOPPED and the power LOCKED OUT and TAGGED OUT. Wear safety glasses when cleaning or servicing the U-Trough Unload. Debris and dust associated with grain transport can damage sight or cause blindness.

Electrical Wear



IMPORTANT! Make sure any electrical wiring is not frayed or cracked and meets proper codes and requirements. Check the Power Cord lead for any twisting. Replace it if any damage is apparent. Make sure to check wear at the U-Trough Unload Motors.



DANGER! Electricity can kill.

Material Build-up, Wear and Damage

Make sure to check for wear at these various points. Maintain proper adjustments on Chains or Belts. Replace the Chain/Belt Guards after adjustments or maintenance. Tighten hardware. Guards and Covers must be secured before the U-Trough Unload is restarted for normal operation. (See **Figure 62**)

Before finishing, make sure all SAFETY signs are readable and tightly attached.

Remove Guards and Covers and check augers, wheels and belts for wear and damage. Clean out dust or particles that may have lodged inside.



DANGER! Electricity can kill! Disconnect, LOCK OUT and TAG OUT electrical power BEFORE inspecting, adjusting or servicing equipment unless maintenance instructions specifically state otherwise. Comply with all applicable SAFETY warning discussed in this Manual. Failure to heed this warning will result in serious injury or death.



IMPORTANT! Replace all Guards and Covers. Do NOT run the U-Trough Unload with any Guards or Covers off.

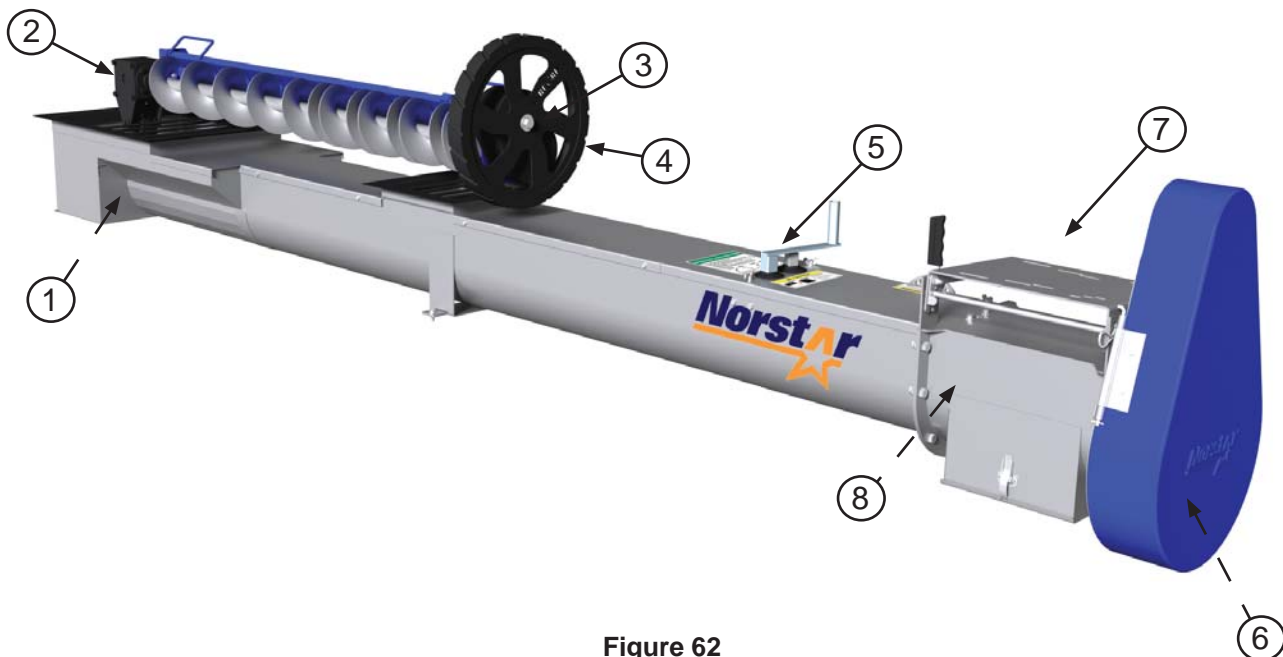


Figure 62
Inspection Locations

Item	Description	Inspect For:	Item	Description	Inspect For:
1	UT Gearbox	wear and damage	5	Crank	wear and damage
2	Sweep Gearbox	wear and damage	6	Belts	wear and damage
3	SureGrip Gearbox	wear and damage	7	Head Motor	wiring good, tight bolts
4	SureGrip Wheel	wear and damage	8	Bearing	wear and damage

Lubricants

Check these points weekly or every fifty (50) hours of operation. Check oil levels in the Gearboxes and add as required. **Gearboxes should be filled with 80/90 gear oil.** Keep the Sprockets/Chains well lubricated to reduce chance of failure. Use an SAE multi-purpose, high temperature grease with extreme pressure (EP) performance. Also acceptable is an SAE multi-purpose, lithium based grease.



WARNING! DO NOT operate the Bin Sweep without gear oil. Gearboxes are shipped with oil, but it is recommended to check to ensure that there is oil in the gearbox. Failure to add the proper type/amount of lubricant BEFORE STARTING the BIN SWEEP will cause permanent damage to the Gearbox and will void the warranty.

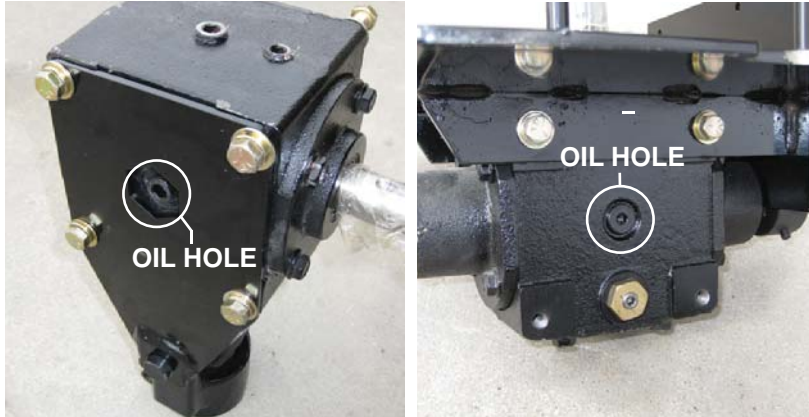


Figure 63
U-Trough 14'-50' Gearboxes

To fill the Gearboxes, remove the plug from the side of the Gearbox.

See **Figure 63** for U-Trough 14'-50' Gearboxes. Fill the Sweep Gearbox (see **Figure 63, left**) with **8oz** of oil. Fill the U-Trough Gearbox (see **Figure 63, right**) with **12oz** of oil.

See **Figure 64** for U-Trough 54'-74' Gearboxes. Fill the Sweep Gearbox (see **Figure 64, top**) with **30oz** of oil. Fill the U-Trough Gearbox (see **Figure 64, bottom**) with **22oz** of oil.

Fill up the Gearbox to the hole with 80/90 gear oil.



Figure 64
U-Trough 54'-74' Gearboxes

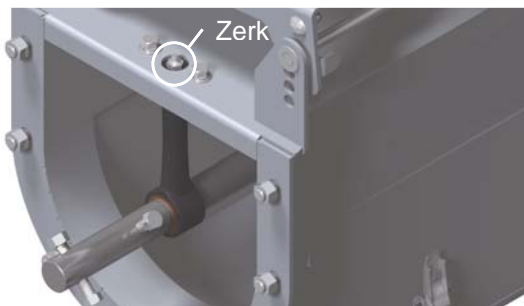


Figure 65
U-Trough Hanger Bushing

The Hanger Bushing is located on the Powerhead and the Incline.

The Hanger Bushing Bracket has a hollow core to allow grease to slowly be added to the Hanger Bushing. Add grease through the grease zerk on the top face of the Powerhead and/or Incline. Keep the core full of grease to ensure that the Bushing doesn't seize up.

Additional Maintenance Tips

- Check for deterioration or looseness of any bolts or fasteners.
- Check the Pulley hub bolts and set screws after the first 8 - 10 hours of operation.
- Check, regularly, for wear and/or damage. Touch up all paint nicks and scratches to prevent rusting.
- Make sure no tools get left on or around the U-Trough Unload after maintenance.

After the season's use, 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 start of next season. Remove all residual grain from the bin and unloading auger. Inspect all moving or rotating parts to see if anything has become entangled in them and, if necessary, remove the entangled material.

Troubleshooting

General Troubleshooting

Trouble	Possible Cause	Solution
Bin Sweep won't move into material.	Hung up on the floor	Raise the Bin Sweep so that it doesn't touch the floor at all
	Dragging on or hitting the floor	
Can't Start Sweep.	No Power	Turn on Power at the Master Panel. Check Fuses at the Master Panel.
	Locked out	Clear tag and turn on.
	Bogged down	Remove as much grain as possible through the center and intermediate sumps.
Belts are Slipping	Belts are not properly tensioned	Adjust the Belt Tensioning Arm to tighten the belt.
	Belts are not correctly sized	Obtain the correct sized belts.
No Grain Flow	Sump is plugged	Clean out the Sump. Remove trash from the top of the grain before starting.
	Center sump is empty	Open the other sump(s)/gate(s)
	Sump is closed	Open the sump gates.

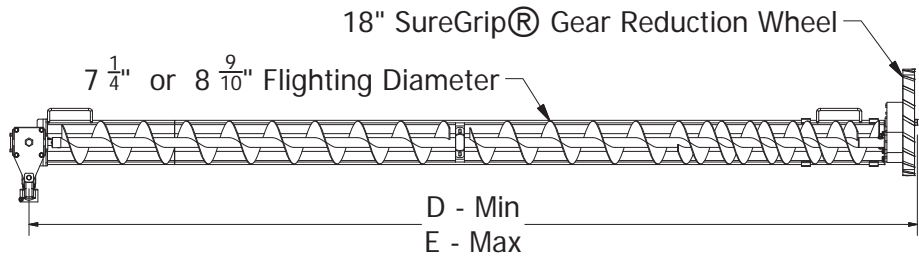
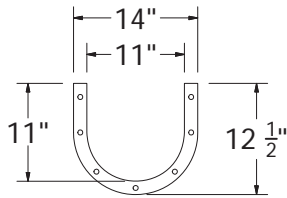
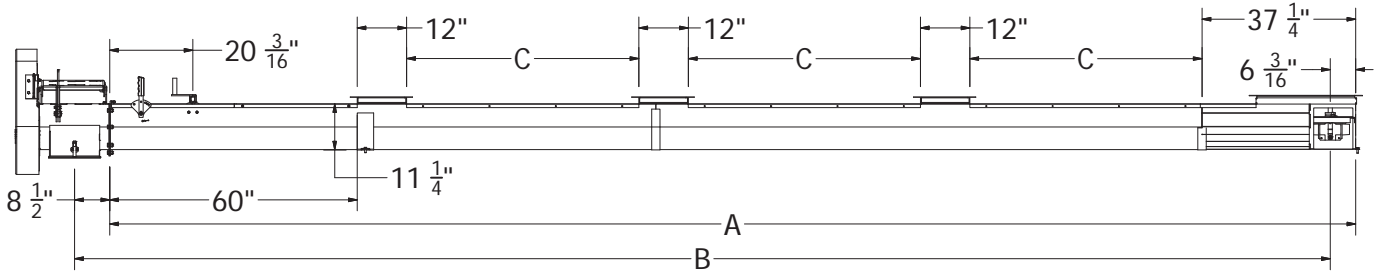
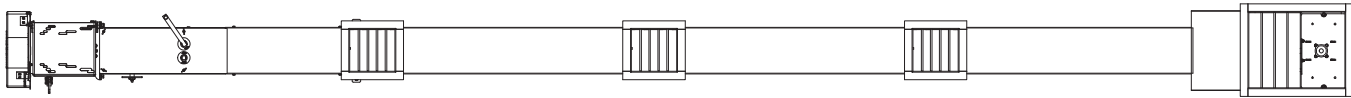
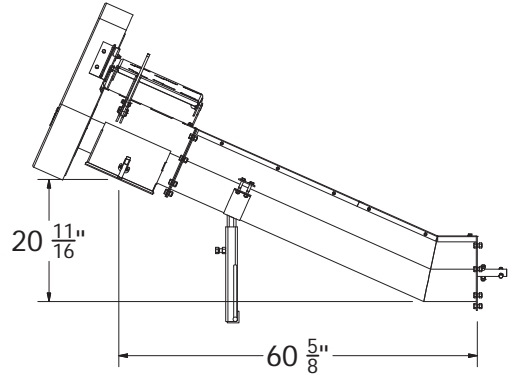
Electrical Troubleshooting

Trouble	Possible Cause	Solution
Low Capacity <i>Material not unloading at full capacity</i>	Low voltage in power source	Check voltage at the motor input. Voltage in power lines may be low. Consult an electrician and/or power company.
Slow Speed <i>Bin Sweep operating below normal speed</i>	Blown fuse on three phase circuit	Check and replace fuses.
High Amperage	Defective motor	check the motor for short or open circuited condition. Repair or replace motor.

Spec Sheet

U-Trough 14'-50' Spec Sheet

INDUSTRIES

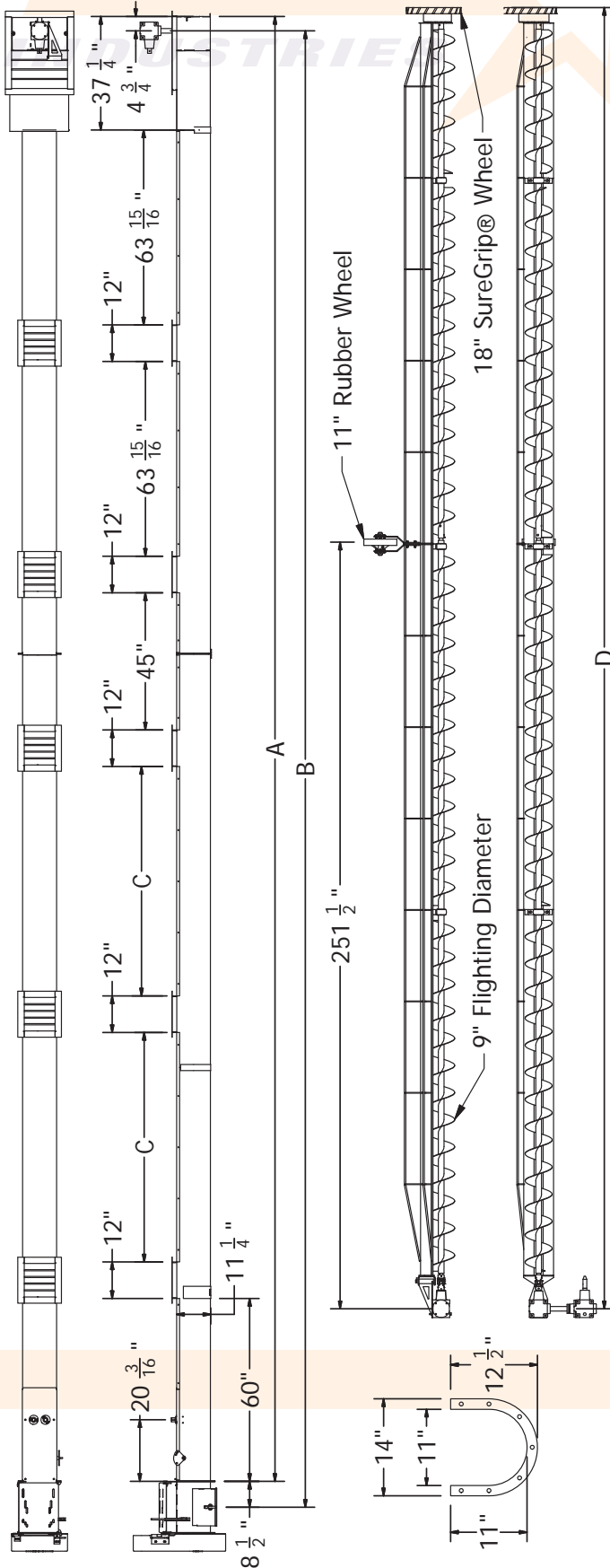


INTERMEDIATE

MODEL NO.	GATES	A	B	C	D	E
14/15	1	136.887"	138.964"	27.375"	13.486'	15.856'
18/19	1	156.137"	158.464"	46.875"	16.986'	19.366'
20/22	1	173.637"	175.964"	64.375"	19.819'	22.204'
24/26	1	194.637"	196.964"	85.375"	23.819'	26.208'
27/29	2	215.043"	217.370"	46.891"	26.653'	29.044'
30/31	2	232.575"	234.901"	55.656"	29.569'	31.963'
32/34	2	247.137"	249.464"	62.938"	31.986'	34.381'
35/37	2	265.137"	267.464"	71.938"	34.986'	37.383'
38/40	2	283.137"	285.464"	80.938"	37.986'	40.384'
42/43	3	302.059"	304.386"	56.266"	41.153'	43.551'
44/46	3	319.122"	321.448"	61.953"	43.986'	46.385'
48/50	3	341.106"	343.433"	69.281"	47.653'	50.052'

Spec Sheet

U-Trough 54'-74' Spec Sheet



INTERMEDIATE GATES

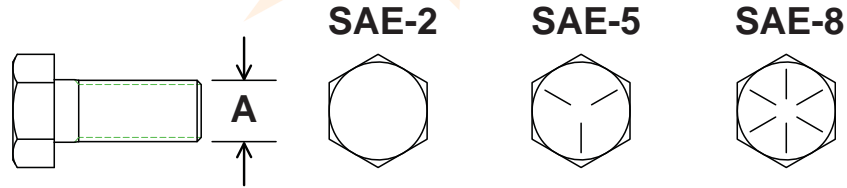
MODEL NO.	INTERMEDIATE GATES	A	B	C	D
Brock 54'	4	372.702"	376.448"	54.565"	319.138"
Brock 60'	4	408.702"	412.448"	90.565"	355.138"
Brock 72'	5	480.702"	484.448"	78.283"	427.138"
Chief 55'	4	382.702"	386.448"	64.565"	325.138"
Chief 61'	4	415.202"	418.948"	97.065"	361.138"
Chief 74'	5	494.202"	497.948"	82.033"	439.138"
Westeel WC 54'	4	370.702"	374.448"	52.565"	319.138"
Westeel WC 60'	4	406.542"	410.288"	88.405"	355.013"
Westeel WC 72'	5	478.182"	481.928"	74.023"	426.638"

Bolt Torque

Torque-Tension Relationships for SAE Grades 5 and 8

The following table of torque values are compliments of Leland Industries, Inc.

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.



Nominal Size and Threads/In	Stress Area in ²	Grade 5 Torq Dry K=0.2 in/lb	Grade 5 Torq Lub K=0.15 in/lb	Grade 8 Torq Dry K=0.2 in/lb	Grade 8 Torq Lub K=0.15 in/lb	
1/4	0.250-28	0.03637	116.0	87.0	164.0	123.0
	0.250-20	0.03182	101.0	76.0	143.0	107.0
5/16	0.3125-24	0.05806	230.0	173.0	327.0	245.0
	0.3125-18	0.05243	209.0	157.0	295.0	221.0
3/8	0.375-24	0.08783	420.0	315.0	593.0	445.0
	0.375-16	0.07749	370.0	278.0	523.0	392.0
7/16	0.4375-20	0.11870	662.0	496.0	935.0	700.0
	0.4375-14	0.10630	593.0	445.0	837.0	628.0
1/2	0.500-20	0.15995	1020.0	764.0	1440.0	1080.0
	0.500-13	0.15190	904.0	678.0	1277.0	958.0
9/16	0.5625-18	0.20298	1452.0	1092.0	2052.0	1536.0
	0.5625-12	0.118195	1308.0	984.0	1848.0	1380.0
5/8	0.625-18	0.25595	2040.0	1524.0	2880.0	2160.0
	0.625-11	0.22600	1800.0	1356.0	2544.0	1908.0
3/4	0.750-18	0.37295	3564.0	2676.0	5040.0	3780.0
	0.750-10	0.33446	3228.0	2412.0	4512.0	3384.0
1	1.000-12	0.66304	8448.0	6336.0	11940.0	8952.0
	1.000-8	0.60574	7728.0	5796.0	10908.0	8172.0
Tensile Strength			120 000 psi		150 000 psi	
Proof Load Stress			86 000 psi		120 000 psi	

Torque Factors for Surface Conditions of Mating Fasteners

Mating Parts:	K
Dry, clean with a thin film of oil	0.15 / 0.20
Additional lubricating coatings of oil, wax, or dissimilar plating or hard washer	0.10 / .015
With other conditions, consult Norstar Industries	

Set Screw Torques

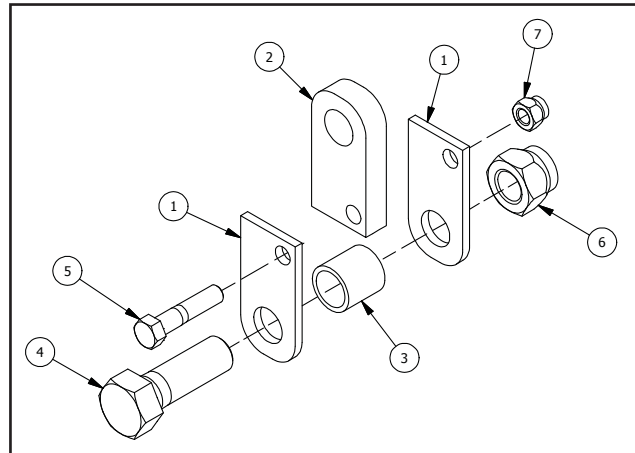
Set Screw Diameter	Hex Size	Torque in-lb
10	3/32	28
1/4	1/8	65
5/16	5/32	125
3/8	3/16	230
7/16	7/32	350
1/2	1/4	500
5/8	5/16	1100

Exploded Views and Parts Lists

The manual contains a parts list and exploded view for your machine. It is separated into major sections which correspond to the groups shown in the Table of Contents and the accompanying illustrations.

The first page of each major section lists the contents of that section, each of which consists of exploded views and related tabular listings.

#s	DESCRIPTION	PART #	QTY
1	Bracket	00001	2
2	Pivot Bracket	00002	1
3	Spacer	00003	1
4	3/4 x 2 1/4" Bolt	00004	1
5	3/8 x 1 3/4" Bolt	00005	1
6	3/4" Nylon Locknut	00006	1
7	3/8" Nylon Locknut	00007	1



WHEN ORDERING PARTS

Always give your dealer the model and Serial Number of your machine to assist him in ordering and obtaining the correct parts. Use the exploded view and tabular listing of the area of interest to exactly identify the required part.

USING THE MANUAL

Parts data consists of exploded view illustrations and associated parts list tables which are read as follows:

ITEM

The item number is the identifier number from the illustration. For example, number 3 on an illustration points to a component which is item 3 on the accompanying table.

DESCRIPTION

This column contains the name or description of the part.

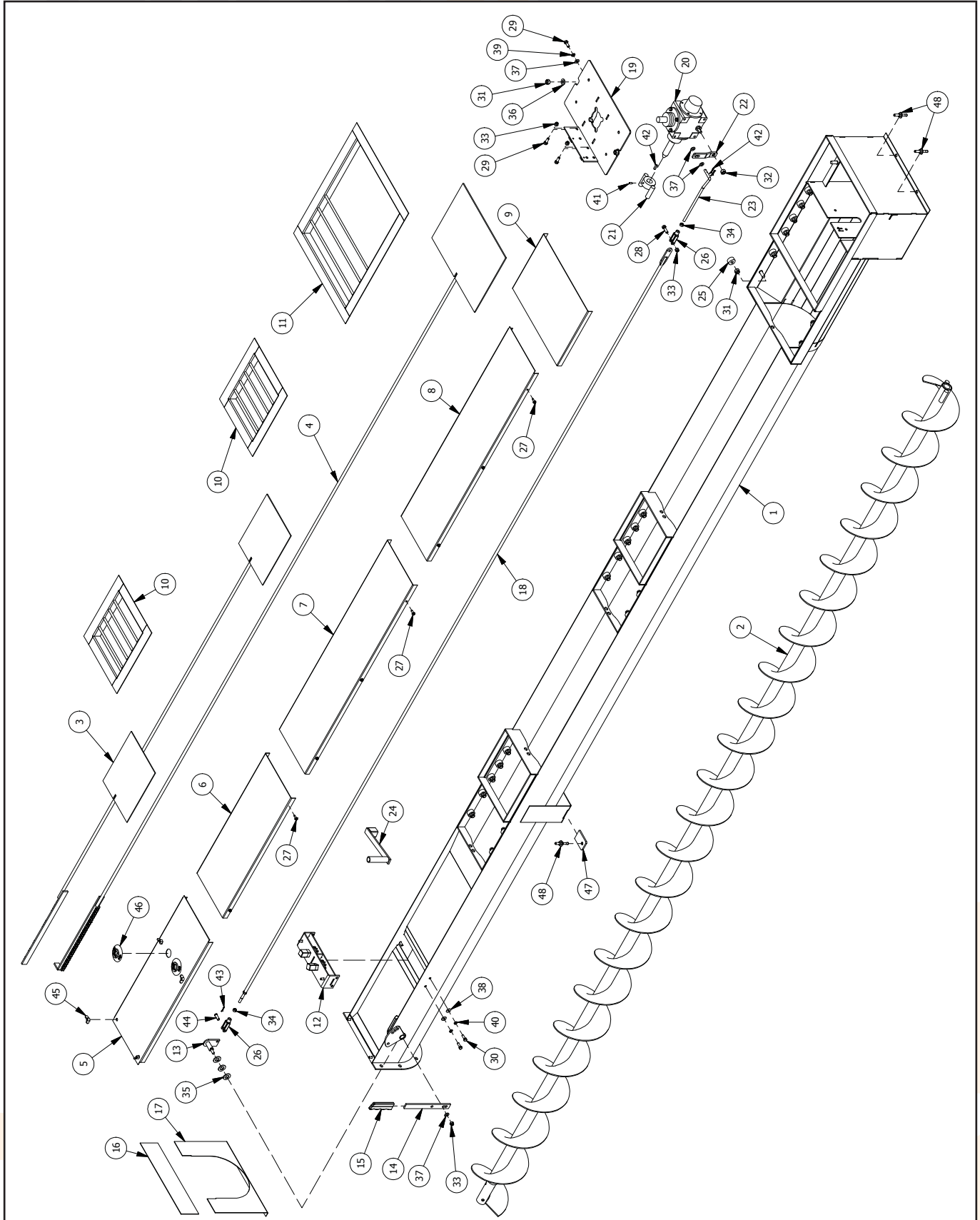
PART NUMBER

The part number is the number by which the component may be identified and ordered from your dealer.

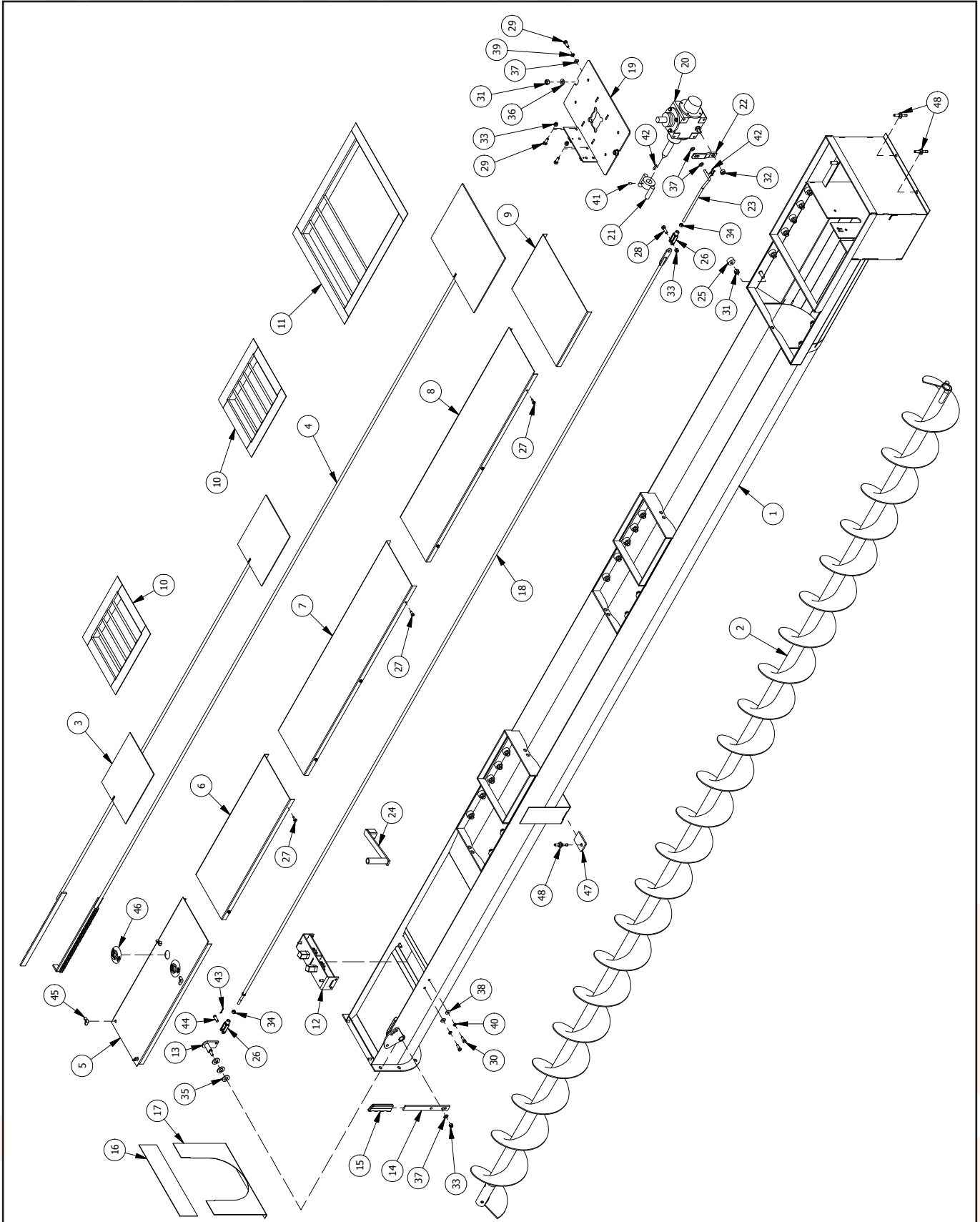
QUANTITY

This column contains the quantity of the items in the assembly.

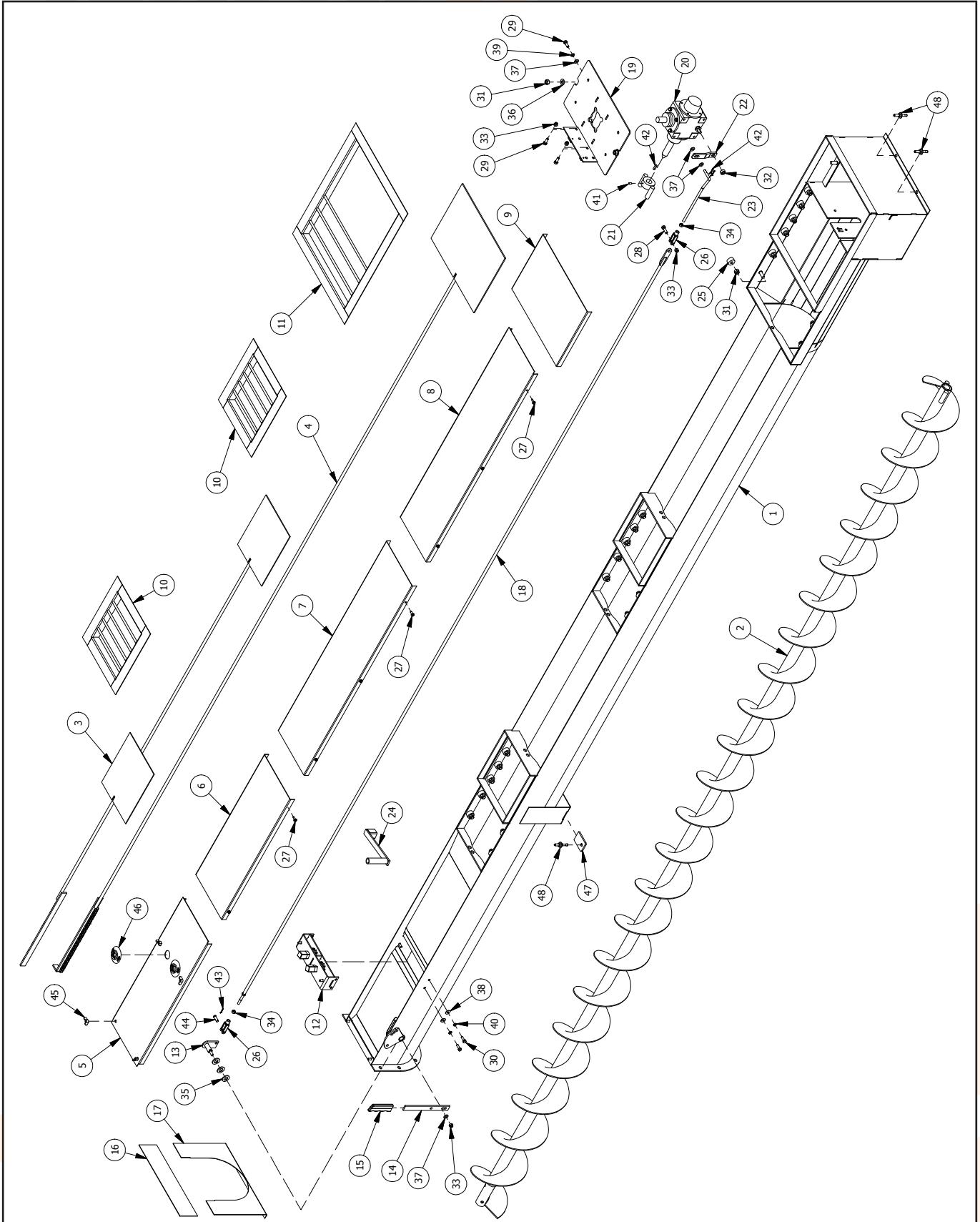
#s	DESCRIPTION	8" PART #	11" PART #	11" HD PART #	QTY
Main U-Trough Housing					
	Model: 14/15	10919	10907	23985	1
	Model: 18/19	10920	10908	23986	1
	Model: 20/22	10921	10909	23987	1
	Model: 24/26	10922	10910	23988	1
	Model: 27/29	10923	10911	23989	1
1	Model: 30/31	10924	10912	23990	1
	Model: 32/34	10925	10913	23991	1
	Model: 35/37	10926	10914	23992	1
	Model: 38/40	10927	10915	23993	1
	Model: 42/43	10928	10916	23994	1
	Model: 44/46	10929	10917	23995	1
	Model: 48/50	10930	10918	23996	1
Flighting					
	Model: 14/15	10742	10718	10730	1
	Model: 18/19	10743	10719	10731	1
	Model: 20/22	10744	10720	10732	1
	Model: 24/26	10745	10721	10733	1
	Model: 27/29	10746	10722	10734	1
2	Model: 30/31	10747	10723	10735	1
	Model: 32/34	10748	10724	10736	1
	Model: 35/37	10749	10725	10737	1
	Model: 38/40	10750	10726	10738	1
	Model: 42/43	10751	10727	10739	1
	Model: 44/46	10752	10728	10740	1
	Model: 48/50	10753	10729	10741	1
Intermediate Gate Assembly					
	Model: 14/15	10547	10547	10547	1
	Model: 18/19	10547	10547	10547	1
	Model: 20/22	10547	10547	10547	1
	Model: 24/26	10547	10547	10547	1
	Model: 27/29	10548	10548	10548	1
3	Model: 30/31	10549	10549	10549	1
	Model: 32/34	10550	10550	10550	1
	Model: 35/37	10551	10551	10551	1
	Model: 38/40	10552	10552	10552	1
	Model: 42/43	10553	10553	10553	1
	Model: 44/46	10554	10554	10554	1
	Model: 48/50	10555	10555	10555	1



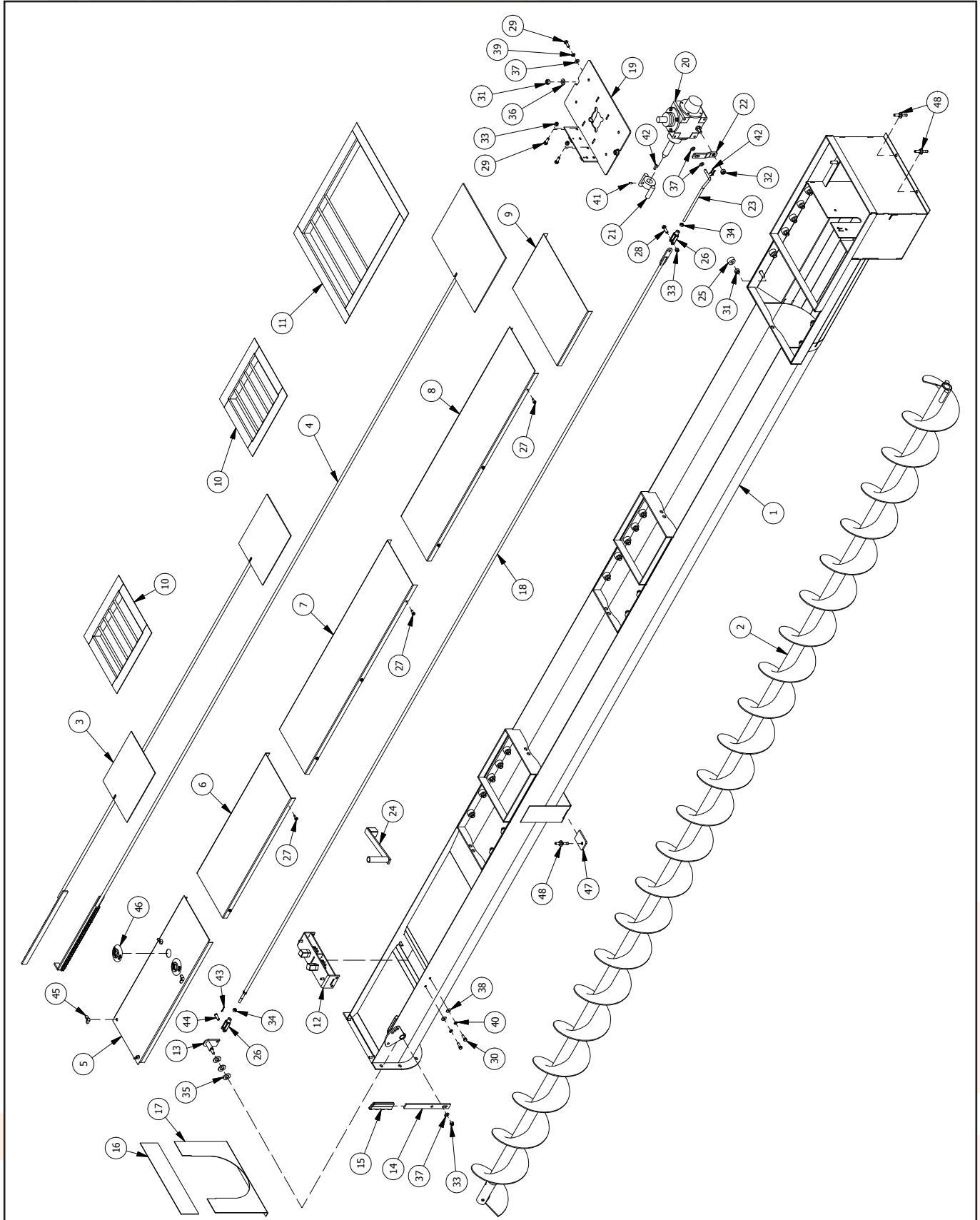
#s	DESCRIPTION	8" PART #	11" PART #	11" HD PART #	QTY
Wide Mouth Gate Assembly					
	Model: 14/15	10535	10535	10535	1
	Model: 18/19	10536	10536	10536	1
	Model: 20/22	10537	10537	10537	1
	Model: 24/26	10538	10538	10538	1
	Model: 27/29	10539	10539	10539	1
4	Model: 30/31	10540	10540	10540	1
	Model: 32/34	10541	10541	10541	1
	Model: 35/37	10542	10542	10542	1
	Model: 38/40	10543	10543	10543	1
	Model: 42/43	10544	10544	10544	1
	Model: 44/46	10545	10545	10545	1
	Model: 48/50	10546	10546	10546	1
5	First Lid	10875	10875	10875	1
6	Second Lid	10901	10901	10901	1
Lid between Intermediate Grates					
	Model: 14/15	-	-	-	
	Model: 18/19	-	-	-	
	Model: 20/22	-	-	-	
	Model: 24/26	-	-	-	
	Model: 27/29	10880	10880	10880	1
7	Model: 30/31	10881	10881	10881	1
	Model: 32/34	10882	10882	10882	1
	Model: 35/37	10883	10883	10883	1
	Model: 38/40	10884	10884	10884	1
	Model: 42/43	10885	10885	10885	2
	Model: 44/46	10886	10886	10886	2
	Model: 48/50	10887	10887	10887	2
Center Sump Lid					
	Model: 14/15	10888	10888	10888	1
	Model: 18/19	10889	10889	10889	1
	Model: 20/22	10890	10890	10890	1
	Model: 24/26	10891	10891	10891	1
	Model: 27/29	10892	10892	10892	1
8	Model: 30/31	10893	10893	10893	1
	Model: 32/34	10894	10894	10894	1
	Model: 35/37	10895	10895	10895	1
	Model: 38/40	10896	10896	10896	1
	Model: 42/43	10897	10897	10897	1
	Model: 44/46	10898	10898	10898	1
	Model: 48/50	10899	10899	10899	1
9	Wide Mouth Lid	10900	10900	10900	1



#s	DESCRIPTION	8" PART #	11" PART #	11" HD PART #	QTY
Intermediate Safety Grating					
10	Models: 14/15-24/26	10634	10634	10634	1
	Models: 27/29-38/40	10634	10634	10634	2
	Models: 42/43-48/50	10634	10634	10634	3
11	Wide Mouth Safety Grating	10557	10557	10557	1
12	Crank Assembly	10607	10607	10607	1
13	Inside Shifter Handle Assembly	10609	10609	10609	1
14	Shifter Handle	14018	14018	14018	1
15	Rubber Shifter Grip	10627	10627	10627	1
16	Upper Bin Flashing Plate	11403	11403	11403	1
17	Lower Bin Flashing Plate	11402	11402	11402	1
Clutch Engage Rod Assembly					
	Model: 14/15	11370	11370	11370	1
	Model: 18/19	11371	11371	11371	1
	Model: 20/22	11372	11372	11372	1
	Model: 24/26	11373	11373	11373	1
	Model: 27/29	11374	11374	11374	1
18	Model: 30/31	11375	11375	11375	1
	Model: 32/34	11376	11376	11376	1
	Model: 35/37	11377	11377	11377	1
	Model: 38/40	11378	11378	11378	1
	Model: 42/43	11379	11379	11379	1
	Model: 44/46	11380	11380	11380	1
	Model: 48/50	11381	11381	11381	1
	19	Gearbox Housing	10146	10145	10145
20	Shifter Gearbox	10527	10527	10527	1
21	Dogg	10530	10530	14488	1
22	Clutch Lever	c/w gearbox	c/w gearbox	c/w gearbox	1
23	Shifter Adaptor Arm	10564	10564	10564	1
24	Crank Handle	10533	10533	10533	1
Roller					
25	Models: 14/15-24/26	10377	10377	10377	24
	Models: 27/29-38/40	10377	10377	10377	36
	Models: 42/43-48/50	10377	10377	10377	48
26	CY-6 Clevis	11360	11360	11360	2
Self-Tapping Screw					
27	Model: 14/15	10299	10299	10299	4
	Model: 18/19	10299	10299	10299	6
	Model: 20/22	10299	10299	10299	8
	Models: 24/26-27/29	10299	10299	10299	12
	Models: 30/31-32/34	10299	10299	10299	16
	Model: 35/37	10299	10299	10299	20
	Models: 38/40-48/50	10299	10299	10299	24



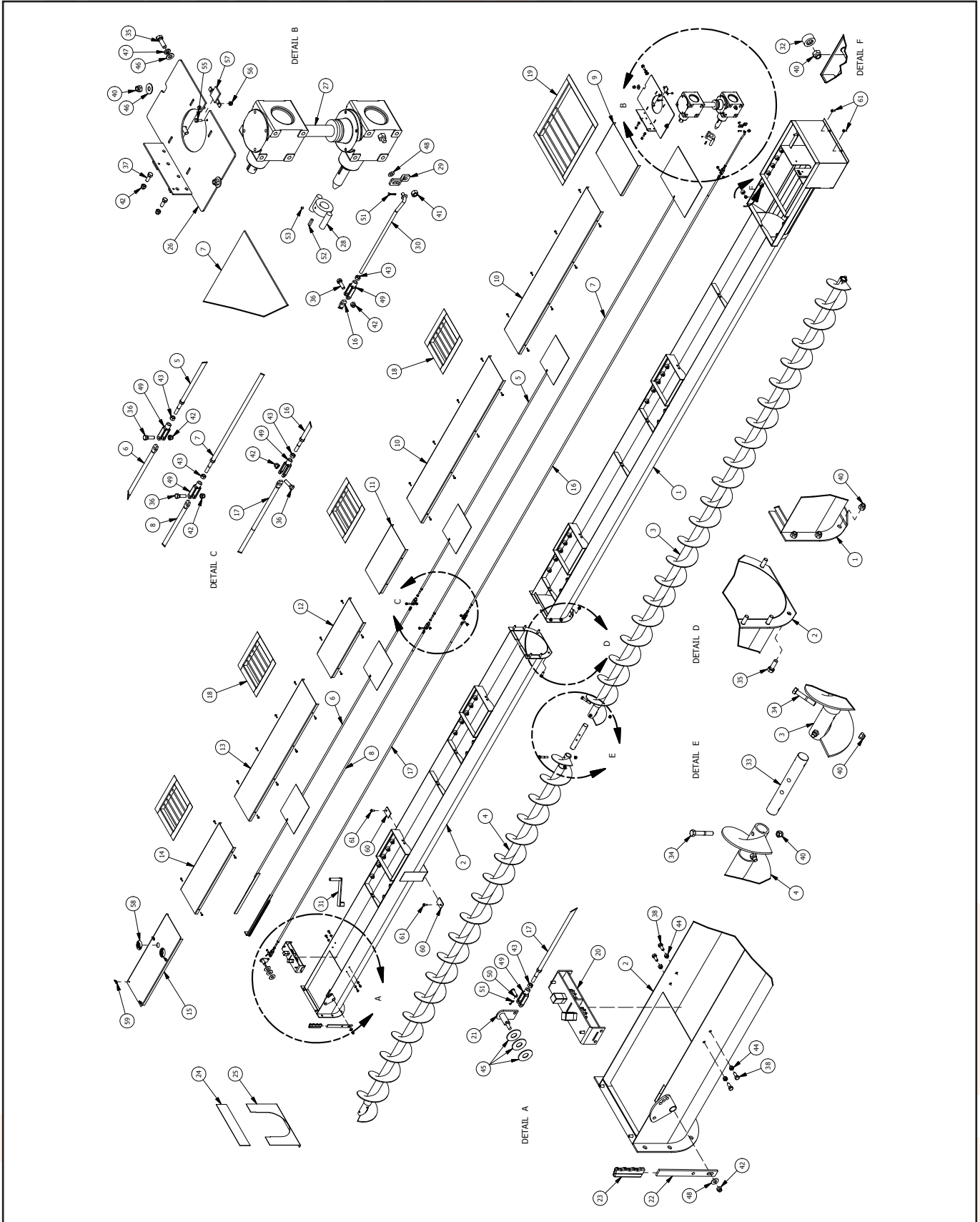
#s	DESCRIPTION	8" PART #	11" PART #	11" HD PART #	QTY
28	3/8 x 1 1/4" Bolt	10311	10311	10311	1
29	3/8 x 1" Bolt	10277	10277	10277	6
30	5/16 x 1" Bolt	10287	10287	10287	4
	1/2" Nylon Locknut				
31	Models: 14/15-24/26	10318	10318	10318	27
	Models: 27/29-38/40	10318	10318	10318	39
	Models: 42/43-48/50	10318	10318	10318	51
32	1/2" Hex Nut	10289	10289	10289	1
33	3/8" Nylon Locknut	10274	10274	10274	4
34	3/8" Fine Threaded Nut	10278	10278	10278	2
35	3/4" Flatwasher	10296	10296	10296	3
36	1/2" Flatwasher	10297	10297	10297	2
37	3/8" Flatwasher	10304	10304	10304	7
38	5/16" Flatwasher	10285	10285	10285	4
39	3/8" Lockwasher	10276	10276	10276	4
40	5/16" Lockwasher	10286	10286	10286	4
41	Setscrew	c/w dogg	c/w dogg	c/w dogg	1
42	1/4 x 1" Key	10281	10281	10281	1
43	1/8" Cotterpin	10292	10292	10292	3
44	3/8 Clevis Pin	c/w clevis	c/w clevis	c/w clevis	1
45	5/16" Wingnut	15777	15777	15777	4
46	Rubber Crank Seal	22480	22480	22480	2
47	Anchor Tab	24021	24021	24021	2
48	3/8 x 2 3/4" Anchor Bolt	24229	24229	24229	4

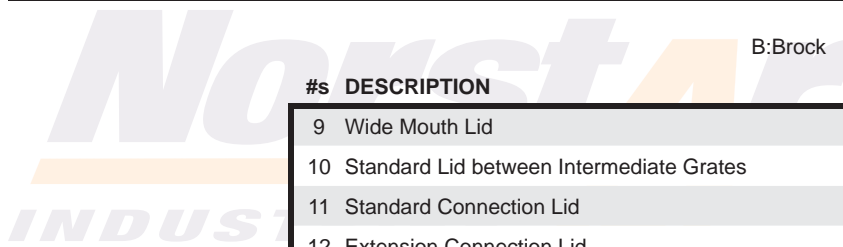




B:Brock C:Chief W:Westeel

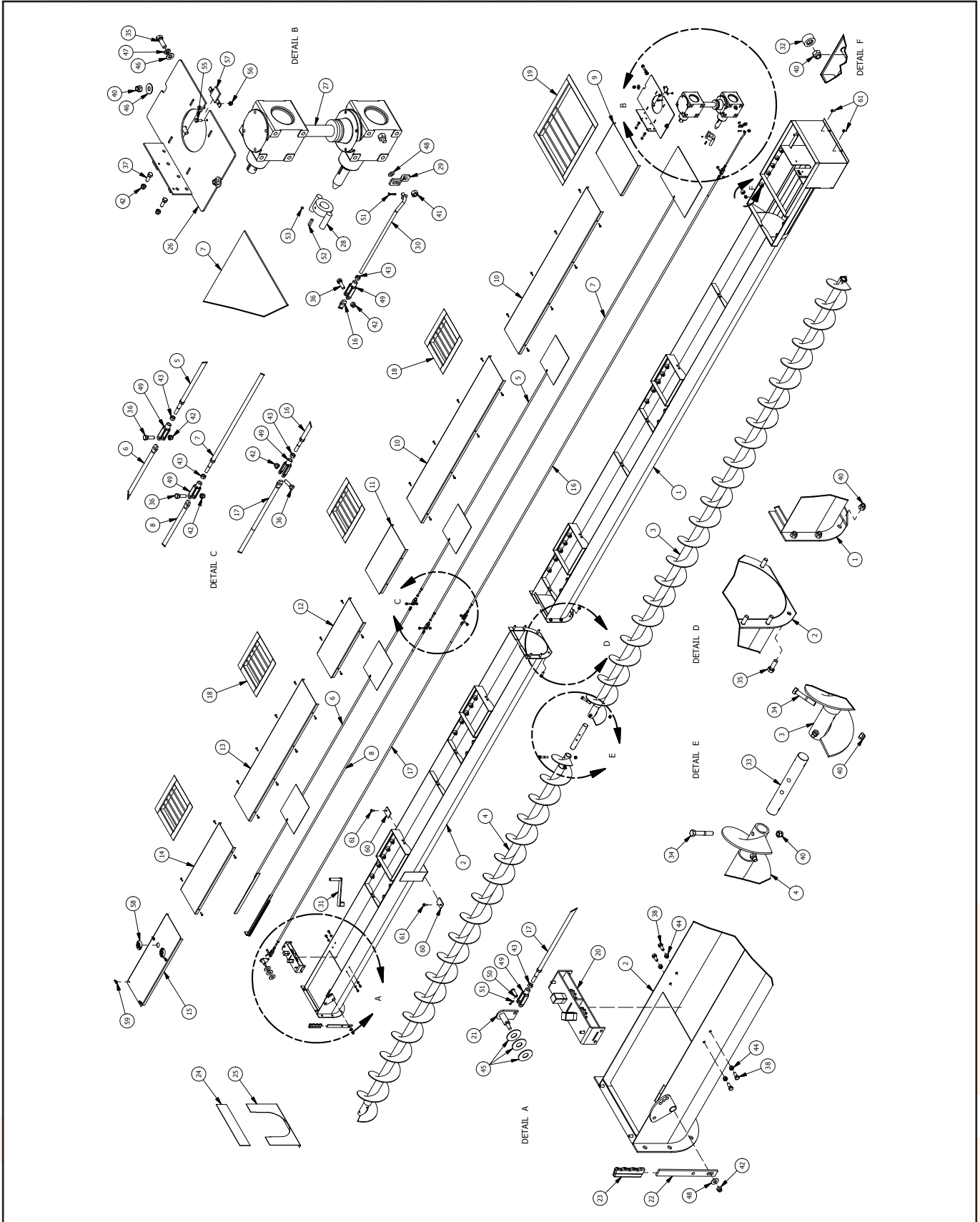
#s	DESCRIPTION	PART #	QTY
1	Standard UT Weldment	14215	1
	UT Weldment Extension		
	Model: B54	14303	1
	Model: B60	14304	1
	Model: B72	14305	1
	Model: C55	14306	1
2	Model: C61	14307	1
	Model: C74	14308	1
	Model: W54	14309	1
	Model: W60	14310	1
	Model: W72	14311	1
3	Standard Fighting Weldment	14108	1
	Extension Fighting Weldment		
	Model: B54	14099	1
	Model: B60	14100	1
	Model: B72	14101	1
	Model: C55	14102	1
4	Model: C61	14103	1
	Model: C74	14104	1
	Model: W54	14105	1
	Model: W60	14106	1
	Model: W72	14107	1
5	Standard Intermediate Gate Assembly	14266	1
	Extension Intermediate Gate Assembly		
	Model: B54	14260	1
	Model: B60	14261	1
	Model: B72	14262	1
	Model: C55	14263	1
6	Model: C61	14264	1
	Model: C74	14265	1
	Model: W54	14267	1
	Model: W60	14268	1
	Model: W72	14269	1
7	Standard Wide Mouth Gate Assembly	14290	1
	Extension Wide Mouth Gate Assembly		
	Model: B54	14281	1
	Model: B60	14282	1
	Model: B72	14283	1
	Model: C55	14284	1
8	Model: C61	14285	1
	Model: C74	14286	1
	Model: W54	14287	1
	Model: W60	14288	1
	Model: W72	14289	1





B:Brock C:Chief W:Westeel

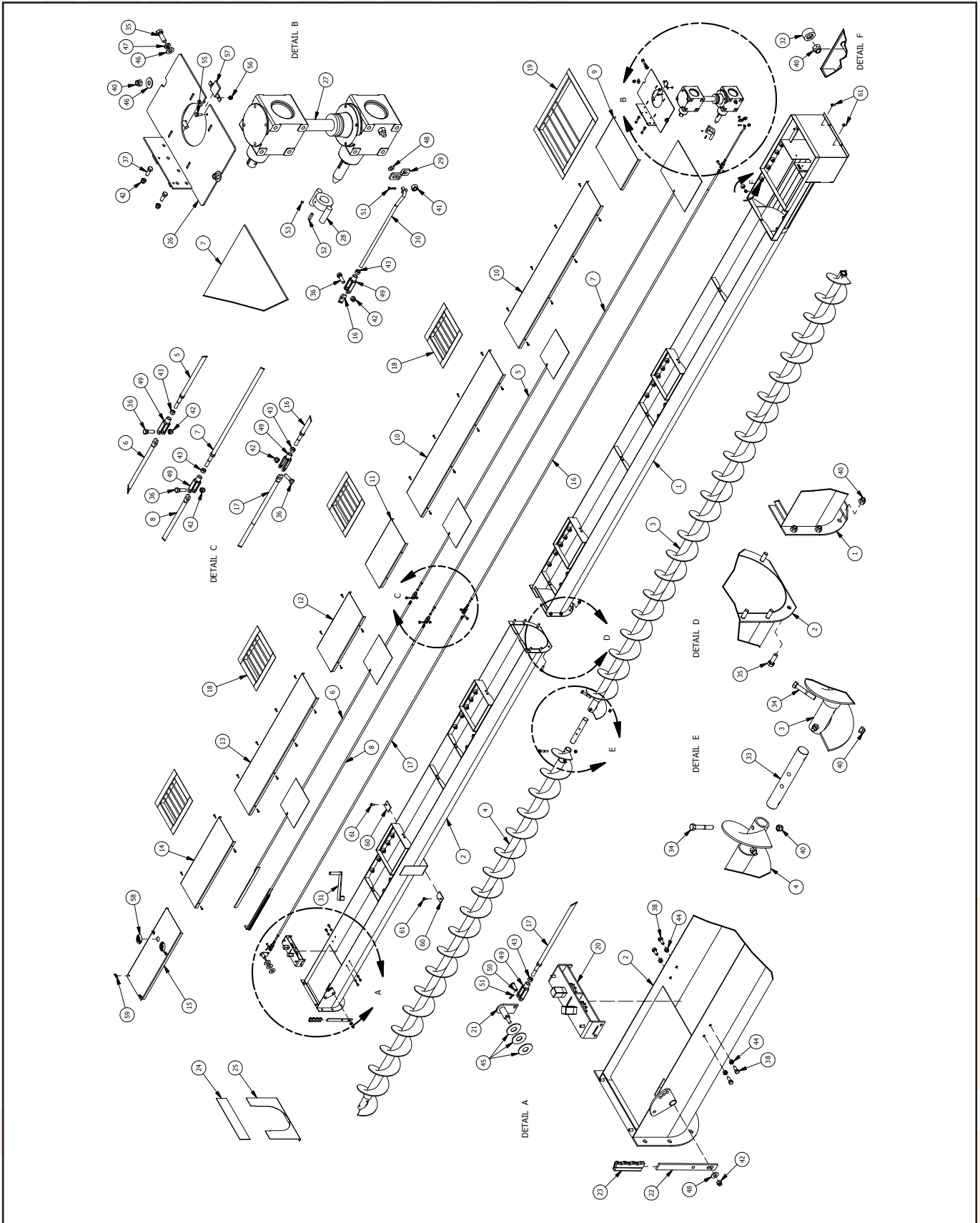
#s	DESCRIPTION	PART #	QTY
9	Wide Mouth Lid	10900	1
10	Standard Lid between Intermediate Grates	14291	2
11	Standard Connection Lid	14292	1
12	Extension Connection Lid	14293	1
	Extension Lid between Intermediate Grates		
	Model: B54	14294	1
	Model: B60	14295	1
	Model: B72	14296	2
	Model: C55	14297	1
13	Model: C61	14298	1
	Model: C74	14299	2
	Model: W54	14300	1
	Model: W60	14301	1
	Model: W72	14302	2
14	First Lid	25326	1
15	Second Lid	10901	1
16	Standard Clutch Rod Assembly	14249	1
	Extension Clutch Rod Assembly		
	Model: B54	14240	1
	Model: B60	14241	1
	Model: B72	14242	1
	Model: C55	14243	1
17	Model: C61	14244	1
	Model: C74	14245	1
	Model: W54	14246	1
	Model: W60	14247	1
	Model: W72	14248	1
	Intermediate Safety Grating		
18	Models: B54,B60,C55,C61,W54,W60	10634	4
	Models: B72,C74,W72	10634	5
19	Wide Mouth Safety Grating	10557	1
20	Crank Assembly	25322	1
21	Inside Shifter Handle Assembly	10609	1
22	Shifter Handle	14018	1
23	Rubber Shifter Grip	10627	1
24	Upper Bin Flashing Plate	11403	1
25	Lower Bin Flashing Plate	11402	1
26	Gearbox Housing	14230	1
27	Shifter Gearbox	23402	1
28	Dogg	14238	1
29	Clutch Lever	14235	1
30	Shifter Adapter Arm	14236	1
31	Crank Handle	10533	1



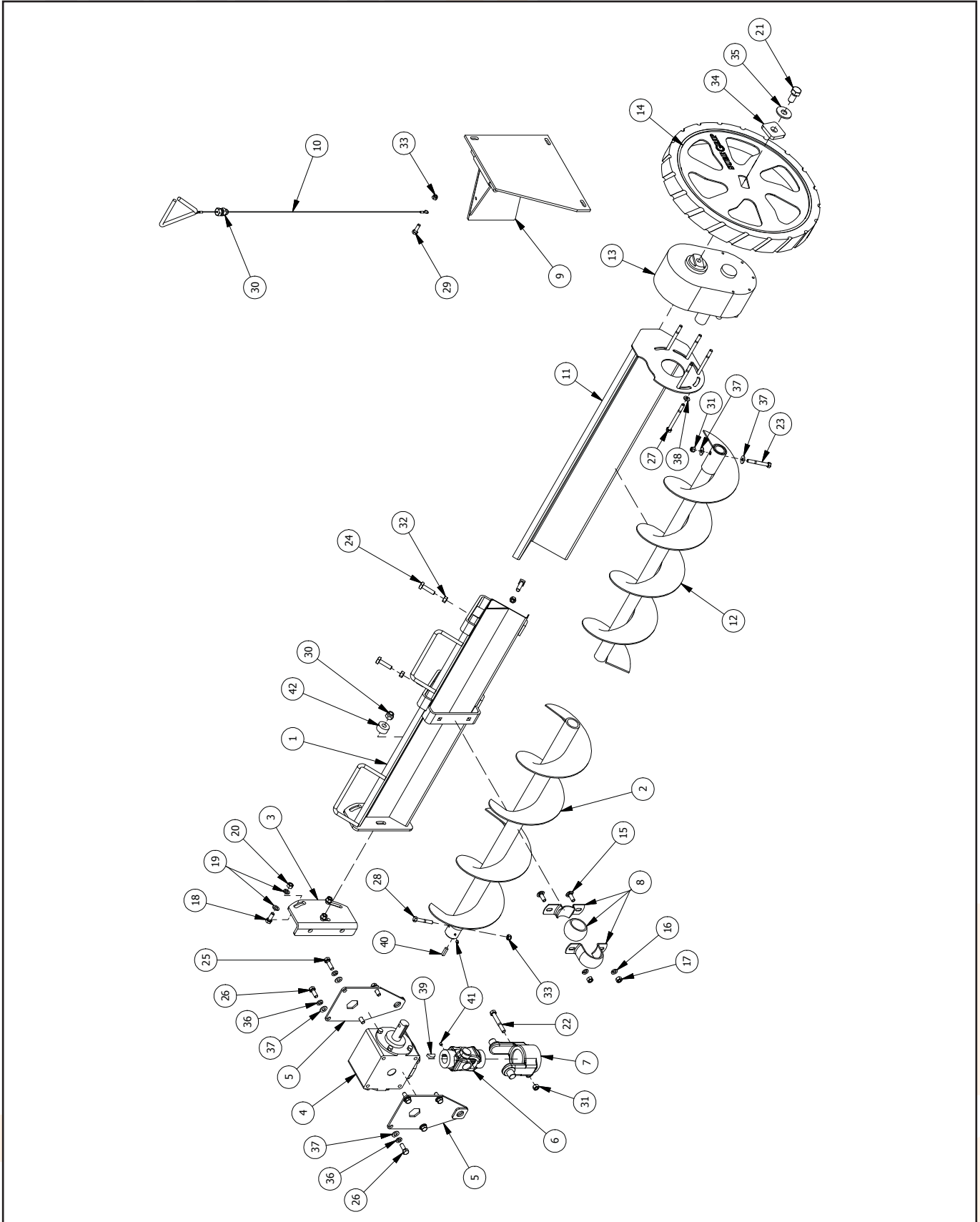


B:Brock C:Chief W:Westeel

#s	DESCRIPTION	PART #	QTY
Roller			
32	Models: B54,B60,C55,C61,W54,W60	23078	60
	Models: B72,C74,W72	23078	72
33	Flighting Connector Shaft	14160	1
34	1/2 x 3" Bolt	10364	4
35	1/2 x 1 1/2" Bolt	10294	10
36	3/8 x 1 1/4" Bolt	10311	4
37	3/8 x 1" Bolt	10277	2
38	5/16 x 1" Bolt	10287	4
1/4 x 1" Self-Tapping Screw			
	Models: B54,C55,W54	10299	36
39	Models: B60,C61,W60	10299	40
	Models: B72,W72	10299	48
	Model: C74	10299	52
1/2" Nylon Locknut			
40	Models: B54,B60,C55,C61,W54,W60	10318	72
	Models: B72,C74,W72	10318	84
41	1/2" Hex Nut	10289	1
42	3/8" Nylon Locknut	10274	7
43	3/8" Fine Threaded Nut	10278	5
44	5/16" Nylon Locknut	10290	4
45	3/4" Flatwasher	10296	3
46	1/2" Flatwasher	10297	6
47	1/2" Lockwasher	14490	4
48	3/8" Flatwasher	10304	2
49	CY-6 Clevis	11360	5
50	3/8" Clevis Pin	c/w clevis	1
51	1/8" Cotterpin	10292	2
52	1/4 x 1" Square Key	10281	1
53	1/4" Setscrew	c/w dogg	1
55	1/4 x 3/4" Bolt	11340	2
56	1/4" Nylon Locknut	11341	2
57	LS Gearbox Filler Weldment	23161	1
58	Rubber Crank Seal	22480	2
59	5/16" Wingnut	15777	4
60	Anchor Tab	24021	2
61	3/8 x 2 3/4" Anchor Bolt	24229	4

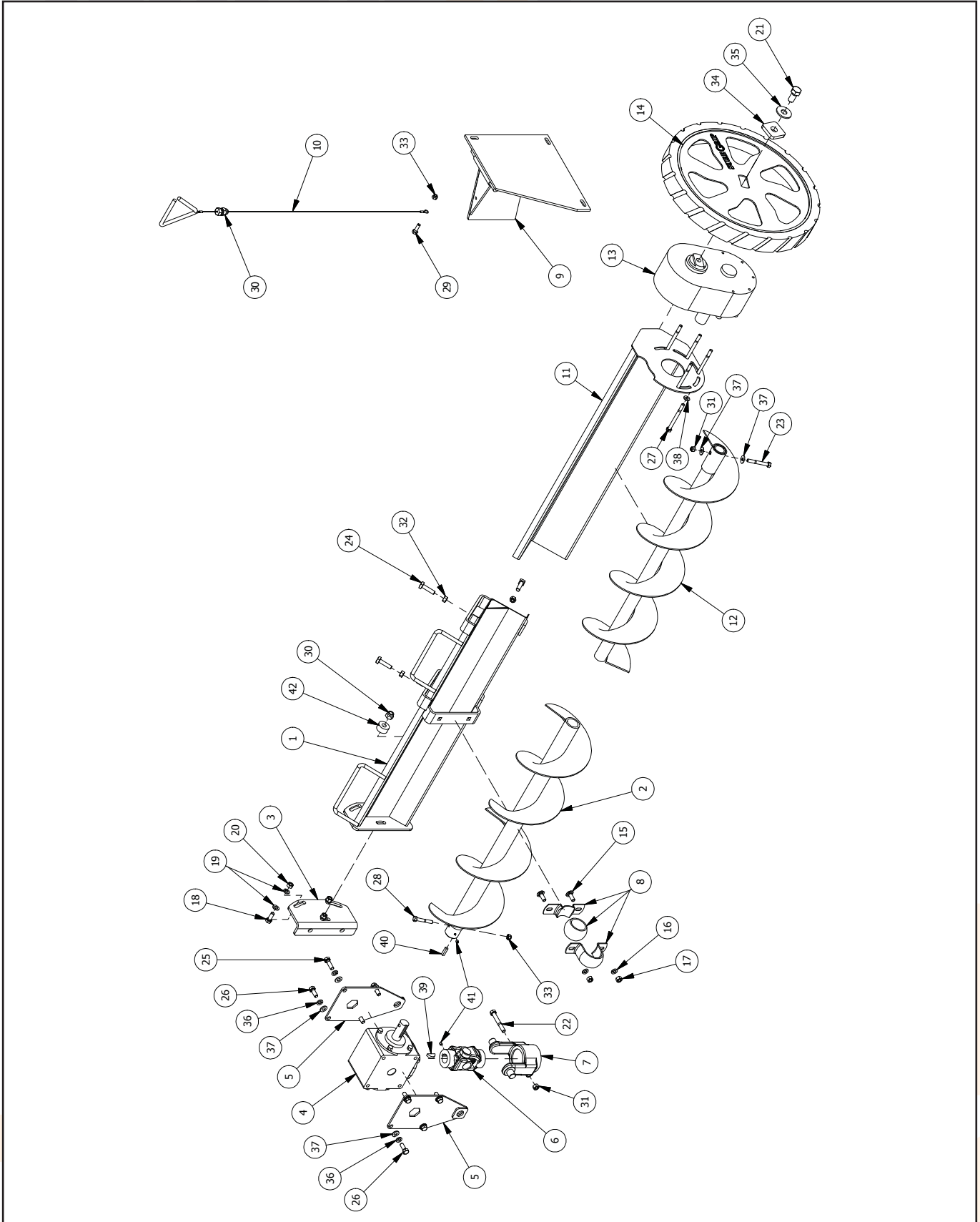


#s	DESCRIPTION	7 1/4" PART #	9" PART #	QTY
Main Sweep Backboard Assembly				
	Model: 14/15	10657	11847	1
	Model: 18/19	10658	11848	1
	Model: 20/22	10659	11849	1
	Model: 24/26	10660	11850	1
	Model: 27/29	10661	11851	1
1	Model: 30/31	10662	11852	1
	Model: 32/34	10663	11853	1
	Model: 35/37	10664	11854	1
	Model: 38/40	10665	11855	1
	Model: 42/43	10666	11856	1
	Model: 44/46	10667	11857	1
	Model: 48/50	10668	11858	1
Sweep Flighting				
	Model: 14/15	10756	14442	1
	Model: 18/19	10757	14443	1
	Model: 20/22	10758	14444	1
	Model: 24/26	10759	14445	1
	Model: 27/29	10760	14446	1
2	Model: 30/31	10761	14447	1
	Model: 32/34	10762	14448	1
	Model: 35/37	10763	14449	1
	Model: 38/40	10764	14450	1
	Model: 42/43	10765	14451	1
	Model: 44/46	10766	14452	1
	Model: 48/50	10767	14453	1
3	Sweep Gearbox Mount Plate	10669	11843	1
4	Gearbox	10654	10654	1
5	Gearbox Bracket	10651	15188	2
6	1" U-Joint	10703	21478	1
7	Gearbox Swivel Housing	13749	13749	1
Wood Bearing				
8	Models: 14/15-24/26	n/a	n/a	0
	Models: 27/29-38/40	10704	11876	1
	Models: 42/43-48/50	10704	11876	2
9	Sweep Stop	10640	10640	1
10	Sweep Stop Cable Assembly	10641	10641	1
11	SureGrip® Backboard	11467	11823	1
12	SureGrip® Flighting	11470	11875	1
13	SureGrip® Gearbox	11468	11468	1
14	SureGrip® Wheel	11469	11469	1
1/2 x 1 3/8" Carriage Bolt				
	Models: 14/15-24/26	-	n/a	0
	Models: 27/29-38/40	-	14196	2
	Models: 42/43-48/50	-	14196	4
15	3/8 x 1 1/4" Carriage Bolt			
	Models: 14/15-24/26	n/a	-	0
	Models: 27/29-38/40	11358	-	2
	Models: 42/43-48/50	11358	-	4





#s	DESCRIPTION	7 1/4" PART #	9" PART #	QTY
	1/2" Flatwasher			
	Models: 14/15-24/26	-	n/a	0
	Models: 27/29-38/40	-	10297	2
	Models: 42/43-48/50	-	10297	4
16	3/8" Flatwasher			
	Models: 14/15-24/26	n/a	-	0
	Models: 27/29-38/40	10304	-	2
	Models: 42/43-48/50	10304	-	4
	1/2" Nylon Locknut			
	Models: 14/15-24/26	-	n/a	0
	Models: 27/29-38/40	-	10324	2
	Models: 42/43-48/50	-	10324	4
17	3/8" Nylon Locknut			
	Models: 14/15-24/26	n/a	-	0
	Models: 27/29-38/40	10274	-	2
	Models: 42/43-48/50	10274	-	4
18	1/2 x 1 1/2" Bolt	-	10294	3
	3/8 x 1 1/4" Bolt	10311	-	3
19	1/2" Flatwasher	-	10297	6
	3/8" Flatwasher	10304	-	6
20	1/2" Nylon Locknut	-	10324	3
	3/8" Nylon Locknut	10274	-	3
21	5/8 x 1 1/2" Bolt	10355	10355	1
22	3/8 x 3 1/2" Bolt	10280	10280	1
	3/8 x 2" Bolt	10305	-	1
23	3/8 x 2 1/2" Bolt	-	10308	1
24	3/8 x 1 1/2" Setscrew	10343	10343	4
25	3/8 x 1 1/4" Bolt	10311	10311	2
26	3/8 x 1" Bolt	10277	10277	6
27	5/16 x 3 3/4" Bolt	c/w gearbox	c/w gearbox	5
28	5/16 x 2" Bolt	10282	10282	1
29	5/16 X 1" Bolt	10287	10287	1
	1/2" Nylon Locknut			
30	Models: 14/15-38/40	10324	10324	1
	Models: 42/43-48/50	10324	10324	2
31	3/8" Nylon Locknut	10274	10274	2
32	3/8" Hex Nut	10301	10301	4
33	5/16" Nylon Locknut	10290	10290	2
34	3/4" Square Washer	13078	13078	1
35	5/8" Lockwasher	15027	15027	1
36	3/8" Lockwasher	10276	10276	8
37	3/8" Flatwasher SM OD	10275	10275	10
38	5/16" Lockwasher	c/w gearbox	c/w gearbox	5
39	Woodruff Key	10279	10279	1
40	1/4 x 1" Key	10281	10281	1
41	Setscrew	10307	10307	2
	Roller			
42	Models: 14/15-38/40	n/a	n/a	0
	Models: 42/43-48/50	10377	10377	1

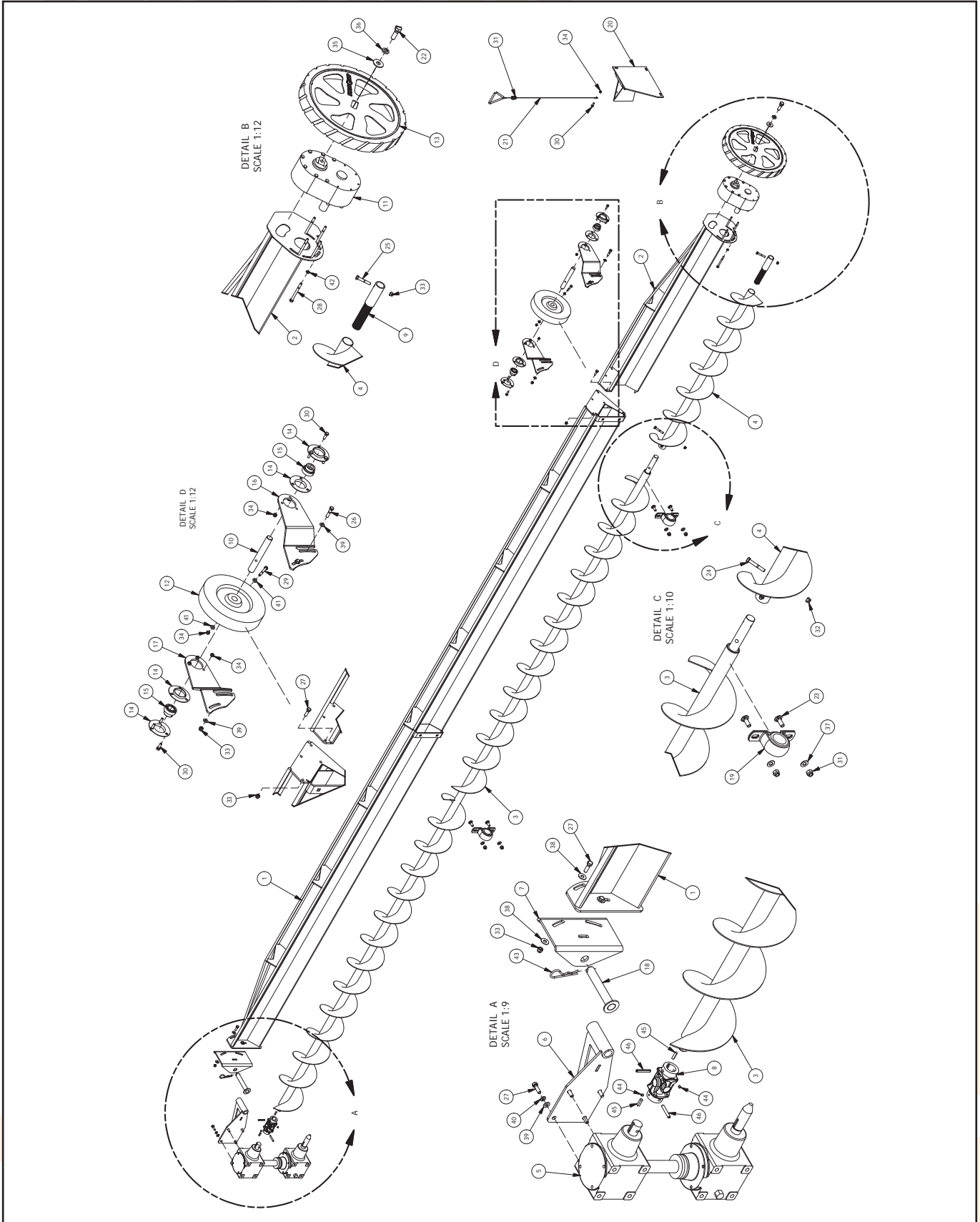


B:Brock C:Chief W:Westeel

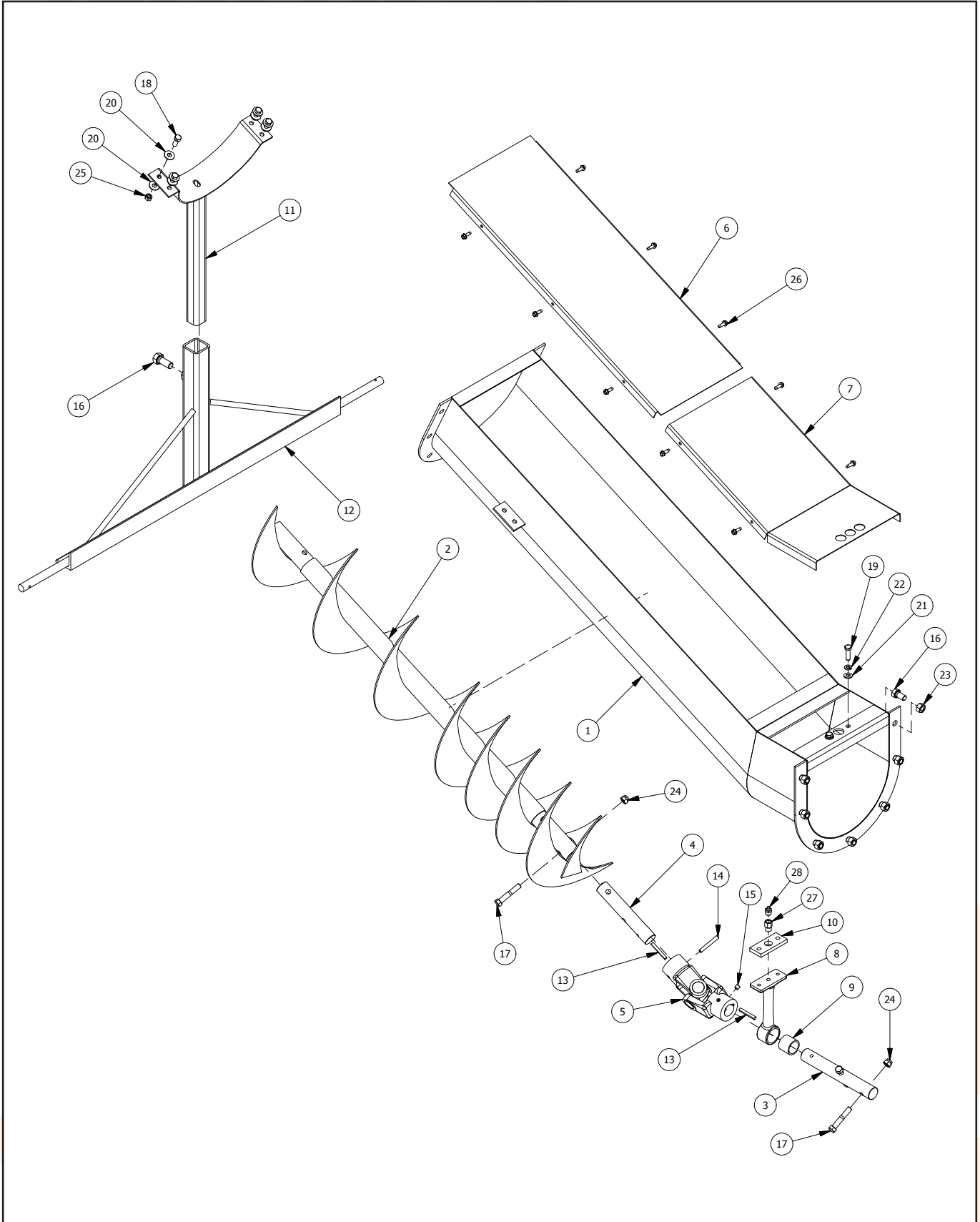
B:Brock C:Chief W:Westeel

#s	DESCRIPTION	PART #	QTY
1	Standard Sweep Backboard	14171	1
	Sweep Extension		
	Model: B54	36577	1
	Model: B60	36578	1
	Model: B72	36579	1
2	Model: C55	36581	1
	Model: C61	36582	1
	Model: C74	36583	1
	Model: W54	36584	1
	Model: W60	36585	1
	Model: W72	36586	1
3	Standard Sweep Flighting	14109	1
	Sweep Extension Flighting		
	Model: B54	36627	1
	Model: B60	36628	1
	Model: B72	36629	1
4	Model: C55	36631	1
	Model: C61	36632	1
	Model: C74	36633	1
	Model: W54	36634	1
	Model: W60	36635	1
	Model: W72	36636	1
5	Gearbox	23402	1
6	Gearbox Pivot Mount	14091	1
7	Swivel Plate	14097	1
8	U-Joint	14192	1
9	Splined Connector Shaft	18834	1
10	Rear Wheel Shaft	31598	1
11	SureGrip® Gearbox	11468	1
12	11" Wheel	11845	1
13	SureGrip® Wheel	11469	1
14	1" Bearing Flangette	11338	4
15	1" Bearing	11339	2
16	Left Wheel Bracket	31596	1
17	Right Wheel Bracket	31597	1
18	Pivot Pin	15788	1
	Wood Bearing		
19	Models: B54,B60,C55,C61,W54,W60	11876	2
	Models: B72,C74,W72	11876	3
20	Sweep Stop	11409	1

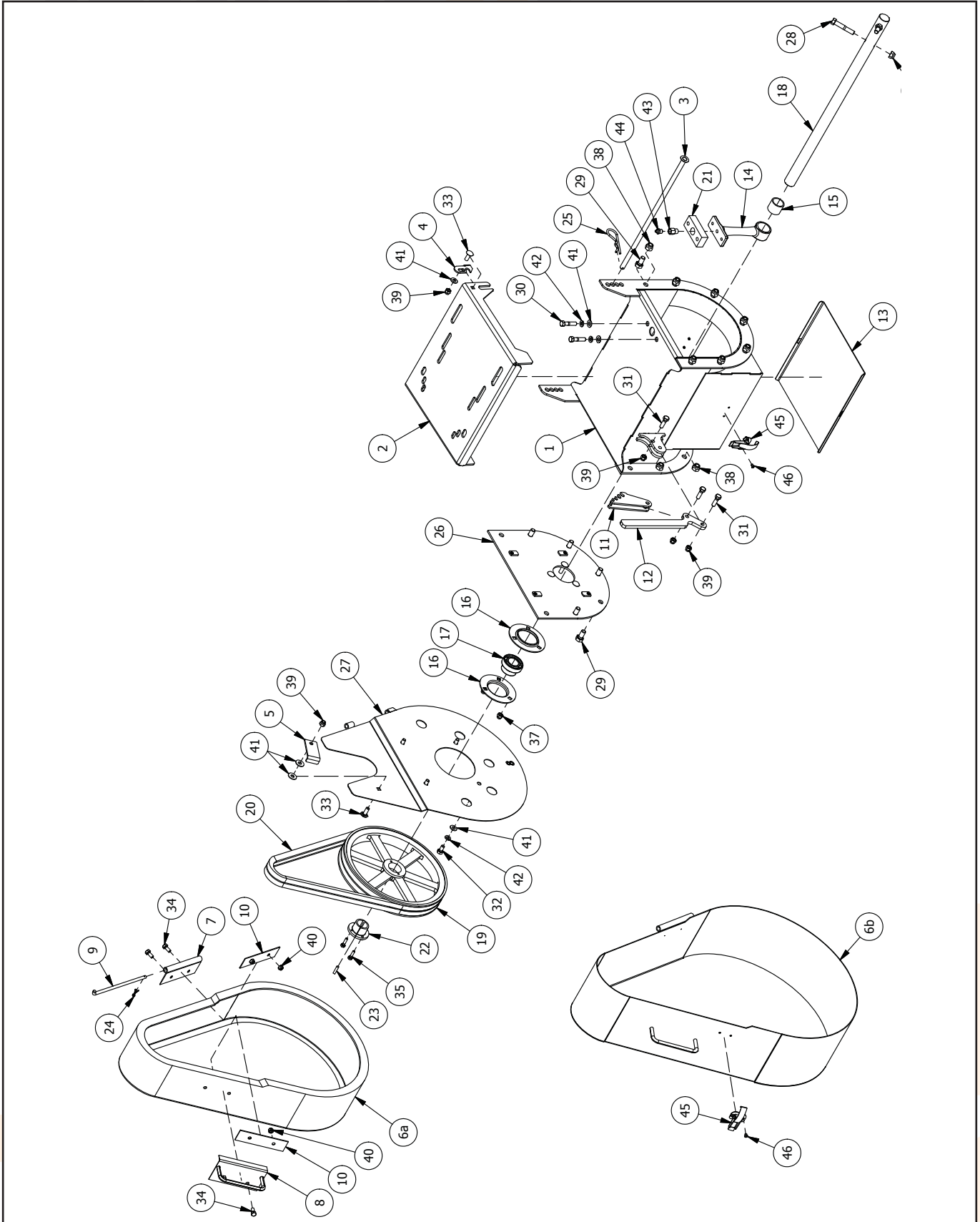
#s	DESCRIPTION	PART #	QTY
21	Sweep Stop Cable Assembly	10641	1
22	5/8 x 1 1/2" Bolt	10355	1
	1/2 x 1 3/8" Carriage Bolt		
23	Models: B54,B60,C55,C61,W54,W60	14196	4
	Models: B72,C74,W72	14196	6
24	7/16 x 2 1/2" Bolt	15778	2
25	3/8 x 2 1/2" Bolt	10308	1
26	3/8 x 1 3/4" Bolt	15780	2
27	3/8 x 1 1/4" Bolt	10311	10
28	5/16 x 3 3/4" Bolt	c/w gearbox	5
29	5/16 x 2 1/2" Bolt	10306	1
30	5/16 x 1" Bolt	10287	7
	1/2" Nylon Locknut		
31	Models: B54,B60,C55,C61,W54,W60	10318	5
	Models: B72,C74,W72	10318	7
32	7/16" Nylon Locknut	15779	2
33	3/8" Nylon Locknut	10274	9
34	5/16" Nylon Locknut	10290	8
35	5/8" Flatwasher	10314	1
36	5/8" Lockwasher	15027	1
	1/2" Flatwasher		
37	Models: B54,B60,C55,C61,W54,W60	10324	4
	Models: B72,C74,W72	10324	6
38	3/8" Flatwasher LG OD	10304	6
39	3/8" Flatwasher SM OD	10274	8
40	3/8" Lockwasher	10276	4
41	5/16" Flatwasher	10285	2
42	5/16" Lockwasher	c/w gearbox	5
43	3/16" x 1" Hairpin	15790	1
44	3/8" Setscrew	23716	2
45	1/4 x 1" Square Key	10281	3
46	5/16 x 2" Spring Pin	14199	2



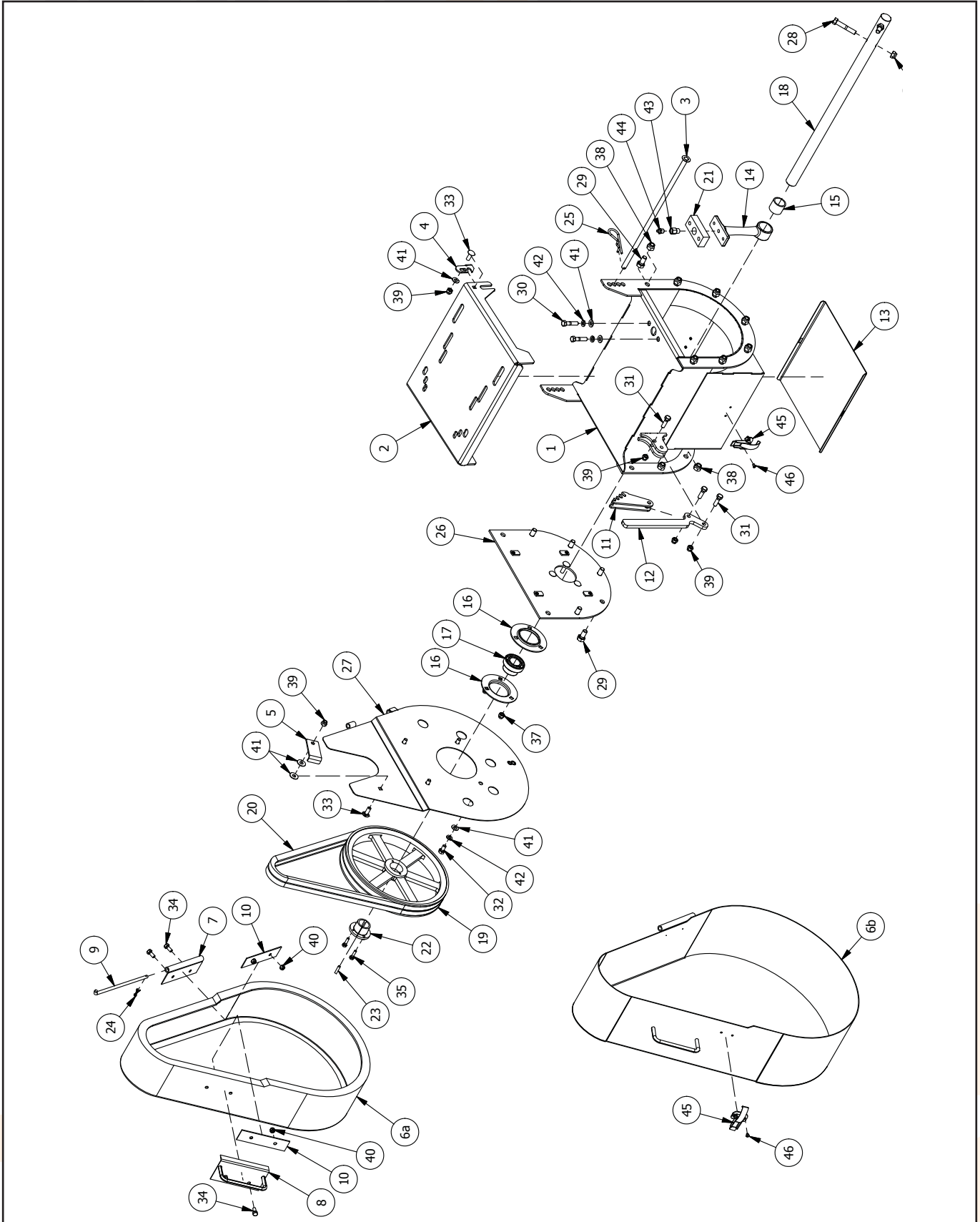
#s	DESCRIPTION	8" PART #	10" PART #	QTY
1	Main Incline Housing	10584	10584	1
2	Incline Main Flighting	10755	10754	1
3	Driveshaft Stub	10175	10174	1
4	Driveshaft Stub Top	10176	10176	1
5	1 1/4" U-Joint	10500	10500	1
6	Incline Main Lid	10902	10902	1
7	Incline Short Lid	10903	10903	1
8	Hanger Bearing Bracket	12739	12742	1
9	Hanger Bearing Bushing	10126	10126	1
10	Hanger Bearing Spacer Plate	15781	n/a	1
11	Incline Cradle	10587	10587	1
12	Incline Stand	10589	10589	1
13	1/4 x 1" Key	10281	10281	2
14	5/16 x 2 1/4" Spring Pin	10342	10342	2
15	3/8" Setscrew	c/w u-joint	c/w u-joint	2
16	1/2 x 1 1/2" Bolt	10294	10294	8
17	7/16 x 2 1/2" Bolt	15778	15778	4
18	3/8 x 2 1/2" Bolt	10308	10308	4
19	3/8 x 3/4" Bolt	10369	10369	2
20	3/8" Flatwasher LG OD	10304	10304	8
21	3/8" Flatwasher SM OD	10275	10275	2
22	3/8" Lockwasher	10276	10276	2
23	1/2" Nylon Locknut	10318	10318	7
24	7/16" Nylon Locknut	15779	15779	4
25	3/8" Nylon Locknut	10274	10274	4
26	Self-Tapping Screw	10299	10299	10
27	Grease Zerk Extension	23079	n/a	1
28	Grease Zerk	23108	23108	1



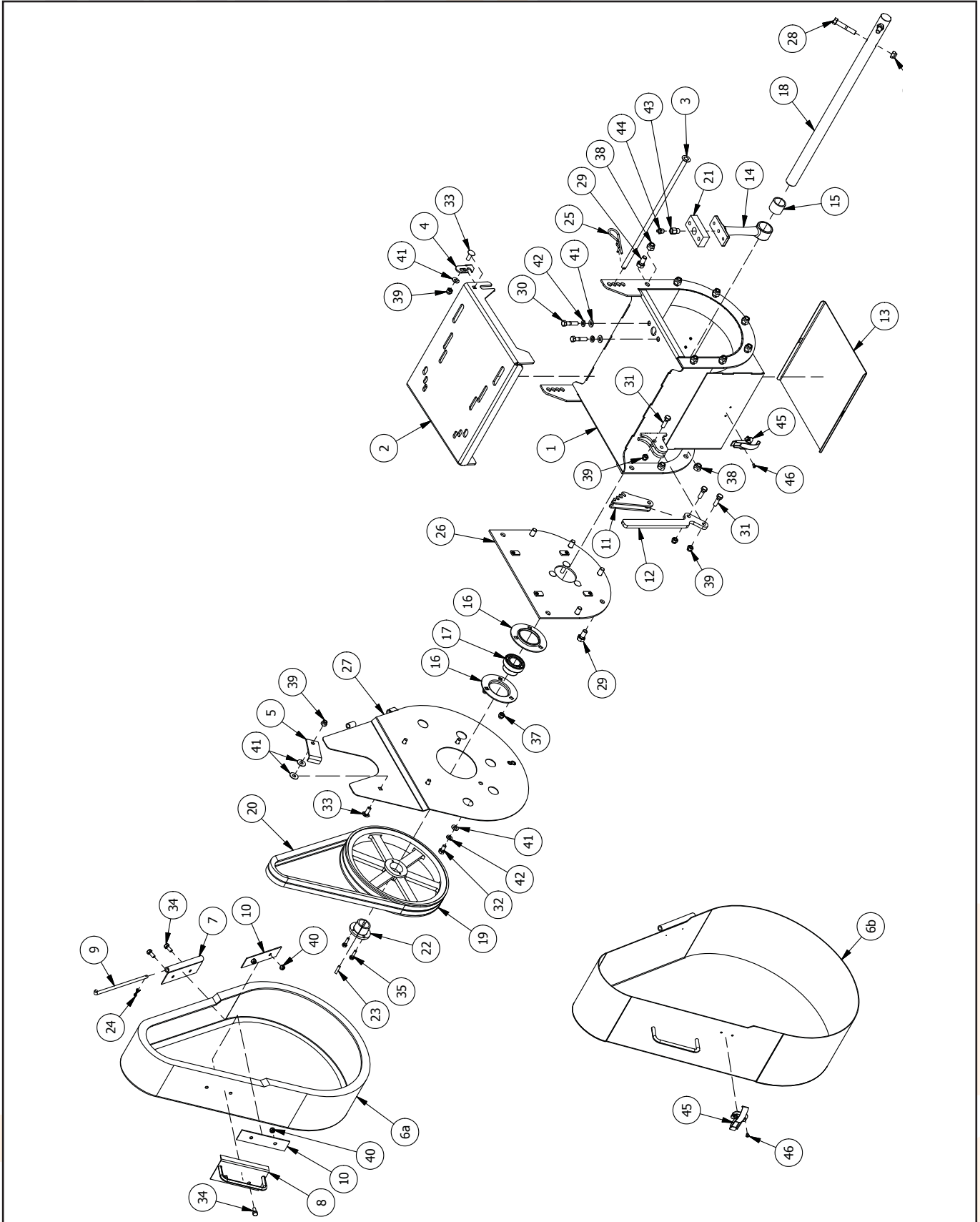
#s	DESCRIPTION	8" PART #		11" PART #			11" HD PART #		
		7" Sweep	QTY	7" Sweep	9" Sweep	QTY	7" Sweep	9" Sweep	QTY
1	Main Head Weldment	40471	1	40471	40471	1	40471	40471	1
2	Motor Mount Plate	40501	1	40501	40501	1	40501	40501	1
3	Motor Mount Hinge Rod	40505	1	40505	40505	1	40505	40505	1
4	Motor Mount Safety Clip	10992	1	10992	10992	1	10992	10992	1
Belt Guard Clip									
5	Models: 14/15-48/50	10131	1	10131	10131	1	10131	10131	1
	Models: 54-74	n/a		n/a	n/a		n/a	-	
	Incline Models: 14/15-48/50	-		-	-		n/a	n/a	
Plastic Belt Guard									
6a	Models: 14/15-48/50	10106	1	10106	10106	1	10106	10106	1
	Models: 54-74	n/a		n/a	n/a		n/a	-	
	Incline Models: 14/15-48/50	-		-	-		n/a	n/a	
Metal Belt Guard									
6b	Models: 14/15-48/50	-		-	-		-	-	
	Models: 54-74	n/a		n/a	n/a		n/a	40497	1
	Incline Models: 14/15-48/50	40497	1	40497	40497	1	n/a	n/a	
Belt Guard Hinge									
7	Models: 14/15-48/50	10983	1	10983	10983	1	10983	10983	1
	Models: 54-74	n/a		n/a	n/a		n/a	-	
	Incline Models: 14/15-48/50	-		-	-		n/a	n/a	
Belt Guard Handle									
8	Models: 14/15-48/50	10982	1	10982	10982	1	10982	10982	1
	Models: 54-74	n/a		n/a	n/a		n/a	-	
	Incline Models: 14/15-48/50	-		-	-		n/a	n/a	
9	Belt Guard Hinge Rod	11292	1	11292	11292	1	11292	11292	1
Backing Plate									
10	Models: 14/15-48/50	10984	2	10984	10984	2	10984	10984	2
	Models: 54-74	n/a		n/a	n/a		n/a	-	
	Incline Models: 14/15-48/50	-		-	-		n/a	n/a	
11	Motor Mount Ratchet Adjustment Bracket	10990	1	10990	10990	1	10990	10990	1
12	Ratchet Handle	10989	1	10989	10989	1	10989	10989	1
13	Main Head Lid	10130	1	10130	10130	1	10130	10130	1
14	Hanger Bearing	12739	1	12739	12739	1	12741	12741	1
15	Hanger Bearing Bushing	23899	1	23899	23899	1	10161	10161	1
16	1 1/4" Bearing Flangette	10966	2	10966	10966	2	-	-	
	1 1/2" Bearing Flangette	-		-	-		11069	11069	2
	1 1/4" Bearing	10965	1	10965	10965	1	-	-	
17	1 1/2" Bearing	-		-	-		11068	11068	1
	1 1/4" Driveshaft	40503	1	40503	40503	1	-	-	
18	1 1/2" Driveshaft	-		-	-		40504	40504	1



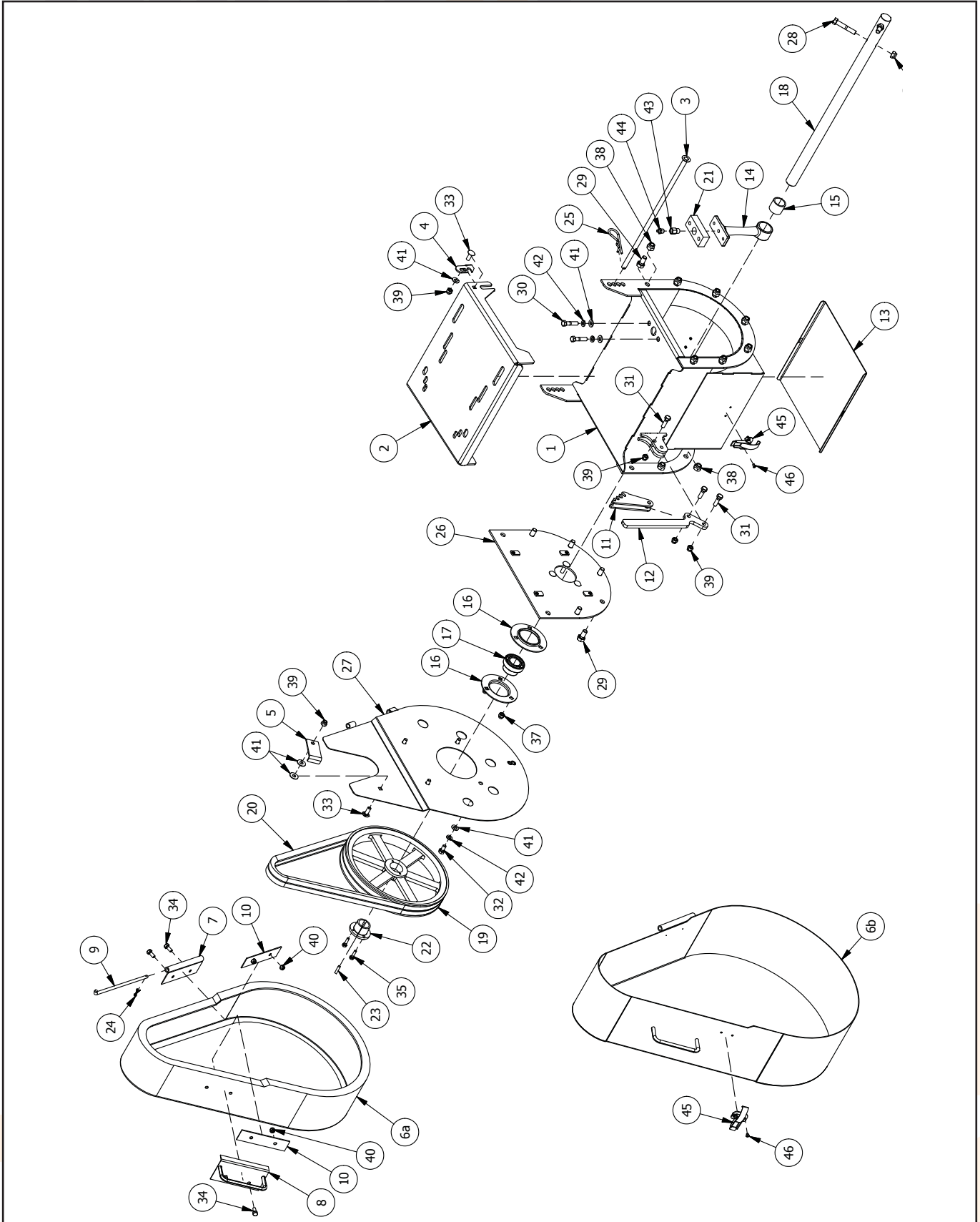
#s	DESCRIPTION	8" PART #		11" PART #		11" HD PART #			
		7" Sweep	QTY	7" Sweep	9" Sweep	QTY	7" Sweep	9" Sweep	QTY
	Pulley 13" - 2 Groove								
	Models: 14/15-24/26	-		-	10967	1	-	13797	1
	Models: 14/15-30/31	-		10967	-	1	13797	-	1
	Models: 14/15-38/40	10967	1	-	-		-	-	
	Pulley 13" - 3 Groove								
	Models: 27/29-35/37	-		-	10970	1	-	14187	1
	Models: 32/34-48/50	-		10970	-	1	14187	-	1
	Models: 42/43-48/50	10970	1	-	-		-	-	
	Pulley 13" - 4 Groove								
	Models: 38/40-48/50	-		-	13823	1	-	13823	1
19	Pulley 16" - 2 Groove								
	Incline Models: 14/15-24/26	-		-	11095	1	n/a	n/a	
	Incline Models: 14/15-30/31	-		11095	-	1	n/a	n/a	
	Incline Models: 14/15-35/37	11095	1	-	-		n/a	n/a	
	Pulley 16" - 3 Groove								
	Models: 54-55	n/a		n/a	n/a		n/a	11097	1
	Incline Models: 27/29-38/40	-		-	11097	1	n/a	n/a	
	Incline Models: 30/31-48/50	-		11097	-	1	n/a	n/a	
	Incline Models: 38/40-48/50	11097	1	-	-		n/a	n/a	
	Pulley 16" - 4 Groove								
	Models: 60-74	n/a		n/a	n/a		n/a	13826	1
	Incline Models: 42/43-48/50	-		-	13826	1	n/a	n/a	
	BX56 Belts								
	Models: 14/15-24/26	-		-	13849	2	-	13849	2
	Models: 14/15-30/31	-		13849	-	2	13849	-	2
	Models: 14/15-38/40	13849	2	-	-		-	-	
	BX58 Belts								
	Models: 27/29-35/37	-		-	13851	3	-	13851	3
	Models: 32/34-48/50	-		13851	-	3	13851	-	3
	Models: 38/40-48/50	-		-	13851	4	-	13851	4
	Models: 42/43-48/50	13851	3	-	-		-	-	
20	BX62 Belts								
	Models: 54-55	n/a		n/a	n/a		n/a	13855	3
	Models: 60-74	n/a		n/a	n/a		n/a	13855	4
	Incline Models: 14/15-24/26	-		-	13855	2	n/a	n/a	
	Incline Models: 14/15-30/31	-		13855	-	2	n/a	n/a	
	Incline Models: 14/15-35/37	13855	2	-	-		n/a	n/a	
	Incline Models: 27/29-38/40	-		-	13855	3	n/a	n/a	
	Incline Models: 30/31-48/50	-		13855	-	3	n/a	n/a	
	Incline Models: 38/40-48/50	13855	3	-	-		n/a	n/a	
	Incline Models: 42/43-48/50	-		-	13855	4	n/a	n/a	



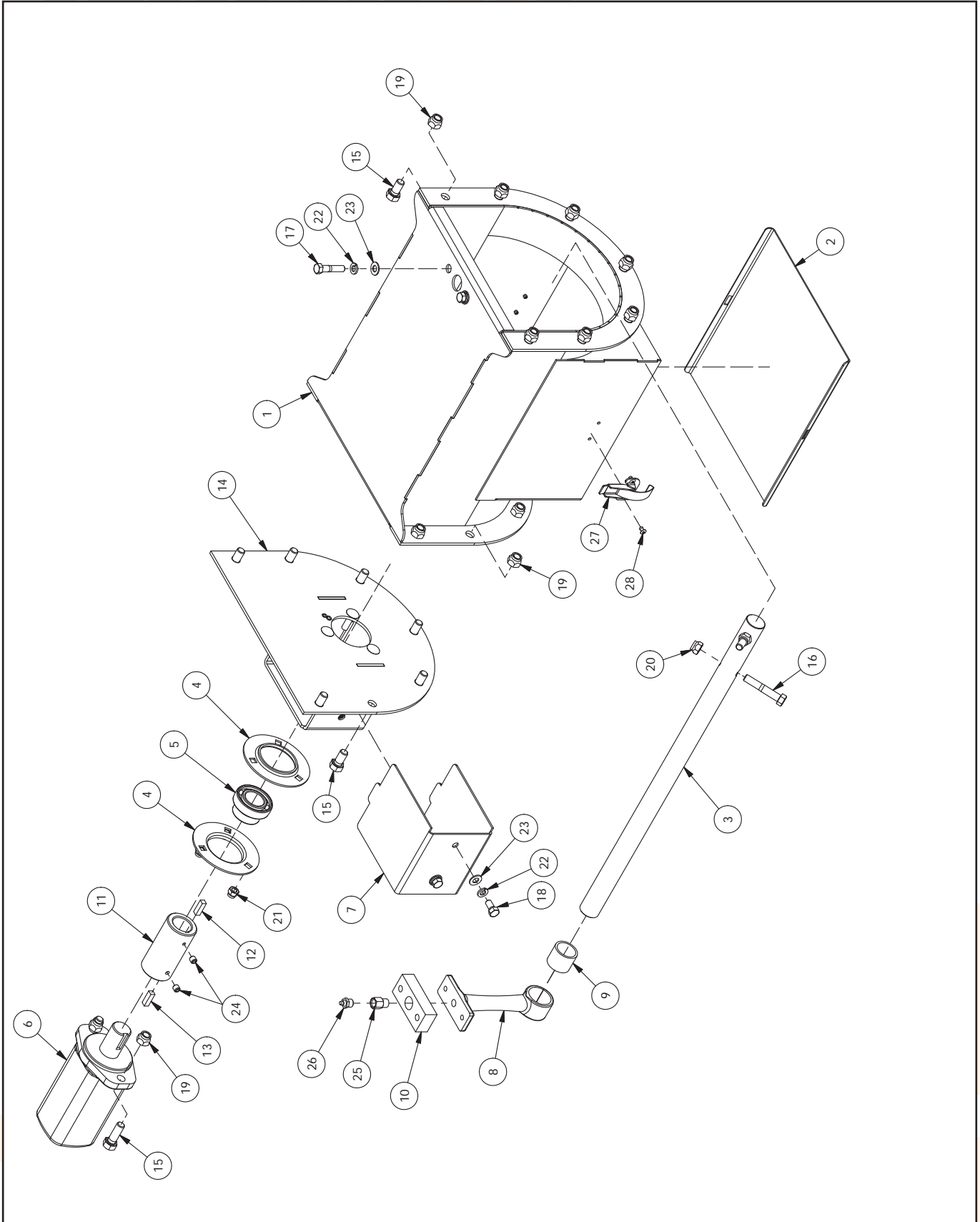
#s	DESCRIPTION	8" PART #		11" PART #			11" HD PART #		
		7" Sweep	QTY	7" Sweep	9" Sweep	QTY	7" Sweep	9" Sweep	QTY
21	Hanger Bearing Spacer Plate	15208	1	-	-		-	-	
	1 1/4" Hub								
	Models: 14/15-35/37	11290	1	11290	11290	1	-	-	
	Models: 38/40-48/50	11290	1	11290	20435	1	-	-	
	Incline Models: 14/15-38/40	20435	1	20435	20435	1	n/a	n/a	
22	Incline Models: 42/43-48/50	20435	1	20435	15046	1	n/a	n/a	
	1 1/2" Hub								
	Models: 14/15-48/50	-		-	-		11064	11064	1
	Models: 54-55	n/a		n/a	n/a		n/a	11064	1
	Models: 60-74	n/a		n/a	n/a		n/a	13836	1
	1/4 x 1" Key	10281	1	10281	10281	1	-	-	
23	3/8 x 1" Key	-		-	-		12125	12125	1
24	1/8" Cotterpin	10292	1	10292	10292	1	10292	10292	1
25	3/16" Hair Pin	15790	1	15790	15790	1	15790	15790	1
26	Bearing Plate Weldment	40490	1	40487	40487	1	40488	40488	1
	Shield Mount Plate Weldment								
	Models: 14/15-48/50	40480	1	40477	40477	1	40477	40477	1
27	Models: 54-74	n/a		n/a	n/a		n/a	40478	1
	Incline Models: 14/15-48/50	40478	1	40478	40478	1	n/a	n/a	
	1/2 x 3" Driveshaft Bolt	-		-	-		11429	11429	2
28	7/16 x 2 1/2" Driveshaft Bolt	15778	2	15778	15778	2	-	-	
	1/2 x 1 1/2" Bolt								
	Models: 14/15-48/50	10294	12	10294	10294	12	10294	10294	12
29	Models: 54-74	n/a		n/a	n/a		n/a	10294	14
	Incline Models: 14/15-48/50	10294	14	10294	10294	14	n/a	n/a	
	3/8 x 1 3/4" Bolt	15780	2	-	-		-	-	
30	3/8 x 1" Bolt	-		10277	10277	2	10277	10277	2
31	3/8 x 1 1/2" Bolt	10293	3	10293	10293	3	10293	10293	3
32	3/8 x 3/4" Bolt	10369	4	10369	10369	4	10369	10369	4
	3/8 x 1 1/4" Carriage Bolt								
	Models: 14/15-48/50	11358	2	11358	11358	2	11358	11358	2
33	Models: 54-74	n/a		n/a	n/a		n/a	11358	1
	Incline Models: 14/15-48/50	11358	1	11358	11358	1	n/a	n/a	
	5/16 x 3/4" Bolt								
	Models: 14/15-48/50	10344	4	10344	10344	4	10344	10344	4
34	Models: 54-74	n/a		n/a	n/a		n/a	-	
	Incline Models: 14/15-48/50	-		-	-		n/a	n/a	
35	Hub Bolt	c/w hub	2	c/w hub	c/w hub	2	c/w hub	c/w hub	2
	1/2" Nylon Locknut (Driveshaft)	-		-	-		10318	10318	2
36	7/16" Nylon Locknut (Driveshaft)	15779	2	15779	15779	2	-	-	
	1/2" Nylon Locknut (Bearing)	-		-	-		10318	10318	4
37	3/8" Nylon Locknut (Bearing)	10274	3	10274	10274	3	-	-	



#s	DESCRIPTION	8" PART #		11" PART #		11" HD PART #			
		7" Sweep	QTY	7" Sweep	9" Sweep	QTY	7" Sweep	9" Sweep	QTY
1/2" Nylon Locknut									
38	Models: 14/15-48/50	10318	12	10318	10318	12	10318	10318	12
	Models: 54-74	n/a		n/a	n/a		n/a	10318	14
	Incline Models: 14/15-48/50	10318	14	10318	10318	14	n/a	n/a	
3/8" Nylon Locknut									
39	Models: 14/15-48/50	10274	5	10274	10274	5	10274	10274	5
	Models: 54-74	n/a		n/a	n/a		n/a	10274	4
	Incline Models: 14/15-48/50	10274	4	10274	10274	4	n/a	n/a	
5/16" Nylon Locknut									
40	Models: 14/15-48/50	10290	4	10290	10290	4	10290	10290	4
	Models: 54-74	n/a		n/a	n/a		n/a	-	
	Incline Models: 14/15-48/50	-		-	-		n/a	n/a	
3/8" Flatwasher SM OD									
41	Models: 14/15-48/50	10275	9	10275	10275	9	10275	10275	9
	Models: 54-74	n/a		n/a	n/a		n/a	10275	7
	Incline Models: 14/15-48/50	10275	7	10275	10275	7	n/a	n/a	
42	3/8" Lockwasher	10276	6	10276	10276	6	10276	10276	6
43	Grease Zerk Extension	23079	1	-	-		-	-	
44	Grease Zerk	23108	1	23108	23108	1	23108	23108	1
Latch									
45	Models: 14/15-48/50	10129	2	10129	10129	2	10129	10129	2
	Models: 54-74	n/a		n/a	n/a		n/a	10129	3
	Incline Models: 14/15-48/50	10129	3	10129	10129	3	n/a	n/a	
Rivet									
46	Models: 14/15-48/50	10972	4	10972	10972	4	10972	10972	4
	Models: 54-74	n/a		n/a	n/a		n/a	10972	6
	Incline Models: 14/15-48/50	10972	6	10972	10972	6	n/a	n/a	



#s	DESCRIPTION	8" PART #	11" PART #	QTY
1	Main Head Housing	40472	40472	1
2	Main Head Lid	10130	10130	1
3	1 1/4" Driveshaft	10127	10127	1
4	1 1/4" Bearing Flangette	10966	10966	2
5	1 1/4" Bearing	10965	10965	1
Hydraulic Motor				
	Models: 14/15-38/40	11436	11436	1
6	Models: 42/43-48/50	11437	11437	1
	Incline Models: 14/15-38/40	11437	11437	1
	Incline Models: 42/43-48/50	11439	11439	1
7	Hydraulic Guard	12319	12319	1
8	Hanger Bearing	12739	12739	1
9	Hanger Bearing Bushing	23899	23899	1
Hanger Bearing Spacer Plate				
10	Models: 14/15-48/50	15208	-	1
	Incline Models: 14/15-48/50	-	-	
11	1 1/4" Coupler	11434	11434	1
12	1/4 x 1" Key	10281	10281	1
13	5/16 x 1" Key	14478	14478	1
Bearing Mount Plate				
14	Models: 14/15-48/50	40491	40489	1
	Incline Models: 14/15-48/50	40489	40489	1
15	1/2 x 1 1/2" Bolt	10294	10294	16
16	7/16 x 2 1/2" Bolt	15778	15778	2
3/8 x 1 3/4" Bolt				
	Models: 14/15-48/50	15780	-	2
17	3/8 x 1" Bolt			
	Models: 14/15-48/50	-	10277	2
	Incline Models: 14/15-48/50	10277	10277	2
18	3/8 x 3/4" Bolt	10369	10369	2
19	1/2" Nylon Locknut	10318	10318	16
20	7/16" Nylon Locknut	15779	15779	2
21	3/8" Nylon Locknut	10274	10274	3
22	3/8" Lockwasher	10276	10276	4
23	3/8" Flatwasher SM OD	10275	10275	4
24	1/4" Setscrew	c/w coupler	c/w coupler	2
Grease Zerk Extension				
25	Models: 14/15-48/50	23079	-	1
	Incline Models: 14/15-48/50	-	-	
26	Grease Zerk	23108	23108	1
27	Powerhead Lid Latch	10129	10129	2
28	Rivet	10972	10972	4





PO Box 119 RR1 • Morris, Manitoba R0G 1K0 • Canada

Toll Free: (855) 746-8200 • Phone: (204) 746-8200

Fax: (204) 746-8074

e-mail: info@norstarindustries.ca

<http://www.norstarindustries.ca>